Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section I: Evaluation

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2016-2017 YEAR END REPORT

Table of Contents

Section I: Evaluation

Tables

Figures

Appendices

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

SECTION I: EVALUATION REPORT, July 31, 2017

The Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (Rural LDC Project) is a project funded by the Ohio Department of Education, Straight A Fund. The project is designed for implementation in five rural districts that comprise the Rural Collaborative consortia schools, including Northwestern Local Schools, Mapleton Local Schools, Hillsdale Local School District, Loudonville-Perrysville Exempted Village Schools, and Black River Local Schools. The project duration involves the grant year (2016-17), and five sustaining years (2017-18 through 2021-22). The project is being implemented during the grant year by the Northwestern Local Schools in partnership with Battelle Education (BEd) and High Schools that Work (HSTW).

The PAST Foundation Knowledge Capture Program (KC) is evaluating project implementation and project outcomes. This report presents evaluation conducted during the grant year (2016-17) and includes individual implementation activity reports by the lead project organizations and are presented in Sections II to IV to this evaluation report, including Northwestern Local Schools (*Section II*), Battelle Education (*Section III*), and High Schools that Work (*Section IV*).

Mid-Year Report (August – December 2016)

The Mid-Year report submitted March 8, 2017 provided an overview of project implementation conducted during fall 2016 (August – December 2016) of the grant year of the project. Supporting documentation for this time period was also submitted as part of the supporting documentation for the report presented in the Appendix of the Mid-Year Report. For reference, the *Mid-Year Report Appendix Cover Page* is presented in this report (see *Appendix A: Mid-Year Appendix Cover Page*). Those documents are considered to comprise Part A of the grant year report; however, the files are not resubmitted with this document and are incorporated by reference and list presented in *Appendix A*.

This document will focus on implementation activities conducted during January 2016 through July 2017. These activities include continuing PD and support for Cohort 1 (C1) teachers (n=15) and Cohort 2 (C2) teachers (n=10). Primary activities achieved during this time period involved nine main components of implementation:

- Monthly Implementation Team Review with District Liaisons
- Mid-project District Leadership Planning Session
- Cohort 1 Teacher Professional Development
- Cohort 1 Post-Project Implementation Teacher Survey
- Cohort 1 Classroom coaching and observation
- Cohort 1 Submittal and review of LDC Module 2
- Cohort 1 Submittal and review of Module 2 sample student projects
- Cohort 2 Teacher Professional Development, phase 1
- Cohort 2 Teacher Pre-Implementation Survey, phase 1

Project formative evaluation activities are presented in *Appendix B: PAST Foundation Project Evaluation Schedule 2016-17. Table B1: Rural LDC Project Year 1 Evaluation Schedule* shows evaluation activities in coordination with the major implementation tasks scheduled and conducted by the Project Partners. This includes revisions for the Spring 2017 schedule developed by the Implementation Team to meet project goals and to better accommodate individual district needs and preferences to initiate training for C2 teachers, as well as to extend the original schedule for C1 deadlines to provide more time for completing Module 2.

Evaluation activities were conducted onsite, or virtually via Zoom®, an interactive web-based platform that supports real-time, virtual participation. *Appendix C - Table C1: Rural LDC Chronology of PAST Foundation Project Evaluation Activities, 2016-17*, provides a more detailed description of work led by the KC Evaluation Team in collaboration with the Project Partners including Northwestern Local Schools Project Manager, BEd, and HSTW. This aspect of formative evaluation involves a process for integrating data collection, review, and feedback to inform implementation strategies established during fall 2016, and continued in the same manner during spring 2017 to accommodate revisions to the timeline made by the Implementation Team. In addition to quarterly evaluation meetings, the *KC Chronology* provides details on additional evaluation meetings organized and conducted as needed in support of key activities that occurred during phases of implementation. In this approach the KC Evaluation Team continued to provide real-time data to inform project implementation strategies developed by the Implementation Team and is presented in *Table 1*.

Table 1: LDC Rural Collaborative
Knowledge Capture Summary of Formative Evaluation Activities (August 2016 – July 2017)

Evaluation Task	Process Conducted by Evaluation Team	Evaluation Product
Observation of LDC Rural Collaborative Implementation Activities	Structured observation of: 1) monthly Implementation Team meetings (**n=11**) to reflect the process of stakeholders, including communication and input from the District Liaisons related to diverse district priorities during phases of project activities; 2) LDC professional development sessions for C1 and C2 teachers (**9/29-30, 10/14, 12/9, 3/24, 5/10, 5/17**); and, 3) Informational meetings and updates for district administrators and staff related to project planning and coordination to support district priorities (**9/7, 12/9,1/30**).	Bullet point reports providing summary of observation data to provide systematic review of Implementation Team structure and process, and to support C1 and C2 Teacher Professional Development
One-on-One Interviews	Conducted key informant interviews (n=8) during fall 2016 with the BEd LDC Coaching Team and the HSTW Coaches to inform formative evaluation of coaching priorities, goals for training, ongoing classroom support, and overall implementation strategies; additional analysis of interview data also informed pre/post teacher survey design.	Narrative analysis of training goals and expectations of LDC Coaches; identify diverse perspectives and experiences that contribute to building targeted coaching support for Cohort 1 aligned to project goals.
Teacher Surveys	Grant Year: Design and conduct pre/post online surveys for (15) Cohort 1 teachers in 5 consortia schools. Survey data included classroom instructional practices including teacher perceptions of program impacts related to science and literacy LDC instructional strategies, and views on a range of practices to achieve student engagement in science learning. Following review and input, the C2 pre-implementation survey was revised and administered in phase 1 of C2 PD and conducted on 5/17/17.	Qualitative and quantitative survey analysis presented in a concise report for review by the Evaluation Team; review and input was also conducted with the implementation Team .
Data Collection of Project Materials	The KC Team created a Google shared drive for Project Partners to archive supporting materials provided to C1 Teachers, and support access to information provided in PowerPoint decks, handouts, and other materials created for C1 and C2 teachers and district staff.	Systematic data collection of supporting documentation for project planning and review; archiving materials for project grant reports.
Formative Evaluation Meetings	Quarterly meetings to coordinate modification of project partner implementation schedules; review logistics of evaluation team involvement in project implementation activities; review interim stages of analysis with Project Partners based on preliminary summary of qualitative and quantitative data to inform implementation strategies; quarterly review of formative data collection and activities; conduct additional Evaluation Team meetings as needed to support key implementation activities.	KC Team conducted **(20) 1-2 hr.** quarterly, PD debrief, and ad hoc meetings coordinated to support implementation planning; summary meeting notes provided to the Project Partners.

The Evaluation Team held (20) meetings including (4) quarterly Evaluation Team meetings (10/28/16, 1/23/17, 3/15/17, and 5/22/17), as well as work-in-progress meetings including survey review, PD planning and review, and team debrief sessions following Implementation Team meetings and professional development sessions. Quarterly Evaluation Team Meeting agendas are presented in *Appendix D*.

The following sections focus on activities conducted by the Project Partners to support C1 Teacher LDC module design, completion, and review of the LDC Science and Literacy Module 2, as well as review of examples of student projects completed during spring 2017. (Please refer to the Mid-Year Report for details on Module 1 implementation activities completed during fall 2016.)

Summary of Project Implementation Activities, January to July 2017

The project LDC Implementation Team (LDC-IT) members participated in monthly review of project activities. The monthly meetings were intended to support District Liaisons to provide important and timely feedback from each district to Project Partners, coordinate particular actions across districts, and assess any additional support needed by Project Partners to better meet the needs of individual district participants. This process has been guided by the Communication Plan (submitted 10/31/16) providing a planned schedule for date and location of regular monthly meetings for District Liaisons to meet with the Project Partners and for the group referred to as the LDC Implementation Team (LDC-IT). The main modification to the Implementation Team process was to reschedule monthly LDC-IT meetings to occur immediately after the end of the school day requested by District Liaisons to reduce time away from classroom and instruction.

The District Liaison participants remained the same during spring 2017 allowing for continuity between fall 2016 and spring 2017 support for C1 teachers in working with the five districts. A list of the LDC-Implementation Team members is presented in *Section II*. Additionally, the LDC Project Manager held individual one-on-one meetings with district leaders during fall 2016. The Project Manager also coordinated a Planning Session for District level staff on January 30.

District administrators participated in a project launch on September 7, 2016. This afternoon event was designed to introduce project goals and objectives to district staff, Board of Education members, and C1 Teachers. The LDC-IT team also planned two additional meetings to provide opportunities for the project team to engage district leadership of each of the five districts. District leaders were invited to an early morning session held on 12/9/16 to coincide with the final PD session for Module 1 review, allowing district leaders to view samples of student LDC project work, and poster presentations provided by HSTW (see *Mid-Year Report 3/6/17).* The LDC Project Posters were designed to show work-in-progress based on photos of classroom work and other documentation produced by HSTW during fall 2016 using information gathered during on-site visits. Project Partners were invited to provide LDC project information for the December 9 event to share information with district leaders and invited press to support outreach to community members. These materials and local newspaper accounts of the event were also submitted with the *Mid-Year Report.*

A second session for district leadership was developed during the fall implementation planning process, and was conducted January 30, 2017 to foster discussion and gain district input on planning for spring 2017 implementation activities, and review of the plan for C2 training. In particular, certain districts reported that plans to modify the Implementation Plan for C2 teacher-training dates were already in discussion as of November 2016, reflecting different district priorities and needs for coordinating activities of LDC district trainers for 2017-18. The revisions made for C2 launch of training in May 2017 (revised from August 2017) recognized distinctions across districts in best timing for Cohort 2 PD to begin, and also to consider preferences for C2 teachers to begin training prior to summer, giving teachers the option to potentially integrate LDC in their planning and preparation for the fall 2017 school term.

A third project event, "*End of Year Reconnect*," was held for district leadership and the broader community on May 3, 2017. Conducted by HSTW, six teachers from three districts presented their science modules to the community (see *Section IV*).

Professional development activities conducted during spring 2017 is reported in detail in the Battelle Education Project Report (see *Section III*). The High Schools that Work year-end report is also presented with supporting documents in *Section IV.*

Evaluation of Implementation Year Outcomes (2016-17)

The data collection research design is presented in *Table 2: Rural LDC Evaluation Research Plan*. This section of the report provides data analysis in response to research questions presented in *Table 2* including four research questions focused on teacher LDC skill development (EP-1 to EP-4), and one question on student performance (EP-5).

TABLE 2: Rural LDC Evaluation Research Plan (revised 4/28/17)

Research Question	Data Collection	Methodology/Instruments
EP-1: Does LDC PD support improvements in teachers' ability to assess student work (LDC rubric) to provide feedback and differentiate instruction to improve student learning?	Teacher rubric to assess quality of instructional design; reflection of instruction, modification and evidence of changes in instruction; use of LDC student rubric	Observation of PD workshops; LDC coach rubric assessment of LDC modules; HSTW onsite coaching reports to capture reflection and modification
EP-2: Does LDC PD support increased collaboration among Rural Collaborative teachers (within districts and between districts) to share best practices in implementing LDC modules and use of student rubrics?	Reflection on instruction, modification and evidence of changes in instruction; numbers of teachers reporting use of the same module and/or sharing of resources; one-on-one interviews with LDC coaches; numbers of modules submitted for national review	Observation, and quantitative evidence of numbers of modules produced and repurposing or reuse of those LDC modules
EP-3: What are barriers or challenges that could impede LDC implementation?	Survey Data; focus group data; one-on-one interview data with LDC coaches	Online Pre/Post Survey; onsite focus group structured dialogue; virtual recorded interviews
EP-4: What strategies are teachers employing to overcome these challenges in attaining best practices?	Survey Data; focus group data; one-on-one interview data with LDC coaches	Online Pre/Post Survey; onsite focus group structured dialogue; virtual recorded interviews
EP-5: What evidence in student performance shows improvement from increased exposure to science concepts and development of STEM skills through hands-on problem based learning and design cycle thinking?	Student test data showing changes over time to track progress in basic to proficient, and proficient to advanced competency	Quantitative student assessments, comparative data 2017 through 2022

LDC Instructional Skill Development and Classroom Implementation

First year data shows progress with particular goals for C1 teachers, with some aspects of LDC skills showing a positive shift toward meeting implementation goals. Survey data and observation data also show other areas that were identified by C1 teachers as challenges. The LDC Implementation Team, BEd, and HSTW focused on areas of particular support to help strengthen LDC skills gained during Year 1 of classroom implementation (2016-17), and also helped to modify the training initiated for C2 teachers (planned classroom implementation 2017-18), as well as during sustaining years of the project. Survey data, PD and workshop observation, as well as observation/on-site coaching reports form the basis of this evaluation. Pre- and post-implementation survey reports are presented in *Appendix E* of this document. This includes *Rural LDC Teacher Pre-Implementation Survey Report Combined Survey Responses for September 30, 2016 and October 14, 2016*, and *Rural LDC Cohort 1 Post-Implementation Survey*. Additionally, revisions to the post-implementation survey design are presented in *Appendix E* in a working document (*Table E1: Pre/Post Survey Review and Modifications)* showing comparative pre/post questions and revisions made with review by the LDC-IT. *Appendix F* of this document presents pre/post infographic summary reports including *LDC Pre-Implementation Infographic Summary of Survey Data, Cohort 1*, and *LDC Post Implementation Infographic Summary of Survey Data, Cohort 1*. The infographic reports were produced by the Knowledge Capture Team and issued as stand-alone reports to help support communication to the Rural Collaborative district-level staff on progress and comparative views of changes in teacher practices, as well as self-reported challenges, and confidence level of C1 teachers regarding classroom implementation and work with students.

The discussion that follows provides a view of evaluation research questions and evaluation of implementation year outcomes including pre-implementation baseline data reflecting teacher self-reporting on science instruction prior to LDC training, and two post-training surveys conducted in mid-October 2016 and March 2017. *Section III* of this Year End Report on Professional Development design, implementation, review and modification, and *Section IV* reporting coaching and onsite support for C1 teachers also inform evaluation of progress with LDC skill development and classroom implementation.

Research Question EP-1:
Does LDC PD support improvements in teachers' ability to assess student work and provide feedback and differentiate instruction to improve student learning?

Assessment of Student Work

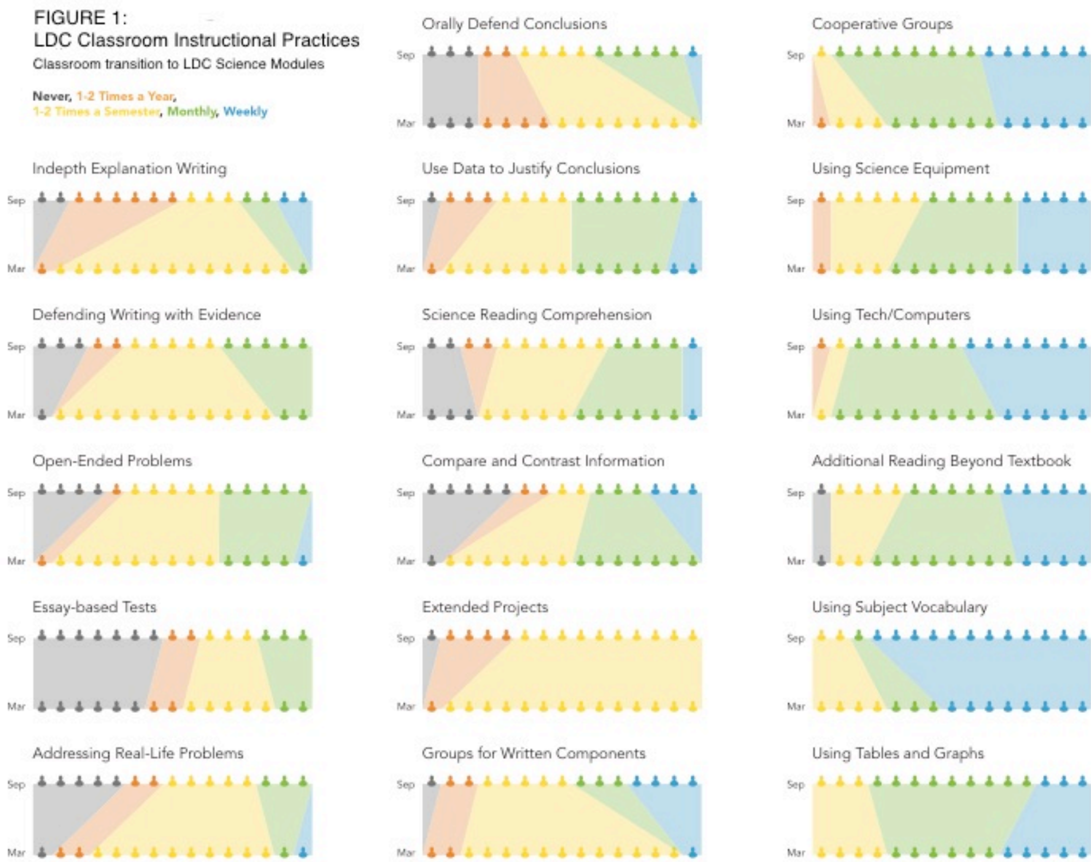
Two training sessions on student work product evaluation were conducted by the BEd LDC Team to review evaluation of student work products using the LDC student rubric. The first session held on December 9, 2017, attended by (13) C1 teachers, was focused on use of the LDC student rubric to evaluate student work products in grade level bands based on student work from Module 1. The December 9 work session was primarily organized for C1 teachers to work in groups to review and score student work by grade band. During the group scoring process of a sub-set of student work products, it was apparent that teachers were not able to calibrate scoring for consistent evaluation and after two rounds of working in groups using the student rubric, it was apparent that teachers were unable to effectively use the rubric.

Based on the team's assessment of the issues identified in December, the second training session to review student work products from Module 2 was held on March 24, 2017 and was organized for teachers to work as a whole group, not by grade band. This allowed teachers to experience evaluation of their own students' work products by the entire group to identify areas where students had not met expectations, and to then redesign/modify their own module teaching tasks to improve student performance based on the individual student rubric analysis. The final session of the day allowed teachers to actually redesign module teaching tasks with assistance from the LDC coaches based on areas identified in the scoring process where students had not met expectations. *Section III* of this report discusses the approach and work undertaken to support increased skill development for C1 teachers to improve their ability to assess student performance, and modify the instructional design to address specific areas of need to improve student growth.

Changes in Instructional Practices

Based on pre/post survey data, shifts in classroom instructional practices reported by teachers show trends that reflect initial stages of a shift from traditional classroom instruction based on textbook and lecture, weekly lesson cycles, and frequent testing (pre-implementation survey data of 9/30/17), and transition to LDC Design Cycle and Problem Based Learning organized and paced for extended instruction of 2 weeks to 8 weeks of instruction using the LDC module. *Figure 1: LDC Classroom Instructional Practices*, shows pre-implementation in comparison to post-implementation instructional methods in a series of (17) questions (adapted from HSTW survey questions regarding science instruction). In Figure 2, the shift from "never" (grey) or "1-2 times/year" (orange) to "1-2 times/semester" (yellow) shows the shift to extended projects and associated problem oriented approach to learning, allowing students to explore the focus of research and project activities over a period of 2-8 weeks, moving away from a 5-day cycle of textbook chapter and end-of-chapter weekly quiz or exam.

FIGURE 1: LDC CLASSROOM INSTRUCTIONAL PRACTICES



Teachers self-reported using the following instructional methods in September "never" or "1-2 times a year" (referring to prior practices used in the 2015-16 academic year and earlier). The following list shows areas where teachers showed a shift to practices 1-2 times/semester (yellow band), in comparison with increases reported in the March 2017 responses:

- *Indepth Explanation Writing*:
  - (8) reported *never* or *1-2 times/year* in September; in comparison pre-data show (3) teachers increased to (13) teachers assigning indepth writing *1-2 times/semester* in March.
- *Defending Writing with Evidence*:
  - (5) teachers reported *never* or *1-2 times/year* in September; in comparison (5) teachers reported *1-2 times/semester,* with an overall increase to (12) in March.
- *Open*-Ended Problems:
  - (5) teachers reported *never* or *1-2 times/year* in September; in comparison (5 teachers reported *1-2 times/semester* in September, with an overall increase to (9) teachers in March.
- *Addressing Real-Life Problems*
  - (7) teachers reported *never or 1-2 times/year* in September*;* in comparison (5) teachers reported *1-2 times/semester* in September*,* with an overall increase to (10) in March.
- *Use of Data to Justify Conclusions*
  - (4) teachers reported *never or 1-2 times/year* in September; in comparison (4) teachers reported *1-2 times/semester* in September, with an overall increase to (7) teachers in March.
- *Extended Projects*
  - (5) teachers reported *never or 1-2 times/year* in September; in comparison (10) teachers reported *1-2 times/semester* in September, with an overall increase to (14) teachers in March.
- Group Work in Written Components
  - (3) teachers reported *never or 1-2 times/year* in September; in comparison (5) teachers reported *1-2 times/semester* in September, with an overall increase to (12) teachers in March.

Two additional areas, "Science Reading Comprehension," and "Compare and Contrast," assignments shifted as follows:

- *Science Reading comprehension*
  - (4) teachers reported assigning students writing using evidence they read to support their conclusions *monthly* in September; in comparison (6) teachers increased this *monthly* in March.

- *Compare and Contrast*
    - 4) teachers reported requiring students to compare and contrast from one text to another *monthly* in September; in comparison (7) teachers reported increasing to *monthly* in March.

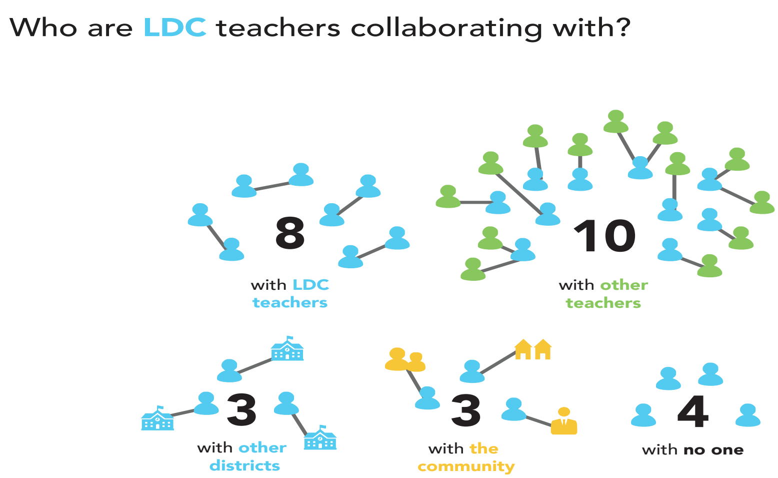
This survey data shows very early shifts occurring among the first cohort of teachers. While these trends are not yet paced to more robust increases, the transition over the sustaining five years should continue to show practices moving to correspond with problem based learning and design thinking. These practices will also be impacted by initiating PD in problem based learning during the 2017-18 school year, led by Northwestern Local Schools. Considering that two of the Rural Collaborative districts have not exposed their teachers to PBL, the impact of the next phase of PD will provide teachers with increased skills to gain experience with implementing PBL in the classroom.

Research Question EP-2:
Does LDC PD support increased collaboration among Rural Collaborative teachers (within districts and between districts) to share best practices in implementing LDC modules and use of student rubrics?

This question addresses two aspects of LDC implementation: 1) increased collaboration during implementation of LDC among science teachers; and 2) sharing of best practices as teachers explored new skills in conducting LDC instruction in their classroom. In reviewing survey data on teacher views on collaboration together with observation data (HSTW fall 2016), teachers found collaboration with other C1 teachers to be a valuable aspect of their ability to implement their LDC modules beginning in the fall with Module 1, and continuing in the spring with Module 2.

Pre- and post implementation survey data showed that 14 of the 15 teachers (over 90%) indicated that collaboration and sharing best practices with other teachers was *Very Important* or *Somewhat Important*. Based on HSTW coaching reports (onsite classroom coaching), *Figure 2: Fall 2016 Teacher Self-Reported Collaboration Associated with LDC Classroom Implementation* shows that during October to December, only 4 of the 15 teachers reported that they *did not* collaborate with other teachers during implementation of Module 1. Of the (11) teachers that did report collaboration during LDC implementation, ten stated that they were collaborating with teachers who were not participating in LDC training (non-cohort teachers), and three teachers reported that they had reached out to LDC teachers in the other LDC districts. This activity is a goal of both the Rural LDC project, as well as a more general goal of the Rural Collaborative consortia schools.

FIGURE 2: Fall 2016 Teacher Self-reported Collaboration Associated with LDC Classroom Implementation (HSTW Coaching Reports, Fall 2016)



HSTW coaching reports documenting classroom implementation during spring 2017 (January through March), continued to track communication between science teachers in the five Rural LDC districts. However, revisions made to the HSTW coaching template resulted in use of two different versions of the coaching report. During spring 2017 all (15) C1 teachers had onsite classroom HSTW coaching twice during the semester, generating 30 coaching reports. Of those coaching reports that documented communication it was noted that teachers reported "Cross-Communications with Science Teachers within the Building/District (8 reports); Cross-Communications with All Curriculum Teachers (2 reports); and, "Cross-Communications with Teachers outside their district" (2 reports).

Additionally, of the (8) teacher coaching reports that documented aspects of communication, all teachers indicated communication with other science teachers. Eight teachers also reported communication with other non-cohort as well as Cohort 1 science teachers in their building/district; and, (2) teachers also reported communication with non-science teachers in their building/district. Four coaching reports indicated that teachers communicated with teachers outside their district, three with other LDC teachers, and one reported reaching out to a non-cohort teacher in another district.

This trend will continue to be tracked as the C2 teachers initiate training and classroom implementation to understand in particular how C1 teachers and C2 teachers are benefitting from sharing of best practices during 2017-18. The recommendation to HSTW is to revise the coaching report template to consistently document collaboration, and that both the HSTW onsite coaching sessions and the LDC C2 PD sessions are designed to encourage teachers to reach out across cohorts, and between districts.

Research Question EP-3:
What are barriers or challenges that could impede LDC implementation?

Survey data regarding teacher identified challenges is presented in *Table 3* and *Table 4*. The survey question provided teachers the opportunity to respond in an "open ended" format, identifying any aspect of their experience during 2016-17. Data is organized thematically to show areas perceived by C1 teachers to present potential challenges for Module 1 (M1) and Module 2 (M2) implementation by grade band.

TABLE 3
Teacher Identified Challenges
(LDC M1 – Fall 2016)

Challenges	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=8)
Time management	✔	✔
Managing content	✔	✔
Understanding how to implement LDC	✔	✔
Managing student expectations	✔	
Teaching writing skills	✔	
Collaborating with other teachers	✔	
Student accountability		✔
Access to resources		✔
Keeping students on task		✔
Using CoreTools		✔

TABLE 4
Teacher Identified Challenges
(LDC M2 – Spring 2017)

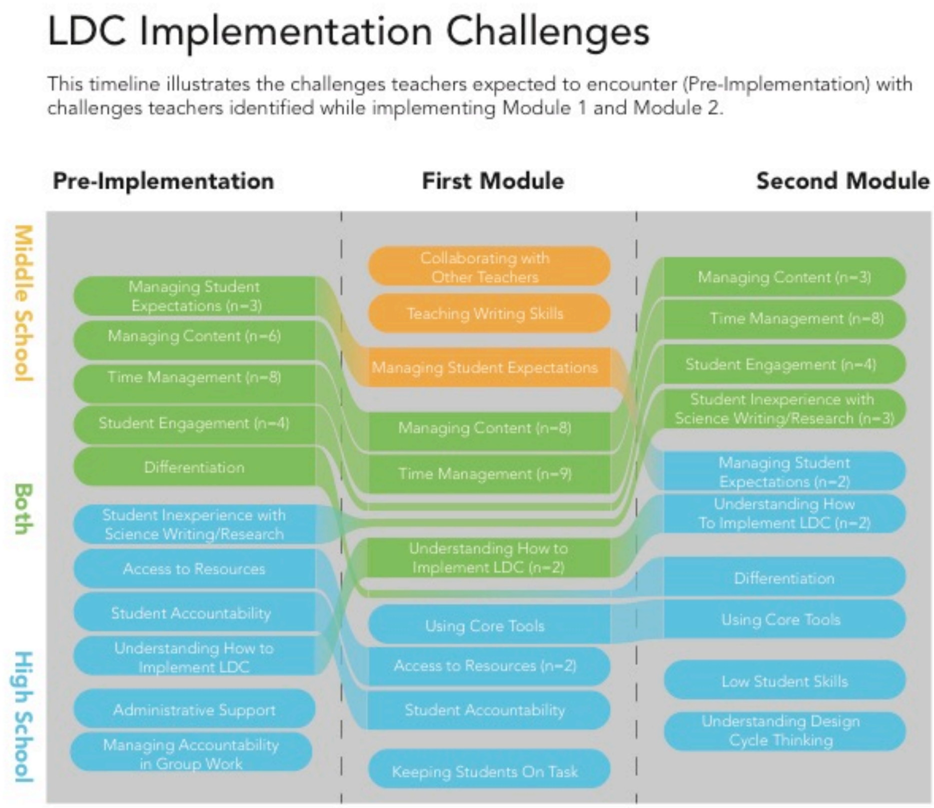
Challenges	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=9)
Time management	✔	✔
Managing content	✔	✔
Student inexperience with science writing/research	✔	✔
Student engagement	✔	✔
Managing student expectations		✔
Differentiation		✔
Understanding how to implement LDC		✔
Low student skills		✔
Using Core Tools		✔
Understanding Design Cycle thinking		✔

A comparative view of these issues is presented in *Figure 3: LDC Implementation Challenges,* showing anticipated challenges (pre-implementation) and actual challenges experienced during implementation of M1 (fall 2016) and M2 (spring 2017). In this view it is evident that both middle- and high-school teachers perceived the greatest challenge to be *Time Management* (n=pre-8; M1-9; M2-8). *Managing Content* was perceived initially to be a challenge by over half of the C1 teachers, but tapered off during implementation of M2 (n=pre-6; M1-8; M2-3). *Student Engagement* was also initially perceived to be a potential challenge by one-fourth of the C1 teachers, and only in M2 do teachers again express this concern (n=pre-4; M1-0; M2-4).

The majority of other areas perceived to pose a challenge as shown in *Figure 3* were issues identified by a single individual out of the (15) C1 teachers (either high school or middle school teacher) with the exception of two individuals reporting difficulty with *Understanding How to Implement LDC* during M1 and M2 classroom implementation (n=pre-1; M1-2; M2-2). *Differentiation* was also identified by one C1 teacher in the pre-implementation survey, and comes up again during M2 implementation.

Additionally, it should be noted that *Administrative Support* was identified in the pre-implementation survey (n=pre-1), and dropped off during actual implementation,

FIGURE 3: LDC Implementation Challenges



suggesting that the Implementation Team strategy to support regular updates or other modes of communication with District level administrators (District Liaisons, HSTW on-site coaches), and holding an orientation session (August 2016), planning meetings, and presentation of progress events with school administrators (December 2016, January and May 2017) helped to inform district staff about the project in ways that gave teachers confidence during implementation with adequate support. Also, *Managing Accountability in Group Work* (n=pre-1) and *Keeping Students on Task* (n=M1-1) also dropped off as a concern as teachers transitioned from training/planning during September/mid-October to implementation of M1 and M2 during late-October to the end of the spring term. *Using Core Tools*, identified by one C1 teacher during M1 and M2 implementation was addressed by the LDC Coaching Team as noted in the Battelle Education Report (see *Section III*).

It is also important to note that 23% of teachers reported having had PD in Design Cycle Thinking prior to the LDC project (Q3 pre-implementation survey), but only one of the (15) C1 teachers identified *Design Thinking* as a challenge during M2 implementation. This suggests that LDC PD and ongoing coaching support provided adequate preparation for teachers to explore instructional strategies to conduct problem based learning and design thinking as part of the LDC student projects completed in M1 and M2.

Finally, the fact that only one or two C1 teachers expressed difficulty with a range of issues shown in *Figure 3* during implementation of M1 and/or M2 provides insight on training areas that may stall successful implementation during sustaining years when an additional (49) 6-12 teachers. A rollout of LDC training will follow for (263) 6-12 teachers in remaining disciplines, who will have completed training and started implementation of LDC instruction in the classroom. Therefore, these are areas that should be tracked closely to assure that as the number of LDC teachers increases, these challenges pose potential areas that may form barriers to buy-in by teachers who experience difficulty in attaining these essential components of the LDC Science Literacy curriculum.

Research Question EP-4:
What strategies are teachers employing to overcome these challenges in attaining best practices?

The pre/post survey data on C1 teacher confidence level with LDC implementation shows that most teachers reported increased confidence (*Very Confident* or *Confident*) by the end of the grant year in the following components of the LDC project (see Q6 in the Supplementary Survey 10/14/16, and Q38 in the Post-Implementation Survey 3/24/17). *Figure 4: How Confident are Teachers with Module Implementation*, shows the following areas where teachers gained in confidence with LDC strategies:

- Navigating online resources
- Collaborating with LDC teachers
- Developing a Quality Instructional Plan
- Developing instruction to support student demonstration of skills
- Using the student scoring guide/ongoing checks
- Constructing an authentic Science Literacy Assignment
- Identifying a focused set of science standards
- Selecting content rich texts
- Selecting a student work product relevant to student LDC learning goals
- Backward Designing a sequence of skills to support student LDC learning goals

Only one area of LDC implementation showed a slight shift reflecting a lower confidence level concerning the ability to "*identify a focus set of common core literacy standards to drive the assignment*." This issue was identified as an area for increased support by the BEd PD team (see *Section III*) and resulted in several modifications to PD instruction for both C1 and C2 teachers.

Teachers were also asked to identify components of the implementation experience that were most helpful to achieve LDC implementation in their classrooms (Q34). *Table 5: Classroom Implementation Support*, shows five areas identified by both middle-school and high-school C1 teachers.

FIGURE 4: TEACHERS CONFIEDENCE WITH MODULES

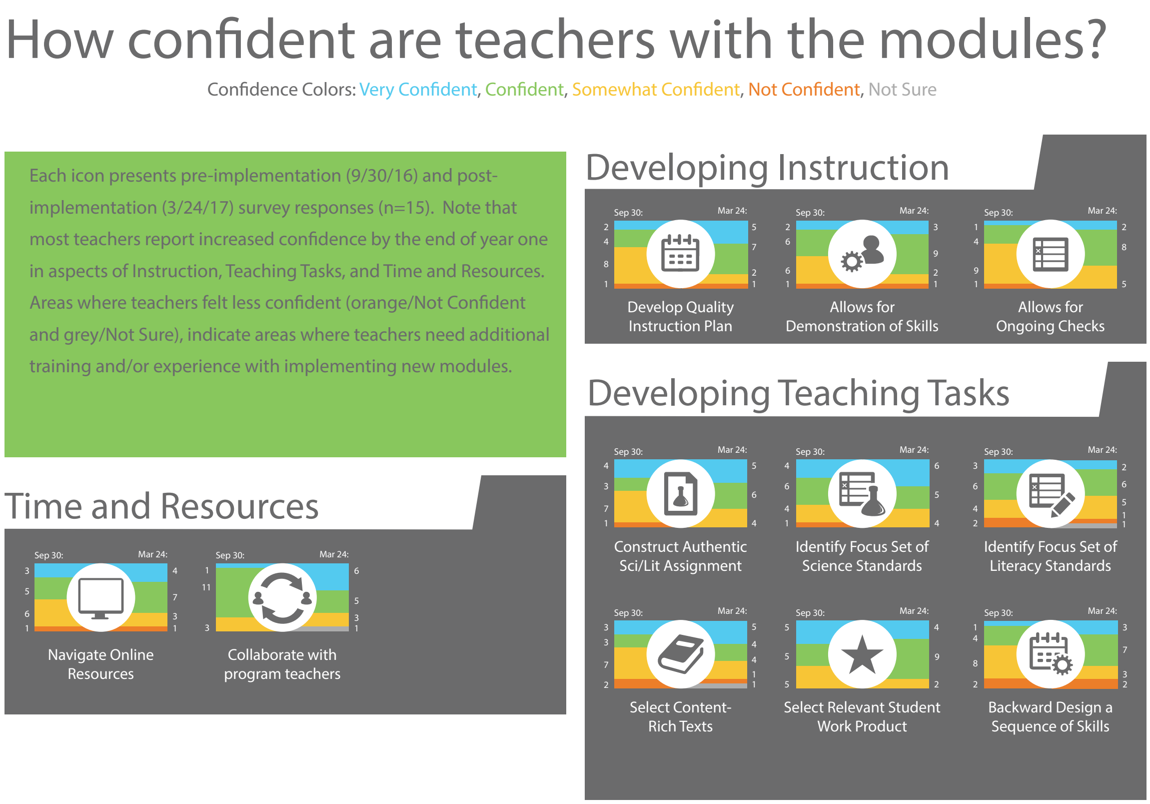


TABLE 5
Classroom Implementation Support

Helpful Aspects	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=8)
Using Core Tools	✔	✔
Learning new ways to teach	✔	✔
Access to coaches	✔	✔
Professional development sessions	✔	✔
Doing a second module	✔	✔
Collaboration with other LDC teachers	✔	
Having a model	✔	
Access to the LDC library	✔	
Researching topics		✔

**One teacher identified as teaching grade levels 5-12.*

Teachers were also asked about the importance of ongoing access to LDC coaches during implementation of M1 and M2 (Post-implementation Q35), and importance of on-site coaching (Post-implementation Q36). Ongoing access to LDC coaches beyond the PD days via email, or through review and comment by coaches on work-in-progress posted to Core Tools, or on-site coaching visits were identified as *Very Important* or *Somewhat Important* by 93% of C1 teachers. Just over two-thirds of C1 teachers said that on-site coaching was *Very Important* or *Somewhat Important* to their success during implementing M1 and M2 in their classrooms.

A complete description of the LDC PD plan and modifications made, data used to inform modifications, and ongoing interaction and assessment of C1 teacher progress with implementation of science M1 and M2 is presented in *Section III* and *Section IV* of this report.

Research Question EP-5:
What evidence in student performance shows improvement from increased exposure to science concepts and development of STEM skills through hands-on problem based learning and design cycle thinking?

Comments on the project Evaluation Plan from ODE (submitted 10/31/16) regarding use of the Science LDC student rubric to conduct student assessments suggested that the validity of the rubric as an assessment tool could be difficult to establish. Use of the rubric during early stages could be problematic concerning bias in subjectivity in evaluating student work for teachers with little experience in calibrating scoring of student work using consistent criteria appropriate to grade levels. These comments helped to direct the project to focus on student test data as a more reliable comparative assessment for baseline and the sustaining years of the project (2017-22).

A review of the Rural Collaborative districts end-of-course tests across grades 5-12 was conducted by the Project Manager to identify common tests used in each district. Additionally, review of the ACT exam STEM scoring system confirmed that ACT has recently determined a reliable assessment of readiness for college level STEM courses based on integrated test scores in science and math (see *Appendix G: ACT Research and Policy Technical Brief, 2015*). The technical brief also addressed the use of the ACT STEM score "in relation to the likelihood of succeeding in a variety of STEM-related college outcomes: cumulative grade point average (GPA) over time, persistence in a STEM major, and ultimately completing a STEM degree." Additionally, end-of-course exams in English Language Arts will also be tracked for grades 5-12 as a measure of potential improvement in exposure to technical reading and writing that is inherent to the goals of LDC Science Literacy curriculum. A detailed description of the student performance-tracking instrument is discussed in detail in *Section II* of the Rural LDC Year End Report 2016-17.

CONCLUSIONS

The implementation year of the Straight A Grant funded *Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative,* has demonstrated an effective strategy to establish implementation to full scale as outlined in the grant proposal. In the following sections of this report (*Sections II, III,* and *IV*), Project Partners provide specific details of the work conducted during this implementation year, and outline plans for sustaining years beginning with 2017-18.

Evaluation during the sustaining years will occur only in 2017-18 based on conducting a pre/post implementation teacher survey tested and modified during the implementation year. Additionally, a student assessment reporting template providing a tracking instrument, assures that Rural Collaborative Districts will report relevant year-end student performance data consistently during the grant period through 2022.

THE PAST FOUNDATION

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section I: Evaluation

Submitted by:
Monica Hunter, Ph.D, Director of Research
Maria Green Cohen, Assistant Director of Research
Kayla Galloway, Research Assistant
Grayson Rudzinski, Design Researcher

PART 2: Appendices A-D

July 31, 2017

APPENDIX
Section I: Evaluation

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative

APPENDIX: MID-YEAR REPORT

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative LDC

Projected Date(s)	Task	Description	Location	Knowledge Capture Team	Implementation Team
TABLE B1: Rural LDC Project YEAR 1 Evaluation Schedule 2016-2017 [revised 7.28.17] (**BLACK TEXT**: Schedule based on Rural LDC Implementation Work Plan; **BLUE TEXT**: PAST Evaluation)					
August 29, 2016	Implementation Team Planning Meeting	OBSERVATION: Preliminary project planning session	Northwestern	Maria Cohen, Kayla Galloway ONSITE	Project Implementation Team
August 29, 2016	Evaluation Team Meeting	Review evaluation timeline; survey work plan	VIRTUAL	Monica Hunter	Scott Smith, Kelly Evans
August 31-September 13, 2016	Key Informant Interviews: LDC coaches (8)	Explore preliminary goals for year 1 teacher cohort (pre/post implementation survey)	VIRTUAL	Monica Hunter, Maria Cohen, Kayla Galloway	Battelle Ed and HSTW LDC coaches (8)
September 7, 2016	Project Launch	All participants – 5 districts orientation	Northwestern	Maria Cohen ONSITE	All participants including teachers
September 16, 2016	Evaluation Planning Meeting	Review Pre-Year 1 Implementation Survey Design	VIRTUAL	Monica Hunter, Maria Cohen	Scott Smith, Diana Rogers
September 20, 2016	Implementation Team Planning Meeting	OBSERVATION: Preliminary project planning session; Review Pre-Year 1 Implementation Survey Design and logistics	Mapleton	Maria Cohen, Kayla Galloway ONSITE	Project Implementation Team
September 21, 2016	Evaluation Planning Meeting	Review Pre-Year 1 Implementation Survey Design	VIRTUAL	Monica Hunter, Maria Cohen	Scott Smith, Kelly Evans, Diana Rogers
September 29-30, 2016	Professional Development	OBSERVATION: teacher PD session: "Brainstorm and Build"	Northwestern	Monica Hunter, Maria Cohen ONSITE	Project Implementation Team and Project Cohort 1 teachers (n=15)
	Teacher Pre-Year 1 Implementation Survey	Conduct survey with teachers on final day of 2-day training session (n=15)			
October 5, 2016	Evaluation Planning Meeting	Preliminary review survey; Review DRAFT project evaluation plan with lead Straight A Team prior to submittal (DUE 10/31/16)	VIRTUAL	Monica Hunter, Maria Cohen, Kayla Galloway	Scott Smith, Kelly Evans, Diana Rogers
October 14, 2016	Teacher Survey	PD #3 Follow-up survey.	Online	Maria Cohen	Cohort 1 Teachers (n=14)
	PD Debrief Session	Participate in review of the PD session	VIRTUAL	Maria Cohen, Monica Hunter	Project Implementation Team
October 20, 2016	Evaluation Planning Mtg.	Review ODE Evaluation Plan components	VIRTUAL	Monica Hunter, Maria Cohen	Scott Smith, Kelly Evans, Diana Rogers

Projected Date(s)	Task	Description	Location	Knowledge Capture Team	Implementation Team
TABLE A: Rural LDC Project YEAR 1 Evaluation Timeline 2016-2017 (cont.) (**BLACK TEXT**: Schedule based on Rural LDC Implementation Work Plan; DATES, TIME, AND LOCATION are subject to revision; **BLUE TEXT**: PAST Evaluation)					
October 26, 2016	Evaluation Planning Mtg.	Review Final Logic Model, Communication Plan, initial review baseline student data	VIRTUAL	Monica Hunter, Maria Cohen	Scott Smith
October 28, 2016	Quarterly Evaluation Meeting	Review analysis of the pre-implementation teacher survey (quarterly report)	VIRTUAL	Monica Hunter, Maria Cohen, Kayla Galloway	Scott Smith, Kelly Evans, Diana Rogers
October 31, 2016	Implementation Team Planning Meeting	OBSERVATION: Project planning session	Hillsdale	Maria Cohen, Kayla Galloway VIRTUAL	Project Implementation Team
	Project Quarterly Report and Final Evaluation Plan	Submit digital report	Digital Submittal	Monica Hunter	Submit to Scott Smith
November 21, 2016	Implementation Team Meeting	Project implementation review and planning	Loudonville-Perrysville	Monica Hunter, Maria Cohen ONSITE	Project Implementation Team
December 5, 2016	Evaluation Team	Review mid-term survey schedule; marketing packet for Dec 9; Nov 21 Bullet Point Report			
December 9, 2016	Administrator Meeting; Professional Development	OBSERVATION: Teacher PD session: “Evaluate and Improve Design”; Debrief	Northwestern	Maria Cohen, Kayla Galloway ONSITE	All project participants; administrators all districts
December 19, 2016	Implementation Team Meeting	DLs reporting on work-in-progress for each district; comments on 12/9 PD; timeline for module 1 deliverables; plan for IT 2017 meetings to better accommodate DLs	Virtual	Monica Hunter, Maria Cohen VIRTUAL	Project Implementation Team
	Evaluation Team	Review 12/9 PD Evaluation Bullet Point Report; plan for half-day meeting re district implementation for 2017-18 grant year; student impact data	VIRTUAL	Monica Hunter, Maria Cohen, Kayla Galloway	Scott Smith, Kelly Evans, Diana Rogers
January 23, 2017	Quarterly Evaluation Meeting	Review evaluation and analysis of the fall implementation process for Mid-Year Report; submit all documentation to MSH for MYR	VIRTUAL	Monica Hunter, Maria Cohen, Kayla Galloway	Scott Smith, Kelly Evans, Diana Rogers

Projected Date(s)	Task	Description	Location	Knowledge Capture Team	Implementation Team
TABLE A: Rural LDC Project YEAR 1 Evaluation Timeline 2016-2017 (cont.) (**BLACK TEXT**: Schedule based on Rural LDC Implementation Work Plan; DATES, TIME, AND LOCATION are subject to revision; **BLUE TEXT**: PAST Evaluation)					
January 30, 2017	Implementation Team Meeting /District staff Year 2 Planning Session	Project implementation review and planning 2-part mtg: 1) District staff review 2016-17 schedule; 2) IT Meeting	Northwestern MS and Virtual*	Monica Hunter, Maria Cohen VIRTUAL	Project Implementation Team
February 27, 2017	Implementation Team Meeting	Team meeting; Rural Collaborative Tour of PAST Innovation Lab and Metro HS	PAST Foundation (Columbus)	Monica Hunter, Maria Cohen, Kayla Galloway ONSITE	Project Implementation Team
March 6, 2017	Project Mid-Year Report	Evaluation Report, digital submission	–	Monica Hunter	Submit to Scott Smith
March 17, 2017	Quarterly Evaluation Meeting/	Review evaluation and analysis including March PD (quarterly report); review Post-Year 1 Survey Design	VIRTUAL	Monica Hunter VIRTUAL	Scott Smith, Kelly Evans, Diana Rogers
March 17, 2017	Project Quarterly Report	Evaluation Report, digital submission	–	Monica Hunter	Submit to Scott Smith
March 24, 2017	Professional Development	Teacher PD session: "Evaluate and Improve"	Northwestern MS and Virtual*	Monica Hunter, Maria Cohen VIRTUAL	All project participants
	C1 Teacher Post-Year 1 Implementation Survey	Conduct post year 1 implementation survey with teachers during 3-day session (n=15)		Kayla Galloway onsite	Cohort 1 Teachers
March 27, 2017	Implementation Team Meeting	Project implementation review and planning	Northwestern MS and Virtual*	Maria Cohen, Kayla Galloway VIRTUAL	Project Implementation Team
April 24, 2017	Implementation Team Meeting	Project implementation review and planning	Northwestern MS and Virtual*	Maria Cohen, Kayla Galloway VIRTUAL	Project Implementation Team
	Evaluation Team Meeting	Review C1 Post-Implementation Survey Report; Initiate planning for End of Year Report (2016-17)	Northwestern MS and Virtual*	Monica Hunter, Maria Cohen, VIRTUAL	Scott Smith, Kelly Evans, Diana Rogers

Projected Date(s)	Task	Description	Location	Knowledge Capture Team	Implementation Team
TABLE A: Rural LDC Project YEAR 1 Evaluation Timeline 2016-2017 (cont.) (**BLACK TEXT**: Schedule based on Rural LDC Implementation Work Plan; DATES, TIME, AND LOCATION are subject to revision; **BLUE TEXT**: PAST Evaluation)					
May 10, 2017	Professional Development	Cohort 2 Training initiated– Part 1	Loudonville-Perrysville	Kayla Galloway; Onsite	L-P District Liaison; BEd Lead Facilitator and LDC Coach; HSTW NE Ohio Regional Coordinator, (2) HSTW LDC Coaches
May 17 2017	Professional Development	Cohort 2 Training initiated– Part 2	Loudonville-Perrysville	Kayla Galloway; Onsite	L-P District Liaison; BEd Lead Facilitator and LDC Coach; HSTW NE Ohio Regional Coordinator, (2) HSTW LDC Coaches
	C2 Pre-Implementation Survey	Conduct survey with teachers on final day of 2-day training session (n=10)	Loudonville-Perrysville	Kayla Galloway; Onsite	
May 22, 2017	Implementation Team Meeting	Project implementation review and planning	Northwestern MS and Virtual*	Monica Hunter, Maria Cohen ONSITE	Project Implementation Team
	Quarterly Evaluation Meeting	Review evaluation of spring implementation process;		Monica Hunter, Maria Cohen, ONSITE	Scott Smith, Kelly Evans, Diana Rogers
May 31, 2017	Project Quarterly Report	Evaluation Report, digital submission	–	Monica Hunter	Submit to Scott Smith
June 6, 2017	Professional Development	OBSERVATION: teacher PD session: “Scale UP/Share Solution” Module 2	Battelle Education, Battelle Memorial Institute	Monica Hunter, Kayla Galloway ONSITE	Scott Smith, Kelly Evans, BEd Coach; HSTW Diana Rogers; and coaches; 4 District Liaisons; C1 Teachers (n=5)
	Evaluation Team Meeting	Debrief PD session; review year-end report coordination and final submittals			Scott Smith, Kelly Evans, Diana Rogers
July 31, 2017	Year 1 Evaluation Report	Digital Submittal to Project Manager	–	Monica Hunter	Submit to Scott Smith

Table C: Rural LDC Chronology of PAST Evaluation Team Activities
July 22, 2016 to July 28, 2017

KC Staff	Date	Event	Product	Participants
MH	7/22/16	Preliminary Project Review	Notes	Project Manger, BEd STEM Relationship Manager
MH/MGC/KG	8/29/16	Implementation Team Meeting	BP*	Project Director, Project Manager, Project Treasurer, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (5) District Liaisons
MH	8/29/16	Evaluation Team Meeting	Notes	Project Manager, BEd STEM Relationship Manager
MH/MGC	9/1/16	Key Informant Interview	Notes	BEd LDC Coach
MH/MGC	9/1/16	Key Informant Interview	Notes	BEd LDC Coach
MH/KG	9/6/16	Key Informant Interview	Notes	HSTW LDC Coach
MH/MGC	9/7/16	Key Informant Interview	Notes	HSTW LDC Coach
MGC	9/7/16	Straight A Fund Kickoff Event	BP*	Project participants and stakeholders
MH/KG	9/9/16	Key Informant Interview	Notes	BEd LDC Coach
MH/KG	9/9/16	Key Informant Interview	Notes	HSTW LDC Coach
MH/KG	9/9/16	Key Informant Interview	Notes	HSTW LDC Coach
MH/KG	9/13/16	Key Informant Interview	Notes	HSTW LDC Coach
MH/MGC	9/16/16	Evaluation Team Meeting	Notes	Project Manager, HSTW NE Ohio Regional Coordinator
MH/MGC/KG	9/20/16	Implementation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (5) District Liaisons
MH/MGC	9/21/16	Evaluation Team Meeting	Notes	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator
MH/MGC/KG	9/29/16	Professional Development Observation	BP*	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, BEd Engineer, (4) HSTW LDC Coaches, (5) District Liaisons, (15) Teachers
MH/MGC/KG	9/29/16	Professional Development Debrief	BP*	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, BEd Engineer, (4) HSTW LDC Coaches

*Bullet Point Report

Table C: Rural LDC Chronology of PAST Evaluation Team Activities
July 22, 2016 to July 28, 2017

KC Staff	Date	Event	Product	Participants
MGC/KG	9/30/16	Professional Development Observation	Notes	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, (2) BEd LDC Coaches, BEd Engineer, (4) HSTW LDC Coaches, (5) District Liaisons, (15) Teachers
MGC/KG	9/30/16	Survey Administration	Survey Report	(15) Teachers
MGC/KG	9/30/16	Professional Development Debrief	BP*	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, (2) BEd LDC Coaches, HSTW NE Ohio Regional Coordinator
MH	9/30/16	Straight A Onboarding Meeting	Notes	Project Director, Project Manager
MH/MGC/KG	10/5/16	Evaluation Team Meeting	Notes	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator
MH/MGC	10/14/16	Professional Development Debrief	BP*	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, (2) BEd LDC Coaches, HSTW NE Ohio Regional Coordinator
MH/MGC	10/14/16	Survey Administration	Survey Report	(14) Teachers
MH/MGC	10/14/16	Survey Debrief	Notes	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, (2) BEd LDC Coaches, HSTW NE Ohio Regional Coordinator
MH/MGC/KG	10/20/16	Evaluation Team Meeting	Notes	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator
MH/MGC	10/26/16	Evaluation Planning Meeting	Notes	Project Manager
MH/MGC/KG	10/28/16	Quarterly Evaluation Team Meeting	Evaluation Plan	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator
MGC/KG	10/31/16	Implementation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (5) District Liaisons
MH/MGC/KG	10/31/16	Submit Final Evaluation Plan	Evaluation Plan	Scott Smith

*Bullet Point Report

Table C: Rural LDC Chronology of PAST Evaluation Team Activities
July 22, 2016 to July 28, 2017

KC Staff	Date	Event	Product	Participants
MH/MGC	11/21/16	Implementation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (5) District Liaisons
MH/KG	12/5/16	Evaluation Team Meeting	Notes	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator
MGC/KG	12/9/16	Breakfast Social	PR Materials and Notes	District Administrators from all five districts and project participants
MGC/KG	12/9/16	Professional Development Observation	BP*	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, (2) BEd LDC Coaches, Battelle Engineer, Battelle Principal Research Specialist, (5) HSTW LDC Coaches, (5) District Liaisons, (13) Teachers
MGC/KG	12/9/16	Professional Development Debrief	BP*	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, HSTW NE Ohio Regional Coordinator
MH/MGC/KG	12/19/16	Implementation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (4) District Liaisons
MH/MGC/KG	12/19/16	Evaluation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator
MH/MGC	1/12/17	Mid-Year Evaluation Report Materials Review	Notes	BEd STEM Relationship Manager
MH/MGC	1/17/17	Mid-Year Evaluation Report Materials Review	Notes	HSTW NE Ohio Regional Coordinator
MH/MGC/KG	1/23/17	Evaluation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator
MH/MGC/KG	1/30/17	Year 2 Administrator Planning Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (5) District Liaisons, District Administrators from four of the five project districts

*Bullet Point Report

Table C: Rural LDC Chronology of PAST Evaluation Team Activities
July 22, 2016 to July 28, 2017

KC Staff	Date	Event	Product	Participants
MH/MGC/KG	1/30/17	Implementation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (5) District Liaisons
MH/MGC	1/31/17	Mid-Year Evaluation Report Materials Review	Notes	BEd STEM Relationship Manager
KG	2/2/17	Survey platform and process review		HSTW NE Ohio Regional Coordinator
MH/MGC	2/6/17	Mid-Year Evaluation Report Materials Review	Notes	HSTW NE Ohio Regional Coordinator
MH	2/21/17	Student Data Review	Notes	Project Manager, HSTW NE Ohio Regional Coordinator
MH/MGC/KG	2/27/17	Implementation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (5) District Liaisons
MGC	3/9/17	ODE Mid-Year Audit	Notes	Project Manager, Project Treasurer
MH	3/17/17	Evaluation Team Meeting	Notes	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator
KG	3/24/17	Professional Development Observation	Notes	Project Manager, BEd Lead Facilitator and LDC Coach, (2) BEd Engineers, (5) HSTW LDC Coaches, (4) District Liaisons, (15) Teachers
KG	3/24/17	Survey Administration	Survey Report	(15) Teachers
MH/KG	3/24/17	Professional Development Debrief	BP*	Project Manager, BEd Lead Facilitator and LDC Coach, (2) BEd LDC Coaches, HSTW NE Ohio Regional Coordinator, (1) District Liaison
MH/MGC/KG	3/27/17	Implementation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, (4) District Liaisons
MH/MGC/KG	4/24/17	Evaluation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator
MH/MGC/KG	4/24/17	Implementation Team Meeting	BP*	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (5) District Liaisons

*Bullet Point Report

Table C: Rural LDC Chronology of PAST Evaluation Team Activities
July 22, 2016 to July 28, 2017

KC Staff	Date	Event	Product	Participants
KG	5/10/17	Professional Development Observation	BP*	(1) District Liaison, BEd Lead Facilitator and LDC Coach, HSTW NE Ohio Regional Coordinator, (2) HSTW LDC Coaches, (4) Cohort 1 Teachers, (11) Cohort 2 Teachers, (1) District Librarian, (1) Gifted Specialist
KG	5/10/17	Professional Development Debrief	BP*	(1) District Liaison, BEd Lead Facilitator and LDC Coach, HSTW NE Ohio Regional Coordinator, (2) HSTW LDC Coaches
KG	5/17/17	Professional Development Observation	BP*	Project Manager, (2) District Liaisons, BEd Lead Facilitator and LDC Coach, HSTW NE Ohio Regional Coordinator, (1) HSTW LDC Coach, (4) Cohort 1 Teachers, (11) Cohort 2 Teachers, (1) District Librarian, (1) Gifted Specialist
KG	5/17/17	Survey Administration	Survey Report	(10) Cohort 2 Teachers
KG	5/17/17	Professional Development Debrief	BP*	District Liaison, BEd Lead Facilitator and LDC Coach, HSTW NE Ohio Regional Coordinator, (1) HSTW LDC Coach
MH/MGC	5/22/17	Evaluation Team Meeting	Notes	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (1) District Liaison
MH/MGC	5/22/17	Implementation Team Meeting	Notes	Project Manager, BEd STEM Relationship Manager, HSTW NE Ohio Regional Coordinator, (4) District Liaisons
MH/KG	6/6/17	Module Prep for National Review Work Session	BP*	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, (1) BEd LDC Coaches, (3) District Liaisons, (5) Cohort 1 Teachers
MH/MGC/KG	6/6/17	Implementation Team Meeting	Notes	Project Manager, BEd STEM Relationship Manager, BEd Lead Facilitator and LDC Coach, (4) District Liaisons
MH	6/12/17	Year 1 Evaluation Report Materials Review	Notes	HSTW NE Ohio Regional Coordinator
MH	6/13/17	Year 1 Evaluation Report Materials Review	Notes	BEd STEM Relationship Manager
MH	6/16/17	Year 1 Evaluation Report Review	Notes	BEd STEM Relationship Manager

*Bullet Point Report

Table C: Rural LDC Chronology of PAST Evaluation Team Activities
July 22, 2016 to July 28, 2017

KC Staff	Date	Event	Product	Participants
MH	7/26/17	Year 1 Evaluation Report Materials Review	Notes	Project Manager
MH	7/26/17	Year 1 Evaluation Report Materials Review	Notes	BEd STEM Relationship Manager

*Bullet Point Report

Agenda
LDC Rural Collaborative
Quarterly Evaluation Team Meeting
1/23/17

1. Review Mid-Year Report materials and documentation: Appendix Cover Page
   - Grant Management
   - HWTW
   - Battelle Ed (see email of Jan 17 recap of questions attached to this agenda)

2. Review PD schedule for 2017
   a. January 30
   b. March 24
   c. May?
   d. June 6-8

3. Schedule working sessions for Student Performance (Feb 16-28) (MSH, SS, DR)

4. Plan for ODE on-site visit March 9

5. Other Items

Recap of Jan 17 email

1. How many of the cohort 1 teachers used the student rubric to assess student projects?
2. If they did use them, did they fully address all criteria listed in the MS, HS “scoring elements” column?
4. Did you find any cases where teachers modified the LDC rubric for their use in assessing student work?
5. If they did not use the LDC rubric, did teachers use a different rubric (one they created?)
6. Did your process for evaluating teacher’s m1 include GQ7 of the Jurying Rubric (review of scored rubrics) for LDC Teaching Tasks?
7. If yes, did your final evaluation of m1 come to any conclusions about the student rubric design? Was it applied correctly? Did teachers find the criteria clearly explained or did they struggle with using the criteria to assign a score for the different scoring elements? Has your team developed any ideas for modifying the rubric itself, or how it is applied by the teachers?
8. Can you characterize any views teachers expressed on the value of the LDC student rubric for their process of scoring student work?

Agenda
LDC Rural Collaborative
Quarterly Evaluation Team Meeting
3/17/17

From: **Monica Hunter** MHunter@pastfoundation.org
Subject: LDC Cohort 1 and Cohort 2 Draft Surveys for review - 3/17/17 Eval Meeting
Date: March 15, 2017 at 12:05 PM
To: Scott Smith nrws_ssmith@tccsa.net, Diana Rogers hstwdr@gmail.com, Gaier, Kelly M GAIERK@battelle.org
Cc: Kayla Galloway Kgalloway@pastfoundation.org, Maria Green Cohen mgreencohen@pastfoundation.org

Hi all — attached are two folders with materials for review on Friday.

The C1 Post file is set up both as an excel spreadsheet to show the pre-survey questions for comparison, and a word doc that presents the revised version as it will appear in the online survey. The excel file is set up with the pre-survey questions in the left column, and the right column shows the post version.

The C2 Pre file is also set up as an excel showing revisions that I am suggesting for C2 compared with the pre that we gave to C1. Most of the suggested changes are PROFILE questions and are in the first set (1-10) of questions. There are a couple of changes in the last section on LDC Professional Development. This survey will be given on May 17 so we have time to consider this question set. I also need to follow-up with Catherine on one or two points regarding what the expected timeframe will be for developing module 1 by the C2 group. The excel spreadsheet is set up with the current question set in the left column, and new questions appear in the left column in blue font. If you have suggested additions or revisions please add your notes in the excel file to the right column.

FYI - Kayla and Maria are both off on Friday so we will hopefully run the zoom with no problem! I will be recording our meeting so they can review the session discussion next week.
Regards, Monica

THE PAST FOUNDATION

MONICA S. HUNTER, PHD. »
Director of Research
Empress of Ethnography

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Columbus, Ohio 43212

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LDC-C1 Cohort1 Post S...5Mar17

LDC-C2 Cohort 2 Pre S...5Mar17

Agenda
LDC Rural Collaborative
Evaluation Team Meeting
4/24/17

1. Review PD schedule for 2017
   a. May 10, 17
      - confirm # of C2 teacher/participants (13?)
      - KG will attend 5/17 and conduct the pre-survey
      - any C1 teachers participating?
   b. June 6 – Battelle Ed in Columbus
      - projected number of participants?
   c. August training for C2 teachers?
      - Any other details on the plan for fall training?

2. C1 Teachers in 2017-18 year
   a. Do we have more details on how many will continue in the project and what role will they play?
      - different for each district?
      - District Liaisons – continued involvement in Y2?
      - C1 Focus Group TBD – ideas for how to get C1 teachers together for a FG sometime in Aug or Fall 2017? There is flex in who we work with – should we consider holding a FG for the district liaisons to gain insight on how the districts are implementing their individual LDC training, PD, other support, etc.?

3. Review Year 1 Final Report deadline: Please plan to submit any documentation, and summary narrative reports no later than June 23rd.
   - Grant Management
   - HWTW
   - Battelle Ed

4. Any additional comments on the C2 Pre-Survey?

5. Review of the C1 post-implementation survey report and summary graphics (3/24)

6. Next Eval Team meeting is 5/22 and will be the last evaluation quarterly meeting – onsite at Northwestern
   - Final review on prep for the Year 1 project report – due Jul 31 to ODE
   - C2 Pre-implementation survey review (5/17)

7. Other

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

AGENDA
Quarterly Evaluation Team Meeting May 22, 2017

Participants:

- PAST Foundation – Monica Hunter, Project Evaluator; Maria Cohen, Evaluation Research Team
- Northwestern – Scott Smith, Project Director
- Battelle Education (BEd) – Kelly Gaier, Project Partner/STEM Education Specialist
- High Schools that Work (HSTW) – Diana Rogers, Project Partner/ HSTW Regional Coordinator

1. Review C2 PD Schedule
    a. June
    b. August
    c. Fall 2017

2. C1 Focus Group – tentative date(s)

3. Review work-in-progress Post-implementation C1 infographics

4. C2 PD and pre-implementation survey (n=10)
    a. Make-up dates and pre-implementation survey plan

5. Review prep for Year 1 project report – due Jul 31 to ODE

    a. All summary reports, documentation, etc. due to PAST Evaluation Team by June 23

6. Student Data submittal

7. Other

THE PAST FOUNDATION

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section I: Evaluation

Submitted by:

Monica Hunter, Ph.D, Director of Research

Maria Green Cohen, Assistant Director of Research

Kayla Galloway, Research Assistant

Grayson Rudzinski, Design Researcher

PART 3: Appendix E-1

July 31, 2017

Rural LDC
Teacher Pre-Implementation Survey Report
Combined Survey Responses for
September 30, 2016 and October 14, 2016

This document is the final report of survey responses for the Rural LDC 2016 Teacher Pre-Implementation Survey. Project districts include: Northwestern Local Schools, Mapleton Local Schools, Hillsdale Local School District, Loudonville-Perrysville Exempted Village Schools, and Black River Local Schools.

The report presents bar charts for survey responses for Qs 1-25, Qs 27-31, and 35. Open-ended responses for Qs 26, 32, 33, and 34 are presented in thematic tables.

SURVEY PROTOCOL

The Rural LDC 2016 Teacher Pre-Implementation Survey was administered on Friday, September 30th during the second day of a two-day LDC professional development session. The survey was completed by a total number of (15) teachers. The survey was administered via a secure web-based platform (SurveyMethods®) designed for conducting a confidential and anonymous survey.

SUMMARY OF SURVEY QUESTIONS FOR SEPTEMBER 30:

Qs 2-3 are profile questions.

Qs 4-5 are questions regarding teachers' experiences in their careers. Teachers were asked about collaboration and sharing best practices with other teachers. Teachers were also asked about experience with coaching other teachers or leading professional development sessions.

Q6 asked teachers how they became involved as a participant in the Rural LDC project.

Qs 7-23 are questions regarding teachers' past instructional practices related to requiring students to conduct research and complete written components of class assignments.

Qs 24-25 asked teachers how important is it for administrators and parents to know about and understand the LDC instructional strategies and model.

Qs 26-28 are questions regarding implementation of the LDC module. *Q26* asked teachers to identify the biggest challenge(s) they anticipate with implementation of the LDC module with their students. *Q27* provides feedback from teachers about importance of access to LDC coaches during implementation of LDC modules in their classroom. *Q28* asked teachers to self-evaluate how well prepared they are to implement their LDC module in their classroom.

Qs 29-31 asked teachers to self-evaluate their LDC module and implementation strategy. *Q29* asked teachers how would they rate their first LDC module. *Q30* asked teachers to rate their confidence level with specific aspects of implementing their LDC module, and *Q31* asked teachers to self-evaluate their understanding and ability to implement components of the LDC instructional model. Teachers selected from a drop-down menu of skills associated with the LDC instructional model.

Qs 32-34 are open-ended questions asking teachers to describe specific aspects of the LDC module and impacts on student learning and performance. *Q32* asked teachers to briefly describe "Design Thinking" and particular benefits for student learning, and Q33 asked teachers to briefly describe PBL and potential impacts on student learning. *Q34* asked teachers to briefly describe anticipated impacts on student performance using LDC modules in their classroom.

Q35 asked teachers to identify the top four skills they think are most important for students to prepare for the future.

FOLLOW-UP SURVEY, OCTOBER 14:

The following sub-set of questions from the September 30th survey were included in a follow-up survey conducted on October 14, 2017 and are presented in a side-by-side comparative view in this report.

Q3 (Q28): How well prepared are you to implement your LDC module in your classroom?

Q4 (Q29): How would you rate your first LDC module?

Q5 (Q30): How confident are you about the following aspects of implementing your LDC module?

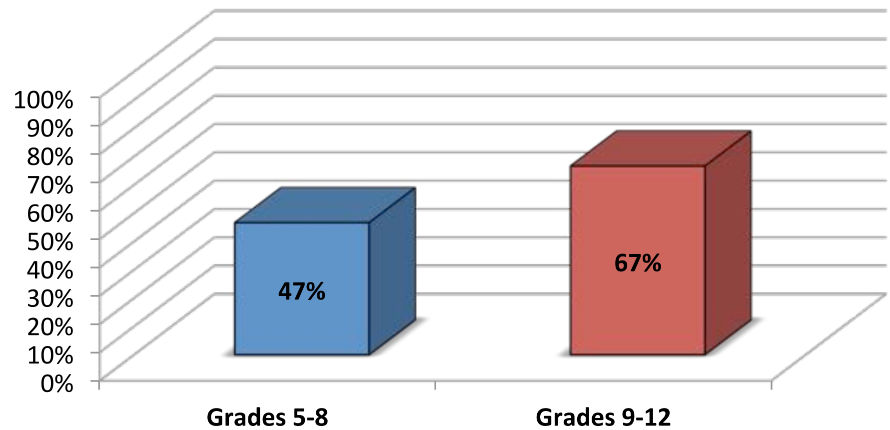
- Find time to revise/complete my LDC module
- Find time during classroom instruction with students to implement the LDC module
- Find time to work with LDC coaches

Q6 (Q31): How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

- Construct an authentic science and literacy assignment (teaching task)
- Identify a focus set of science standards to drive the assignment
- Identify a focus set of common core literacy standards to drive the assignment
- Select complex and content rich text(s) that align to a specific set of student learning goals
- Select student work product that is relevant to the student learning goals of the assignment
- Develop a quality instructional plan
- Backward design a sequence of skills from the assignment aligned to student learning goals
- Develop instruction that allows students to demonstrate the skills needed to meet the expectations of the assignment
- Develop instruction that allows for ongoing checks (scoring guide) for understanding student skill development
- Navigate LDC Core Tools
- Collaborate with other LDC project teachers

Q2: I currently teach (please check all that apply):

Data collected on September 30, 2016 (n=15)



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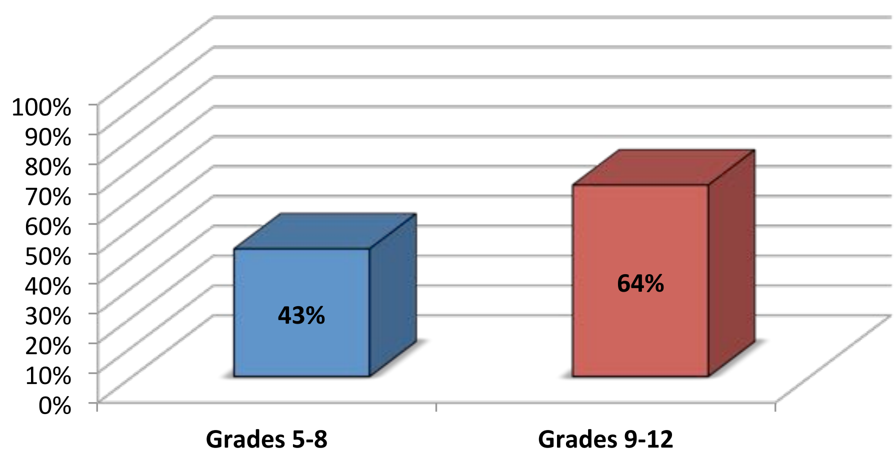
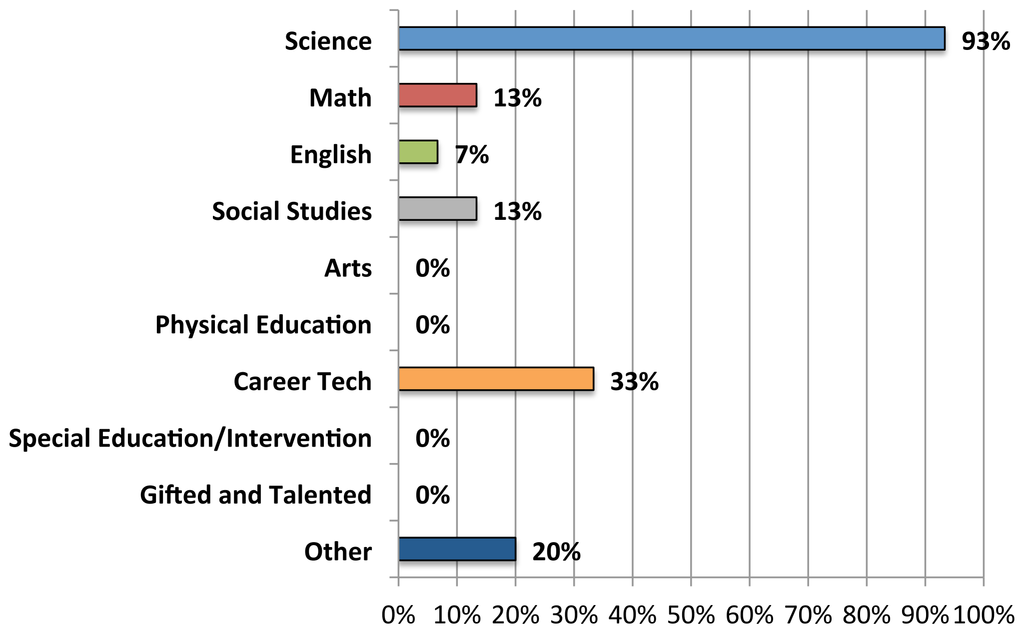


Note: Respondents were given the option of selecting more than one grade-level band.

Q3: In your teaching career, which content areas have you taught? (Please choose all that apply.)

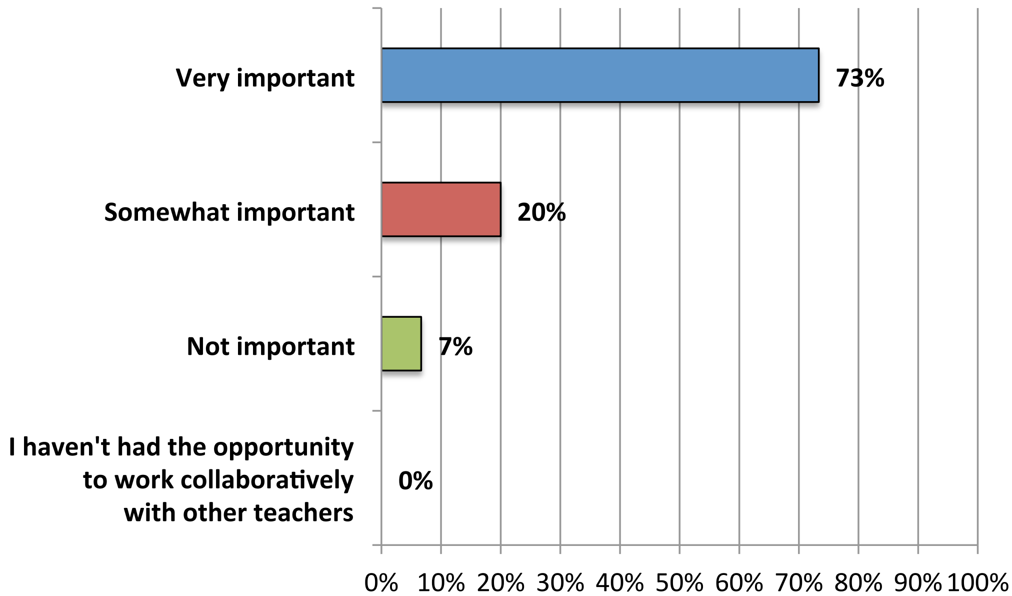
(n=15)



Note: Respondents were given the option of selecting multiple content areas if applicable, as well as the option of an "if other" response, which is reflected in the ***Other*** *category.*

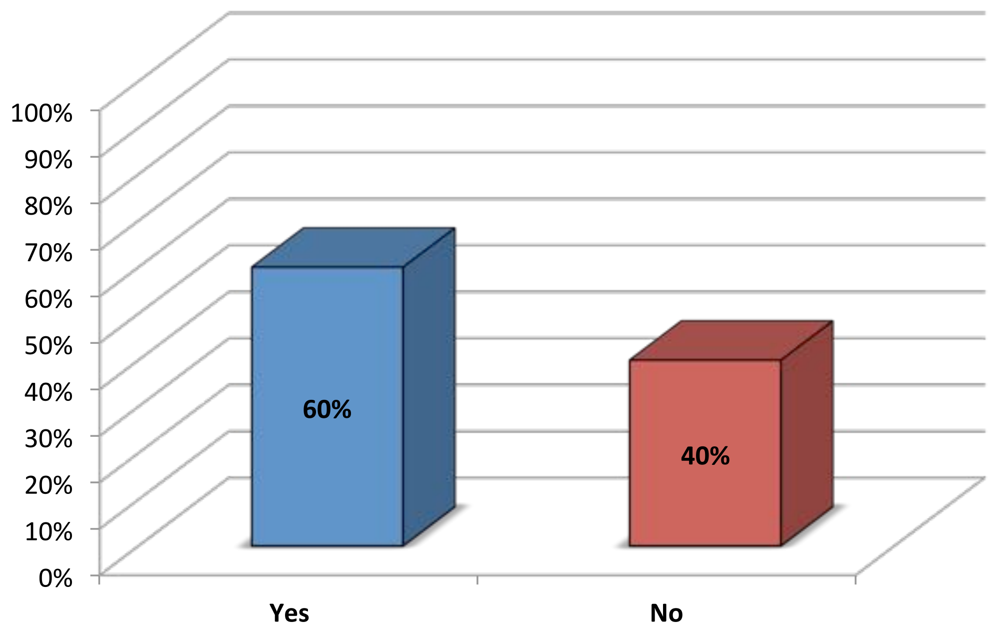
Q4: In your experience, how important is collaboration and sharing best practices with other teachers?

(n=15)



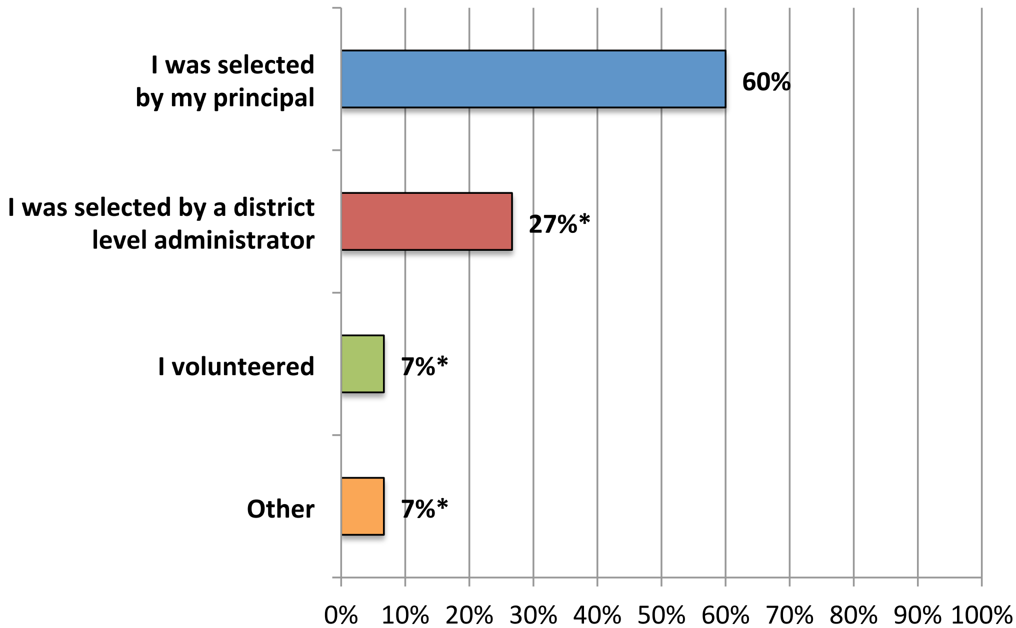
Q5: In your teaching career, have you had experience in coaching other teachers or leading professional development sessions?

(n=15)



Q6: How did you become involved as a participant in the Rural Collaborative LDC Project?

(n=15)

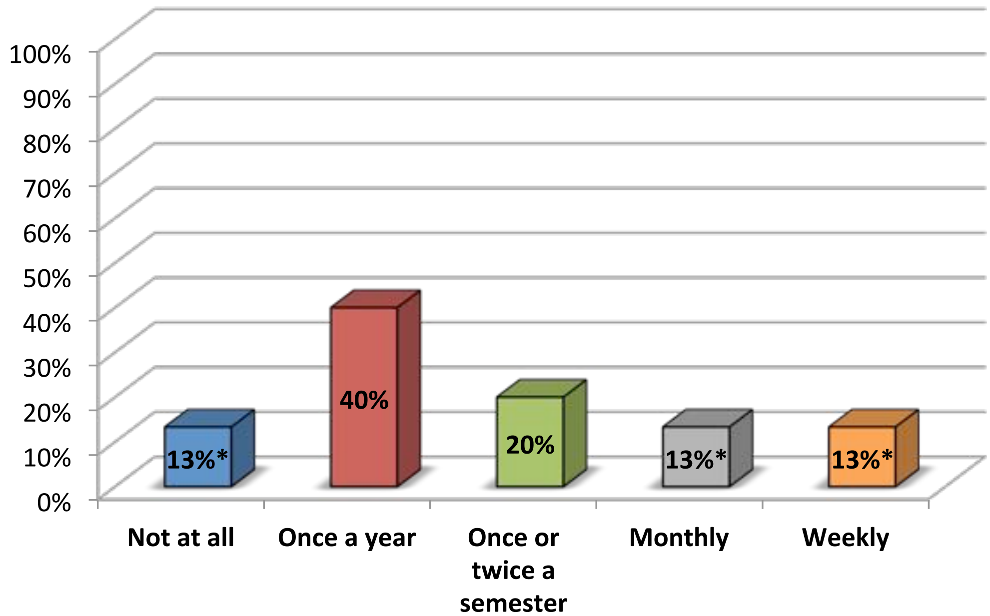


All data is rounded to the nearest percentage point.

*Note: Respondents were given the option of an "if other" response, which is reflected in the **Other** category.*

Q7: I have required my students to write in-depth explanations about a class project or activity.

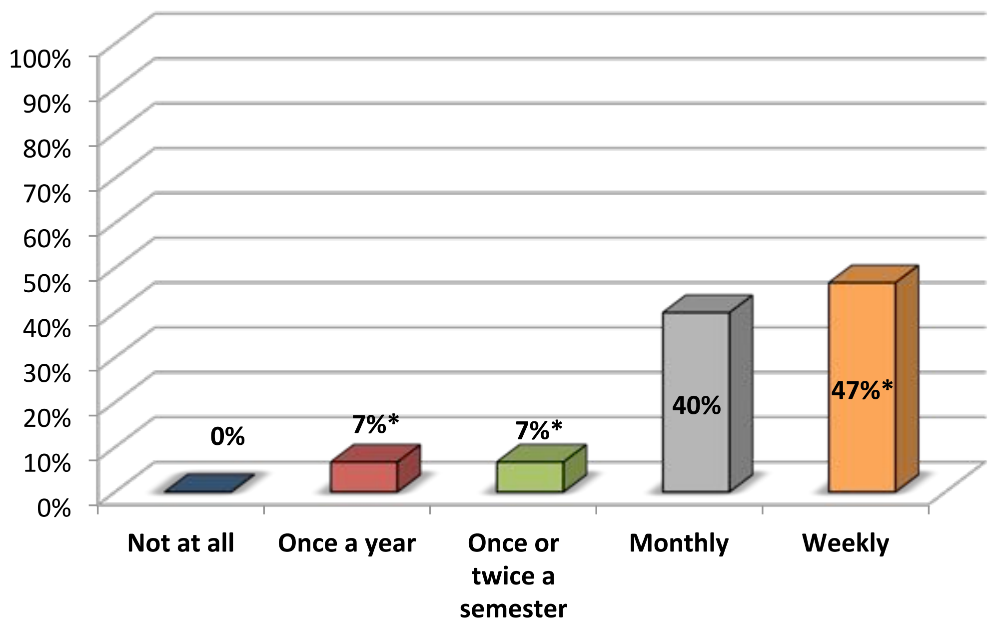
(n=15)



All data is rounded to the nearest percentage point.

Q8: I have required my students to use computer or technology to complete an assignment or project.

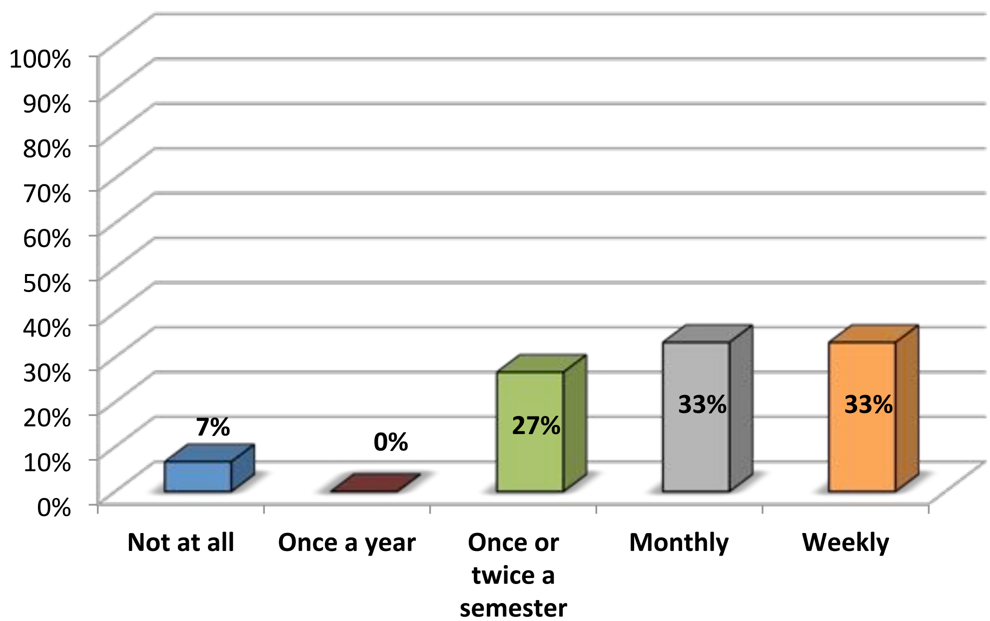
(n=15)



**All data is rounded to the nearest percentage point.*

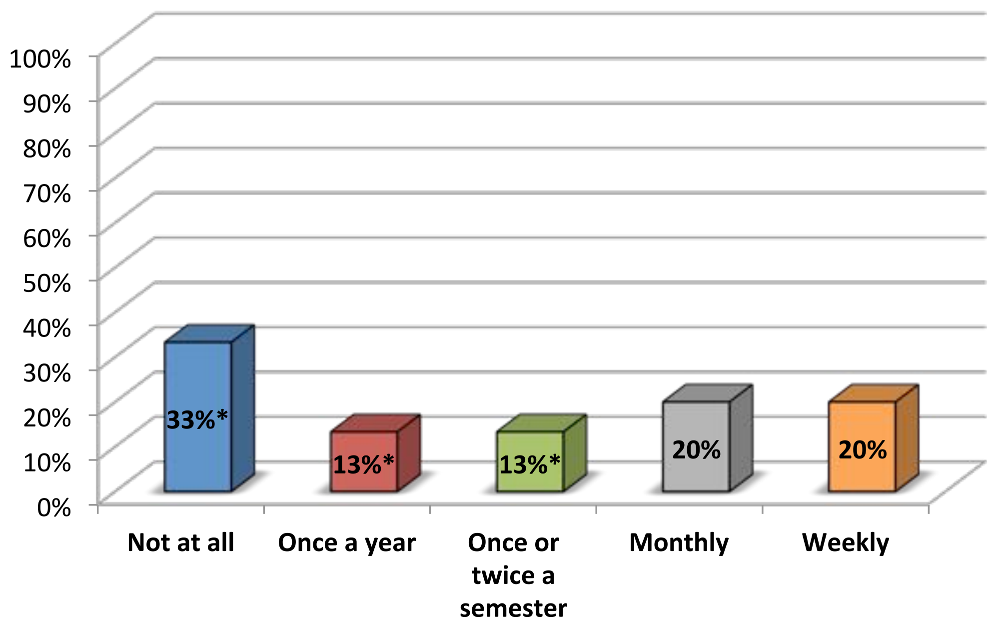
Q9: I have assigned reading to my students in addition to the class textbook.

(n=15)



Q10: I have required my students to compare and contrast information from one text to another.

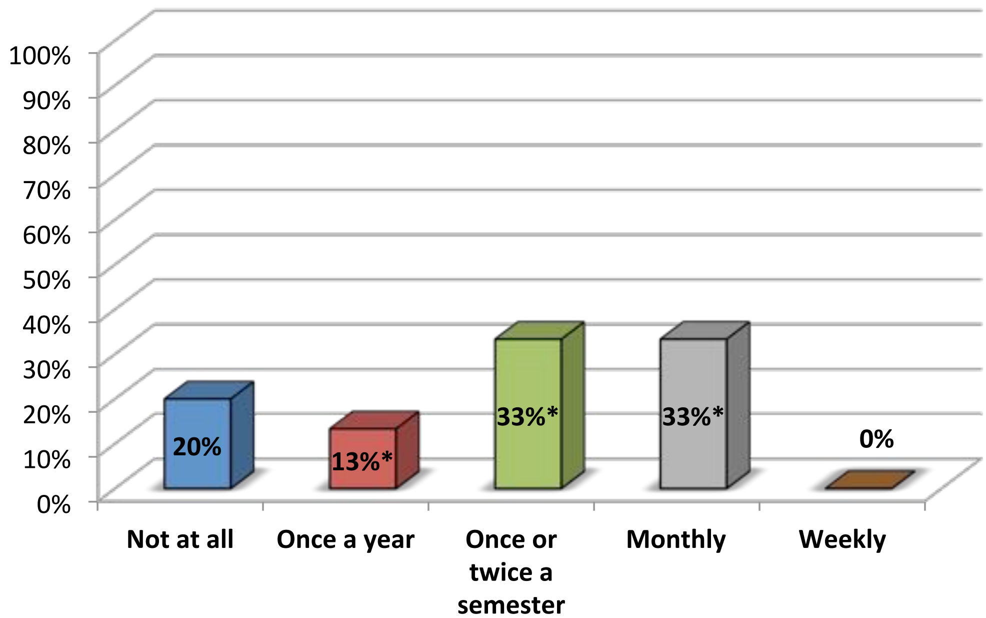
(n=15)



All data is rounded up to the nearest percentage point.

Q11: I have required my students to produce writing assignments that make them defend their thinking with support and evidence from what they are reading.

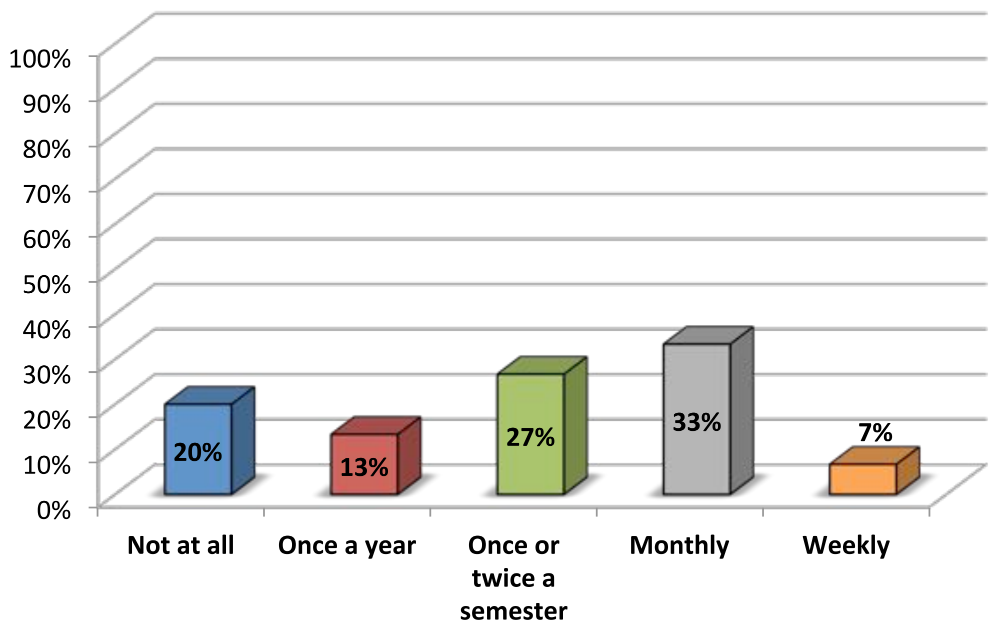
(n=15)



*All data is rounded up to the nearest percentage point.

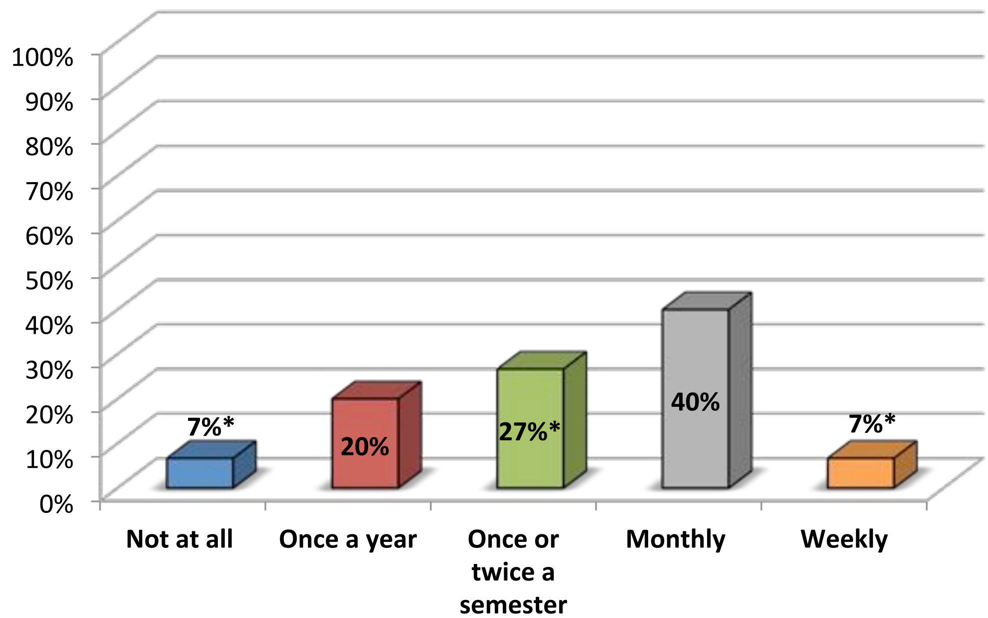
Q12: I have required my students to orally defend their conclusions from an investigation or project before their peers.

(n=15)



Q13: I have required my students to use data collected during investigations or projects to justify and defend their conclusions.

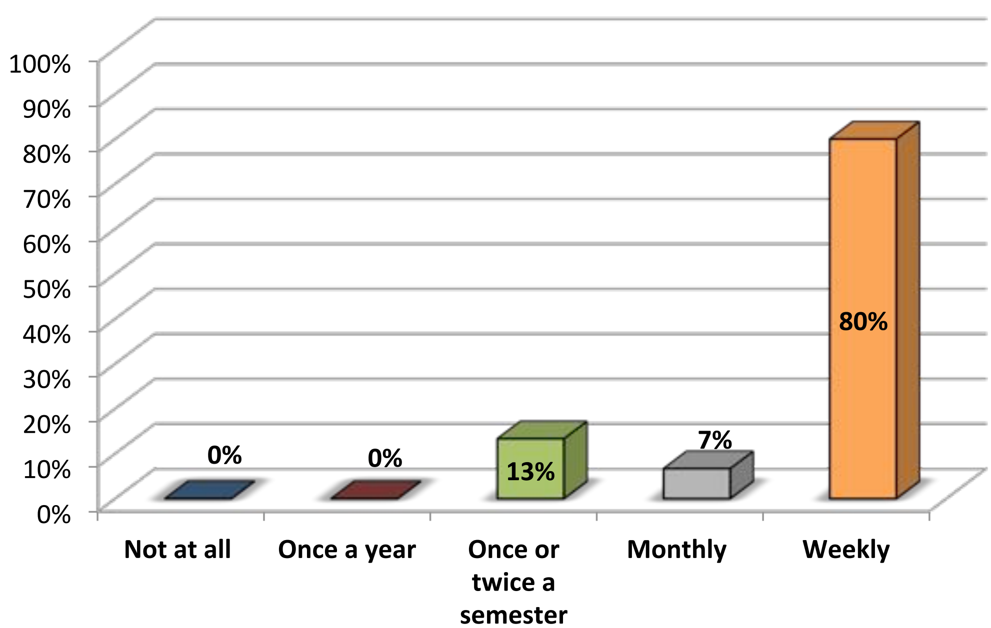
(n=15)



**All data is rounded to the nearest percentage point.*

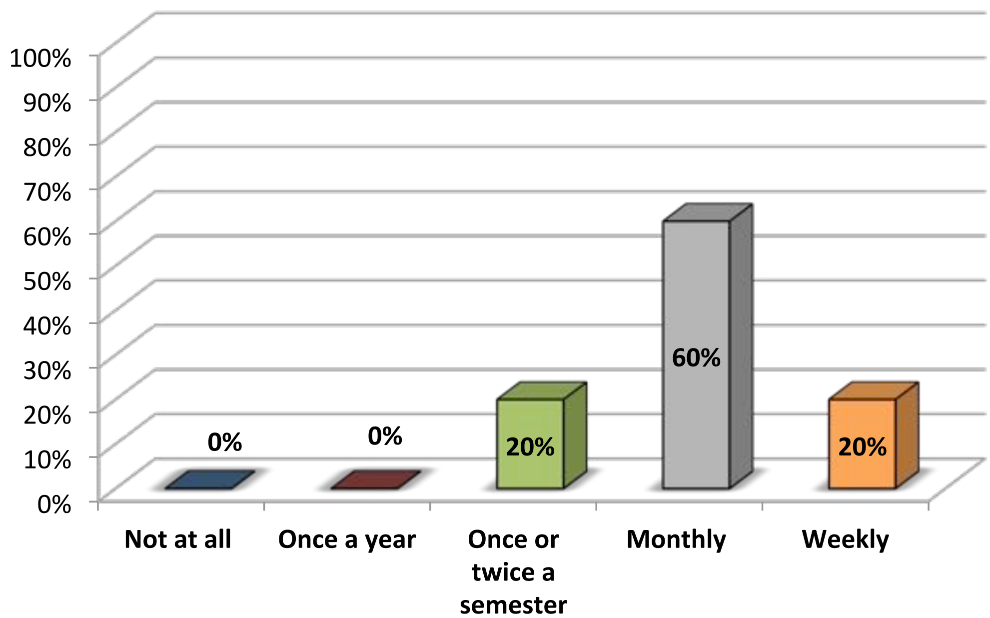
Q14: I have required my students to complete assignments using the vocabulary associated with the subject area being taught.

(n=15)



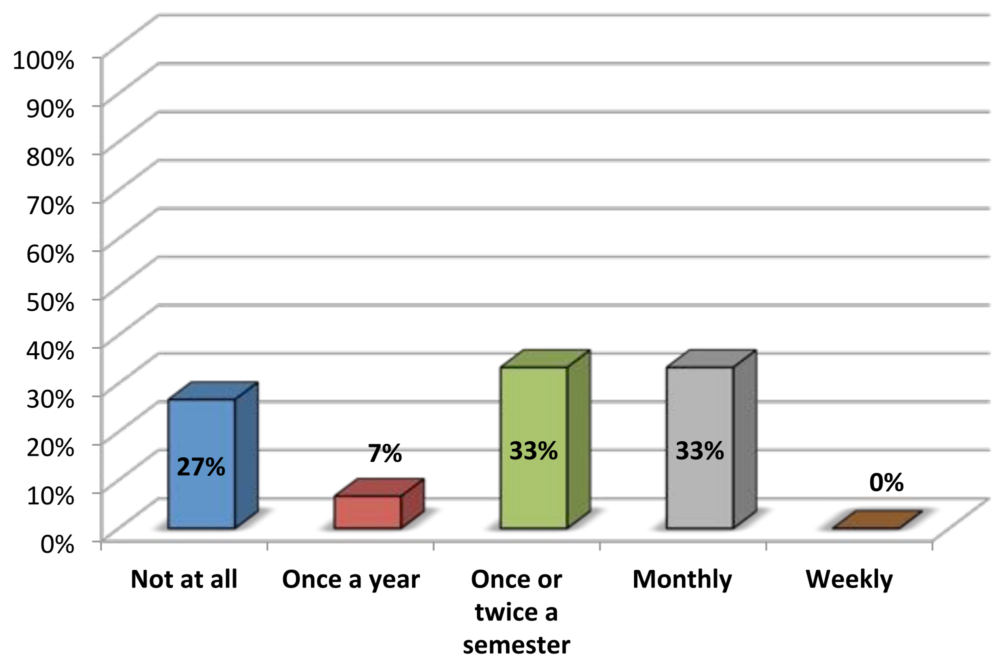
Q15: I have required my students to develop and analyze tables, charts and graphs in schoolwork.

(n=15)



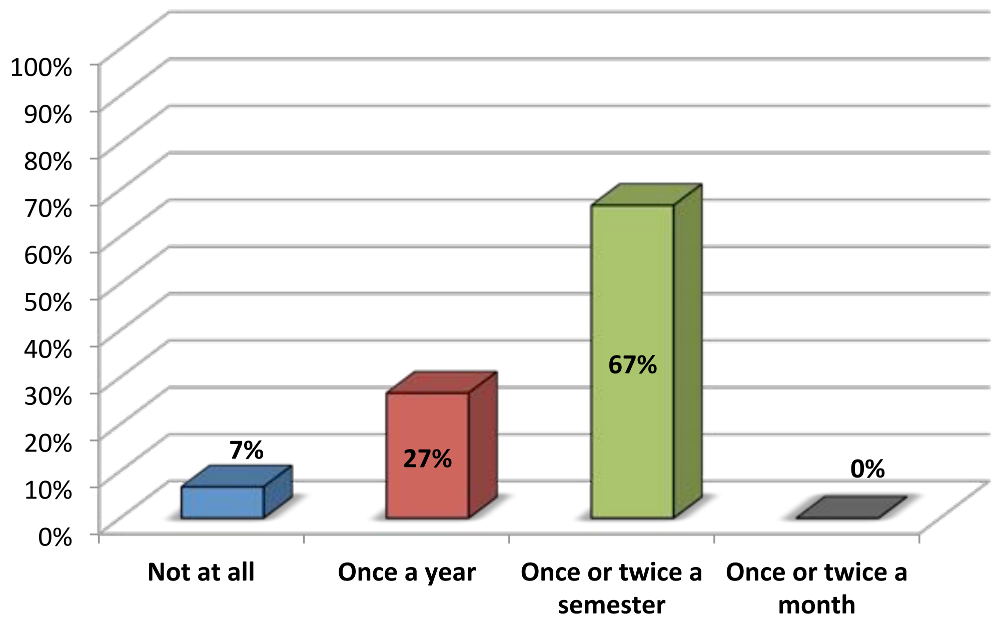
Q16: I have required my students to work on open-ended problems for which there is no immediately obvious method of solution.

(n=15)



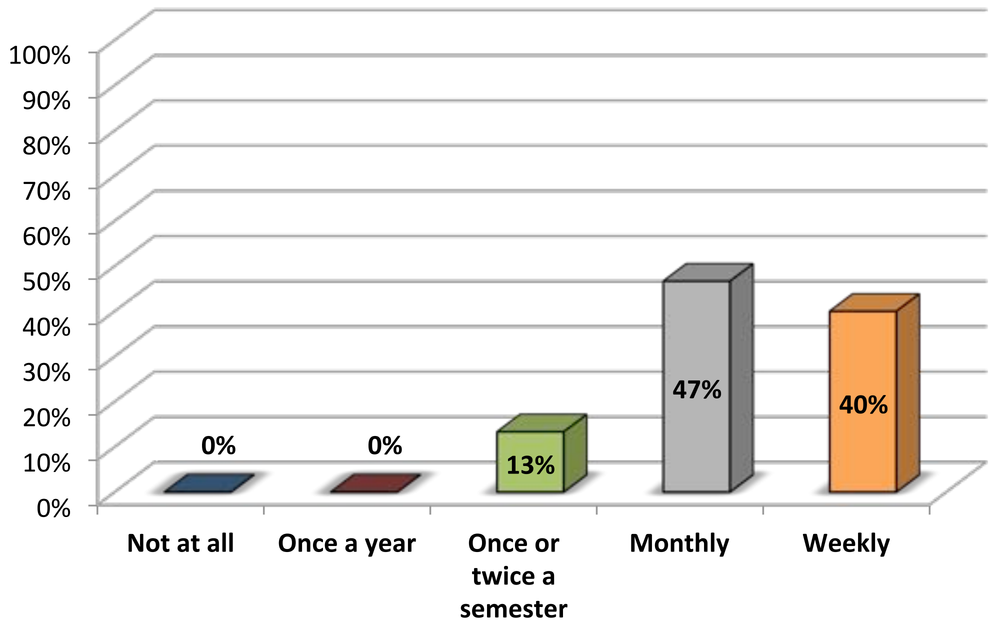
Q17: I have required my students to work on an extended, major project that lasts one week or more.

(n=15)



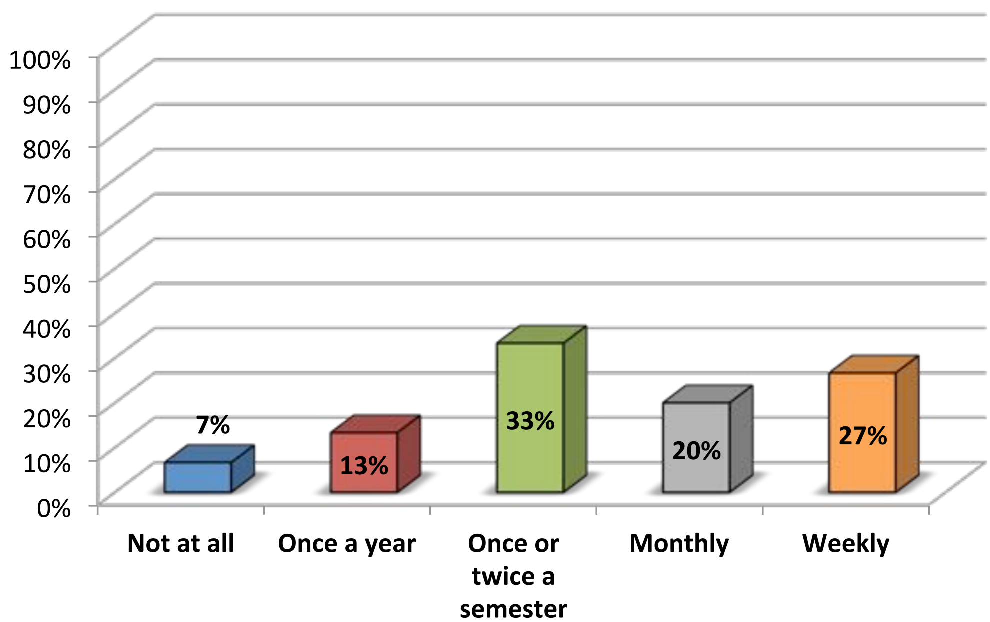
Q18: I have required my students to work in cooperative groups to deepen understanding of content.

(n=15)



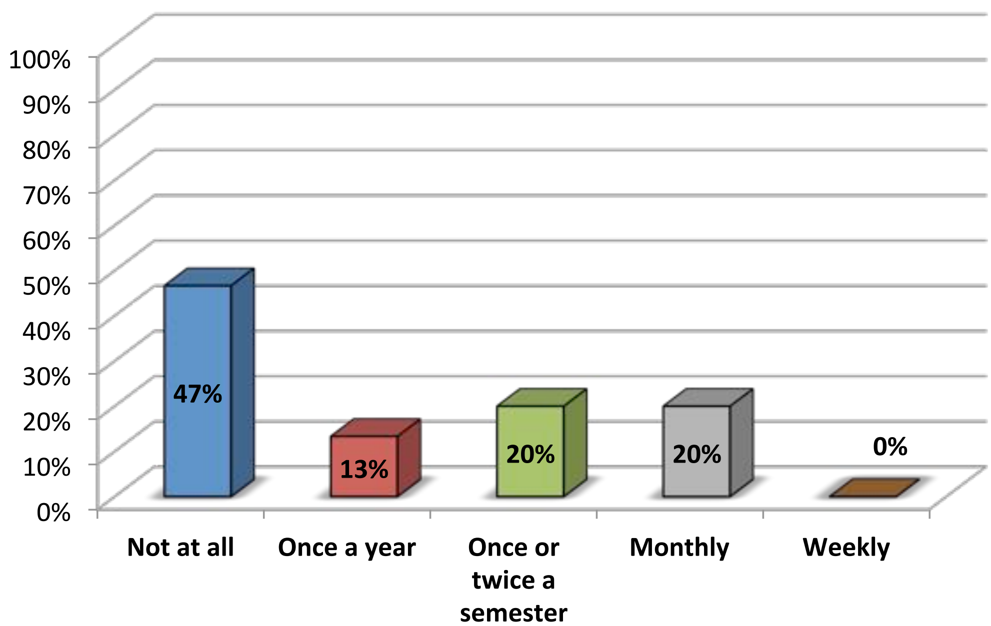
Q19: I have required my students to work in groups to complete a written product as a component of a project.

(n=15)



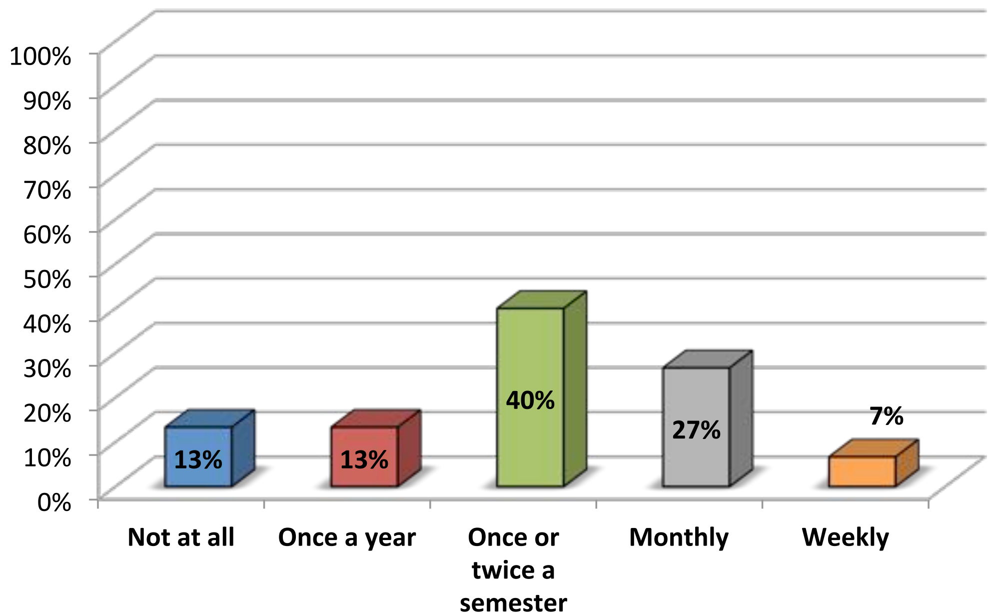
Q20: I have required my students to take a test that is predominantly essay questions.

(n=15)



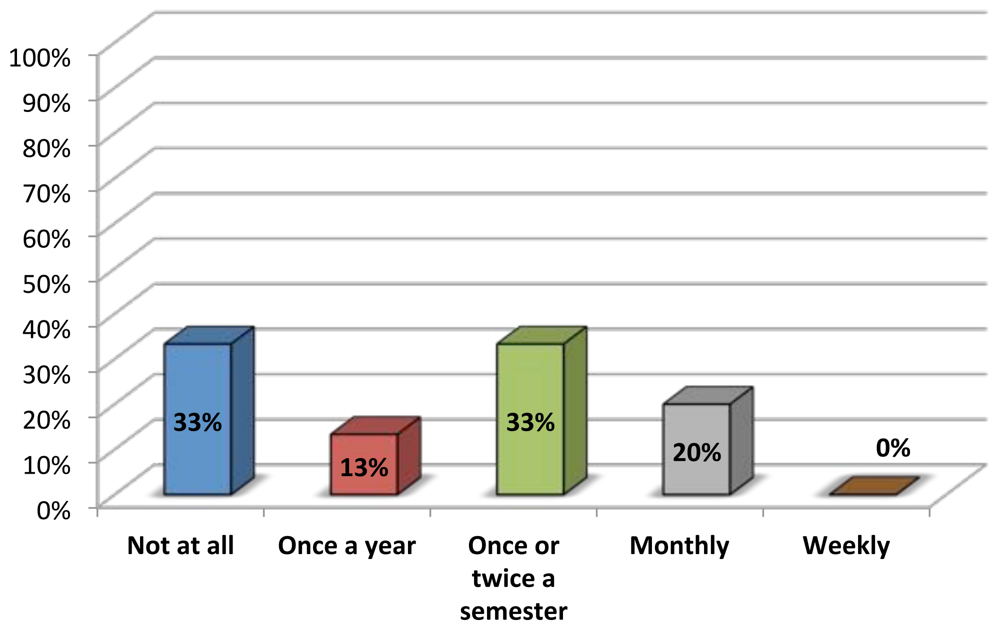
Q21: I have required my students to read science related materials (besides textbooks) and show their understanding through writing.

(n=15)



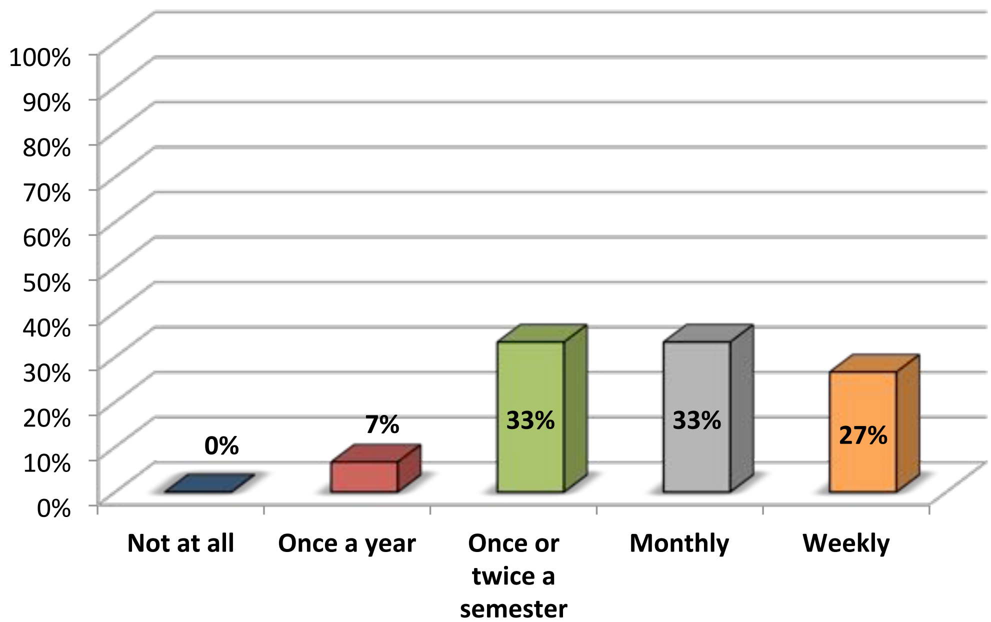
Q22: I have required my students to complete a writing assignment that addresses an authentic (real-life) problem in the community or work setting.

(n=15)



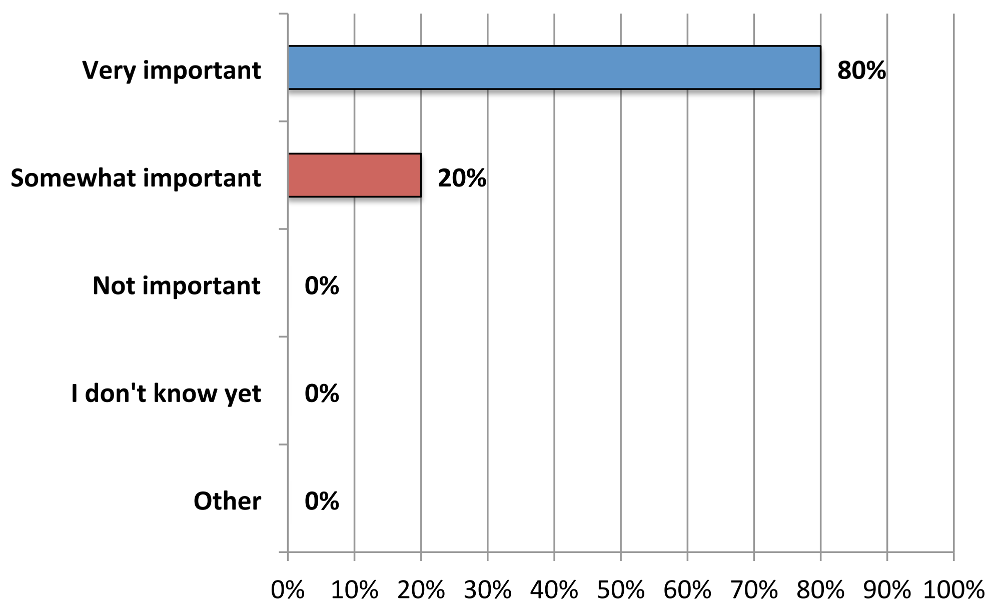
Q23: I have required my students to use science equipment to perform lab activities and use the information (data) collected to complete written assignments in science class.

(n=15)



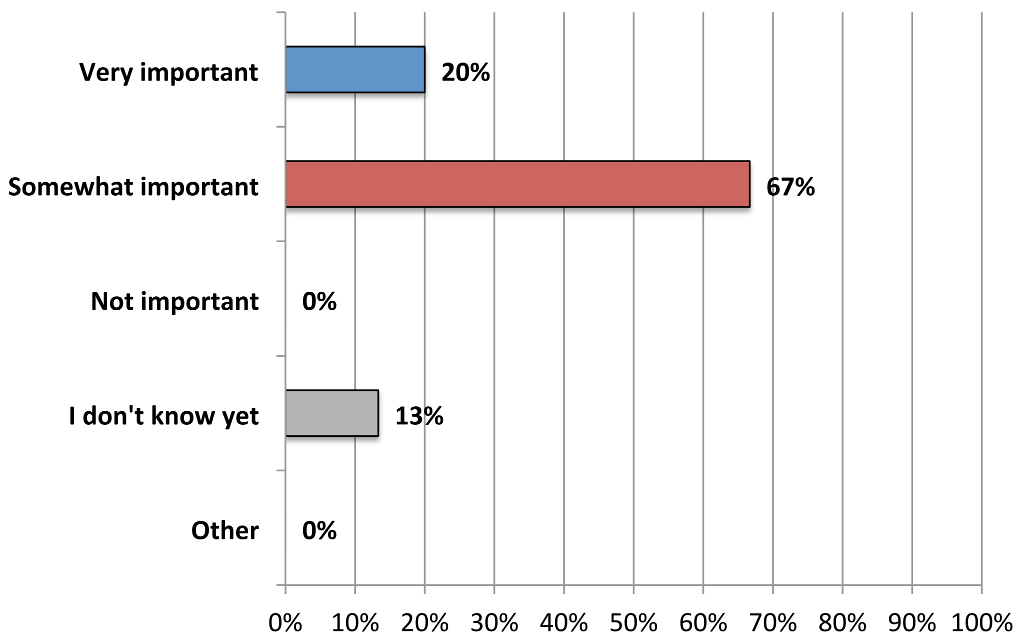
Q24: How important is it that your administrators understand the LDC instructional strategies that you will be implementing in your classroom this year?

(n=15)



Q25: How important is it for parents to know about/understand the LDC model for science literacy and learning?

(n=15)



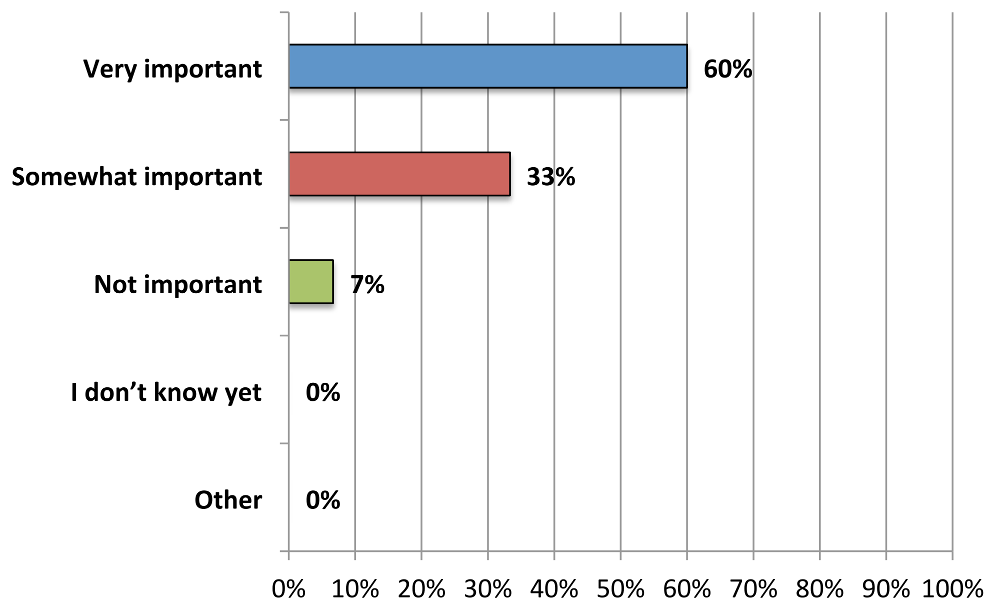
Q26: What do you anticipate to be your biggest challenge(s) with implementing your LDC module with your students?

(n=14)

Challenges	Teacher Grade Level		
	Grades 5-8 (n=4)	Grades 9-12 (n=8)	Grades 5-12 (n=2)
Time management	✔	✔	✔
Managing content	✔	✔	✔
Managing student expectations	✔	✔	
Student engagement	✔	✔	
Differentiation	✔		
Managing group work		✔	
Student accountability		✔	
Administrative support		✔	
Access to resources		✔	
Low student skills		✔	

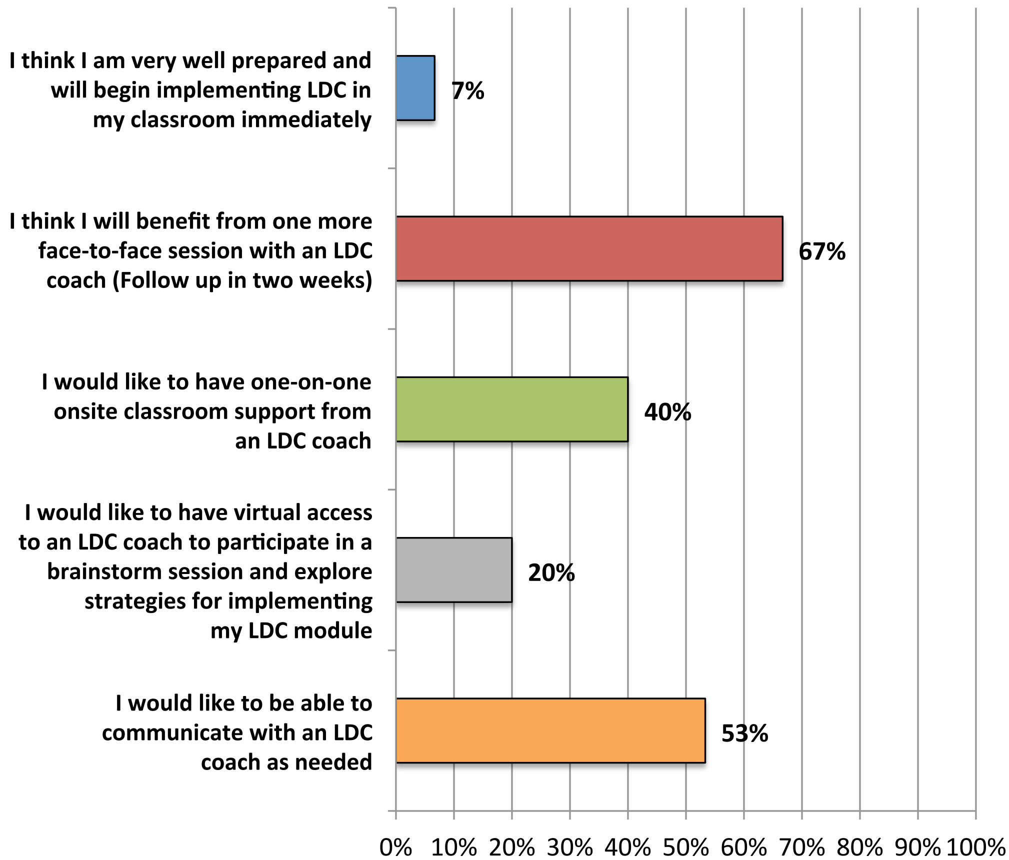
Q27: How important is it to have access to LDC coaches during implementation of LDC modules in your classroom?

(n=15)



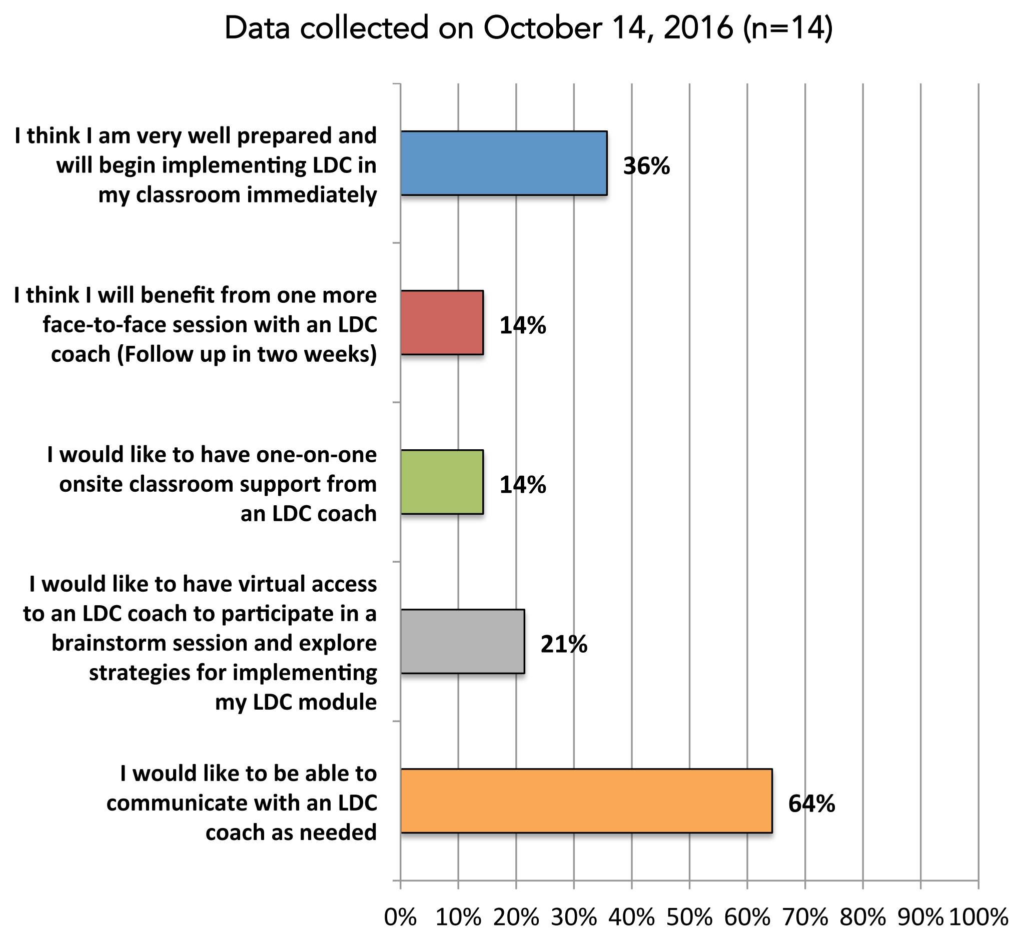
Q28/Q3: How well prepared are you to implement your LDC module in your classroom?

Data collected on September 30, 2016 (n=15)



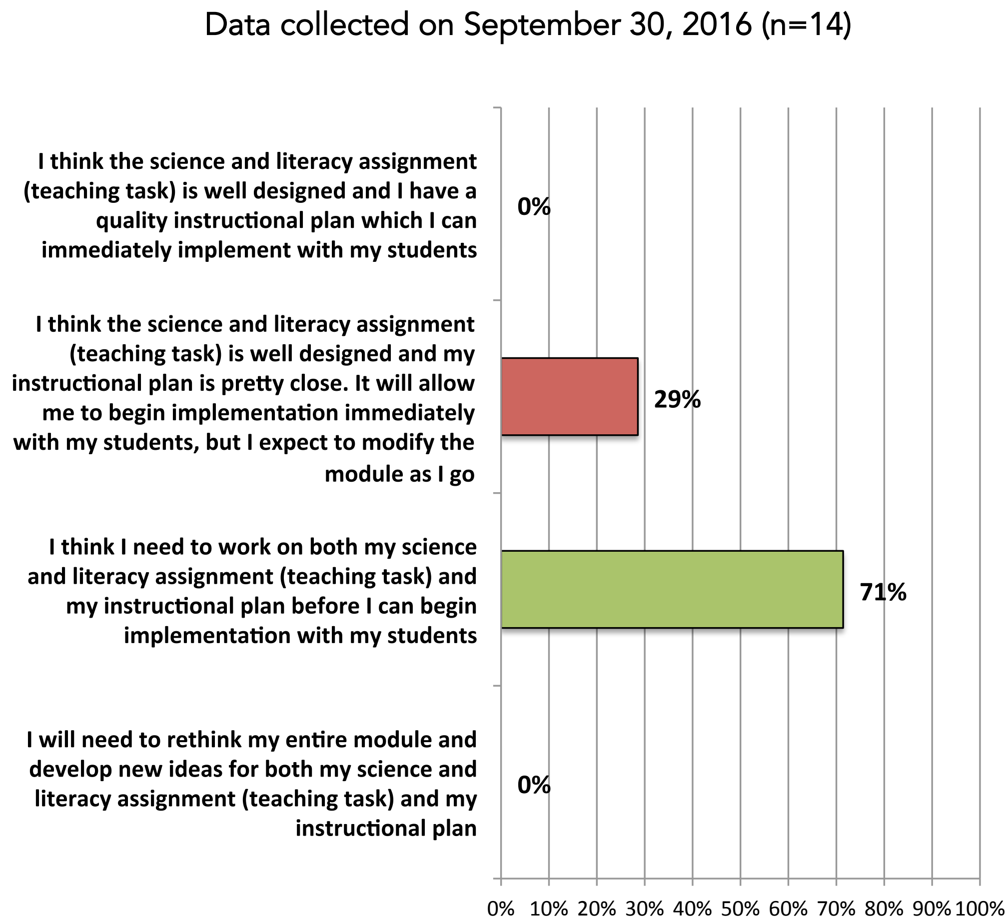
Note: Respondents were given the option of selecting more than one response category if applicable.

(Continued) Q28/Q3: How well prepared are you to implement your LDC module in your classroom?



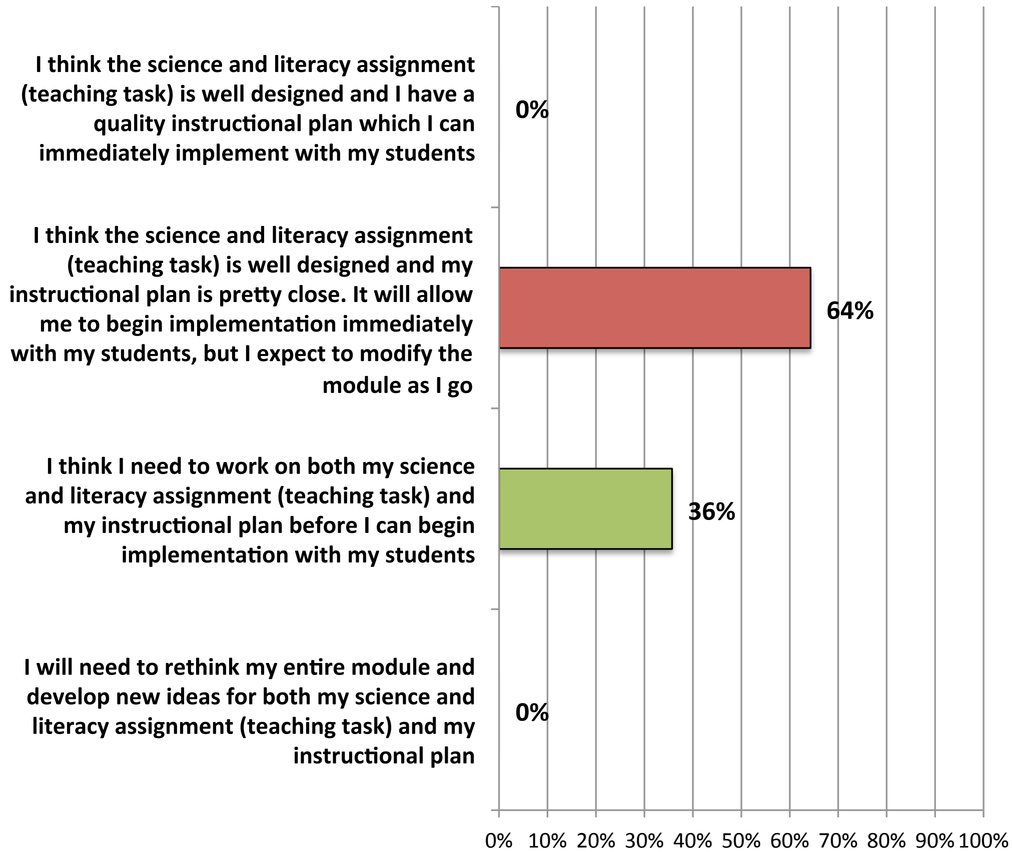
Note: Respondents were given the option of selecting more than one response category if applicable.

Q29/Q4: How would you rate your first LDC module?



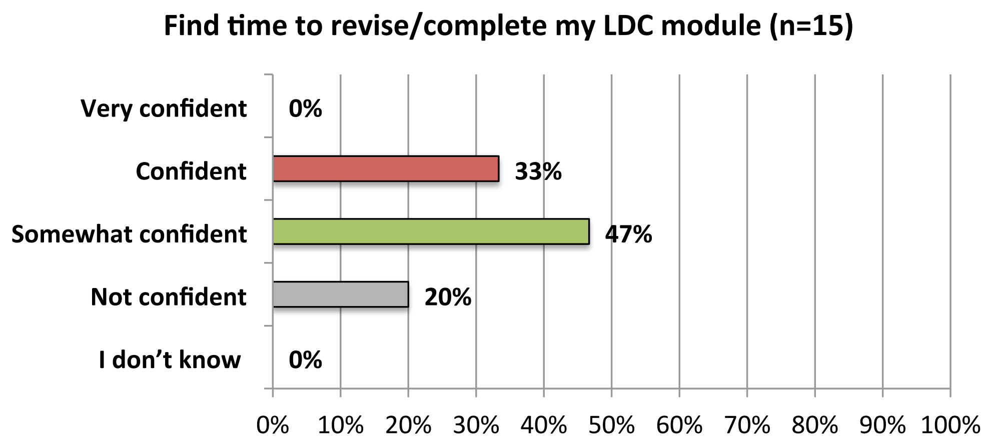
(Continued) Q29/Q4: How would you rate your first LDC module?

Data collected on October 14, 2016 (n=14)



Q30/Q5: How confident are you about the following aspects of implementing your LDC module?

Data collected on September 30, 2016



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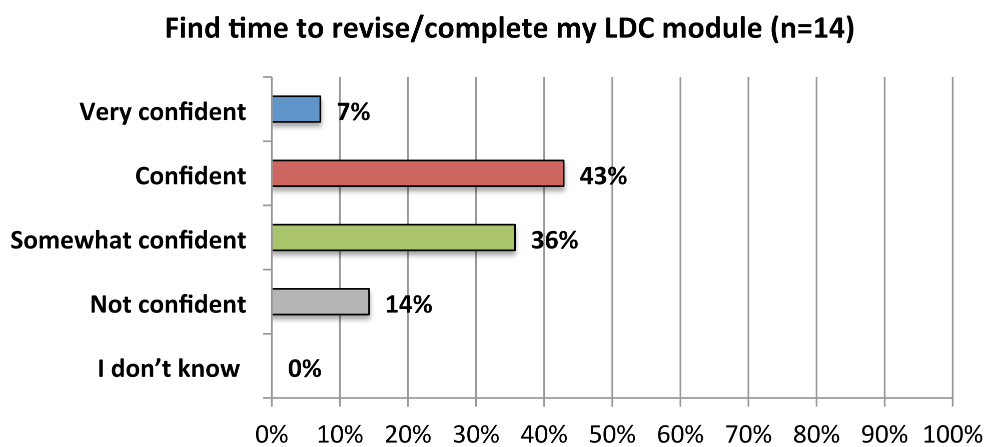

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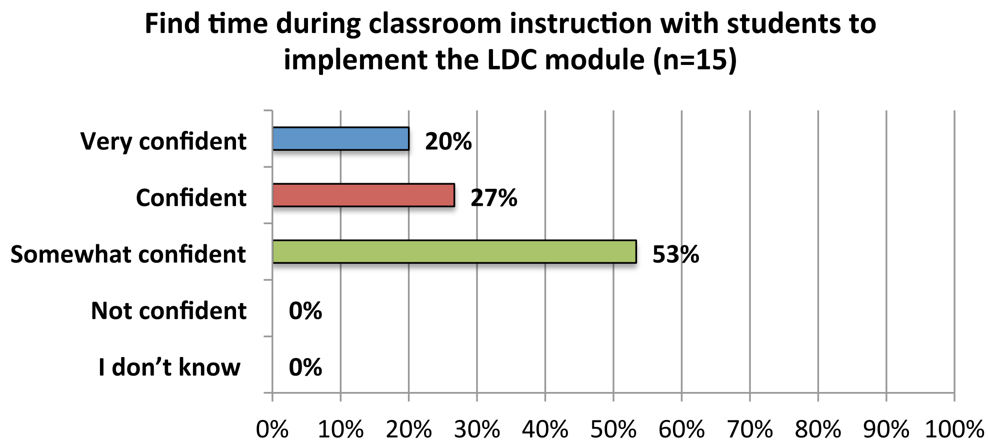

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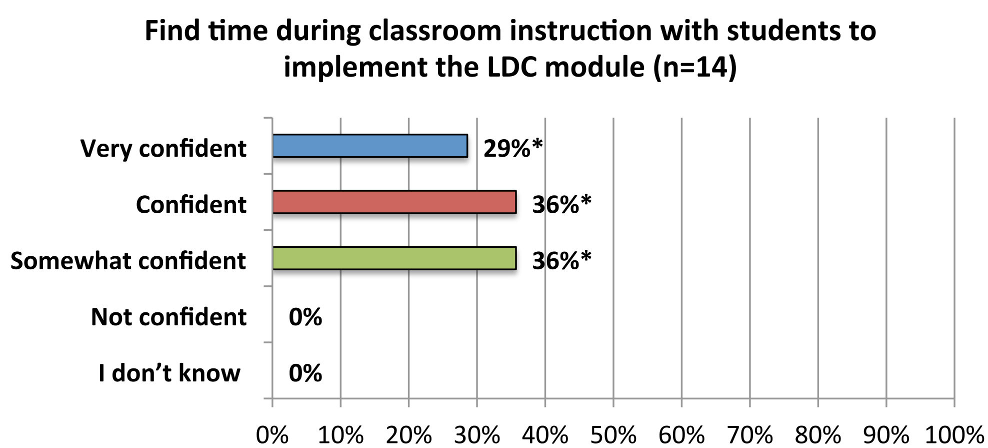

All data is rounded to the nearest percentage point.

(Continued) Q30/Q5: How confident are you about the following aspects of implementing your LDC module?

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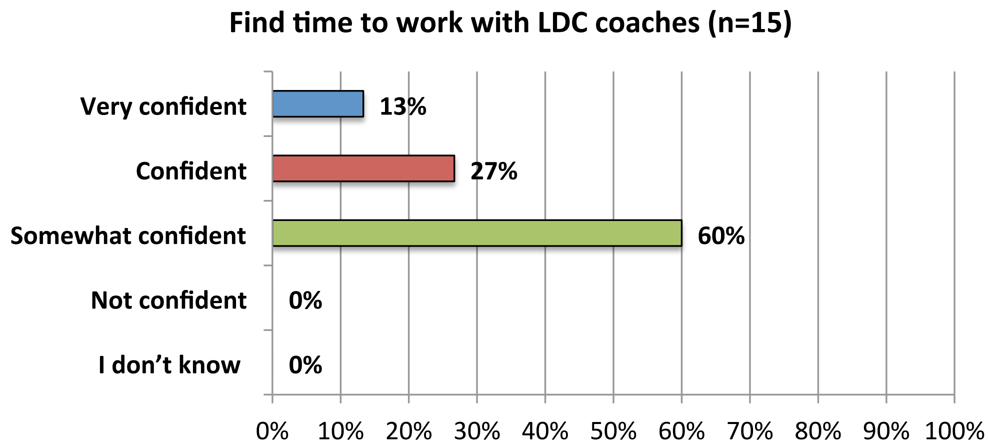

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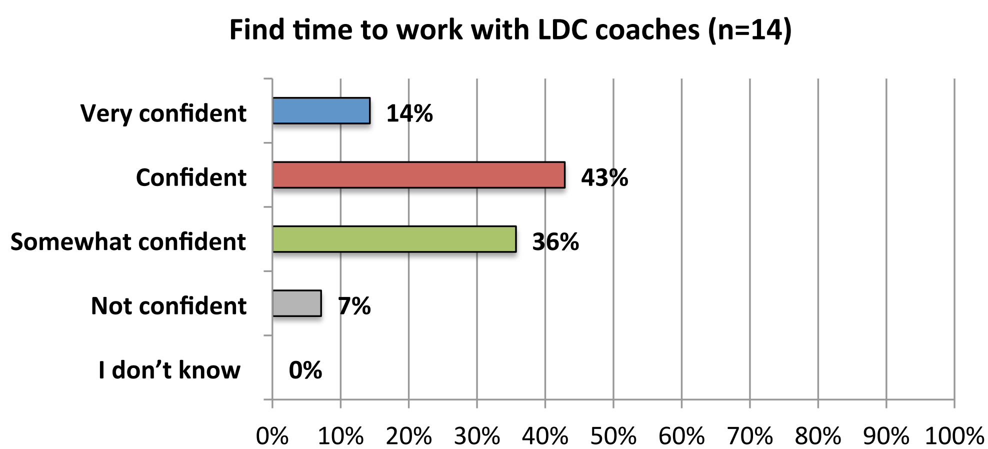

Q31/Q6: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

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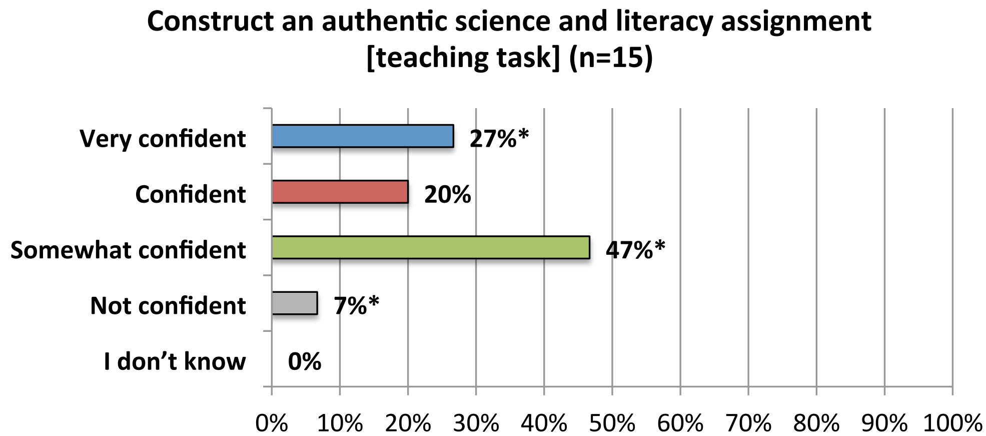

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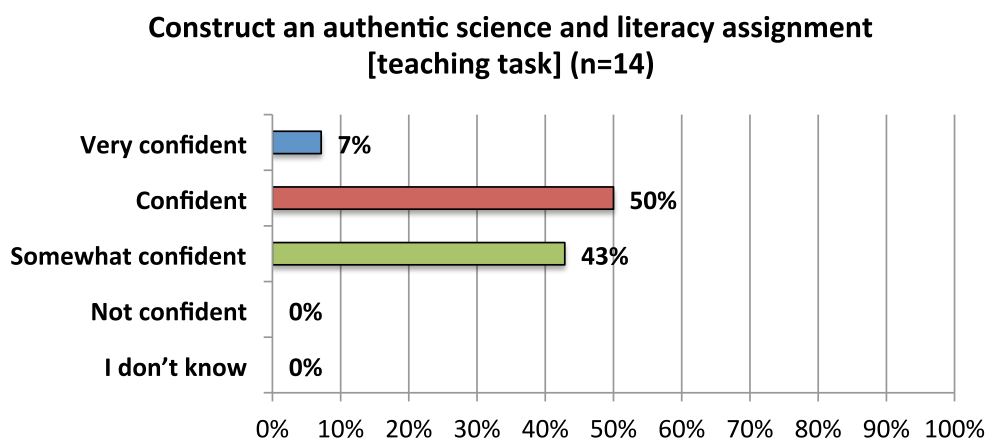

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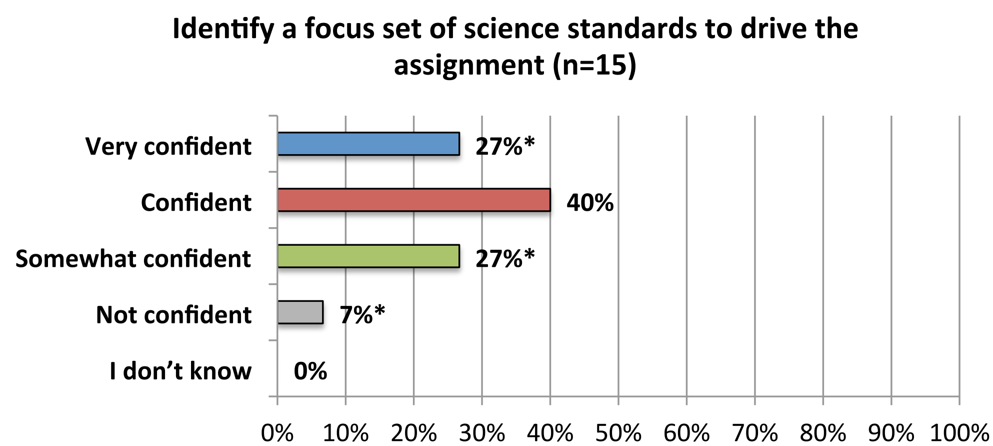

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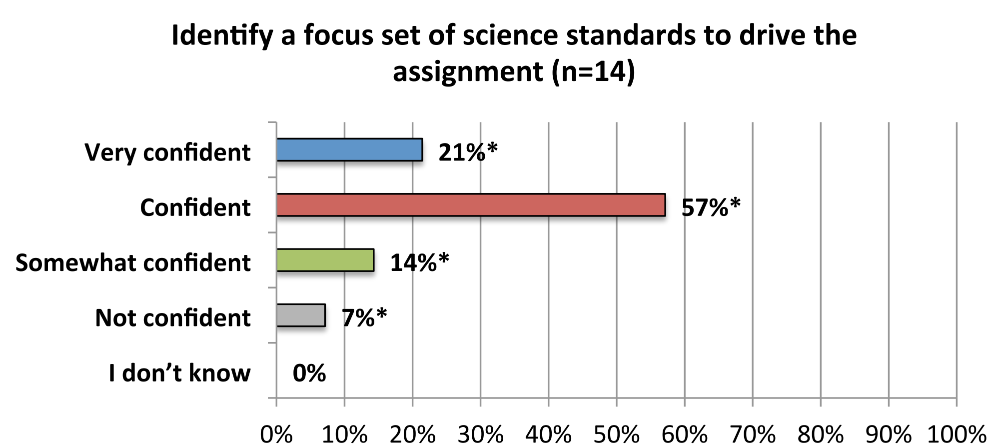

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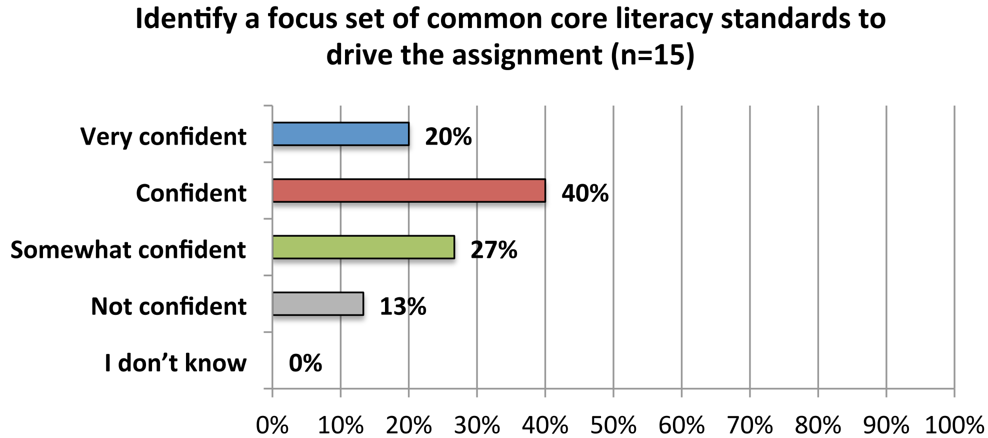

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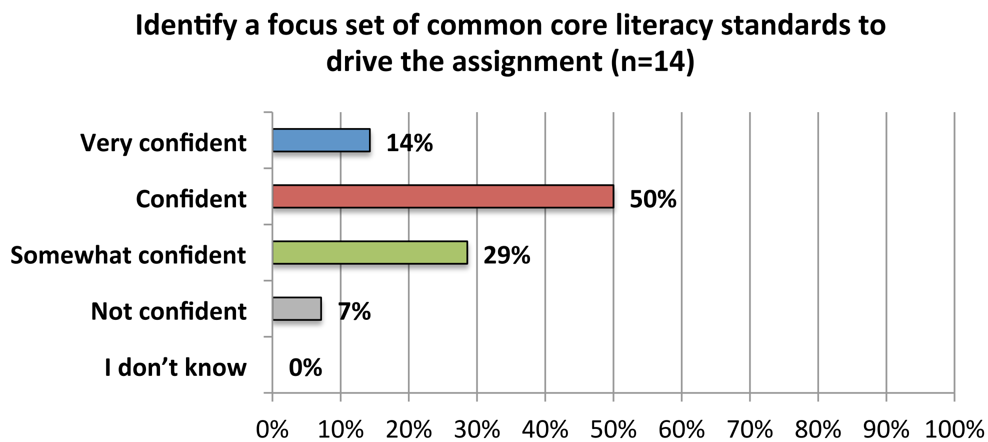

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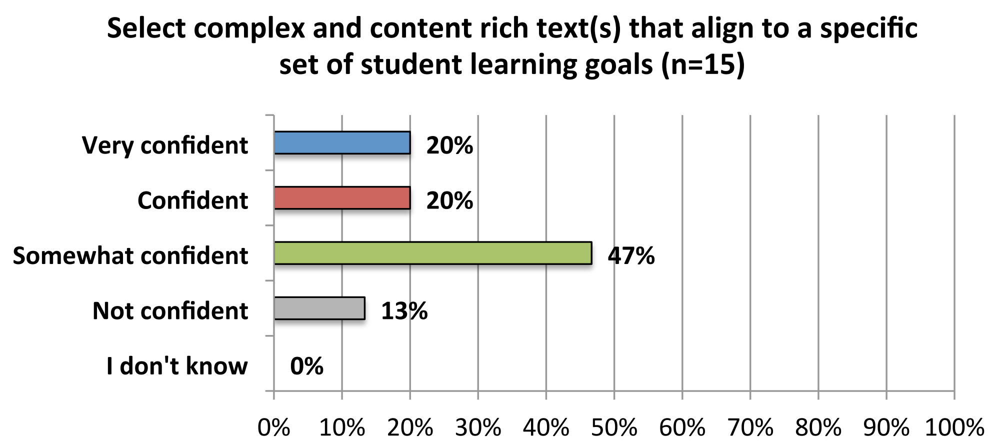

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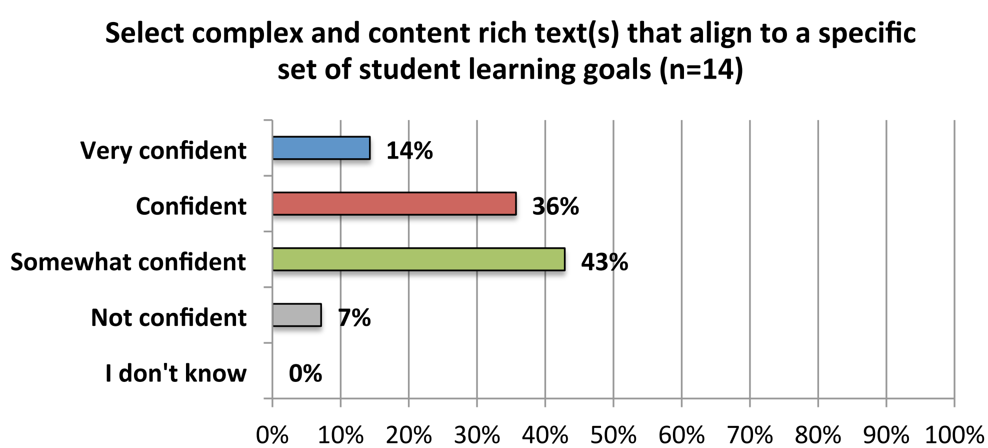

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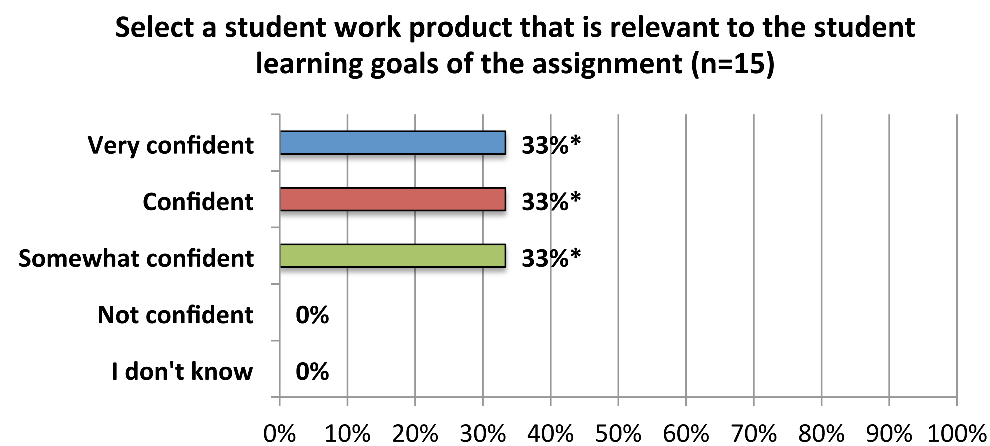

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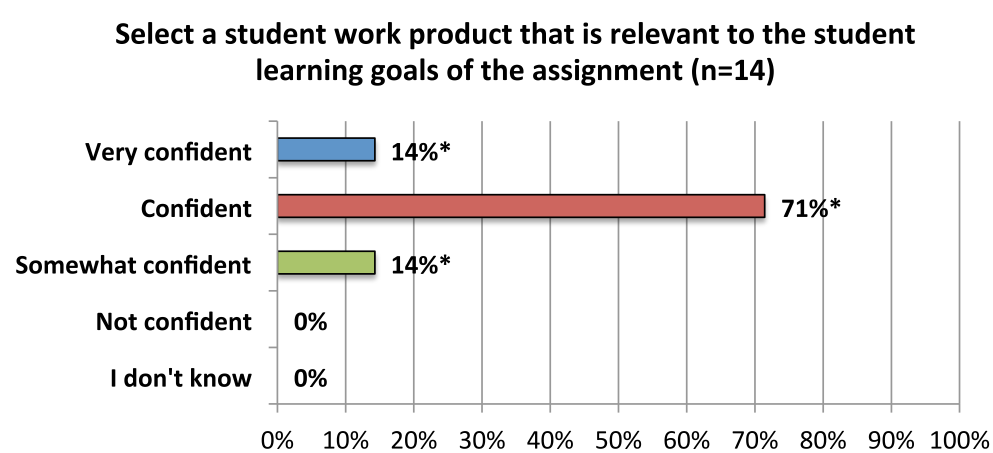

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(Continued) Q31/Q6: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

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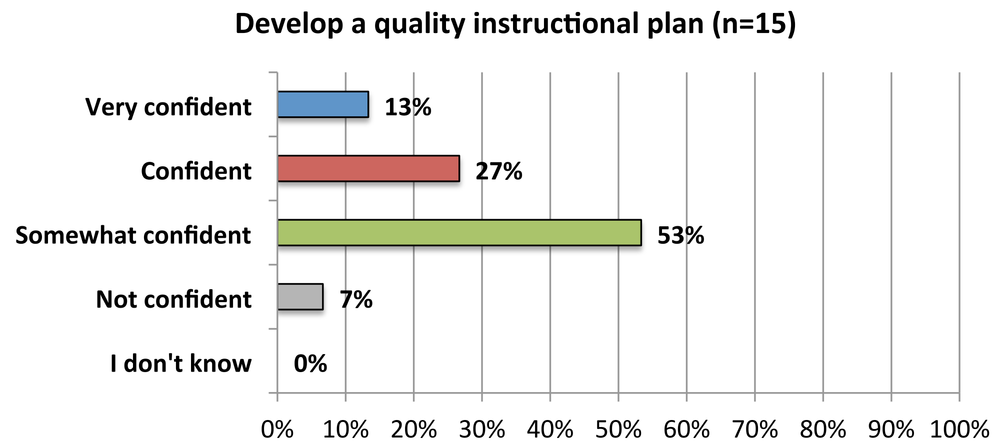

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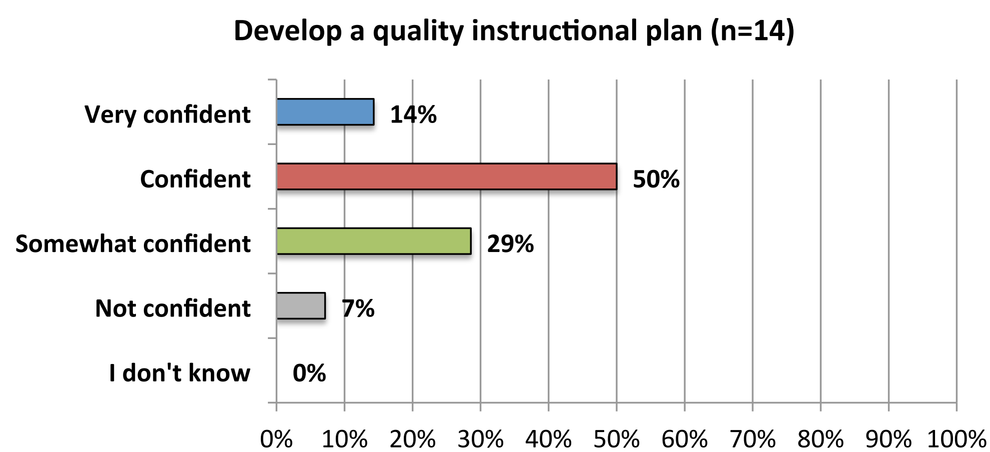

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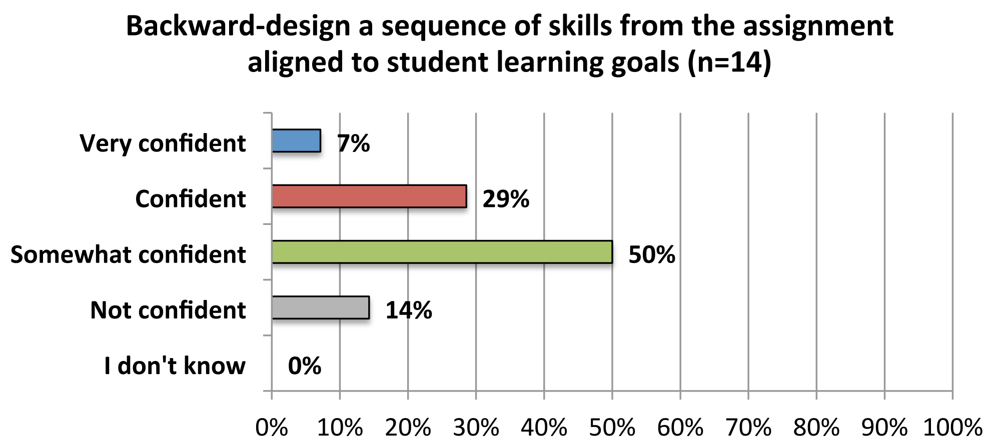

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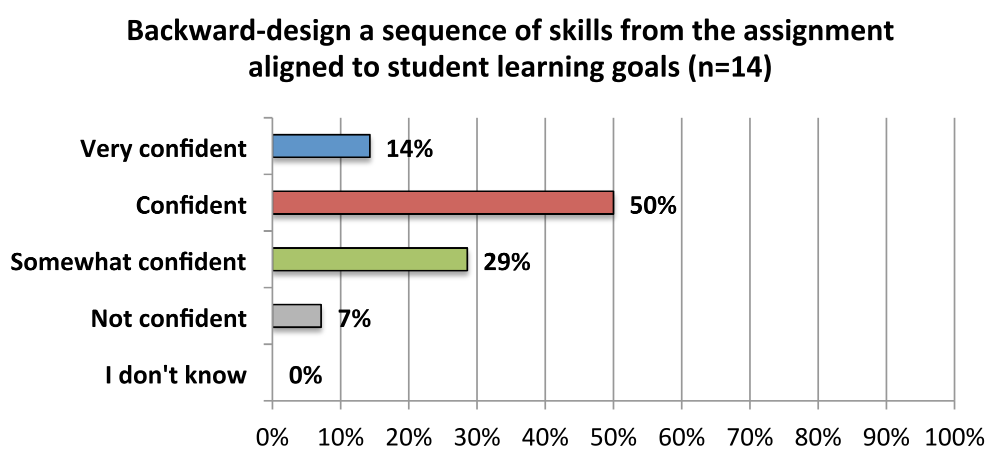
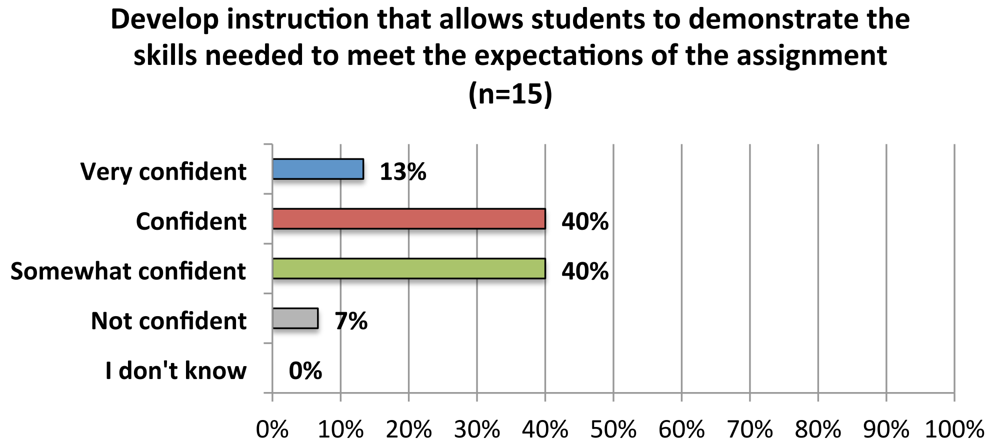
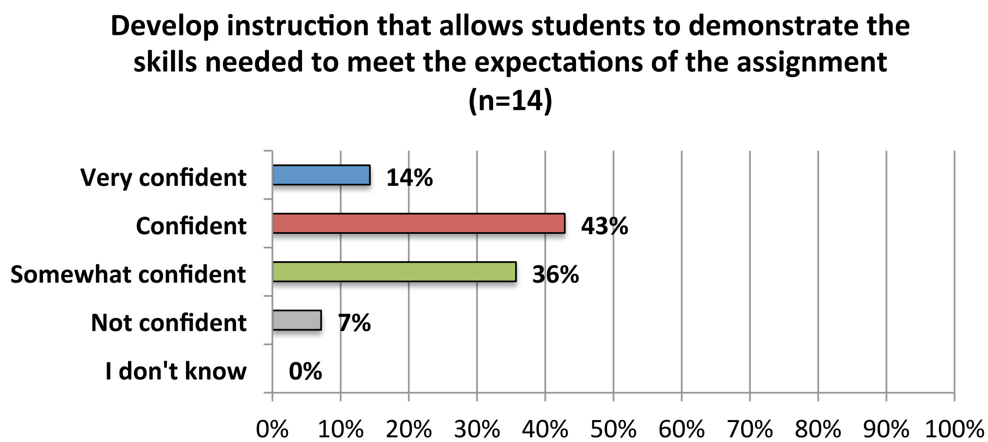


(Continued) Q31/Q6: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

Data collected on September 30, 2016

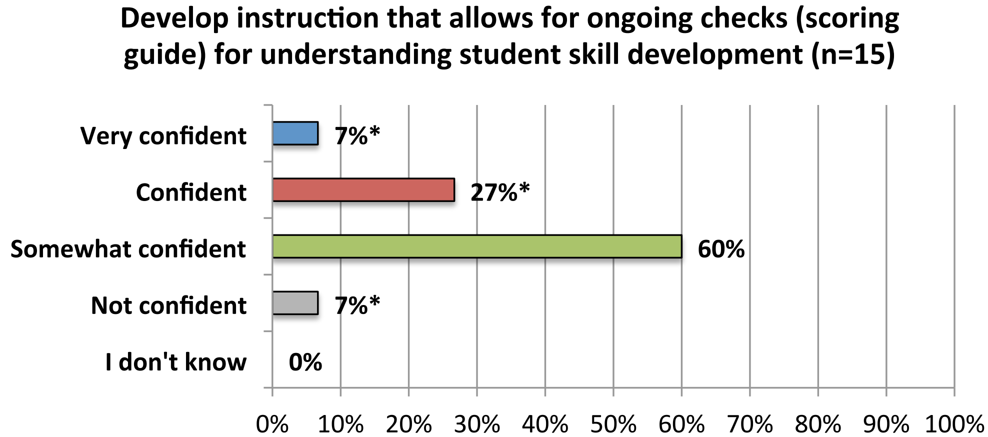


Data collected on October 14, 2016

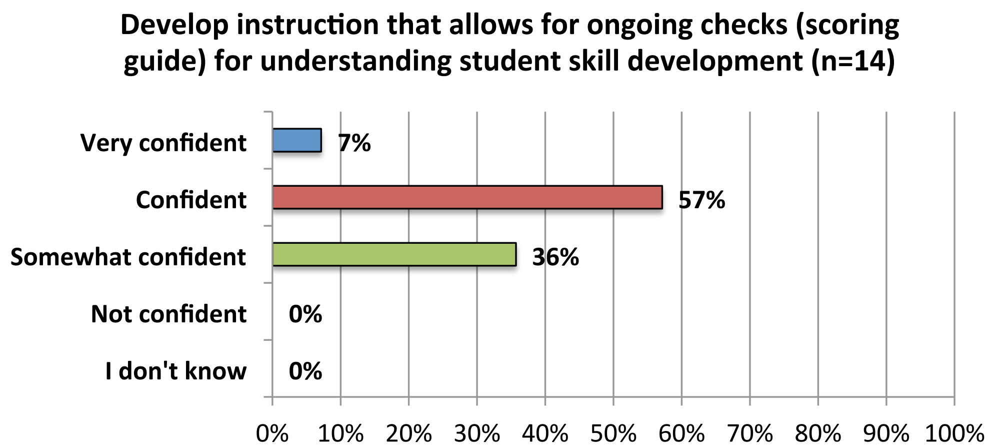


(Continued) Q31/Q6: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

Data collected on September 30, 2016



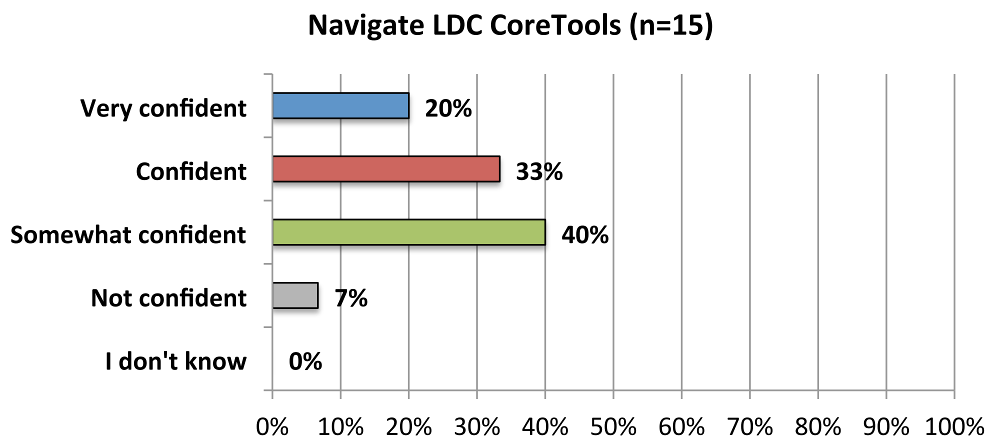
Data collected on October 14, 2016



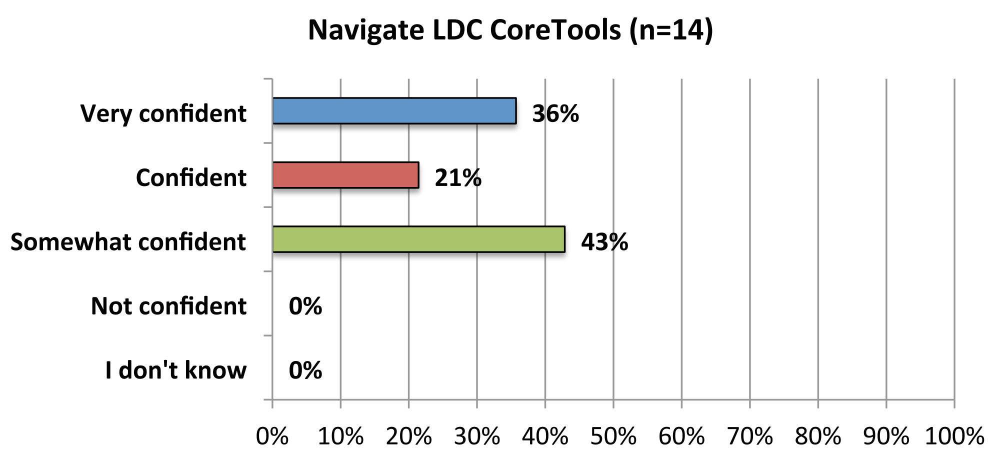
**All data is rounded to the nearest percentage point.*

(Continued) Q31/Q6: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

Data collected on September 30, 2016

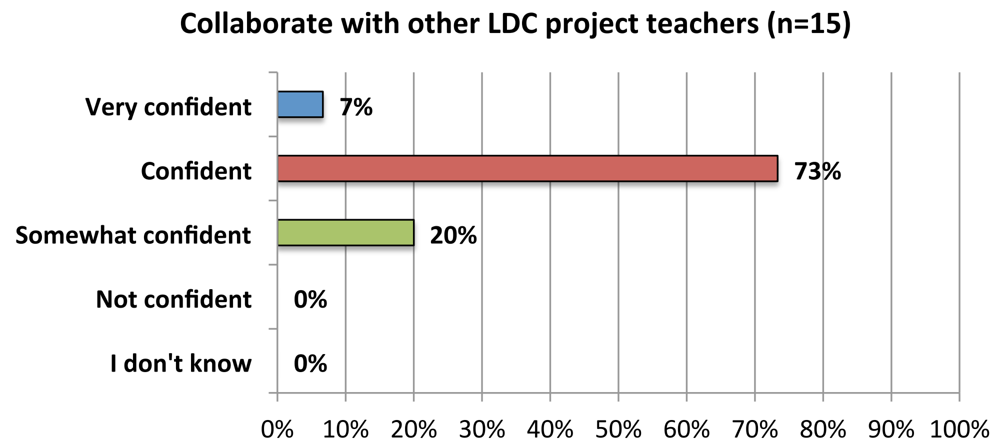


Data collected on October 14, 2016

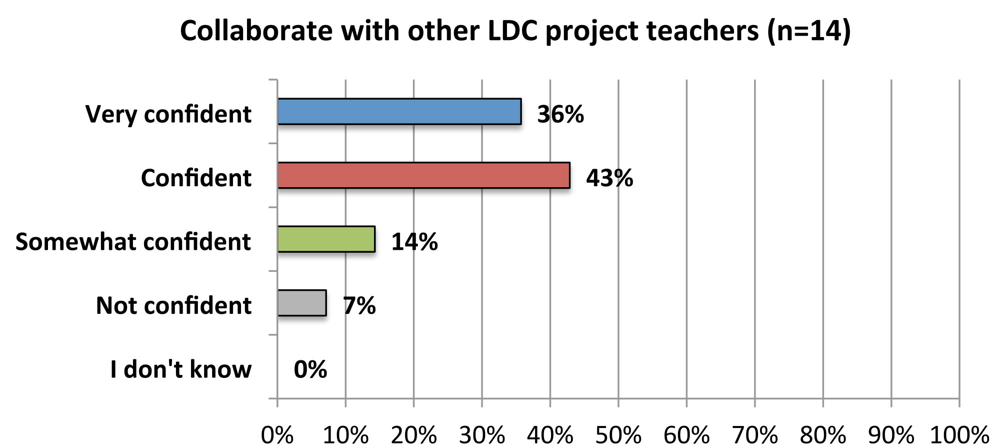


(Continued) Q31/Q6: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

Data collected on September 30, 2016



Data collected on October 14, 2016



Q32: Briefly describe "Design Thinking" and particular benefits for student learning

(n=14)

Design Thinking	Teacher Grade Level		
	Grades 5-8 (n=4)	Grades 9-12 (n=8)	Grades 5-12 (n=2)
Product development	✔	✔	
Structured process	✔	✔	
Real world	✔		
Hands-on experience		✔	
Engineering principles		✔	
Backward design		✔	
Nontraditional		✔	
Open ended		✔	

Benefits to Students	Teacher Grade Level		
	Grades 5-8 (n=4)	Grades 9-12 (n=8)	Grades 5-12 (n=2)
Creativity	✔	✔	✔
Problem solving	✔	✔	✔
Critical thinking	✔	✔	
Learning from mistakes	✔	✔	
Seeing the big picture	✔		
Collaboration	✔		
Communication	✔		
Structured process		✔	
Organizational skills		✔	
Engagement		✔	
Ownership of learning			✔

Q33: Briefly describe PBL and potential impacts on student learning

(n=14)

PBL	Teacher Grade Level: Grades 5-8 (n=4)	Grades 9-12 (n=8)	Grades 5-12 (n=2)
Structured process	✔	✔	✔
Nontraditional	✔	✔	
Real world	✔	✔	
Open ended	✔	✔	
Teacher as facilitator/Student led instruction		✔	
Applied learning		✔	
Hands-on learning		✔	

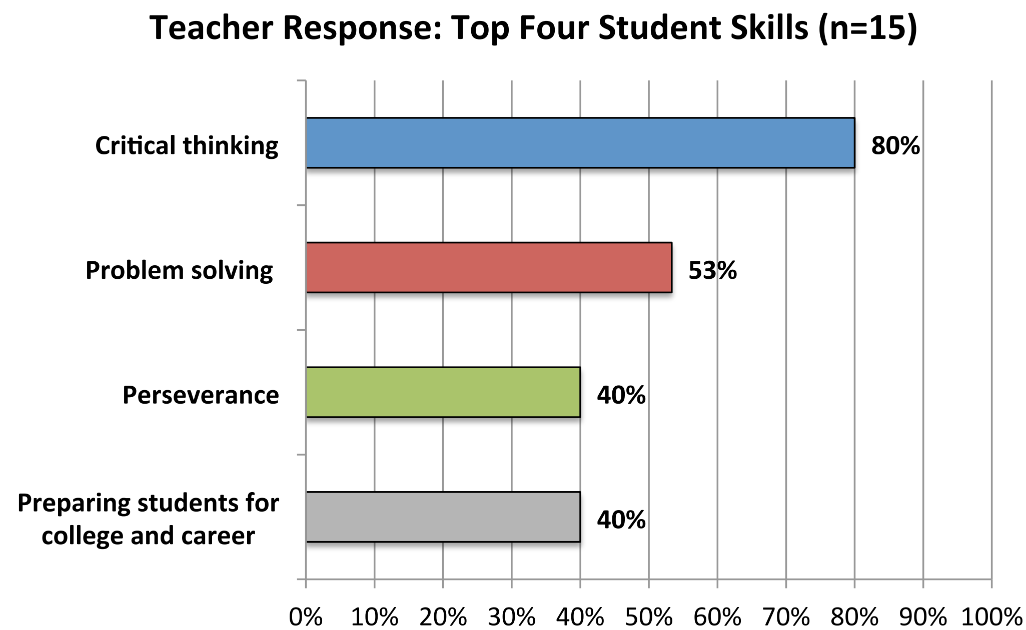
Potential Impacts on Student Learning	Teacher Grade Level: Grades 5-8 (n=4)	Grades 9-12 (n=8)	Grades 5-12 (n=2)
Engagement	✔	✔	✔
Ownership of learning	✔	✔	
Critical thinking	✔	✔	
Seeing the big picture	✔	✔	
Problem solving	✔	✔	
Building confidence	✔		
Research skills		✔	
Differentiation		✔	

Q34: Briefly describe any anticipated impacts on student performance using LDC components in your classroom

(n=14)

Anticipated Impacts	Teacher Grade Level		
	Grades 5-8 (n=4)	Grades 9-12 (n=8)	Grades 5-12 (n=2)
Student engagement	✔	✔	✔
Content retention	✔	✔	✔
Student growth	✔	✔	
Reading fluency	✔	✔	
Differentiation	✔	✔	
Writing skills	✔		
College and career interests	✔		
Design process	✔		
Teacher growth	✔		
Learning from mistakes	✔		
Risk taking	✔		
Problem solving		✔	
Student buy-in		✔	
Higher quality projects		✔	
Critical thinking		✔	
Time management		✔	

Q35: What are your top skills you would like your students to develop in your class to prepare them for the future?



Note: Teachers identified four categories among 12 choices:
[A) Problem solving; B) Critical thinking; C) Collaboration; D) Understanding the scientific process; E) Perseverance; F) Following directions/listening; G) Conducting research; H) Finding resources/valid data to support project design; I) Communication; J) Presenting research/project to their peers or other audience; K) Organization/project management; L) Preparing students for college and career; M) If other, please describe briefly]

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section I: Evaluation

Submitted by:
Monica Hunter, Ph.D, Director of Research
Maria Green Cohen, Assistant Director of Research
Kayla Galloway, Research Assistant
Grayson Rudzinski, Design Researcher

PART 3: Appendix E-2

July 31, 2017

Rural LDC Cohort 1 Post-Implementation Survey

The Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

April 20, 2017

This document provides a preliminary report of survey responses for the LDC Science and Literacy Project 2017 Cohort 1 Post-Implementation Survey. Project districts include: Northwestern Local Schools, Mapleton Local Schools, Hillsdale Local School District, Loudonville-Perrysville Exempted Village Schools, and Black River Local Schools. The Survey was completed by all Cohort 1 teachers (n=15).

The report presents bar charts for survey responses for Qs 1-23, Qs 25-30, Q32, Qs 35-38, and 40. Open-ended responses (Qs 24, 31, 33, 34 and 39), and questions that provided the option for respondents to select an open-ended "if other" comment are presented in table format in this report.

SURVEY PROTOCOL

The Rural Collaborative 2017 Teacher post-implementation survey was administered on Friday, March 24th during the third LDC professional development session. The survey was administered via a secure web-based platform (SurveyMethods®) designed for conducting a confidential and anonymous survey. Survey participants were asked to review survey protocols prior to voluntary agreement to participate in the post-implementation survey.

SUMMARY OF SURVEY QUESTIONS AND ISSUES

Q2 is a profile question.

Qs 3-4 are questions regarding teachers' experiences in their careers. Teachers were asked about experience with coaching other teachers or leading professional development sessions. Teachers were also asked about collaboration and sharing best practices with other teachers.

Qs 5-6 are questions regarding teacher's experience with coaching, mentoring, and collaborating with other teachers, specifically during the first year of LDC implementation. Teachers were asked if they engaged in collaboration with other LDC teachers in any way in the first year of implementation. Teachers were also asked if they engaged in mentoring, coaching other teachers or leading professional development sessions during the 2016-17 school year.

Qs 7-23 are questions regarding teachers' classroom instructional practices during the first year if LDC implementation related to requiring students to conduct research and complete written components of class assignments.

Q24 is an open-ended question asking teachers to briefly describe "design cycle thinking" and whether there are particular benefits for student learning.

Q25 and Q27 asked teachers if they think their building administrators and parents were provided sufficient information to understand the LDC Science and Literacy Project.

Q26 and Q28 asked teachers how important is it for administrators and parents to know about and understand the LDC instructional strategies and model.

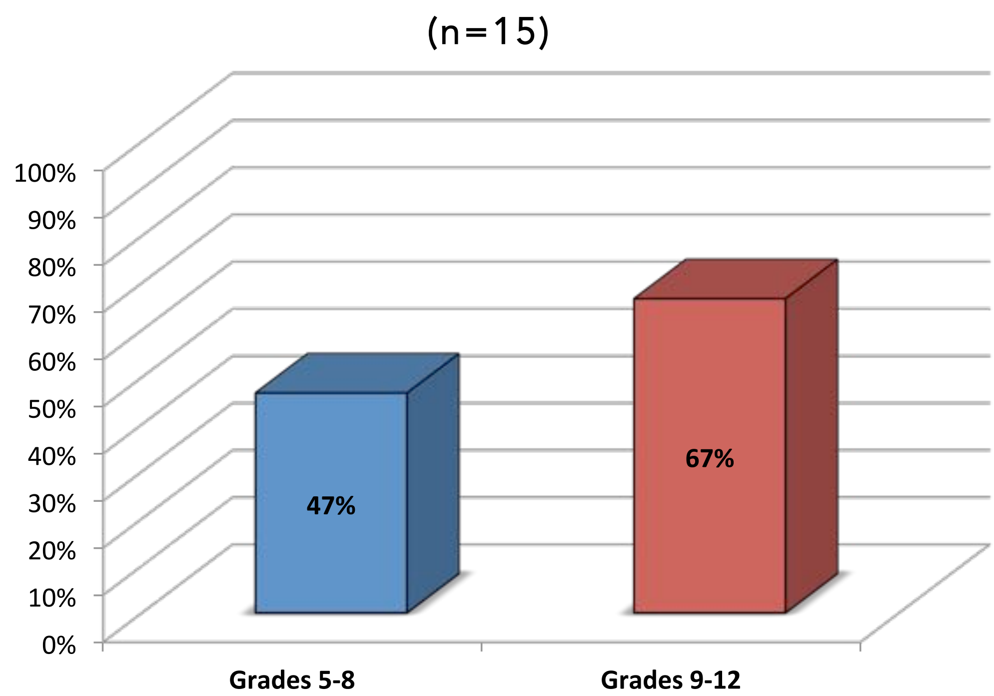
Qs 29-33 are questions regarding implementation of the LDC module. Q29 asked teachers to describe their first LDC module. Q30 asked teachers how many additional hours they worked beyond the on-site PD days to prepare for the December 9th review session. Q31 is an open-ended question describing the greatest challenge with implementing their first LDC module (fall 2016). Q32 asked teachers to describe their second LDC module. Q33 is an open-ended question to describe the greatest challenge with implementing their second LDC module (spring 2017).

Qs 34-38 are questions regarding support and communication during the first year of the LDC Project. Q34 is an open-ended question asking teachers what was most helpful to support implementation in their classroom during the first year of the LDC project. Q35-36 provides feedback from teachers about the importance of having access to LDC coaches, as well as on-site coaching during the first year of the LDC Science and Literacy project. Q37 provides feedback from teachers about the top three ways they preferred to receive feedback on their LDC modules between PD workshops. Q38 asked teachers to self-evaluate confidence level in implementing aspects of the LDC instructional model in the classroom.

Q39 is an open-ended question asking teachers to briefly describe observed impacts on student performance associated with LDC instruction in their classroom.

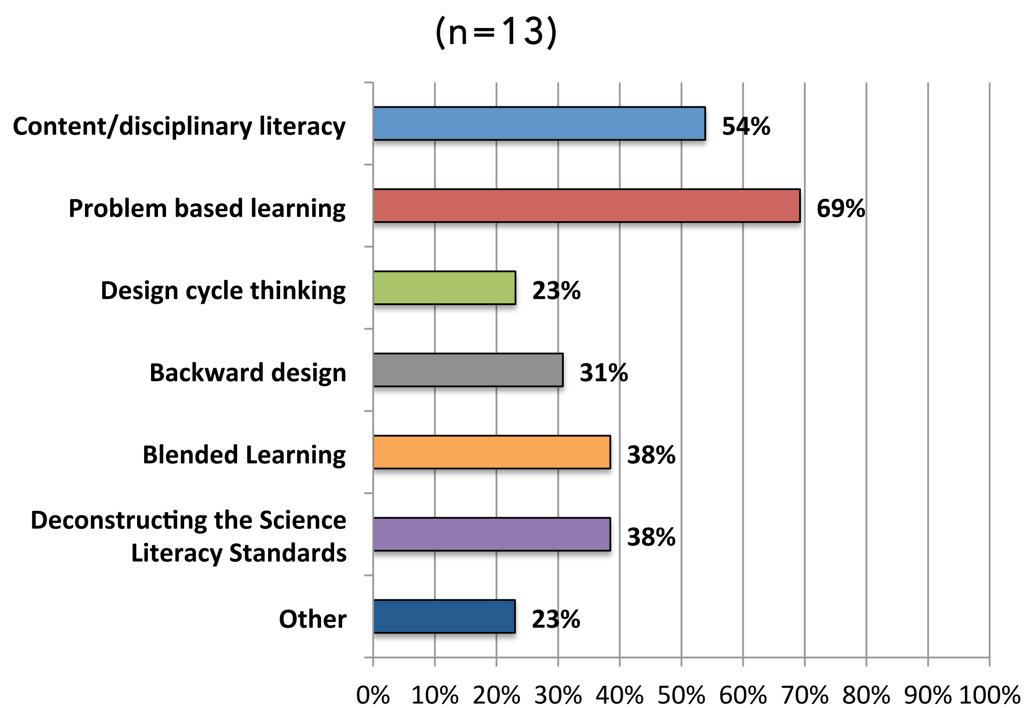
Q40 asked teachers to identify the top three skills they think are most important for students to prepare for the future. Teachers selected from a drop-down menu of skills associated with the LDC instructional model.

Q2: I currently teach (please check all that apply:



Note: Respondents were given the option of selecting more than one response category if applicable.

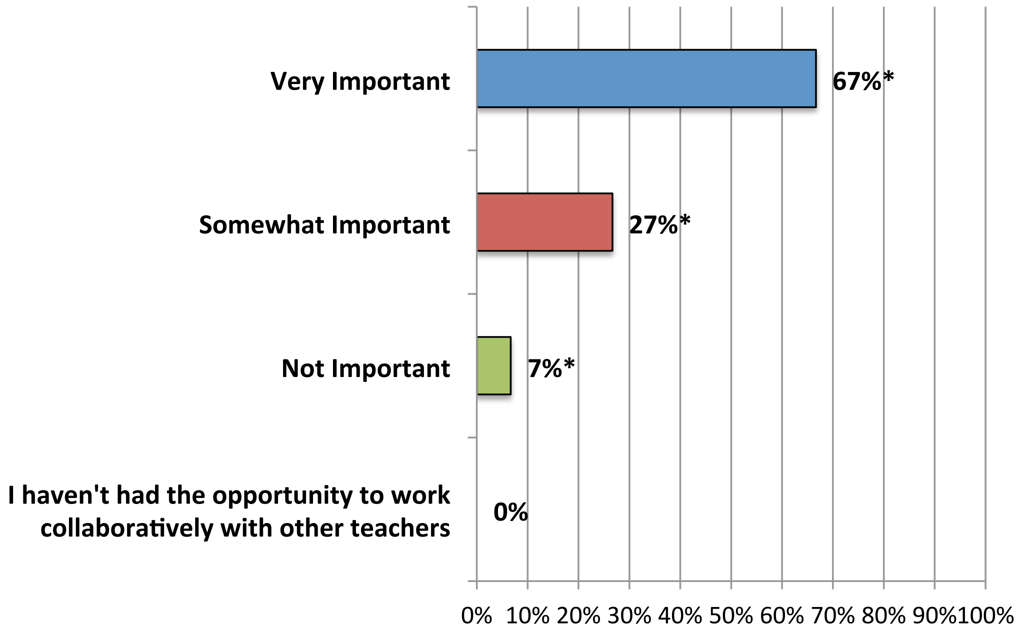
Q3: In your teaching career, what professional development experiences have you had (prior to LDC Science & Literacy)? (Please choose all that apply.)



Note: Respondents were given the option of selecting more than one response category if applicable, and the option of an "if other" response, which is reflected above as "Other."

Q4: In your experience, how important is collaboration and sharing best practices with other teachers?

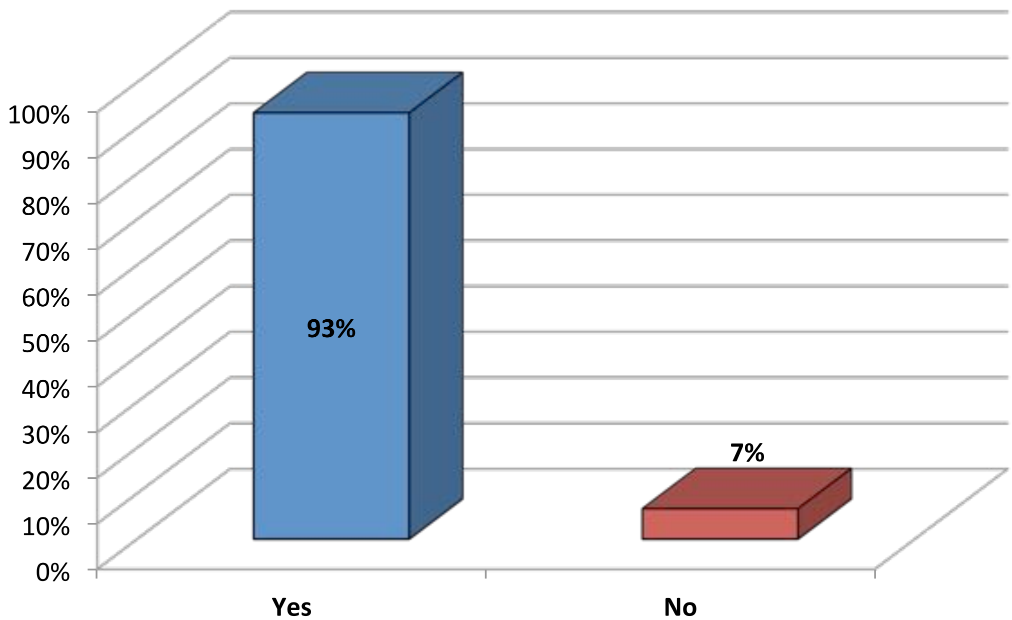
(n=15)



All data is rounded to the nearest percentage point.

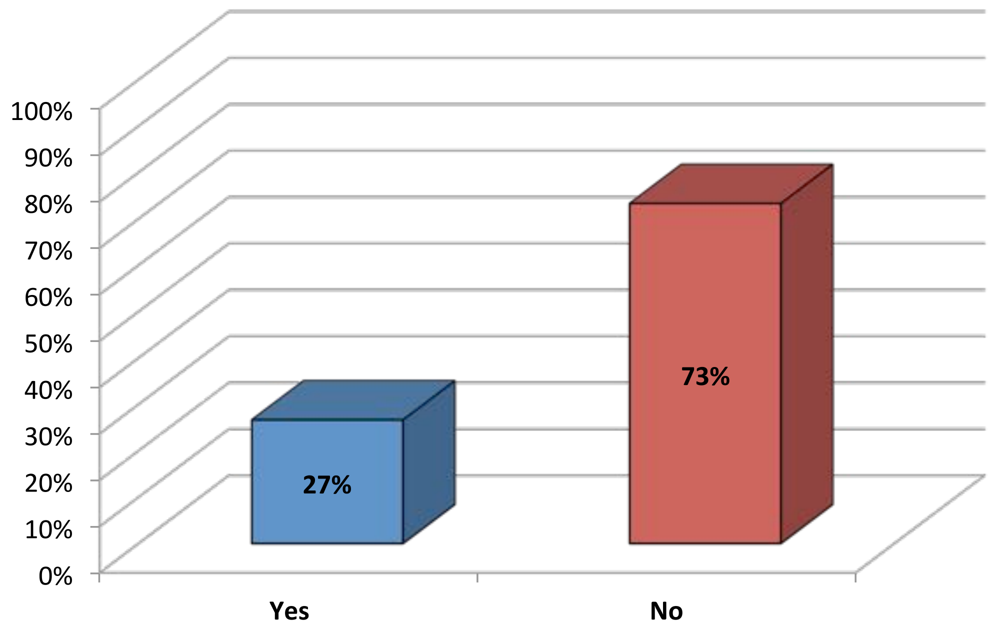
Q5: In this first year of LDC implementation did you engage in collaboration with other LDC teachers in any way?

(n=15)

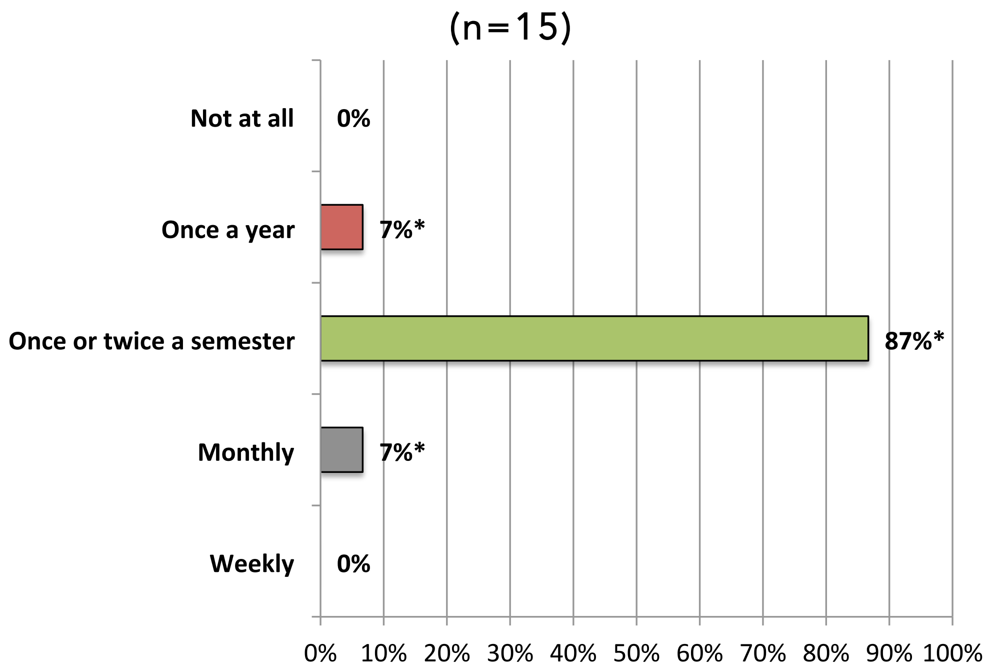


Q6: During the 2016-17 school year, did you engage in mentoring, coaching other teachers or leading professional development sessions?

(n=15)



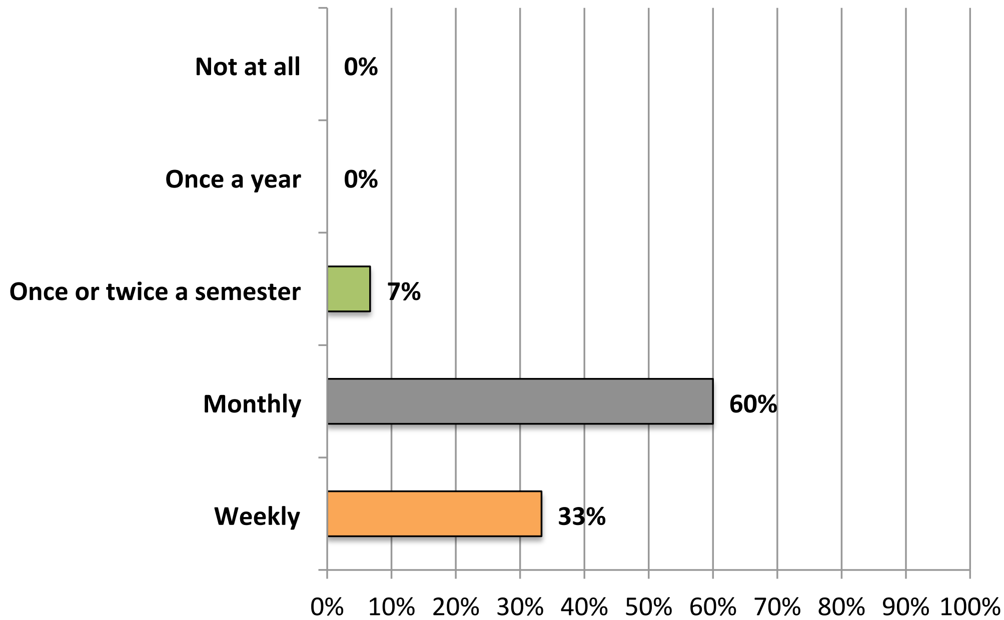
Q7: During the first year of LDC implementation, I required my students to write in-depth explanations about a class project or activity.



All data is rounded to the nearest percentage point.

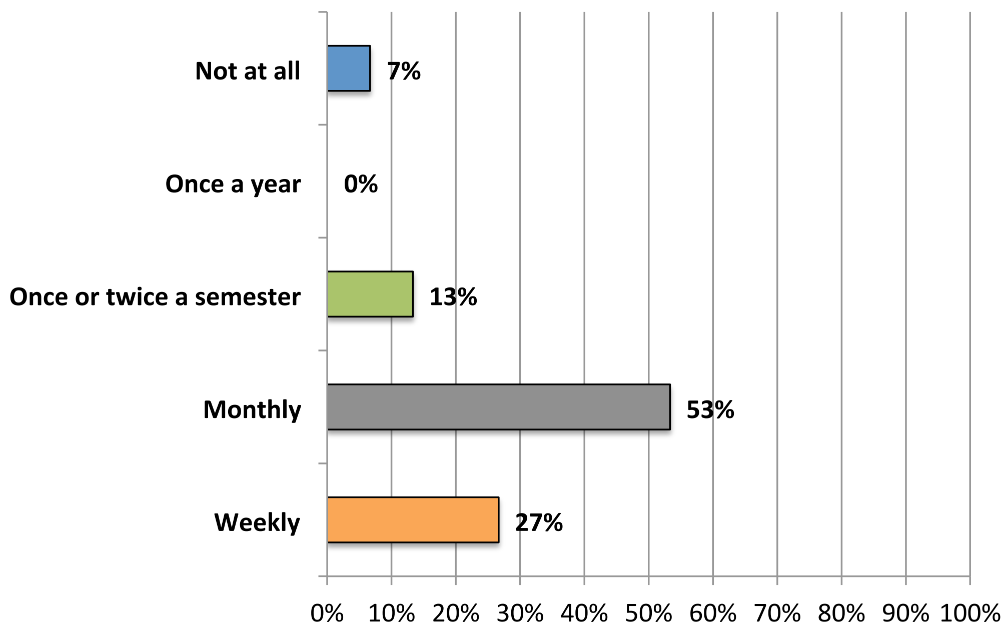
Q8: During the first year of LDC implementation, I required my students to use computers or technology to complete an assignment or project.

(n=15)



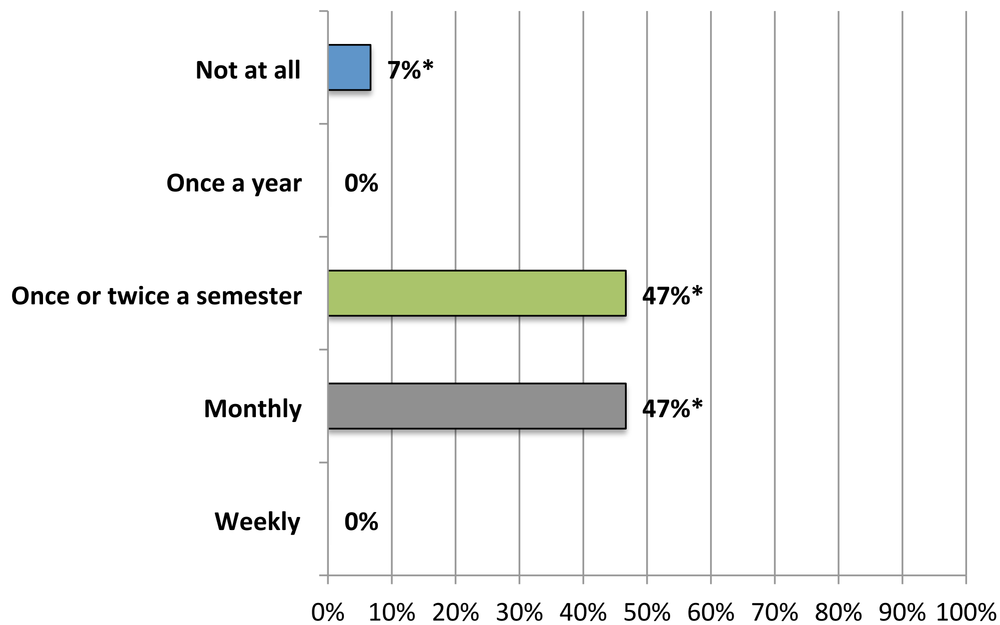
Q9: During the first year of LDC implementation, I assigned reading to my students in addition to the class textbook.

(n=15)



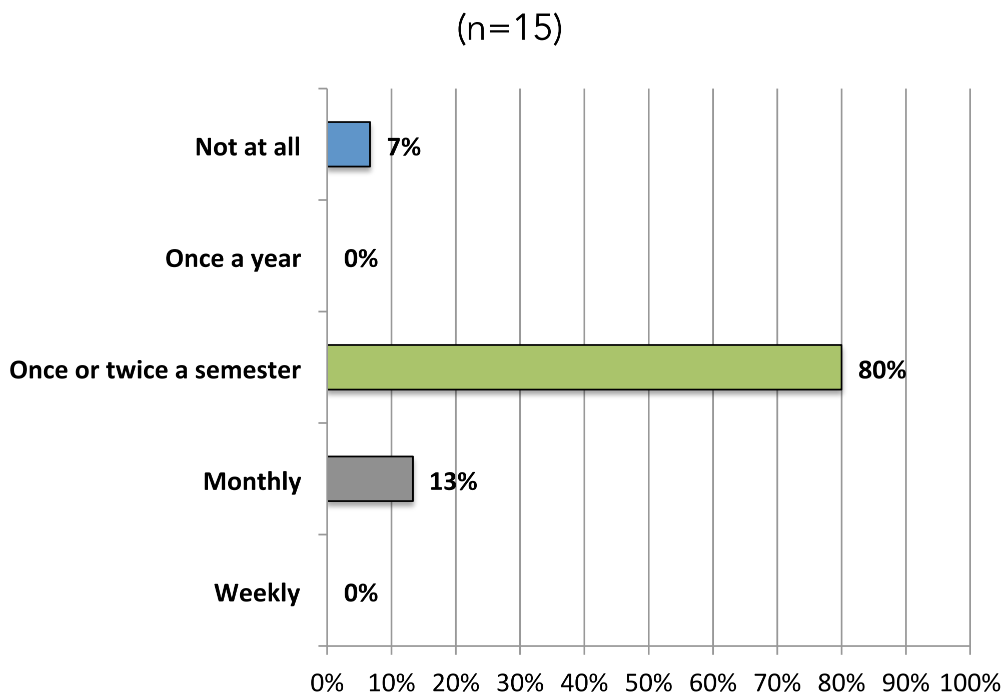
Q10: During the first year of LDC implementation, I required my students to compare and contrast information from one text to another.

(n=15)



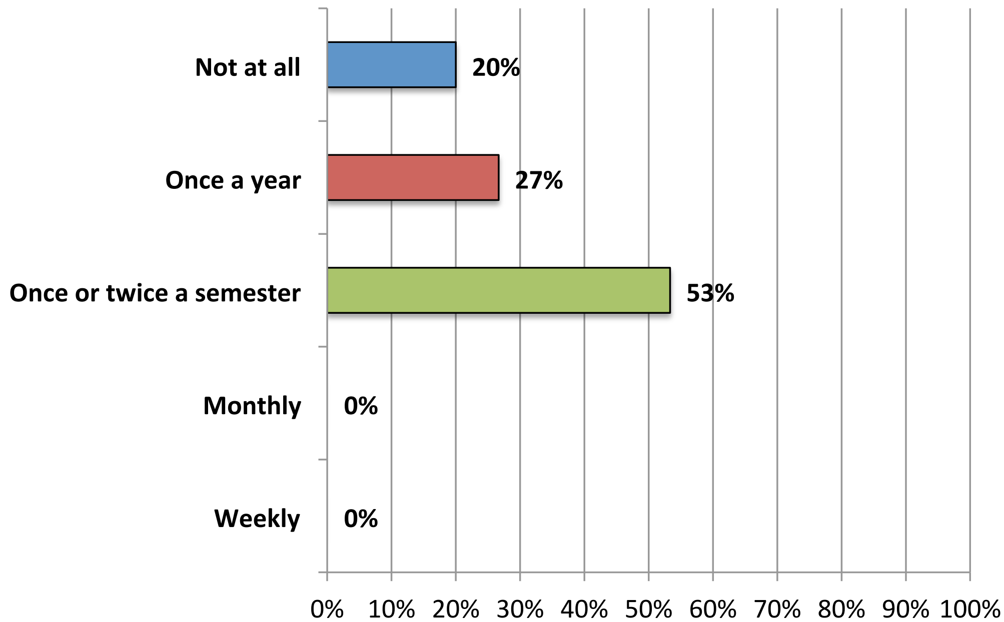
All data is rounded to the nearest percentage point.

Q11: During the first year of LDC implementation, I required my students to produce writing assignments that made them defend their thinking with support and evidence from what they read.



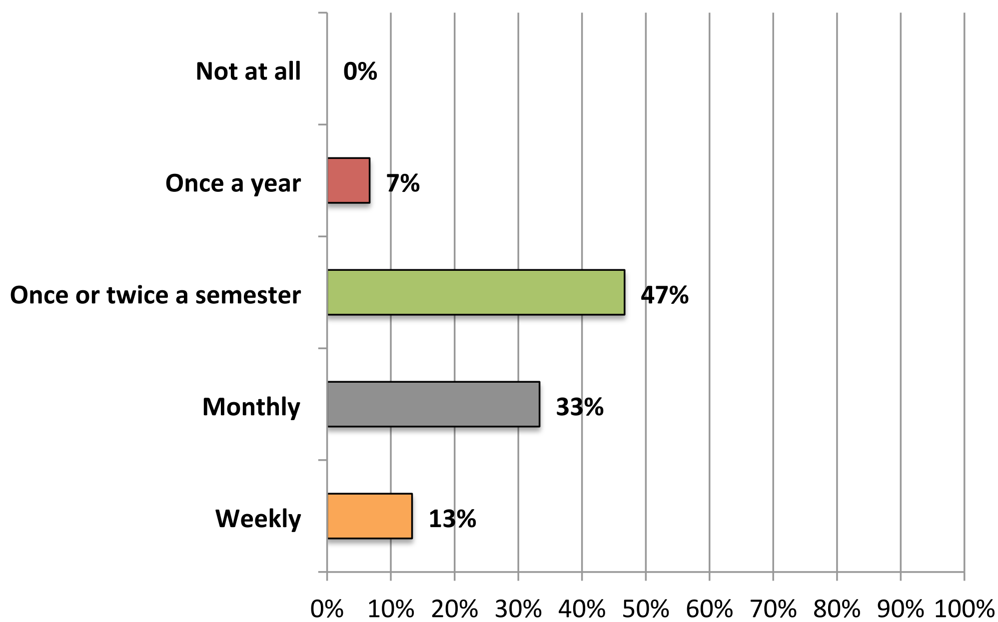
Q12: During the first year of LDC implementation, I required my students to orally defend their conclusions from an investigation or project before their peers.

(n=15)



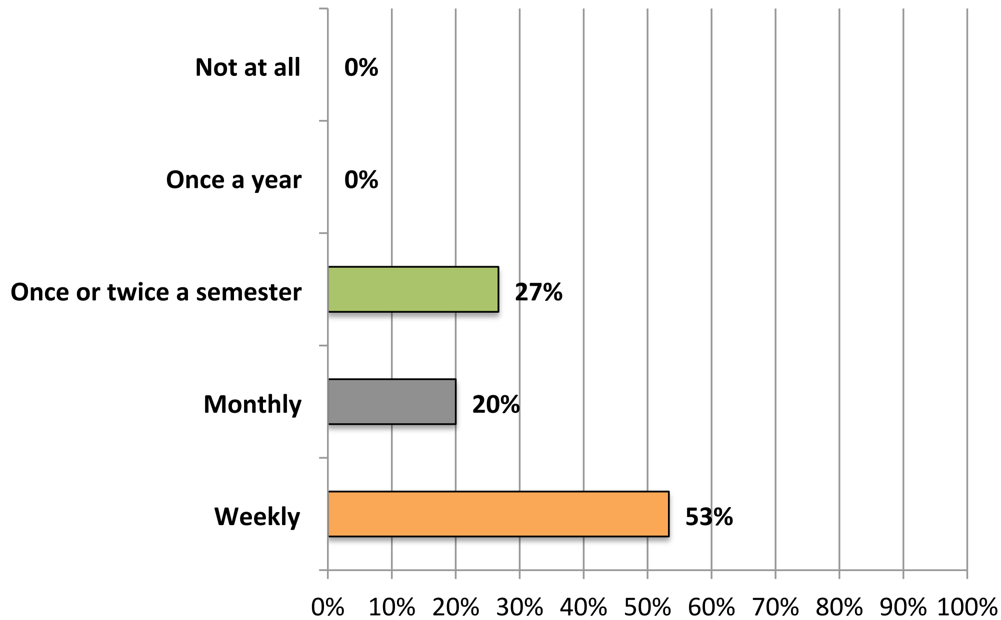
Q13: During the first year of LDC implementation, I required my students to use data collected during investigations or projects to justify and defend their conclusions.

(n=15)

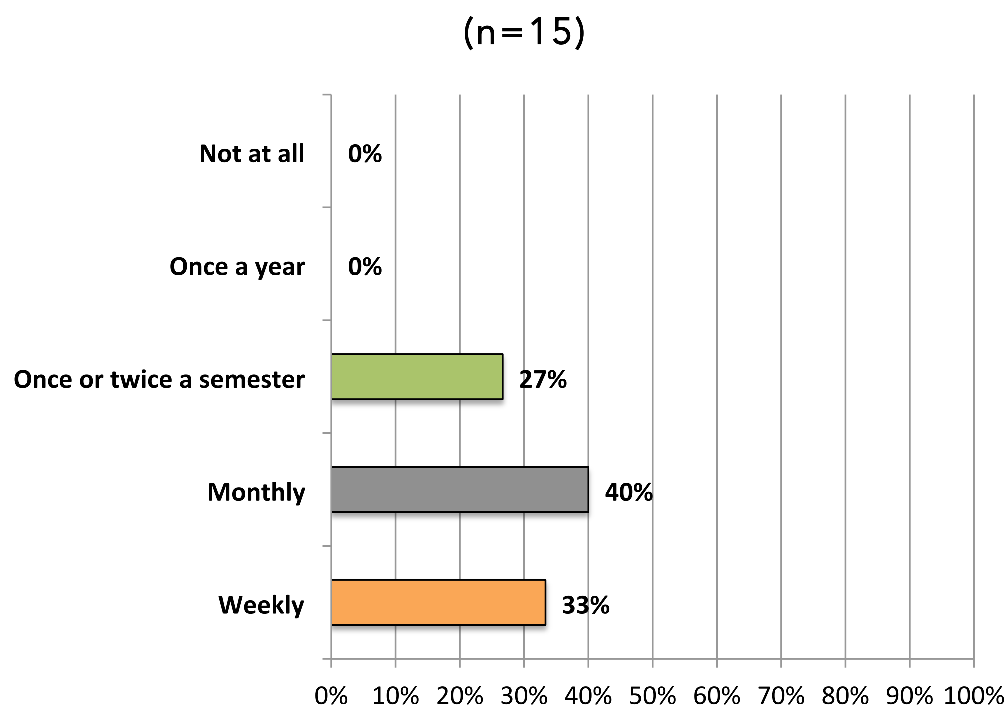


Q14: During the first year of LDC implementation, I required my students to complete assignments using the vocabulary associated with the subject area being taught.

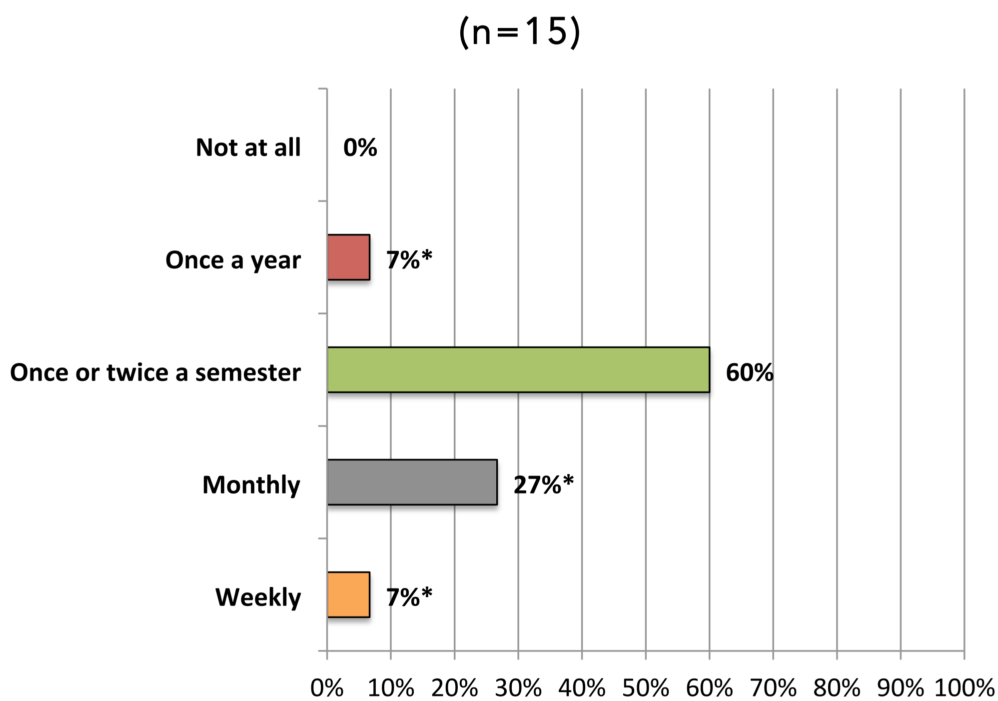
(n=15)



Q15: During the first year of LDC implementation, I required my students to develop and analyze tables, charts and graphs in schoolwork.

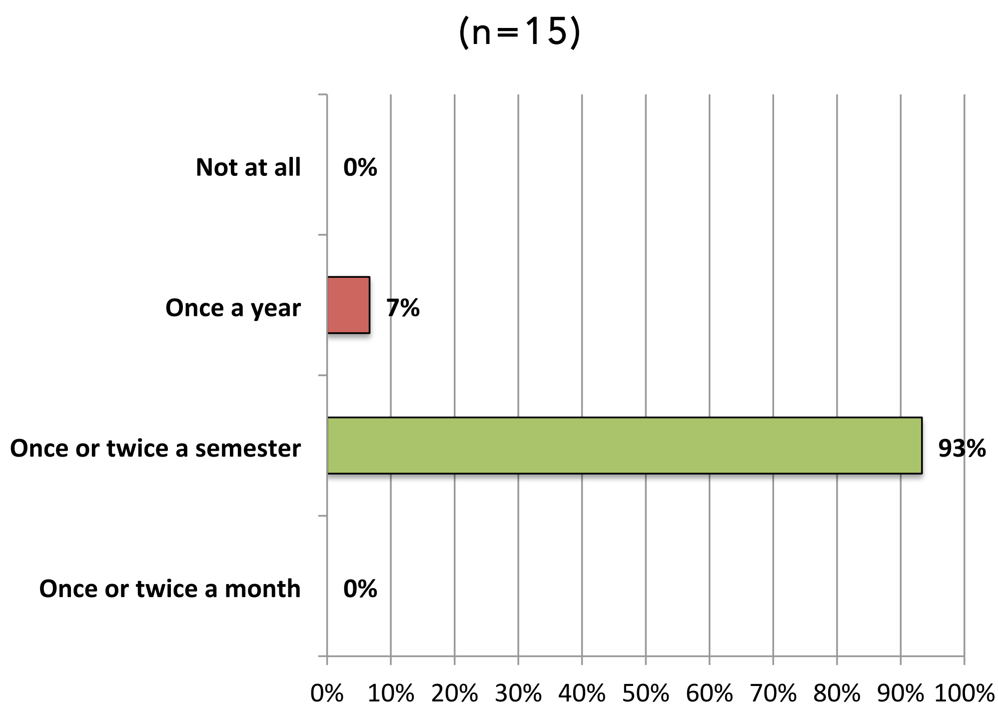


Q16: During the first year of LDC implementation, I required my students to work on open-ended problems for which there is no immediately obvious method of solution.

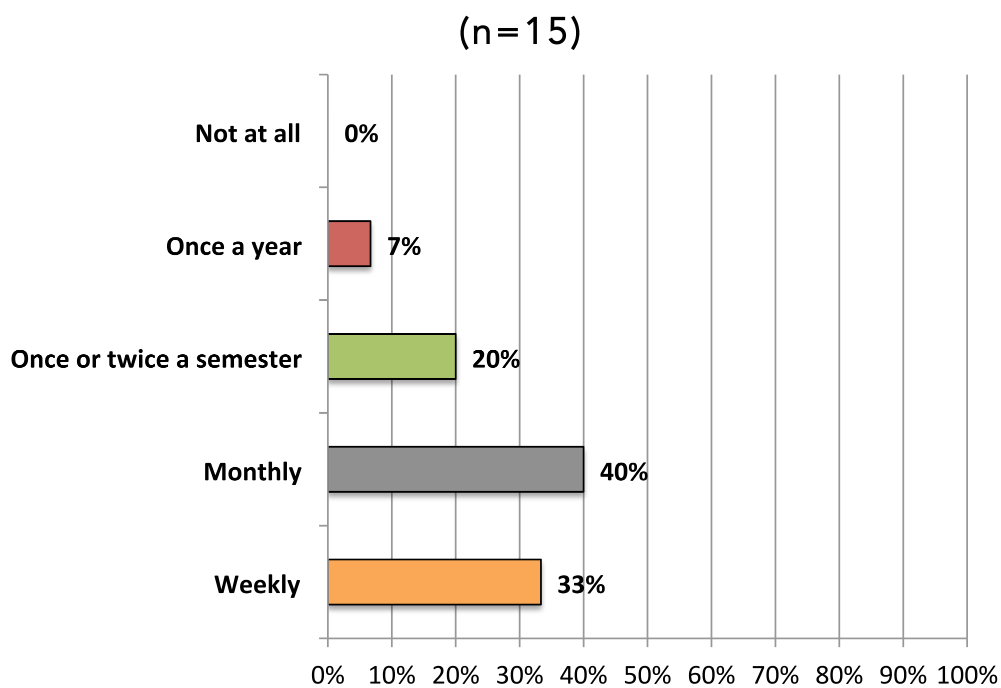


**All data is rounded to the nearest percentage point.*

Q17: During the first year of LDC implementation, I required my students to work on an extended, major project that lasted one week or more.

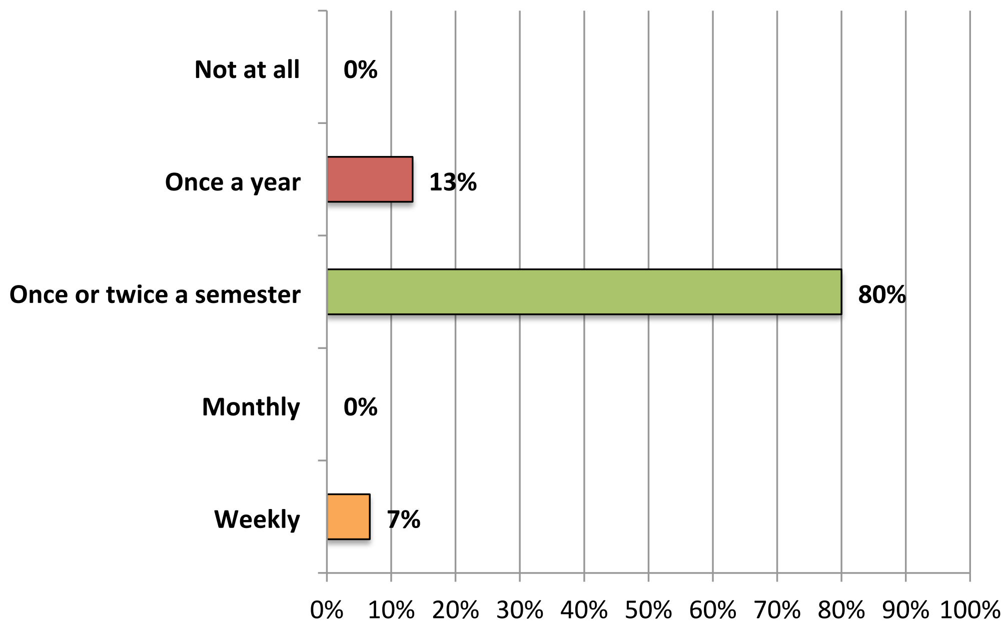


Q18: During the first year of LDC implementation, I required my students to work in cooperative groups to deepen understanding of content.



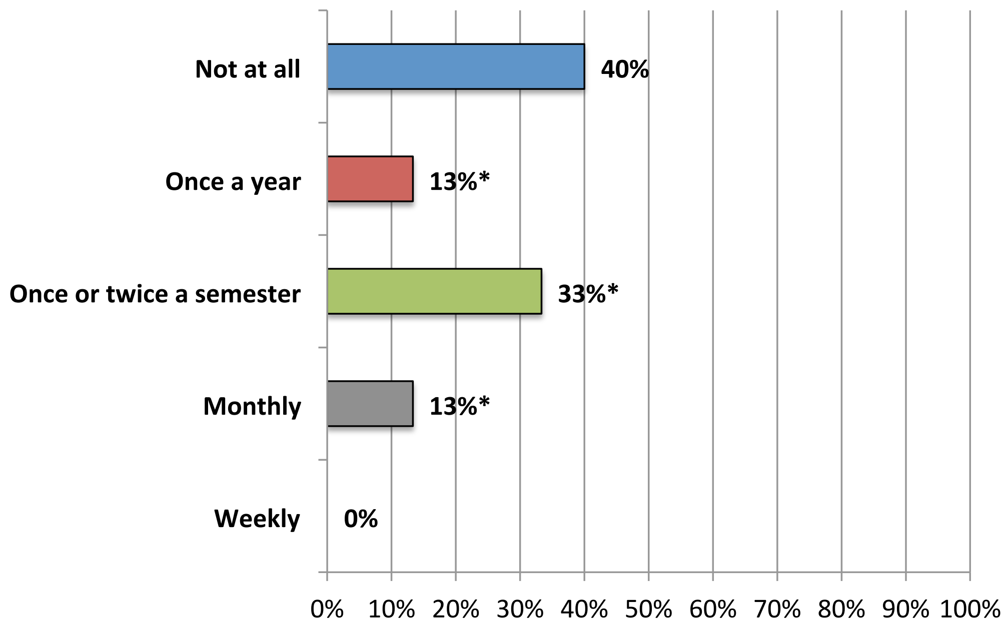
Q19: During the first year of LDC implementation, I required my students to work in groups to complete a written product as a component of a project.

(n=15)



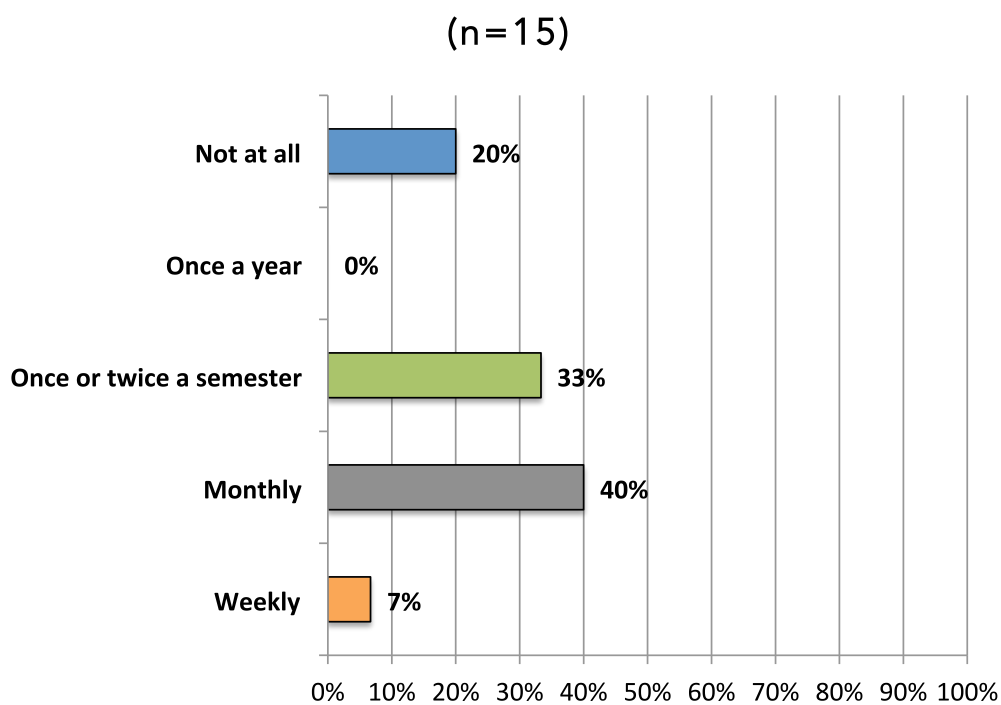
Q20: During the first year of LDC implementation, I required my students to take a test that is predominantly essay questions.

(n=15)



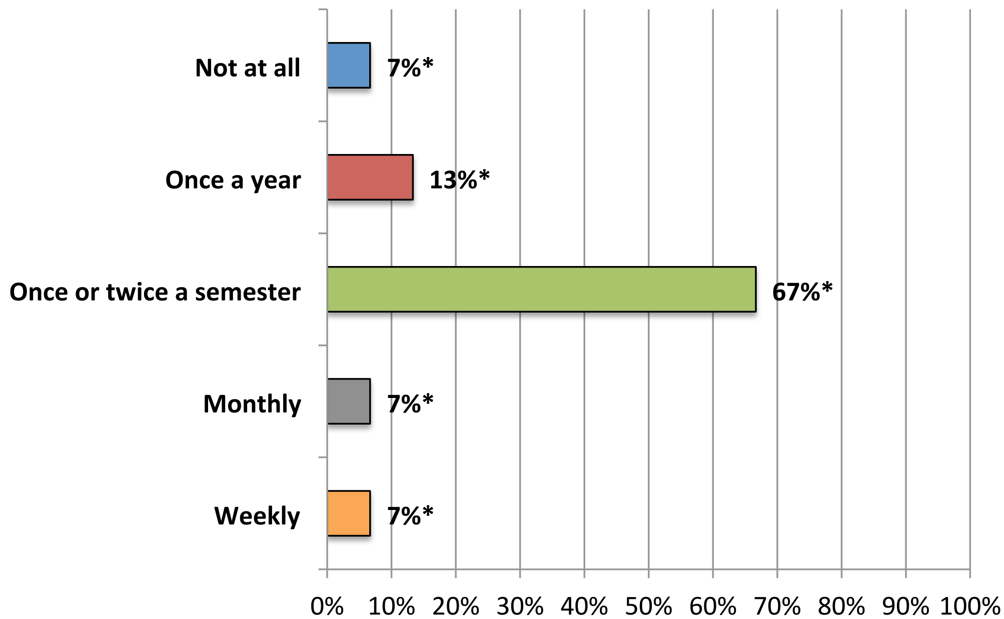
All data is rounded to the nearest percentage point.

Q21: During the first year of LDC implementation, I required my students to read science related materials (besides textbooks) and show their understanding through writing.



Q22: During the first year of LDC implementation, I required my students to complete a writing assignment that addressed an authentic (real-life) problem in the community or work setting.

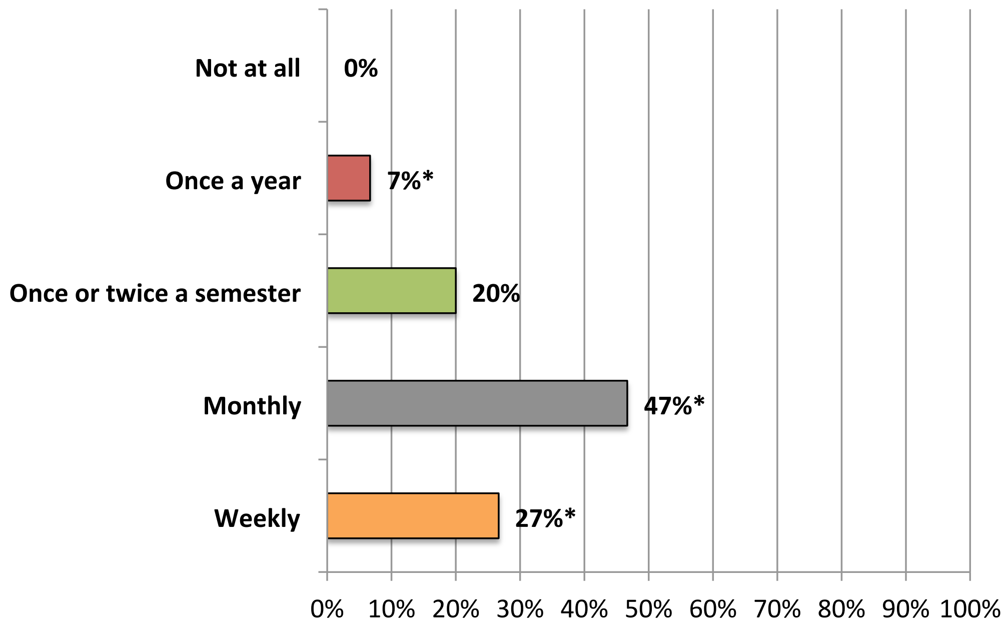
(n=15)



All data is rounded to the nearest percentage point.

Q23: During the first year of LDC implementation, I required my students to use science equipment to perform lab activities and use the information (data) collected to complete written assignments in science class.

(n=15)



*All data is rounded to the nearest percentage point.

Q24: Briefly describe "design cycle thinking" and if you think there are particular benefits for student learning.

(n=11 respondents*)

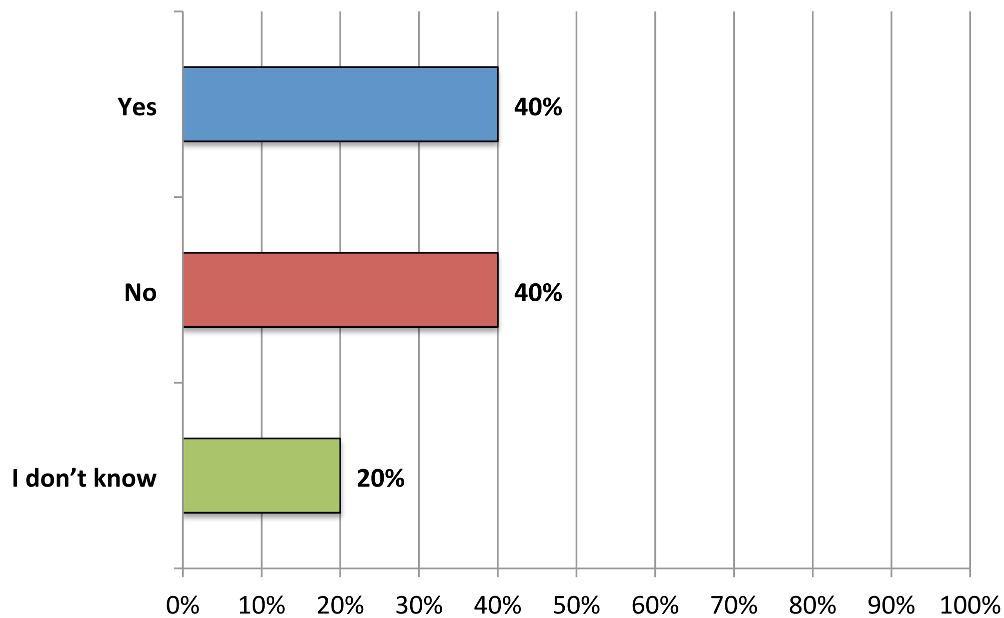
Design Thinking	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=7)
Structured process	✔	✔
Real world	✔	✔
Engineering principles	✔	✔
Hands-on experience	✔	
Product development		✔

Benefits to Students	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=7)
Research skills	✔	✔
Problem solving	✔	✔
Learning from mistakes	✔	✔
Structured process	✔	✔
Critical thinking		✔
Seeing the big picture	✔	
Communication		✔

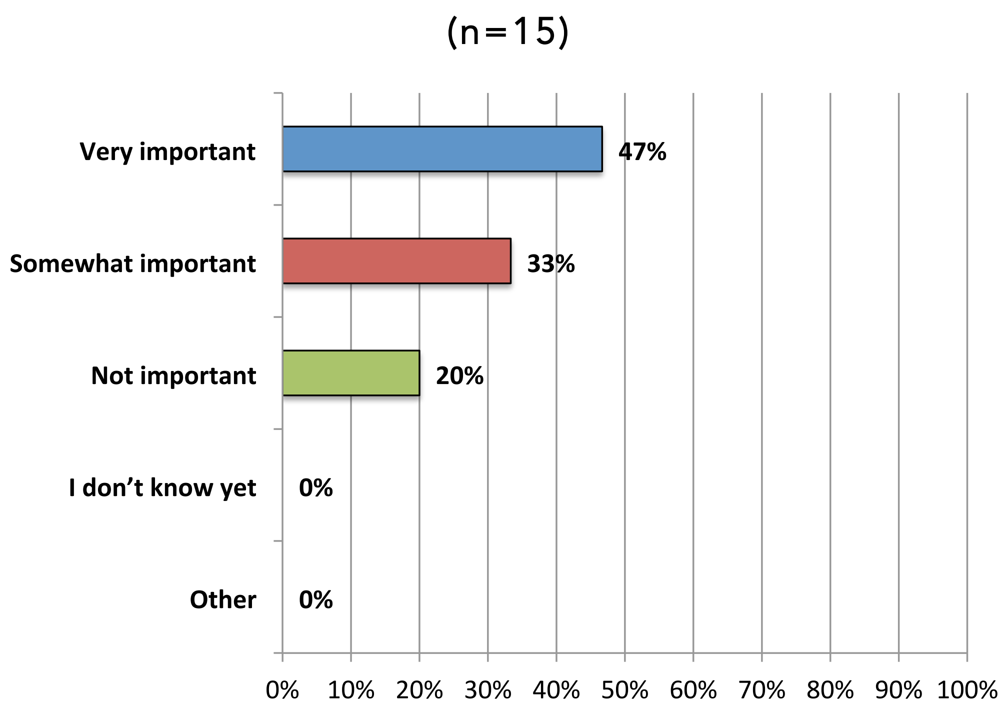
One teacher identified as teaching grade levels 5-12.

Q25: During the first year of LDC implementation do you think that your building administrators were provided sufficient information to understand the LDC Science and Literacy Project?

(n=15)



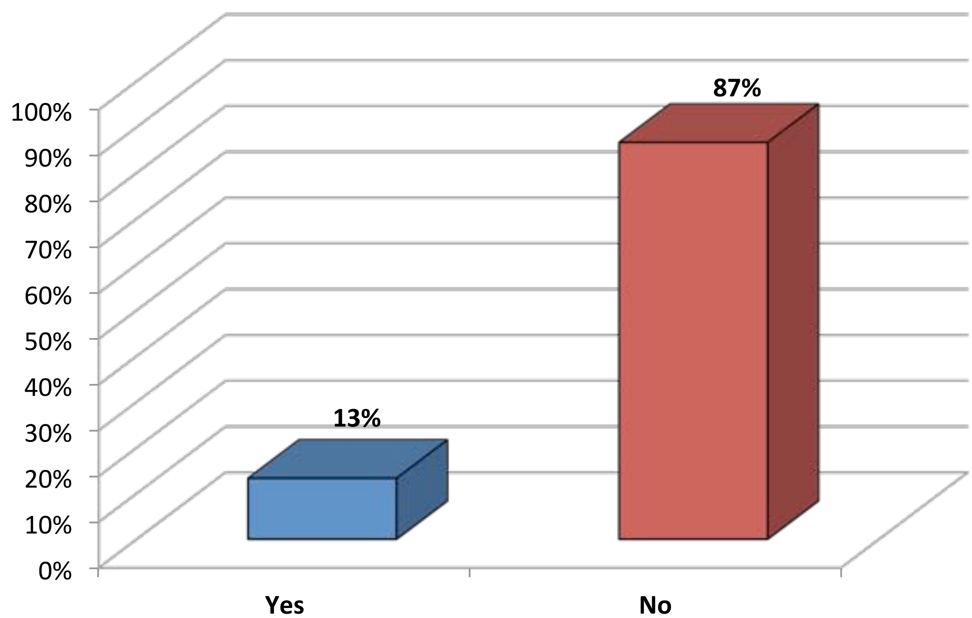
Q26: How important is it for your building administrators to understand the LDC instructional strategies that you implemented in your classroom this year?



Note: Respondents were given the option of an "if other" response, which is reflected above as "Other."

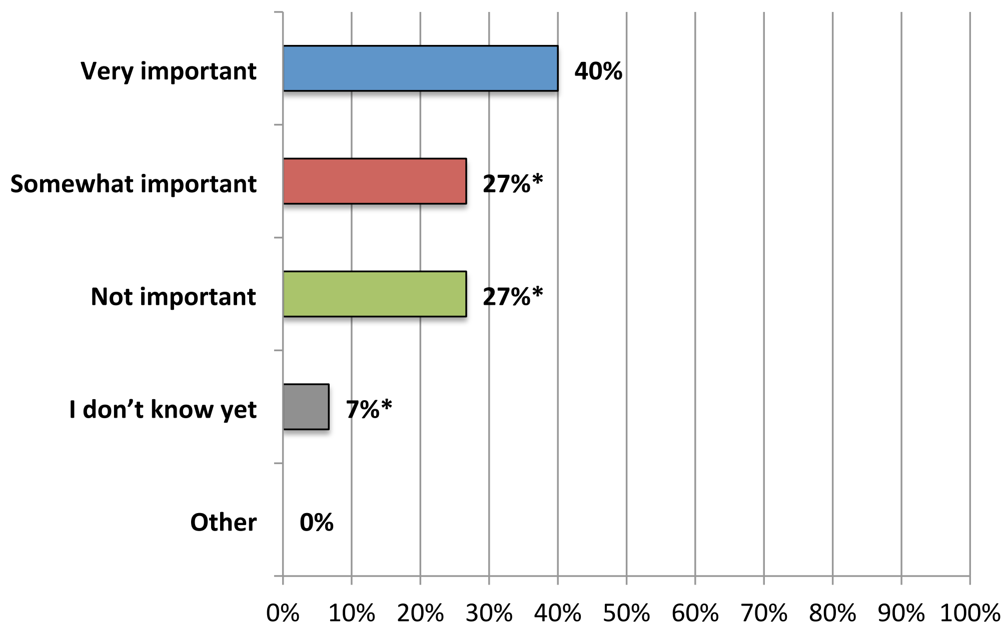
Q27: During the first year of LDC implementation do you think that parents were provided sufficient information to understand the LDC Science and Literacy Project?

(n=15)



Q28: How important is it for parents to understand the LDC model for science literacy and learning?

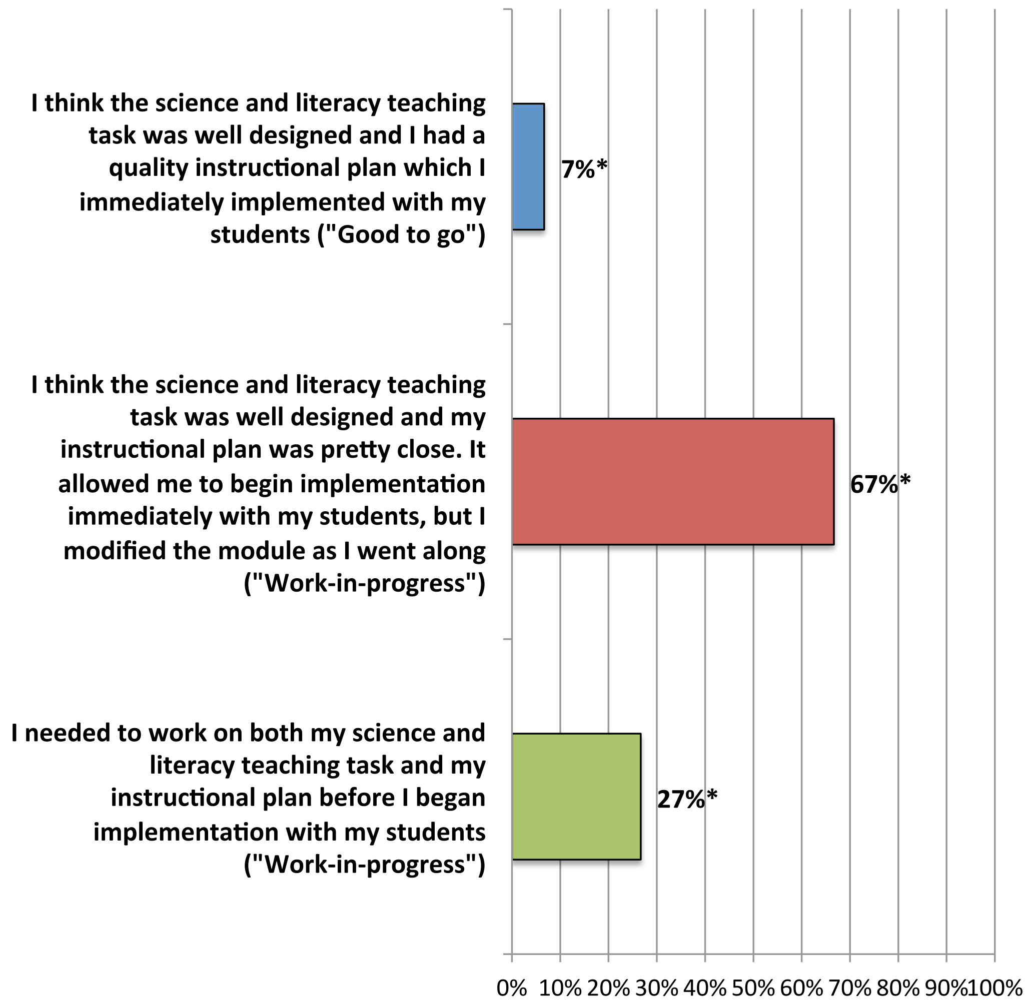
(n=15)



**All data is rounded to the nearest percentage point.*

Q29: How would you describe your first LDC module (fall 2016)?

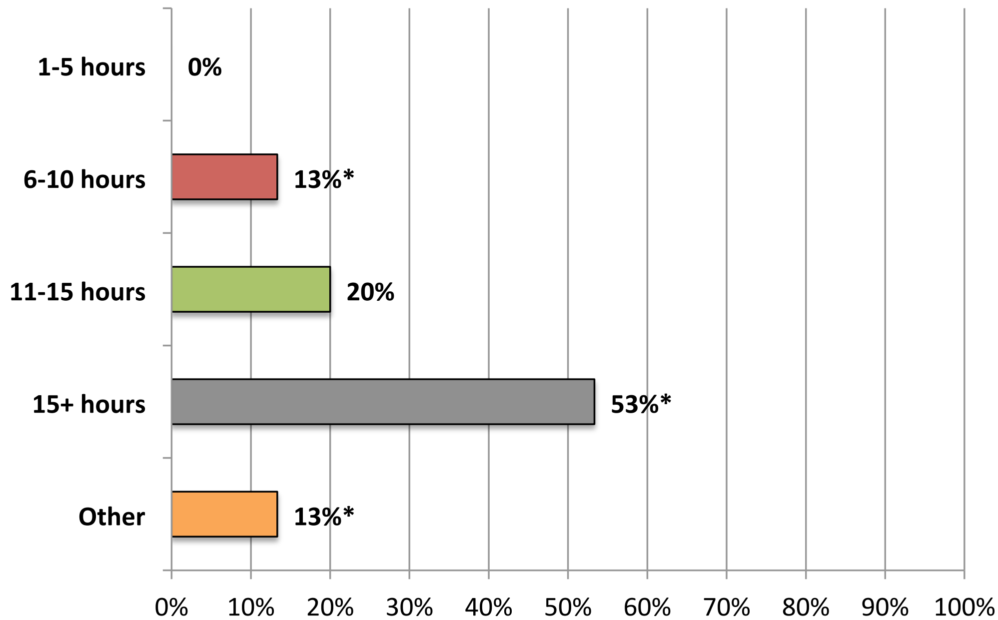
(n=15)



**All data is rounded to the nearest percentage point.*

Q30: Beyond the on-site Battelle PD days (September 29-30 and October 14), how many additional hours did you work to prepare for the December 9th review session?

(n=15)



**All data is rounded to the nearest percentage point.*

Note: Respondents were given the option of an "if other" response, which is reflected above as "Other." Two respondents reported that they worked no less than 40-50 additional hours.

Q31: What was your greatest challenge with implementing your first LDC module (fall 2016)?

(n=13 respondents*)

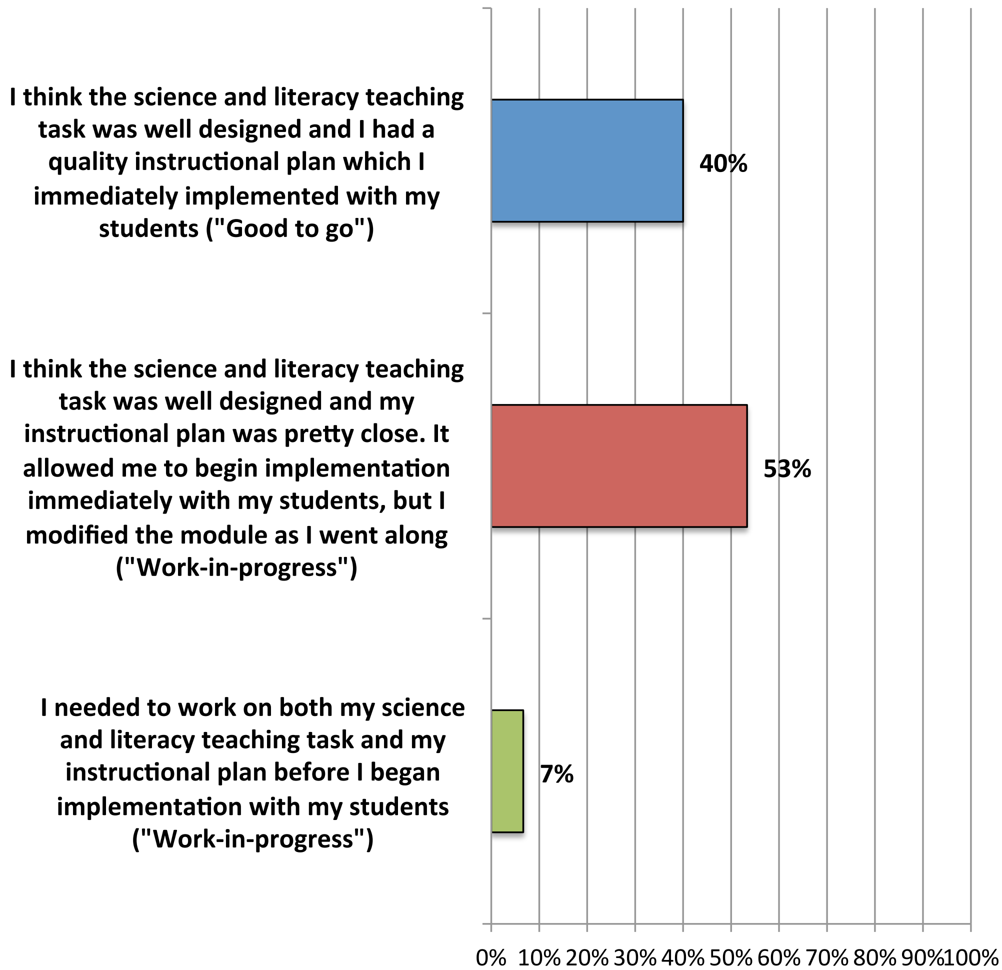
Q31: What was your greatest challenge with implementing your first LDC module (fall 2016)?
(n=13)*

Challenges	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=8)
Time management	✔	✔
Managing content	✔	✔
Understanding how to implement LDC	✔	✔
Managing student expectations	✔	
Teaching writing skills	✔	
Collaborating with other teachers	✔	
Student accountability		✔
Access to resources		✔
Keeping students on task		✔
Using CoreTools		✔

One teacher identified as teaching grade levels 5-12.

Q32: How would you describe your second LDC module (spring 2017)?

(n=15)



Q33: What was your greatest challenge with implementing your second LDC module (spring 2017)?

(n=13 respondents*)

Q33: What was your greatest challenge with implementing your second LDC module (spring 2017)
(n=13)*

Challenges	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=9)
Time management	✔	✔
Managing content	✔	✔
Student inexperience with science writing/research	✔	✔
Student engagement	✔	✔
Managing student expectations		✔
Differentiation		✔
Understanding how to implement LDC		✔
Low student skills		✔
Using Core Tools		✔
Understanding Design Cycle thinking		✔

One teacher identified as teaching grade levels 5-12.

Q34: During the first year of the LDC Project, what aspect of your experience was the most helpful to you to support implementation in your classroom?

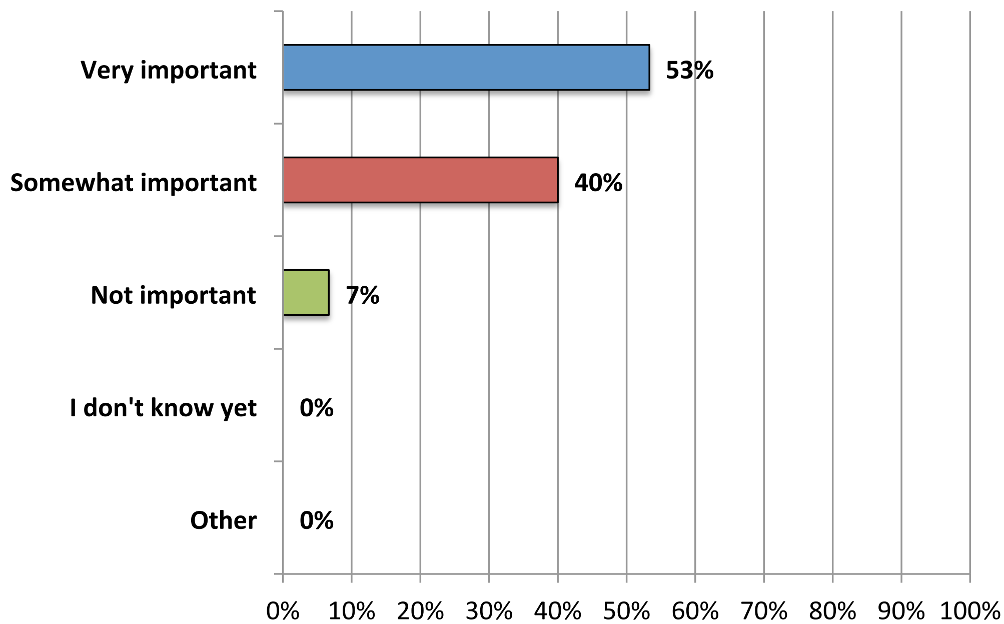
(n=12 respondents*)

Helpful Aspects	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=8)
Using Core Tools	✔	✔
Learning new ways to teach	✔	✔
Access to coaches	✔	✔
Professional development sessions	✔	✔
Doing a second module	✔	✔
Collaboration with other LDC teachers	✔	
Having a model	✔	
Access to the LDC library	✔	
Researching topics		✔

**One teacher identified as teaching grade levels 5-12.*

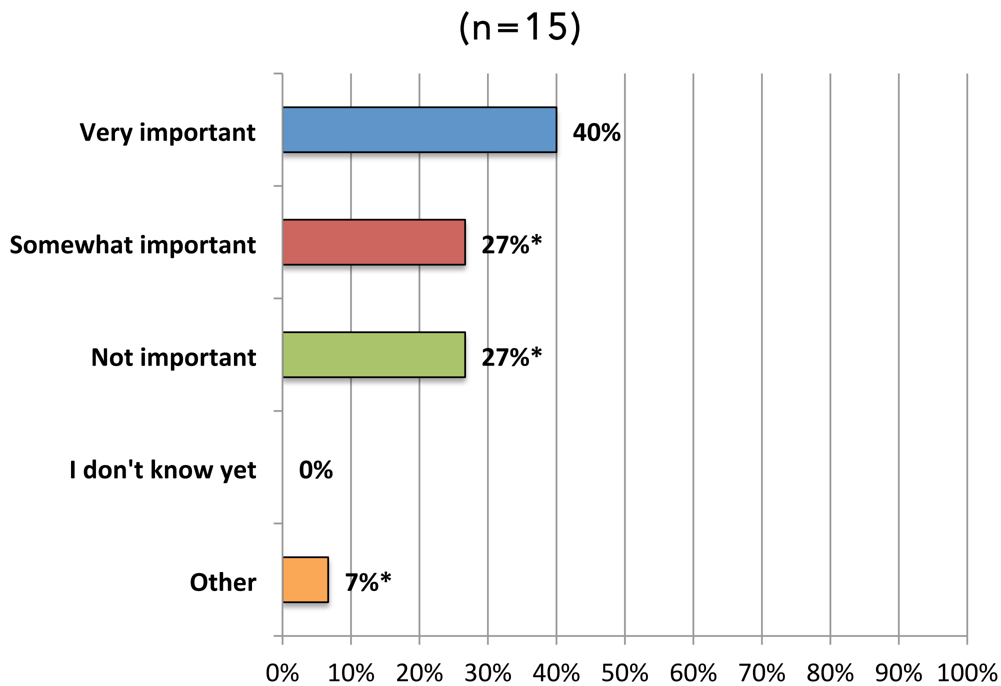
Q35: How important was it to you to have ongoing access to LDC coaches in the first year of implementation of the LDC Science and Literacy project?

(n=15)



Note: Respondents were given the option of an "if other" response, which is reflected above as "Other."

Q36: How important was it for you to have on-site coaching during the first year of implementation of LDC modules in your classroom?

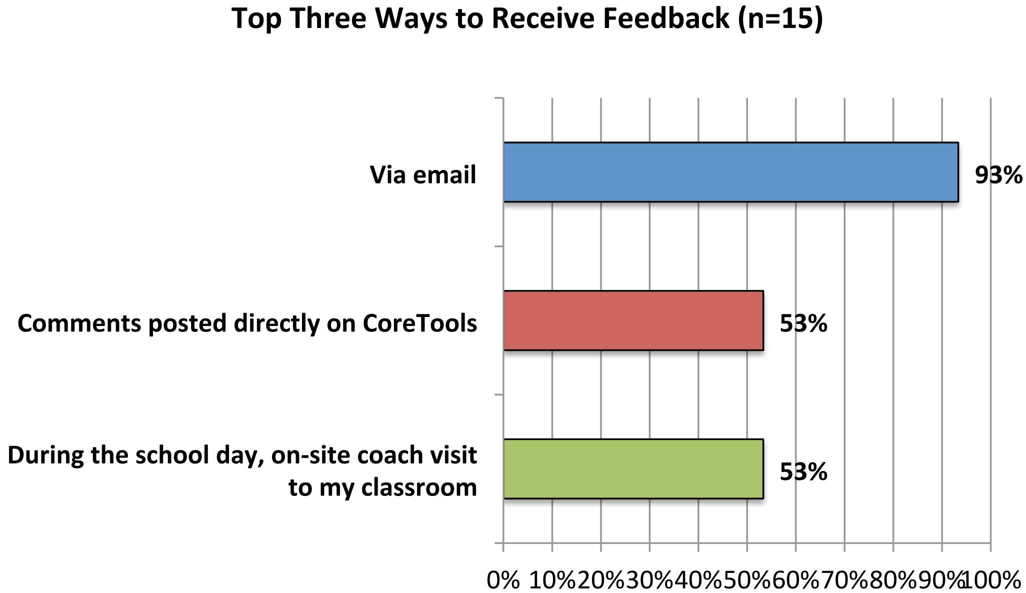


**All data is rounded to the nearest percentage point.*

Note: Respondents were given the option of an "if other" response, which is reflected above as "Other."

Q37: Please select the top three ways you preferred to receive feedback on your LDC modules between PD workshops.

(n=15)

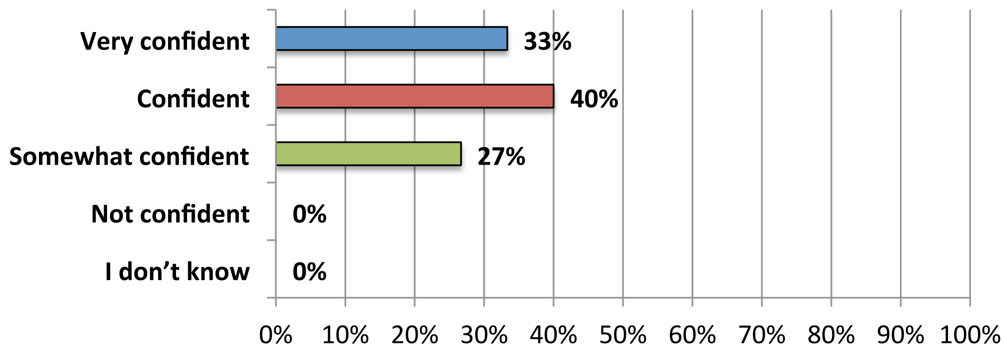


Note: Teachers identified three categories among 16 choices:
[A) Comments posted directly on CoreTools; B) Via email; C) LDC coach voice recording with feedback; D) During the school day, by phone; E) During the school day, on-site coach visit to my classroom; F) During the school day, in a virtual meeting (skype, zoom, etc.); G) During prep period, by phone; H) During prep period, on-site coach visit to my classroom; I) During prep period, in a virtual meeting (skype, zoom, etc.); J) After school, by phone; K) After school, on-site coach visit to my classroom; L) After school, in a virtual meeting (skype, zoom, etc.); M) During the weekend, by phone; N) During the weekend, in a face-to-face meeting; O) During the weekend, in a virtual meeting (skype, zoom, etc.); P) If other, please describe briefly]

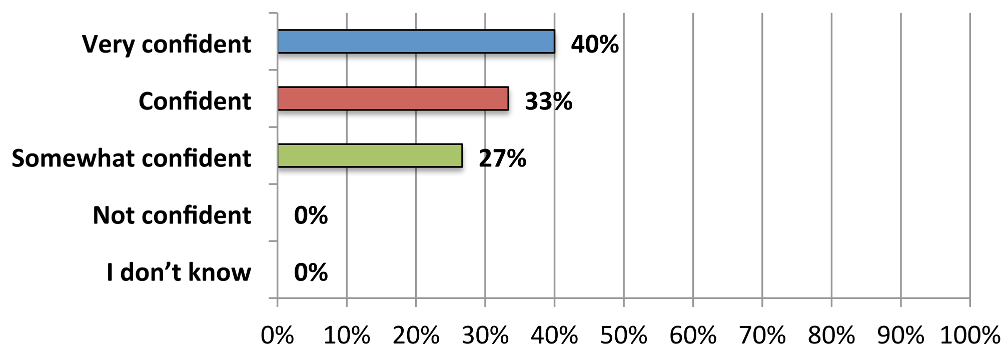
Q38: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

(n=15)

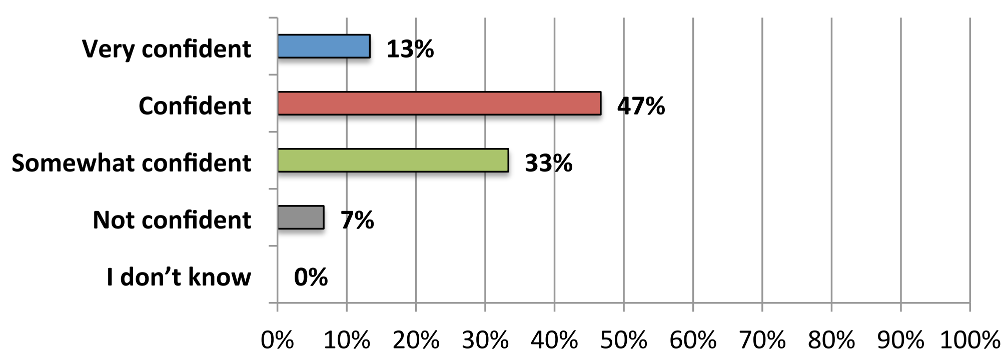
Construct an authentic science and literacy assignment [teaching task] (n=15)



Identify a focus set of science standards to drive the assignment (n=15)

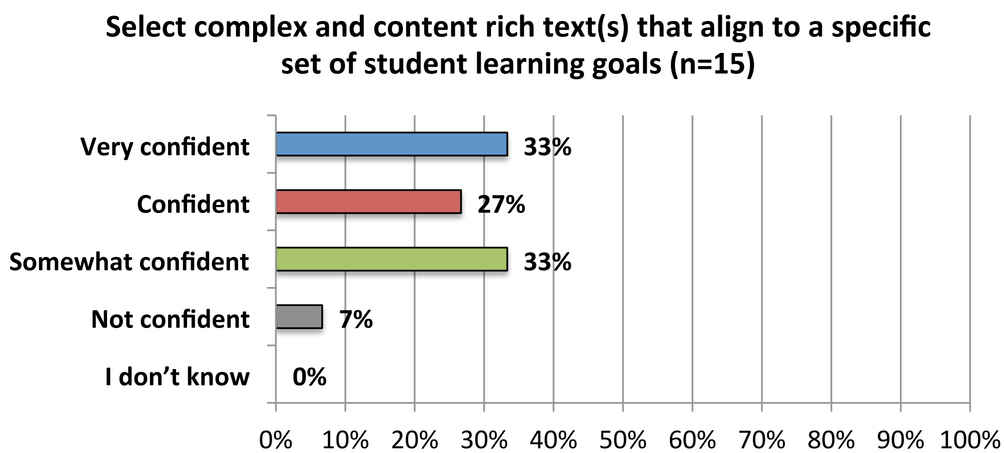


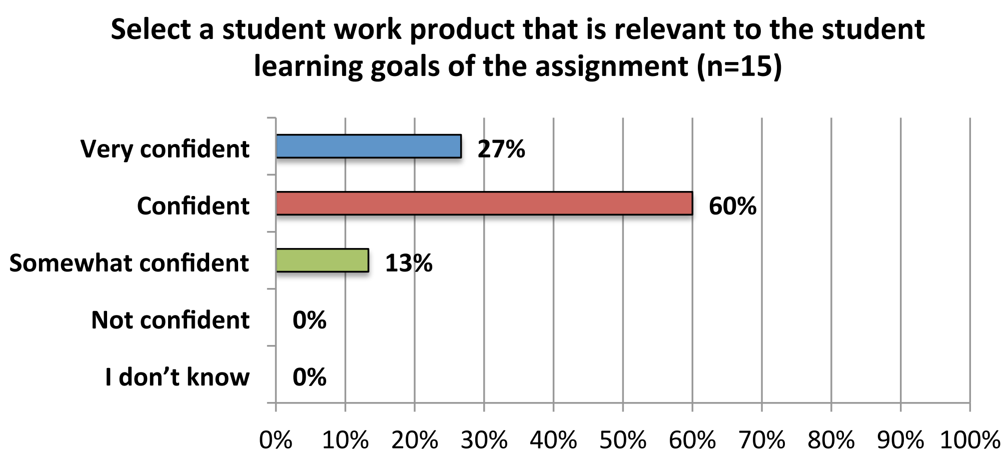
Identify a focus set of common core literacy standards to drive the assignment (n=15)

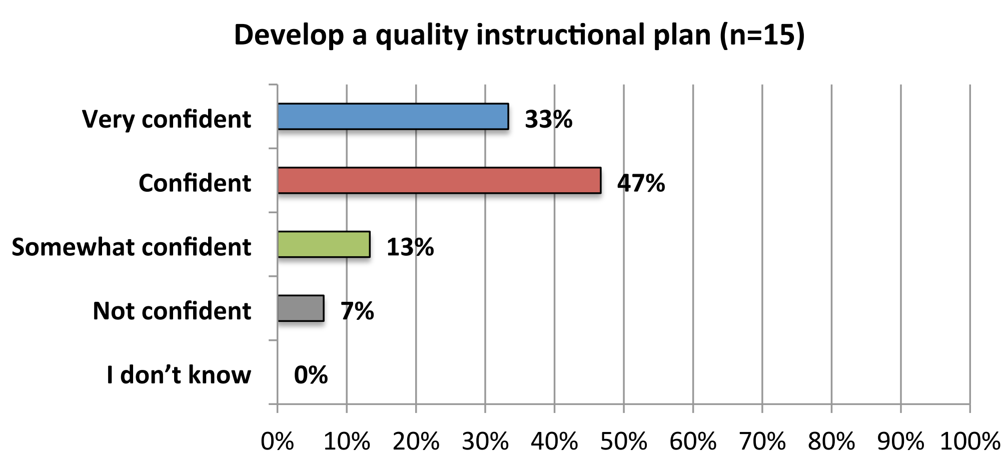


(Continued) Q38: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

(n=15)



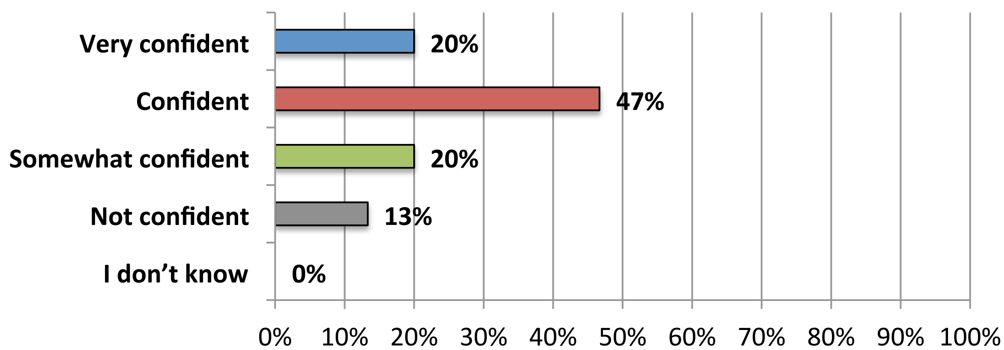




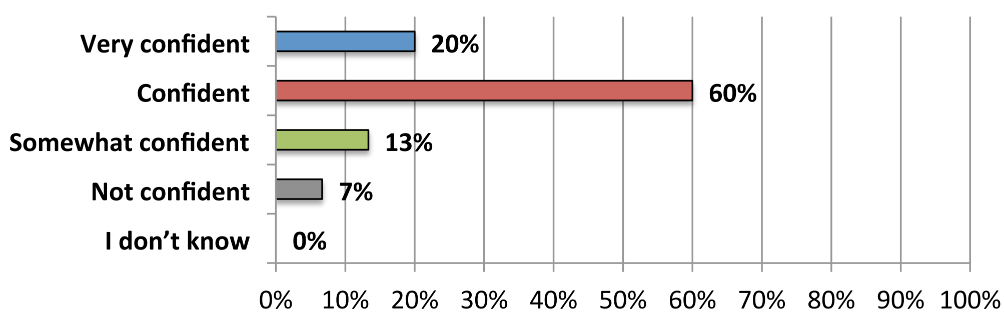
(Continued) Q38: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

(n=15)

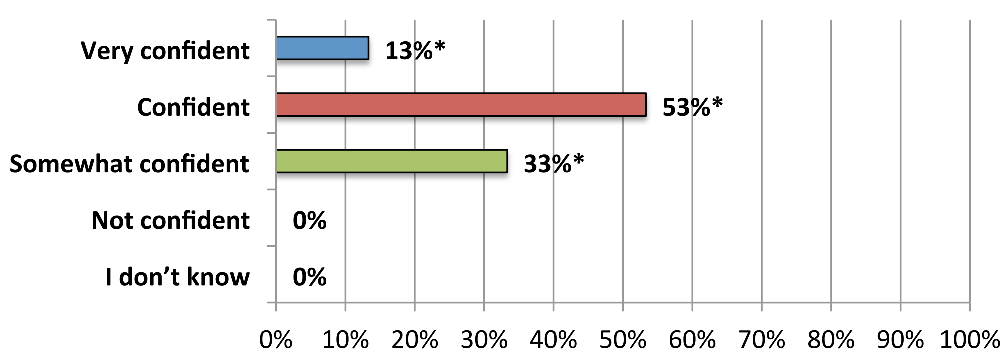
Backward-design a sequence of skills from the assignment aligned to student learning goals (n=15)



Develop instruction that allows students to demonstrate the skills needed to meet the expectations of the assignment (n=15)



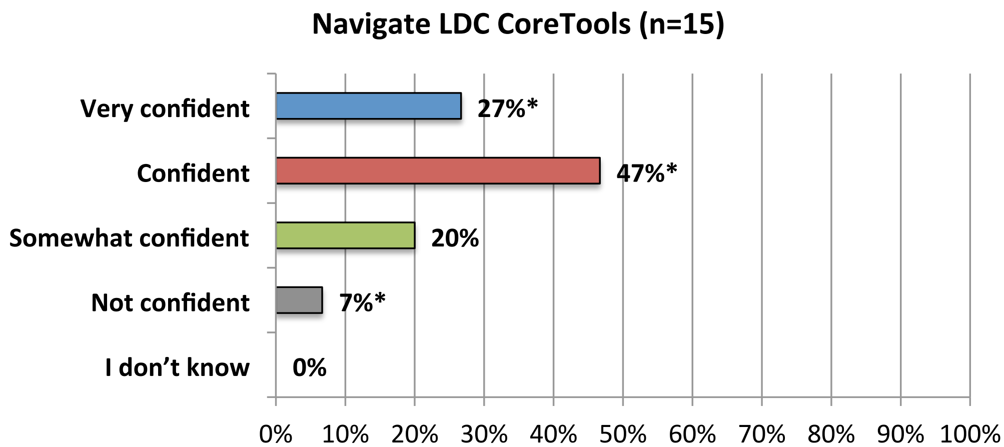
Develop instruction that allows for ongoing checks (scoring guide) for understanding student skill development (n=15)

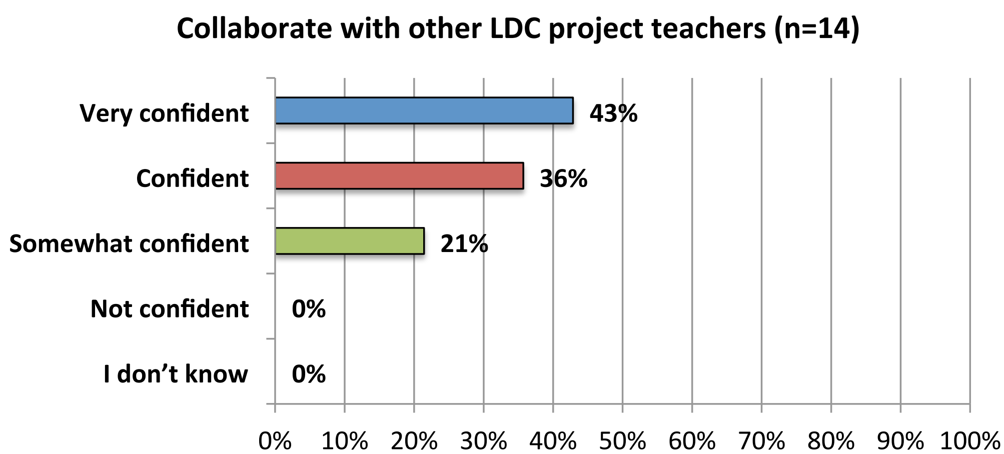


All data is rounded to the nearest percentage point.

(Continued) Q38: How confident are you in your understanding and ability to implement the following components of the LDC instructional model?

(n=15)





All data is rounded to the nearest percentage point.

Q39: Briefly describe any impacts on student performance that you observed this year associated with LDC instruction in your classroom.

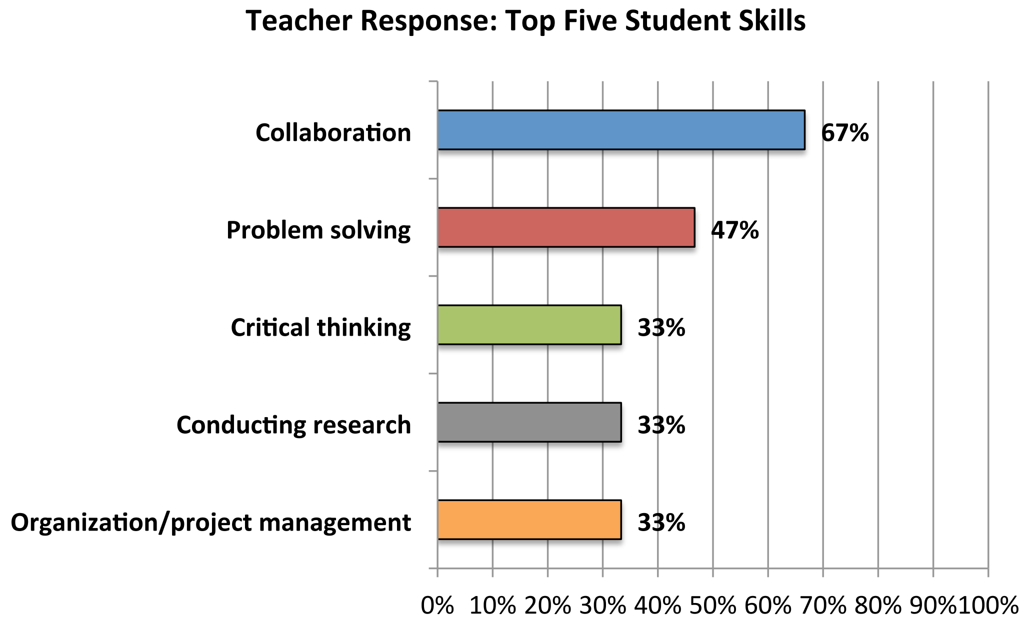
(n=11 respondents*)

Observed Impacts	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=7)
Student engagement	✔	✔
Student growth	✔	✔
Writing skills	✔	✔
Design process	✔	✔
Problem solving	✔	✔
Increased student focus	✔	✔
Learning from mistakes	✔	
Research skills	✔	
College and career interests		✔
Real world experience		✔

One teacher identified as teaching grade levels 5-12.

Q40: What are the top skills you think your students developed to help prepare them for the future as a result of LDC instruction?

(n=15)



Note: Teachers identified four categories among 12 choices:
[A) Problem solving; B) Critical thinking; C) Collaboration; D) Understanding the scientific process; E) Perseverance; F) Following directions/listening; G) Conducting research; H) Finding resources/valid data to support project design; I) Communication; J) Presenting research/project to their peers or other audience; K) Organization/project management; L) Enhanced understanding of what it takes to be ready for college and career; M) If other, please describe briefly]

THE PAST FOUNDATION

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section I: Evaluation

Submitted by:
Monica Hunter, Ph.D, Director of Research
Maria Green Cohen, Assistant Director of Research
Kayla Galloway, Research Assistant
Grayson Rudzinski, Design Researcher

PART 4: Appendix F

July 31, 2017

THE PAST FOUNDATION

LDC Pre-Implementation

Infographic Summary of Survey Data, Cohort 1

by Monica Hunter, PhD., Maria Green Cohen,
Kayla Galloway, and Grayson Rudzinski

Objective:

Share feedback from teachers participating in the Rural LDC Project at the outset of implementation.

Table of Contents:

Who took this survey?

They have experience teaching:

Science	**14**
Career Tech	**5**
Math	2
Social Sciences	2
Agriculture	2
English	1
Health	1
Strength Training	1

15 Teachers

Mapleton Local Schools

Loudonville-Perrysville Exempted Village Schools

Black River Local Schools

Hillsdale Local School District

Northwestern Local Schools

Three Teachers from Each District

6 Middle School (5-8)

2 Teach Both

9 High School (9-12)

60% Have experience teaching other teachers.

How did they get involved?

10 Selected by Principal

4 Selected by District Admin

1 Volunteered

140

What methods are teachers using?

Frequently Use:

Most teachers (60-87%) use these methods **weekly or monthly**.

Cooperative Groups
Working in groups to deepen understanding of content.

Science Equipment
Using science equipment to perform lab activities and use data collected to complete written assignments in class.

Computers/Tech
Requiring students to use computers/tech to complete an assignment or project.

Assigned Readings
Assigning a reading beyond the textbook.

Vocabulary
Requiring students to use vocabulary from the subject being taught to complete assignments.

Tables and Graphs
Having students develop and analyze tables, charts, and graphs.

Occasionally Use:

Some teachers (40-47%) use these methods **weekly or monthly**.

Presenting
Having students orally defend their thinking in front of peers.

Data
Having students use data they have collected to justify their conclusions.

Group Writing
Requiring student groups to complete a written product as a project component.

Compare/Contrast
Requiring students to compare and contrast information from one text to another.

Extended Projects
Working on an extended major project that lasts one week or more.

Rarely Use:

Few teachers (20-34%) used these methods **weekly or monthly**.

In-depth Explanations
Requiring students to write in-depth explanations about an activity or project.

Supporting Evidence
Having students defend their thinking with supportive evidence from readings.

Open-ended Problems
Working on problems with no obvious solutions.

Real-life Problems
Addressing real-life problems in writing assignments.

Essay-based Tests
Giving a test that is predominantly essay questions.

Science Readings
Reading science-related texts and demonstrating understanding through writing.

What challenges are teachers expecting?

Student Interactions

Student Expectations
Getting students to switch mindsets.

Student Engagement
Building enthusiasm and student buy-in.

Managing Groups
Effectively grouping students so all members participate.

Differentiation
Responding to the needs of all learners.

Logistics

Time Management
Having enough time to plan and implement.

Managing Content
Covering necessary standards associated with the problem.

Admin Support
Building leaders' understanding of LDC and support for implementation.

Access to Resources
Gathering materials to complete projects.

100%

of teachers think it is either **Very or Somewhat Important** for **Administrators** to understand the LDC instructional strategies teachers are implementing.

80% think it is **Very Important.**

87%

think it is **Important** for **Parents** to understand the LDC model.

142

How confident are teachers with the modules?

Confidence Colors: Very Confident, Confident, Somewhat Confident, Not Confident

How prepared do teachers feel?

	Sep 30:	Oct 14:
Felt Well Prepared	1	5
Wanted One More Meeting	10	2
Wanted On-site Support	6	2
Wanted Brainstorm Session	3	3
Wanted LDC Coach Access	8	9

How do teachers rate their first module?

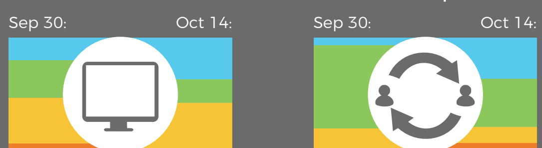
	Sep 30:	Oct 14:
Good to Go, with As-Needed Modifications	4	9
Needs Work Before Implementation	10	5

Time and Resources

Time to Revise

Time to Implement

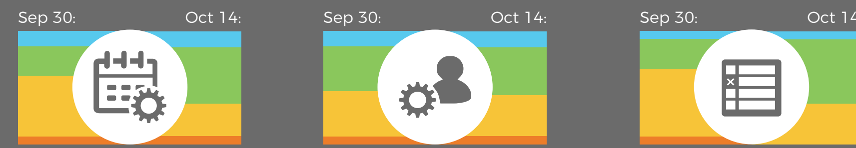
Time to Work with Coaches



Navigate Core Tools

Collaborate with LDC teachers

Developing Instruction



Develop Quality Instruction Plan

Allows for Demonstration of Skills

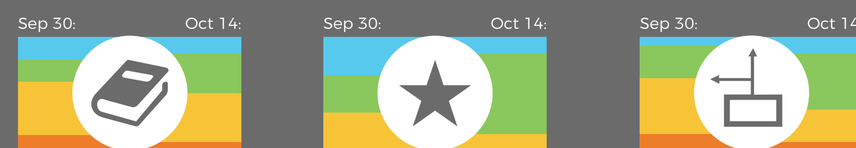
Allows for Ongoing Checks

Developing Teaching Tasks

Construct Authentic Sci/Lit Assignment

Identify Focus Set of Science Standards

Identify Focus Set of Literacy Standards



Select Content-Rich Texts

Select Relevant Student Work Product

Backwards Design a Sequence of Skills

143

What do teachers think about Design Thinking/PBL?

What is it?

Characteristics

Open-ended
Working on problems with no obvious solutions.

Real World
Connecting learning to the real world.

Nontraditional
Moving away from lectures and teaching to the test.

Methods

Develop Products
Developing a product to meet a specified need.

Structure
Scaffolding learning with step-by-step instruction.

Applied Learning
Connecting content to application.

Hands-on Learning
Producing something tangible.

Student-led
Teacher acting as a "guide on the side."

Engineering
Introducing engineering design principles.

What are the benefits?

Student Skills

Problem Solving
Giving students experience with finding solutions.

Critical Thinking
Developing reasoning skills.

Collaboration
Helping students build the skills they need to work well in teams.

Communication
Building student skills in expressing ideas effectively.

Creativity
Fostering generative and creative skills.

Research
Conducting studies to discover new knowledge.

Organization
Building good habits for managing time, resources, and ideas.

Student Growth

Engagement
Building enthusiasm and student buy-in.

Learn from Mistakes
Finding pathways forward through evaluating what went wrong.

Big Picture
Encouraging students to look for the wider relevance of their work.

Ownership
Giving students a sense of investment in their work.

Confidence
Helping students feel pride in their work, their skills, and in themselves.

144

What is the anticipated impact on student performance?

Middle School:

- Writing Skills
- College & Career
- Design Process
- Learn from Mistakes
- Risk-taking
- Teacher Growth

Both:

- Engagement
- Content Retention
- Student Growth
- Reading Fluency
- Differentiation

High School:

- Problem Solving
- Critical Thinking
- Higher Quality Projects
- Student Buy-in
- Time Management

Our Methodology:

This report provides an infographic overview of survey data collected from teachers engaged in the first year of implementing Straight A funded Rural LDC Project. Project districts include: Northwestern Local Schools, Mapleton Local Schools, Hillsdale Local School District, Loudonville-Perrysville Exempted Village Schools, and Black River Local Schools.

The Rural LDC 2016 Teacher Pre-Implementation Survey (35 questions) was administered on September 30th during the second day of a two-day LDC professional development session. The survey was completed by a total number of (15) teachers. A supplemental survey (6 questions) was administered on October 14th, and was completed by a total number of (14) teachers.

The survey was administered via a secure web-based platform (SurveyMethods®), designed for conducting confidential and anonymous surveys.

About PAST KC:

PAST Foundation has over 16 years of experience working in schools nationwide. The Knowledge Capture Team provides evaluation services necessary to support project implementation and grant reporting.

Through our work, we have seen this approach guide real-time course correction, advancing both short-term and long-term goals that achieve critical outcomes.

Our Knowledge Capture program includes systematic analysis of transformative processes supporting successful K-12 STEM education initiatives. This is especially important for multiple-year implementation processes that often rely solely on student performance on standardized tests as the only measure of positive change.

PAST can help you track and prove your success.

THE PAST FOUNDATION

LDC Post-Implementation

Infographic Summary of Survey Data, Cohort 1

by Monica Hunter, PhD., Maria Green Cohen,
Kayla Galloway, and Grayson Rudzinski

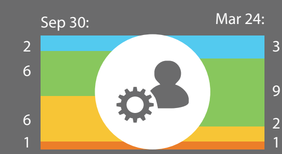
How confident are teachers with the modules?

Confidence Colors: Very Confident, Confident, Somewhat Confident, Not Confident, Not Sure

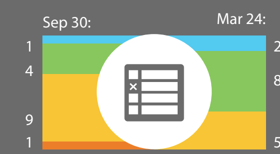
Each icon presents pre-implementation (9/30/16) and post-implementation (3/24/17) survey responses (n=15). Note that most teachers report increased confidence by the end of year one in aspects of Instruction, Teaching Tasks, and Time and Resources. Areas where teachers felt less confident (orange/Not Confident and grey/Not Sure), indicate areas where teachers need additional training and/or experience with implementing new modules.

Developing Instruction

Develop Quality Instruction Plan



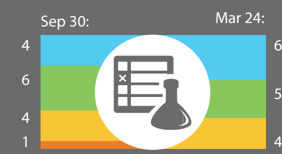
Allows for Demonstration of Skills



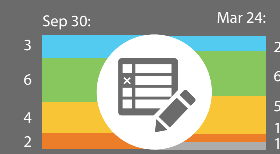
Allows for Ongoing Checks

Developing Teaching Tasks

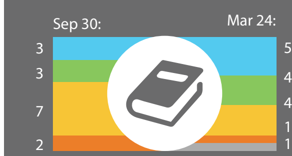
Construct Authentic Sci/Lit Assignment



Identify Focus Set of Science Standards



Identify Focus Set of Literacy Standards

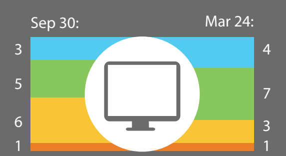


Select Content-Rich Texts

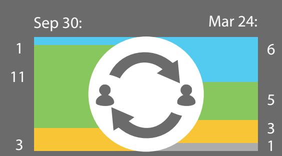
Select Relevant Student Work Product

Backward Design a Sequence of Skills

Time and Resources



Navigate Online Resources



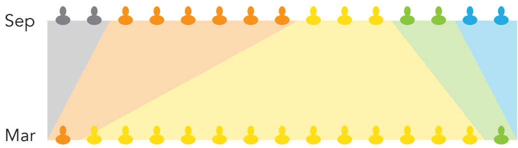
Collaborate with program teachers

Instructional Strategies

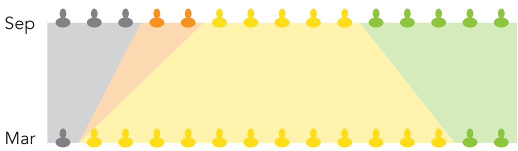
Classroom transition to LDC Science Modules

Never, **1-2 Times a Year**,
1-2 Times a Semester, **Monthly**, **Weekly**

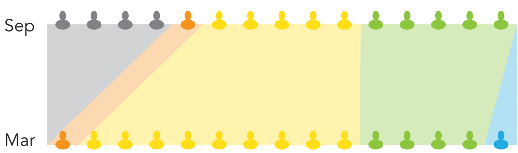
Indepth Explanation Writing



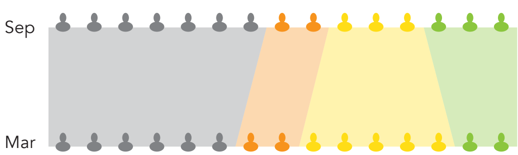
Defending Writing with Evidence



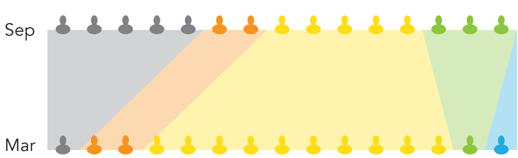
Open-Ended Problems



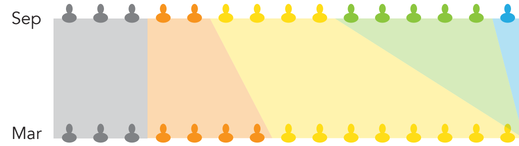
Essay-based Tests



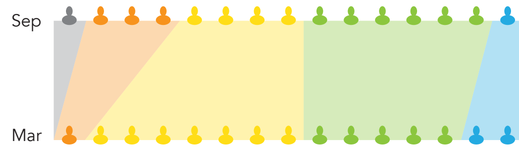
Addressing Real-Life Problems



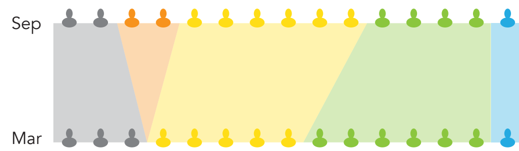
Orally Defend Conclusions



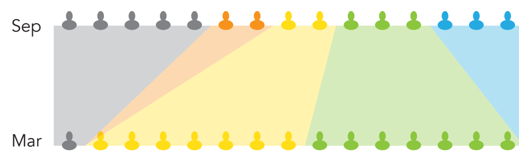
Use Data to Justify Conclusions



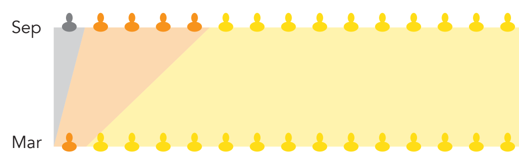
Science Reading Comprehension



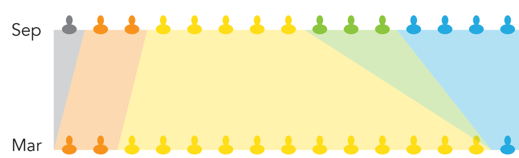
Compare and Contrast Information



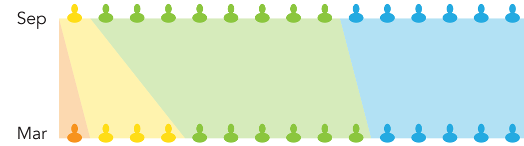
Extended Projects



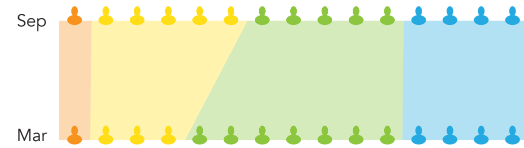
Groups for Written Components



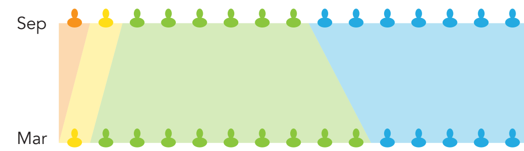
Cooperative Groups



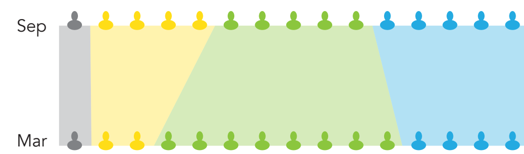
Using Science Equipment



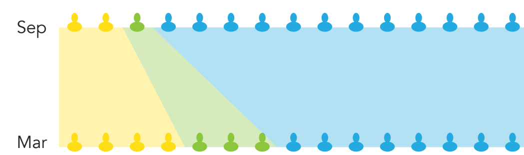
Using Tech/Computers



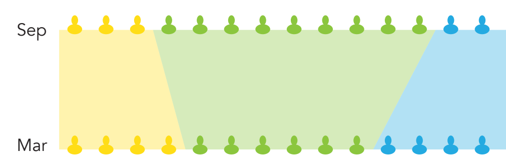
Additional Reading Beyond Textbook



Using Subject Vocabulary



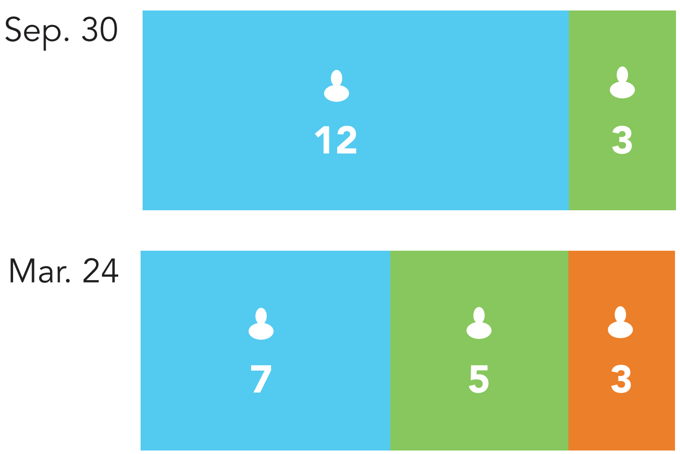
Using Tables and Graphs



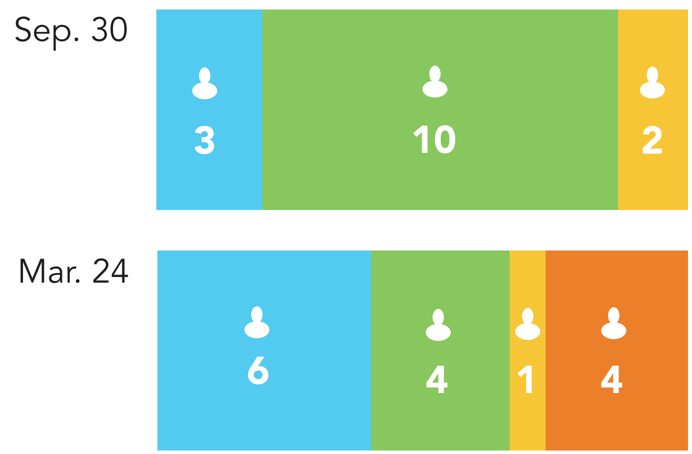
Communication of LDC Implementation

How Important is it that they understand the LDC instructional strategies that you implemented in your classroom this year?

Administrators



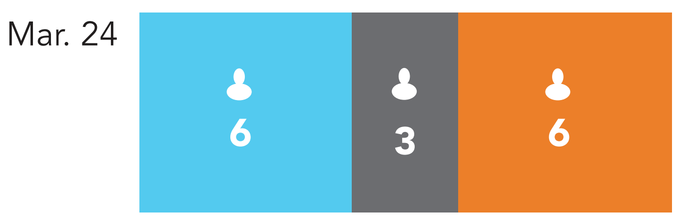
Parents



Very Important, **Somewhat Important**, **Not sure**, **Not Important**

During the first year of LDC implementation do you think that they were provided sufficient information to understand the LDC Science and Literacy Project?

Administrators



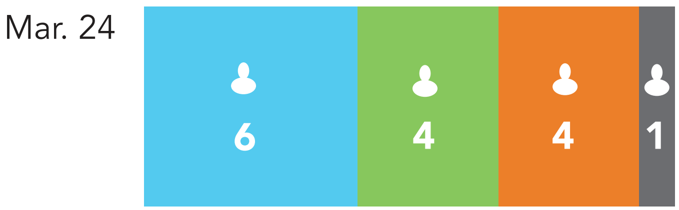
Parents

Yes, **Don't Know**, **No**

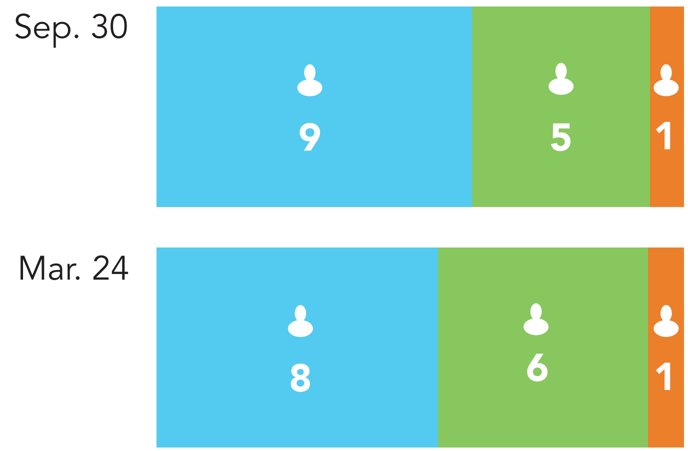
Teacher LDC Support Needs

How important was it for you to have on-site coaching and ongoing access to LDC coaches during the first year of implementation of LDC modules in your classroom?

On-site Coaching (Mar. 24)



Access to LDC Coaches



Very Important, **Somewhat Important**, **Not sure**, **Not Important**, **Other**

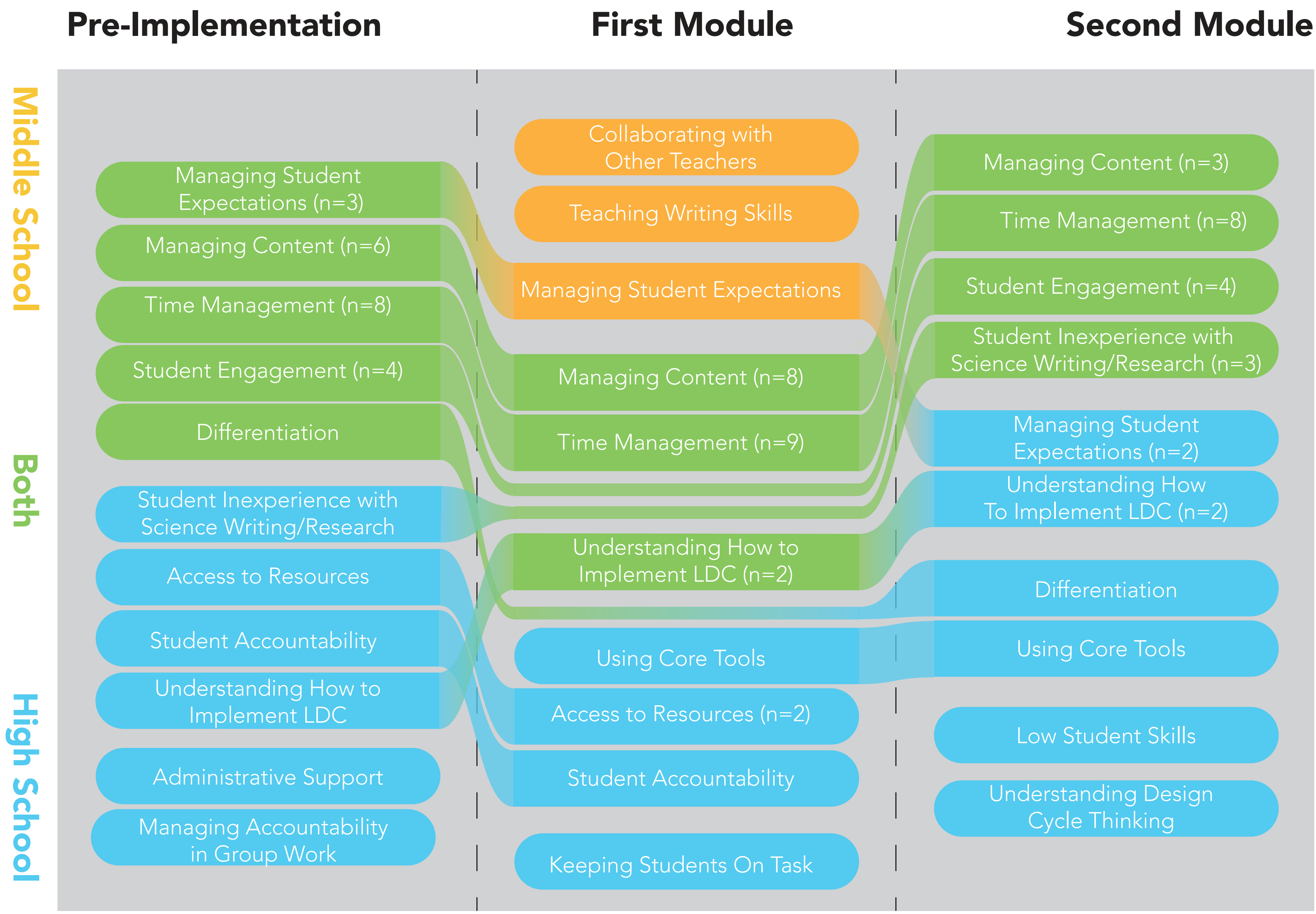
Who are LDC teachers collaborating with?

Source: HSTW Fall 2016

10	8	3	3	4
with **other teachers**	with **LDC teachers**	with **other districts**	with **the community**	with **no one**

LDC Implementation Challenges

This timeline illustrates the challenges teachers expected to encounter (Pre-Implementation) with challenges teachers identified while implementing Module 1 and Module 2.



THE PAST FOUNDATION

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section I: Evaluation

Submitted by:

Monica Hunter, Ph.D, Director of Research

Maria Green Cohen, Assistant Director of Research

Kayla Galloway, Research Assistant

Grayson Rudzinski, Design Researcher

PART 5: Appendix G

July 31, 2017

TECHNICAL BRIEF

Development and Validation of a STEM Benchmark Based on the ACT STEM Score

JUSTINE RADUNZEL, PHD

KRISTA MATTERN, PHD

JILL CROUSE, PHD

PAUL WESTRICK, PHD

In fall 2015, ACT will introduce a STEM score for the ACT® test that will provide students and educators with more insight into critical aspects of college readiness.[1] Developed in response to the national focus on student deficiencies in math and science, the score is derived from ACT mathematics and science test scores and represents students' overall performance in these subjects. This brief presents validity evidence for using the ACT STEM score as an indicator of students' readiness for college coursework in science, technology, engineering, and mathematics (STEM) disciplines.

A recent ACT research report suggests that academic readiness for STEM coursework may require higher scores than those suggested by the ACT College Readiness Benchmarks given that Calculus instead of College Algebra appears to be the typical first mathematics course of students majoring in STEM.[2] The median ACT mathematics test score associated with a 50% probability of earning a B or higher grade in Calculus is 27. The typical first science course taken is largely dependent upon a student's major, as evidenced by differences between the four STEM major clusters included in ACT's definition of STEM.[3] Based on performance in Chemistry, Biology, Physics or Engineering, the median ACT Science score associated with a 50% probability of earning a B or higher grade is 25. In comparison, the ACT College Readiness Benchmarks in mathematics and science are 22 and 23, respectively.[4]

Two types of validity research are presented in this brief. The first involves identifying the ACT STEM score that is associated with a reasonable chance of success in first-year STEM-identified mathematics and science courses. This information can be used to help gauge overall student readiness for STEM-related coursework. The second type examines the ACT STEM score in relation to the likelihood of succeeding in a variety of STEM-related college outcomes: cumulative grade point average (GPA) over time, persistence in a STEM major, and ultimately completing a STEM degree. These results illustrate that predicting student success in STEM-related fields is a valid use of the ACT STEM score.

Justine Radunzel is a principal research scientist in Statistical and Applied Research specializing in postsecondary outcomes research and validity evidence for the ACT test.

Krista Mattern is a director in Statistical and Applied Research specializing in the validity and fairness of assessment scores as well as more general issues in higher education such as enrollment, persistence, and graduation.

Jill Crouse is a senior research associate in Educational and Workforce Research Services specializing in postsecondary research and report development.

Paul Westrick is a research scientist in Statistical and Applied Research specializing in postsecondary outcomes research and validity evidence for the ACT test.

Acknowledgements
The authors would like to thank Wayne Camara and Deborah Harris for reviewing earlier versions of the manuscript and providing helpful comments and suggestions.

ACT Technical Briefs provide reliability, validity, and other psychometric analyses on ACT education and workforce development assessments, services, and programs and those of its partners. For more on the ACT test, visit www.act.org.

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Course Success

When combining grade data for Calculus and multiple science courses from an earlier study into a single course-success model, the typical ACT STEM score associated with at least a 50% chance of earning a B or higher grade in a STEM-related course is 26. The ACT STEM score of 26 also corresponds to the average of the ACT mathematics (27) and science (25) scores, which were derived by using separate STEM content area course-success models for Calculus and a combination of science courses.[5] Given that a STEM score will be reported on the ACT score report, it is appropriate that the STEM readiness benchmark be developed based on that score rather than the mathematics and science scores separately. That being said, the two STEM readiness definitions (i.e., ACT STEM score ≥ 26 versus ACT mathematics score ≥ 27 and ACT science score ≥ 25) reach similar conclusions with regard to which students are classified as STEM-ready. For the 2014 ACT-tested high school graduating class, 93% would be classified consistently under the two definitions of STEM readiness: 13% would be STEM-ready and 80% would not be STEM-ready under either definition.[6] Of the 7% that would be classified differently under the two definitions, all of the cases were STEM-ready based on the ACT STEM score ≥ 26 definition but were considered not STEM-ready based on the ACT mathematics score ≥ 27 and ACT science score ≥ 25 definition. The disparities are due primarily to students not earning an ACT mathematics score of 27 or higher.

Figure 1 shows that as students' ACT STEM scores increase, the typical chances of earning a B or higher grade in STEM-related courses also increase. The median probability of earning a B or higher grade across the two content areas as a function of ACT STEM score is greater than 50% for students with an ACT STEM score of 26 or higher and is at least 75% for those with an ACT STEM score of 31 or higher.[7] The probability of earning a C or higher grade is also plotted in Figure 1. For students with an ACT STEM score of 26 or higher, students' chances of earning a C or higher grade are greater than 75%.

In contrast to the rates for students who appear to be ready for STEM coursework, students with lower ACT STEM scores, such as a 22 or below, have at most a 35% chance of earning a B or higher grade in a STEM-related mathematics or science course. Their chances of earning a C or higher grade in STEM-related courses are below 65%. (For reference, students who meet neither of the ACT College Readiness Benchmarks in mathematics and science will have an ACT STEM score of 22 or below.)

Results from supplemental analyses suggest that the typical highest percentage of correct classifications (that is, the maximum accuracy rate) across institutions for using the ACT STEM score to predict course success in Calculus and STEM-related science courses is consistently greater than 60%.[8] For Calculus, the typical rate was 64%, with an interquartile range (IQR) of 61% to 69% across institutions. For the individual science courses, the typical accuracy rate was 66% for Physics (IQR = 63% to 74%), 67% for Chemistry (IQR = 64% to 72%), and 69% for Biology (IQR = 65% to 73%). The median increase in the percentage of correct classifications associated with using the ACT STEM score over classifying all students as STEM-ready was 11% to 12% in Calculus and Physics and 21% to 22% in Chemistry and Biology.

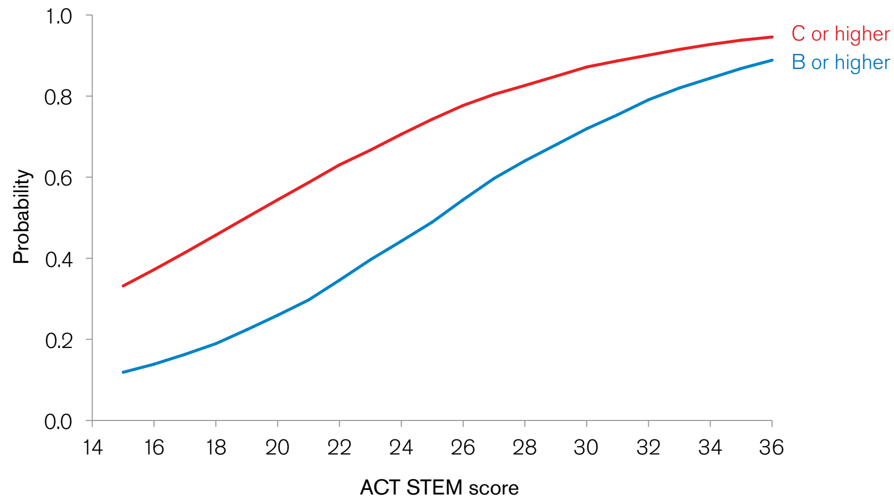


Figure 1. Probability of success in STEM-related courses by ACT STEM score at a typical four-year institution. The math-related course is Calculus. The science-related courses include Chemistry, Biology, Physics, and Engineering.

Cumulative GPA

ACT STEM scores are not only related to course success in individual mathematics and science courses. They are also related to achieving a specific cumulative college GPA over time among students in STEM majors. Figure 2 illustrates the positive relationship between ACT STEM score and first-year college GPA. It indicates that higher ACT STEM scores are associated with a higher likelihood of achieving a specific first-year college GPA at a typical four-year postsecondary institution.[9] For example, students' chances of earning a first-year GPA of 3.0 or higher are 20 percentage points higher for students majoring in STEM with an ACT STEM score of 26 than for those with an ACT STEM score of 22 (63% and 43%, respectively). Figure 2 also illustrates the positive relationships between ACT STEM score and GPAs of 2.0 or higher and 2.5 or higher.

Additionally, STEM persisters—students who persisted in a STEM major—with higher ACT STEM scores are more likely than those with lower scores to achieve a cumulative college GPA of 3.0 or higher beyond year 1. Focusing on STEM persisters ensures that a majority of students' grades are earned in STEM-related courses. As shown in figure 3, the chances of achieving a 3.0 or higher cumulative GPA are 70% at year 2, 72% at year 3, and 74% at year 4 for STEM persisters with an ACT STEM score of 26. The corresponding chances are 17 to 20 percentage points lower for STEM persisters with an ACT STEM score of 22 (50%, 54%, and 57%, respectively).[10]

STEM Persistence

In terms of STEM persistence, students with higher ACT STEM scores are more likely than those with lower scores to persist in a STEM major over time. This finding is observed not only at year 2, but also at years 3 and 4 (figure 4).[11] Additionally, STEM attrition is

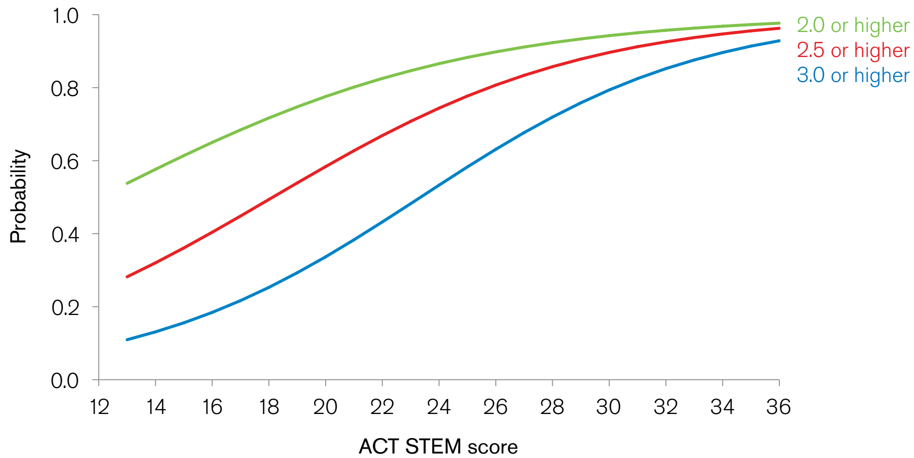


Figure 2. Probability of achieving specific first-year college GPAs by ACT STEM score for STEM majors at a typical four-year institution

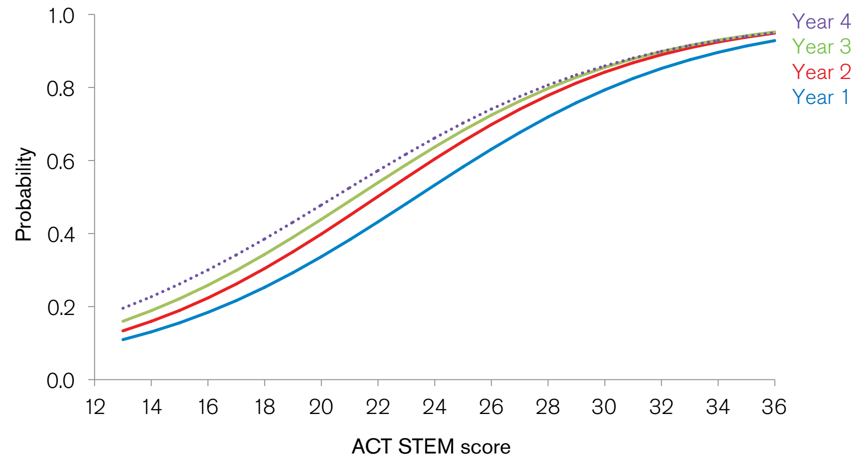


Figure 3. Probability of achieving a cumulative college GPA of 3.0 or higher over time by ACT STEM score among STEM persisters at a typical four-year institution

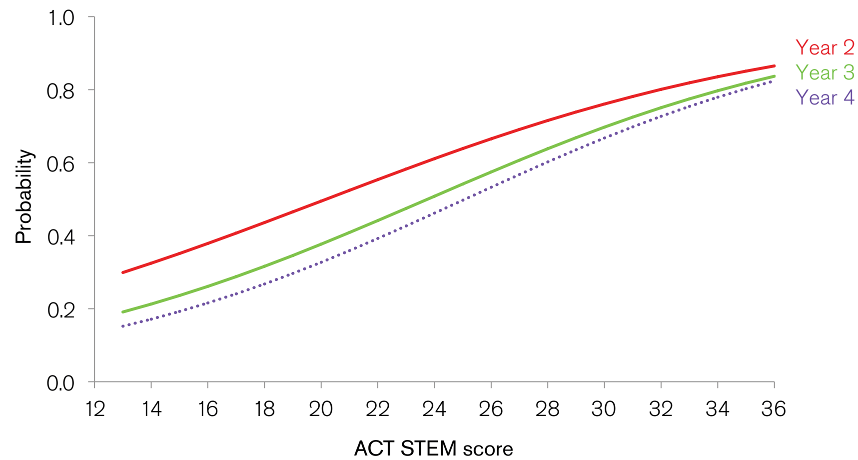


Figure 4. Probability of persisting in a STEM major at years 2, 3, and 4 by ACT STEM score at a typical four-year institution

less likely to occur over time among students with higher ACT STEM scores.

The chances of persisting in a STEM major are 67% at year 2, 57% at year 3, and 53% at year 4 for students with an ACT STEM score of 26. In comparison, students' chances are 12 to 14 percentage points lower across the years for those with an ACT STEM score of 22 (55%, 44%, and 39%, respectively).

STEM persistence status at year 4 was accurately predicted by the ACT STEM score for 63% of the students majoring in STEM in the study sample.[12] Moreover, among students predicted to persist to year 4 based on their ACT STEM score, 67% actually persisted in a STEM major at year 4. Conversely, of those predicted not to persist, 61% did not persist in STEM at year 4. Similar percentages were observed for the STEM persistence outcomes at years 2 and 3.

STEM Degree Completion

Not only are students majoring in STEM with higher ACT STEM scores more likely to persist in a STEM major through year 4, but they are also more likely to complete a degree in a STEM field. This finding is illustrated in figure 5 for STEM majors at a typical four-year institution with substantial differences observed between those with higher and lower ACT STEM scores.[13]

For students majoring in STEM with an ACT STEM score of 26, the chances of completing a bachelor's degree in a STEM field within four, five, or six years of initially enrolling in college are 21%, 34%, and 38%, respectively. Students with STEM scores above 26 have even greater chances of success. For example, students' chances of completing a bachelor's degree in STEM within six years is more than 60% for students with an ACT STEM score of 32 or higher. In comparison, STEM majors with an ACT STEM score of 22 or below have only a 25% or smaller chance of doing so.

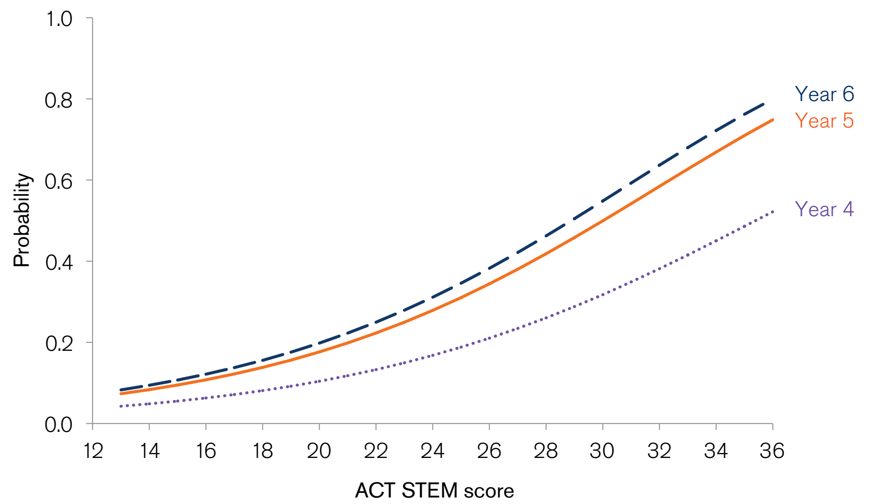


Figure 5. Probability of completing a bachelor's degree in a STEM field at years 4, 5, or 6 by ACT STEM score at a typical four-year institution

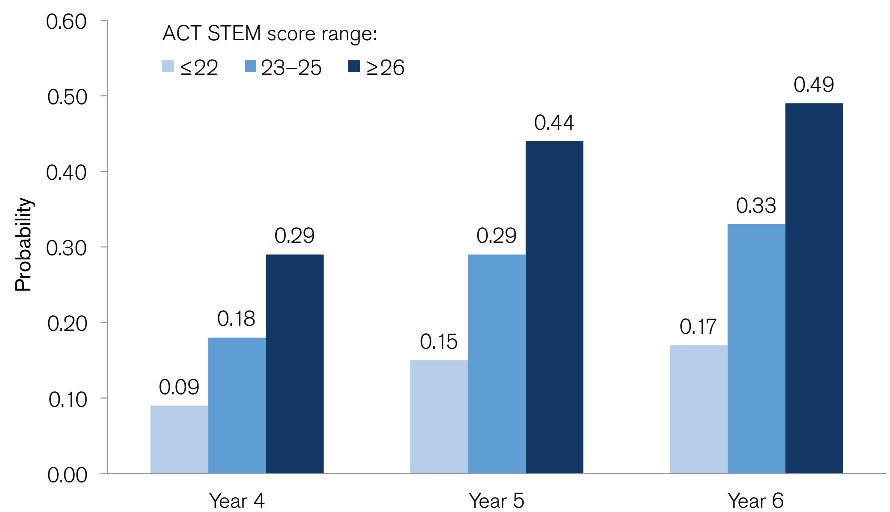


Figure 6. Probability of completing a bachelor's degree in a STEM field at years 4, 5, or 6 by ACT STEM score range at a typical four-year institution

Figure 6 provides an alternative view of these results by examining STEM bachelor's degree completion rates by grouping students into three ACT STEM score categories: 22 or below, 23 to 25, and 26 or above. Students with an ACT STEM score of 26 or higher are nearly three times more likely than those with a score of 22 or below to earn a STEM degree within four, five, or six years (49% vs. 17% at year 6). Only one-third of students majoring in STEM with an ACT STEM score between 23 and 25 complete a STEM degree by the end of year 6.

Results for Students Who Began at a Two-Year Institution

In addition to the four-year sample results, the relationships between ACT STEM scores and STEM success for students attending two-year institutions were examined.[14] The outcomes are similar as those for the four-year sample, except in degree completion. For the two-year sample, completion of an associate's or bachelor's degree (for those who transferred) in STEM within 4, 5, or 6 years was evaluated.

Similar to the findings for the four-year sample, ACT STEM scores are positively related to students' chances of achieving specific cumulative GPAs over time, persisting in a STEM major over time, and completing an associate's or bachelor's degree in a timely manner for STEM majors who began at a two-year postsecondary institution. This result is illustrated in figure 7 for achieving a specific cumulative GPA and in figure 8 for completing an associate's or bachelor's degree in a STEM field.

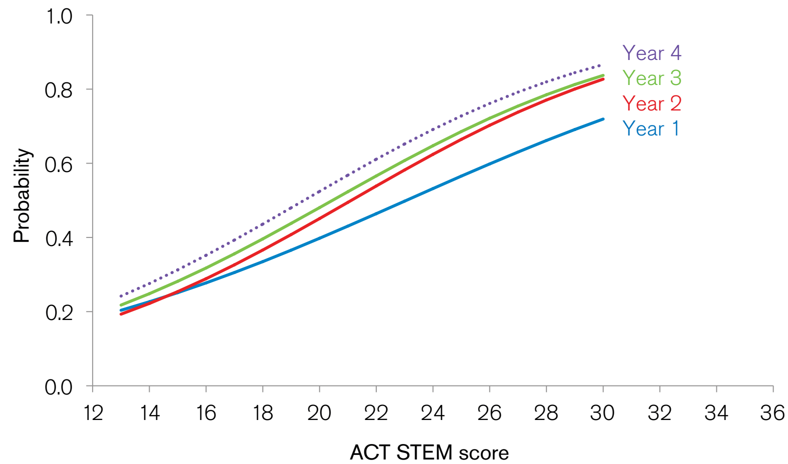


Figure 7. Probability of achieving a cumulative college GPA of 3.0 or higher over time by ACT STEM score among STEM persisters who began at a two-year institution

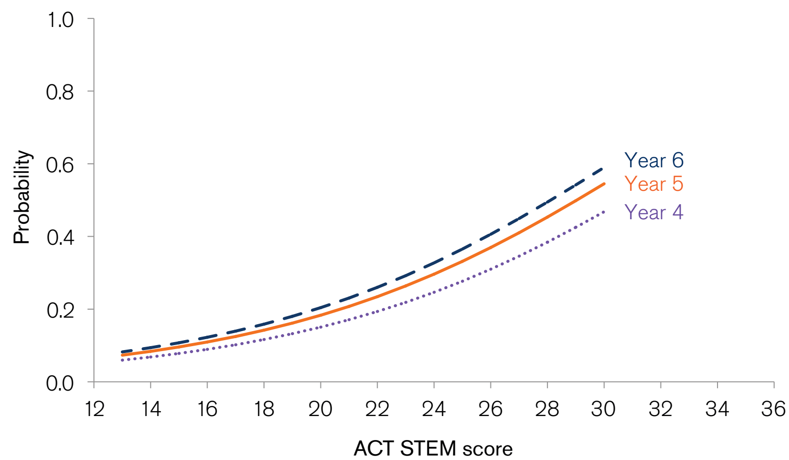


Figure 8. Probability of completing an associate's or bachelor's degree in a STEM field at year 4, 5, or 6 by ACT STEM score for STEM majors who began at a two-year institution

Results by STEM Major Cluster

For each of the four STEM major clusters, students with higher ACT STEM scores are more likely than those with lower scores to succeed in STEM.[15] In particular, ACT STEM scores are positively related to students' chances of achieving specific cumulative GPAs over time, persisting in a STEM major over time, and completing a degree in STEM for each STEM major category. This finding holds for both the two- and four-year samples. Figure 9 illustrates this result for STEM persistence at year 4 for the four-year sample.

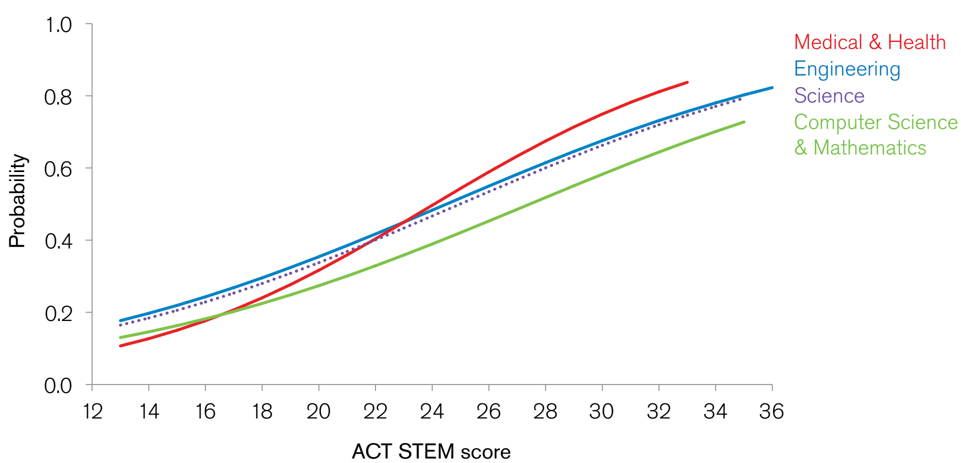


Figure 9. Probability of persisting in a STEM major at year 4 by ACT STEM score and STEM major cluster at a typical four-year institution

Conclusion

This report provides validity evidence for using the ACT STEM score to predict various outcomes of academic success. Irrespective of the outcome, students with higher ACT

STEM scores are more likely to achieve success. Because measures of both science and mathematics are critical for gauging academic preparedness in STEM disciplines, ACT is uniquely positioned to provide feedback to students.

An ACT STEM score of 26 or higher is associated with at least a 50% chance of earning a B or higher grade in STEM-related courses such as Calculus, Chemistry, Biology, Physics, or Engineering. Students' chances of success continue to improve as ACT STEM score increases. In addition to the ACT STEM score, the individual ACT mathematics and science scores can be used to gauge student readiness for content-specific coursework, especially for STEM majors requiring Calculus-based mathematics and science courses such as engineering and mathematics.[16]

Clearly, there are other factors related to STEM success. For instance, the results in this report indicate a number of high-scoring students majoring in STEM do not complete a STEM degree, and some low-scoring students do. This finding is consistent with a growing body of literature that has found educational success is a product of not only academic skills and knowledge but of noncognitive factors as well.[17] Studies have shown that motivation, academic goals, and academic self-efficacy are significantly related to college grades and retention, even after controlling for socioeconomic status, high school GPA, and ACT/SAT scores.[18] In addition to the ACT STEM score, other measures that might be considered to help identify students who are likely to be successful in STEM-related fields include students' vocational interests, their high school coursework and grades, academic behaviors, and motivational factors.[19] ■

Notes

1 The STEM score is the rounded average of the ACT mathematics and science test scores. In addition to a STEM score, students will receive an English Language Arts (ELA) score, a Progress Toward Career Readiness indicator, and an Understanding Complex Texts indicator.

2 The ACT College Readiness Benchmark in mathematics was based on course grades earned in College Algebra. Krista Mattern, Justine Radunzel, and Paul Westrick, *Development of STEM Readiness Benchmarks to Assist Career and Educational Decision Making*, ACT Research Report 2015-3 (Iowa City, IA: ACT, 2015), http://www.act.org/research/researchers/reports/pdf/ACT_RR2015-3.pdf.

3 Given the inconsistency among various STEM definitions, ACT conducted a comprehensive literature review and refined its definition of STEM. One distinction of ACT's definition is that it excludes social/behavioral sciences such as psychology and sociology. The four STEM major clusters included in the definition are Science, Engineering & Technology, Medical & Health, and Computer Science & Mathematics. To learn more about the majors and occupations included in ACT's definition of STEM, see ACT, *The Condition of STEM 2013* (Iowa City, IA: ACT, 2014), http://www.act.org/stemcondition/13/.

4 In mathematics and science, 22 and 23 are the typical scores associated with at least a 50% chance of earning a B or higher grade in College Algebra and Biology, respectively. Jeff Allen, *Updating the ACT College Readiness Benchmarks*, ACT Research Report 2013-6 (Iowa City, IA: ACT, 2013), http://www.act.org/research/researchers/reports/pdf/ACT_RR2013-6.pdf.

5 For a description of the data, see Mattern, Radunzel, and Westrick, *Development of STEM Readiness Benchmarks*, 13. In the current analyses, the single ACT STEM score/course success model includes an indicator for content area (math versus science). Results are based on the typical probabilities of success across the two content areas giving equal weight to the two areas. The typical 25th and 75th percentiles across the two content areas are 25 and 27, respectively. The same ACT STEM cut score is suggested when the median probabilities of success are obtained from the separate content-specific course success models.

6 For students classified as not being STEM-ready by both definitions, 73.4% had an ACT mathematics score below 27 and an ACT science score below 25, 1.4% had an ACT mathematics score of 27 or higher and an ACT science score below 25, and 5.1% had an ACT mathematics score below 27 and an ACT science score of 25 or higher.

7 An ACT STEM score of 26 is the first score above the 0.50 threshold based on the median probabilities of earning a B or higher grade across the two content areas. Specifically, an ACT STEM score of 25 is associated with a median probability of 0.49, while for a score of 26 the corresponding probability is 0.54.

8 This finding is observed for several other mathematics and science courses such as College Algebra, Trigonometry, Precalculus/Finite Math, Anatomy/Physiology, Zoology, and Astronomy. Course success is defined here as earning a B or higher grade. Course grade data for these supplemental analyses are based on data from partnering institutions that have used ACT's Course Placement services (96 institutions/approximately 60,000 students for Calculus; 198 institutions/approximately 140,000 students for Biology; 106 institutions/approximately 110,000 students for Chemistry; 14 institutions/approximately 4,000 students for Physics with Calculus). The sample sizes here are greater than those used to develop the ACT STEM benchmarks in mathematics and science due to earlier freshman cohorts (prior to 2005) being included in these analyses (see Mattern, Radunzel, and Westrick, *Development of STEM Readiness Benchmarks*). The study sample is weighted to ensure that the sample is representative of a larger population of ACT-tested first-year college enrollees in terms of race/ethnicity, gender, ACT Composite score,

and high school GPA. The methodology for deriving the maximum accuracy rate is based on statistical decision theory for validating educational selection decisions and is the same as that used by ACT for helping institutions make course placement decisions. See Richard Sawyer, "Decision Theory Models for Validating Course Placement Tests," *Journal of Educational Measurement* 33, no. 3 (1996): 271–290. doi: 10.1111/j.1745-3984.1996.tb00493.x.

9 For a description of the data, see Mattern, Radunzel, and Westrick, *Development of STEM Readiness Benchmarks*, 18. Success rates are based on fixed-effect parameter estimates from hierarchical logistic regression models.

10 Students' chances of achieving a cumulative GPA of 3.0 or higher are likely increasing over time due to STEM attrition (e.g., students earning lower grades are more likely to switch to a non-STEM major or drop out of higher education), an outcome to be discussed in the next section.

11 For a description of the data, see Mattern, Radunzel, and Westrick, *Development of STEM Readiness Benchmarks*, 18. Success rates are based on fixed-effect parameter estimates from hierarchical multinomial regression models. Students were tracked primarily at the initial institution attended.

12 The predicted STEM persistence status for each student was based on their estimated chances of success derived using the fixed effect parameter estimates from the ACT STEM score model. If a student's chances were 50% or higher, they were predicted to persist (classified as persisting) in a STEM major.

13 For a description of the data, see Mattern, Radunzel, and Westrick, *Development of STEM Readiness Benchmarks*, 18. Success rates are based on fixed-effect parameter estimates from hierarchical discrete-time regression models. Students were tracked primarily at the initial institution attended.

14 Data are based on more than 10,000 students in STEM majors who first enrolled in one of 36 two-year institutions from two state systems (freshman cohorts 2005 to 2009). Success rates are based on fixed-effect parameter estimates from hierarchical regression models. Students were tracked across in-state two- and four-year postsecondary institutions, so in-state transfer information was available.

15 For the four-year sample, 28% were Engineering & Technology majors, 20% were Medical & Health majors, 11% were Computer Science & Mathematics majors, and 41% were Science majors. For the two-year sample, 26% were Engineering & Technology majors, 45% were Medical & Health majors, 13% were Computer Science & Mathematics majors, and 16% were Science majors.

16 Mattern, Radunzel, and Westrick, *Development of STEM Readiness Benchmarks*.

17 Krista D. Mattern, Jeremy Burrus, Wayne J. Camara, Ryan O'Connor, James Gambrell, Mary Ann Hanson, Alex Casillas, and Becky Bobek, *Broadening the Definition of College and Career Readiness: A Holistic Approach*, ACT Research Report 2014-5 (Iowa City, IA: ACT, 2014), http://www.act.org/research/researchers/reports/pdf/ACT_RR2014-5.pdf.

18 Steven B. Robbins, Kristy Lauver, Huy Le, Daniel Davis, Ronelle Langley, and Aaron Carlstrom, "Do Psychosocial and Study Skill Factors Predict College Outcomes? A Meta-Analysis," Psychological Bulletin 130, no. 2 (2004): 261–288.

19 Justine Radunzel, Krista Mattern, and Paul Westrick, "More Than Test Scores: A Multidimensional Model of STEM Success" (Paper presented at the annual forum for the Association of Institutional Research, Denver, CO, May 28, 2015).

THE PAST FOUNDATION

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section II: Project Management

Submitted by: Scott Smith, Rural LDC Project Manager and Northwestern Local School District Associate Superintendent

July 31, 2017

RURAL
LITERACY DESIGN COLLABORATIVE

Today's workers require STEM knowledge and skills more than a generation ago (NSF, 2015). It is necessary to shift K-12 instruction from a knowledge focus knowledge utilization. STEM professionals integrate content and practices in their work yet traditional K-12 instruction has emphasized lectures, note-taking, assessment that test recall. When lab activities do occur, they are generally cookbook experiences (NRC, 2007). Increasing science and engineering accessibility requires more in-depth study and research opportunities for students. These proficiencies can be acquired over time and experiences through Literacy Design Collaborative (LDC). Integrating lab and design experiences with other classroom instruction is challenging. It requires increased rigor and it necessitates support for teachers. This is especially true in rural, high poverty communities. With few in-district colleagues, it is critical to build communities beyond the district so teachers may collaborate and share effective resources and strategies.

Scott Smith
Associate Superintendent
Northwestern Local School District
Rural LDC Project Manager

Project Implementation Summary

July 28, 2017

Rural Collaborative to Improve instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Table of Contents

RURAL LITERACY DESIGN COLLABORATIVE

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative

OBJECTIVES

1. **Increase the number of students engaged in learning that builds STEM skills and PBL practices they need for success in college and career.**
2. **Improve instructional practices to support student gains in higher order thinking skills—problem-solving, independent thinking, analysis, collaboration and creativity—and develop improved reasoning, research and technical writing skills.**
3. **Create a Clean Energy Lab to provide a shared learning space for applied learning aligned to problem based design and experimentation.**

INPUT

Battelle Education
Facilitates the collaboration of science teachers to create and implement LDC modules to integrate STEM practices and literacy skills with STEM content.

High Schools That Work
Provides experienced LDC and literacy coaches to the five rural districts.

Coordinates and supports local leaders in providing LDC professional development.

Northwestern
Provides professional development in five rural districts focused on STEM and problem based learning.

Offers access and coordinates support for use of the Clean Energy Lab.

EVALUATION

Qualitative

1. Structured observations of planning, teacher PD, virtual meetings
2. One-on-one interviews with selected project participants
3. Directed focus group discussions with LDC coaches
4. Online pre/post teacher surveys to establish baseline and longitudinal data across five districts

Quantitative

1. Student End of Course test scores
2. ACT scores
3. Increases in the number of MS and HS STEM CTE pathways and courses offered in consortia schools
4. Number of 6-12 teachers completing LDC professional development
5. Number of LDC modules created and implemented by 6-12 teachers
6. Number of 6-12 teachers and students utilizing the Clean Energy Lab

OUTCOMES

- **Increase 6-12 student scores on Science End of Course Exams**
- **Increase student scores in ACT College & Career Readiness, ACT STEM and ACT Science**
- **Increase the number of rigorous STEM courses 6-12 students elect to take**
- **Increase the number of science courses 6-12 students take**

Rural Collaborative to Improve instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Today's workers require STEM knowledge and skills more than a generation ago (NSF, 2015). It is necessary to shift K-12 instruction from a knowledge focus knowledge utilization. STEM professionals integrate content and practices in their work yet traditional K-12 instruction has emphasized lectures, note-taking, assessment that test recall. When lab activities do occur, they are generally cookbook experiences (NRC, 2007). Increasing science and engineering accessibility requires more in-depth study and research opportunities for students. These proficiencies can be acquired over time and experiences through Literacy Design Collaborative (LDC). Integrating lab and design experiences with other classroom instruction is challenging. It requires increased rigor and it necessitates support for teachers. This is especially true in rural, high poverty communities. With few in-district colleagues, it is critical to build communities beyond the district so teachers may collaborate and share effective resources and strategies.

Project Implementation Summary Description

The purpose of this document is to summarize the Rural LDC grant project components during the implementation year (FY17). Complete details and information for each of the components listed in this Project Implementation Summary can be found in the various compliance documents submitted in the Ohio Department of Education Compliance Tracking System for this project and in the Rural LDC Year End Evaluation Report provided by The PAST Foundation. (See *Section I of the Rural LDC Year End Report, 2016-2017*).

Communications

Since this was a collaborative project consisting of five rural school district and three organizations, there was a need to create and utilize a communication plan to ensure that the Rural LDC project provided relevant, accurate and consistent project information to all stakeholders and this was critical to the success of the project. In addition based on Cohort 1 survey results and general conversations, there was a need for the project manager to do site visits and meet with district administrators (superintendent, treasurer, district liaison, building principals) in October/November 2016 to discuss the LDC model, progress of the project, the scope of work required by Cohort 1 teachers, provide information on what LDC will look like in the classroom as they do teacher observations/evaluations, as well as the budget status and to address district questions and concerns. District administrators were brought together in January 2017 as they attended a breakfast meeting with Cohort 1 teachers to learn more about the first modules created and the work yet to be done with the second modules and to meet with the local media. (See *Rural LDC Evaluation Plan, Appendix K, submitted October 31, 2016*).

Implementation Team

The implementation team was responsible for developing the project plans and monitoring the project progress, direction, deliverables and budget. The Rural Implementation Team met monthly during the implementation year and consisted of stakeholders from each of the five rural school districts as well as from Battelle Education, High Schools That Work and The PAST Foundation.

Jeff Layton	Superintendent	Northwestern	Project Oversight
Scott Smith	Associate Superintendent	Northwestern	Project Manager

Lesa Forbes	Treasurer	Northwestern	Project Treasurer
Jill Beiser	District Liaison	Black River	
Jennifer Stump	District Liaison	Hillsdale	
Catherine Puster	District Liaison	Loudonville-Perrysville	
Lisa Bowersock	District Liaison	Mapleton	
Jacki Zody	District Liaison	Northwestern	
Kelly Gaier Evans	STEM Relationship Manager	Battelle Education	
Diana Rogers	NE Regional Coordinator	High Schools That Work	
Monica Hunter	Director of Research	The PAST Foundation	
Maria Cohen	Assistant Director of Research	The PAST Foundation	
Kayla Galloway	Research Assistant	The PAST Foundation	

Planning and Implementation

There was ongoing planning throughout the implementation year by the Rural LDC Implementation Team to ensure project success; however, the initial planning developed during the writing of the grant proposal provided a feasible outline to implement the project. The majority of the ongoing planning during the implementation year dealt with logistics of arranging dates, times and locations of activities associated with the project. The scope of activities was actually accelerated to meet the needs of several districts in the project. The original proposal intended to start Cohort 2 professional development during the 2017-2018 school year; however, there was interests to accelerate this timeline to provide LDC professional development for some of the Cohort 2 teachers at the end of the 2016-2017 school year. The remainder of the Cohort 2 teachers will receive professional development at the beginning of the 2017-2018 school year as described in the original proposal. These two groups will come together in September 2017 to become one group of Cohort 2 teachers as they develop and implement two LDC modules.

Programmatic Sustainability

The initial proposal intended for each district to build internal expertise and capacity to provide their own LDC professional development to Cohort 2 teachers and any new science teachers in subsequent years immediately following the professional development provided by Battelle Education to Cohort 1 teachers. There was a shift in approach during the implementation year that resulted in adding an intermediate step to establishing the programmatic sustainability within each of the five rural districts. The approach changed to an even more gradual release of responsibility as Battelle Education provided direct instruction for Cohort 1, then guided instruction for Cohort 2 utilizing a core group of Cohort 1 teachers to eventually districts providing their own independent LDC professional development beyond the 2017-2018 school year.

Professional Development

Literacy Design Collaborative—Battelle Education

Battelle Education, under the leadership of Kelly Gaier Evans and Peter DeWitt, provided a well-structured, high quality LDC professional development plan based on their previous work in this area and their association with the national Literacy Design Collaborative organization. The LDC professional development allowed teachers to refine and gain knowledge in both content and pedagogy as they designed, developed and implemented LDC science modules. The base model for the LDC professional development was implemented as described in the original proposal; however, it was slightly modified based on teacher survey data as well as other formative assessments before, during and after the professional development sessions. Battelle Education also adapted the professional development timeline and process to meet the needs of the districts and individual teachers in this project based on input from members of the Rural LDC Implementation Team. In addition, Battelle Education provided support, mentorship and resources to Cohort 1 teachers through virtual coaching between professional development sessions. (See *Section III: Battelle Education Year End Report, 2016-2017* document)

Problem-Based Learning Professional Development—Northwestern

The Northwestern Local School District was to provide Problem-Based Learning (PBL) professional development utilizing the Illinois Mathematics and Science Academy's PBL model to the other four Rural LDC districts during the implementation year of the grant. The Implementation Team revised the proposed plan to initiate PBL training during the grant year and postponed this professional development until the 2017-2018 school year to allow Cohort 1 teachers to focus on the intensive LDC science PD and onsite coaching during the implementation year of this grant project. The addition of PBL PD was viewed as a potential level of training that could over-extend the Implementation Team and Cohort 1 teachers, and result in a negative impact for the LDC professional development and LDC module development. The change to postpone initiating a second track of PD reflects the priority of assuring high buy-in for Cohort 1 teachers from the District Liaisons from the five districts who were responsible for establishing LDC in preparation for year 1 and sustaining years of LDC training and implementation that will be carried out by each of the five districts.

Coaching

High Schools That Work (HSTW), under the leadership of Diana Rogers, provided experienced Literacy Design Collaborative and literacy/science facilitators and coaches to support each Cohort 1 science teacher from the five school districts in creating and teaching two LDC modules, providing feedback and evaluating the modules. The support and coaching occurred during professional development sessions as well as virtually and onsite in each of the districts. This onsite, job-imbedded support and coaching was a crucial component to the success of this project. HSTW also assisted in building capacity within each school district to support local leaders in implementing LDC in subsequent years as well as promoting this project within the districts, regionally, statewide and nationally through online and conference presentations. High Schools That Work provided additional in-kind contributions (i.e. personnel, time and resources) to support the work during the implementation year as well as in Year 1. Funds were shifted from the original budget to extend the contract of HSTW services to provide virtual and onsite coaching and support to Cohort 2 teachers based on the positive experience with Cohort 1 teachers. (See *Section IV: High Schools That Work Year End Report, 2016-2017* document)

Data Collection

Student Achievement

The original proposal included the ACT® Quality Core and Aspire assessments as a measurement tool for the academic achievement component of the project. Due to the number of existing state assessment requirements, it was determined to eliminate the ACT® Quality Core and Aspire assessments and utilize the mandated Ohio State Achievement Assessments in grades 5-12 English/Language Arts, Math and Science to measure outcomes of this project. It was also determined to use College and Career Readiness (ACT® Composite), ACT® STEM (as calculated by using ACT ® Math and Science scores), and ACT® Science that all five districts use to assess students in 11th grade. There was intent in the original proposal to expand STEM learning opportunities to students by providing funding for Project Lead The Way (PLTW) and/or Southern Regional Education Board (SREB) training that would increase the number of rigorous STEM and science courses offered in each of the five school districts. Four of the five school districts participating in this project have elected to allocate funding for PLTW and/or SREB teacher training during summer 2017. Student Achievement data will be collected from each of the districts in August/September 2017 and will be submitted to ODE before October 31, 2017. (See *Rural LDC Outcome Data Collection and Reporting* document, *Appendix A* and *Appendix B*)

Cost Savings

This project provided clean energy technologies (geothermal system, wind turbine, solar panels and LED lighting) to a newly constructed 30'x100' greenhouse and existing 32'x80' storage building in the Northwestern Local School District. Energy consumption of electricity and natural gas will be collected to determine the yearly cost savings to this facility as the result of the installed clean energy technologies. Cost Savings data from Northwestern will be collected in August/September 2017 and will be submitted to ODE before October 31, 2017. (See Appendix A: *Rural LDC Outcome Data Collection and Reporting* document.)

Budget

The Rural LDC project budget was managed with efficiency and oversight throughout the duration of the project that enabled the shifting of remaining funds to accelerate the timeline of the grant project which strengthened the original proposal and met the needs of the five rural school districts.

Early in the planning stages during the implementation year of the project, it was determined to eliminate the purchased ACT® Quality Core and Aspire assessments to measure student achievement as written in the original grant proposal. The original budget appropriated $32,500 for the ACT® Quality Core and Aspire assessments, but was shifted to provide stipends for Cohort 2 teachers, coaching stipends for Cohort 1 teachers and for management by District Liaisons in Year 1 of the project utilizing an additional contract with High Schools That Work (HSTW). Additional funds were also shifted to purchased services for the five rural districts to obtain additional Project Lead The Way (PLTW) or Southern Regional Educational Board (SREB) training in order to expand their STEM pathways and Science/STEM course offerings. HSTW is also providing an additional $13,500 in-kind contribution to this project in order to provide coaching oversight and support for each of the five districts as Cohort 2 teachers develop and implement the LDC Science modules during the 2017-2018 school year and as Cohort 1 teachers develop leadership and coaching skills related to providing feedback, mentoring and resources within their district.

Rural districts participating in this project were under-budget in supplies and capital outlay as there were less than anticipated costs for supplies, materials, technology and science equipment purchased in the development and implementation of the LDC Science modules by Cohort 1 teachers. However, there were capital overlay cost over-runs with the Northwestern Clean Energy Learning Space conversation that required a budget revision in this area.

Project Evaluation

The Rural LDC project was evaluated by the Knowledge Capture team of Dr. Monica Hunter, Maria Cohen and Kayla Galloway in association with The PAST Foundation. The knowledge and experience of the Knowledge Capture team provided an invaluable perspective that strengthened the overall Rural LDC project. As described in the grant proposal, the overall mixed methods evaluation plan involved both qualitative and quantitative evaluation methods to aid this project to 1) establish benchmark data, 2) determine effective modifications during the course of the grant project, 3) regularly assess fidelity to project goals and outcomes,

4) identify constraints encountered that may pose threats to validity within the implementation process, and
5) review evidence of change and impact.
A Project Evaluation Team was created to monitor the progress of the progress throughout the implementation year of the project. This team met monthly and as needed to review formative and summative survey information and to evaluate and to guide future planning. (See *Section I: Evaluation Report, Appendices B, C and D* documents)

Monica Hunter	Director of Research	The PAST Foundation
Maria Cohen	Assistant Director of Research	The PAST Foundation
Kayla Galloway	Research Assistant	The PAST Foundation
Scott Smith	Associate Superintendent	Northwestern
Kelly Gaier Evans	STEM Relationship Manager	Battelle Education
Diana Rogers	NE Regional Coordinator	High Schools That Work

Collaboration

Beyond the intended student achievement and cost savings outcomes of the Rural LDC project as well as collaboration among Cohort 1 teachers, collaboration became an unintended and important element of the success of the project in the implementation year. There is evidence of teamwork, partnership, association and cooperation embedded in the structure of the professional development as intended by Battelle Education as Cohort 1 teachers across the five districts planned and implemented the LDC modules. There is also evidence to suggest that collaboration extended to superintendents, treasurers, curriculum directors and other school employees beyond the original scope of the project. The extended collaboration and relationships also included the partnerships with Battelle Education, High School That Work and The PAST Foundation. Networking, sharing of information (i.e. schedules, course descriptions, CTE, etc.), experiences and resources, touring facilities and involvement in other projects, grants and opportunities were created as a result of this project.

APPENDIX
Section II: Project Management

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative

Outcome Data Collection and Reporting

Academic Achievement

The Rural Collaborative will utilize Ohio's State Achievement Assessments to determine student achievement in knowledge and skills as outlined by Ohio's Learning Standards in English, Math and Science. It will also utilize the ACT® Reading, English, Math and Science sections to determine student readiness for college and career, STEM, and Science.

Data for the five Rural LDC school districts will be collected and analyzed for grades 3-8 ELA, Math and Science as well as high school End of Course English I, English II, Algebra I, Geometry, and Biology assessments through the 2021-2022 school year measured by district percent proficient. The ACT® district scores, taken by students in 11th grade in each of the five participating districts, will be collected and analyzed through the 2021-2022 school year in the areas of College and Career Readiness (ACT® Composite), ACT® STEM (as determined by ACT® using Math and Science scores), and ACT® Science. (Table 1.) Data for the number of STEM and science courses available in each of the five participating school districts will also collected. The two components of student achievement and number of courses available will measure the outcomes for this project.

District data managers from each of the five districts will submit data each year as soon as Ohio's State Achievement Assessment scores are available in the *Online Reporting System* of the Ohio's State Tests Portal (http://ohtst.portal.airast.org/) and from the ACT® District Profile Report. (See *Rural LDC Data Collection* document)

Data points for each Ohio assessment in grades 5-12 include:

- Number of Students Tested
- Average Scale Score
- Percent Proficient
- Number of Students at Each Performance Level (Limited, Basic, Proficient, Accelerated, Advanced)
- Percent at Each Performance Level (Limited, Basic, Proficient, Accelerated, Advanced)

Data points for 11th graders taking the ACT® include:

- Number of Students Tested
- Average ACT® Composite Score
- Average ACT® STEM Score
- Average ACT® Science Score

Table 1. Rural LDC Outcome Data—Academic Achievement Measures

Rural LDC Outcome Data—Academic Achievement Measures		
Grade	**Assessment**	**Measures**
5	**AIR ELA**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
5	**AIR Math**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
5	**AIR Science**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
6	**AIR ELA**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
6	**AIR Math**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
7	**AIR ELA**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
7	**AIR Math**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
8	**AIR ELA**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
8	**AIR Math**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
8	**Algebra I**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
8	**AIR Science**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
HS	**English I**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
HS	**English II**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
HS	**Algebra I**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
HS	**Geometry**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
HS	**Biology**	Number of Students Tested Average Scale Score Percent Proficient Number of Students at Each Performance Level Percent at Each Performance Level
HS	**ACT® Reading**	Average ACT® College and Career Readiness (Composite) Average ACT® STEM Average ACT® Science
HS	**ACT® English**	
HS	**ACT® Math**	
HS	**ACT® Science**	

The number of STEM courses and Science courses offered by the five participating districts will be collected and analyzed to measure the number of rigorous STEM courses students in grades 5-12 students elect to take and the number of science courses students in grades 6-12 take during the school year. (Table 2)

Table 2. Rural LDC Outcome Data—STEM and Science Courses

Rural LDC Outcome Data—Academic Achievement						
Number of	Baseline 2016-2017	Sustainability Y1 2017-2018	Sustainability Y2 2018-2019	Sustainability Y3 2019-2020	Sustainability Y4 2020-2021	Sustainability Y5 2021-2022
STEM Courses						
Science Courses						

Cost Savings

The energy consumption of electricity (kWh) and natural gas (ft^3) along with yearly costs for each energy source will be monitored, collected and analyzed for the existing Northwestern Local School District Clean Energy Learning Space consisting of a 32'x80' storage building and 30'x100' greenhouse as a result of the installation of the geothermal system, wind turbine, solar panels, and LED lighting as part of this project. (Table 3)

Table 3. Rural LDC Outcome Data—Cost Savings

Rural LDC Outcome Data—Cost Savings							
		Baseline 2016-2017	Sustainability Y1 2017-2018	Sustainability Y2 2018-2019	Sustainability Y3 2019-2020	Sustainability Y4 2020-2021	Sustainability Y5 2021-2022
Northwestern Clean Energy Learning Space	Electric						
	Yearly Cost						
	Natural Gas						
	Yearly Cost						
	Total Yearly Cost						

Section II: Rural LDC Data Collection

Composite of Participating Districts

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

Baseline 2016-2017

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Composite of Participating Districts

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

Sustainability Y1 2017-2018

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12			
Number of Science Courses in grades 5-12			

Section II: Rural LDC Data Collection

Composite of Participating Districts

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

Sustainability Y2 2018-2019

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12			
Number of Science Courses in grades 5-12			

Section II: Rural LDC Data Collection

Composite of Participating Districts

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

Sustainability Y3 2019-2020

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12			
Number of Science Courses in grades 5-12			

Section II: Rural LDC Data Collection

Composite of Participating Districts

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

Sustainability Y4 2020-2021

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12			
Number of Science Courses in grades 5-12			

Section II: Rural LDC Data Collection

Composite of Participating Districts

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

Sustainability Y5 2021-2022

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12			
Number of Science Courses in grades 5-12			

Section II: Rural LDC Data Collection

Composite of Participating Districts

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

Five Year Average 2018-2022

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12			
Number of Science Courses in grades 5-12			

Section II: Rural LDC Data Collection

Black River

Baseline 2016-2017

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Black River

Sustainability Y1 2017-2018													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Black River

Sustainability Y2 2018-2019														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students					
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Black River

Sustainability Y3 2019-2020													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Black River

Sustainability Y4 2020-2021

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Black River

Sustainability Y5 2021-2022

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Black River

Five Year Average 2018-2022

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Hillsdale

Baseline 2016-2017													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Hillsdale

Sustainability Y1 2017-2018

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Hillsdale

Sustainability Y2 2018-2019

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Hillsdale

Sustainability Y3 2019-2020													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Hillsdale

Sustainability Y4 2020-2021													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Hillsdale

Sustainability Y5 2021-2022

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Hillsdale

Five Year Average 2018-2022													
	Num_Students	Avg_Scale_Score	Percent_Proficien	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Loudonville-Perrysville

Baseline 2016-2017														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students					
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Loudonville-Perrysville

Sustainability Y1 2017-2018														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Loudonville-Perrysville

Sustainability Y2 2018-2019														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students					
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Loudonville-Perrysville

Sustainability Y3 2019-2020

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Loudonville-Perrysville

Sustainability Y4 2020-2021														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students					
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Loudonville-Perrysville

Sustainability Y5 2021-2022														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Loudonville-Perrysville

Five Year Average 2018-2022													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Mapleton

Baseline 2016-2017

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Mapleton

Sustainability Y1 2017-2018

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Mapleton

Sustainability Y2 2018-2019													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Mapleton

Sustainability Y3 2019-2020

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Mapleton

Sustainability Y4 2020-2021

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Mapleton

Sustainability Y5 2021-2022

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Mapleton

Five Year Average 2018-2022													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Northwestern

Baseline 2016-2017														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students					
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Northwestern

Sustainability Y1 2017-2018

	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Northwestern

Sustainability Y2 2018-2019														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students					
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Northwestern

Sustainability Y3 2019-2020														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students					
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Northwestern

Sustainability Y4 2020-2021													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Northwestern

Sustainability Y5 2021-2022													
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students				
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

Section II: Rural LDC Data Collection

Northwestern

Five Year Average 2018-2022														
	Num_Students	Avg_Scale_Score	Percent_Proficient	Num_Students					Percent_Students					
				Basic	Limited	Proficient	Accelerated	Advanced	Basic	Limited	Proficient	Accelerated	Advanced
ELA 5													
ELA 6													
ELA 7													
ELA 8													
English I													
English II													
Math 5													
Math 6													
Math 7													
Math 8													
Algebra I													
Geometry													
Science 5													
Science 8													
Biology													

ACT® Composite		
ACT® STEM		
ACT® Science		

Number of STEM Courses in grades 5-12	
Number of Science Courses in grades 5-12	

THE PAST FOUNDATION

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section III: Battelle Education

Submitted by: Kelly Gaier Evans, Rural LDC Project Partner and Battelle Education STEM Relationship Manager

July 31, 2017

Introduction

At Battelle, employees need to be fluent in STEM concepts but even more, they need to be persistent and innovative. They need to be good communicators and problem solvers. When faced with a challenge or problem, they need to be able to research and learn from what has been done before and find new solutions to problems that didn't exist a decade ago. Once they identify solutions, they need to be able to communicate those solutions.

When looking at literacy within science, Battelle knows the importance of giving students early opportunities to engage with design – and knows the importance of supporting students with the literacy skills inherent to success in engineering.

Battelle knows that for teachers to embed these experiences takes time. Teachers need time to collaborate and share best practices. In rural schools across Ohio, a middle school science teacher may not have another colleague in their school or district teaching the same course or content. Battelle's goal for the Rural Collaborative has been two-fold. One – to improve instruction and expand student STEM opportunities and 21st century skills through LDC. Two – to improve upon the first iteration of the tool and training by testing the Literacy Design Collaborative (LDC) tool in a new environment and taking lessons learned to improve the tool for future teachers. Since the release of the Battelle LDC and Science collection, over 7,000 teachers across the country have accessed the LDC tools. It is important to Battelle to test the tools in multiple contexts to ensure that the tool is able to improve teacher practice.

To improve upon the original design, Battelle Education, Battelle's nonprofit venture in STEM education, partnered STEM teachers and Battelle Scientists/engineers from the first pilot in 2015 with 15 teachers from five rural schools.

The end-of-year results are promising. Qualitative feedback has been positive. Here are just a few notes shared with Battelle Education throughout the course of the grant year:

HS teacher from Mapleton 3/24/2017

> *"This is not a question rather a plea. I would really like to be a part of this again doing any and all things possible because I feel that this is an excellent teaching technique."*

HS teacher from Mapleton *3/25/2017*

> *"I'd say the module had a positive impact on science fair. Check out our hardware from the Mohican District Science Fair. Wow!"*

District teacher from Hillsdale *5/26/2017*

> “*I wanted you all to know what an impact LDC has made on us at Hillsdale. Today we had department meetings and we are sitting around talking about skills we want kids to have grades 5-12 in science, and the bulk of our conversation centered around the things we learned at LDC, and how easy it will be for us to all model those things at each level in our modules. The conversation was so focused on this that our department chair actually apologized that she wasn't involved and stated she was sorry she couldn't add one more thing, but I think she totally supports what we want to do, and how we want to use the things we've learned to build a curriculum plan for all of us to prepare our students including using common language, expectations, research skills, graphing, reports....virtually everything we discussed collectively to have kids learn we are going to use in our LDC modules, and the people not involved are going to receive all of our report and plan templates to model for their classes as well...and all seem on board to do this...thank you!*”

Executive summary

Battelle Education’s deliverable in the grant year was to facilitate and coach science teachers across 5 rural school districts to create and implement common experimentation and design assignments that support teachers in integrating STEM practices and literacy skills with STEM content. This deliverable was broken down into several key milestones:

1. Brainstorm and Build Milestone (On or around October 14, 2016) - Teams of teachers have been identified, selected and grouped. Battelle Education has facilitated multiple face-to-face sessions to build out the science and literacy mini-modules as well as provided virtual feedback on these assignments.
2. Evaluate and Improve design milestone (On or around March 15, 2017): Teachers have implemented several rounds of science and literacy assignments. Virtual sessions are used to reflect on implementation and the face-to-face sessions are used for coaches to lead teachers through analyzing student work against common expectations and making data based decisions for future implementation.
3. Scale up (On or before June 30, 2017): After the first year of rapid prototyping to improve design, Battelle Education coaches will lead teachers from year 1 through a strategic planning and “how to coach” sessions to determine how to launch and support their colleagues in implementing science and literacy work.

Attachment A is a calendar of events hosted by Battelle Education outlining how Battelle Education has met the deliverable and milestones outlined above. Based on the needs across the five districts, the implementation team revised the original plan for the third milestone as discussed below in the implementation grant year section.

Cohort I teachers implemented 29 LDC design modules during the 2016-17 academic year. This year’s implementation cycles have truly informed and changed the tools available for teachers across the collaborative, as well as the state and the nation for future implementation cycles.

Implementation Grant Year: LDC Science Professional Development

August 2016 – June 2017

Throughout the grant year, Battelle Education led professional development for a cohort of 15 teachers across the five districts pulling on lessons learned from the initial implementation of the Battelle Science Collection at the Metro school in 2015-2016. This professional development series was designed as two cycles of prototyping and implementation. After each implementation teachers came together to review student results. Beyond the PD offered by Battelle Education, the 15 teachers also had in the classroom support by High Schools That Work (HSTW) coaches.

Below are the details of the key work performed by Battelle Education in chronological order. Each key piece of work includes a title, timeframe, key personnel and/or attendees, a summary of work, and attachments.

Summary of Battelle Science and Literacy Professional development

Meet and greet session – overview of the work.

When: Sept 7, 2016 4:00-6:00PM

Who: Teachers, coaches, and administrators, Battelle Education team, HSTW team

Summary: The goal of this session was to bring the key stakeholders together to build engagement and buy-in. It also allowed Battelle to give a high level overview of the LDC and Science work to the teachers involved so that they had a chance to begin brainstorming their ideas well in advance of the September 2-day Overview Training.

Attachment(s): Attachment B: Meet and Greet Sept 7, 2016

Overview Training: Brainstorm and Build

When: Sept 29-30, 2016 + 1 follow-up day Oct 14, 2016, 8AM – 3PM each day

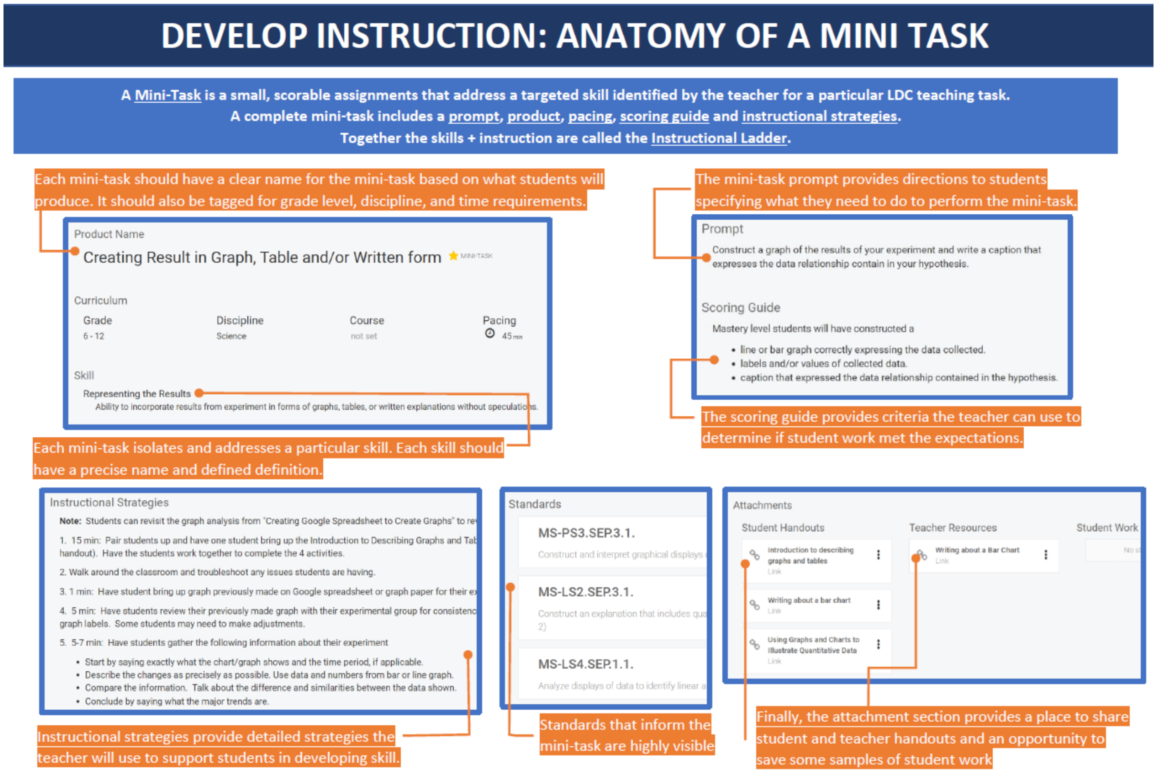
Who: 15 teachers (grades 5-12[1]) from Black River, Hillsdale, Loudonville-Perrysville, Mapleton, and Northwestern Districts, Battelle engineer, Battelle Education LDC and Science facilitator, 2 Battelle Education teacher coaches (additional attendees included: Battelle Education project manager, Grant project manager, District liaisons, HSTW coaches, PAST Foundation evaluators)

Summary: Through professional development and coaching, identified educators participated in an induction and creation workshop – collaborating in grade band teams. This was a three-day training starting with two back-to-back sessions and followed up with a third follow-up session two weeks later. The following benchmarks were established to drive instruction across these three days:

- develop a shared set of expectations and student outcomes for infusing literacy in STEM by identifying big ticket science practices and college career readiness standards to focus on throughout grant year
- engineer an overarching science literacy task (*see Image 1*) building from tasks in the LDC Battelle Science Collection, infusing in specific content to teach within your STEM discipline
- create a science and literacy module through strategic selection/modification of key mini-tasks (*see Image 2*) to support student success on overarching science literacy task
- receive and apply feedback on tasks and instruction from coaches
- build common rubrics, selecting dimensions of the LDC rubric based on identified focus areas [note: the LDC rubrics have been reviewed and tested by the Stanford Center for Assessment, Learning, and

Equity (SCALE)]

Image 1: Overarching Science Literacy Task



After the first two training days were conducted, data from the pre-implementation survey and observations of the professional development and coaching debrief provided the implementation team with three important points:

1) Teachers wanted to see what the end-student product would look like.
2) Time was a number one concern with only 33% of teachers feeling confident they would find time to revise/complete their LDC module.
3) A little over 50% of teachers left the first two days indicating they were only somewhat confident in developing a quality instructional plan.

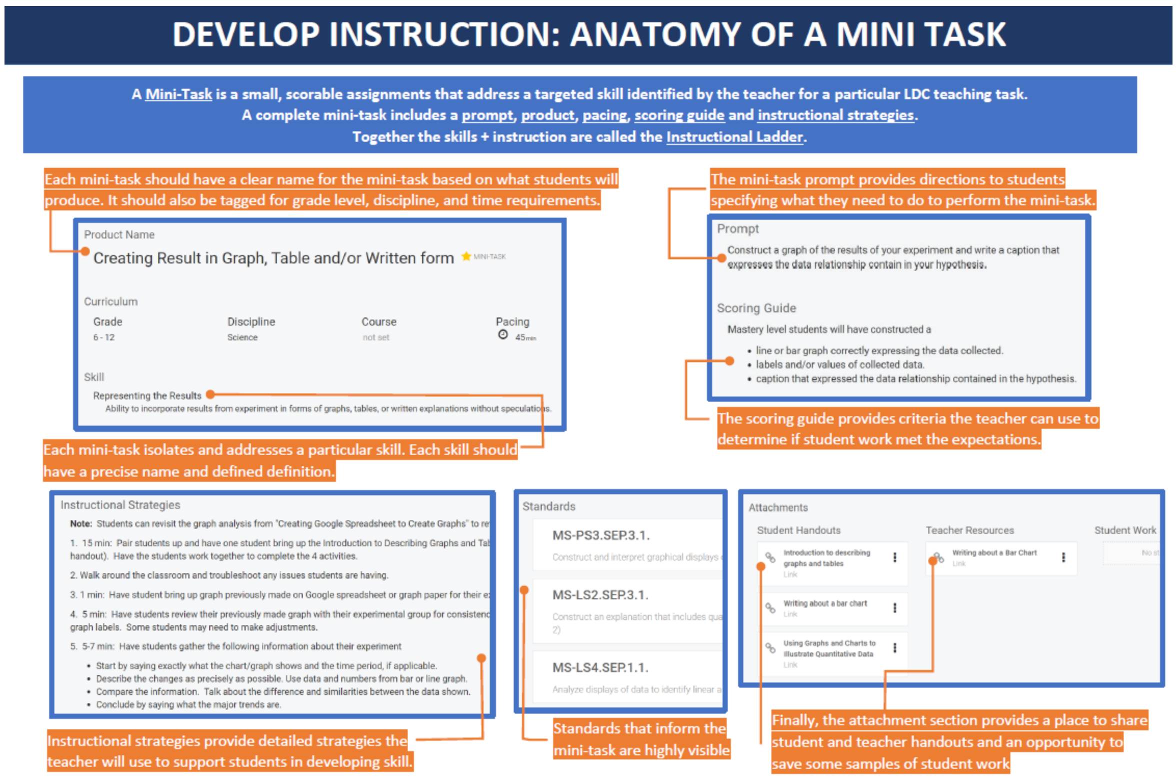
To address these concerns, Battelle Education's coaching team made the following adjustments to the follow-up workshop held October 14th (2 weeks after the Overview Training):

1) Designed a 90-min. session on the student design report. This included:
    a) A presentation by a Battelle Engineer to set context of what an actual Design Report looks like in industry
    b) Time to analyze student design report examples produced from the first pilot at Metro (Spring 2016)
    c) Time to score student design report examples using the LDC student scoring rubric
2) To address the concern around time to revise/complete their LDC module, we revised the original agenda for October 14th to maximize the amount of time provided to teachers throughout the day for structured work time. Three hours of time (about half of the workshop day) was designated as work time with technical assistance provided by the Battelle Coaches and the HSTW Coaches. We also highlighted this work time in red on the agenda and included an announcement at the beginning of the day to underscore the message that this is a teacher concern that we heard following the Overview Training, and that we worked hard to reorganize the day to extend work time to occur with the entire coaching team available to assist. Additionally, when the Battelle Education coaching team reviewed the modules a few days prior to the October 14th follow-up session, very few teachers had gone back into the module to make edits, indicating that teachers needed more supported work time.

3) As a large portion of the instructional plan revolves around the RFP and the Design Report we structured our day that way. Starting first with the time to analyze what goes into a Design Report and the second half of the day analyzing what goes into an RFP. The RFP session began with a Battelle Engineer setting the real-world context. Explaining where and how he uses an RFP. How he reads it and etcetera. Next, a Battelle Teacher coach walked participants through a Technical reading of an RFP and then a debrief. This was designed to give teachers a chance to both see what goes into an RFP as well as to practice using the skills students need to use when reading an RFP. After this, teachers were given time to work with support from coaches on developing the RFP and instruction for the Technical Reading component of the module.

Attachment(s): Attachment C: Day 1 and 2 Agenda (Sept 29-30); Attachment D: Day 3 Agenda (Oct 14); Attachment E1&E2: LDC Design Rubrics; Attachment F: Overview of LDC

Image 2: Mini-tasks



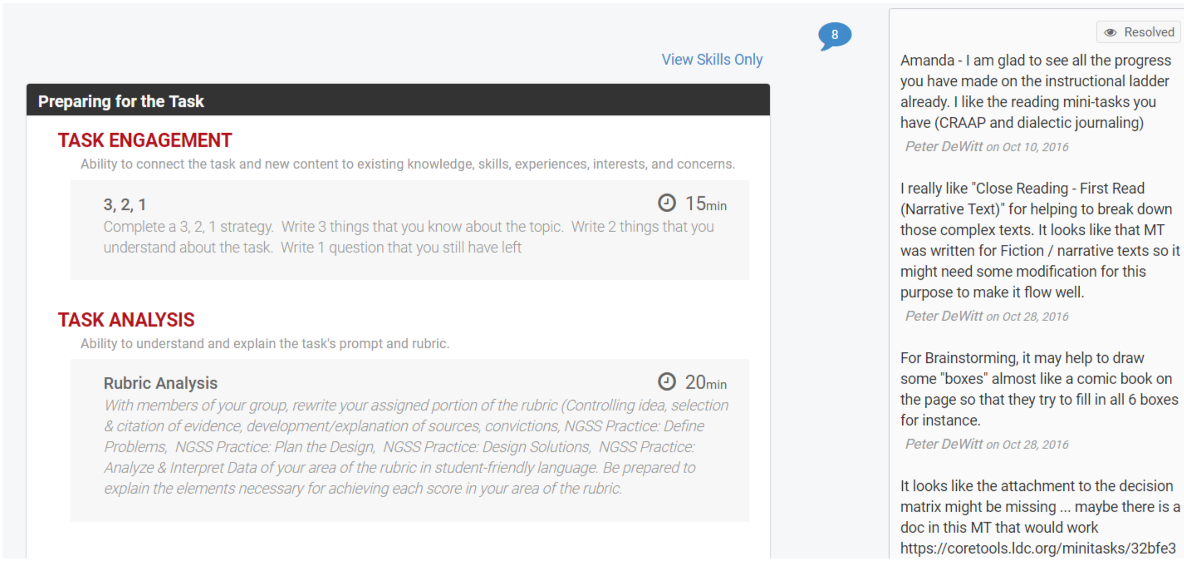
Virtual coaching/feedback (Fall 2016)

When: October 14-December 9, 2016

Who: 15 teachers (grades 5-12) from Black River, Hillsdale, Loudonville-Perrysville, Mapleton, and Northwestern, 3 Battelle coaches

Summary: Between the October 14th and the December 9th PD sessions, the 15 teachers were tasked with finalizing their Science LDC modules and implementing in the classroom with their students. During this time, the Battelle coaching team were available to teachers for feedback and to share resources. While initially conceptualized as a virtual meeting, with the multiple schedules involved, teacher preferences, and the additional onsite coaching offered through HSTW, feedback and coaching largely took place via the LDC CoreTools (web-based module building/sharing platform), via email, and via phone conversations. The LDC CoreTools offers a "comments" section which allows coaches to leave notes directly on the module as seen below. Teachers are then able to mark each comment as resolved as they modify their module (*see Image 3*).

Image 3: LDC CoreTools



Most teachers planned to implement their module towards the end of the fall, planning to finish right before the group was scheduled to come back together on December 9th. In reviewing teacher progress with modules, Battelle coaches did not see a lot of progress in CoreTools in mid-late October and early November.

The Battelle coaching team met in person on November 21st to review participant modules using the LDC Peer Review Rubric (*see Image 4*). The LDC Peer Review Rubric supports scoring of four dimensions of LDC teaching asks and three dimensions of the instructional ladder. The scoring options are *Exemplary*, *Good-to-Go*, and *Work-in-Progress*. What we found were three different groups of modules:

1) Modules where the task and instruction were both *Good-to-Go* or close. Some things were missing, but overall module was on track.
2) Modules where the tasks are largely *Good-to-Go* , but not a lot of detail instructionally. In other words, we expect they will complete the module but if we were to give the module to someone else, they would have a hard time replicating.
3) Modules with very little work completed – coaches considered the possibility whether these teachers documented planning outside of CoreTools (paper planning), or just did not document their planning at all. Follow-up with these teachers was identified as an essential step to gain better understanding of the particular challenges encountered by this group of teachers.

Image 4: LDC Peer Review Rubric

Work in progress: Some aspects of the module need revision to be a more useful assignment for students. intended results.

Good to Go: Can be used with confidence in the intended results.

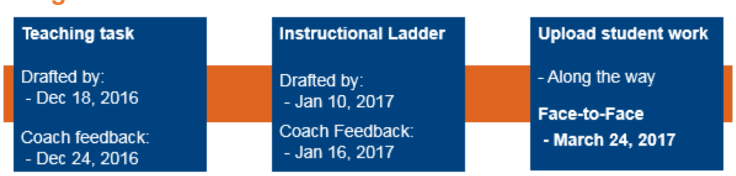
Exemplar: Can be easily adapted by other educators, and is a model for emulation.

TASK SCORING GUIDE	Work in Progress	Good to Go	Exemplar
Task Clarity and Coherence	• ---------------- • ------------ • ---------------	• ---------------- • -------------- • -------------	• ---------------- • ------------ • ---------------
Content	• ---------------- • ------------ • ---------------	• ---------------- • -------------- • -------------	• ---------------- • ------------ • ---------------
Text/s	• ---------------- • ------------ • ---------------	• ---------------- • -------------- • -------------	• ---------------- • ------------ • ---------------
Writing Product	• ---------------- • ------------ • ---------------	• ---------------- • -------------- • -------------	• ---------------- • ------------ • ---------------

INSTRUCTIONAL LADDER SCORING GUIDE	Work in Progress	Good to Go	Exemplar
Skills list	• ---------------- • ------------ • ---------------	• ---------------- • -------------- • -------------	• ---------------- • ------------ • ---------------
Mini-tasks	• ---------------- • ------------ • ---------------	• ---------------- • -------------- • -------------	• ---------------- • ------------ • ---------------
Results	• ---------------- • ------------ • ---------------	• ---------------- • -------------- • -------------	• ---------------- • ------------ • ---------------

Based on this trend and to better support teachers with staying on track for module two (planned for Spring 2017), the Battelle coaching team set deadlines (*see Image 5*) for completing components of module two and for coaches to provide feedback. The goal with this change was to provide participants with a clearer set of timelines and expectations so that they would be able to receive timely feedback on their work.

Image 5: Feedback Calendar



Attachment(s): Attachment G: LDC Peer Review Rubric

Evaluate and Improve Design (Fall 2016)

When: December 9, 2016, 8AM – 3PM

Who: 13 teachers[2] (grades 5-12) from Black River, Hillsdale, Loudonville-Perrysville, Mapleton, and Northwestern, Battelle engineer, Battelle Scientist, Battelle Education facilitator, 2 Battelle Education teacher coaches (additional attendees included: Battelle Education project manager, Grant project manager, District liaisons, HSTW coaches, PAST Foundation evaluators)

Summary: 13 teachers came back together as a group with scientists and coaches after the first implementation to:

- analyze student work from final student product against rubric (this was conducted in grade level teams)
- identify areas students met or exceeded expectations, and areas for growth
- design/modify a module to improve student performance based on student work analysis
- infuse new disciplinary STEM content into the module for second implementation and test of module
- evaluate mini-tasks teachers would like to submit for national peer review and feedback.

Based on the November Battelle coaches review session, it was noticed that teachers were often not aligning the mini-task to the specific skill. To address this trend, Battelle Education incorporated time during the December 9th session to look at examples and non-examples of skill-aligned mini-tasks.

Student Work Rubrics

The Dec 9th morning session focused on evaluating student work products. Participants evaluated student work in groups using the LDC student work rubric (*see Image 6*). Several teachers had not yet completed their modules by December 9th and were unable to bring final student work products for review. Those that did were asked to select 3 student work products for the group to score. This review allowed teachers to analyze their instructional ladder based on data collected from their sample student work. A sample set of student scored rubrics were collected but generally even after a second round of calibration we observed that the group had not yet calibrated on the student scoring rubric enough to be consistent across different breakout groups. To ensure more consistent data collection in round 2 module implementation, Battelle Education coaches determined they would ask teachers to submit a google form after the scoring session to submit scores and comments on three samples of student work. We also planned to conduct another round of calibration as a full group work session to continue efforts to build consistency.

Changes from original plan: During the December 9th session, teachers became concerned with the timeline for implementing the second module (Spring 2017). Recognizing their concern the group was able to revise the scheduled timeline to move the next PD session back by 3 full weeks to give teachers more time for implementation. It was originally scheduled for March 3, 2017 and was moved to occur on March 24, 2017.

Attachment(s): Attachment H: Day 4 Agenda (Dec 9); Attachment E1&E2: LDC Design Rubrics

Image 6: Sample of the LDC Student Work Rubric

LDC Literacy Design Collaborative

DESIGN Student Work Rubric - Argumentation Task - Grades 6-8

Student Paper: [redacted] **Module:** [redacted] **Module Author:** [redacted]

Scoring Elements	Emerging		Approaches Expectations		Meets Expectations		Advanced
	1	1.5	2	2.5	3	3.5	4
Controlling Idea	Makes an unclear or unfocused claim.		Makes a general claim **that addresses the prompt**, with an **uneven focus.**	X	**Establishes and maintains** a clear claim that addresses **all aspects** of the prompt.		Establishes and maintains a clear, **specific, and credible** claim that addresses all aspects of the prompt.
Justification: Students to not come right out and make a clear claim arguing the effectiveness of their design. They state "This design was not very successful because the water dropped 5 degrees C." However, students do present their idea and maintain in throughout the paper and they address all aspect of the prompt.							
Development / Explanation of Sources	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.		Explanation of ideas and source material is **minimal** or **contains minor errors.**		**Accurately** explains ideas and source material and **how they support the argument.** X		**Thoroughly** and accurately explains ideas and source material, **using reasoning** to support **and develop** the argument.
Justification: The design report accurately explains convection, conduction and radiation, in addition to providing information about current insulation materials. It is not advanced because the students do not thoroughly and explicitly explain reasoning for their design decisions.							

Virtual Coaching/Feedback (Winter/Spring 2017)

When: December 10, 2016 – March 24, 2017

Who: 15 teachers (grades 5-12) from Black River, Hillsdale, Loudonville-Perrysville, Mapleton, and Northwestern, 3 Battelle coaches

Summary: Between the December 9th and the March 24th PD sessions, the 15 teachers were tasked with finalizing their Science LDC modules and implementing in the classroom with their students. During this time, the Battelle coaching team were available to teachers for feedback and to share resources. On January 16, 2017, the Battelle coaching team came together to conduct paired reviews of each teacher's module to offer specific feedback to teachers.

Attachment(s): Attachment I: Example of January Peer Review

Planning to Share Solution – District Planning

When: January 30, 2017

Who: District principals and superintendents, Battelle Education Lead Facilitator, Battelle Education project manager, Grant project manager and implementation team members from the 5 districts, PAST Foundation and HSTW

Summary: In the project proposal, program sustainability discusses pulling together participants from Cohort I in summer 2017 to imagine and design a plan to scale up for their colleagues who would become part of Cohort II. The deliverables from this summer session were to select teachers and liaisons from Cohort I to lead deployment of their colleagues and to identify improvements to the delivery model based on learning from the grant year (2016-17).

After the first round of implementation in the fall, district liaisons advocated for an earlier scale up based on a desire from Cohort I teachers to have more time. To incorporate this feedback and move earlier to scale up, Battelle Education facilitated a planning discussion with district leaders to imagine and design a plan for expansion. In this planning session, districts were divided over how to facilitate the scale up session. Many wanted to give their Cohort II teachers an opportunity to work over the summer and wanted to see the overview scale up session for Cohort II moved up to May 2017, while other districts needed the summer to hire replacment science teachers. This resulted in a decision to offer two overview sessions for Cohort II to accommodate district needs. The first session was conducted in May, and the second session will be conducted in August/September. One of the district liaisons (Loundonville-Perrysville) volunteered to serve as the lead facilitator and to work with Battelle Education and Cohort I teachers to share their examples. Based on the timing of this scale up session, the second, deliverable – to identify improvements to the delivery model based on learnings from Cohort I, was addressed in the facilitator planning session rather than in the summer scale up session as originally proposed.

Attachment(s): Attachment J: District Planning Meeting Agenda Jan 30 2017

Planning to Share Solution – Facilitator Prep

When: March 10, 2017, 10AM – 2PM and Wednesday, April 3, 2017 3:30PM – 6 PM

Who: District liaison, Loudonville-Perrysville/ selected scale up facilitator, Battelle Education Lead Facilitator, Battelle Education Project manager (additional attendees included: HSTW and PAST Foundation evaluators)

Summary: The district lead facilitator-in-training worked with Battelle Education to imagine and design a plan for scale-up expansion for 2017-18. Feedback from round one implementation was reviewed to identify areas to improve the training from the grant year deployment for Cohort I. The primary goal of this session was to identify what modifications should be made to the tools and the professional development in order to improve effectiveness of the training for Cohort II. The district liaison came to the meeting with an agenda and timeline drafted for review.

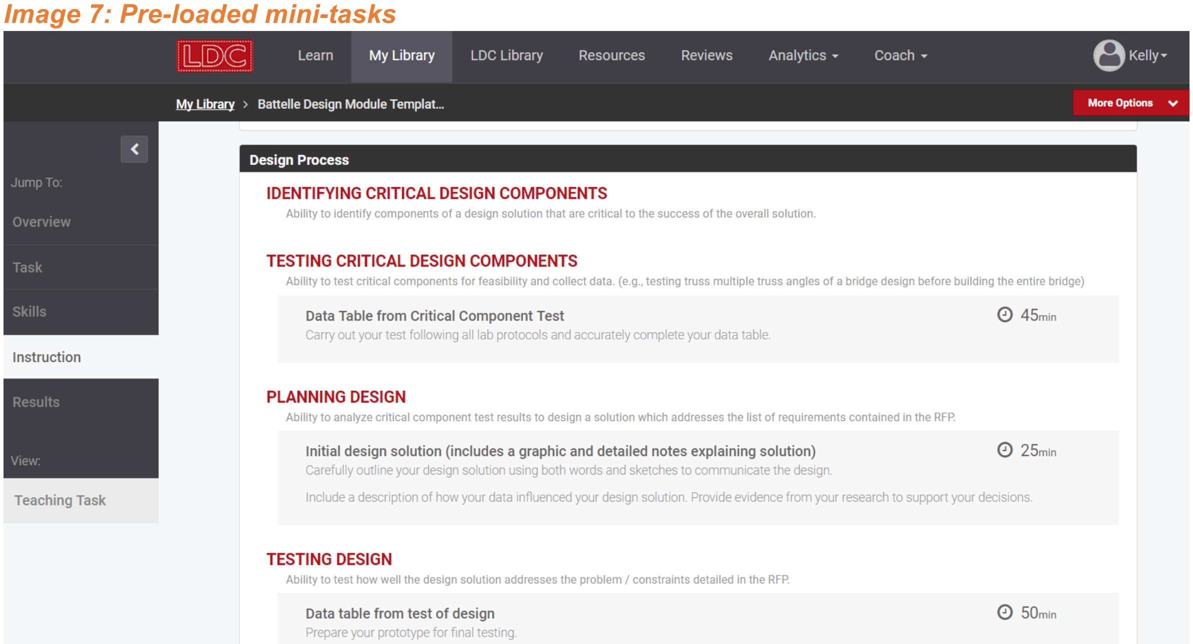
After reviewing Cohort I's PD and implementation strategy, and reflecting on teacher feedback and outcomes, Battelle Education and the district facilitator-in-training agreed upon the following PD outcomes for the Cohort II Overview Training:

1) Build the “why”
    a. Why are you here?
    b. Why Science and Literacy?
2) Create a *Good-to-Go* design teaching task. Note: The LDC Peer Review Rubric supports scoring of four dimensions of LDC teaching tasks and three dimensions of the instructional ladder. The scoring options are *Exemplary*, *Good-to-Go* , and *Work-in-Progress* (see image 6)
3) Create an example of an RFP draft
4) Create an example of a Scored LDC student work rubric for an *Exemplar* Design Report
5) Create a solid mini-task that demonstrates understanding of mini-task components
6) Begin building an example of an instructional ladder with skills list

Additionally, it was discussed that teachers with less experience with STEM need more supports. The following areas of additional supports and tool improvements were identified to support Cohort II training:

1) LDC overview page (Backwards Design + anatomy of a mini-task)
2) Design Report *Exemplar* examples – with this PD occurring only in the second iteration, Battelle Education will continue to collect more *Exemplar* examples of student work. We hope to identify some examples from Cohort I to share with next year’s Cohort II (2017-18).
3) Pre-loaded mini-tasks – To support teachers with success, Battelle Education has determined that taking time to pre-load general skill-aligned mini-tasks will set teachers up with further success and reduce the work load. In *Image 8* below, a snapshot from CoreTools is presented showing several pre-loaded mini-tasks so that teachers are beginning from a template with samples of what the instruction might look like.

Image 7: Pre-loaded mini-tasks



4) Modified skills list – Before Cohort II training, Battelle Education analyzed the skills list to identify how to distill the skills to make it more succinct and accessible for middle-school and high-school students. The list was compressed to 22 skills rather than the original 33 skills. Many revisions focused on incorporating more of the language of the standards. We predict that this revision will allow teachers to better understand the intent of the skills list more deeply and will provide more time for teacher to focus on additional skills needed based on unique student needs and add to the skills list to tailor the list for their

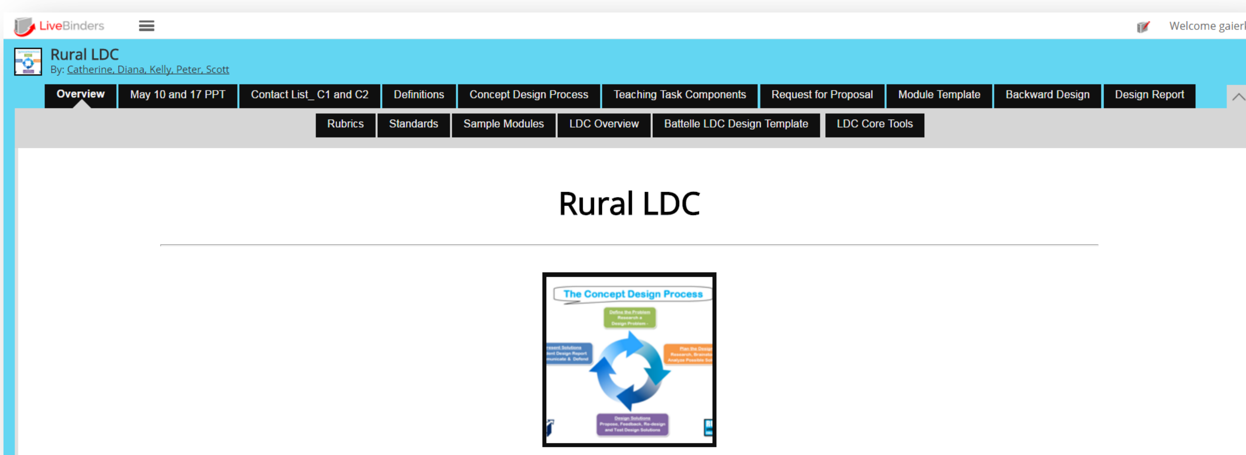
use.

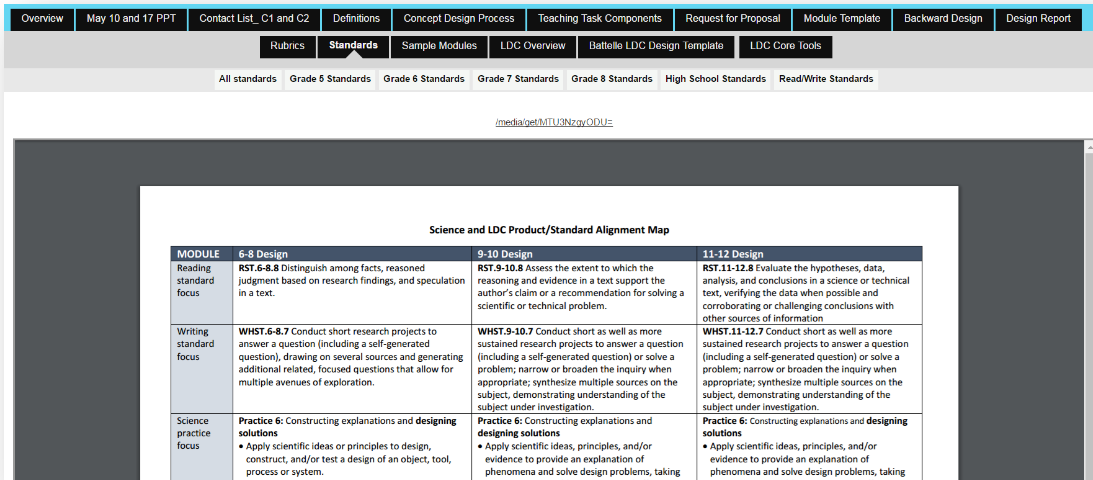
5) Non-negotiables for a testable design task - This is intended to address a concern identified for Cohort I between module 1 and module 2. While in the first module, most teachers created a testable design, in the second module several tasks did not identify a product/problem that could be tested.
6) RFP template – rather than just providing examples, Battelle Education will develop a template teachers can use.

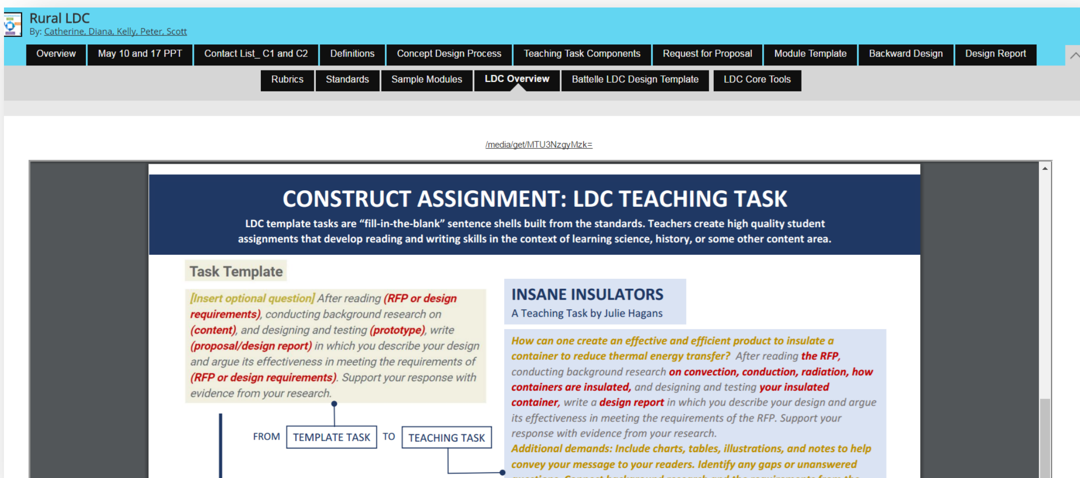
Battelle Education believes that these supports will reduce the number of choice points for a teacher during initial phases of training and becoming familiar with the LDC process, while still giving teachers autonomy in selecting what content to focus on and to make adaptations based on their local contexts and student needs.

In reflecting on the implementation for Cohort I, participants also indicated a need for a place to collect all of the new information and deadlines. To meet this need, the implementation team created both print materials and a digital binder of materials Using the “Live Binder” platform (see images 8-10) for Cohort II. Additionally, rather than using CoreTools at the launch of the training, the Cohort I facilitator opted to set up Google folders for each participant to draft their teaching task, RFP and first mini-task. Teachers will be introduced to CoreTools once they understand the LDC concepts, enabling them to share resources with the national LDC community during a later phase of training.

Images 8-10: Live Binder Screenshots







Attachment(s): Attachment K: Agendas from planning Cohort II in May sessions;

Revise Identified Tools Based on Cohort I Implementation

When: March – April, 2017

Who: Battelle Education Lead Facilitator, Battelle Education Project manager, Battelle Engineer

Summary: Battelle Education worked to improve the experience for Cohort II teachers (and others) by incorporating the changes identified above from the planning session. Additionally, each of these items were uploaded to Live Binder to serve as a digital binder for all LDC and Science resources as discussed in the planning stage above.

Attachment(s): Attachment F: LDC overview page; Attachment L: Modified Skills list (1.0 to 2.0 comparison); Attachment M: Collection of mini-tasks; Attachment N. Mini-task example – Writing the Details of the Design Procedures Attachment O: one page sheet on Common Pitfalls of Design; Attachment P: Battelle Education RFP template April 2017; Attachment Q: Student design report with annotated scoring rubric

Evaluate and Improve Design (Winter/Spring 2017)

When: March 24, 2017, 8AM – 3PM

Who: 15 teachers (grades 5-12) from Black River, Hillsdale, Loudonville-Perrysville, Mapleton, and Northwestern, Battelle engineer, Battelle Scientist, Battelle Education facilitator, 2 Battelle Education teacher coaches (additional attendees included: Battelle Education project manager, Grant project manager, District liaisons, HSTW coaches, PAST Foundation evaluators)

Summary: 15 teachers came back together to work with scientists and coaches) after the first implementation round to:

- re-calibrate as a full group against the LDC student work rubric
- analyze student work from second-round implementation against rubric
- identify areas students met or exceeded expectations and areas for growth
- design/modify mini-tasks to improve student performance based on areas for growth identified during the student work analysis
- make revisions/changes needed in design LDC module based on student work analysis

In the December 2016 session, coaches noted that the scoring of student work was not consistent and partners requested that Battelle coaches spend more time on calibration. To address this need Battelle Education incorporated time during the March 24th session to calibrate as a full group (rather than looking at grade level specific pieces of student work). To attempt to remove teacher bias, we also randomly assigned 3 different samples of student work to each small team so that they were not looking at just their own student work. We asked teachers to hand in all scores on student work so that we could reference those scores in providing examples for teachers moving forward. The second part of the day was spent collaborating to create mini-tasks around the skills students struggled the most with including (1) citing sources (2) Annotated bibliography (3) Writing an executive summary (4) defending their design.

Attachment(s): Attachment R: Part III Agenda; Attachment S: Sample scored student work sheet; Attachment T: Sample mini-task created to address need – Background including APA formatted footnotes

Scale up to Cohort II (Group A) Overview training

When: May 10, 2017 and May 17, 2017

Who: Cohort II teachers, Battelle Facilitator – moving to support role, Cohort I Facilitator-in-training, HSTW Coaching team, and PAST Foundation evaluators

Summary: Delivery of overview training to Cohort II lead by district facilitator-in-training with support from Battelle Education and HSTW coaching staff.

Attachment(s): Attachment U. Cohort II.A Part I Agenda, May 2017

Share Solution: Workshopping Modules to Share More Widely

When: June 6, 2017

Who: Cohort I teachers: 6 teachers in person (grades 5-12) [2 completing make-up work] Battelle Education facilitator, Battelle Education teacher coach (additional attendees included: Battelle Education project manager, Grant project manager, District liaisons, HSTW coaches, PAST Foundation evaluators)

Summary: After the rapid prototyping, participants from the first cohort came together to improve their 2016-17 modules based on feedback from Battelle Coaches using the LDC peer review rubric. The goal of this session was two-fold: 1) for teachers to continue to improve their understanding of LDC through module revision and reflection and, 2) to prepare modules to be shared with others and/or submit their work for national peer review. In preparation for this session, Battelle Education coaches came together to review each teacher's module on April 13, 2017 and to offer specific feedback to move teachers to *Good-to-Go* or *Exemplar* for national review (see table 1 for scores). Closer to the June dates, the Battelle Education team created a specific checklist incorporating that feedback to help teachers both track their changes and their progress. Participants were emailed a copy of their peer review and feedback a week prior to the workshopping session. This workshop session prioritized time for teachers to make revisions to their modules in preparation for submission for national review. Additionally, the June 6 agenda included taking teachers and district liaisons on a tour of Battelle led by scientists and engineers to learn more about the everyday work and work environment for scientists and engineers.

Table 1: Peer review scores from April 2017

Module #	Teaching task: task clarity and Coherence	Teaching task: Content	Teaching Task: Text	Teaching task: Writing product	Teaching task: Holistic	Instr. Ladder: What Skills?	Instr. Ladder: What Instruction?	Inst.l Ladder: What Results?	Instr. Ladder: Holistic
1	Exemplary	G2G	G2G	Exemplary	G2G	WIP	WIP	WIP	WIP
2	G2G	WIP	WIP	G2G	WIP	WIP	WIP	G2G	WIP
3	Exemplary	Exemplary	G2G	G2G	G2G	G2G	G2G	G2G	G2G
4	WIP	G2G	WIP	G2G	WIP	G2G	WIP	WIP	WIP
5	WIP	WIP	WIP	Exemplary	WIP	G2G	WIP	WIP	WIP
6	G2G	G2G	WIP	G2G	WIP	Exemplary	G2G	G2G	G2G
7	WIP	G2G	G2G	G2G	WIP	G2G	WIP	G2G	WIP
8	G2G	G2G	WIP	G2G	WIP	G2G	WIP	G2G	WIP
9	WIP	WIP	WIP	Exemplary	WIP	WIP	WIP	G2G	WIP
10	WIP	WIP	WIP	G2G	WIP	WIP	WIP	G2G	WIP
11	G2G	G2G	G2G	G2G	G2G	G2G	WIP	WIP	WIP
12	G2G	WIP	WIP	G2G	WIP	G2G	WIP	WIP	WIP
13	WIP	WIP	WIP	Exemplary	WIP	WIP	WIP	G2G	WIP
14	WIP	G2G	WIP	G2G	WIP	Exemplary	G2G	Exemplary	G2G
15	G2G	G2G	WIP	G2G	WIP	WIP	WIP	G2G	WIP

Here are several of the "take-aways" participants shared at the end of the workshopping session:

- "By collaborating, we found out that students really haven't learned the pH scale ~~much~~ by my 9th grade course, so… I created more for my mini-task. Wow!"
- "Very glad to get feedback and be able to respond to specific suggestions"
- "Loved the tour – very nice to see what we prepare kids for in action. Appreciated the time to work and rework right with a reviewer."
- "Hard work paid off!"

Attachment(s): Attachment V: Screen shot of coaching checklist; Attachment W: June 6, 2017 Agenda; Attachment X: Peer review sample from April 2017 review

Outcomes

15 teachers across the five school districts implemented the Battelle LDC Design modules with varying levels of fidelity all bringing deeper learning of the engineering design process to their students. 14 of the 15 teachers implemented a design module during semester one (fall 2016) as evidenced by sharing student work at the December 2016 session (or sharing it after the event), and all 15 teachers implemented a design module during semester two (spring 2017) as evidenced by sharing student work at the March session (or it sharing it after the event). As of the last full peer review event in April of 2017, five teachers had modules which were in the *Good-to-Go* category in either the holistic teaching task score or the holistic instructional ladder score.

Analyzing the results of the teacher surveys, at the pre-training 6 teachers reported being confident or very confident in their ability to develop a quality instruction plan. By the post survey we saw this number double to 12 teachers who were now reporting confidence in developing an instructional plan. Similarly, at the beginning of this work, 7 teachers indicated they were confident or very confident in constructing an authentic science and literacy task and by the end 11 of the teacher felt confident/very confident and four felt somewhat confident. No teachers reported feeling not confident by the end of the year.

Another observation made between the pre and the post survey, is that we saw a large increase in the teachers who have students conducting in-depth written explanations in their classrooms. Before this year, 8 of 15 teachers reported having students write in depth explanations 1-2 times a year or not at all. By the end of this year, only 1 of 15 teachers reported having students write in depth explanations 1-2 times a year, with the 14 remaining teachers reporting that their students were now doing this 1-2 times a semester or more. We were also excited to see growth in the number of teachers providing open ended problems to their students. During the pre-survey, 4 teachers indicated they never used this instructional practice and 1 teacher indicated they used it 1-2 times a year. By the end of the year, all teachers were using this instructional practice and 14 of 15 teachers were using this instructional practice 1-2 times a semester or more.

The elements which offered the largest challenge for this cohort of teachers throughout the year was time management with 8-9 teachers struggling with this throughout the year. Our goal is to reduce this concern for future cohorts by building a larger collection of resources to pull from.

Managing content was a close second. It was self-reported as a challenge at the beginning of the year by 6 teachers. This challenge was reported by half the number of teachers (3) by the end of the year. One explanation for this reduction could be that teachers were able to better see the alignment to the science practices and how to tie in their content. Another explanation could be that teachers implementing the module with the same class of students were able to move faster, having worked on several of the skills earlier in the year. Battelle Education is interested in better understanding this challenge to support future cohorts.

Challenges observed by the coaching team in the review of modules included the text/s and the Instruction: 11 teachers are still listed as a "*Work-in-Progress*" for the text element, and 12 teachers were listed as a "*Work-in-Progress*" for the element of instruction. Many teachers needed additional documentation or minor edits to get to the "*Good-to-Go*" level in one or both of the holistic scores. The LDC Design process engages teachers in a rigorous learning process of engineering design and backwards design of instruction that requires time to experience the training and coaching process for these shifts to take hold. Battelle Education is excited to watch teachers continue to engage in this process and make changes to their instructional practices.

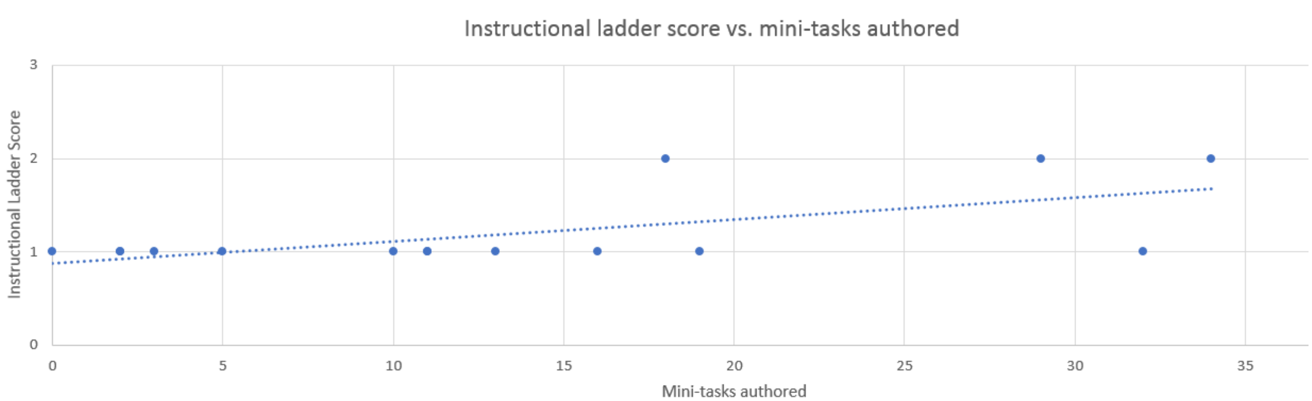
Table 2: Summary of data from April 2017 Battelle Coaches Peer Review session

April 2017 Peer Review	Work-in-Progress	Good-to-Go	Exemplar
Holistic score: Teaching task	12	3	0
Task clarity and Coherence (Teaching task)	7	6	2
Content (Teaching task)	6	8	1
Text (Teaching task)	11	4	0
Writing product (Teaching task)	0	11	4
Holistic score: Instructional Ladder	12	3	0
Skills (Instructional Ladder)	6	7	2
Instruction (Instructional Ladder)	12	3	0
Results (Instructional Ladder)	5	9	1

The goal for June 6th was to deepen understanding through reflection and documentation. Ultimately, facilitators wanted to provide time for participating teachers to make changes and submit work for an additional peer review by outside reviewers as a part of the national review process. The deadline to do so is June 30, 2017. As of the time of this report, seven teachers submitted modules for national review. Six teachers attended this workshopping session at Battelle and made significant changes to their modules. The changes made on June 6th are not reflected in the table above.

As in the midterm report, teachers who have spent more time viewing/creating/modifying mini-tasks typically had higher scores on the instructional ladder. In table 3 below, the horizontal axis represents how a module is scored on the peer review rubric. 1 represents a *Work-in-Progress* score; 2 represents a *Good-to-Go*, and 3 represents an *Exemplar* score. This tells us that to be successful with writing a module to be shared, teachers do need to commit additional planning time to the initiative beyond workshop days.

Table 3: Instructional ladder score vs mini-tasks authored



Attached are two examples of teacher modules produced from this year with student work. The first teacher had time to go back and make revisions based on our checklist. The second module author did not take advantage of the workshop day.

Insane Insulators

The first module designed, "Insane Insulators," was designed for a 7th grade Science classroom in rural Ohio and implemented with 115 students. The purpose of this module was for students to research thermal energy transfers, create and test a prototype of an insulated container, and produce a Final Design Report using scientific writing practices. In the Final Report, students are expected to incorporate background knowledge and data collected through prototype testing to analyze the success of their design. Students also revisit their design and develop future changes after the prototype testing.

While the module embeds numerous standards, this module focused particularly on the following:

- Ohio's New Learning Standards: K-8 Science: Thermal-energy transfers in the ocean and how the atmosphere contributes to the formation of currents, which influence global climate patterns.
- Next Generation Science Standard Practice 6: Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations
- RST.6-8.8: Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
- WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Dig This

The second module attached, "Dig This," was designed for a high school physics classroom in rural Ohio. The purpose of this module was for students to research forces, create and test a prototype of a shovel, and produce a Final Design Report using scientific writing practices. In the Final Report, students are expected to incorporate background knowledge and data collected through prototype testing to analyze the success of their design. Students also revisit their design and develop future changes after the prototype testing.

Again, the module embeds numerous standards, but identifies specific standards to focus on. This physics module focuses on the following standards:

- Ohio's New Learning Standards: Newton's laws applied to complex problems, Friction force (static and kinetic), and Work and power.
- WHST.9-10.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Teachers can choose to share these with all teachers using the web platform, CoreTools. For example, the revised templates are all now available at no cost for teachers across the country who sign up for a free CoreTools account. You can access the templates here.

Attachment(s): Attachment Y: MS Science Module "Insane Insulators"; Attachment Z: HS physics module, "Dig This."

Recommendations for future rollouts

1. Virtual workshop office hours: In the planning of this project, Battelle Education decided to have teams identify what works best for them at launch for their virtual check in sections. Based on this rollout, in future rollouts, Battelle Education would recommend scheduling virtual workshopping sessions and using it as “virtual office hours”. These workshop hours would focus on either the teaching task or skills ladder and would provide an opportunity to workshop a module using the feedback. Teachers could either have their module workshopped or participate in workshopping a colleague’s module – in both scenarios the teachers engage in improving the work and learning the questions they should be asking themselves. It would also provide an opportunity for teachers to hop online and ask their questions if they have any. If no one is online, the coach is able to use this time to leave feedback for each of their teachers in their modules.
2. Support identifying texts: In looking at the data from this year, teachers still need support identifying appropriate texts. This is an area to consider when designing future roll out agendas.
3. In depth feedback on instructional mini-tasks: This year, teachers were running into challenges with backwards design when they moved from skill to instruction. Rather than focusing on the whole instructional ladder for feedback, moving forward we would recommend having coaches ask teachers to identify 1-2 mini-tasks they want feedback on early in the design process. The goal is to make it seem more manageable time wise for teachers by looking at smaller chunks. Coaches would provide focused feedback on those two mini-tasks equipping the teachers with the confidence as they progress through the entire module.

Programmatic sustainability

July 2017- June 2018

As this grant moves into year 1, Battelle Education turns toward supporting the five district collaborative with building internal expertise. Excitingly, the district liaison who stepped up to facilitate Grant year 1 PD to cohort II has been promoted to district superintendent. To replace her role as lead facilitator, the collaborative has identified 2 teachers from cohort I to lead the cohort II session the remainder of Grant Year 1. Battelle Education will work with these two teachers and HSTW to support them in facilitating the training to cohort II. Additionally, Battelle Education will offer support to 1-2 teachers from each district in learning how to give feedback to cohort II teachers. The following calendar has been established for grant year 1 and is also available as a standalone document in the appendix:

August 31- September 1, 2017 + September 12, 2017	Lead facilitators-in- training from cohort I Teachers from second cohort Battelle Education facilitators HSTW coach	**Scale Up (Cohort II.B).** Teachers and liaisons from round 1 will be selected to lead deployment to their colleagues. The lead facilitator will have time with Battelle to plan orientation and ongoing support for new educators. Completion benchmarks include: • Delivery of overview training to cohort II (group B) • Workshop for both cohort II groups to improve science and literacy modules prior to first implementation *Note: Some districts need to scale up to cohort II in May while other districts needed the summer to hire on new science teachers. This resulted in a decision to offer to overview sessions for cohort II one in May and one in August/September.*
Summer 2017 August 4th or August 7th	Teachers from first cohort	Coaching 5- 7 teachers from cohort I for coaching and giving feedback
Summer 2017	Teachers from first cohort	Prepare two teachers to be lead facilitators for year 2
November 21, 2017 1 day face-to-face at Blackriver 8AM – 3PM	Cohort II teachers District liaison and teachers from round 1 Battelle Education lead facilitator	**Evaluate and Improve design.** Full cohort II teams will come back together (teachers, scientists, and coaches) to: • analyze student work from final student product against rubric (this is done in grade level teams) • identify areas students met or exceeded expectations and areas for growth • design/modify modules to improve student performance based on student work analysis • Infuse new disciplinary STEM content into module for second implementation and test of module
March 7, 2018 1 day face-to-face at Hillsdale 8AM – 3PM	Cohort II teachers District liaison and teachers from round 1 Battelle Education lead facilitator	**Evaluate and Improve design.** Full cohort II teams will come back together (teachers, scientists, and coaches) to: • analyze student work from final student product against rubric (this is done in grade level teams) • identify areas students met or exceeded expectations and areas for growth • design/modify modules to improve student performance based on student work analysis • Infuse new disciplinary STEM content into module for second implementation and test of module

Ongoing	Battelle Education PM and Battelle Education lead facilitator	**Progress monitoring and planning** • Analyze session data • Reflect on session and identify areas of excellence and areas for improvement

Attachment(s): Attachment A: Battelle Education Calendar

Conclusion

Battelle Education's deliverable in the grant year was to facilitate and coach science teachers across 5 rural school districts to create and implement common experimentation and design assignments that support teachers in integrating STEM practices and literacy skills with STEM content. Through the work with Rural LDC collaborative this year, teachers across the collaborative have begun to shift their teaching practices to integrate STEM practices and literacy skills with STEM content. The work has caused meaningful change across the collaborative. Cohort I teachers implemented 29 LDC design modules during the 2016-17 academic year. This year's implementation cycles have truly informed and changed the tools available for teachers across the collaborative, as well as the state and the nation for future implementation cycles.

Footnotes

[1] **Note on teacher participants:** While the original grant plan specified involvement of grades 6-12 teachers – one district selected two teachers to include grades 5-8 range. The Rural Collaboration group agreed to allow the exception to include 5th grade.

[2] **Note on Dec 9 teacher participants:** Two teachers were unable to attend due to illness. They were able to upload their student work on CoreTools from the first round of implementation and both participated in the Spring session.

APPENDIX
Section III: Battelle Education

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative

Appendix J:
District Planning Meeting Agenda (January 30, 2017)

Appendix K:
Agendas from Planning Cohort II in May Sessions

Appendix L:
Modified Skills List (1.0 to 2.0 Comparison)

Appendix M:
Collection of Mini-tasks

Appendix N:
Mini-task Example – Writing the Details of the Design Procedures Attachment

Appendix O:
Common Pitfalls of Design

Appendix P:
Battelle Education RFP Template (April 2017)

Appendix Q:
Student Design Report with Annotated Scoring Rubric

Appendix R:
Part III Agenda

Appendix S:
Sample Scored Student Worksheet

Appendix T:
Sample mini-task created to address need – Background including APA formatted footnotes

Appendix U:
Cohort II.A Part I Agenda, May 2017

Appendix V:
Screenshot of Coaching Checklist

Appendix W:
June 6, 2017 Agenda

Appendix X:
Peer Review Sample from April 2017 Review

Appendix Y:
MS Science Module “Insane Insulators”

Appendix Z:
HS Physics Module “Dig This”

Science and Literacy Rural Collaborative

Battelle Education Calendar of work: Implementation Grant Year

When	Who	What
Late Summer/Early fall	Battelle facilitator team Battelle Project manager	**Plan.** Battelle facilitator team will kick off planning and development of Science and Literacy mini-module series.
Sept 7, 2016 4:00-6:00PM	Teachers, coaches, and administrators, Battelle Education team, HSTW team	**Meet and greet session –** overview of the work (2 hours)
2 days face to face** Sept 29-30, 2016** + virtual feedback in between + 1 follow up day face to face Oct 14, 2016	15 teachers (grades 5-12[1]) from Blackriver, Hillsdale, Loudonville-Perrysville, Mapleton, and Northwestern, Battelle engineer, Battelle Education LDC and Science facilitator, 2 Battelle Education teacher coaches (additional attendees included: Battelle Education project manager, Grant project manager, District liaisons, HSTW coaches, PAST Foundation evaluators)	**Brainstorm and Build**. Through professional development and coaching, identified educators will participate in an induction and creation workshop – collaborating in grade band teams to meet the following benchmarks: • develop a shared set of expectations and student outcomes for infusing literacy in STEM by identifying big ticket science practices and college career readiness standards to focus on throughout pilot year • build common rubrics, selecting dimensions of the LDC rubric based on identified focus areas [note: the LDC rubrics have been reviewed and tested by the Stanford Center for Assessment, Learning, and Equity (SCALE)] • engineer an overarching science literacy task building from tasks in the LDC Battelle Science Collection infusing in specific content to teach within your STEM discipline • create a science and literacy mini-module through strategic selection/modification of key mini-tasks to support student success on overarching science literacy task • receive and use feedback on tasks and instruction from coaches
Fall implementation/virtual coaching/feedback October 14 – December 9, 2016	15 teachers (grades 5-12) 3 Battelle coaches	**Implementation and virtual coaching and support** • teachers implement science and literacy modules with students connecting with coaches on questions/concerns • teachers participate in an online community via CoreTools to collaborate with teams from neighboring districts, scientists, and coaches

		• analyze student work from various stages of implementation against criteria for success • access LDC online support courses through CoreTools suite as needed • coaches share targeted feedback with teachers via CoreTools, email, phone, and/or virtual meetings
1 day face-to-face December 9, 2016 8AM – 3PM	13 teachers[2] (grades 5-12) from Blackriver, Hillsdale, Loudonville-Perrysville, Mapleton, and Northwestern, Battelle engineer, Battelle Scientist, Battelle Education facilitator, 2 Battelle Education teacher coaches (additional attendees included: Battelle Education project manager, Grant project manager, District liaisons, HSTW coaches, PAST Foundation evaluators)	**Evaluate and Improve design.** Full teams will come back together (teachers, scientists, and coaches) to: • analyze student work from final student product against rubric (this is done in grade level teams) • identify areas students met or exceeded expectations and areas for growth • design/modify modules to improve student performance based on student work analysis • Infuse new disciplinary STEM content into module for second implementation and test of module
Winter/Spring Virtual check-in day/s *Late January/Early Feb*** Set with their grade level teams.*	Teachers and coaches set date and times to check in.	**Implementation and virtual coaching and support** • teachers implement science and literacy modules with students connecting with coaches on questions/concerns • teachers participate in an online community via CoreTools to collaborate with teams from neighboring districts, scientists, and coaches • analyze student work from various stages of implementation against criteria for success • access LDC online support courses through CoreTools suite as needed • coaches and teachers use the feedback calendar (Task drafted by Dec 18, 2016; feedback on task by Dec 24, 2017; Insturctional ladder drafted by Jan 10, 2017; feedback on instruction by Jan 16, 2017) to share targeted feedback via CoreTools, email, phone, and/or virtual meetings

Scale up with district stakeholders January 30, 2017	5 district liaisons, principals and superintendents Additionally: Battelle Lead Facilitator Implementation team members at PAST Foundation and HSTW	**Planning toShare Solution.** After the first round of implementation, district leaders in the collabrative will come together to imagine and design a plan for expansion. Completion benchmarks include: • Finalizing a strategy for scale up *NOTE: This was added as the districts were interested in exploring the option of an earlier scale up for cohort II.*
Friday, March 10, 2017 10AM – 2PM	District liaison / scale up facilitator Battelle Lead Facilitator Battelle PM	**Share Solution.** After the first round of implementation, district lead facilitator in training will come together to imagine and design a plan for expansion. Feedback from round one implementation will be reviewed to identify areas to improve the training from year 1 deployment. • Identification of tools and pd supports to modify and improve *NOTE: This is being added as the collaborative is interested in scaling up in May 2017 as opposed to initial plan to scale up at the beginning of next school year based on feedback from teachers.*
1 day in person Friday, March 24, 2017 8AM – 3PM **Moved back 3 weeks from original date by teacher request)*	15 teachers (grades 5-12) from Blackriver, Hillsdale, Loudonville-Perrysville, Mapleton, and Northwestern, Battelle engineer, Battelle Scientist, Battelle Education facilitator, 2 Battelle Education teacher coaches (additional attendees included: Battelle Education project manager, Grant project manager, District liaisons, HSTW coaches, PAST	**Evaluate and Improve design.** Full teams will come back together (teachers, scientists, and coaches) to: • analyze student work from final student product against rubric (this is done in grade level teams) • identify areas students met or exceeded expectations and areas for growth • design/modify modules to improve student performance based on student work analysis • Infuse new disciplinary STEM content into module for future implementation

	Foundation evaluators)	
March – April	Battelle Lead Facilitator Battelle PM	**Revise tool based on cohort I implementation.** After analyzing the first rollout, Battelle Education identified improvements to the tool and training including: • Creating a reduced skills list • Creating a Collection of mini-tasks aligned to the reduced skills list • Creating a 1 pager on the non-negotiables of design • Creating exemplars of an RFP for teachers • Identifying and scoring exemplar student written products: design reports *NOTE: This is being added as needs were identified in cohort I*
Wednesday, April 3, 2017 **3:30PM – 6 PM**	District liaison / scale up facilitator Battelle Lead Facilitator Battelle PM	**Share Solution.** District lead facilitator-in-training will and Battelle will work together to finalize plan for overview training. *NOTE: This is being added as the collaborative is interested in scaling up in May 2017 as opposed to initial plan to scale up at the beginning of next school year based on feedback from teachers.*
May 10, 2017 **May 17, 2017**	District liaison (lead facilitator in training) Teachers from first cohort Teachers from second cohort Battelle facilitators HSTW coach	**Scale up.** Teachers and liaisons from round 1 will be selected to lead deployment to their colleagues. The lead facilitator will have time with Battelle to plan orientation and ongoing support for new educators. Completion benchmarks include: • Selection of teachers from 2016-2017 implementation to serve as coaches-in-training • Identification of improvements to the delivery model based on learning from pilot. • Delivery of overview training to cohort II *Note: Some districts are adament to scale up to cohort II in May while other districts needed the summer to hire on new science teachers. This resulted in a decision to offer to overview sessions for cohort II one in May and one in August/September.*
June 6, 2017	Teachers from first cohort Battelle facilitators HSTW coach	**Share Solution.** After the rapid prototyping, participants from the first cohort will come together improve their modules based on feedback from Battelle Coaches using the LDC peer review rubric. As a result of this sessions, teachers will improve their understanding of LDC and prepare their modules to be shared with others and/or submit their work for national review.

Battelle Education Calendar of work: Year 2 (Programmatic Sustainability)

Summer 2017 August 4th or August 7th	5-7 Teachers/liaisons from first cohort	**Peer Review Coaching session** Coaching 5 - 7 teachers from cohort I for coaching on giving feedback to peers
Summer 2017 1st planning session: whichever date we do not use August 4th or 7th for peer review 2nd session: Monday, August 28, 2017	2 lead teachers from first cohort	Prepare two teachers to be lead facilitators for year 2.
August 31- September 1, 2017 + September 12, 2017	District liaison (lead facilitator in training) Teachers from first cohort Teachers from second cohort Battelle facilitators HSTW coach	**Scale Up.** Teachers and liaisons from round 1 will be selected to lead deployment to their colleagues. The lead facilitator will have time with Battelle to plan orientation and ongoing support for new educators. Completion benchmarks include: • Delivery of overview training to cohort II (group 2) • Workshop for both cohort II groups to improve science and literacy modules prior to first implementation *Note: Some districts are adament to scale up to cohort II in May while other districts needed the summer to hire on new science teachers. This resulted in a decision to offer to overview sessions for cohort II one in May and one in August/September.*
Fall/Winter 2017 1 day face-to-face 8AM – 3PM	Cohort II teachers District liaison and teachers from round 1 Battelle lead facilitator	**Evaluate and Improve design.** Full cohort II teams will come back together (teachers, scientists, and coaches) to: • analyze student work from final student product against rubric (this is done in grade level teams) • identify areas students met or exceeded expectations and areas for growth • design/modify modules to improve student performance based on student work analysis • Infuse new disciplinary STEM content into module for second implementation and test of module
Spring 2018 1 day face-to-face 8AM – 3PM	Cohort II teachers District liaison and teachers from round 1 Battelle lead facilitator	**Evaluate and Improve design.** Full cohort II teams will come back together (teachers, scientists, and coaches) to: • analyze student work from final student product against rubric (this is done in grade level teams) • identify areas students met or exceeded expectations and areas for growth • design/modify modules to improve student performance based on student work analysis • Infuse new disciplinary STEM content into module for second implementation and test of module

Science and Literacy with LDC Meet and Greet
Jake's
6655 E. Lincoln Way
Wooster OH 44691
September 7, 2016, 4PM-6PM

Why this work is important

1. to you
2. to Battelle

Overview of project scope

Getting started (specific for teachers)

1. Brainstorm ideas. Priority units. And Brainstorm 3 design ideas.

Science and Literacy with LDC
Northwestern High School Library
7473 N Elyria Rd
West Salem, OH 44287
September 29-30, 2016

Day 1 Agenda

Breakfast and Coffee Network: NRWS_District Password: 124dd5bef2	7:30-8:00AM
Welcome - Icebreaker (15 min) - Why we are here (15 min)	8:00-8:30AM
What is the Literacy Design Collaborative (LDC)? - Close read mini-task: What is a Science Literacy Design Collaborative (LDC) module? (20 min) - Defining LDC (45 min)	8:30-9:35AM
Break	9:35-9:45AM
Project Scope	9:45-10:00AM
Introduction to LDC Coretools	10:15-10:30AM
Teaching Task Think Tank	10:30-11:30AM
Lunch	11:30-12:00PM
Constructing a powerful science and literacy assignment (Teaching Task) - Building out your teaching task on CoreTools: what is the final product, what are kids making, what does success look like, what major content standards will you address (1 hour 15 min) - Prep for shark tank presentations (15 min) - Shark Tank Presentations/Feedback of you Teaching Task (60 min) - Revisions (20 min)	12:00-2:50PM
Closing	2:50-3:00PM

Day 2 Agenda

Breakfast and coffee Network: NRWS_District Password: 124dd5bef2	7:30-8:00AM
Welcome	8:00-8:05AM
Skills and Instruction Deep Dive **"What Factors Influence Plant Carbon Dioxide Production and Usage?"**	8:05-8:30AM
The Design Process with Battelle Principal Research Scientist	8:30-9:00AM
Backwards Design: Products by skill cluster	9:00-9:45AM
Break	9:45-10:00AM
Developing an instructional plan - The nuts and bolts of the instructional plan: skills list and mini-tasks (30 min) - Developing your first mini-task (instruction focused on one skill) (30 min) - Presenting your mini-task (20 min) - Next steps for afternoon (10 min)	10:00-11:30AM
Lunch	11:30-12:00PM
Evaluations **http://tinyurl.com/h2xov2v**	12:00-12:30PM
Developing your instructional plan 2-3 mini-tasks sign off by coach	12:30-2:00PM
Break	2:00-2:15PM
Instructions between now and October 14th	2:15-2:30PM
Developing your instructional plan continued	2:30-2:50PM
Closing	2:50-3:00PM

Science and Literacy with LDC
Northwestern High School Library
7473 N Elyria Rd
West Salem, OH 44287
October 14, 2016

Day 3 Agenda

Open work time **(Breakfast and Coffee)** Network: NRWS_District Password: 124dd5bef2	7:30-8:00AM
Welcome	8:00-8:15AM
The Design Report - David Chase – context - What might this look like in HS or in MS - Student Rubrics	8:15-9:45AM
Break	9:45-9:55AM
The Design Report cont'd - Can all students design (10 min) - Write MT's associated with the Design Report (75 min)	9:55-11:20AM
FAQ's - Group work; time for grading, hook (vision)	11:20-11:30AM
Lunch	11:30-12:00AM
RFP and technical reading - David Chase – context (15 min) - Example analysis -Technical reading of an RFP (15 min) - Technical reading MT debrief (10 min) - RFP writing time/ Technical Reading MT writing time (50 min)	12:00-1:30PM
Open work time (MT's, RFP, anything) * **	1:30-2:30PM
Evaluation	2:30-2:40PM
Closing	2:40-3:00PM

*****Scott will lead discussion with District liaisons in a separate break out space.**

STUDENT WORK RUBRIC - ARGUMENTATION TASK - GRADES 6-8

DESIGN TEMPLATE RUBRIC

Scoring Elements	Emerging		Approaches Expectations		Meets Expectations		Advanced
	1	1.5	2	2.5	3	3.5	4
Controlling Idea ***	Makes an unclear or unfocused claim.		Makes a **general** claim **that addresses the prompt**, with an **uneven focus**.		Establishes and maintains a clear claim that addresses all aspects of the prompt.		Establishes and maintains a clear, specific, and credible claim that addresses all aspects of the prompt.
Selection & Citation of Evidence	Includes minimal details from sources. Sources are used without citation.		Includes **details, examples, and/or quotations** from sources that are **relevant to the claim**. **Inconsistently** cites sources.		Includes details, examples, and/or quotations from sources that are relevant to the claim and supporting ideas. Consistently cites sources with minor formatting errors.		Includes well-chosen details, examples, and/or quotations from sources that support the claim and supporting ideas. Consistently cites sources using appropriate format.
Development / Explanation of Sources***	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.		Explanation of ideas and source material is **minimal** or **contains minor errors**.		Accurately explains ideas and source material and how they support the argument.		Thoroughly and accurately explains ideas and source material, using reasoning to support and develop the argument.
Organization	Lacks an evident structure. Makes unclear connections among claim, reasons, and evidence.		**Groups ideas and uses some transitions** to connect ideas, with **some lapses in coherence or organization**.		Groups and sequences ideas to develop the controlling idea. Uses transitions to clarify the relationships among claim(s), reasons, and evidence.		Groups and sequences ideas logically to develop the controlling idea and create cohesion. Uses varied transitions to clarify the relationships among claim(s), reasons, and evidence.
Conventions	Major errors in standard English conventions interfere with the clarity of the writing. Language or tone is inappropriate.		**Errors** in standard English conventions **sometimes interfere** with the clarity of the writing. Uses language and tone that are sometimes inappropriate for the audience and purpose.		Consistently applies standard English conventions; minor errors, while noticeable, do not interfere with the clarity of the writing. Uses language and tone appropriate to the audience and purpose.		Consistently applies standard English conventions, with few errors. Demonstrates varied syntax and precise word choice. Consistently uses language and tone appropriate to the audience and purpose.

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Scoring Elements	Emerging		Approaches Expectations		Meets Expectations		Advanced
	1	1.5	2	2.5	3	3.5	4
NGSS Practice: Define Problems ***	Defines a problem or design statement that is impractical or does not match the intent of the problem or constraints.		Defines a problem or design statement that generally matches the intent of the problem or constraints.		Defines a problem or design statement that completely matches the intent of the problem and constraints.		Defines a problem or design statement that completely matches the intent of the problem and constraints, and explains how the design solves the problem and addresses constraints.
NGSS Practice: Plan the Design ***	Proposes a design plan and explains the criteria, constraints, OR intent of the problem with major errors or omissions.		Proposes a design plan and explains the criteria, constraints, OR intent of the problem with minor errors or omissions.		Proposes a design plan and explains how the plan addresses the criteria, constraints, and intent of the problem.		Proposes a design plan with detailed explanation that thoroughly explains how the plan addresses the criteria, constraints, and intent of the problem.
NGSS Practice: Design Solutions ***	Uses no data to evaluate how well the design addresses the problem/constraints. The redesign of the original model or prototype is inappropriate or incomplete.		Uses relevant but limited amounts of data to evaluate how well the design addresses the problem/constraints and outlines an appropriate redesign of the original model or prototype.		Uses relevant and adequate amounts of data to evaluate how well the design addresses the problem/constraints and using the data explains an appropriate redesign of the original model or prototype.		Uses detailed and complete data to evaluate how well the design addresses the problem/constraints and provides a detailed rationale with supporting data for the appropriate redesign of the original model or prototype.
Content Understanding (Generic) ***	Attempts to include disciplinary content in explanation or argument but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.		Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.		Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.		Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding.

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STUDENT WORK RUBRIC - ARGUMENTATION TASK - GRADES 9-12

DESIGN TEMPLATE RUBRIC

Scoring Elements	Emerging		Approaches Expectations		Meets Expectations		Advanced
	1	1.5	2	2.5	3	3.5	4
Controlling Idea ***	Makes a general claim with an unclear focus.		Establishes a **clear** claim **that addresses the prompt**, with an **uneven focus**.		Establishes **and maintains** a **clear, specific, and credible claim** that addresses **all aspects** of the prompt.		Establishes and maintains a **precise, substantive** claim that addresses all aspects of the prompt. **Acknowledges limitations and/or the complexity of the issue or topic**.
Selection & Citation of Evidence	Includes minimal details from sources. Sources are used without citation.		Includes **details, examples, and/or quotations** from sources that are **relevant to the claim**. **Inconsistently** cites sources.		Includes details, examples, and/or quotations from sources that **support** the claim and **supporting ideas**. **Consistently** cites sources **with minor formatting errors**.		Includes **well-chosen** details, examples, and/or quotations from sources that **fully support** the claim and supporting ideas. Consistently cites sources **using appropriate format**.
Development / Explanation of Sources***	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.		Explains ideas and source material **to support the argument**, with **some incomplete reasoning or explanations**.		**Accurately** explains ideas and source material and **how they support** the argument.		**Thoroughly** and accurately explains ideas and source material, **using logical reasoning to support and develop** the argument.
Organization	Lacks an evident structure. Makes unclear connections among claims, reasons, and/or evidence.		**Groups ideas and uses transitions** to develop the argument, with **some lapses in coherence or organization**.		**Groups and sequences** ideas to **develop a cohesive argument**. Uses transitions **to clarify the relationships among claim(s), reasons, and evidence**.		Groups and sequences ideas **in a logical progression in which ideas build to create a unified whole**. Uses **varied** transitions to clarify the **precise** relationships among claim(s), reasons, and evidence.
Conventions	Major errors in standard English conventions interfere with the clarity of the writing. Language or tone is inappropriate.		Errors in standard English conventions **sometimes interfere** with the clarity of the writing. Uses language and tone that are **sometimes inappropriate** for the audience and purpose.		**Consistently applies** standard English conventions; **minor errors**, while noticeable, **do not interfere** with the clarity of the writing. Uses language and tone **appropriate to the audience and purpose**.		Consistently applies standard English conventions, **with few errors**. Demonstrates **varied syntax** and **precise word choice**. **Consistently** uses language and tone appropriate to the audience and purpose.

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Scoring Elements	Emerging		Approaches Expectations		Meets Expectations		Advanced
	1	**1.5**	**2**	**2.5**	**3**	**3.5**	**4**
NGSS Practice: Define Problems ***	Defines a problem or design statement that partially matches the intent of the problem or the constraints.		Defines a problem or design statement that matches the intent of the problem and identifies the constraints.		Defines a problem and explains specific design elements necessary for a suitable design (e.g., fit to the problem, addresses the constraints, etc.).		Defines a problem precisely and thoroughly explains why specific design elements are necessary for a suitable design (e.g., fit to the problem, addresses the constraints, etc.).
NGSS Practice: Plan The Design ***	Proposes a design plan and description that misses one or more important aspects of the criteria, constraints, OR intent of the problem.		Proposes a design plan and provides a general description that addresses the criteria, constraints, or intent of the problem.		Proposes a design plan with detailed explanation that completely addresses the criteria, constraints, and intent of the problem.		Proposes a design plan and evaluates the suitability of the design to address the criteria, constraints, AND intent of the problem.
NGSS Practice: Design Solutions ***	Uses inaccurate or irrelevant evidence (data or scientific knowledge) to explain how the design addresses the problem/constraints OR identifies an impractical redesign without explanation or supporting evidence.		Uses minimal relevant evidence (data or scientific knowledge) to explain how the design addresses the problem/constraints OR identifies a potential redesign with limited explanation and supporting evidence.		Uses relevant and adequate amounts of evidence (data or scientific knowledge) to explain how the design addresses the problem/constraints AND uses the evidence to explain an appropriate redesign of the original model or prototype.		Uses detailed and multiple sources of evidence (data or scientific knowledge) to evaluate how well the design addresses the problem as well as constraints AND provides a detailed rationale with supporting data for the appropriate redesign of the original model or prototype.
Content Understanding (Generic) ***	Attempts to include disciplinary content in explanation or argument but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.		Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.		Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.		Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding.

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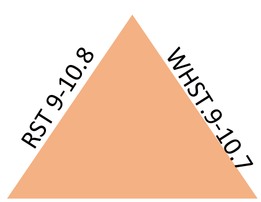
OVERVIEW OF LITERACY DESIGN COLLABORATIVE (LDC) TOOLS

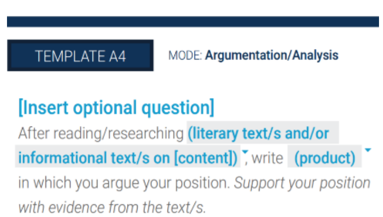
	Analyze Assignment	Construct Assignment	Develop Instruction	Assess and Iterate
Specific Competencies	IDENTIFY GOALS MAP ASSIGNMENTS TO GOALS	CHOOSE: ☐ CONTENT ☒ WORK PRODUCT ☐ TEXTS ☒ WRITING MODE ☒ RUBRIC DESIGN A POWERFUL PROMPT ASSESS PROMPT AND MAKE IT BETTER	IDENTIFY SKILLS NEEDED FOR TASK USE BACKWARDS DESIGN TO: ☐ SELECT INSTRUCTION ☐ PLAN INSTRUCTION ☐ ASSESS INSTRUCTION ☐ SEQUENCE INSTRUCTION	SCORE AND GIVE USEFUL FEEDBACK ANALYZE STUDENT WORK PLAN NEW ASSIGNMENTS BASED ON ANALYSIS
LDC Tools	STANDARD SELECTION	TASK TEMPLATE	BACKWARD DESIGN	RUBRICS & SAMPLE STUDENT WORK

Analyze Assignment — STANDARD SELECTION



1 reading focus standard
1 writing focus standard
1 discipline focus standard

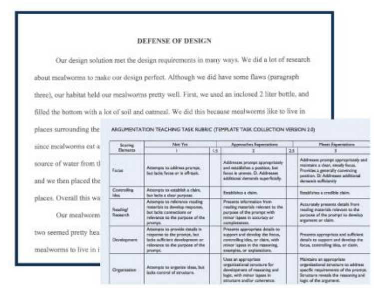
Construct Assignment — TASK TEMPLATE


TEMPLATE A4 MODE: Argumentation/Analysis

[Insert optional question] After reading/researching (literary text/s and/or informational text/s on [content]), write (product) in which you argue your position. Support your position with evidence from the text/s.

Develop Instruction — BACKWARD DESIGN

Assess and Iterate — RUBRICS & SAMPLE STUDENT WORK



Adapted from LDC and Formative Assessment found at: https://ldc.org/sites/default/files/LD5_Sales_Collateral_Cards_Formative_Assessment_finalpdf.pdf and LDC Teacher Competencies found at https://ldc.org/sites/default/files/UpdatedLD5_Sales_Collateral_Cards_TEACHER-COMPETENCIES_final%20%281%29.pdf

CONSTRUCT ASSIGNMENT: LDC TEACHING TASK

LDC template tasks are "fill-in-the-blank" sentence shells built from the standards. Teachers create high quality student assignments that develop reading and writing skills in the context of learning science, history, or some other content area.

Task Template

*[Insert optional question] After reading **(RFP or design requirements)**, conducting background research on **(content)**, and designing and testing **(prototype)**, write **(proposal/design report)** in which you describe your design and argue its effectiveness in meeting the requirements of **(RFP or design requirements)**. Support your response with evidence from your research.*

FROM TEMPLATE TASK TO TEACHING TASK

INSANE INSULATORS

A Teaching Task by Julie Hagans

How can one create an effective and efficient product to insulate a container to reduce thermal energy transfer? *After reading **the RFP**, conducting background research **on convection, conduction, radiation, how containers are insulated**, and designing and testing **your insulated container**, write a **design report** in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research.*

Additional demands: Include charts, tables, illustrations, and notes to help convey your message to your readers. Identify any gaps or unanswered questions. Connect background research and the requirements from the RFP in your response.

COMPLETE TASK PROMPT INCLUDES:	
Task Template	**Teaching Task Example "INSANE INSULATORS"**
Content	Design (NGSS Practice 6) + Thermal Energy Transfers
Work product	Design Report
Texts	RFP + background research + data from testing
Writing mode	Argumentation
Rubric	6-8 LDC Argumentation Rubric

A series of skills are required to complete the module.

- TASK ENGAGEMENT
- TASK ANALYSIS
- UNDERSTANDING LIST OF REQUIREMENTS
- RESEARCHING A DESIGN PROBLEM
- BRAINSTORMING POSSIBLE SOLUTIONS
- TESTING CRITICAL DESIGN COMPONENTS
- REVISING DESIGN
- TEST FINAL DESIGN
- DEFINE THE PROBLEM
- COMMUNICATING BACKGROUND RESEARCH
- GENERATING GRAPHIC OF DESIGN
- DEFENSE OF DESIGN
- EXECUTIVE SUMMARY

Mini-tasks

Adapted from LDC and Formative Assessment found at: https://ldc.org/sites/default/files/LD5_Sales_Collateral_Cards_Formative_Assessment_finalpdf.pdf and LDC Teacher Competencies found at https://ldc.org/sites/default/files/UpdatedLD5_Sales_Collateral_Cards_TEACHER-COMPETENCIES_final%20%281%29.pdf

DEVELOP INSTRUCTION: ANATOMY OF A MINI TASK

A Mini-Task is a small, scorable assignments that address a targeted skill identified by the teacher for a particular LDC teaching task.
A complete mini-task includes a prompt, product, pacing, scoring guide and instructional strategies.
Together the skills + instruction are called the Instructional Ladder.

Each mini-task should have a clear name for the mini-task based on what students will produce. It should also be tagged for grade level, discipline, and time requirements.

Product Name

Creating Result in Graph, Table and/or Written form ★ MINI-TASK

Curriculum

Grade	Discipline	Course	Pacing
6 - 12	Science	not set	45 min

Skill

Representing the Results

Ability to incorporate results from experiment in forms of graphs, tables, or written explanations without speculations.

Each mini-task isolates and addresses a particular skill. Each skill should have a precise name and defined definition.

The mini-task prompt provides directions to students specifying what they need to do to perform the mini-task.

Prompt

Construct a graph of the results of your experiment and write a caption that expresses the data relationship contain in your hypothesis.

Scoring Guide

Mastery level students will have constructed a

- line or bar graph correctly expressing the data collected.
- labels and/or values of collected data.
- caption that expressed the data relationship contained in the hypothesis.

The scoring guide provides criteria the teacher can use to determine if student work met the expectations.

Instructional Strategies

Note: Students can revisit the graph analysis from "Creating Google Spreadsheet to Create Graphs" to re

1. 15 min: Pair students up and have one student bring up the Introduction to Describing Graphs and Tab handout). Have the students work together to complete the 4 activities.

2. Walk around the classroom and troubleshoot any issues students are having.

3. 1 min: Have student bring up graph previously made on Google spreadsheet or graph paper for their ex

4. 5 min: Have students review their previously made graph with their experimental group for consistenc graph labels. Some students may need to make adjustments.

5. 5-7 min: Have students gather the following information about their experiment

- Start by saying exactly what the chart/graph shows and the time period, if applicable.
- Describe the changes as precisely as possible. Use data and numbers from bar or line graph.
- Compare the information. Talk about the difference and similarities between the data shown.
- Conclude by saying what the major trends are.

Instructional strategies provide detailed strategies the teacher will use to support students in developing skill.

Standards

MS-PS3.SEP.3.1.

Construct and interpret graphical displays

MS-LS2.SEP.3.1.

Construct an explanation that includes qua 2)

MS-LS4.SEP.1.1.

Analyze displays of data to identify linear a

Standards that inform the mini-task are highly visible

Attachments

Student Handouts

- Introduction to describing graphs and tables — Link
- Writing about a bar chart — Link
- Using Graphs and Charts to Illustrate Quantitative Data — Link

Teacher Resources

- Writing about a Bar Chart — Link

Student Work

No st

Finally, the attachment section provides a place to share student and teacher handouts and an opportunity to save some samples of student work

Adapted from LDC and Formative Assessment found at: https://ldc.org/sites/default/files/LD5_Sales_Collateral_Cards_Formative_Assessment_finalpdf.pdf and LDC Teacher Competencies found at https://ldc.org/sites/default/files/UpdatedLD5_Sales_Collateral_Cards_TEACHER-COMPETENCIES_final%20%281%29.pdf

Literacy Design Collaborative

LDC Module Curriculum Alignment Rubric

Module Information					
Module Title					
Module ID					
Reviewer(s)					
Date Reviewed					
LDC Task Holistic Score	***SELECT ONE:***	Not Scored	Work in Progress	Good to Go	Exemplary
LDC Instructional Ladder Holistic Score	***SELECT ONE:***	Not Scored	Work in Progress	Good to Go	Exemplary
Reviewer Summative Comments					

LDC TASK SCORING GUIDE

	GQ1: Does the teaching task, along with texts, content and writing product, have a clear and coherent purpose and focus, allow for diverse responses, and require students to respond to texts?		
	Work in Progress	**Good to Go**	**Exemplary**
Clarity & Coherence	• Template type uses a writing mode that does not match the intended purpose of the prompt. • Task purpose is overly broad or narrow. • Prompt wording is unclear. • Prompt wording, student background, or overview of the task biases students toward a particular response. • Task is answerable without using the texts or instructional scaffolding in module. • Background statement may not frame task for students.	• Template task uses a writing mode that matches the intended purpose of the prompt. • Task purpose is focused. • Prompt wording is clear. • Prompt wording is unbiased, leaving room for diverse responses. • Prompt wording, content, texts, and writing product are aligned to task purpose (a "good fit"). • Task is text dependent, requiring students to go beyond prior knowledge to use evidence from the texts in their responses. • Background statement frames task for students.	("Good to Go" characteristics and...) • Task is worded precisely to give students a clear and focused purpose for writing and unambiguous directions. • Prompt, texts, content, and writing product are tightly aligned (are close to a "perfect fit") to task purpose. • Task provides a pattern that can be used as a model to create other teaching tasks in the discipline.
	GQ2: Does the teaching task build students' content knowledge, enduring understandings, and complex, higher order thinking skills central to the discipline?		
	Work in Progress	**Good to Go**	**Exemplary**
Content	• Has a weak connection to content central to the discipline. • Oversimplifies a topic, OR does not require students to engage in analytic reading and thinking skills. • Includes content or skill standards that are not relevant the task	• Addresses content central to the discipline and grade level CCSS reading standards, requiring students to build strong content knowledge. • Engages students in a range of analytic reading and thinking skills.	("Good to Go" characteristics and...) • Addresses big ideas or enduring understandings central to the discipline. • Engages students in complex, higher- order thinking skills specific to the discipline.

LDC TASK SCORING GUIDE (*CONTINUED*)			
Texts	**GQ3: Are the provided text(s) engaging, authentic, accessible, tightly relevant to the prompt, and appropriately complex, requiring students to apply CCSS reading skills?**		
	Work in Progress	**Good to Go**	**Exemplary**
	• Are loosely aligned or misaligned to the purpose of the task. • Bias students toward a particular response. • Are too difficult or too easy for the range of student ability. • Include so many texts or allow so much student choice that it will be difficult to support reading closely and provide appropriate instruction.	• Are useful for providing content and evidence to be used in addressing the task. • Do not bias students toward a particular response. • Are accessible to most target students and appropriately complex, requiring them to apply grade level CCSS reading skills to comprehend and analyze content.	("Good to Go" characteristics and...) • Are engaging, tightly relevant (indispensable), and authentic. • Are tightly aligned to the task purpose. • Represent central modes of discourse in the discipline. • Are carefully selected, excerpted, or modified to provide texts with varied complexity (using either quantitative or qualitative measures) appropriate to students' reading ability.
Writing Product	**GQ4: Does the teaching task engage students in applying CCSS writing skills to produce writing in a genre that is appropriately challenging, central to the discipline, and appropriate for the task content?**		
	Work in Progress	**Good to Go**	**Exemplary**
	• Is inappropriate to the discipline, content, or challenge of the task. • Is too difficult or too easy for the range of student ability.	• Is appropriate for the discipline and content, and coherent with the purpose of the task. • Is accessible to all students and intellectually challenging, requiring them to apply CCSS writing skills to demonstrate their content understanding and CCSS reading skills.	("Good to Go" characteristics and...) • Authentically engages students in rhetorical modes and types of writing central to the discipline.

LDC TASK SCORING GUIDE (*CONTINUED*)			
	Work in Progress	**Good to Go**	**Exemplary**
Task Holistic Score	Needs revision for reasons listed below.	The teaching task creates academic contexts for applying grade level CCSS reading and writing standards, and engages students in reading texts closely, as well as writing that is text-based and appropriate for the discipline, purpose, and/or audience. Teaching task is text-dependent and has a clear, focused, and coherent purpose overall. Task prompt, texts, and writing product are aligned to the content and purpose of the teaching task. Teaching task addresses content central to the discipline; engages students in applying a range of analytic reading and thinking skills; and employs useful text(s) that are appropriate for most students at the target grade level.	The teaching task creates academic contexts for applying grade level CCSS reading and writing standards, and engages students in reading texts closely, as well as writing that is text-based, appropriate, and authentic for the discipline, purpose, and/or audience. Teaching task is text-dependent and has a clear, focused, and coherent purpose and precise elements overall. Task prompt, texts, and writing product are tightly aligned to content and to the purpose of the teaching task. Teaching task addresses content and big ideas central to the discipline; engages students in applying higher order thinking skills specific to the discipline; and employs carefully selected or customized, relevant text(s) of varying complexity suited to the range of students in the target grade level. Focus of teaching task is central to the discipline or course and has broad applicability.
	Feedback:		

LDC INSTRUCTIONAL LADDER SCORING GUIDE

What Skills?	**GQ5: Does the Skills List address the specific demands of the teaching task, include CCSS reading and writing skills that are appropriate for the grade level, and support access to the texts and completion of the teaching task?**		
	Work in Progress	**Good to Go**	**Exemplary**
	• Skills list misses one or more significant demands of the task. • Skills are not clustered and sequenced to support the teaching task. • Skills list reflects the default skills list and includes skills that are not relevant to the teaching task.	• Skills list is relevant to teaching task, (including the task prompt, content, discipline, text(s), and writing product). • Skills are clustered and sequenced to support the teaching task. • Skills list includes grade-level appropriate reading, writing, and thinking skills.	("Good to Go" characteristics and...) • Skills list is precise and tightly aligned to the task and the demands of the texts. • Skills are clustered and sequenced to support access to the texts and completion of the teaching task product.
What Instruction?	**GQ6: Do the mini-tasks, instructional strategies, and materials provide students with opportunity to develop grade level CCSS reading and writing skills and sufficient support to complete the teaching task successfully?**		
	Work in Progress	**Good to Go**	**Exemplary**
	• Some mini-tasks (product, prompt, and scoring guide) do not relate to skills list. • Mini-tasks rely on general strategies that provide weak support for the skills, texts, and teaching task OR provide too much support, removing any challenge for students. • Instructional strategies are loosely connected to mini-tasks and completion of the teaching task. • Pacing is not realistic. • Materials, references, and supports used in instruction are not available to other teachers. • Module does not present adequate opportunity to teach writing in response to reading.	• Mini-tasks (product, prompt, and scoring guide) relate to skills list. • Mini-tasks support the teaching task (including the prompt, content, discipline, text(s), and writing product). • Instructional strategies support the mini-tasks and completion of the teaching task, (and are aligned to prompt, content, discipline, text(s), and writing product). • Mini-tasks and instructional strategies provide opportunities for students to learn specified grade level CCSS reading, writing, and thinking skills. • Pacing is realistic. • Materials, references, and instructional strategies are included, linked, or cited in enough detail to allow other teachers to obtain them.	("Good to Go" characteristics and...) • Mini-tasks and instructional strategies are coherent, tightly aligned to the skills, and well designed to support student success on the teaching task. • Mini-tasks and instructional strategies explicitly build student capacity to apply discipline-specific literacy skills to complex texts. • Mini-tasks and instructional strategies explicitly build student capacity to produce clear and coherent writing appropriate to discipline, task, purpose, and audience. • Mini-tasks are well placed to provide formative feedback and give evidence about student progress. • Materials, references, and instructional strategies are high quality, customized to the purpose of the teaching task, and described in enough detail for another teacher to use them. • Scoring guides for mini-tasks include clear criteria aligned to the skill being taught. • Texts, mini-tasks, or instructional strategies are differentiated for diverse learners.

<table>
<tr><th colspan="4">LDC INSTRUCTIONAL LADDER SCORING GUIDE (CONTINUED)</th></tr>
<tr><td rowspan="3">What Results?</td><td colspan="3">GQ7: Has the module been taught, and does it include student work samples that have been scored and/or annotated?</td></tr>
<tr><th>Work in Progress</th><th>Good to Go</th><th>Exemplary</th></tr>
<tr><td>• No student work samples are included</td><td>• Student work samples are included</td><td>• Students work samples representing different score levels are included, with scored rubrics</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td rowspan="4">Ladder Holistic Score</td><th>Work in Progress</th><th>Good to Go</th><th>Exemplary</th></tr>
<tr><td>Needs revision for reasons listed below.</td><td>Instructional ladder generally aligns to grade level CCSS standards and creates an opportunity to teach writing in response to reading. Instructional ladder is coherent and aligned to the teaching task. Instructional ladder supports the teaching task with a well-planned instructional sequence in which mini-tasks lead to the final product's completion. Instructional ladder provides sufficient detail so that others might use it. Student work samples may be included (but are not required to receive a holistic Good to Go score).</td><td>Instructional ladder closely aligns to grade level CCSS standards and creates an opportunity to build discipline-specific literacy and thinking skills, and to teach writing in response to reading text(s) closely. Instructional ladder is highly coherent, tightly aligned and customized to an "Exemplary" or "Good to Go" teaching task, and appropriate in rigor to the course. Instructional ladder supports the teaching task with a well-planned and strategic instructional sequence in which mini-tasks lead to the final product's completion. Instructional ladder is detailed and polished with attention to the needs of a wide educator audience. Texts, mini-tasks, and/or instructional strategies may be differentiated for diverse learners. Scored and/or annotated student work samples representing different score levels are included.</td></tr>
<tr><td colspan="3">Feedback:</td></tr>
<tr><td colspan="3"></td></tr>
</table>

BATTELLE Education

Science and Literacy
Part II: Assess Outcomes & Iterate Instruction
December 9, 2016

Breakfast	6:45-7:45
Welcome	8:00-8:20
Collecting data from final student work	8:20-10:20
Break	10:20-10:30
Analyzing instructional ladder (based on data)	10:30-11:00
Brainstorming Teaching task for Spring	11:00-11:30
Lunch	11:30-12:00
Next Steps	12:00-12:15
Work time: Teaching task and RFP development	12:15-2:15
Developing your mini-task library based on identified needs	2:15-2:45
Closing	2:45-3:00

Mousetrap Cars

Module Review Summary

Authors	Reviewer	Date
Kelly M. Gaier Evans	Kelly M. Gaier Evans and Claire Hampel	01/16/2017

LDC TEACHING TASK SCORING GUIDE

TASK CLARITY & COHERENCE

Good to Go

Can students answer this without conducting additional research?
Considering the texts: Is the pdf you posted the core text for the research? If so, will students be able to pull from this text to demonstrate their learning of the content specifically about potential and kinetic energy since that is the focus? Or do they need more information about types of energy to meet the standard?

Uses standard background statement from template.

CONTENT

Good to Go

Lists a 9-10 reading standard but also lists additional reading standards for 6 -8. Remove the 9-10 standard OR replace with the grade level appropriate standard being focused on.
What writing skills will you focus on?
Focus is on kinetic and potential energy. Is this enough content for the length of the module? How will students read/research this?

TEXT(S)

Work in Progress

RFP: The RFP contains the student work rubric which allows students to read for what success will look like. Giving students the full teaching task would help them see all of the components to be successful.
2nd text: Mouse trap research info seems to be too easy. It seems like it will bias students towards particular designs. Will they get enough information about types of energy from this source to support them in understanding the content?

WRITING PRODUCT

Good to Go

You do not have listed any writing standards?

HOLISTIC RATING

Work in Progress

TO move to G2G, please consider your writing standards to be added. Also consider how your students will read and research about the types of energy which are a focus for this module.

LDC INSTRUCTIONAL LADDER SCORING GUIDE

WHAT SKILLS?

Good to Go

Will students be doing the presentation at the end? If not, please delete these additional skills.

WHAT INSTRUCTION?

Good to Go

For meets requirements, what are you looking for as a metric of success?
Example, in the task analysis mini-task, instead of just completing, can we be more specific? For example, if you are having them analyze the task, could you ask that their first text message include the types of products that they will be producing and that they have at least 3 products - data, car, design report.
I like that the selling your services mini-task has students including a justification that references and sites research. I wonder if it might also reference how it meets requirements of RFP?
In Defense of Design, I like that you are concrete with asking for 3 citations from background resesarch. I wonder if you also want to ensure they use data from their collection here to?
One of the writing standards listed in the instruction, Defense of Design, has the following writing standard: WHST.6-8.9, should this be added as a focus for the module?
Draw evidence from informational texts to support analysis, reflection, and research.
Some mini-tasks focus on wrong content and should be modified - example Inner/outer circle partner discussion uses standard 3.3 about natural resources.

WHAT RESULTS?

Unrated

HOLISTIC RATING

Work in Progress

Some of the mini-tasks need to be edited to be relevant to your specific science content and teaching task.

BATTELLE Education

Science and Literacy Scale up
January 30, 2017

Overview of scale up rollout recommendations (based on this year) 1. Facilitators (Train-the-trainer calendar) 2. New teachers (training for new teachers)	15 minutes
Models of Scale up • Collaborative • Individual	15 minutes
Discussion	60 minutes
Next steps	15 minutes

Planning Cohort II for the NW rural LDC collaborative
Date: 3.8.2017
Attendees: K. Gaier Evans; P. DeWitt; Catherine Puster (Knowledge Capture, PAST Foundation)

3/8 PLANNING AGENDA:

1. Reflecting on this year
    - A. Overview of this year's PD series
        1. Battelle timeline
        2. Workshop Goals and agendas
        3. Overview of cohort I outcomes and feedback
    - B. Battelle's next steps and plans for improving tool based on cohort I implementation

2. Planning for next year
    - A. Critical design questions for Cohort II
    - B. Develop timeline
    - C. Discuss workshop I goals and outcomes for Cohort II
    - D. Identify next steps and supports needed

Planning Cohort II for the NW rural LDC collaborative
Date: 5/3/2017
Attendees: K. Gaier Evans; P. DeWitt; Catherine Puster

5/3 FINAL PREP AGENDA:

1. **Overview of tools/supports**
    - **a. DESIGN (30 min) 3:30-3:45**
        - i. Evaluate and discuss resources on live binder [Concept design process tab]
            1. Non – negotiables one pager and slides (Peter)
                - i. ADD TO DESIGN PROCESS TAB (*Complete 5/5/2017*)
            2. RFP template and exemplar (on live binder)
                - a. Evaluate and discuss all resources on live binder
                    - i. ADD: Word version to live binder. And add the RFP template to the Design templates on CoreTools. (*Complete 5/5/2017)*
    - **b. Exemplars modules + student work [3:45 – 5:00]**
        - i. LDC one pager (*LDC overview tab on livebinder*)
        - ii. Modules to recommend teachers look at/use (*Battelle recommended using the following two*)
            1. Discussion on module exemplars [*sample modules tab on livebinder*]
                - a. Dig This (HS)
                - b. Insane Insulators (MS)
        - iii. Updated skills list (30 minutes) 3:30-4:00 [*sample modules tab on livebinder*]

1. Have a blank version and a skills list with complete mini-task samples version. (*Battelle LDC design template tab in live binder also linked directly to design templates in CoreTools under LDC CoreTools tab on live binder)*
2. DISCUSSION: Add in the other mini-task pieces for a google doc. (*Complete: In live binder and google drive as of 5/5/2017*)

iv. Updated rubric (15 minutes) 4:00-4:15 [*Rubric tab in live binder*]

v. Exemplar student work - Coming to a consensus on exemplar student work (45 minutes) 4:15-5:00 [*design report tab in live binder]*

1. Do one student paper (MS Insane Insulators) and add in some slides about how it scores. Add in a PDF of scoring for this paper
   a. *Added slides in presentation 5/5/2017*
   b. *Added PDF in design report tab in LiveBinder 5/5/2017*

2. **Finalizing details** for May 10th, 17th 5:00-6:00
   a. Add in goals/outcomes/timeline

Battelle LDC DESIGN SKILLS LIST – Version 1 and 2 MODIFIED

Yellow = Newly added skill   Turquoise = Revised/Modified/Combined skill   Pink = Removed skill

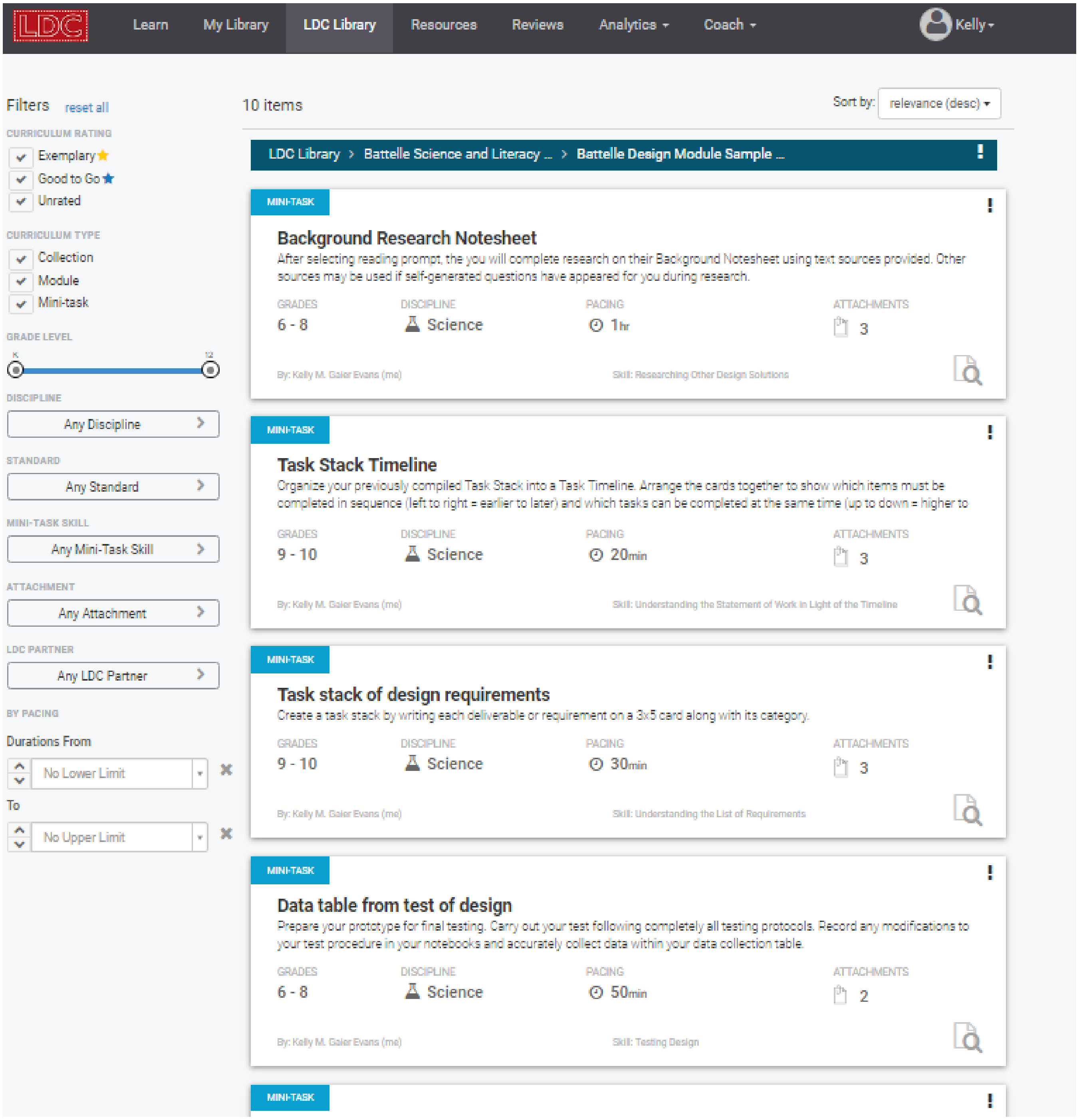
Design Skills 1.0 (ORIGINAL)		Design Skills List 2.0 (REVISED)
Preparing for the Task		***Preparing for the Task***
Task Engagement: Ability to connect the task and new content to existing knowledge, skills, experiences, interests, and concerns.		*Task Engagement*: Ability to connect the task and new content to existing knowledge, skills, experiences, interests, and concerns.
Task Analysis: Ability to understand and explain the task's prompt and rubric.		*Task Analysis*: Ability to understand and explain the task's prompt and rubric.
Analyzing the Request for Proposals (RFP)		***Analyzing the Request for Proposals (RFP)***
		Defining the Problem - ability to describe exactly the intent of the problem to be solved.
Understanding the List of Requirements: Ability to read, understand, analyze, and interpret a list of design requirements to create a list of features of a design solution.		*Understanding the List of Requirements*: Ability to read, understand, analyze, and interpret a list of design requirements to create a list of features of a design solution.
Understanding the Statement of Work in Light of the Timeline: Ability to scale the scope of a project to fit the time available.		*Understanding the Statement of Work in Light of the Timeline*: Ability to scale the scope of a project to fit the time available.
Seeking Clarification on RFP: Ability to identify gaps in understanding about design requirements or statement of work and communicate those gaps in understanding as questions that can be answered by an organization or individual that issued an RFP.		*Essential Vocabulary*: Ability to understand and explain the essential vocabulary pertinent to the task.
Creating Possible Design Solutions		***Creating Possible Design Solutions***
Selecting Relevant and Credible Texts: Ability to select texts that present credible research addressing similar design problems.		*(OPTIONAL) Selecting Relevant and Credible Texts*: Ability to select texts that present credible research addressing similar design problems. (OPTIONAL – Consider will students be responsible for finding additional texts?)
Researching a Design Problem: Ability to understand the existing bodies of knowledge related to a problem.	→	*Researching a Design Problem*: Ability to understand the existing bodies of knowledge related to a problem, including find designs that have been previously developed by others and to glean useful information from the approaches they took.
Researching Other Design Solutions: Ability to find designs that have been previously developed by others and to glean useful information from the approaches they took.		

Brainstorming Possible Solutions: Ability to engage in a collaborative, creative process to brainstorm many possible solutions to an RFP.		*Brainstorming Possible Solutions*: Ability to engage in a collaborative, creative process to brainstorm many possible solutions to an RFP.
Analyzing Possible Solutions: Ability to engage in theoretical, technical analysis of brainstormed, possible solutions in order to identify pros/cons of each solution in reference to an RFP's list of requirements and scope.		
Proposal Process		~~***Proposal Process***~~
Communicating Possible Solutions: Ability to condense possible solutions into a simple paper or presentation that presents one or more options and potential pros and cons of that (those) solution(s).		
Bidding the Project: Ability to identify all needed resources for proposed product/solution and to communicate those needs to an RFP-issuing institution.		
Selling Your Services: Ability to communicate the capability of your team to complete your proposed solution: "why you should hire us."		
Seeking Constructive Feedback: Ability to solicit specific, constructive feedback on a design proposal in order to inform decisions and course for the rest of a design process.		
Detailed Design Process		***Design Process***
Selecting Final Design Direction: Ability to use feedback and pros/cons analysis to select a final solution for an RFP that will be developed fully.		
Clarifying Size, Form, Function: Ability to clearly design a solution and articulate that solution: "it looks like this . . ."		
Identifying Critical Design Components: Ability to identify subsystems within a design solution that are critical to the success of the design solution.		*Identifying Critical Design Components*: Ability to identify components of a design solution that are critical to the success of the overall solution.
Testing Critical Design Components: Ability to test critical subsystems for feasibility.		Testing Critical Design Components: Ability to test critical components for feasibility and collect data. (e.g., testing truss multiple truss angles of a bridge design before building the entire bridge)
Finalizing Design: Ability to incorporate critical component test results in order to adjust the design of subsystems (and overall design) as necessary in order to ensure final design solution adequately addresses the list of requirements contained in an RFP.		Planning Design: Ability to analyze critical component test results to design a solution which addresses the list of requirements contained in the RFP.
		Testing Design: Ability to test and collect data on how well the design solution addresses

		the problem / constraints detailed in the RFP.
		Revising Design: Ability to analyze test results to re-design a solution as necessary to ensure final design addresses the list of requirements contained in the RFP. *(NOTE: pulls language from Finalizing Design)*
Design Report Writing Process		***Design Report Writing Process***
		Define the problem with constraints (revisited): Ability to define a problem and restate the design constraints given in the RFP.
Communicating Background On Design: Ability to communicate the background on "why we are doing what we are doing."		*Communicating Background Research*: Ability to explain relevant disciplinary content and background research on existing design solutions.
Generating Graphic of Design: Ability to generate a graphical representation (photograph, drawing, CAD rendering, etc.) of the overall design solution in order to orient the reader to the components of the solution.		*Generating Graphic of Design*: Ability to generate a graphical representation (photograph, drawing, CAD rendering, etc.) of the overall design solution in order to orient the reader to the components of the solution.
Communicating Details of Design: Ability to communicate (with words and graphics) the details of a design solution and how it is built/executed.		*Communicating Details of Design*: Ability to translate the design graphic into words to describe critical components of how the design is built/executed.
Defending Design As Meeting Requirements: Ability to clearly articulate (using evidence) how the design solution meets the original design requirements		*Defending Design As Meeting Requirements*: Ability to use data (including graphs, charts, or tables) from testing to communicate how the design solution meets the design requirements.
Appending Technical Information: Ability to organize and communicate all technical reports, data from sub-system test reports, specific experimental protocols, etc. into an easy-to-navigate appendix to be used by the reader as needed.		*(OPTIONAL) Appending Technical Information*: Ability to organize and communicate all technical reports, data from sub-system test reports, specific experimental protocols, etc. into an easy-to-navigate appendix to be used by the reader as needed.
Writing an Executive Summary: Ability to write a brief, comprehensive, and accurate summary of an issue/need and designed solution to that need.		*Writing an Executive Summary*: Ability to write a brief, comprehensive, and accurate summary of an issue/need and designed solution to that need.
Finalizing a Title Page: Ability to make a title page with appropriate identifying information.		*Refining the Report:* Ability to format (e.g., title page, citations, etc.) and edit final design report.
Providing Peer Review Feedback: Ability to provide meaningful feedback on a design report for a partner.		
Making Technical Revisions: Ability to proofread and format a final paper.		
Presentation (optional extension process)		

Creating a Standard Presentation: Ability to turn a Design Report into a presentation (e.g., PowerPoint, Poster, Prezi, etc.) that can be successfully shared in a visual/auditory manner.		
Understanding Audience: Ability to appropriately adjust presentation duration and depth based on different audience members' available time, level of interest, and technical fluency.		
Creating Supporting Technical Slides: Ability to identify what may be frequently-asked, technical questions; the ability to create supporting technical slides to provide an extension to the standard-length presentation.		
Presenting: Ability to clearly communicate a design presentation to one or more audiences.		
Reflecting on Presentation: Ability to reflect on a particular presentation and identify relevant lessons for improving future presentation.		

Below is a screenshot of the Battelle Design Module sample mini-tasks on CoreTools. To access the complete set of sample minit-tasks, please visit Core Tools at: https://coretools.ldc.org/curriculumLibrary?library_scope=VIEWABLE&collections=dcfb7367-fd93-4a50-ad30-f73b43aa79bb



Writing the Details of the Design: Procedures

GRADES	DISCIPLINE	COURSE	PACING
11 - 12	Science	Physics	50min

SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
COMMUNICATING DETAILS OF DESIGN: Ability to communicate (with words and graphics) the details of a design solution and how it is built/executed.	**WRITING THE DETAILS OF THE DESIGN: PROCEDURES** After designing your solution, write 2-4 paragraphs explaining the procedures you have used to build your prototype. Be sure to include quantitative data (e.g. estimated times and quantities of materials); qualitative data (e.g. preparation tips and techniques); and pictures. This section should be detailed enough for someone to repeat the work you did and obtain equivalent results.	*Student meets expectations if he/she:* • produces 2-4 paragraphs explaining the complete procedure for building the solution • uses enough detail for the procedure to be followed and repeated by a peer to obtain equivalent results • uses complete sentences and passive voice	**This lesson was pulled from the module "Dig this" by Leanna Colosimo.** **Teacher Note:** *This lesson is adapted from a mini-task in the module "Catching Sun with a Donut" (for a link to this mini-task, see below under Teacher Resources). This mini-task assumes that students have recently completed a lab experiment and are familiar with procedural writing.* **Modeling and Guided Practice:** 1. Distribute an example of a scientific article to students. Chose an article that students have read before. 2. As a class, read aloud the **procedure/methods** section. Explain that a procedure is like a "how to" guide for the reader. As you read, think aloud about the replicability, content, organization, and format of the piece. You might choose to: • Define and emphasize the notion of **replicability**--why it is important and how it is achieved. Explain that when scientists write their procedures or methods section, they want to use enough detail so that the steps can be replicated. If students are not familiar with the term, post the definition and explain what replicability is NOT (i.e. one-of-a-kind or unrepeatable). • Discuss how **content and organization** in the procedure/methods section affects replicability. • Note the inclusion of **materials** and the **format** for delivering each step of the procedure. • Discuss the use of **passive voice** for writing the procedure as opposed to using bullet points or commands. • Project the slides below (under Teacher Resources). 3. Next, share an example of a **procedure** that is missing some content or is unclear in some way. Find an example and remove some of the content ahead of time or consider writing your own example (e.g. how to write on the chalk board or how to make a peanut butter and jelly sandwich). Consider asking one student volunteer to read aloud this

procedure and have another student volunteer attempt to perform the steps in front of the class. Have the rest of the class try to guess which steps are missing (e.g. the procedure explains how to write on the board using chalk, but did not say to take the chalk out of the box).

Partner Work:

Have students practice writing a procedure about a different topic (e.g. explicit instructions on how to walk from the classroom to the bathroom). Assign students partners and ask them to exchange directions and follow the procedures to complete the task. Tell students to be sure to leave the task unnamed so their partners don't know the end product.

Individual Writing Practice:

1. Project the Prompt (see above) or write it on the board.

2. Read it aloud to students and ask them to complete their writing individually. Emphasize the need for including all required sections as described in the prompt. Note: If students need extra support with their writing, distribute the Student Handout below and have the students brainstorm their ideas first.

Closing:

1. After students finish, have them compare their procedures/methods sections with a peer. Project the scoring guide and ask them to provide feedback to their partner based off of these requirements.

2. Have students share out some of their partner discussions with the whole group.

Standards:

WHST.11-12.2 : Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

WHST.11-12.4 : Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCR.W.2 : Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

CCR.W.4 : Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Additional Attachments:

Procedure Paper 1.pdf

Writing the Details of the Design: Procedures

	Design Procedures.pptx **Student Handout - Procedures.docx**

by Kelly M. Gaier Evans

Adapted from ***"Writing the Details of the Design: Procedures"*** *by leanna colosimo*

Design Project Common Pitfalls

This quick-check is meant to assist teachers in self-checking a design concept for common pitfalls.

Design Process

- Defining
- Researching
- Brainstorming
- Prototyping
- Testing
- Revising
- Reporting

Will students be asked to engage in an open-ended process? YES _____ NO _____

The design process is fluid, non-prescriptive, and even characterized by trial and error.

Non-Example: Chemistry students are given lab directions for synthesizing Asprin (acetylsalicylic acid).

Example: Chemistry students synthesize Asprin, and then work in teams of 6 to design and test group production protocols to increase efficiency and purity of Asprin production.

Does the RFP define the required specifications and constraints? YES _____ NO _____

The RFP describes the specifications all student designs should meet and details the protocol for measurement of the specification's dependent variables. Similarly having project constraints (e.g., cost, timeframe) cause design trade-offs to be made.

Non-Example: Artificial lighting designs must be able to grow plants.

Example: Artificial lighting designs must use less than 50 watts, cost less than $35, and grow Arabidopsis plant biomass at a rate of no less than 10% per week.

Will students actually be able to manufacture and test their designs? YES _____ NO _____

Student designs must be able to be constructed and tested in reality - not just theory.

Non-Example: Students will design blueprints for a house that must be able to withstand tornadic activity.

Example: Students will build prototype houses for structural testing in a high-velocity wind tunnel.

Will students need to apply content from your class to research, develop, and test their design? YES _____ NO _____

The Design prompt should focused around a content-specific problem / need.

Non-Example: Physics students are charged with designing and building a prototype car.

Example: Physics students are charged with designing and building a new car bumper that reduces forces on passengers during a crash.

RFP Template for LDC DESIGN MODULE

[INSERT REQUEST FOR PROPOSAL NAME]

Table of contents

NOTE: This example is adapted from Clayton VanDoren's
REQUEST FOR PROPOSAL (RFP) #2016-VC1 INSULATED VACCINE CARRIER

Project Purpose: This is the why statement or the purpose statement. Why are we issuing this RFP? What are we seeking to solve?

Thousands of persons in remote and environmentally hostile areas, such as subtropical Africa, have no access to modern medical facilities, yet are most at risk for contracting any one of hundreds of infectious diseases. Balto Pharmaceuticals LLP is dedicated to the purpose of delivering vaccines or other drugs to these patients on a case-by-case basis. To do so, Balto LLP is seeking to procure an insulated vaccine carrier that can be carried from a medical facility in a population center to a remote location by a trained transport dog.

Objective: This is what the RFP is asking vendors (or students) to do.

Balto LLP is seeking a provider to design and manufacture a vaccine carrier to deliver drugs in hostile environments using trained dogs. The device should be easy to open and re-seal, maintain the temperature of the enclosed vaccine as specified below, be compatible with a standard dog harness, and be durable and shock resistant. The container must also meet World Health Organization regulations for drug handling equipment.

The scope of this project includes all design and development as documented provided in a design report, and the delivery of a fully tested prototype vaccine carrier to Balto Pharmaceutical LLP. The bidder is not responsible for the actual delivery of vaccines, including the selection and training of dogs and the worldwide distribution of the actual drugs.

Project Requirements: This section outlines the objectives of the project and the goals that need to be met to achieve a satisfactory result. This includes deliverables, tasks, and deadlines. *Note: Although this appears to be a checklist, it is not the final evaluation of the design report. It is a place to remind students of the requirements along the way.*

Phase	***Product***	***Due date***
Research and Design Process	*Background research for design*	
	Possible Solutions	
	Identified critical design components to test	
	Test results	

	Final solution recommendation	
Writing Design Report	*Graphic of Design*	
	Draft of Design Report	
	Final Design Report	

<u>Final Test Requirements:</u> Technical specifications define a set of requirements that a product must meet. A product or assembly that does not meet all of the specifically expressed requirements does not meet the specification, and often is referred to as being out of specification or "out of spec."

The following criteria must be met to achieve a successful project. In all cases, the vaccine will be provided in a screw-cap glass vial with a volume of 15 ml.

- *Thermal Stability: Starting with the vaccine at a temperature of 4° C (40° F), maintain the vaccine below a temperature of 10° C (50° F) for no less than 3 hours in an external temperature of 35° C (95° F), without solar loading (exposure to sunlight). It is anticipated that vaccine deliveries will be run at night.*
- *Shock Resistance: The container must protect the vaccine vial against mechanical shocks equivalent to a vertical drop from a height of 6.0 m (20 ft) onto an asphalt surface to simulate a worst-case drop onto rock or dried, hard-pack mud.*
- *Durability: The container must maintain its external closure when subjected to a drag test where it will be dragged through sand for a distance of 100 m at a speed of 16 kph (10 mph)*
- *Ease of handling: It must be possible to open the carrier, insert the vaccine vial, and close the carrier within 60 seconds to prevent warming of the vaccine. It is acceptable to have multiple parts such as an inner insulation sleeve and an outer shock resistant pouch as long as the handling criterion is met.*
- *Size and Weight: The vaccine carrier must not exceed a total volume of 600 cubic centimeters and have a maximum weight, vaccine excluded, of no more than 650 grams.*

<u>Constraints:</u> These are real world limitations on a design which the client requires. This may include cost or time.

Budget/Cost: The vaccine carrier that meets all of the above requirements at the lowest cost will awarded the contract, all other factors being equal.

Time: Please see project requirements for timeline.

<u>Evaluation:</u> The LDC Design module uses the LDC argumentation rubric PLUS additional NGSS practice scoring elements added in.

LDC Literacy Design Collaborative

DESIGN Student Work Rubric - Argumentation Task - Grades 6-8

Student Paper: [redacted] **Module:** [redacted] **Module Author:** [redacted]

Scoring Elements	Emerging		Approaches Expectations		Meets Expectations		Advanced
	1	1.5	2	2.5	3	3.5	4
Controlling Idea	Makes an unclear or unfocused claim.		Makes a general claim **that addresses the prompt**, with an **uneven focus**.	X	**Establishes and maintains a clear** claim that addresses **all aspects** of the prompt.		Establishes and maintains a clear, **specific, and credible** claim that addresses all aspects of the prompt.
Justification: Students to not come right out and make a clear claim arguing the effectiveness of their design. They state "This design was not very successful because the water dropped 5 degrees C." However, students do present their idea and maintain in throughout the paper and they address all aspect of the prompt.							
Development / Explanation of Sources	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.		Explanation of ideas and source material is **minimal** or **contains minor errors**.		**Accurately** explains ideas and source material and **how they support the argument**. X		**Thoroughly** and accurately explains ideas and source material, **using reasoning** to support **and develop** the argument.
Justification: The design report accurately explains convection, conduction and radiation, in addition to providing information about current insulation materials. It is not advanced because the students do not thoroughly and explicitly explain reasoning for their design decisions.							
NGSS Practice: DEFINE PROBLEMS	Defines a problem or design statement that is impractical or does not match the intent of the problem or constraints.		Defines a problem or design statement that generally matches the intent of the problem or constraints.		Defines a problem or design statement that completely matches the intent of the problem and constraints.	X	Defines a problem or design statement that completely matches the intent of the problem and constraints, and explains how the design solves the problem and addresses constraints.
Justification: Team defines the problems and the constraints. Begins to explain how their design meets constraints/specs with the fit of the beaker inside detailed description but do not explain how their design meets the other constraints (time, money, etc)							
NGSS Practice: DESIGN SOLUTIONS	Uses no data to evaluate how well the design addresses the problem/constraints. The redesign of the original model or prototype is inappropriate or incomplete.		Uses relevant but limited amounts of data to evaluate how well the design addresses the problem/constraints and outlines an appropriate redesign of the original model or prototype.		Uses relevant and adequate amounts of data to evaluate how well the design addresses the problem/ constraints and using the data explains an appropriate redesign of the original model or prototype. X		Uses detailed and complete data to evaluate how well the design addresses the problem/constraints and provides a detailed rationale with supporting data for the appropriate redesign of the original model or prototype.
Justification: Team has an appropriate re-design based on data, however, there are errors in the data presented and a lack of detailed data presented. The appendix includes an observation log which references a graph that was created but is not included in the report. Consider how can you further represent data in the defense of design.							
CONTENT UNDERSTANDING	Attempts to include disciplinary content in explanation or argument but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.		Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.		Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.		Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding. X
Justification: Great paragraphs about the content convection, conduction, radiation, and insulation materials. Team also integrates content explanations in suggested re-design.							

Insane Insulators
Radiators
Northwestern Middle School
January 2017

Ex. Summary

Problem:

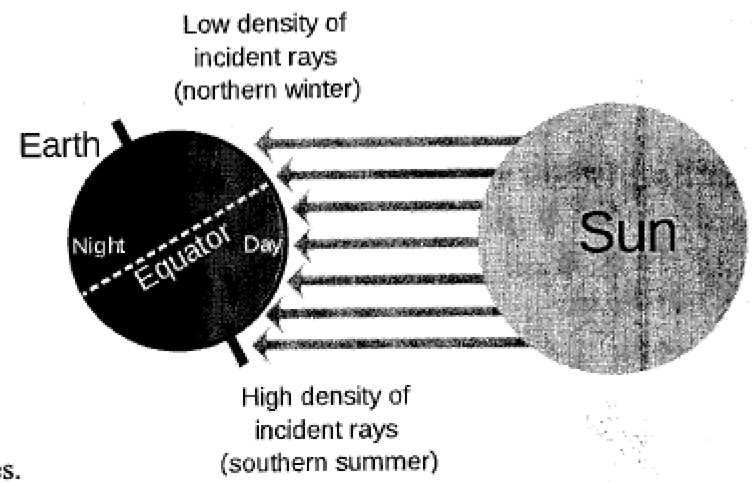
The problem presented to the team was that an oil company needed a way to keep the oil warm while transferring it. The constraints presented to the team was that each team had 35 Hagans Bucks. Another was that each team will have to create a container that insulates 250mL of water best over the course of 10 minutes. Another is that the container had to have a small opening to insert the temperature probe, and had to be able to fit and insert the 250mL beaker. The team could only use the supplies given to us by Mrs. Hagans. The team only has 2 weeks to finish the project, and the team who designs the container that allows the smallest amount of heat loss over 10 minutes for the cheapest price will win the competition.

Soulution:

The team's solution to solve the problem was to create a box with cardboard with paper towels in it to reduce the amount of heat loss. The materials used within the design were white paper towels, cardboard, fabric, scissors, and duct tape. Radiation was reduced by having a box around the beaker not letting out any steam. Convection was reduced by having paper towels around the beaker. Conduction was reduced by having only insulation material around the beaker. The results from the experiment was that the water started at 53.8°C and it ended at 8.8°C so the total loss of temperature was 5°C. This design was not very successful because the water dropped 5°C.

Radiation

Radiation plays a huge role in our atmosphere and everywhere around us. Radiation is the transfer of energy as electromagnetic waves. Radiation occurs everyday of our lives. It occurs when the Sun's electromagnetic waves heat the Earth. Radiation help our atmosphere in many ways such as warming the atmosphere or changing the climate. Some places we can see radiation everyday is in the kitchen when you boil a pot water you see steam which is an example of radiation. Also another example is a microwave. One more example is Chemotherapy. Chemotherapy is a treatment to help fight cancer. As you can see radiation plays an important role in our everyday normal lives.

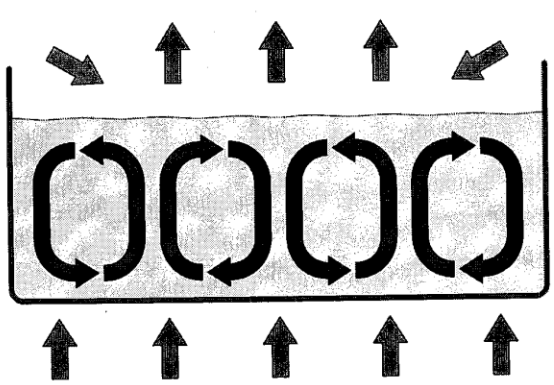


Source 1: Science Fusion Book

Source 2: Conduction, Convection, & Radiation Examples

Convection

Convection is when any movement of matter that results in differences density. We see convection in everyday life in the air. Such as when it's summer. The floor of your house may be cooler than what the air feels. That is because of convection, in which hot air rises and cool air sinks. Cool air is denser than warm air, and that is why cool air sinks and hotter air will rise up. The same thing happens in the ocean. This is called a convection current. A convection current has warmer water that floats up, and some cooler water that will flow down, creating a consistent current. The way that convection affects our weather is letting the warmer water on the surface of the water rise up, and create some clouds in the air that will later let rain fall down to the ground. There are many way convection affects people in everyday life.



urces:

http://physics.stackexchange.com/questions/62423/conduction-convection-radiation-examples-besides-vacuum-flask

http://examples.yourdictionary.com/examples-of-convection.htm#jqsGpx5JBVV9caW.99

Conduction

Conduction occurs when heat passes through objects to heat something up. Conduction occurs on the earth when solar radiation from the sun hits the ground which heats the air around it. Conduction can be reduced by using insulators such as insulation which keep the warm air inside of a room. Some places we see conduction everyday are in the kitchen, at work, and even in school.

Source 1: Heat transfer vocabulary

Source 2: Real world physics

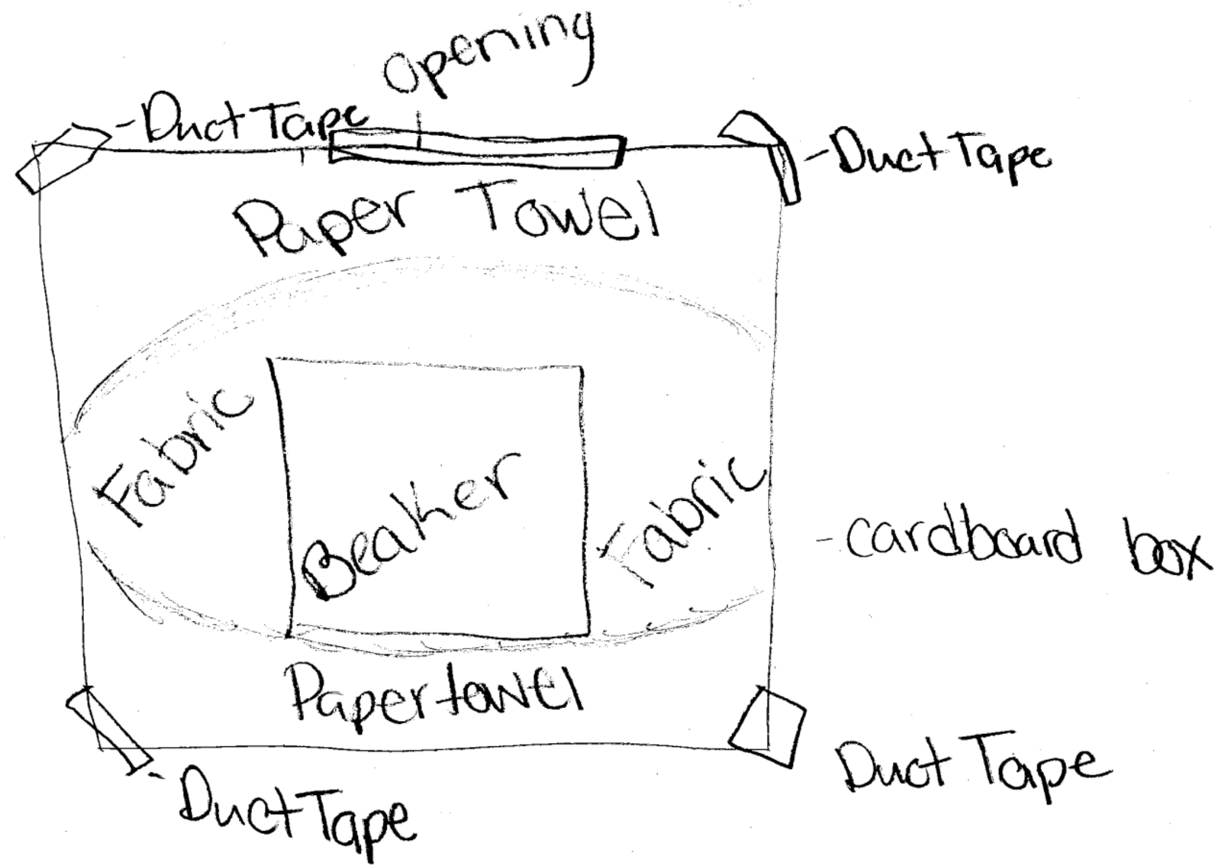
Current Insulation Methods

Insulators are a material that does not let heat and electricity travel through the object easily. The main goal of insulators is to reduce heat loss or heat gain. Some examples of insulators that you see in everyday life are your home, animal fur, and saucepan handles. Another example is a saucepan handle. This keeps the heat from the burner from circulating through it, and protects you from the heat of the pan. One more example is animal fur. This is an insulator because the fur traps the warm air close to the body and keeps the animal warm when it is cold outside. Even though you can't see the insulation it is still inside the walls. If you have ever seen the part in between the inside wall and the outside wall of a house there is a layer of insulation which is make up of fiberglass. Which even though it doesn't sound like it is a very good insulator and this keeps your house warm in the Winter.

Source 1:DKfindout

Source 2: thinkinsulation.com

The Radiators



Detailed Description

For this project the materials the team used were one corrugated section, three two inch pieces of duct tape, two pieces of 4x4 inches of fabric, two white paper towels, and one pair of scissors. These materials reduced radiation by not letting out any steam coming from the warm water. The materials reduced convection by having a box around the beaker therefor not letting out any steam when the warm water rises and the cold water sinks. These materials reduced conduction by not letting the warmth escape from the beaker. When building the insulator the team started by making sure the beaker fit the dimensions that the team was going to make the box, the beaker fit so the team drew the dimensions on the box. The one of the team members cut out the box. Next the team folded the box and taped it. Then the team put the insulation inside the box. Then the team conducted the experiment.

Defense of Design

The team chose the design of this container because the team thought that it would help prevent radiation, conduction, and convection. The team thought that radiation would be reduced by having a box around the beaker not letting out any steam. Convection would be reduced by having paper towels around the beaker. Conduction would be reduced by having only insulation material around the beaker. All in all, the design was not very effective and the container lost 5°F.

The original temperature of the water in the cup was 53.8 °C. After the course of the 10 minutes, the water had dropped 5.0°C, with a finishing temperature of 48.8°C. The project had resulted in a change of temperature. Two failures from the project was that the box was so big that the temperature had gone down, and there was not enough insulation materials. A success from this project was that the temperature did not drop more than 5 degrees. In conclusion, the results from the team's design was that the temperature was originally 58.8 °C and dropped 5.0°C, resulting in the final temperature being 48.8°C.

The team would make many changes in the future to the design. Some of the changes the team would make would be to use the rest of the cardboard to insulate the rest of the box instead of having open space. This would prevent conduction because the material is thick so heat could not circulate throughout the box. Also, the team would change the size of the box. This would change the amount of convection occurring by not letting steam come off the top of the beaker when the cold water sinks. This also would also reduce the amount of radiation occurring because of the steam coming off. Since there is a tight space there is no where for the steam to go. Another change the team would make is to make sure that the box has no holes and if it did have holes, make sure that they were covered up. In conclusion the if the team ever redid this experiment the group would cover the holes up, make a smaller box, and use the rest of the cardboard to fill the box up.

Team Name: Radiaters

Period: 7

In each bubble, brainstorm solutions to create an insulated container.

Small opening, door, holds a 250mL beaker, uses supplies provided, follows budget, and allows the smallest amount of heat loss

Insulated Container Web

1
Corrugated Section 15
DuckTape .2 4
Fabric .2 10
White Paper towl 2
Scissors
$33

2
Poaster board 10
Masking Tape 2
Brown paper towl 1
Bubble wrap 5
$18

3
Card board 15
Glue 4
Styrafoam 10
News paper 2
$31

4
Poaster Board 10
Fabric 5
Scissors 0
Duck Tape 2
White PT 2
Brown PT 1
$20

5
Poaster Board 10
Brown PT 1
Masking Tape 2
Bubble Wrap 5
White PT 2
$20

Team Name: Radiators

Decision Matrix

Directions: List your ideas and rank them with the following criteria. 1 is the best ranking and 10 is the lowest. Whichever idea has the lowest score as a total is the idea your team should continue on with.

Design Idea	Container can hold a 250mL beaker	Quality of Insulation Material	Cost Effective	Has openings to insert beaker and probe	Simple/Effective Procedure	Time Efficient (Easy to produce/use)	Total Score
1	1	2	6 1/2	1	1	3	14 1/2
2	1	10	1	1	1	1	15
3	1	4	6 1/2	1	1	1	14 1/2
4	1	2	4	1	1	1	10
5	1	5	2	1	1	1	11

Decision Made: Design #1

Does everyone agree this is the best idea? Yes

Teacher Signature:

Group Name: The Radiators

Project Proposal Sheet: Insane Insulators

Directions: Fill this out with your group after completing the decision matrix in preparation for your consultation with me about your final design. Your group will meet with me separately and explain this form.

1. What materials are you using? Write out each item the number of each you want and the total cost for your items. * You don't need to fill in all rows.

Material	How many do you want?	Cost of each item?	Total Cost for item
Corrugated Section	1	$15	$15
Duct Tape	3	$2	$6
Fabric	2	$5	$10
White PT	2	$2	$4
Scissors	1	$0	$0
		Total Cost	$35

2. Is the project cost effective? Yes it's under the limit

3. Why do you think this is the best design? Write 2-3 sentences justifying your purchases.

This design has the most amount of insulation. Also, the materials are thiceker which helps the object stay together.

4. In what way is this design innovative?

Yes, because we made the idea on our own

Teacher comments/ suggestions for improvement

Team Name: The Radiators

Insane Insulators: Observation Log

Simulation Instructions:

1. Obtain your teams insulated container, a 250mL beaker, a laptop, a portion of newspaper, and a probe.

2. Have one team member log into the laptop and open the Logger Pro software. Open the file titled "A Hot Hand". Mrs. Hagans will guide you on how to set the program.

3. Lay the newspaper out on the desk. Place your insulated container on top of the newspaper. Mrs. Hagans will bring the hot water to your beaker.

4. Once your beaker is filled, carefully and slowly place it inside of your container.

5. Seal your container and then insert the probe. Record that starting temperature of the water.

6. Select "Collect Data" and allow the program to collect for 10 minutes.

7. At the end of the collection, record the final temperature. Complete the table below.

8. Mrs. Hagans will guide you on how to export your graph that has been created by Logger Pro. Print the graph.

9. Complete the conclusion questions. Staple all group members and the line graph paper(s) together. Turn into the classroom tray.

Temperature of Water (Before)	Temperature of Water (After)	Change in Temperature (Before - After)	Did the container have a change in temp (Circle Yes or No)
53.8 °C	48.8 °C	5.0 °C	YES NO

Final Cost of Insulated Container: $

$35

4 13
~~53~~.8
48.8
5.0

Conclusion Questions

1. Recall the constraints required for this project when designing your insulated container?

$35 constraints, insulate the best over 10 minutes, small opening for probe, be able to fit a 250mL container, a door/opening for beaker, materials provided by Mrs. Hogans, and 2 weeks to complete project.

2. Explain how your choice of using (insert materials selected depending on group's design) affected the overall results of your experiment?

Since our box was so big temperature went down, and we didn't have enough insulation material.

3. What conclusions can you draw about the effectiveness of your container design and the constraints provided now that you have completed the experiment?

We could've put the cloth over the opening and then shut the lid to the box.

4. If your group had a change in the temperature at the end of the simulation, explain what you believe happened. If your group did not have a change in the temperature at the end of the simulation, explain what you believe happened.

The cloth fell off the cup, which let the cup get Colder.

5. Provide and explain what you feel is the biggest success of your container and this project thus far.

Our box Stayed together.

Science and Literacy
Part III: Evaluate and Improve Design
March 24, 2016

Welcome	8:00-8:15
Calibration	8:15-9:00
Scoring Student work *(Take a 10 minute break sometime within this time frame)*	9:00-11:00
Sharing identified strengths and challenges	11:00-11:30
Evaluation via PAST Foundation	11:30-12:00
Lunch	12:00-12:30
Curating a collection of mini-tasks based on needs	12:30-2:15
Capturing changes and publishing your module	2:15-3:00
Next steps and closing	3:00-3:15

Rural LDC Science Teacher's Scored "Design Reports" Module 2

Module Title: See the Light Module Author: Mrs. Colosimo Team reviewing student work: Rogers, Michalak, Conley

LDC Rubric Elements		Controlling Idea	Development/ Explanation	NGSS Practice: Define the Problem	NGSS Practice: Plan the Design	NGSS Practice: Design Solutions	Content Understanding
Student Paper Descriptor	Score	3	2.5	2	2	2	2
	Notes/ Feedback	restated the teaching task.	background, but did not explain how to use materials	problem was not clearly stated in teaching task. Possible/impossible.	recipe followed? unclear in explanation	1 design, no redesign, no data included	minimal listing of content. minimal understanding at best

Module Title: Falcon River Project Module Author: Mr. Williams Team reviewing student work: Rogers, Conley, Michalak

LDC Rubric Elements		Controlling Idea	Development/ Explanation	NGSS Practice: Define the Problem	NGSS Practice: Plan the Design	NGSS Practice: Design Solutions	Content Understanding
Student Paper Descriptor	Score	3	3.5	3	4	3.5	3.5
	Notes/ Feedback	claim reflected goals of RFP	impressive. nice flow. make good connections	met found needs and explains designs	Great work!	Good use of relevant research data.	strong understanding of content

Module Title: The Beetle Juice Module Author: Mr. Burt Team reviewing student work: Rogers, Conley, Michalak

LDC Rubric Elements		Controlling Idea	Development/ Explanation	NGSS Practice: Define the Problem	NGSS Practice: Plan the Design	NGSS Practice: Design Solutions	Content Understanding
Student Paper Descriptor	Score	1.5	~~2~~ 1.5	2	1	Ø	1
	Notes/ Feedback	general, unfocused claim.	plaganized not developed enough. Include density.	missing criteria and constraints	no attempt to complete the task	incomplete	no clear depth of know.

Rural LDC Science Teacher's Scored "Design Reports" Module 2

RURAL LITERACY DESIGN COLLABORATIVE

Module Title: WATER WHEEL Module Author: JOHNSON, DUBOIS, ONEY Team reviewing student work: KELLY, ANGELA, & MIKE

LDC Rubric Elements		Controlling Idea	Development/ Explanation	NGSS Practice: Define the Problem	NGSS Practice: Plan the Design	NGSS Practice: Design Solutions	Content Understanding
Student Paper Descriptor	Score	2.5	2.5	1.5	1.5	2.0	3
	Notes/ Feedback	COST / BUDGET? WHAT IS EFFICIENT?	SOME REFERENCES BUT UNCLEAR.	PARTIALLY MATCHES INTENT OF PROBLEM	MISSING ONE OR MORE IMPORTANT ASPECTS	COULDN'T REPLICATE BASED ON DESCRIPTION	UNDERSTAND PROBLEM

Module Title: BALTIC BUILDING Module Author: ______ Team reviewing student work: ______

LDC Rubric Elements		Controlling Idea	Development/ Explanation	NGSS Practice: Define the Problem	NGSS Practice: Plan the Design	NGSS Practice: Design Solutions	Content Understanding
Student Paper Descriptor	Score	3	1	1	1.5	2.5	2.0
	Notes/ Feedback	TASK MET	EXPLAIN SCIENTIFIC TERM. FROM RFP.	PARTIALLY MATCHES INTENT	INTENT UNCLEAR	MINIMAL EVIDENCE & DATA NEED SUPPORT	LACK DESCRIPTION OF UNDERSTANDING

Module Title: ANAEROBIC BIODIGESTER Module Author: ______ Team reviewing student work: ______

LDC Rubric Elements		Controlling Idea	Development/ Explanation	NGSS Practice: Define the Problem	NGSS Practice: Plan the Design	NGSS Practice: Design Solutions	Content Understanding
Student Paper Descriptor	Score	3.0	2.0	3.0	2.5	3.0	3.0
	Notes/ Feedback	CLEAR IDEAS THROUGH OUT	SOURCES PRESENT BUT WHERE USED?	ADVISE SPECIFIC CONSTRAINTS	SPECIFICS IN EVIDENCE	REDESIGN EVIDENT	UNDERSTOOD PROBLEM

Background including APA formatted footnotes

GRADES	DISCIPLINE	COURSE	PACING
6 - 12	Science	Any	25min

SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
PLANNING THE WRITING: Ability to develop a line of thought and text structure appropriate to an argumentation task.	**BACKGROUND INCLUDING APA FORMATTED FOOTNOTES** Students will develop the background portion of the Design Report on a google doc using the footnote feature for citations.	3-6 sources each being used 3 times in the paper. The number of sources could vary based on the age group. Each sentence that is not written with the students OWN knowledge should be cited.	1. Share google doc article "What's a Fart?" and summary example with students 2. Read the article "What's a Fart?" 3. Read the summary example and highlight the sentences that came from the article. 4. Instruct students on how to insert a footnote into google docs. (Click insert footnote after the period after the sentence that needs to be cited. Enter APA citation into the footnote.) 5. Have students insert a footnote on their paragraph where appropriate. 6. Check answers using student example of attached teacher answer key.

Standards:

RST.11-12.1 : Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

RST.11-12.7 : Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Additional Attachments:

Kid's Health- What's a Fart?
Whats a fart.docx
Example Summary Example
What's a Fart Example Summary.docx
Example Summary Teacher Key

by Amanda M. Michalak

RURAL LITERACY DESIGN COLLABORATIVE

Rural Literacy Design Collaborative (LDC) - Cohort 2

Days 1 & 2: Wednesdays, May 10 & 17, 2017, 8 - 3:30 p.m.

New Hope Church: 637 N Market St, Loudonville, OH 44842

Sponsored by: Loudonville-Perrysville Exempted Schools

Partners: *HSTW* NE Ohio Region, Battelle Education, PAST Foundation

Preparation	● Identify 2-3 science standards and 2-3 reading/writing standards that will anchor your LDC Science Module - backward design ● Identify lessons including targeted standards to embed in a LDC Science Module that will be taught for approximately 2 weeks during the first grading period. During this module, students will: work in a team, respond to a real-world problem, read texts for background understanding, design a testable experiment, collect data and evidence, and write a *Student Team Design Report* that includes defending their design ● Bring your laptop
Day 1 **Today's Outcomes** **Tuesday** **May 11**	Construct a well designed *Good to Go* - LDC Science Teaching Task ● Embed literacy standards/practices in the science classroom ● Determine grade level/partners for constructing and implementing a LDC Science Module

Day 2
Today's
Outcomes
Wednesday
May 17
	● Creating LDC Science Module Components:
	  ● *Work in Progress* RFP with Design Report
	  ● *Work in Progress* Instructional Ladder with Skills and Mini-Tasks
	● Complete an Individual Teacher Timeline, Task and Deliverables with Requested Resources

Rural Literacy Design Collaborative (LDC) - Cohort 2

Days 1 & 2: Wednesdays, May 10 & 17, 2017, 8 - 3:30 p.m.

New Hope Church: 637 N Market St, Loudonville, OH 44842

Sponsored by: Loudonville-Perrysville Exempted Schools

Partners: *HSTW* NE Ohio Region, Battelle Education, PAST Foundation

Day 1	**Working AGENDA: Wednesday, May 10**
7:30 a.m.	Registration/Refreshments/Sign-in
8:00 – 8:15.	Welcome/Introductions and Teacher Expectations- Google Drive for managing the work (Connections – Roster for participants) Why are we here? (CP)
8:15 – 9:00	Earthworm Explosion –(Hook Mini-Task – KWL Observations Sheet) – Problem Statement for a Teaching Task 15 min Group Talk; 20 minute to debrief; standards and essential question/problem statement; 2 Mini-Task
9:00 – 10:00	Starting with Standards (Science, Literacy & Other) and Lesson Plans & Teaching – Catherine (3 content standards plus 2 – 3 reading/writing) – Skills Checklist
10:00 – 10:15	Break
10:15 – 10:45	Debrief in Small Groups (7 groups of 5 teachers and 1 facilitator)
10:45 – 11:45	Share Teaching Task – Kori (MS) Jim (HS) 1) Reading/Research 2) Testable Experiment 3) Writing (RFP/Design Report)
11:45 – 12:30	Lunch
12:30 – 1:00	Connection Activity
1:00 – 2:00	Constructing a Teaching Task
2:00 – 3:15	Peer Review (formative) a Teaching Task – Large /Small Group & Debrief (Gallery Walk)
3:15 – 3:30	Wrap- Up and Exit Slip Deliverables before you leave today: *Good to Go* Teaching Task Partner (s) for LDC Science Module 1
3:30 p.m.	Adjourn
3:30 – 4:00	Facilitator Debrief

RURAL LITERACY DESIGN COLLABORATIVE

Rural Literacy Design Collaborative (LDC) - Cohort 2

Days 1 & 2: Wednesdays, May 10 & 17, 2017, 8 - 3:30 p.m.

New Hope Church: 637 N Market St, Loudonville, OH 44842

Sponsored by: Loudonville-Perrysville Exempted Schools

Partners: *HSTW* NE Ohio Region, Battelle Education, PAST Foundation

Day 2	**AGENDA: Wednesday, May 17**
7:30 a.m.	Registration/Refreshments/Sign-in
8:00 – 8:30	Slang Mini-Task – Kori (Shows the LDC Rubric and student rubric) – Exemplar Student Work and had to score with student rubric
8:30 – 9:00	Rubrics and Design (The Design Cycle Language?) – Kara (HSTW) 2) LDC Student Work Rubric- design report 3) Teacher Feedback Rubric (HSTW Coaching Report)-Wow and Wonder, self-eval (WIP, GTG or Exemplar)
9:00 – 10:00	Construct RFP/Design Report (Introduce the assignment, time to work with a blank template) - HSTW
10:00 – 10:15	Break
10:15 – 11:00	Score RFP/Design Report (Feedback with Teacher Feedback Rubric) – Peer Review Mini-Tasks - HSTW
11:00 – 11:30	PAST Foundation Cohort 2 Survey
11:30 – 12:15	Lunch
12:15 – 1:00	Instruction Ladder/Plan the Work (Mini-Task – Task/Timeline) – (When does the pre-instruction stop and LDC Module begin – Must be clear)
1:00 – 1:30	Revise RFP/Design Report - HSTW
1:30 – 3:15	Meet in Grade Level Teams with a Coach to Plan the Work/ (i.e. timeline, tasks, RFP/Design Report, Instructional Ladder) Each teacher/team share their plan
	LDC Core Tools to showcase the Mini-Task, Library and Tool
3:15 – 3:30	<u>Wrap – Up LDC Teaching Teams Planning Time</u>: Deliverables before you leave today: 1) *Good to Go* Teaching Task, 2) *Work in Progress – RFP/Design Report* 3) *Work in Progress – Individual Plan with Timeline, Tasks & Deliverables & Resources Needed*
3:30 p.m.	Adjourn

3:30 – 4:00	Facilitator Debrief

CHECKLIST FOR NATIONAL SUBMISSION

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fx Addressed -- but I used a 9-10 standard consistent w/ grade level and chose one that matches the demands of designing and using the void detection protocol

CHECKLIST FOR NATIONAL SUBMISSION

Instructions: Use this common pitfalls and issues checklist to make changes to your LDC Design Module for national submission. When a change has been made, mark the cell yellow. If you are stuck with a change - mark it red. Your coach will be by to review changes and support you. Once they have a reviewed an area the coach will change it to green.

Module Title:	Veneers and Voids	Submitted.	
Module Author:	Clayton		**Question**
Coach support:	Peter		**Addressed**
Checklist created by:	Peter		**Coach approved**
Common issue/pitfall			**Status**
Section 1: Teaching Task			**Status**
A) Task Not Standards - Driven	**Is the task missing a balanced cluster of 2–4 focus standards addressing reading, writing, and content? Or is the task prompt misaligned to the demands of the identified focus standards?**		
Issue: Need to add a Reading focus standard	Notes:	Needs to include at least one reading focus standard: I recommend the following : CCSS.ELA-LITERACY.RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.	Addressed – but I used a 9-10 standard consistent w/ grade level and chose one that matches the demands of designing and using the void detection protocol
Issue: Need to add a Writing focus standard	Notes:	Needs to include at least one writing focus standard: we recommend the following: CCSS.ELA-LITERACY.WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	Addresses – as above
B) Flawed question	**Does the task prompt include an optional question that is overly broad—like an "essential" question—that students will not directly answer in their final product? Does the optional question in any way contradict or confuse the purpose of the rest of the prompt?**		
Issue: Outside template context provided in task	Notes:	While LDC will likely balk at the two introductory sentences during jurying, I will defer to the author.	Addressed – shortened to one sentence specifically linked to the provider of the RFP
C) Problematic Text/s	**Are the selected texts either too lengthy or too many in number, too short or too few in number, or otherwise not appropriate given the grade-level, discipline, and/or purpose of the task?**		**Coach approved**
Issue:	Notes:		
	Do the texts "answer"the prompt and students need only summarize, paraphrase, or otherwise reproduce		

Clayton | Jacki/Kelly | Julie H. | Joe | Kelly | Kendra | Amanda | Trevor

CHECKLIST FOR NATIONAL SUBMISSION

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fx Is the Instructional Ladder missing skills or learning experiences devoted to supporting the specific demands of the task's writing product?

CHECKLIST FOR NATIONAL SUBMISSION

Instructions: Use this common pitfalls and issues checklist to make changes to your LDC Design Module for national submission. When a change has been made, mark the cell yellow. If you are stuck with a change - mark it red. Your coach will be by to review changes and support you. Once they have a reviewed an area the coach will change it to green.

Module Title:	Insane Insulators	Submitted	
Module Author:	Julie Hagans		Question
Coach support:	Diana Rogers and Barb Ni		Addressed
Checklist created by:	Kelly Gaier Evans		Coach approved
Common issue/pitfall			**Status**
J) Instructional Ladder Not Customized to Address the Demands of the Writing Product		**Is the Instructional Ladder missing skills or learning experiences devoted to supporting the specific demands of the task's writing product?**	
Skill: Brainstorming Possible Solutions	Notes:	Looking at your writing standard (WHST.6-8.7) - I wonder if you might support students on drawing on several sources by slighly modifying the "Brainstorming possible solutions" mini-task. I like the brainstorm web a lot. Could you align it more by having students bring in data from all of their sources, the RFP, the research, etc . You might also further align this mini-task with the focus reading standard by adding some language within each bubble to require students to add a reason to each part of their solution idea: ---- fact and/or reason: ---- and then provide an example which does that: solution: small opening; reason: RFP requires a place for thermometer, research on thermal energy says large openings.... OR provide modeling within your instructional strategies.	Coach approved
K) Instructional Ladder Does Not Specify Opportunity for Students to Read Text Independently		**Does the Instructional Ladder fail to specify when and how students will read the text(s) independently?**	
Skill: Researching a design Problem (Dialectical Journal)	Notes:	The Dialectical Journal is not completely aligned to the skill. The skill reads "RESEARCHING A DESIGN PROBLEM: Ability to understand the existing bodies of knowledge related to a problem." While you are having them answer questions about the existing bodies of knowledge, you are not having them relate it to the problem. I wonder if you could address this and the reading standard (RST6-8.8), by asking students one more question. Ask them to create some reasoned judgements - how do these facts on (radiation, convection,etc) relate to the problem (insulate a container to reduce thermal energy transfer). How might these facts influence your design? Mini task was not necessry and therefore was deleted.	Coach approved
		One challenge in the "background research notesheet" mini-task is that it is a second mini-task aligned to the prior skill - researching a design solution. The researching other design solutions it hit upon in both research mini-tasks only through the "Current insulation methods" Work on the alignment there. Battelle re-worked this skill language moving forward and included it all in the way we defined "Researching a Design Problem." We re-wrote it to say:	

Clayton | Jacki/Kelly | Julie H. | Joe | Kelly | Kendra | Amanda | Trevor

Battelle Education
Rural LDC and Science
Preparing for national review
June 6, 2017

Sign in	8:45-9:00
Welcome and overview of new tools (skills list, RFP template)	9:00-9:30
Expectations	9:30- 9:45
Workshopping your design module	9:45-11:30
Lunch	11:30-12:00
Tour (hosted by: Nola Bliss - research associate; Carrie Howland - research scientist; and David Chase)	12:00-12:45
Workshopping your design module. Instructions on final touches and submission	12:45-2:50
Closing	2:50-3:00

Tools/Resources -

1. 1 page overview of LDC mini-task
2. Common pitfalls checklist
3. Individual module printed.
4. New RFP template**
5. Battelle LDC Design Module skills list (Version 2.0)**

   **NOTE: These are also available in the Battelle Science and Literacy Collection 2.0 (Spring 2017) Collection on CoreTools- http://tinyurl.com/yannvl7c

Peer Review Feedback from April 2017 review

Reviewers: Kelly and Claire

Module: Insane Insulators

Teaching task: Clarity and Coherence

Scoring Guide: **Teaching Task** | Instructional Ladder (For: 04/14/2017 09:43am | Kelly M. Gaier Evans and Claire Hampel) Close

Viewing: **TASK CLARITY & COHERENCE** | CONTENT | TEXT(S) | WRITING PRODUCT | HOLISTIC RATING

Guiding Question

Work in Progress	Good to Go ✔ Selected	Exemplary
• Template type uses a writing mode that does not match the intended purpose of the prompt. • Task purpose is overly broad or narrow. ✔ Prompt wording is unclear. • Prompt wording, student background, or overview of the task biases students toward a particular response. • Task is answerable without using the texts or instructional scaffolding in module. • Background statement may not frame task for students	✔ Template task uses a writing mode that matches the intended purpose of the prompt. ✔ Task purpose is focused. • Prompt wording is clear. ✔ Prompt wording is unbiased, leaving room for diverse responses. • Prompt wording, content, texts, and writing product are aligned to task purpose (a "good fit"). • Task is text dependent, requiring students to go beyond prior knowledge to use evidence from the texts in their responses. ✔ Background statement frames task for students.	• Task is worded precisely to give students a clear and focused purpose for writing and unambiguous directions. • Prompt, texts, content, and writing product are tightly aligned (are close to a "perfect fit") to task purpose. ✔ Task provides a pattern that can be used as a model to create other teaching tasks in the discipline.

COMMENTS FOR TASK CLARITY & COHERENCE:

When you read the task it is slightly unclear. Are students being asked to create a "product to insulate a container" or an "Insulated container" The optional question in the template task says "product to insulate a container" and later in the template it says testing "your insulated container." I would suggest using consistent language to make it very clear to students. What about?

How can one create an effective and efficient insulated container for hot liquids to reduce thermal energy transfer? After reading (add: the) RFP, conducting background research on convection, conduction, radiation, how containers are insulated, and designing and testing your insulated container, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and notes to help convey your message to your readers. Identify any gaps or unanswered questions. Connect background research and the requirements from the RFP in your response.

Once you edit teaching task on module be sure to go back and edit on the RFP as well.

Cannot completely assess texts and alignment with text without having access to the text (currently in google drive folder i do not have access to). Could you make the background research informational texts a pdf (or word doc like the pdf) so that other teachers can access it, once shared publicly? If texts are aligned and a good fit with the content and product, then I would mark this as a Good to Go until the language in the teaching task is clarified.

Teaching task: Content

Viewing: TASK CLARITY & COHERENCE | **CONTENT** | TEXT(S) | WRITING PRODUCT | HOLISTIC RATING

Guiding Question

Work in Progress	Good to Go ✔ Selected	Exemplary
• Has a weak connection to content central to the discipline. • Oversimplifies a topic, OR does not require students to engage in analytic reading and thinking skills. • Includes content or skill standards that are not relevant the task.	• Addresses content central to the discipline and grade level CCSS reading standards, requiring students to build strong content knowledge. ✔ Engages students in a range of analytic reading and thinking skills.	✔ Addresses big ideas or enduring understandings central to the discipline. • Engages students in complex, higher-order thinking skills specific to the discipline.

COMMENTS FOR CONTENT:

Exemplar once you add in the reading focus standard and content focus standard.
Needs to include at least one reading focus standard: we recommend the following :
RST.6-8.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. OR RST 6-8.2 (central ideas) based on your student needs.
Additional reading standards are scaffolded in the instructional ladder, but you should have at least one listed as a focus for the module.

Need to modify the content standard: PHYSICAL SCIENCE (PS) Topic: Conservation of Mass and Energy: Energy can be transferred through a variety of ways: Thermal energy can be transferred through radiation, convection and conduction. (and other standards as applicable on how energy transfers)

Teaching task: Texts

Viewing: TASK CLARITY & COHERENCE | CONTENT | **TEXT(S)** | WRITING PRODUCT | HOLISTIC RATING

Guiding Question

Work in Progress ✔ Selected	Good to Go	Exemplary
• Are loosely aligned or misaligned to the purpose of the task. • Bias students toward a particular response. • Are too difficult or too easy for the range of student ability. • Include so many texts or allow so much student choice that it will be difficult to support reading closely and provide appropriate instruction.	• Are useful for providing content and evidence to be used in addressing the task. • Do not bias students toward a particular response. • Are accessible to most target students and appropriately complex, requiring them to apply grade level CCSS reading skills to comprehend and analyze content.	• Are engaging, tightly relevant (indispensable), and authentic. • Are tightly aligned to the task purpose. • Represent central modes of discourse in the discipline. • Are carefully selected, excerpted, or modified to provide texts with varied complexity (using either quantitative or qualitative measures) appropriate to students' reading ability.

COMMENTS FOR TEXT(S):

Not scored, need access to texts.

Teaching task: Writing Product

Viewing: TASK CLARITY & COHERENCE | CONTENT | TEXT(S) | **WRITING PRODUCT** | HOLISTIC RATING

Guiding Question

Work in Progress	Good to Go ✔ Selected	Exemplary
• Is inappropriate to the discipline, content, or challenge of the task. • Is too difficult or too easy for the range of student ability.	✔ Is appropriate for the discipline and content, and coherent with the purpose of the task. ✔ Is accessible to all students and intellectually challenging, requiring them to apply CCSS writing skills to demonstrate their content understanding and CCSS reading skills.	✔ Authentically engages students in rhetorical modes and types of writing central to the discipline.

COMMENTS FOR WRITING PRODUCT:

Exemplar once you add in the focus writing standard.
Needs to include at least one writing focus standard: we recommend the following:
WHST.6-8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
Additional writing standards are scaffolded in the instructional ladder, but this is what we would recommend as the focus for the design module.

Teaching task: Holistic

Viewing: TASK CLARITY & COHERENCE | CONTENT | TEXT(S) | WRITING PRODUCT | **HOLISTIC RATING**

Work in Progress ✔ Selected	Good to Go	Exemplary
✔ Needs revision for reasons listed below.	• The teaching task creates academic contexts for applying grade level CCSS reading and writing standards, and engages students in reading texts closely, as well as writing that is text-based and appropriate for the discipline, purpose, and/or audience. Teaching task is text-dependent and has a clear, focused, and coherent purpose overall. Task prompt, texts, and writing product are aligned to the content and purpose of the teaching task. Teaching task addresses content central to the discipline; engages students in applying a range of analytic reading and thinking skills; and employs useful text(s) that are appropriate for most students at the target grade level.	• The teaching task creates academic contexts for applying grade level CCSS reading and writing standards, and engages students in reading texts closely, as well as writing that is text-based, appropriate, and authentic for the discipline, purpose, and/or audience. Teaching task is text-dependent and has a clear, focused, and coherent purpose and precise elements overall. Task prompt, texts, and writing product are tightly aligned to content and to the purpose of the teaching task. Teaching task addresses content and big ideas central to the discipline; engages students in applying higher order thinking skills specific to the discipline; and employs carefully selected or customized, relevant text(s) of varying complexity suited to the range of students in the target grade level. Focus of teaching task is central to the discipline or course and has broad applicability.

COMMENTS FOR HOLISTIC RATING:

Looks great but there are a few key pieces that need to be completed.
Need to add in the reading and writing focus standards and make the texts public for others to access. Also, look at the notes on teaching task clarity.
General comments: Overview and Teacher reflection section need to be completed. We will discuss this at the June 6, 2017 session. The overview is a brief explanation of the context the module will be taught as well as other helpful background information. See Squirmy Science for an example of an overview: https://coretools.ldc.org/mods/5a33b69e-a7e1-445f-b64a-0cc5b46c87d2. In terms of the reflection, here are some question prompts you might consider: Did students perform better or worse than you expected? Were there parts of the rubric that all students seemed to do well on? Were there parts of the rubric that all students struggled with? What modifications have you made to the instruction based on student results?

< Previous

Instructional Ladder: Skills

Viewing: **WHAT SKILLS?** | WHAT INSTRUCTION? | WHAT RESULTS? | HOLISTIC RATING

Guiding Question

Work in Progress	Good to Go	Exemplary ✔ Selected
• Skills list misses one or more significant demands of the task. • Skills are not clustered and sequenced to support the teaching task. • Skills list reflects the default skills list and includes skills that are not relevant to the teaching task.	✔ Skills list is relevant to teaching task, (including the task prompt, content, discipline, text(s), and writing product). ✔ Skills are clustered and sequenced to support the teaching task. ✔ Skills list includes grade-level appropriate reading, writing, and thinking skills.	✔ Skills list is precise and tightly aligned to the task and the demands of the texts. ✔ Skills are clustered and sequenced to support access to the texts and completion of the teaching task product.

COMMENTS FOR WHAT SKILLS?:

Skills list looks comprehensive.

Instructional Ladder: Instruction

Viewing: WHAT SKILLS? | **WHAT INSTRUCTION?** | WHAT RESULTS? | HOLISTIC RATING

Guiding Question

Work in Progress	Good to Go ✔ Selected	Exemplary
✔ Some mini-tasks (product, prompt, and scoring guide) do not relate to skills list. • Mini-tasks rely on general strategies that provide weak support for the skills, texts, and teaching task OR provide too much support, removing any challenge for students. • Instructional strategies are loosely connected to mini-tasks and completion of the teaching task. • Pacing is not realistic. • Materials, references, and supports used in instruction are not available to other teachers. • Module does not present adequate opportunity to teach writing in response to reading.	• Mini-tasks (product, prompt, and scoring guide) relate to skills list. ✔ Mini-tasks support the teaching task (including the prompt, content, discipline, text(s), and writing product). ✔ Instructional strategies support the mini-tasks and completion of the teaching task, (and are aligned to prompt, content, discipline, text(s), and writing product). • Mini-tasks and instructional strategies provide opportunities for students to learn specified grade level CCSS reading, writing, and thinking skills. ✔ Pacing is realistic. ✔ Materials, references, and instructional strategies are included, linked, or cited in enough detail to allow other teachers to obtain them.	• Mini-tasks and instructional strategies are coherent, tightly aligned to the skills, and well designed to support student success on the teaching task. • Mini-tasks and instructional strategies explicitly build student capacity to apply discipline-specific literacy skills to complex texts. • Mini-tasks and instructional strategies explicitly build student capacity to produce clear and coherent writing appropriate to discipline, task, purpose, and audience. • Mini-tasks are well placed to provide formative feedback and give evidence about student progress. • Materials, references, and instructional strategies are high quality, customized to the purpose of the teaching task, and described in enough detail for another teacher to use them. • Scoring guides for mini-tasks include clear criteria aligned to the skill being taught. • Texts, mini-tasks, or instructional strategies are differentiated for diverse learners.

COMMENTS FOR **WHAT INSTRUCTION?**:

The mini-task prompt provides directions to students specifying what they need to do to perform the mini-task. In many mini-tasks in this module, the prompt reads more like instructions to other teachers (which should go into the instructional strategies section). If you were to project your instructions for the mini-task product on the board for kids, what would it say? For example, in the mini-task: RFP 3-2-1 Exit Ticket, gauging from your instructional strategy and skill, your prompt might be something like: "After reading and analyzing the RFP, provide 3 pieces of information you know, 2 pieces of information you understand about what you are to create with this project from reading the RFP, and 1 question you have about this project based on the RFP." The instructional strategies section of the mini-task is the place to include detailed strategies the teacher will use to support students in developing skill and instructions other teachers would want to see. A little bit further down in your module, "Insane Insulator Requirement checklist" and "Affinity Map" provides good examples of a student facing prompt. Check all mini-tasks prompts to make sure they are student facing.

Task analysis is defined as the "Ability to understand and explain the task's prompt and rubric." But it does not look like you have kids look at the rubric at all here. Consider adding an additional mini-task here to have students see what success looks like using the rubric. If kids have already seen rubric, you might just mention that in your instructional strategies. You might talk to Kori about the student slang mini-task she used. Check all mini-tasks to ensure they are aligned to the skill.

In the scoring guide, be sure to provide criteria you are looking for to determine if students are successful. For example, in understanding the list of requirements, first mini-task, your criteria for success might be "students make connections in each part of the RFP to real-world applications." Maybe the product from this class conversation is a "charted list of real world connections" students made during the full class discussion. A second example, in "Affinity Map" the scoring guide says "This activity is a formative assessment and is not scored." Even though the mini-task will not be graded, think about what you are looking for. The scoring guide might say "Student questions meet expectations if they ask for clarification in areas of the RFP such as the design requirements or the scope of work." Check all mini-task scoring guides to ensure they are giving you feedback on whether or not students are successfully building defined skill. I suggest downloading the pdf version of your module and just scanning skill and scoring guide to see if it is able to give you information on whether student is developing that skill.

The Dialectical Journal is not completely aligned to the skill. The skill reads "RESEARCHING A DESIGN PROBLEM: Ability to understand the existing bodies of knowledge related to a problem." While you are having them answer questions about the existing bodies of knowledge, you are not having them relate it to the problem. I wonder if you could address this and the reading standard (RST6-8.8), by asking students one more question. Ask them to create some reasoned judgements - how do these facts on (radiation, convection,etc) relate to the problem (insulate a container to reduce thermal energy transfer). How might these facts influence your design?

The background research notesheet is an extension of the skill researching a design solution. The researching other design solutions it hit upon in both research mini-tasks only through the "Current insulation methods" Work on the alignment there. In both of these, think about what it is you as the teacher need to see in the student work to be successful rather than specific completion points. For example, in researching a design problem, I would look that students have "1) identified key facts and summarized existing bodies of knowledge and 2) have written clear reasoned judgements on how these facts can impact student design solutions."

Brainstorming possible solutions: I like the brainstorm web a lot. I wonder if you could structure it so it allows them to bring in data from all of their sources, the RFP, the research, etc (WHST.6-8.7). You might also further align this mini-task with the focus reading standard by adding some language within each bubble to require students to add a reason to each part of their solution idea: ----- fact and/or reason: ----- and then provide an example which does that: solution: small opening; reason: RFP requires a place for thermometer, research on thermal energy says large openings.... OR provide modeling within your instructional strategies.

Instructional Ladder: What Results

Viewing: WHAT SKILLS? | WHAT INSTRUCTION? | **WHAT RESULTS?** | HOLISTIC RATING

Guiding Question

Work in Progress	Good to Go ✔ Selected	Exemplary
• No student work samples are included.	✔ Student work samples are included.	• Student work samples representing different score levels are included, with scored rubrics.

COMMENTS FOR **WHAT RESULTS?**:

To move to exemplar, include scored student rubrics with student work.
Nice job including samples of student work throughout the entire module!

Instructional Ladder: Holistic

Viewing: WHAT SKILLS? | WHAT INSTRUCTION? | WHAT RESULTS? | HOLISTIC RATING

Work in Progress	Good to Go ✔ Selected	Exemplary
✔ Needs revision for reasons listed below	• Instructional ladder generally aligns to grade level CCSS standards and creates an opportunity to teach writing in response to reading. Instructional ladder is coherent and aligned to the teaching task. Instructional ladder supports the teaching task with a well-planned instructional sequence in which mini-tasks lead to the final product's completion. Instructional ladder provides sufficient detail so that others might use it. Student work samples may be included (but are not required to receive a holistic Good to Go score).	• Instructional ladder closely aligns to grade level CCSS standards and creates an opportunity to build discipline-specific literacy and thinking skills, and to teach writing in response to reading text(s) closely. Instructional ladder is highly coherent, tightly aligned and customized to an "Exemplary" or "Good to Go" teaching task, and appropriate in rigor to the course. Instructional ladder supports the teaching task with a well-planned and strategic instructional sequence in which mini-tasks lead to the final product's completion. Instructional ladder is detailed and polished with attention to the needs of a wide educator audience. Texts, mini-tasks, and/or instructional strategies may be differentiated for diverse learners. Students work samples representing different score levels are included, with scored rubrics.

COMMENTS FOR HOLISTIC RATING:

Overall, this looks really great Julie. Some instructional areas need work on making sure it is clearly aligned especially with scoring rubrics. See notes in What instruction.

Insane Insulators

by Julie M. Hagans

This module was designed to allow students the opportunity to produce a prototype that reduces thermal energy transfers. Ohio K-8 Science Standards were used for this module. This module follows the PHYSICAL SCIENCE (PS) strand with the Topic: Conservation of Mass and Energy: Energy can be transferred through a variety of ways: Thermal energy can be transferred through radiation, convection and conduction. (and other standards as applicable on how energy transfers). The specific standard addressed is Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns.

Students had learned about thermal energy transfers in ocean currents prior to the implementation of this module. At the conclusion of this module, students will be implementing thermal energy transfers in the atmosphere. This module builds upon how energy is transferred, as previously learned in Ohio science classrooms.

This module was taught in a Seventh Grade Science classroom in rural Ohio to 115 students. The purpose of this module was for students to research thermal energy transfers, create and test a prototype of an insulated container, and produce a Final Design Report using scientific writing practices. In the Final Report, students are incorporating background knowledge and data collected through prototype testing to analyze the success of their design. Students also revisit their design and develop future changes at the conclusion of the prototype testing.

GRADES	DISCIPLINE	COURSE	PACING
6 - 8	**Science**	**Seventh Grade Science**	**20hr**

Section 1: What Task?

Teaching Task

Task Template BETA A - Argumentation

How can one create an effective and efficient insulated container to reduce thermal energy transfer? After reading the RFP, conducting background research on convection, conduction, radiation, and current insulation options, and designing and testing your insulated container prototype, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and notes to help convey your message to your readers. Identify any gaps or unanswered questions. Connect your background research and the requirements from the RFP in your response.

Standards

Next Generation Science Standards

Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. **Focus**

Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly.

Apply scientific reasoning to link evidence to the claims to assess the extent to which the reasoning and data support the explanation or conclusion.

Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

Ohio's New Learning Standards: K-8 Science

Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns. **Focus**

Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects

RST.6-8.8 **Focus**

Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

WHST.6-8.7 **Focus**

Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Texts

- **Insane Insulators Background Research Resources.doc**
- **Insane Insulators Request for Proposal.doc**

Student Work Rubric - Argumentation Task - Grades 6-8

	Emerging	Approaches Expectations	Meets Expectations	Advanced
	1	2	3	4
Controlling Idea	Makes an unclear or unfocused claim.	Makes a **general** claim **that addresses the prompt**, with an **uneven focus**.	Establishes and maintains a clear claim that addresses all aspects of the prompt.	Establishes and maintains a clear, specific, and credible claim that addresses all aspects of the prompt.
Development / Explanation of Sources	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.	Explanation of ideas and source material is **minimal** or **contains minor errors**.	Accurately explains ideas and source material and how they support the argument.	Thoroughly and accurately explains ideas and source material, using reasoning to support and develop the argument.
Organization	Lacks an evident structure. Makes unclear connections among claim, reasons, and evidence.	**Groups ideas and uses some transitions** to connect ideas, with **some lapses in coherence or organization**.	Groups and sequences ideas to develop the controlling idea. Uses transitions to clarify the relationships among claim(s), reasons, and evidence.	Groups and sequences ideas logically to develop the controlling idea and create cohesion. Uses varied transitions to clarify the relationships among claim(s), reasons, and evidence.
Conventions	Major errors in standard English conventions interfere with the clarity of the writing. Language or tone is inappropriate.	**Errors** in standard English conventions **sometimes interfere** with the clarity of the writing. Uses language and tone that are sometimes inappropriate for the audience and purpose.	Consistently applies standard English conventions; minor errors, while noticeable, do not interfere with the clarity of the writing. Uses language and tone appropriate to the audience and purpose.	Consistently applies standard English conventions, with few errors. Demonstrates varied syntax and precise word choice. Consistently uses language and tone appropriate to the audience and purpose.
NGSS Practice: Define Problems	Defines a problem or design statement that is impractical or does not match the intent of the problem or constraints.	Defines a problem or design statement that generally matches the intent of the problem or constraints.	Defines a problem or design statement that completely matches the intent of the problem and constraints.	Defines a problem or design statement that completely matches the intent of the problem and constraints, and explains how the design solves the problem and addresses constraints.
NGSS Practice: Plan the Design	Proposes a design plan and explains the criteria, constraints, OR intent of the problem with major errors or omissions.	Proposes a design plan and explains the criteria, constraints, OR intent of the problem with minor errors or omissions.	Proposes a design plan and explains how the plan addresses the criteria, constraints, and intent of the problem.	Proposes a design plan with detailed explanation that thoroughly explains how the plan addresses the criteria, constraints, and intent of the problem.
NGSS Practice: Design Solutions	Uses no data to evaluate how well the design addresses the problem/constraints. The redesign of the original model or prototype is inappropriate or incomplete.	Uses relevant but limited amounts of data to evaluate how well the design addresses the problem/constraints and outlines an appropriate redesign of the original model or prototype.	Uses relevant and adequate amounts of data to evaluate how well the design addresses the problem/constraints and using the data explains an appropriate redesign of the original model or prototype.	Uses detailed and complete data to evaluate how well the design addresses the problem/constraints and provides a detailed rationale with supporting data for the appropriate redesign of the original model or prototype.
Content Understanding (Generic)	Attempts to include disciplinary content in explanation or argument but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.	Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.	Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.	Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding.

Background for Students

Steve Jobs. Mark Zuckerburg. Famous names due to their famous inventions. Have you ever wanted to be the one to fix a problem? Have your name known to the world for a product you have created? Maybe you are the type who wants to be known for making a difference. Here is your chance! Through this activity, you will be presented the problem of helping a company design a method of transport for a highly sensitive material, that must maintain it's temperature. You will work collaboratively with two other team members to develop a design for this company, following their constraints and budget, create a prototype of your invention, develop a full design report and compete with other teams to win the company over. Keep an open mind, take all ideas into consideration, and have fun!

Extension

Every year, hundreds of companies ask engineers to design and develop solutions for the problems they present. Not only to make prototypes of their solutions, but to defend why their particular design is the best. While this module only requires students to produce a prototype and final design report, and extension could have these students creating a presentation of their design and results. The students could present their findings to a board of teachers, or local professionals, to give them the experience and practice of "selling" their ideas in the real world. Their presentation should include a PowerPoint, handouts, their actual prototype, a time limit, speaking roles for each team member, and changes they would make to their product. Finally, students should be exposed to a Question and Answer session.

Section 2: What Skills?

Preparing for the Task

TASK ENGAGEMENT: Ability to connect the task and new content to existing knowledge, skills, experiences, interests, and concerns.

TASK ANALYSIS: Ability to understand and explain the task's prompt and rubric.

Request for Proposals (RFP) Analysis Process

UNDERSTANDING THE LIST OF REQUIREMENTS: Ability to read, understand, analyze, and interpret a list of design requirements to create a list of features of a design solution.

UNDERSTANDING THE STATEMENT OF WORK IN LIGHT OF THE TIMELINE: Ability to scale the scope of a project to fit the time available.

SEEKING CLARIFICATION ON RFP: Ability to identify gaps in understanding about design requirements or statement of work and communicate those gaps in understanding as questions that can be answered by an organization or individual that issued an RFP.

Concept Design Process (Creating Possible Solutions)

RESEARCHING OTHER DESIGN SOLUTIONS: Ability to find designs that have been previously developed by others and to glean useful information from the approaches they took.

BRAINSTORMING POSSIBLE SOLUTIONS: Ability to engage in a collaborative, creative process to brainstorm many possible solutions to an RFP.

ANALYZING POSSIBLE SOLUTIONS: Ability to engage in theoretical, technical analysis of brainstormed, possible solutions in order to identify pros/cons of each solution in reference to an RFP's list of requirements and scope.

Proposal Process

BIDDING THE PROJECT: Ability to identify all needed resources for proposed product/solution and to communicate those needs to an RFP-issuing institution.

SELLING YOUR SERVICES: Ability to communicate the capability of your team to complete your proposed solution: "why you should hire us."

SEEKING CONSTRUCTIVE FEEDBACK: Ability to solicit specific, constructive feedback on a design proposal in order to inform decisions and course for the rest of a design process.

Detailed Design Process

CLARIFYING SIZE, FORM, FUNCTION: Ability to clearly design a solution and articulate that solution: "it looks like this . . ."

TESTING CRITICAL DESIGN COMPONENTS: Ability to test critical subsystems for feasibility.

Design Report Writing Process

GENERATING GRAPHIC OF DESIGN: Ability to generate a graphical representation (photograph, drawing, CAD rendering, etc.) of the overall design solution in order to orient the reader to the components of the solution.

COMMUNICATING DETAILS OF DESIGN: Ability to communicate (with words and graphics) the details of a design solution and how it is built/executed.

DEFENDING DESIGN AS MEETING REQUIREMENTS: Ability to clearly articulate (using evidence) how the design solution meets the original design requirements

APPENDING TECHNICAL INFORMATION: Ability to organize and communicate all technical reports, data from sub-system test reports, specific experimental protocols, etc. into an easy-to-navigate appendix to be used by the reader as needed.

WRITING AN EXECUTIVE SUMMARY: Ability to write a brief, comprehensive, and accurate summary of an issue/need and designed solution to that need.

FINALIZING A TITLE PAGE: Ability to make a title page with appropriate identifying information.

MAKING TECHNICAL REVISIONS: Ability to proofread and format a final paper

PROVIDING PEER REVIEW FEEDBACK: Ability to provide meaningful feedback on a design report for a partner

Section 3: What Instruction?

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
Preparing for the Task				
30 mins	**TASK ENGAGEMENT**: Ability to connect the task and new content to existing knowledge, skills, experiences, interests, and concerns.	**3-2-1 EXIT TICKET OF INSULATION DEMONSTRATION** After reviewing the videos highlighting thermal energy transfers, you will be completing a 3-2-1 exit ticket. Exit ticket responses should include: 3: Briefly describe the three types of heat transfer. 2: Provide two current materials used for insulation. 1: One question you have over the project thus far.	Students will create an exit ticket is to be formatively assessed for understanding of heat transfers and the purpose of insulators. This ticket can help the teacher determine if the students are ready to be presented with the RFP or if further instruction in heat transfers and insulators is required. Exit ticket responses should include: 3: Briefly describe the three types of heat transfer. 2: Provide two current materials used for insulation. 1: One question you have over the project thus far.	1. Be sure to select school/age appropriate videos/photos and props that provide examples of insulation in correspondence with radiation, conduction, and convection. 2. Show the PowToon video, found on YouTube, that reviews convection, conduction, and radiation. At the conclusion of the video, take time to discuss with your students where they see these forms of heat transfer in their everyday lives. Be sure to highlight the pros and cons of heat transfer. Students will be shown a short, PowToon video, that reviews the basics of heat transfer. The video highlights convection, conduction, and radiation. https://www.youtube.com/watch?v=L3kJnInTu6w Students will be shown a variety of photos and videos containing what an insulator is and why it was invented. These videos can be found on YouTube. https://www.youtube.com/watch?v=IRT-Q_dTu4M https://www.youtube.com/watch?v=pyfM_fKSICE 3. Ask students, How can we reduce these forms of heat transfer? What have you already seen, maybe in your home or at school, that helps to reduce heat transfer? Continue with the discussion about what an insulator is, and why they exist. 4. Show the students examples of insulation (a thermos, a coat, spray foam) or the videos from YouTube. Sample links have been included above. 5. Discuss with students how insulation affects radiation, conduction, and convection. 6. Have students complete the 3-2-1 Exit Ticket over convection/conduction/radiation, as well as the purpose of insulation, and turn in prior to leaving class. Use this exit ticket as your way of seeing where the students are at with understanding heat transfers and the purpose of insulators. 3: Briefly describe the three types of heat transfer. 2: Provide two current materials used for insulation. 1: One question you have over the project thus far.
	Standards: Thermal-energy transfers in the ocean and the atmosphere contribute to the formation of currents, which influence global climate patterns.			

	Additional Attachments: **3-2-1 Exit Ticket.pdf**			
15 mins	**TASK ANALYSIS**: Ability to understand and explain the task's prompt and rubric.	**RFP 3-2-1 EXIT TICKET** After you are introduced to the company that needs you to invent and create a method of transporting your liquid product with the smallest amount of heat transfer possible in an insulated container, complete a 3-2-1 Exit Ticket. You should provide 3 pieces of information you know from reading the RFP, 2 pieces of information you understand about what you are to create with this project from reading the RFP, and 1 question you have based around this project after reading the RFP.	In order to be successful, student statements must relate to the task and include the terminology provided in the prompt. The students should provide 3 pieces of information they know from reading the RFP, 2 pieces of information they understand about what they are to create with this project from reading the RFP, and 1 question they have based around this project after reading the RFP.	1. Explain to the students that they have the opportunity to be an inventor. Introduce to the students that your company needs them to invent and create a method of transporting your liquid product with the smallest amount of heat transfer possible. 2. Hand the students the RFP. 3. Give the students 5-10 minutes to look through the RFP on their own. If students require assistance with reading, read each part of the RFP aloud, but do not elaborate on specific details. 4. After reading and analyzing the RFP, ask the students to provide 3 pieces of information you know, 2 pieces of information you understand about what you are to create with this project from reading the RFP, and 1 question you have based around this project after reading the RFP. 5. Direct students to log into Google Classroom. Students are to open the Google Form titled Insane Insulators RFP 3-2-1 Exit Ticket. Students will be working alone on completing this Exit Ticket and will then submit the ticket. You can also print this ticket off if you prefer.
	Standards: **SL.8.2** : Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.			
	Additional Attachments: **Insane Insulators Request for Proposal.doc** **Insane Insulators RFP 3-2-1 Exit Ticket Student Example.doc** **Insane Insulators RFP 3-2-1 Exit Ticket.doc**			
Request for Proposals (RFP) Analysis Process				
30 mins	**UNDERSTANDING THE LIST OF REQUIREMENTS**: Ability to read, understand, analyze, and interpret a list of design requirements to create a list of features of a design solution.	**REAL WORLD CONNECTIONS TO THE RFP & HIGHLIGHTING RFP KEYPOINTS** After completing a class led discussion by the teacher, you will continue to read through the entire RFP. You are encouraged to ask questions and engage in the importance of this assignment when compared to the real-world job force.	This mini-task is designed to be a class discussion. The teacher is encouraged to have students ask questions throughout to discover misconceptions and provide clarification. Discussion Points that show student mastery should include: Real World	1. Re-distribute the RFP to students. If the students have the RFP, have them take it out. I recommend having the RFP as a different color so students can find it quickly. 2. Go through each part of the RFP, step-by-step. Read the RFP aloud, or have students volunteer. Before moving to the next section, have the students ask questions so you can provide clarification. 3. Highlight key points and due dates. Attached in Teacher Resources is the checklist key for the next mini task. Refer to this checklist to help facilitate the direction of the class discussion, ensuring each item is addressed to the students. 4. Have students make connections in each part of

			Connections to the 21st century skill of collaboration Managing their budget Constraints Time frame Final report components. Highlighted material should include: Constraints Budget Materials Project Scope Project Timeline	the RFP to real-world applications. Explain to students that all of these components are skills needed in the 21st century work force. This is a great opportunity for students to learn the value of budgets, constraints, time frames, and teamwork. 4. Complete the next mini-task, the RFP Checklist think-pair-share.
	Standards: **RST.6-8.3** : Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.			
	Additional Attachments: **Insane Insulators Request for Proposal.doc** **Insane Insulators Checklist Teacher Key.doc**			
25 mins	**UNDERSTANDING THE LIST OF REQUIREMENTS**: Ability to read, understand, analyze, and interpret a list of design requirements to create a list of features of a design solution.	**INSANE INSULATOR REQUIREMENT CHECKLIST PEER REVIEW** After looking at Mrs. Hagan's RFP, create a checklist of all items required to create a successful insulated container to reduce radiation, conduction, and convection.	Mastery level student work will include a checklist including the following: 1. Conduct Background Research 2. Background Research Paper 3. Design an insulated container 4. Completed within a two week manner 5. Smallest margin of heat loss 6. Only uses the provided materials within the budget 7. Requires smallest amount of money 8. Decision Matrix 9. Project Proposal 10. Diagram of Final Design (Hand Drawn or Computer) 11. 3-D Design of Insulated	1. Have the students locate their RFP. 2. Provide handout disclosing the number of checklist items. 3. Allow student work time using think-pair-share model. Allow the students time to individually look through the RFP to complete the checklist on their own. Assign each person a partner. Have them go through the RFP again and re-evaluate their checklist. Have students come together as a class. Create one final, complete checklist over the RFP. 4. Students must submit checklist to Google Classroom or can turn in a hard copy to the teacher. Be sure to allow student access to these checklists throughout the project to ensure student success. ***I found it beneficial to revisit the checklist whenever we began a new mini-task throughout the unit. This helped students measure their success and be aware of what they have to complete yet in the given time frame.

			Container 12. Final Design Report 13. Title Page 14. Executive Summary 15. Graphic of Overall Design (already completed at this time) 16. Detailed Design Information 17. Defense of Design 18. Appendix	
	Standards: **RST.6-8.2** : Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.			
	Additional Attachments: **Insane Insulators Checklist.doc** **Insane Insulators Checklist Teacher Key.doc**			
25 mins	**UNDERSTANDING THE STATEMENT OF WORK IN LIGHT OF THE TIMELINE**: Ability to scale the scope of a project to fit the time available.	**CALENDAR REVIEW** Put a timeline together that is reasonable with our overall timeline. This will be done as a class.	This will be done as an entire class. Students need to be contributing the appropriate dates for each portion of the Project Scope by following the Project Time Line found in the RFP.	*The teacher will refer to the RFP and calendar graphic organizer.* *Then the teacher will facilitate a class discussion to:* *Group thoughts: Add here thought that we come up with as a class. These should be important things that you want to include in your writing.* *Finally students will review the calendar to identify important dates and possible conflicts.* *Time management* *Prioritizing* *Organizing*
	Standards: **RST.6-8.2** : Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.			
	Additional Attachments: **Monthly Calendar Template.doc** **Insane Insulators Project Calendar.doc**			
15 mins	**SEEKING CLARIFICATION ON RFP**: Ability to identify gaps in understanding about design requirements or statement of work and	**AFFINITY MAP** Write one question that you have on a post it note and post it onto the white board.	This activity is a formative assessment and is not scored. Each student should contribute at least one question. Student questions meet	1.Students should write a question that they have about the problem. 2. Place the question on the white board. 3. Participate in the group discussion and help to group all of the post it notes into just a few groups that have an affinity(similarity).

	communicate those gaps in understanding as questions that can be answered by an organization or individual that issued an RFP.		expectation if they ask for clarification in areas of the RFP such as the design requirements or scope of work.	4. Address as a class, how these questions can be resolved or what resources are needed that would benefit these questions. This activity has been developed for students to have the opportunity to ask questions, without having to put them selves on the spot. This activity encourages students who usually keep their questions to themselves, to participate in class. Students do not have to read their questions a loud. One or two students can read all of the questions a loud to the class.
	Standards: **RST.6-8.2** : Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.			
Concept Design Process (Creating Possible Solutions)				
1 hr	**RESEARCHING OTHER DESIGN SOLUTIONS**: Ability to find designs that have been previously developed by others and to glean useful information from the approaches they took.	**BACKGROUND RESEARCH NOTESHEET** After selecting reading prompt, the you will complete research on their Background Notesheet using text sources provided. Other sources may be used if self-generated questions have appeared for you during research.	This activity is scored for completion. Students will receive one point for each answer to the questions from their selected heat transfer topic. Students will also receive one point for each answer to the questions from the team research, current methods of insulation. Worth 8 points total.	1. Students will be given their Background Notesheet. 2. Students need to have the RFP. Depending on the heat transfer topic they have selected, conflict the notesheet for their specific topic. Students are to research the answer to each of the questions proposed in the Background Research portion of the RFP, the last page. 3. Students will need guidance with finding appropriate sources. Attached is a list of appropriate sources that can guide students. 4. Once students have completed their research on their portion, they will share out their findings with their teammates and fill in the missing pieces of their notesheets. 5. Together as a team, they will complete the research for current insulation methods.
	Standards: **RST.6-8.1** : Cite specific textual evidence to support analysis of science and technical texts. **RST.6-8.2** : Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. **RST.6-8.7** : Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).			
	Additional Attachments: **Background Research Notesheet Student Example.pdf** **Background Research Informational Texts** **Insane Insulators Background Research Notesheet.doc**			
15 mins	**BRAINSTORMING POSSIBLE SOLUTIONS**: Ability to engage in a	**BRAINSTORMING POSSIBLE SOLUTIONS** After reading and analyzing the RFP,	Students will receive participation points for this brainstorming activity.	1. Students will need the RFP in front of them. 2. Students will be given the brainstorming handout. 3. Students complete brainstorming handout by

	collaborative, creative process to brainstorm many possible solutions to an RFP.	brainstorm as many creative and effective methods to create and insulate your container. Use the bubble brainstorming web template attached. Under each bubble on the brainstorming web, include a brief description to justify your reasoning for the design. Justification must include evidence pulled from all sources used during research.	Students must initiate two solutions to receive the four participation points. *Each solution is worth two points. Students must provided a justification for each of their brainstormed solution to receive four participation points. *Each justification is worth two points. Worth a total of 8 points.	providing as many creative solutions as possible. ***Please note that the bubble brainstorming web included does not have a location for students' justification. Please be sure to add this location prior to providing the handout to students.
	Standards: **WHST.6-8.7** : Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.			
	Additional Attachments: **Insane Insulators Brainstorm Web.pdf** **Insane Insulators Brainstorm Web.doc** **Brainstorming Web Student Example.pdf**			
30 mins	**ANALYZING POSSIBLE SOLUTIONS**: Ability to engage in theoretical, technical analysis of brainstormed, possible solutions in order to identify pros/cons of each solution in reference to an RFP's list of requirements and scope.	**DECISION MATRIX** Analyze your top designs by ranking the criteria for each in a decision matrix.	Students will demonstrate the following: - Cooperative collaboration with their group as they complete the worksheet attached. -Complete the decision matrix for each design solution, ranking each component of the solution with regards to RFP constraints and requirements. -Select their top design solution, the solution that scores highest on the Decision Matrix, and need to include the design justification for their chosen solution based around RFP	1. Briefly talk to students about engineers have to think about when designing a product. Then ask the students what are the qualities of a good product in this engineering design. 2. Have students get into their groups and explain the worksheet directions- doing an example on the board of what it looks like. 3. Give students time to fill out the decision matrix for their top 5 choices from their brainstorming list. 4. Call over the teacher when finished to get a signature showing that it was completed.

			requirements to get a teacher signature of approval.	

Standards:

ETS1.A:1. : The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1)

Additional Attachments:

Decision Matrix Student Example.pdf

Insane Insulators Decision Matrix.doc

Proposal Process

40 mins	**BIDDING THE PROJECT**: Ability to identify all needed resources for proposed product/solution and to communicate those needs to an RFP-issuing institution.	**PROJECT PROPOSAL** Establish the materials list and budget to meet the parameters of the RFP.	The mini-task is a formative assessment to determine if the students understand how to use the budget and understand the materials being provided. Students will need to complete the Project Proposal form, that includes their materials requested, as well as the subtraction of these materials from their budget. If the students include all materials, and accurately analyze their budget, then they receive a sign off of teacher approval.	1. Students will need their pros and cons list. 2. Students will need the final design they determined as a group. 3. Students will need access to the materials for the design. 4. Students will receive a copy of the Project Proposal Sheet. The teacher must approve of their materials (that they are only using materials provided by the RFP requirements) and they are within budget. For teacher approval: 1. As students are doing other work for class, call back student groups one at a time and have them present their design proposal to you. 2. Evaluate their design by talking through the materials they are using, their costs, and the effectiveness of their design. 3. Sign off on all groups that have thought through their design and are ready to build. Tell groups that aren't ready to go back and consider your comments. **It should take no more than 10 minutes per group or about an hour total depending on the number of groups you have. One student from each group will come to Hagans Hardware to purchase their materials once all groups have been approved. ***I used these Project Proposal Forms as a why to indicate the approximate amount of each material I would need for the students.

Standards:

SL.7.1 : Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

Additional Attachments:

	Insane Insulators Design Proposal Sheet.doc			
10 mins	**SELLING YOUR SERVICES**: Ability to communicate the capability of your team to complete your proposed solution: "why you should hire us."	**DESIGN JUSTIFICATION** Why do you think this is the best design? Write 2-3 sentences justifying your purchases.	This mini task is a formative assessment to determine if the students understand the constraints on the RFP when designing their prototype. Students will have mastered this task if they can defend why the selected their design and the materials they used meet all RFP constraints and requirements.	1. Students will need to reference their background research in their justifications. 2. Students will also need to reference their decision matrix. 3. Students will defend their design selection on the Project Proposal Sheet from the prior mini task. 4. Students will answer numbers 1-3 as a group on a piece of notebook paper.
	Standards: **WHST.6-8.1** : Write arguments focused on discipline-specific content.			
35 mins	**SEEKING CONSTRUCTIVE FEEDBACK**: Ability to solicit specific, constructive feedback on a design proposal in order to inform decisions and course for the rest of a design process.	**SHARING CONSTRUCTIVE FEEDBACK ON PROJECT PROPOSALS** First, read your peers' proposal handout. Next, write at least two constructive comments about your peers' design on sticky notes.	Students meet expectations if they: • Provide feedback on peers' designs by writing at least two constructive comments on sticky notes • Produce constructive comments that are substantial, related to the assignment objectives, and provide a question or idea.	**Teacher note:** Students should have some experience with providing peers with written feedback prior to teaching this mini-task. Also, this mini-lesson assumes students have started planning for a long-term project and completed a project proposal. Some possible project proposal templates are included under Student Resources. For additional background lesson ideas, see the **Decision Making Practice mini-task** linked below under Teacher Resources. **Modeling and Guided Practice:** 1. Ensure all partnerships and groups have completed their project proposal and have it on hand. 2. Explain that throughout the next couple of days their group will be called back to propose their work to the teacher. However, today they are going to **evaluate** each other's proposals in order to get ideas on how to improve their plans. 3. Create a t-chart on the board and ask students, *"What is the difference between a **comment** and a **constructive comment**."* Depending on student responses and interests, it could be helpful to draw an analogy to social media comments. You might say: *I heard some students talking about the upcoming school dance. One of them posted some photos of ideas for a possible school dance theme and shared it with the school dance planning committee using social media. One student wrote a response to the picture saying, "I disagree that we should have a pirate theme" (**a comment).** Another student wrote, "I like the pirate theme, but I heard that the neighboring middle school had a similar theme for their dance a few weeks ago and some of our students may have*

*attended. Given that one of our goals for this dance is innovation, would it be possible to consider a Treasure Island theme instead?" (**a constructive comment**).*

4. Call on students to share examples of the difference between the two. Explain that today students will practice writing at least **two** constructive comments (i.e., ideas that are helpful and give a potential question or idea to the other group). Depending on your students' background knowledge and what is shared during the discussion, you might say: **Comments** are often about a writer's likes or dislikes, or are commands to another writer—delete this word, or add more information about ____. However, strong peer editors usually go beyond just writing their opinions and give specific feedback to their peers after thinking about the specific task and goals of the assignment. Typically, **constructive comments** are considered helpful because they are related to the project goals (i.e., I wonder if we should push back the date of the dance given that we will need to design Treasure Island-themed decorations).

5. If students need additional modeling, offer some examples and sentence starters:

What constructive feedback looks like:

- *I like____; however,____.*
- *It seems helpful how you____; I wonder what ____.*
- *It is interesting how you _____. Have you considered adding/removing/changing _______ in order to ______?*

What constructive feedback does NOT look like:

(One of the following in isolation.)

- *Don't ____.*
- *Remove ____.*
- *Great job!*

6. You may also consider creating a "mock" project proposal, and go through the process of writing constructive comments on sticky notes for this proposal. Either way, it is important to share some sort of criteria—for example, a rubric.

Student Practice:

1. Switch the teams' proposals and have them write on sticky notes to make at least two comments for the other group.

2. When they are finished, they can pass the paper back to the group and discuss the comments of their peer edit.

Closing:

1. Ask groups/partnerships to share one piece of helpful feedback they received.

				2. Give students time either in class or as homework to revise their project proposals to incorporate the feedback they received.
	Standards: **WHST.6-8.5** : With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. **SL.7.1.C** : Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.			
	Additional Attachments: **Sample Design Proposal Sheet with Example.docx** **Decision Matrix Practice Mini-Task** **Decision_Matrix** **Sample Design Proposal Sheet Version 2** **Sample Design Proposal Sheet .docx**			
Detailed Design Process				
35 mins	**CLARIFYING SIZE, FORM, FUNCTION**: Ability to clearly design a solution and articulate that solution: "it looks like this . . ."	**DETAILED DESIGN DRAWING** Draw a neat, precise, detailed diagram of your team's final design. Describe your team's design in three to four sentences.	Drawings that meet expectations include: • A neat, precise, and detailed drawing of their final product that demonstrates a full understanding of the team's building design • Includes all materials from the Project Proposal Form. • Labeling on all aspects of the drawing. • A brief description that includes the size/dimensions of the design and the function of each of the materials.	1. Have students get into their groups to first write a brief description of why they chose the design they did as a team. This just has to be a short three to four sentences including anything they changed based on our meeting. The description should include the size of the design and the function of the various materials. 2. Show students some sample pictures of diagrammed drawings as examples of what they will be creating. 3. Next, pass out paper or students can work on computers for their individual drawings showing the form of their design. 4. Instruct students to keep their drawings to turn in with their final design report.
	Standards: **ETS1.A:1.** : The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1)			
20 mins	**TESTING CRITICAL DESIGN COMPONENTS**: Ability to test critical subsystems for feasibility.	**NOTES OVER TESTING OF MATERIALS SELECTED** Measure out materials and evaluate the amounts for your container.	Notes should be detailed and include any problems students foresee and any changes that are discussed. This is a formative assessment	1. Provide students with materials according to their team's budget and supply list. 2. Provide Veriner Go! Temperature Probs. 3. Walk students through Veriner Go! Temperature Prob Program created within Veriner software. Assist students with changing the data collection tool to 10

		Create a sample of your container and have a trial run. Take notes on your measurements and what you observe.	that will not be scored. Additionally, notes should include any problems students foresee and any changes that are discussed to improve feasibility.	minutes, recording the temperature once per minute. 4. Complete trial run of container test. 5. Allow modifications of design. 6. Have students create a list/notes of throughout this activity. Students should list the amount of their materials used, how long it took them to assemble their prototype, the starting and ending temperature of the beaker inside their container, and list all modifications they would like to make to their current design.
	Standards: **ETS1.B:1.** : A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (MS-ETS1-4)			
50 mins	**TESTING CRITICAL DESIGN COMPONENTS**: Ability to test critical subsystems for feasibility.	**OBSERVATION LOG FOR TESTING OF PROTOTYPE** After using selected materials and creating a prototype of their selected design, the student will take the insulated container they have created and will complete the simulation. Students are to follow the directions on the observation log, filling in the chart, then answering the conclusion sentences.	Students will receive a completion grade for this activity. 5 points for filling out the Observation Log chart appropriately 5 points if their prototype is completed by test day 5 points for team work while operating the data collection tool from Vernier 5 points for appropriately answering the conclusion questions	1. Have student obtain their prototype. Give the students time to make modifications to their current design. 2. Pass out the observation log. Walk the students through the instructions, step-by-step. 3. Have one team member log into a laptop to access the Vernier software. Have them plug the temperature probe into the laptop to connect to the Hot Hand program. 4. The other teams members should prepare the prototype for testing. 5. As the instructor, prepare the hot water for the experimental phase. Fill the plastic beaker to 250mL of hot water and place inside the student's prototype. It is recommended that the teacher handles the hot liquid to prevent injury or accidents with the students. 6. Students are to insert the temperature probe into their beaker. Start the data collection. 7. Students are to record the information on the Observation Log as the collection progresses.
	Standards: **SL.8.1** : Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly. **SL.7.1.D** : Acknowledge new information expressed by others and, when warranted, modify their own views. **SL.7.1** : Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.			
	Additional Attachments: **Observation Log Student Example.pdf** **Insane Insulators Observation Log.doc**			
Design Report Writing Process				
20 mins	**GENERATING GRAPHIC OF**	**SELECT FINAL DRAWINGS**	The drawing will be scored on the	1. Send all students from each group to a Design Drawing station. Here students will need to produce a

	DESIGN: Ability to generate a graphical representation (photograph, drawing, CAD rendering, etc.) of the overall design solution in order to orient the reader to the components of the solution.	After establishing the final design of the prototype, you will need to produce a drawing that includes all materials, amounts of materials, and shape of insulated container. The diagram should be fully labeled. A person seeing your drawing should have an accurate image of what the prototype actually looked like.	following criteria: 2 points if the drawing is an appropriate, easy to view size 2 points if the drawing is neat 2 points if the drawing is labeled 2 points if the drawing contains all the materials listed in the Project Proposal Sheet 2 points if the team name is indicated on the drawing	creative design that best represents the group's container design. These students need access to art supplies, rulers, etc.
40 mins	**COMMUNICATING DETAILS OF DESIGN**: Ability to communicate (with words and graphics) the details of a design solution and how it is built/executed.	**DETAILED DESCRIPTION OF FINAL DESIGN** After creating the group's Insulated Container Design drawing, produce a well written paragraph that explains the final design of the prototype and incorporates data from research and testing.	Scoring will occur using the LDC Argumentative Rubric, previously provided, when students submit their Final Design Report. This rough draft can be used as a completion grade. Students need to include each material they used and why it was selected. Rough draft should include all components listed on the Detailed Description Instruction Page provided below.	Students are to take out their Diagram of Design and produce a well written, detailed description, of this design. Students should complete the paragraph in the order they constructed their final container. Students need to be very detailed, include measurements/amounts, so an outsider could produce their product. Teacher should actively circulate among the groups to ensure proper information in the assignment.
	Standards: **WHST.6-8.1.B** : Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. **WHST.6-8.1** : Write arguments focused on discipline-specific content.			
	Additional Attachments: **Detailed Description Instructions.doc**			
35 mins	**DEFENDING DESIGN AS MEETING REQUIREMENTS**: Ability to clearly articulate (using evidence) how the design solution meets the original design requirements	**DEFENSE OF DESIGN** After completing the final testing of the prototype, produce three paragraphs on how your design solution meets the design requirements. You must have one paragraph explaining the reasoning	Defense of design meets expectations if it includes: • Three paragraphs on how the design solution met the design requirements	1. Explain the defense of design by reading through the rubric criteria. 2. Create a t-chart on the board with the word "claim" on one side and the word "support" on the other. Write up an example claim: "We chose to use the poster board because it was cheaper and we could afford to buy more pieces of it." Support: "...the container needs to have a support structure to hold whatever materials

		behind the materials/design, one paragraph discussing the results of the prototype test, and one paragraph discussing future changes.	Paragraph 1: The paragraph clearly contains how the design solution (insulated container that was tested) met the design requirements using at least 1 source from the background research to support design decisions. Include the information from your Executive summary about how your design reduced convection, conduction, and radiation. Paragraph 2: The paragraph must have been written clearly and accurately about the successes and failures of the design solution using at least one piece of data to support reasoning. Include information from your background research to defend your successes and failures. Paragraph 3: The paragraph must include three ideas for changes in the future to improve the design idea. Be sure to discuss how these changes will reduce convection, conduction, and radiation. • At least three sources from the background research to support design decisions.	we decide as a team to place inside to help with insulation. 3. Have students work with their team to write another claim and support specific to their design. 4. Share out with the class their examples and write on the board for other groups to use if applicable. 5. Ask students how they might reference back to their graphic and their data table in the defense of design. Give students a few minutes to work as a team to incorporate either their graphic or their data table. Ask students to share out and add to the examples on the board. 6. Give students work time to use more of their research to write the defense of design as a team. ** If your students don't know how to do in-text citations you will need more instruction here.

			Final scoring of this portion will occur when the Final Design Report is submitted using the LDC Argumentative Rubric.	

Standards:

WHST.6-8.9 : Draw evidence from informational texts to support analysis, reflection, and research.

Additional Attachments:

Defense of Design Instructions.doc

5 mins	**APPENDING TECHNICAL INFORMATION**: Ability to organize and communicate all technical reports, data from sub-system test reports, specific experimental protocols, etc. into an easy-to-navigate appendix to be used by the reader as needed.	**APPENDIX** After producing the Final Design Report, collect your sketches not included in the paper, raw data, graphs not included in the text and attach to the end of the final product.	**appendix rubric.docx**	Students are to collect their Brainstorming Web, Decision Matrix, and Observation Log at the end of their Final Design Report to be the Appendix.

Standards:

WHST.6-8.4 : Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

50 mins	**WRITING AN EXECUTIVE SUMMARY**: Ability to write a brief, comprehensive, and accurate summary of an issue/need and designed solution to that need.	**EXECUTIVE SUMMARY** Before writing the Executive Summary final copy, you will use the graphic summary organizer to collect the required information. You will then use this graphic summary organizer to write your Executive Summary.	The group will produce one graphic organizer for participation points. Students need to provide the problem and constraints presented by the RFP. Students must also include how their solution addresses the different forms of thermal energy transfer, the materials they used, and a summary of their findings from their testing of their prototype. The Executive Summary will be	Students will use the RFP, the background research essays, observations, and any sources they used to answer the questions on the Executive Summary Graphic Organizer prior to writing their summary. Upon completion of this organizer, students will be able to construct their Executive Summary. Once the scaffolding sheet is complete, students are to produce the Executive Summary.

			scored with the Final Report using the LDC Argumentative Rubric.	
	Standards: **WHST.6-8.1.E** : Provide a concluding statement or section that follows from or supports the argument presented. **WHST.6-8.1.A** : Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.			
	Additional Attachments: **Executive Summary Scaffold Student Example.pdf** **Insane Insulators Executive Summary Scaffold Page.doc**			
10 mins	**FINALIZING A TITLE PAGE**: Ability to make a title page with appropriate identifying information.	**FINAL TITLE PAGE** After compiling and editing all parts of the Final Design Report, you will be creating the Title Page that includes your team name, school, and date.	**Title Page Rubric.docx**	Title page should include: • Lists Insane Insulators • Team Name • Location of Design • Supervisor/Instructor • Graphics and/or clip art is properly cited if not produced by yourself.
20 mins	**MAKING TECHNICAL REVISIONS**: Ability to proofread and format a final paper	**LDC RUBRIC REVIEW** After compiling all required components of the the Final Design Report, you will use the LDC rubric introduced by Mrs. Hagans to review your final product.	This mini task will not be scored as it is an opportunity for student revision and reflection. Students will use the LDC Argumentative Rubric to go through their Final Design Report after the teacher walks the students through reading and implementing the rubric.	Student will be given a copy of the LDC Argumentation Rubric that will be used to assess the Final Design Report. Students will also be given a copy of the Insane Insulators Evidence for Rubric handout. Teacher will go through each category of the rubric and then refer to the evidence handout. The goal of this mini-task is for students to understand what portions of their reports will be assessed for each Scoring Element on the LDC rubric. Provide time for question and answer from the students. I also used a sample paper and read exemplar portions aloud for each portion of the Scoring Elements.
	Additional Attachments: **Insane Insulators Student Work Rubric - Argumentation Task.pdf** **Insane Insulators Evidence for Rubric.doc**			
50 mins	**PROVIDING PEER REVIEW FEEDBACK**: Ability to provide meaningful feedback on a design report for a partner	**PEER REVIEW AND CONSTRUCTION OF FINAL DESIGN REPORT** After receiving a copy of the LDC Argumentative Task Rubric, you will work as a team to go through each portion of your final writing product, and the Evidence for Rubric handout, to determine where your Final Design	Scoring will occur by teacher using the LDC Argumentation Rubric for each team's Final Design Report.	Students will work as a team to go through each portion of the LDC Argumentation Task Rubric, and the Evidence for Rubric handout, to determine where their Final Design Report will score. Students are to correct each portion of the Final Design Report as needed. Students can also seek help from teacher to clear up misconceptions and/or ask for guidance. Once all final edits are made, each portion of the Final Design Report will be printed.

	Report will score.		Students will compile their Final Design Reports in the following order: 1. Title Page 2. Executive Summary 3. Background Research 3 Paragraph Essay 4. Diagram of Design 5. Detailed Description 6. Defense of Design 7. Appendix containing; a. Oil Spill Brainstorming Web b. Decision Matrix c. Project Proposal Sheet d. Observation Log

Standards:

SL.7.3 : Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.

Additional Attachments:

LDC Agumentation Rubric.pdf

Insane Insulators Evidence for Rubric.doc

Instructional Resources

Teacher Resource

- **Catching Sun with a Donut Design**
- **Squirmy Science Design Module for Ecology Unit**
- **Battelle Mini-Task Collection**

Student Handout

- **Insane Insulators Request for Proposal.doc**

Section 4: What Results?

Student Work Samples

Meets Expectations

- **Insane Insulators Final Report (High).pdf**
- **Insane Insulators Appendix (High).pdf**

Approaches Expectations

- **Insane Insulators Final Report (Middle).pdf**
- **Insane Insulators Appendix (Middle).pdf**

Emerging

- **Insane Insulators Final Report (Low).pdf**
- **Insane Insulators Appendix (Low).pdf**

Teacher Reflection

This module was implemented in January of the school year. Students were grouped based upon high, middle, and low abilities. I worked with the intervention specialist on my team, as well as consulting STAR benchmark scores in Math and Reading, to group my students. I also looked at the personalities of my students when deciding the groupings. I allowed the students to select a team name and I referred to them by their team name throughout the entire project.

I allowed the students to select their own team roles as well as which portion of the Background Research paper they were most comfortable. I directed some students with disabilities to roles and research portions that best fits their strengths.

After implementing this module, students can accomplish great writing when provided the proper scaffolding and resources. I saw a huge improvement in their writing and communication skills compared to writing earlier this school year. Overall, students performed better than I expected. They were excellent in creating innovative designs based around background research and the materials provided. They struggled with fully communicating why they made all decisions during this process in writing.

After implementing this module, some mini tasks were deleted due to their repetitive nature. These mini tasks are not included in the current module.

As for advice for other educators, take this module and make it fit your students. No two classrooms are the same and therefore what worked for my students may not work for yours. Feel free to add or reduce scaffolding where needed and listen to your students' feedback. It is extremely important to encourage and celebrate failure throughout this module! That is how students grow. Also, incorporate real world connections as frequently as possible. There are many non-academic teachable moments within this module as well.

All Attachments

- **Insane Insulators Background Research Resources.doc : https://s.ldc.org/u/8eubazpxqpc5n7yt5uxto42qr**
- **Insane Insulators Request for Proposal.doc : https://s.ldc.org/u/elueeggumluzace2dbmr5wdu5**
- **Insane Insulators Final Report (High).pdf : https://s.ldc.org/u/3h9fae0rkwpayacd614lvwkkn**
- **Insane Insulators Appendix (High).pdf : https://s.ldc.org/u/bhbz06avrcx88ta5uazh9eyan**
- **Insane Insulators Final Report (Middle).pdf : https://s.ldc.org/u/ey1msaya4sntnfg2p1ybzkqn8**
- **Insane Insulators Appendix (Middle).pdf : https://s.ldc.org/u/bed10c91urc83wvwiygy0o90i**
- **Insane Insulators Final Report (Low).pdf : https://s.ldc.org/u/4oy45gvsprau94vrrpih5031v**
- **Insane Insulators Appendix (Low).pdf : https://s.ldc.org/u/593nqxzsbrlpvwgu2phowa72f**
- **Catching Sun with a Donut Design : https://s.ldc.org/u/c1pc1caugf5sk595hi1f979la**
- **Squirmy Science Design Module for Ecology Unit : https://s.ldc.org/u/1opmocsaqvnnal3cvxi25mtt5**
- **Battelle Mini-Task Collection : https://s.ldc.org/u/wdunvkggiwzdgjbe1hrhf7ph**
- **Insane Insulators Request for Proposal.doc : https://s.ldc.org/u/c2ljghaf2joeqvdfxzte568a0**

Dig This

by leanna colosimo

Adapted from "Battelle Design Module Template" by Kelly M. Gaier Evans and Peter DeWitt

LDC provides templates to enable teachers to do complex work more easily and with greater precision. Module templates provide scaffolds and resources to accelerate your planning with lots of decision points for customization. The Battelle Design module template is one of three new STEM LDC module templates. It may look a little different on the surface than the original LDC informational and argumentative templates, and that's a good thing. The innovative elements are designed to align tightly with scientific literacy. We hope you can also recognize the enduring LDC principles of backwards design, planning instruction from a small cluster of focus standards, and writing in response to reading.

Production is the essence of STEM education. Purposeful production is the definition of design. This LDC template is based on the process Battelle Memorial Institute engineers go through in designing and prototyping solutions to the world's problems/opportunities. This process has led to the Xerox machine, the CD, and countless other innovations! This Design LDC Module Template is meant to be applied in a "real-world" manner—optimally driven by authentic partnerships with your community. Your community partner can help identify a need and parameters for the students' design, as well as then serving as an authentic audience for your students' work. There is a world of opportunities out there that is waiting for our students' design ability. Use this LDC template to help the students scaffold and capture their design process with excellence.

This template has been developed to provide a sequence of skills for supporting students in design. Authors will need to consider the following when using this template:

1. What teaching task will you set for your students to answer? You create your teaching task by filling in the black spaces in an LDC task template specially designed to support the design process.

2. What science content will this design module focus on? Once you know the content, the author should add the relevant science standards. The template embeds the science and engineering practices, but specific standards will be dependent upon the focus content selected by module author.

3. What RFP will frame your students' work? The RFP referenced in the teaching task might be an existing

RFP appropriate to your age group and content, or it may be crafted by the author or in collaboration with a local business.

4. Which skills do your students need for your task? This template offers a "menu" of skills. Depending upon what your students know or do not know, you may choose to use all of these skills or eliminate some that students have already mastered. Consider your focus and customize the list to meet the purpose of your task and your students.

5. Do the skill definitions fit the grades you teach? This template was designed using standards for Grades 9-10. These may be modified depending on your course. You may need to also modify skill definitions to reflect your grade-level standards.

6. What mini-tasks will you use to develop each skill you identify? You can design your own mini-tasks or adapt the ones from other modules. You may find it particularly helpful to draw from the Battelle Mini-Task Collection designed to support these templates: https://coretools.ldc.org/collections/e1274be1-ab7c-4efb-9e3c-8bf3e65a7acd.

7. How will you introduce your module? This overview should be replaced with one that explains your own module to other teachers.

Note: The Design Process is predicated by the ability to test solutions in a controlled manner (i.e., carry out a controlled experiment). It is advisable, therefore, that your students be relatively fluent in experimentation prior to completing this module. If your students do not yet have a sound foundation in experimentation, please see the Battelle Controlled Experiment Module Template. These module templates are part of a three-part Battelle LDC Science Collection: Data Analysis, Controlled Experimentation, and Design. The series represents a continuum of skills that build upon each other.

We thank David Chase (Principal Research Scientist at Battelle) for his assistance in sharing the work processes and providing real world examples to inform the creation of this template.

GRADES	DISCIPLINE	COURSE	PACING
11 - 12	**Science**	**Physics**	**N/A**

Section 1: What Task?

Teaching Task

Task Template BETA A - Argumentation

How can a shovel be designed so that it would decrease the amount of force and work necessary to move dirt, mulch, straw/hay, and other agricultural debris? After reading the RFP, conducting background research on forces, work, power, shovel design (handle and blade), types of materials, human factors, cost, and levers, and designing and testing a shovel, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and any other relevant diagrams to help convey your message to your readers. Identify any gaps or unanswered questions.

Standards

Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects

WHST.9-10.7 **Focus**

Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

SL.9-10.4 **Focus**

Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.

Common Core State Standards for Mathematics

CCSS.Math.Content.HSS-ID.C

Interpret linear models

CCSS.Math.Content.HSS-ID.A

Summarize, represent, and interpret data on a single count or measurement variable

Ohio's New Learning Standards: High School Science

Newton's laws applied to complex problems **Focus**

Friction force (static and kinetic) **Focus**

Work and power **Focus**

Texts

Science Direct blade size and weight effect

- NASA design comparison of two shovels
- Ergonomics of shovelling and shovel design
- Dig It Request for Proposal LDC.docx

Student Work Rubric - Argumentation Task - Grades 9-12

	Emerging	Approaches Expectations	Meets Expectations	Advanced
	1	2	3	4
Controlling Idea	Makes a general claim with an unclear focus.	Establishes a **clear** claim **that addresses the prompt**, with an **uneven focus**.	Establishes **and maintains** a **clear, specific, and credible claim** that addresses **all aspects** of the prompt.	Establishes and maintains a **precise, substantive** claim that addresses all aspects of the prompt. **Acknowledges limitations and/or the complexity of the issue or topic**.
Development / Explanation of Sources	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.	Explains ideas and source material **to support the argument**, with **some incomplete reasoning or explanations**.	**Accurately** explains ideas and source material and **how they support** the argument.	**Thoroughly** and accurately explains ideas and source material, **using logical reasoning to support and develop** the argument.
NGSS Practice: Define Problems	Defines a problem or design statement that partially matches the intent of the problem or the constraints.	Defines a problem or design statement that matches the intent of the problem and identifies the constraints.	Defines a problem and explains specific design elements necessary for a suitable design (e.g., fit to the problem, addresses the constraints, etc.).	Defines a problem precisely and thoroughly explains why specific design elements are necessary for a suitable design (e.g., fit to the problem, addresses the constraints, etc.).
NGSS Practice: Plan The Design	Proposes a design plan and description that misses one or more important aspects of the criteria, constraints, OR intent of the problem.	Proposes a design plan and provides a general description that addresses the criteria, constraints, or intent of the problem.	Proposes a design plan with detailed explanation that completely addresses the criteria, constraints, and intent of the problem.	Proposes a design plan and evaluates the suitability of the design to address the criteria, constraints, AND intent of the problem.
NGSS Practice: Design Solutions	Uses inaccurate or irrelevant evidence (data or scientific knowledge) to explain how the design addresses the problem/constraints OR identifies an impractical redesign without explanation or supporting evidence.	Uses minimal relevant evidence (data or scientific knowledge) to explain how the design addresses the problem/constraints OR identifies a potential redesign with limited explanation and supporting evidence.	Uses relevant and adequate amounts of evidence (data or scientific knowledge) to explain how the design addresses the problem/constraints AND uses the evidence to explain an appropriate redesign of the original model or prototype.	Uses detailed and multiple sources of evidence (data or scientific knowledge) to evaluate how well the design addresses the problem as well as constraints AND provides a detailed rationale with supporting data for the appropriate redesign of the original model or prototype.

Background for Students

Extension

Plan how you will present your solution in person, including what you will say and what you will show your audience (models, handouts, visuals projected on a screen, and so on). Be sure to practice and check your timing. Then make the presentation, take questions, and give answers. Finally, when the presentation is done, think through what worked well and what you want to do differently in future presentations.

Section 2: What Skills?

Preparing for the Task

TASK ANALYSIS: Ability to understand and explain the task's prompt and rubric.

Request for Proposals (RFP) Analysis Process

UNDERSTANDING THE LIST OF REQUIREMENTS: Ability to read, understand, analyze, and interpret a list of design requirements to create a list of features of a design solution.

UNDERSTANDING THE STATEMENT OF WORK IN LIGHT OF THE TIMELINE: Ability to scale the scope of a project to fit the time available.

Concept Design Process (Creating Possible Solutions)

SELECTING RELEVANT AND CREDIBLE TEXTS: Ability to select texts that present credible research addressing similar design problems.

RESEARCHING OTHER DESIGN SOLUTIONS: Ability to find designs that have been previously developed by others and to glean useful information from the approaches they took.

BRAINSTORMING POSSIBLE SOLUTIONS: Ability to engage in a collaborative, creative process to brainstorm many possible solutions to an RFP.

ANALYZING POSSIBLE SOLUTIONS: Ability to engage in theoretical, technical analysis of brainstormed, possible solutions in order to identify pros/cons of each solution in reference to an RFP's list of requirements and scope.

Proposal Process

SEEKING CONSTRUCTIVE FEEDBACK: Ability to solicit specific, constructive feedback on a design proposal in order to inform decisions and course for the rest of a design process.

Detailed Design Process

IDENTIFYING CRITICAL DESIGN COMPONENTS: Ability to identify subsystems within a design solution that are critical to the success of the design solution.

TESTING CRITICAL DESIGN COMPONENTS: Ability to test critical subsystems for feasibility.

FINALIZING DESIGN: Ability to incorporate critical component test results in order to adjust the design of subsystems (and overall design) as necessary in order to ensure final design solution adequately addresses the list of requirements contained in an RFP.

Design Report Writing Process

COMMUNICATING BACKGROUND ON DESIGN: Ability to communicate the background on "why we are doing what we are doing."

GENERATING GRAPHIC OF DESIGN: Ability to generate a graphical representation (photograph, drawing, CAD rendering, etc.) of the overall design solution in order to orient the reader to the components of the solution.

COMMUNICATING DETAILS OF DESIGN: Ability to communicate (with words and graphics) the details of a design solution and how it is built/executed.

DEFENDING DESIGN AS MEETING REQUIREMENTS: Ability to clearly articulate (using evidence) how the design solution meets the original design requirements

APPENDING TECHNICAL INFORMATION: Ability to organize and communicate all technical reports, data from sub-system test reports, specific experimental protocols, etc. into an easy-to-navigate appendix to be used by the reader as needed.

WRITING AN EXECUTIVE SUMMARY: Ability to write a brief, comprehensive, and accurate summary of an issue/need and designed solution to that need.

FINALIZING A TITLE PAGE: Ability to make a title page with appropriate identifying information.

PROVIDING PEER REVIEW FEEDBACK: Ability to provide meaningful feedback on a design report for a partner

MAKING TECHNICAL REVISIONS: Ability to proofread and format a final paper

Presentation (Optional Extension Process)

CREATING A STANDARD PRESENTATION: Ability to turn a Design Report into a presentation (e.g., PowerPoint, Poster, Prezi, etc.) that can be successfully shared in a visual/auditory manner.

UNDERSTANDING AUDIENCE: Ability to appropriately adjust presentation duration and depth based on different audience members' available time, level of interest, and technical fluency.

CREATING SUPPORTING TECHNICAL SLIDES: Ability to identify what may be frequently-asked, technical questions; the ability to create supporting technical slides to provide an extension to the standard-length presentation.

PRESENTING: Ability to clearly communicate a design presentation to one or more audiences.

REFLECTING ON PRESENTATION: Ability to reflect on a particular presentation and identify relevant lessons for improving future presentation.

Section 3: What Instruction?

PACING	SKILL AND DEFINITION	PRODUCT AND PROMPT	SCORING GUIDE	INSTRUCTIONAL STRATEGIES
Preparing for the Task				
30 mins	**TASK ANALYSIS**: Ability to understand and explain the task's prompt and rubric.	**EXIT TICKET: ANNOTATION** Use highlighters to deconstruct the prompt and assign a specific color to each part/aspect of the prompt.	**Student meets expectations if he/she does the following:** • Color-codes the prompt correctly according to the model provided by the teacher. • Written list of know, need to know, and questions for each of the colors/parts of prompt.	• Students will receive a copy of the teaching task (prompt) from the teacher. • Teacher will model the deconstruction of the prompt on an overhead projector/document camera. • Students will create a list of what they need to know, what they already know, and questions they have for each part/color of the prompt.
	Standards: **RL.11-12.1** : Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain. **RL.11-12.2** : Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text. **RL.11-12.10** : By the end of grade 11, read and comprehend literature, including stories, dramas, and poems, in the grades 11—CCR text complexity band proficiently, with scaffolding as needed at the high end of the range. By the end of grade 12, read and comprehend literature, including stories, dramas, and poems, at the high end of the grades 11—CCR text complexity band independently and proficiently. Identify questions and concepts that guide scientific investigations			
Request for Proposals (RFP) Analysis Process				
40 mins	**UNDERSTANDING THE LIST OF REQUIREMENTS**: Ability to read, understand, analyze, and interpret a list of design requirements to create a list of features of a design solution.	**PARALLEL STRUCTURE** Using the RFP create a parallel list of design requirements.	Successful students will transform the RFP into a list with parallel structure.	1. Review what "parallel structure" means with students. Use the handouts from the Purdue OWL for examples and/or background information. 2. Stress that parallel structure, while important for readability in all writing, is especially important in business and professional writing, where readers are more likely to skim for information. When readers are skimming, parallel structure makes it easier for them to find and process information. Additionally, parallel structure is more stylistically pleasant to most readers. Therefore, in situations where the writing has the potential to bring in more clients, writers are all the more encouraged to use it. 3. In order to model "parallel structure", share the poorly written list with students. Ask them to point out sections that aren't parallel and explain why they are problematic. Our services include: • we do system backups

				• guarantee recovery • diagnose regularly • we have chocolate milkshakes 4. Have students rewrite the list to be parallel. The final list can look like this: Our services include • complete system backups. • guaranteed recovery. • regular diagnostics. • chocolate milkshakes. 5. Have students create a list from the RFP making sure that it is parallel. NOTE: there are several ways to revise the prompt so that the list is parallel. For example, students could remove the periods altogether, use capitalization for each line, etc. Just be sure that whichever option they use, the structure remains parallel.
	Standards: Identify questions and concepts that guide scientific investigations **CCR.W.4** : Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.			
	Additional Attachments: **parallel_structure.pdf** **parallel_structure_professional.pdf**			
25 mins	**UNDERSTANDING THE STATEMENT OF WORK IN LIGHT OF THE TIMELINE**: Ability to scale the scope of a project to fit the time available.	**CALENDAR REVIEW** Set goals to answer the teaching task and annotate important dates.	Students meet expectations if: • They create their own goals to research with a purpose. • They record the class discussion • They annotate the calendar	*The teacher will pass out the project management goals and calendar graphic organizer.* *Students will first:* *Your thoughts: In your own words, what are the important features of a good response to this prompt?* *Then the teacher will facilitate a class discussion to:* *Group thoughts: Add here thought that we come up with as a class. These should be important things that you want to include in your writing.* *Finally students will review the calendar to identify important dates and possible conflicts.*
	Additional Attachments: **Project Management Calendar.docx**			
Concept Design Process (Creating Possible Solutions)				
50 mins	**SELECTING RELEVANT AND CREDIBLE TEXTS**: Ability to select texts that present credible	**CRAAP TEST FOR CREDIBLE SOURCES** Students use the CRAAP method to evaluate their selected	Mastery level student work will .... • Identify the currency, relevance, authority,	1. Distribute CRAAP method handout 2. Allow students time to assess the credibility of their source(s) 3. Confirm students' work

	research addressing similar design problems.	sources.	accuracy, and purpose for the selected texts	
	Additional Attachments: **CRAAP test** **Worksheet from Lamar State College - Orange**			
20 mins	**RESEARCHING OTHER DESIGN SOLUTIONS**: Ability to find designs that have been previously developed by others and to glean useful information from the approaches they took.	**SIFTING PREVIOUS DESIGN MODULES** Research previous designs, analyze how they meet the RFP requirements, and create a list of 9.	Successful completion of the task will demonstrate: 1. A list of 9 previously developed designs. 2. Each design will provide a summary of the data or research which supports a RFP criteria.	1. Read the prompt. 2. Have students read scoring guide and list what they need to do to complete task. 3. Allow time for students to research on computers.
	Standards: Recognize and analyze explanations and models			
30 mins	**BRAINSTORMING POSSIBLE SOLUTIONS**: Ability to engage in a collaborative, creative process to brainstorm many possible solutions to an RFP.	**BRAINSTORMING DESIGN SOLUTIONS** Generate 3 design solutions that meet multiple RFP criteria using your previous research	Student meets expectations if: There are 3 design solutions which meet multiple RFP criteria. Their designs demonstrate a connection to previous research which will include a write up of the RFP criteria that each piece within the design meets as well as the background research.	1. Read the prompt. 2. Have students through partner sharing give evidence that they understood the prompt. This should include how they will be using your previously researched designs of which there should be 9, combine them into 3 new designs which will meet multiple RFP criteria. 3. Write up what RFP criteria each piece of the design meets and include your previous research.
	Standards: Formulate and revise explanations and models using logic and evidence (critical thinking)			
	Additional Attachments: **The Tiger 5 paw (1).docx** **The Steps for the Tiger 5 prewriting.pptx**			
30 mins	**ANALYZING POSSIBLE SOLUTIONS**: Ability to engage in theoretical, technical analysis of brainstormed, possible solutions in order to identify pros/cons of each solution in reference	**DECISION MATRIX PRACTICE** After brainstorming possible topics for a shovel design, select your top 3 choices. Using a set of criteria and working with your group, analyze your top choices to determine the best	*Meets expectations if student work:* - Demonstrates group collaboration with analysis of possible designs - Considers at least 5 criteria relevant to RFP - Importance is ranked using scale from 1-10	**Background:** This mini-lesson works well after students have had a chance to brainstorm possible topics for a research paper. By engaging in this mini-lesson, students will have an opportunity to practice selecting the most relevant topic from a brainstormed list of possible topics. Students will narrow their choices by considering a set of criteria and ranking the level of importance of each criterion. **Whole Group Modeling:**

to an RFP's list of requirements and scope.	design. Then, rank the importance of each criterion on a scale of 1-10 (1=best, 10=worst). Be able to justify your selections.		1. Project a copy of the Decision Matrix on an overhead. Share a sample research question with students such as: what is the best elective for me to take this semester? Brainstorm possible answers to the question by listing the classes on the far left column of the Decision Matrix. 2. Ask students what it means to compare and contrast ideas. Write the terms on the board and record students' definitions of the words. If students do not give a complete definition of the terms, explain that comparing and contrasting is a form of analysis that helps individuals look at possible choices and can help when making decisions. Clarify that this process of decision making is something that students and professionals undergo everyday (e.g. engineers getting ready to design a product). 3. Ask if anyone in the class has ever had to make a decision about their school schedule. Then, ask what was hard about this decision. 4. Expand upon some of the student comments. ("You had a hard time deciding which elective to sign up for -- you could not decide between taking gym or art class. You thought about how you know a lot about exercising, but don't know much about how art and are interested in learning new material." By considering the criterion of 'Adequate Level of Challenge' you were able to analyze these two options. Other criteria might have included: how much do I like the content that will be covered during the elective class? 'Adequate Level of Interest' and how much time will I have to devote to this elective? 'Adequate Time Commitment.'") 5. After you generate a series of criteria and record them on the top row of the Decision Matrix, model how to rank the level of importance of each criterion. Ask students about a particular class they were considering taking and, ask on a scale of 1-10 (1=best, 10=worst), how challenging was the class ('Adequate Level of Challenge')? Record the students' response on the board. **Small Group Practice:** Assign students to groups of 3-4 students and ask them to refer back to their list of possible topics for their research paper. Ask them to generate at least 5 criteria that are important to consider when picking the most relevant research topic. Then, have them rank each of these criteria using the 1-10 scale. *Lesson adapted from National Building Museum: http://www.nbm.org/assets/external/school-program-lessons/green-or-not.html. Assessed on September 20, 2015.

Standards:

MS-ETS1-1 : Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

	CCR.W.2 : Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.			
	Additional Attachments: **Decision Matrix.docx** **National Building Museum** **SquirmyScienceDecisionMatrix.docx** **ScoringRubricSquirmyScience.docx**			
Proposal Process				
50 mins	**SEEKING CONSTRUCTIVE FEEDBACK**: Ability to solicit specific, constructive feedback on a design proposal in order to inform decisions and course for the rest of a design process.	**CONSTRUCTIVE FEEDBACK ON PROJECT PROPOSALS** Present the design proposal to Fabrication Department, then respond to the constructive comments on your design.	Students meet expectations if they: • communicate their design to fabrication department. • respond to criticism with constructive comments that are substantial, related to the assignment objectives, and provide a question or idea. • Finalize their design to include the constructive comments made by fabrication department.	**Modeling and Guided Practice:** 1. Ensure all partnerships and groups have completed their project proposal and have it on hand. 2. Have groups individually present their design proposals to the fabrication department. 3. After receiving the constructive comments student groups will ask questions for clarification, respond with appropriate comments back that may explain a design choice or purpose, and thank the fabrication department. **Closing:** 1. Ask groups/ partnerships to share one piece of helpful feedback they received. 2. Give students time in class to revise their project proposals to incorporate the feedback they received.
	Standards: **SL.7.1.C** : Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.			
	Additional Attachments: **Sample Design Proposal Sheet with Example.docx** **Decision Matrix Practice Mini-Task** **Decision_Matrix** **Sample Design Proposal Sheet Version 2** **Sample Design Proposal Sheet .docx**			
Detailed Design Process				
40 mins	**IDENTIFYING CRITICAL DESIGN COMPONENTS**: Ability to identify subsystems within a design solution that are critical to the success of the design solution.	**SHOVEL ANATOMY** Identify the subsystems within the shovel design and what aspects they affect.	Successful students will identify the following subsystems within the design solution: 1. handle- sliding friction a. grip 2. blade - work, static friction	Check each group to make sure that they are writing down the necessary subsystems. Then ask guiding questions to make sure they connect the appropriate aspect that is affected by that particular subsystem.

			a. shape b. size c. design components that help overcome static friction	
	Standards: Formulate and revise explanations and models using logic and evidence (critical thinking)			
Design Report Writing Process				
45 mins	**COMMUNICATING BACKGROUND ON DESIGN**: Ability to communicate the background on "why we are doing what we are doing."	**CONTROLLING IDEA AND INTRO PARAGRAPH** Using the handout provided, analyze the requirements of a controlling idea and introductory paragraph. Then, compose your own.	**Work Meets or Exceeds Expectations if:** ● The writer establishes a strong controlling idea with a very clear purpose that addresses the task prompt ● The introductory paragraph has a good hook that grabs the reader's attention, states the main topics of the essay, and introduces the main points of each body paragraph. **Work Approaches Expectations if:** ● The writer establishes a controlling idea with a general purpose ● The controlling idea addresses only part of the task prompt ● The introductory paragraph has a hook that is weak ● The introductory paragraph may not contain the main points that will be discussed in the body paragraphs **Work Needs Improvement if:** ● The writer attempts to establish a controlling idea but lacks a clear purpose. ● The controlling idea does not address the task prompt ● The introductory	Assign partners prior to facilitating this lesson. Provide each student with a copy of the Controlling Idea handout. **Controlling idea:** You are going to establish your controlling idea (AKA thesis). We will be using the Controlling Idea handout for this task. Independently read the top portion of the handout that defines and gives examples of controlling ideas. As you read, circle words and phrases that are important to understanding what a controlling idea is. (5 minutes) With a partner, compare the words that you circled and explain your reasoning behind your choices. Together, discuss why each of the examples is a good controlling idea. Also discuss how the examples could be stronger. (10 minutes) Independently and using your notes and annotations from the texts you previously read, practice writing the controlling idea for your essay at least twice. (10-20 minutes) Exchange controlling ideas with your partner and use the Controlling Idea Feedback form to provide feedback to each other, making sure to respond to each question on the form. Sign the bottom of the form and give the completed form to your partner. (10 minutes) Take the time to read the feedback from your partner. Using his or her feedback, revise your controlling idea. (10-20 minutes) *Additional support: Students may require you to come up with a class definition of controlling idea along with a list of requirements. They may also need a few additional examples/ non examples, or for you to think aloud as you develop your own controlling idea. This will provide additional support to students who might struggle to write their own controlling idea. Preferential peer partnering is also an option.* **Introductory paragraph:** Independently read the information about introductory paragraphs. As you read, circle words and phrases that are important to remember when writing

			paragraph lacks a hook and does not present the ideas that will be discussed in the body paragraphs	introductory paragraphs. (5 minutes) With a partner, compare the words that you circled and explain your reasoning behind your choices. Together, discuss why each of the example is a good introductory paragraph. Also discuss how the example could be stronger. (10 minutes) Independently and using your controlling idea and notes and annotations from your readings, use the organizer to write a draft of your introductory paragraph. (20-30 minutes) *Additional support: Students may require you to come up with a class definition of introduction paragraph along with a list of requirements. They may also need a few additional examples/ non examples, or for you to think aloud as you develop your own introductory paragraph. This will provide additional support to students who might struggle to write their own introduction. Preferential peer partnering is also an option.*
	Standards: **W.11-12.5** : Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. **W.11-12.4** : Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. **W.11-12.1** : Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. **W.11-12.2.A** : Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.			
	Additional Attachments: **Controlling Idea and Intro Paragraph** **Dr. Beth Impson's Thoughts on Controlling Idea**			
40 mins	**COMMUNICATING BACKGROUND ON DESIGN**: Ability to communicate the background on "why we are doing what we are doing."	**TBE: WRITING BODY PARAGRAPHS WITH TEXT BASED EVIDENCE** Use the blank paragraph organizer to **identify, explain,** and **support** your claims. Be sure to use text-based **evidence** (including proper **citations**). In addition, make the **connection** between your thesis, claim, and evidence clear.	**Exceeding** • Demonstrates in-depth and insightful analysis of the texts, as necessary to support the claim • Presents ideas fully and thoughtfully, making highly effective use of a wide range of specific and relevant evidence to support analysis • Demonstrate proper citation of sources to avoid plagiarism when dealing with direct quotes and paraphrased material	Teacher notes: • This mini-task should be used *after* students have completed extensive research on their topic, selected a thesis, and organized their argument into subtopics. It is helpful if they have also written their introduction paragraph. • This mini tasks provides a framework for introducing ideas, citing evidence, and explaining this evidence. • Students should be familiar with the concepts of claim, counterclaim, and citation. • See the attachments labeled "another option" for alternative organizers and outlines. **Warm Up** • Project a student or teacher developed model body paragraph. It is helpful if you have a model paragraph that is about a different topic than the one your students will be writing about. You should also photocopy and distribute this example.

At level

- Demonstrates appropriate and accurate analysis of the texts, as necessary to support the claim
- Presents ideas sufficiently, making adequate use of specific and relevant evidence to support analysis
- Demonstrates proper citation of sources to avoid plagiarism when dealing with direct quotes and paraphrased material

Approaching

- Demonstrates some analysis of the texts
- Presents ideas briefly, making use of some specific and relevant evidence to support analysis
- Demonstrates inconsistent citation of sources to avoid plagiarism when dealing with direct quotes and paraphrased material

Beginning

- Demonstrates confused or unclear analysis of the texts
- Presents ideas inconsistently and/or inaccurately, in an attempt to support analysis, making use of some evidence that may be irrelevant
- Demonstrates little use of citations to avoid plagiarism when dealing with direct quotes and paraphrased material

- Explain that this is a paragraph from the middle of the essay. Emphasize that it was proceeded by an introduction paragraph.
- Project the color coding guide attached below.
- In small groups or on their own, students color code (underline or highlight) aspects of the essay in the model.
- Together as a class, go over the parts of the paragraph. Ask students to articulate how they made decisions about color coding the essay.

Modeling

- Introduce the blank paragraph outline. Explain that the paragraph students analyzed in the warm up followed this format. You may type in the sentences from the warm up paragraph into the blank model to emphasize this point.
- If you think your students need to see this process modeled, do a think aloud as you fill out the paragraph outline. Again, it is helpful if you have a model paragraph that is distinct from the topic your students will have to write about.
- As you think aloud, you may want to highlight the following:
  - *How you identified your claim*
  - *How you supported your claim*
  - *How you explained your claim*
  - *The relationship between the thesis, claim, and evidence*
  - *Appropriate citation formatting*
  - *Sentence starters that can be used when talking about how to move from a topic sentence/central idea/thesis TO Supporting text based evidence*
    - *For example, the text says...*
    - *The author writes...*
    - *____ says...*

  - *Sentence starters that can be used when talking about how to move from supporting text best evidence to explaining how text based evidence supports the thesis*
    - *This means...*
    - *This explains...*
    - *In other words...*
    - *This shows...*
    - *When the author does this...*

Practice

- Distribute a paragraph outline to each student. Students should individually complete a paragraph outline from the evidence they have selected.
- Partner students as they finish. Instruct them to check with a partner that all elements of the essay have been included: the claim that connects to the essay thesis; relevant evidence to prove the claim; a citation of the evidence and reasons; explanation or analysis of the evidence.
- Optional: Students can color code the sections of their organizer to double check that all elements are included.

				Closing • Project and discuss exemplary student work. • You have walked your students through the process of composing a body paragraph. They will need to complete the same outline for their other body paragraphs.

Standards:

CCR.R.1 : Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCR.W.1 : Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

CCR.W.4 : Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Additional Attachments:

- **Paragraph Outline Blank .docx**
- **Warm Up Color coded text TBE.pdf**
- **Warm Up Annotated example .pdf**
- **Warm Up Annotation Instructions.pdf**
- **Common Core test level 6 example .docx**
- **Another Option: TBE anchor chart.pdf**
- **Another Option: Argument Outline.docx**
- **Common Core test counter claim level 6 example .docx**
- **Common Core test level 4 example .docx**
- **Common Core test counter claim level 4 example .docx**
- **Resource for Analyzing Evidence**
- **Resource for Introducing Evidence**

35 mins	**GENERATING GRAPHIC OF DESIGN**: Ability to generate a graphical representation (photograph, drawing, CAD rendering, etc.) of the overall design solution in order to orient the reader to the components of the solution.	**PICTURE THIS** Draw or photograph your design and explain all parts.	Students who meet the requirements will include the following: a drawing or photograph of the design with all parts labeled and materials listed.	Begin by showing them some ways to represent their design work, examples will include drawings, photographs, and CAD. Then model how to label all parts, and explain materials.

Standards:

Formulate and revise explanations and models using logic and evidence (critical thinking)

Design and conduct scientific investigations

50 mins	**COMMUNICATING DETAILS OF DESIGN**: Ability to communicate (with words and graphics) the details of a	**LAB REPORT DO'S AND DON'TS** After reviewing and discussing the example and non-example lab reports,	Student has noticed significant differences between the example and non-example lab.	There's a lot of ways you could go with these resources. The guidelines would be useful for proofreading/ editing (or for establishing expectations--it's a lot for a kid to get at once though). Most helpful, I think, are the example and non-example labs.

	design solution and how it is built/executed.	you will write a lab report Do's and Donts in order to inform your lab report writing in this class.		Here's one possible way to go: 1. Begin by having students read the non-example lab independently, followed by the example lab (the third link). Have them write down the differences they noticed. 2. Have students get together in groups of 2-4 to discuss what they noticed. Encourage them to expand their observations into one master list. 3. As a whole class, discuss what distinguishes the example from the non-example lab. 4. As a class, create a poster (that will stay on the wall) with Lab Report Do's and Don't.
	Standards: **CCR.W.5** : Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. **CCR.W.4** : Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.			
	Additional Attachments: **More Guidelines** **Non-example and example** **Example** **General Guidelines**			
50 mins	**COMMUNICATING DETAILS OF DESIGN**: Ability to communicate (with words and graphics) the details of a design solution and how it is built/executed.	**WRITING THE DETAILS OF THE DESIGN: PROCEDURES** After completing your lab, write 2-4 paragraphs explaining the lab procedures. Be sure to include quantitative data (e.g. estimated times and quantities of materials); qualitative data (e.g. preparation tips and techniques); and pictures. This section should be detailed enough for someone to repeat the work you did and obtain equivalent results.	*Student meets expectations if he/she:* • produces 2-4 paragraphs explaining the complete lab procedure • uses enough detail for the procedure to be followed and repeated by a peer to obtain equivalent results • uses complete sentences and passive voice	**Teacher Note:** *This lesson is adapted from a mini-task in the module "Catching Sun with a Donut" (for a link to this mini-task, see below under Teacher Resources). This mini-task assumes that students have recently completed a lab experiment and are familiar with procedural writing.* **Modeling and Guided Practice:** 1. Distribute an example of a scientific article to students. Chose an article that students have read before. 2. As a class, read aloud the **procedure/methods** section. Explain that a procedure is like a "how to" guide for the reader. As you read, think aloud about the replicability, content, organization, and format of the piece. You might choose to: • Define and emphasize the notion of **replicability**--why it is important and how it is achieved. Explain that when scientists write their procedures or methods section, they want to use enough detail so that the steps can be replicated. If students are not familiar with the term, post the definition and explain what replicability is NOT (i.e. one-of-a-kind or unrepeatable). • Discuss how **content and organization** in the procedure/methods section affects replicability. • Note the inclusion of **materials** and the **format** for delivering each step of the procedure. • Discuss the use of **passive voice** for writing the

procedure as opposed to using bullet points or commands.
- Project the slides below (under Teacher Resources).

3. Next, share an example of a **procedure** that is missing some content or is unclear in some way. Find an example and remove some of the content ahead of time or consider writing your own example (e.g. how to write on the chalk board or how to make a peanut butter and jelly sandwich). Consider asking one student volunteer to read aloud this procedure and have another student volunteer attempt to perform the steps in front of the class. Have the rest of the class try to guess which steps are missing (e.g. the procedure explains how to write on the board using chalk, but did not say to take the chalk out of the box).

Partner Work:

Have students practice writing a procedure about a different topic (e.g. explicit instructions on how to walk from the classroom to the bathroom). Assign students partners and ask them to exchange directions and follow the procedures to complete the task. Tell students to be sure to leave the task unnamed so their partners don't know the end product.

Individual Writing Practice:

1. Project the Prompt (see above) or write it on the board.

2. Read it aloud to students and ask them to complete their writing individually. Emphasize the need for including all required sections as described in the prompt. Note: If students need extra support with their writing, distribute the Student Handout below and have the students brainstorm their ideas first.

Closing:

1. After students finish, have them compare their procedures/methods sections with a peer. Project the scoring guide and ask them to provide feedback to their partner based off of these requirements.

2. Have students share out some of their partner discussions with the whole group.

Standards:

CCR.W.4 : Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCR.W.2 : Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

WHST.11-12.4 : Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

WHST.11-12.2 : Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.

Additional Attachments:

	Student Handout - Procedures.docx **Design Procedures.pptx** **Writing the Details of the Design: Procedures** **Procedure Paper 1.pdf**			
50 mins	**COMMUNICATING DETAILS OF DESIGN**: Ability to communicate (with words and graphics) the details of a design solution and how it is built/executed.	**ELABORATING ON GATHERED EVIDENCE** Analyze your evaluated evidence using the focus questions to pull the evidence as a direct quote and paraphrase into the graphic organizer. Then elaborate on the quote to show how the evidence supports your central idea.	*Work Meets Expectations If:* • directly quotes evidence from the text • paraphrases the direct quote • provides an ellaboration of the quote	Before printing the graphic organizer below. Modify the questions in the left column to align with the Critical Focus Question and Teaching Task. 1. Hand out the graphic organizer to the students that is attached below in the student handouts. 2. Students will first record the title of the article at the top of the page in order to avoid plagiarism. Module how to do this with an article so the students know what information is needed to do a proper citation. 3. Students will pull the evidence from the articles according to their evaluation (The mini-task for this practice is Evaluating Evidence of Annotation) If the students have not done the previous mini-task I would have the students first evaluate their evidence before putting it into the graphic organizer. 4. Students could either direct quote or paraphrase. You may want them to do both if they need to practice this skill. 5. Students will use their rationale from the evaluate evidence mini-task to elaborate on their evidence. If the students have not done the previous mini-task then have them justify why the evidence supports their claim or central idea. 6. Have the students share their elaboration of evidence with partner. **Second graphic organizer "Interpret the Evidence" is a variation with out the use of the guided questions.** Step one: Students cite the article and critical focus question at the top of the handout. Step two: First column "Evidence from the text": (Select key ideas or evidence from the text that supports your purpose for reading). Step Three: Second column "I Say": (What is your interpretation, or connection related to this selection from the text?). Step four: Third column "And So": (So what? What is this important? What are you going to do with this information?) Step five: Students use each row to create a paragraph on the back of the handout or in their notebook.
	Standards: Differentiate between types of cellular reproduction. (DOK 1) • Main events in the cell cycle and cell mitosis (including differences in plant and animal cell divisions			

- Binary fission (e.g., budding, vegetative propagation, etc.)
- Significance of meiosis in sexual reproduction
- Significance of crossing over

CCR.R.1 : Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

CCR.R.2 : Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

CCR.R.10 : Read and comprehend complex literary and informational texts independently and proficiently.

Additional Attachments:

Close Read.docx
Six examples of Interpreting the Evidence.docx
Bacteria Articles.docx
Fungal and Parasite.docx
Virus Excerpts CNN, CDC, and Virus.docx
Interpret_the_Evidence20160229-3-1l0e1u6 (6).docx

50 mins	**DEFENDING DESIGN AS MEETING REQUIREMENTS**: Ability to clearly articulate (using evidence) how the design solution meets the original design requirements	**OUTLINE FOR WRITING AN ARGUMENT** Create an outline based on your notes and reading in which you state your claim, sequence your points, and note your supporting evidence.	*Work Meets Expectations If:* • Creates an outline or organizer. • Supports controlling idea. • Uses evidence from texts read earlier.	Provide and teach one or more examples of outlines or organizers. Pass out the Argument Outline Handout. Invite students to generate questions in pairs about how the format works, and then take and answer questions. Students complete Argument Outline Handout. Mini-conferencing with students while they work. Approve completed outlines and take home to read if needed. ***Notes:*** The Argument Outline is an LTF adapted template for writing the persuasive essay. Earlier in the year it would be helpful to read several articles during which you dissect ALL elements of an argument and counter-argument. In addition, students should analyze all components of an argument by reading exemplar models written by published authors (the informational texts included in this module). ***Accommodations and Interventions:*** Students needing extra support will benefit from the format of the Outline. More advanced students have the option to be more creative with their writing and don't necessarily have to follow the outline perfectly.

Standards:

CCR.W.5 : Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.

CCR.W.2 : Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

CCR.W.1 : Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.

Additional Attachments:

	Outline for Writing an Argument			
50 mins	**APPENDING TECHNICAL INFORMATION**: Ability to organize and communicate all technical reports, data from sub-system test reports, specific experimental protocols, etc. into an easy-to-navigate appendix to be used by the reader as needed.	**DON'T FORGET TO HITCH YOUR TRAILER** Get your appendix (trailer) in order and hitch it.	Students who successfully meet the requirements will attach all data/data tables, test reports, and technical reports in order of how they are mentioned in the final design report with appropriate labels.	Read through final design report and make a note of where and which data, etc... is mentioned. Then go through your data/data tables, technical reports, and test reports and place them in the same order. Lastly check to make sure you have labelled them the same in the report as you have in the appendix and make sure it is included in your final design report.
	Standards: Communicate and support a scientific argument Use technology and mathematics to improve investigations and communications			
30 mins	**WRITING AN EXECUTIVE SUMMARY**: Ability to write a brief, comprehensive, and accurate summary of an issue/need and designed solution to that need.	**EXIT TICKET: CLAIM STATEMENT** Create a claim statement (several sentences) that • Describes the main idea of your paper and the main argument that you are trying to make • Offers your readers a quick preview of what your paper is going to be about • Makes an argumentative assertion • Focuses your paper on a very specific, debatable point • Gives your audience guidance about the conclusions you draw in the paper	Student creates a claim statement that meets all the requirements of the task.	What Is a claim statement? • A position statement for an argument How Should I Write a Thesis Statement? Claim + Reason = Claim Statement • After reading all texts in the module, have students answer the essential question and make their claim (using "because" to support their claim). • Use examples in the teacher resources to teach this concept. • As students write their papers, go back to the essential question and review their claim statement to make sure that their papers are staying on point. • After claim statements are written, have students exchange and give peer feedback.
	Standards: **W.11-12.1.A** : Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.			
	Additional Attachments: writing a claim statement			
20 mins	**FINALIZING A**	**COVER IT**	Successful students will	Show them an example of a title page which has all of

	TITLE PAGE: Ability to make a title page with appropriate identifying information.	Create a title page to cover your design report.	have a completed title page that includes the following information: 1. name of project 2. name of students on the team 3. date	the necessary information and in the correct format.
	Standards: **WHST.11-12.7** : Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.			
50 mins	**PROVIDING PEER REVIEW FEEDBACK**: Ability to provide meaningful feedback on a design report for a partner	**GROUP PEER REVIEW** 1. Assign the following roles to each group member for peer review: Clarity Crusader, Proofreader, Structure Czar, and Example Exemplar. 2. Read each others' papers in your assigned role; giving feedback to help improve each others' writing. 3. Respond to the closing question: How did this process help to improve your paper? Be sure to include specific details in your response.	Meets Expectations if Student: • Provides specific examples that will improve their peers' writing. • Offers feedback to their peers that is respectful. • Reflects on the feedback received to their own paper and plans revisions.	**Note to Teacher:** Attached are a set of student handouts (see Peer Review Roles under Student Handouts) to help students with this process. This can be done using the Peer Review Roles handouts or in a number of other ways: • Have students come to class with four copies of their essay. Each student gets a copy of the essay and makes comments directly on their copy of the essay. • Have each student bring a single copy of their essay to class. Each student has a different color of a highlighter and a pen and make comments on the single copy of the essay. Project a copy of the student handout on the board. • Have each student bring a single copy of their essay to class and photocopy a full class set of the Peer Review Roles handout. Students get different colors of highlighters and make comments linked to highlighted parts of the essay on the handouts provided. **Direct Instruction:** Review each of the roles for students. If students are not familiar with these roles, direct instruction may be necessary. This would probably take a single class period. 1. Present each of the roles to the class. 2. Give the students a sample copy of a paper for them to edit. 3. Focus on one of the roles. Together, with you modeling and then students giving their ideas, go through the paper in this role. 4. Do the same for each of the roles. 5. **Ticket out the door:** Students write on a 3 x 5 card or small slip of paper about how this process helped to improve their paper. Remind the students that it is important to include specific details during this closing writing activity. **Practice:** 1. Students move to groups of four students and receive the Peer Review Roles handout. 2. Based on strengths, students will assign roles within their groups 3. Students will pass their papers to each of their group members until each student has reviewed all

				three papers. 4. **Ticket out the door:** Students will write on a 3 x 5 card or small slip of paper about how this process helped to improve their paper. 5. **Homework**: Students will make necessary changes to their work based on their peers' feedback.
	Standards: **CCR.W.5** : Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.			
	Additional Attachments: **Peer Review Roles.docx**			
50 mins	**MAKING TECHNICAL REVISIONS**: Ability to proofread and format a final paper	**USING ARMS TO REVISE** You will use the ARMS strategy to systematically revise your writing and give feedback to others about their writing.	Complete: • Evidence of feedback: ◦ Added words or sentences ◦ Removed words or sentences ◦ Moved words or sentences ◦ Substituted words or sentences Not Complete • Missing or incomplete feedback	• Explain: When we revise our writing, we are looking at the ideas and progression of the writing. To help you revise your writing, we are going to use the **ARMS** strategy. • Display ARMS strategy: ◦ **A**dd words or sentences where information is missing or lacking development ◦ **R**emove words or sentences that do not fit or are repetitive ◦ **M**ove words or sentences around to help the flow of the essay ◦ **S**ubstitute weak words and/or sentences with more specific vocabulary • Briefly review the **ARMS** strategy with the students (if it has been taught before). • For students unfamiliar with this strategy, more time will be needed for modeling: ◦ Model how (any why) to add, remove, move, and substitute words/sentences with an example text (suggestion: use a piece of your own writing as an example to revise) • Assign students partners. Instruct students to use this strategy on their partner's writing. • Monitor and assist as needed • Invite students to conference when revisions are complete, encouraging them to explain the changes they made to their partner. Note: "Additional Peer Revision" and "Peer Checklist for Revision" below offer different revision strategies.
	Standards: **CCR.W.5** : Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.			
	Additional Attachments: **Peer Checklist for Revising with a little Editing** **Additional Peer Revision Resource** **Use ARMS to Revise**			

Presentation (Optional Extension Process)

Instructional Resources

Teacher Resource

- **Catching Sun with a Donut Design**
- **Squirmy Science Design Module for Ecology Unit**
- **Battelle Mini-Task Collection**

Section 4: What Results?

Student Work Samples

Advanced

- Student Report 4.pdf

Approaches Expectations

- Student Report 2.pdf

Meets Expectations

- Student Report 3.pdf
- Student Report 1.pdf

Teacher Reflection

Not provided

All Attachments

- Science Direct blade size and weight effect : https://s.ldc.org/u/44zdim98agd15arnvveadh9yi
- NASA design comparison of two shovels : https://s.ldc.org/u/6bz0gff4w0o1g6h0fgz7182hu
- Ergonomics of shovelling and shovel design : https://s.ldc.org/u/850uikh0w5gr2qanzyxt5oyku
- Dig It Request for Proposal LDC.docx : https://s.ldc.org/u/def53gz2ihuln7w9wviwbek3g
- Student Report 4.pdf : https://s.ldc.org/u/dsgz9ifz68tpxsuc8tdbw3it2
- Student Report 2.pdf : https://s.ldc.org/u/ec81nr2img1zt6f1o3i12ovi
- Student Report 3.pdf : https://s.ldc.org/u/3ce35c062mcgr7530tkzhjx3u
- Student Report 1.pdf : https://s.ldc.org/u/6r3oqnub4sj6nqiimjw9aeby2
- Catching Sun with a Donut Design : https://s.ldc.org/u/c1pc1caugf5sk595hi1f979la
- Squirmy Science Design Module for Ecology Unit : https://s.ldc.org/u/1opmocsaqvnnal3cvxi25mtt5
- Battelle Mini-Task Collection : https://s.ldc.org/u/wdunvkggiwzdgjbe1hrhf7ph

THE PAST FOUNDATION

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section IV: High Schools that Work

Submitted by: Diana Rogers, Rural LDC HSTW Coach and Partner

July 31, 2017

High Schools That Work Report to Monica – Updated July 18, 2017
Submitted by Diana Rogers, Rural LDC HSTW Coach & Partner

Report Components:

- Narrative Summary of Implementation Tasks
- Appendices – HSTW Key Deliverables
  - HSTW Chronology – August 29, 2016 though June 12, 2017
  - HSTW On-site Coaching Reports
  - HSTW Virtual Coaching Reports
  - HSTW Monthly Liaison & Evaluation Team Reports
  - December 9, 2016 – PowerPoint Presentation: Rural LDC Science & Literacy – Modules 1
  - March 24, 2017 – PowerPoint Presentation: Rural LDC Science & Literacy – Modules 2
  - May 3, 2017 – HSTW NE Ohio Region – End of Year Reconnect & Best Practice Showcase: Agenda, PowerPoint Presentations for HS and MS and Rural LDC Best Practice Newsletter
  - May 10 & 17, 2017 – Cohort 2 Rural LDC Workshops: HSTW Concept Design Process poster, see Live Binder Resource List
  - HSTW Award Letters for Scholarships to Northwestern Local Schools (Amanda Michalak), and Black River Local Schools (Jill Beiser) to attend and present at the College and Career Readiness Conference, Nashville, July 10-12, 2017
  - July 10-12, 2017 – College and Career Readiness Conference, Nashville: Registration information
  - July 11, 2016 - College and Career Readiness Conference, Nashville PowerPoint Presentation: *Working to Improve STEM through LDC,* Rural LDC Best Practice Newsletter and other handouts: Bioenergy Module, RFP, Design Reports
  - July 13- 14, 2017 – National LDC Review of Modules: Rural LDC Report on feedback from the national review (Kara will have ready on July 18, 2017)

High Schools That Work Report to Monica – Updated July 18, 2017
Submitted by Diana Rogers, Rural LDC HSTW Coach & Partner

Narrative Summary of Implementation Tasks: "How we did it!"

Tasks include:

1) Professional Development Support
2) On-site Coaching and Classroom Observations
3) Virtual Coaching Support/Feedback
4) Monthly District Liaison & Evaluation Team Meetings
5) Local, Regional and National Rural LDC Presentations & Rural LDC Best Practice Newsletter & Handout Materials (Dec 9, 2016, March 24, 2017, May 3, 2017, July 11, 2017)
6) Summary of Cohort 1 HSTW Direct Financial Support for 2016-2017
7) Cohort 2 Rural LDC Project Support 2017-2018

1) Professional Development (PD) Support

High Schools that Work (HSTW) provided support to Battelle Education during the Rural LDC Cohort 1 teacher professional development series. Support included five HSTW Coaches attending all five PD sessions and supporting Battelle by working with small groups of teachers and to provide facilitation, feedback, and resources. HSTW created two PowerPoint presentations that highlighted the teachers' work at the end of LDC Science modules 1 (Dec 9, 2016) and 2 (Mar 27, 2017) with a description of their teaching tasks and photos of classroom instruction. These presentations were shared with administrators, media, partners and teachers. HSTW was also involved with the facilitator/partners debriefing after each PD session by sharing insights on challenges, benefits, and contributing ideas and suggestions for improvements. By engaging with teachers during PD, HSTW Coaches established a personal relationship and built trust among the teachers, resulting in coaches and teachers willing to work together to provide "honest" and critical feedback during the on-site visits without worry of "failure."

High Schools That Work provided support to Loudonville-Perrysville School District in the design and facilitation of Rural LDC Cohort 2 teachers professional development Days 1 and 2. HSTW assisted the district leadership with creating a new facilitation design, communication with teachers, building a Google folder for Cohort 2 teachers and developing materials and facilitation.

2) On-site Coaching and Classroom Observations

High Schools that Work conducted on-site coaching with Cohort 1 Rural Collaborative teachers (n=15) across the five districts. Site visits were documented using the "Rural LDC HSTW Coaching Report." The HSTW Coaches conducted 3 site visits with each school district during the period of October 5 through December 5, 2016 and 3 site visits with each school district January 9 through March 21, 2017 (see *Appendix A: Chronology of Rural LDC Activities by High Schools That Work, Fall 2016 and Winter/Spring 2017)*.

Table 1 provides a summary of work conducted with districts, including the assigned HSTW coaches, and the number of on-site and virtual coaching days provided. In addition to the grant funding, HSTW NE Ohio Region contributed an additional $14,000 in coaching support and services during the 2016-2017 through a grant from the Ohio Department of Education.

TABLE 1: HSTW Coach Summary of Work by District (2016-17)

Rural LDC Districts Year 1 Cohort 1 Teachers	Assigned HSTW Coaches	Services Provided
Black River: 3 teachers grades 5, 7, 11-12	Gwen Bryant, Barb Nichols, Angela Smith, Kara Mitchell	5 on-site visits, 2 virtual feedback sessions
Hillsdale: 3 teachers, grades 6, 9, 11-12	Gwen Bryant, Barb Nichols, Angela Smith, Kara Mitchell	5 on-site visits, 2 virtual feedback sessions
Loudonville-Perrysville: 3 teachers, grades 7, 10, 11-12	Barb Baltrinic, Susan Rhoades, Diana Rogers, Kara Mitchell	5 on-site visits, 2 virtual feedback sessions
Mapleton: 3 teachers, grades 6, 9 and 11-12	Gwen Bryant, Barb Nichols, Angela Smith, Kara Mitchell	5 on-site visits, 2 virtual feedback sessions
Northwestern: 3 teachers, grades 7, 10, 11-12	Barb Baltrinic, Susan Rhoades, Diana Rogers, Kara Mitchell	5 on-site visits, 2 virtual feedback sessions

Rural LDC HSTW Coaches Expertise & Experiences

- Kara Mitchell served as a Rural LDC HSTW Virtual Coach providing feedback on Cohort 1 modules and in working with teachers to prepare their modules for national review; provided mentoring for all Rural LDC HSTW Coaches; trained in Ohio (Battelle Education) and nationally (SREB/LDC) as an LDC certified trainer;

certified by LDC nationally to calibrate and provide feedback on modules for exemplar status; 6 years LDC classroom experience including collaborating with building administrators and a pilot teacher team in implementing LDC school wide in grades 9-12; 11 years ELA teaching experience in grades 9-12

- Diana Rogers served as the Rural LDC Lead HSTW Coach providing training, mentoring and oversight of the Rural LDC HSTW Coaching Team; 6 years experience in working with LDC at the local, region, state and nationally; state and national trained in LDC and in national LDC calibration and review of module for exemplar status; 32 years experience in working with schools, districts, grant writers and administrators

- Gwen Bryant served as an on-site coach and mentor for Rural LDC HSTW Coaches; trained in Ohio and nationally as an LDC coach and facilitator, nationally trained Marzano school improvement coach; 6 years LDC experience; 25 years in the classroom

- Barb Baltrinic is a regionally trained LDC coach with 6 years of experience as a school improvement/literacy coach; 5 years experience in postsecondary working with student teachers; 30 years experience in the classroom teaching secondary ELA

- Barb Nichols is a regionally trained LDC coach with 6 years of experience as a school improvement coach; 30 years experience in the classroom teaching science in a career technical center

The HSTW Coach generates a HSTW Coaching Report during the on-site visits to a classroom/school. During on-site visits the coaching reports are intended to document particular coaching work and feedback from teachers including:

- Teacher progress in developing their LDC module and mini-tasks
- Collaboration with other teachers
- Feedback on Battelle training sessions and follow-up support
- Questions, comments/concerns related to LDC module implementation

- Teacher requests for areas of additional support from BEd and/or HSTW Coaches.

The coaching reports also include information about next steps proposed by the coach, detailing specific resources to be sent by the HSTW Coach to teachers, and/or the specific items expected from the teacher by a specific date, and in some cases date, time and location of the next on-site visit. See *Appendix G in the Mid-Year Report* for a list of teacher resources made available by HSTW to Cohort 1 Teachers during fall 2016.

Written coaching reports were emailed to the teachers for review and comment. If corrections or additions to the HSTW Coaching Report were requested, the reports were updated with additional suggested changes made by a teacher to fully reflect the teacher's coaching experience. The final reports were emailed to the teacher, District Liaison and the Evaluation Team. As a follow- up, the HSTW Coaching Team participated in a team debrief session to share information reflected in the reports to determine individual teacher needs and to establish the specific issues to track within and across districts, or additional teacher feedback to collect on subsequent visits. From January through March 2017 the HSTW Coaches planned and reflected monthly during a one-hour virtual conference via a web-based platform (Zoom®).

A review of issues identified in the coaching reports shows the following areas concerning project implementation over the course of three visits held from 10/5/16 to 3/21/17. Teacher coaching reports reflect both HSTW observation of classroom work with LDC Modules and one-on-one discussion gaining teacher feedback on their experience over the course of the fall 2016 Module 1 and winter/spring 2017 Module 2 implementation process.

- *Project supplies:* 3 of the 5 districts experienced delays in receiving project materials, causing delays initiating LDC projects in their classroom. This included 3 middle school classroom teachers and 3 high school classroom teachers.

- *Time management:* 4 teachers representing 4 districts felt they needed more coaching support to improve managing time to create and implement their LDC modules in their classrooms. Teachers (2 middle school/2 high school) also stated that they would benefit from having substitute time to better focus on working with on-site coaches to complete their module.

- *Skills in use of LDC Core Tools:* HSTW coaches noted that in some cases teachers reported that the process for uploading their module to the LDC Core Tools website was lengthy, involving up to 4-5 hours, while other teachers were able to upload their modules easily. This may reflect differences in teacher basic web skills.

- *Teacher Collaboration:* During fall 2016, (8) teachers in (4) districts (3 middle school/5 high school) reported some type of collaboration with Cohort 1 teachers/District Liaisons within their districts; and, (10) teachers in all (5) districts (5 middle school/5 high school) reported collaboration with non-cohort teachers within their district. Only (3) teachers (1 middle school /2 high school) reported cross-district collaboration with Cohort 1 Teachers/District Liaisons in other Rural Collaborative districts. (See Figure 1: Teacher Self-Reported Collaboration Associated with LDC Classroom Implementation (HSTW Coaching Reports, Fall 2016)

- *Student Collaboration:* (9) teachers across all (5) districts commented on LDC impact on student collaboration, including (3) middle school and (6) high school teachers.

- *Student Engagement:* (3) middle school classes in (3) districts showed positive student engagement either through observation by the HSTW coach or noted by the teacher. In three districts, (4) teachers (1 middle school /3 high school) stated that they thought their students would encounter challenges with LDC Module work, including writing the required report.

As a result of the feedback received from teachers during the on-site coaching visits and from the following survey questions from the Cohort 1 Post Survey (March 14, 2017), HSTW working with select district partners upon request, provided substantive ancillary support to the district and teachers:

Question #26 – 80% of teachers responded that it was very important or somewhat important to speak with the principal about the LDC modules

- Response: January 30, 2017 – Rural LDC Partners hosted an administrators meeting for all 5 districts to discuss progress, respond to questions about outcomes, and determine the design and leadership desired for Cohort 2 trainings. After on-site coaching visits, the Rural LDC HSTW Coach met with the district liaison/principal when possible to debrief each teacher's progress in completing their modules and meeting the expectations for Cohort 1 teachers. Principals were included in select email to teachers with updates on a teacher's progress and when encouragement or support was needed.

Question #27 – 87% of teachers responded that it was very important or somewhat important to inform the community about the Rural LDC initiative – LDC modules

- Response: December 9, 2016 and March 24, 2017 – The local papers were invited to the final "showcase of Modules 1 and 2" and share the information with the community in community news articles; May 3, 2017 HSTW NE Ohio Region End of Year Reconnect – 70 administrators and teachers leaders attended presentations by the Rural LDC HS and MS teachers sharing the Rural LDC project with the HSTW NE Ohio "community". (See Mid-Year Report Appendix D.)

Question #30 - 53% of teachers responded to a question about spending 15 or more hours in completing Module 1

- Response: At the January 30, 2017 administrators meeting, Loudonville-Perrysville volunteered to lead the workshop redesign for May 10 and 17, 2017 Cohort 2 Workshop Series. HSTW and Battelle Education provided support in this process. HSTW deliverables included:

- May 10 & 17, 2017 Cohort 2 Workshop design feedback - feedback on the agenda, teacher expectations, Big Ideas, Instructional Ladder, set up Google folders for each teacher, provided feedback to Loudonville-Perrysville on new training documents

- Concept Design Process posters – printed and distributed at Cohort 2 Workshop Series implementation design changes to simplify the process and align with the STEM education approach

3) Virtual Coaching Support/Feedback

High Schools that Work offered Virtual Coaching Support/Feedback to Cohort 1 teachers during the development and implementation of Module 2 (during winter/spring 2017). A nationally trained LDC virtual coach and evaluator reviewed teachers' second Module in LDC Core Tools and provided the teacher and On-site Coach with detailed feedback. HSTW On-site Coaches provided feedback during face-to-face on-site coaching visits. The purpose of adding HSTW Virtual Coaching Support/Feedback was to improve the feedback cycle to teachers while also improving the HSTW On-site Coaches feedback skills and knowledge shared by the nationally trained LDC coach and evaluator.

4) Monthly District Liaison & Evaluation Team Meetings

High Schools that Work provided monthly reports of the HSTW On-site Coaching and regional/national presentation opportunities. During these meeting, information was shared; services were explained, clarified and re-directed based upon the feedback received. In addition to the HSTW Straight A Grant, sub-grant funding, HSTW NE Ohio Region provided financial support for coaching, supplies and presentation grants awarded to select teachers and district representatives to attend and present at regional and national conferences.

HSTW participated in monthly evaluation team meetings with Northwestern Local Schools (NWLS), Battelle Education and the PAST Foundation. Data, information and survey questions were reviewed and discussed. HSTW provided numerous reports to NWLS and PAST upon request.

5) Local, Regional and National Rural LDC Presentations & Rural LDC Best Practice Newsletter & Handout Materials (Dec 9, 2016, March 24, 2017, May 3, 2017, July 11, 2017)

High Schools That Work delivered on the promises/tasks proposed in the grant application to promote and sustain the Rural LDC project. HSTW showcased the Rural LDC Module 1 and 2 during the following events:

- December 9, 2016 and March 24, 2017 with PowerPoint presentations that included the description of each teachers modules and photos
- May 3, 2017 End of Year Reconnect for HSTW NE Ohio Region with 6 teachers from 3 of the 5 districts presenting with a PowerPoint presentation and Rural

LDC Best Practice Newsletter

- July 11, 2017, National LDC Nashville Presentation: Working to Improve STEM through LDC with a teacher and District Liaison presenting with HSTW using a customized PowerPoint and handouts

6) Summary of Cohort 1 HSTW Direct Financial Support for 2016-2017

Table 2 presents detailed information on the direct financial support provided by HSTW NE Ohio Region for work conducted through July 2017. (The Straight A sub grant services contract to HSTW is not included in this table.)

TABLE 2: HSTW NE Ohio Region Direct Financial Support (2016-17)

Support/Services	Detailed Description	HSTW Funding
Professional Development Support	Program management and coaching support/mentoring for Cohort 1 PD; Design and facilitation of Cohort 2, May 10-11 sessions	$4,000
Cohort 1 On-site/ Virtual Coaching	Program management and coaching support/mentoring of HSTW Coaches during on-site and virtual coaching	$5,000
Monthly Liaison & Evaluation Meetings	Project management, ongoing communication and evaluation report development	$7,500
Region, State and National Presentations	Program management and support for HSTW Coaches, Cohort 1 teachers, district representatives in preparing and presenting to include districts grants of $1,000 - $2,000 to cover travel costs	$4,000
HSTW Best Practice Newsletters	Program management and support for the layout, design, printing, and distribution of newsletters to districts and online (1,500 copies @ 200 copies per district and 500 for presentations)	$4,000
Total Contribution		$24,500

7) Cohort 1 & 2 Rural LDC Project Support 2017-2018

- Cohort 1 Professional Development Support – HSTW working with Battelle Education will continue to provide PD support for select Cohort 1 teachers in developing their co-facilitation and mentoring skills. HSTW Coaches will participate in the Cohort 1 trainings (Aug 4, 7 and 28, 2017), assist three teachers to edit their modules for national review, and compensate two Cohort 1 teachers as co-facilitators during Cohort 2 PD sessions (Aug 31, Sep1, Sep 12, Nov 21, 2017; Mar 7, 2018).

Following is a table of the HSTW Coaches proposed support and services for Cohort 1 Teachers in Year 2.

TABLE 3: HSTW Proposed Cohort 1 Support/Services, 2017-18

Rural LDC Districts Year 2 Cohort 1 Teachers	Assigned HSTW Coaches	Proposed Support/Services
Black River 2 teachers	Barb Baltrinic, Kara Mitchell, Diana Rogers	2 PD sessions, on-site and virtual support as requested
Hillsdale 1 teacher	Barb Nichols, Kara Mitchell, Diana Rogers	2 PD sessions, on-site and virtual support as requested
Loudonville 1 teacher	Barb Nichols, Kara Mitchell, Diana Rogers	2 PD sessions, on-site and virtual support as requested
Mapleton 1 teacher	Barb Baltrinic, Kara Mitchell, Diana Rogers	2 PD sessions, on-site and virtual support as requested
Northwestern 2 teachers	Barb Nichols, Kara Mitchell, Diana Rogers	2 PD sessions, on-site and virtual support as requested

• Cohort 2 Professional Development/On-Site & Virtual Coaching Support – HSTW working with Battelle Education and the five, Rural LDC school districts will continue to provide professional development support for Cohort 2 teachers in developing two LDC Science modules during the 2017-2018 school year. HSTW Coaches will assist in the design, facilitation and feedback at the five professional development sessions (Aug 31, Sep 1, Sep 12, Nov 21, 2017; Mar 7, 2018) and during on-site and virtual coaching sessions.

Table 4 presents proposed support and services for Cohort 2 Teachers in Year 2 (2017-18) by HSTW Coaching Team.

TABLE 4: HSTW Proposed Cohort 2 Services/Support, 2017-18

Rural LDC Districts Year 2 Cohort 2 Teachers	Assigned HSTW Coaches	Proposed Services/Support
Black River 2 teachers	Barb Baltrinic, Kara Mitchell, Diana Rogers	5 on-site visits and 2 virtual feedback sessions
Hillsdale 3 teachers	Barb Nichols, Kara Mitchell, Diana Rogers	5 on-site visits and 2 virtual feedback sessions
Loudonville	Barb Nichols, Kara Mitchell,	5 on-site visits and 2 virtual

3 teachers	Diana Rogers	feedback sessions
Mapleton 3 teachers	Barb Baltrinic, Kara Mitchell, Diana Rogers	5 on-site visits and 2 virtual feedback sessions
Northwestern 3 teachers	Barb Nichols, Kara Mitchell, Diana Rogers	5 on-site visits and 2 virtual feedback sessions

- Monthly Liaison & Evaluation Team Meetings
  - Ongoing HSTW participation in monthly liaison meeting and providing monthly reports uploaded in the Google folder.
  - Ongoing HSTW participation in evaluation team meetings with reports and information provided upon to NWLS request.

- Local, Regional and National Rural LDC Presentations & Rural LDC Best Practice Newsletter & Handout Materials 2017-2018

High Schools That Work will continue to meet the schedule of deliverables proposed in the Straight A Grant application to promote and sustain the Rural LDC project. HSTW will support teachers and district liaisons to present at local, regional, state, and national meetings and conferences as follows:

- October 2017 PLTW National Conference; presentation by two Cohort 1 teachers from Northwestern High school on Rural LDC and PLTW with HSTW fiscal and handout support.
- November 16-17, 2017 Ohio School Improvement Institute; presentations by Cohort 1 and 2 teachers, district liaisons and HSTW with customized PowerPoint and handouts.
- July 2018 – HSTW 32nd Staff Development Conference, Orlando; presentations by Cohort 1 and 2 teachers, district liaisons and HSTW with customized PowerPoint and handouts.

- HSTW Best Practice Newsletter - Rural LDC Cohort 1 & 2 Year 2 – to use at local, regional, state and national presentations and meetings.

- Summary of HSTW Direct Financial Support for 2017-2018. Table 5 presents direct funding to be provided by HSTW for support and services for Cohort 1 and 2 during year two of the Rural LDC Project. These funds are supplemental to the Straight A Grant Funding provided for year two of the Rural LDC Project.

TABLE 5: HSTW Cohort 1 and Cohort 2 Support and Services, 2017-18

Support/Services	Detailed Description	HSTW Funding
Professional Development Support	Attend Cohort 1 and 2 PD sessions by three HSTW Coaches; contract with two Cohort 1 teachers to co-facilitate Cohort 2 PD;	$10,000
Cohort 1 On-site/ Virtual Coaching	Provide 5 on-site and 2 virtual sessions per district by two coaches	$5,000
Cohort 2 On-site/ Virtual Coaching	Provide 5 on-site and 2 virtual sessions per district by two coaches	$8,000
Monthly Liaison & Evaluation Meetings	Attend monthly meetings, prepare reports, upload to Google folder	$3,500
Region, State and National Presentations	Prepare presentation documents and upload to Google folder. Attend meetings/ conferences with district representatives; award district $1,000 - $2,000 presentation grants	$6,000
HSTW Best Practice Newsletters	Layout, design, printing, distribution both online and direct with 1,500 copies for presentations and to each district	$4,000
Total Contribution		$36,500

APPENDIX
Section IV: High Schools that Work

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative

Appendix A:
HSTW Chronology – August 29, 2016 through June 12, 2017

Appendix B:
HSTW On-site Coaching Report Template

Appendix C:
HSTW Monthly Liaison & Evaluation Team Reports

Appendix D:
March 24, 2017 – PowerPoint Presentation:
Rural LDC Science & Literacy – Modules 2

Appendix E:
May 3, 2017 – HSTW NE Ohio Region – End of Year Reconnect & Best Practice Showcase: Agenda, PowerPoint Presentations for HS and MS and Rural LDC Best Practice Newsletter

Appendix F:
May 10 & 17, 2017 – Cohort 2 Rural LDC Workshops: HSTW Concept Design Process poster and Live Binder Resource List

Appendix G:
HSTW Award Letters for Scholarships to Northwestern Local Schools (Amanda Michalak), and Black River Local Schools (Jill Beiser) to attend and present at the College and Career Readiness Conference, Nashville, July 10-12, 2017

Appendix H:
July 10-12, 2017 – College and Career Readiness Conference, Nashville: Registration information

Appendix I:
July 11, 2016 – College and Career Readiness Conference, Nashville PowerPoint Presentation: *Working to Improve STEM through LDC*, Rural LDC Best Practice Newsletter and other handouts: Bioenergy Module, RFP, Design Reports

Appendix J:
July 13-14, 2017 – National LDC Review of Modules: Rural LDC Report on feedback from the national review

Report to The PAST Foundation for NWLS Straight A Grant

Chronology of Rural LDC Activities by *HSTW* LDC Coaches

August 29, 2016 through June 6, 2016 (page 1 of 4)

Submitted: June 12, 2017, by Diana Rogers, Regional Coordinator

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Mapleton

Staff	Date	Event/Activity	Documentation Product	Participants
Diana Rogers (DR)	8/29/16	Monthly LDC Liaison Mtg Northwestern (2 hrs)	*HSTW* LDC Introductory PowerPoint	See *Rural LDC Collaborative Participant Contact Information*
DR, Barb Baltrinic (BB), Barb Nichols (BN), Angela Smith (AS)	9/7/16	Rural LDC Meeting and Social, Jake's of Wooster (2 hrs)	*HSTW* LDC Introductory PowerPoint for district reps	See *Rural LDC Collaborative Participant Contact Information*, invited district guest; See S Smith for the sign-in sheet
DR, BN	9/20/16	Monthly LDC Liaison Mtg. Mapleton (2 hrs)	No *HSTW* products	See *Rural LDC Collaborative Participant Contact Information*
DR, Gwen Bryant (GB), BB, BN, AS	9/28/16	*HSTW* LDC Coaches Training Day, Wayne Co. Sch CTC (5 hrs)	*HSTW* LDC Coaching Notebook and handouts	No additional participants. Closed training *HSTW* LDC Coaches only
DR, Gwen Bryant (GB), BB, BN	9/29/16	Battelle Training Day 1 Northwestern (7 hrs)	Battelle Training Materials provided No *HSTW* products	See *Rural LDC Collaborative Participant Contact Information*; S Smith for the sign-ins
DR, Gwen Bryant (GB), BB, BN	9/30/16	Battelle Training Day 2 Northwestern (7 hrs)	Battelle Training Materials provided No *HSTW* products	See *Rural LDC Collaborative Participant Contact Information*; S Smith for the sign-ins
BN, DR	10/5/16	On-Site Visit at Mapleton (2 hrs)	*HSTW* LDC Coaching Report	L Bowers, Liaison, three teachers: J Otis, T Bunt, L Colosimo
BN, DR	10/5/16	On-Site Visit at Hillsdale (3 hrs)	*HSTW* LDC Coaching Report	J Stump, Liaison; two teachers: T Cline, M Williams
BN, DR	10/6/16	On-Site Visit at Black River (3 hrs)	*HSTW* LDC Coaching Report	J Beiser, Liaison; three teachers: S Infantino, CVanDoren, MYocum
BB, DR	10/11/16	On-Site Visit at Northwestern (4 hrs)	*HSTW* LDC Coaching Report	J Zody, Liaison; three teachers: J Hagans, A Michalak, KWoodruff
BN, DR	10/12/16	On-Site Visit at Loudonville (3 hrs)	*HSTW* LDC Coaching Report	C Puster, Liaison; three teachers: K Aubel, J Conley, K Carnegie
BN	10/12/16	On-Site Visit at Hillsdale (1 hr)	*HSTW* LDC Coaching Report	J Stump, Liaison; teacher LBowen
DR, GB, BB, BN, AS	10/14/16	Battelle Training Day 3 Northwestern (7 hrs)	Battelle Training Materials provided No *HSTW* products	See *Rural LDC Collaborative Participant Contact Information*; SSmith for the sign-ins
BN, AS	10/17/16	On-Site Visit at Black River (All Day)	*HSTW* LDC Coaching Report	J Beiser, Liaison; three teachers: S Infantino, C VanDoren, M Yocum
DR	10/31/16	Monthly LDC Liaison Mtg Hillsdale (2hrs)	No *HSTW* products	See *Rural LDC Collaborative Participant Contact Information*
BN, DR, AS	11/7/16	On-Site Visit at Hillsdale (3 hrs)	*HSTW* LDC Coaching Report	J Stump, Liaison; two teachers: T Cline, M Williams
BN, DR	11/8/16	On-Site Visit at Loudonville (All Day)	*HSTW* LDC Coaching Report	C Puster, Liaison; three teachers: K Aubel, J Conley, K Carnegie
BB, DR	11/9/16	On-Site Visit at Northwestern (2 hrs)	*HSTW* LDC Coaching Report	Two teachers: J Hagans, A Michalak
GB, AS, BN	11/16/16	On-Site Visit at Mapleton (3.5 hrs)	*HSTW* LDC Coaching Report	L Bowers, Liaison, three teachers: J Otis, T Bunt, L Colosimo
BN, AS	11/21/16	On-Site Visit at Black River (5 hrs)	*HSTW* LDC Coaching Report	J Beiser, Liaison; three teachers: S Infantino, CVanDoren, MYocum
DR	11/21/16	Monthly LDC Liaison Mtg Loudonville-Perrysville (2 hrs)	*HSTW* On-Site Calendar/Resources	See *Rural LDC Collaborative Participant Contact Information*

Report to The PAST Foundation for NWLS Straight A Grant

Chronology of Rural LDC Activities by *HSTW* LDC Coaches

August 29, 2016 through June 6, 2017 (page 2 of 4)

Staff	Date	Event/Activity	Documentation Product	Participants
BB, DR	11/29/16	On-Site Visit at Loudonville (3 hrs)	*HSTW* LDC Coaching Report/ Photos	C Puster, Liaison; three teachers: K Aubel, J Conley, K Carnegie
BN, AS	11/30/16	On-Site Visit at Hillsdale (All Day)	*HSTW* LDC Coaching Report/ Photos	J Stump, Liaison; three teachers: T Cline, M Williams, L Bowen
BB, DR	12/2/16	On-Site Visit at Northwestern (3 hrs)	*HSTW* LDC Coaching Report/ Photos	Three teachers: J Hagans, A Michalak, K Woodruff
BN, DR	12/5/16	On-Site Visit at Mapleton (3.5 hrs)	*HSTW* LDC Coaching Report/Photos	L Bowers, Liaison, three teachers: J Otis, T Bunt, L Colosimo
DR, GB, BB, BN, AS	12/9/16	Battelle Training Day 4 at Northwestern (7 hrs)	Battelle Training materials; *HSTW* PowerPoint & Display Boards	See *Rural LDC Collaborative Participant Contact information*; Smith for the sign-ins
DR	12/19/16	Monthly LDC Liaison Mtg Black River (2 hrs)	*HSTW* On-Site Calendar	See *Rural LDC Collaborative Participant Contact Information*
BB, DR	1/9/17	On-Site Visit at Northwestern (All Day)	*HSTW* LDC Coaching Report	J Zody, Liaison; three teachers: J Hagans, A Michalak, KWoodruff
BB, DR, AS, KM	1/11/17	HSTW Coach Monthly Zoom Conference (1 hr)	HSTW Coaches Follow-Up Email with Handouts	No additional participants
BB, DR, AS, KM	1/13/17	HSTW Special Zoom with K Gaier (1 hr)	HSTW Coaches Follow-Up Email with Handouts	Kelly Gaier, Battelle Education
DR, AS, KM	1/18/17	HSTW Virtual Coaching Zoom for Mapleton	HSTW Coaches Follow-Up Email with Handouts	No additional participants
AS, DR	1/20/17	On-Site Visit at Mapleton (3.5 hrs)	*HSTW* LDC Coaching Report	L Bowers, Liaison, three teachers: J Otis, T Bunt, L Colosimo
DR	1/23/17	LDC Monthly Evaluation Mtg (2 hrs)	Information emailed to PAST Foundation	M Hunter, K Gaier, S Smith
DR	1/30/17	Special Admin/Liaison Mtg (2 hrs)	Battelle Handouts	See *Rural LDC Collaborative Participant Contact Information*
DR	1/30/17	Monthly LDC Liaison Mtg Northwestern (2 hrs)	*HSTW* Implementation Team Report	See *Rural LDC Collaborative Participant Contact Information*
BN, DR	1/26/17	On-Site Visit at Loudonville (All Day)	*HSTW* LDC Coaching Report	C Puster, Liaison; three teachers: K Aubel, J Conley, K Carnegie
BN, DR, KM	1/18/17	HSTW Virtual Coaching Zoom for Hillsdale	HSTW Coaches Follow-Up Email with Handouts	No additional participants
BN, DR	2/1/17	On-Site Visit at Hillsdale (3 hrs)	*HSTW* LDC Coaching Report	J Stump, Liaison; three teachers: L Bowen,T Cline, M Williams
BN	2/6/17	On-Site Visit at Black River (3 hrs)	*HSTW* LDC Coaching Report	J Beiser, Liaison; three teachers: S Infantino, CVanDoren, MYocum
BB, DR	2/7/17	On-Site Visit at Northwestern (All Day)	*HSTW* LDC Coaching Report	J Zody, Liaison; three teachers: J Hagans, A Michalak, KWoodruff
BB, DR, AS, KM	2/8/17	HSTW Coach Monthly Zoom Conference	HSTW Coaches Report by Email with Handouts	No additional participants
BB, DR, KM	2/10/17	HSTW Virtual Coaching Zoom for Loudonville	HSTW Coaches Follow-Up Email with Handouts	No additional participants
DR	2/21/17	LDC Monthly Evaluation Mtg (2 hrs)	Information emailed to PAST Foundation	M Hunter, K Gaier, S Smith
DR	2/27/17	PAST Foundation Tour (2 hrs)	*HSTW* Implementation Team Report	See *Rural LDC Collaborative Participant Contact Information*
DR	2/27/17	Monthly LDC Liaison Mtg PAST Foundation (2 hrs)	*HSTW* Implementation Team Report	See *Rural LDC Collaborative Participant Contact Information*
BB, DR, AS, KM	3/1/17	HSTW Coach Monthly Zoom Conference	HSTW Coaches Follow-Up Email with Handouts	No additional participants
DR	3/7/17	Special Conference Call May Cohort 2 Planning	Follow-up Email and Handouts	C Puster

Report to The PAST Foundation for NWLS Straight A Grant

Chronology of Rural LDC Activities by *HSTW* LDC Coaches

August 29, 2016 through June 6, 2017 (page 3 of 4)

Staff	Date	Event/Activity	Documentation Product	Participants
DR	3/9/17	Straight A Grant Mtg with NWLS & ODE (3 hrs)	No HSTW Products	J Layton, S Smith, ODE Rep, M Hunter
BN	3/13/17	On-Site Visit at Black River (3 hrs)	*HSTW* LDC Coaching Report	J Beiser, Liaison; three teachers: S Infantino, CVanDoren, MYocum
AS	3/13/17	Virtual Coaching Zoom Mapleton (1 hr)	*HSTW* LDC Coaching Report	L Bowers, Liaison, three teachers: J Otis, T Bunt, L Colosimo
BN	3/15/17	On-Site Visit at Hillsdale (All Day)	*HSTW* LDC Coaching Report/ Photos	J Stump, Liaison; three teachers: T Cline, M Williams, L Bowen
BB	3/15/17	On-Site Visit at Northwestern (All Day)	*HSTW* LDC Coaching Report	J Zody, Liaison; three teachers: J Hagans, A Michalak, KWoodruff
DR	3/15/17	Special Cohort 2 Planning Mtg Loudonville	Draft Cohort 2 Handouts	C Puster
BN, DR	3/16/17	On-Site Visit at Loudonville (All Day)	*HSTW* LDC Coaching Report	Three teachers: K Aubel, J Conley, K Carnegie
DR	3/17/17	LDC Monthly Evaluation Mtg NWLS (2 hrs)	Information provided to PAST Foundation	M Hunter, K Gaier, S Smith
DR	3/20/17	LDC Special Evaluation Mtg Zoom (2 hrs)	Information provided to PAST Foundation	M Hunter, K Gaier, S Smith
BN	3/21/17	On-Site Visit at Hillsdale (3 hrs)	*HSTW* LDC Coaching Report	J Stump, Liaison; three teachers: L Bowen,T Cline, M Williams
DR, AS, BB, BN	3/22/17	Special LDC Coaches Zoom (1 hr)	*HSTW* Coaches Follow-up Email with Handouts	No additional participants
DR, GB, BB, BN, AS	3/24/16	Battelle Training Day 4 Northwestern (7 hrs)	Battelle Training Materials provided; HSTW Power Point & Display Boards	See *Rural LDC Collaborative Participant Contact Information*; SSmith for the sign-ins
DR	3/27/17	Monthly LDC Liaison Mtg Zoom (1 hr)	*HSTW* Implementation Team Report	See *Rural LDC Collaborative Participant Contact Information*
DR	4/12/17	Special Cohort 2 Zoom Conference (1 hr)	Draft Cohort 2 workshop handouts	C Puster, S Smith
DR	4/13/17	Rural LDC Best Practice Newsletter Zoom (1 hr)	Final Draft Rural LDC Best Practice Newsletter	HSTW Office Staff: C Rolfe
BB, DR, AS, KM	4/22/17	HSTW Coach Monthly Zoom Conference	HSTW Coaches Follow-Up Email with Handouts	No additional participants
DR	4/24/17	LDC Monthly Evaluation Mtg NWLS (2 hrs)	Information provided to PAST Foundation	M Hunter, K Gaier, S Smith
DR	4/24/17	Monthly LDC Liaison Mtg Northwestern (2 hrs)	*HSTW* Implementation Team Report	See *Rural LDC Collaborative Participant Contact Information*
DR, KM	4/26/17	Special Cohort 2 Planning Zoom (2 hrs)	Draft Cohort 2 Workshop Handouts	No additional participants
DR	5/1/17	Special Cohort 2 Zoom Conference (1 hr)	Draft Cohort 2 workshop handouts	C Puster
DR, BB, BN, AS, GB	5/3/17	HSTW NE Ohio Region End-of-Year Reconnect (2 – 1 hr. sessions)	Rural LDC PowerPoint for MS; Rural LDC PowerPoint for HS; Rural LDC Best Practice Newsletter; Teacher Handouts	HS Teachers: L Colosimo, Tony Bunt, J Conley, A Michalak; MS Teachers: K Aubel, J Hagans; Administrators from BR, NW, LP, MLS
DR, BN, KM	5/10/17	Cohort 2 Workshop - Day 1 at New Hope Church, Loudonville	Cohort 2 Workshop Handouts	C Puster, P DeWitt, Select Cohort 1 teachers; Cohort 2 teachers and administrators (see contact sheet)
DR, BN, KM	5/11/17	Special ELA LDC Rubric Workshop (4 hrs)	LDC Rubric, LP ELA Rubrics; Customized LDC LP Rubric for Cohort 2	C. Puster, LP Administrator, 4 LP ELA Teachers

Report to The PAST Foundation for NWLS Straight A Grant

Chronology of Rural LDC Activities by *HSTW* LDC Coaches

August 29, 2016 through June 6, 2017 (page 4 of 4)

Staff	Date	Event/Activity	Documentation Product	Participants
DR, BN	5/17/17	Cohort 2 Workshop - Day 2 at New Hope Church, Loudonville	Cohort 2 Workshop Handouts	C Puster, S Smith. P DeWitt, Select Cohort 1 teachers; Cohort 2 teachers (see contact sheet)
DR	5/22/17	LDC Monthly Evaluation Mtg NWLS (2 hrs)	Information provided to PAST Foundation	M Hunter, K Gaier, S Smith
DR	5/22/17	Monthly LDC Liaison Mtg Northwestern (2 hrs)	*HSTW* Implementation Team Report	See *Rural LDC Collaborative Participant Contact Information*
DR, BB, BN	6/6/16	Battelle Training Day 5 at Battelle (6 hrs)	Battelle Training Materials provided	Select Cohort 1 teachers; K Gaier, P DeWitt, Dorothy, S Smith, M Hunter, K Galloway
DR	6/12/17	Special Evaluation Zoom Conference (2 hrs)	HSTW Chronology and other documents	M Hunter

RURAL LITERACY DESIGN COLLABORATIVE

HSTW LDC Coaching Report

HIGH SCHOOLS THAT WORK

School Name
School Address
Date

Purpose On-Site Visit	• Meet with teachers to review work completed for LDC Module 2 • Provide assistance and feedback before/during implementation
Teacher/Liaison	• Teacher (grade and subject) • Present/Not Present: District Liaison Name, District Liaison
***HSTW* Coaches**	• Name, Email, Phone • Name, Email, Phone
LDC Module Title	• Title
# Students Targeted	• # students (groups of ?; individual/group grade)
Course/Content	• Chemistry/Genetics
Duration of Module	• ? weeks: date to date
Progress on Module	• For teacher rating on progress, see Teacher Performance Rubric, pg. 2
Progress on Major Tasks	• Teaching Task/Texts: • Instructional Ladder/Mini Task: • RFP: X • Design Report: X
Student Reflection	•
Feedback to Battelle on Trainings	• **Sept 7 Jakes: X** • **Sep 29 - 30: X** • **Advice/Recommendations for Cohort 2: X** • **Mapleton Cohort 2 Teachers: X**
Feedback LDC Core Tools	• **X**
Feedback On-Site Coaching	• X
Module 1 to 2 Feedback	•
Next Steps/Support Requested	• X
Questions	• No additional questions

Teacher Performance LDC Modules Scoring Rubric

The Teacher Performance LDC Modules Scoring Rubric is to determine the level of completion in developing and implementing the Scoring Elements in LDC Core Tools.

Date	Date	**Teacher**	Teacher Name	**HSTW Coaches**	Name and Name

Scoring Elements	**1 Work in Progress**	**2 Good to Go**	**3 Exemplar**	**Teacher/Coach Scoring & Comments**
Title **Teachers Task**	Needs to be developed.	Clear purpose with alignment of the RFP, texts, science content and design report	Clear and focused purpose with tight alignment of the RFP, texts, science content and design report	**3 Exemplar** Teacher has completed the implementation and everything is aligned
Standards/ **Content**	Too many standards and weak connection to the science content	Literacy and science standards identified with connection to science content	Literacy and science standards identified with strong connection to science content	**X**
RFP/Design Specification	Needs to be developed	Authentic and clear and uploaded	Authentic, clear and engaging and uploaded	**X**
Texts/Resources	Not selected or relevant	Are useful and aligned and uploaded	Aligned, relevant and engaging	**X**
LDC Rubric	Needs revisions	Revised to include all scoring elements	Revised to include all scoring elements and detailed content description	**X**
Skills/Mini-Tasks	Skills/Mini-tasks not reviewed or edited.	Skills/Mini-tasks selected and uploaded. Mini-Tasks relate to the skills list with resources uploaded	Mini-tasks relate to the skills list and designed to support student success with resources and student products uploaded	**X**
Design Report/ Student Work	Design reports template drafted, but not developed.	Design report template uploaded with *LDC Scoring Rubric*	Design reports uploaded with *LDC Scoring Rubric* at all scoring levels	**X**
Teacher Resources	Not uploaded	Uploaded and relevant	Uploaded, relevant and customized	**x**

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Rural LDC: *HSTW* Report to District Liaisons

January 30, 2017 Submitted by: Diana Rogers, Rural LDC Lead Coach

Updates:

- ❑ New *HSTW* On-Site Coaching Assignments, effective January 2, 2017 (side bar)
- ❑ *HSTW* On-Site Coaching Dates, January 9 - March 24, 2017 (two per district)
  - Black River, Feb 6, 2017 and 2nd date TBD
  - Hillsdale, Feb 1 and Mar 15, 2017 (Feb 15 optional)
  - Mapleton, Jan 20 and Mar 13, 2017
  - Northwestern, Jan 9 and Feb 7, 2017
- ❑ New *HSTW* Coaching Report, effective January 15, 2017 (see attached)

New Items and Actions Needed:

❑ **Rural LDC Science Best Practice Newsletter -** handout for May 3 and July 10-12

See draft LDC Science Best Practice Newsletter and will be sent electronically

Complete the following by Feb 27, 2017
- Review the draft Rural LDC Best Practice Newsletter and provide edits and photos (Drafts and communications will be managed by Kara Mitchell)
- Provide photos of each teacher and Module 2 student engagement; make sure student waivers are on file for all the students in the photos

❑ **May 3, 2017 Rural LDC Science Showcase** (as part of *HSTW* NE Ohio Region's End-of Year Reconnect at NEW Center, NEOMED, Rootstown, OH)

See the attached draft flyer and draft proposal template.

Complete the following by February 27, 2017
- Register at www.ohiohstw.org the following: district/building administrators, district liaison, Cohort 1 teachers, Cohort 2 teachers
- Submit requests for substitutes for May 3, 2017
- Assist Cohort 1 Teachers in completing a presentation proposal

❑ **July 10 - 12, 2017 SREB/HSTW College Readiness Conference (CRC), Nashville, TN**

See the attached flyer and draft proposal.

- ➢ Two, 60 minute presentations, one high school and one middle school
- ➢ HS Presentation - see draft proposal; Suggested Presenters: Dorothy and Amanda Michalak and/or other HS teacher
- ➢ MS Presentation - proposal to be submitted; Suggested Presenters: Claire and Julie, Trevor and/or Sonya

Complete the following by Feb 27, 2017
- Provide feedback on the draft presentation proposal, availability of your teachers, if recommended. Diana will submit the proposal on behalf of the teachers.
- Send an email to Diana Rogers with the names and emails of the district/teachers attending the CRC; Once you confirm your teachers, *HSTW* NE Ohio Region will send an award letter offering a grant to support the travel cost of teacher presenters.
- Register your district/teacher representatives at www.sreb.org (College and Career Readiness Conference)

Rural LDC: *HSTW* Report to District Liaisons Feb 27, 2017

(Updated 3-3-17) **Submitted by: Diana Rogers, Rural LDC Lead HSTW Coach**

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On-Site Coaching Updates:

- ❑ *March HSTW* On-Site Coaching Dates (two per district)
  - Black River, March 13, 2017
  - Hillsdale, March 15, 2017
  - Loudonville March 16, 2017
  - Mapleton, March 13, 2017
  - Northwestern, March 15, 2017
- ❑ New Updated *HSTW* Coaching Report with Wow and Wonders

Actions Needed:

❑ May 3, 2017 Rural LDC Science Presentations – HSTW NE Ohio Region: End of Year Showcase

Actions needed:

1) Invite all Cohort 1 and Cohort 2 teachers to attend at www.ohiohstw.org and arrange substitutes. No cost to attend. Lunch is provided.
2) Support the following teachers who are confirmed to present. I will be working with them on the presentation
   - Grades 5 – 8: Julie Hagans, Kori Aubel
   - Grades 9 – 12: Amanda Michalak, Jim Conley, Leanna Colosimo, Tony Bunt

❑ July 10 - 12, 2017 SREB/HSTW College Readiness (CRC), Nashville, TN

Actions needed:

1) Support the following teachers/district liaison who are confirmed to present. I will be working with them on the presentation
   - Grades 5 – 8: No one is able to attend
   - Grades 9 – 12: Amanda Michalak, Leanna Colosimo, Jill Beiser
2) Remind the district/high school administrators to sign and process the award letter for grant to cover the teacher's cost for attending the conference..

❑ Rural LDC Science Best Practice Newsletter - handout for May 3 and July 10-12

Actions needed: I will be working with the presenters to develop the newsletter. I may ask you to assist with logos, photos and editing.

❑ LDC Science Modules for National Review - July 10-12, 2017 in Nashville TN

Actions needed:

1) Assist HSTW Coaches in selecting modules to submit for national review. This will require teachers to "polish" their modules. HSTW Coaches will provide the feedback to get them to a "polished" product.
2) Volunteer (district liaisons) to go to Nashville and participate in the LDC Science Modules national review and feedback experience. May use your HSTW grant to support the cost.

Rural LDC: *HSTW* Report to District Liaisons March 27, 2017

Submitted by: Diana Rogers, Rural LDC Lead HSTW Coach

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On-Site Coaching Updates:

- ❑ *Module 2 HSTW Coaching Reports are files in the shared Rural LDC Google Drive:*
  - Black River: February 6 and March 13, 2017
  - Hillsdale: February 1 and March 15, 2017
  - Loudonville: January 26 and March 16, 2017
  - Mapleton: January 20 and March 13, 2017
  - Northwestern: January 9, February 7 and March 15, 2017 (not filed)

Actions Needed (repeated items from last month - still need responses):

❑ May 3, 2017 Rural LDC Science Presentations – HSTW NE Ohio Region: End of Year Showcase (See agenda and presentation time)

Actions needed:

1) Invite all Cohort 1 and Cohort 2 teachers to attend at www.ohiohstw.org and arrange substitutes. No cost to attend. Lunch is provided.
2) Support the following teachers who are confirmed to present. I will be working with them on the presentation
   - Grades 5 – 8: Julie Hagans, Kori Aubel
   - Grades 9 – 12: Amanda Michalak, Jim Conley, Leanna Colosimo

❑ July 10 - 12, 2017 SREB/HSTW College Readiness (CRC), Nashville, TN

Actions needed:

1) Support the following teachers/district liaison who are confirmed to present. I will be working with them on the presentation
   - Grades 5 – 8: No one is able to attend
   - Grades 9 – 12: Amanda Michalak, Leanna Colosimo, Jill Beiser
2) Remind the district/high school administrators to sign and process the award letter for grant to cover the teacher's cost for attending the conference.

❐ Rural LDC Science Best Practice Newsletter - handout for May 3 and July 10-12

Actions needed: I will be working with the presenters to develop the newsletter. I may ask you to assist with logos, photos and editing.

❐ LDC Science Modules for National Review - July 10-12, 2017 in Nashville TN

Actions needed:

1) Assist HSTW Coaches in selecting modules to submit for national review. This will require teachers to "polish" their modules. HSTW Coaches will provide the feedback to get them to a "polished" product.
2) Volunteer (district liaisons) to go to Nashville and participate in the LDC Science Modules national review and feedback experience. May use your HSTW grant to support the cost.

Rural LDC: *HSTW* Report to District Liaisons April 24, 2017

Submitted by: Diana Rogers, Rural LDC Lead HSTW Coach

Ongoing On-Site HSTW Coaching Support:

- ❑ *Discussion on On-Site HSTW Coaching Support for Cohort 1 & Cohort 2*

Upcoming Rural LDC Science Presentations

- ❑ May 3, 2017 Rural LDC Science Presentations
  HSTW NE Ohio Region: End of Year Showcase
  - Grades 5 – 8: Julie Hagans, Kori Aubel
  - Grades 9 – 12: Amanda Michalak, Jim Conley, Leanna Colosimo

- ❑ July 10 - 12, 2017 SREB/HSTW College Readiness (CRC), Nashville, TN
  Support the following teachers/district liaison who are confirmed to present. I will be working with them on the presentation.
  - Grades 9 – 12: Amanda Michalak, Leanna Colosimo, Jill Beiser

- ❒ Rural LDC Science Best Practice Newsletter for May & July (in final draft)

HSTW Supporting Loudonville in Hosting Cohort 2 Workshops

- ❑ May 10 & 17, Cohort 2 Rural LDC Science (Days 1 & 2)
  Assisting Catherine with the planning and facilitation. Kara Mitchell and Diana Rogers will be assisting with the facilitation

HSTW Supporting Rural LDC Science Modules for National Review

- ❒ LDC Science Modules for National Review - July 10-12, 2017 in Nashville TN
  Kara Mitchell, HSTW LDC Coach, will assist with the peer review of the Rural LDC Science Modules and other modules submitted for national review

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May 22, 2017 Rural LDC *HSTW* Report to District Liaisons

Submitted by: Diana Rogers, Rural LDC Lead HSTW Coach

1. HSTW Rural LDC Science Presentations

- HSTW NE Ohio Region: End of Year Showcase, May 3, 2017
  Status: Everyone did a great job!
  Deliverables: See presentations PowerPoints, photos, videos and Best Practice Newsletter in Rural LDC, HSTW folder May 3.
  - Rural LDC Middle School Grades 5 – 8: Julie Hagans, Kori Aubel
  - Rural LDC High School Grades 9 – 12: Tony Bunt, Amanda Michalak, Jim Conley, Leanna Colosimo

- SREB/HSTW College Readiness Conference (CRC), Nashville, TN, July 10 - 12, 2017
  Status: Proposal was accepted: *Working to Improve STEM Through LDC*
  July 11, 10:45 - 11:45, Presidential Chamber A
  Deliverables: Diana working on PowerPoint; Completed handouts: Rural LDC Best Practice Newsletter and Concept Design posters
  - Grades 9 – 12: Jill Beiser, Amanda Michalak, Diana Rogers (need a Mapleton replacement for Leanna)

  Next Steps: Diana will be working with presenters on the Nashville Presentation; Will email this week with potential dates for a Zoom conference

- PLTW Summit, Orlando, FL, Oct 22-25, 2017
  Status: Kelly Woodruff submitted a proposal and it was accepted: *Rural LDC Science and PLTW: Making Science Technical Writing Authentic (Date and Location not provided). HSTW will assist with Jacki Zody's expenses to present with Kelly*
  Next Steps/Deliverables: Kelly and Jacki working on presentation PowerPoint and handouts; Diana will assist with Rural LDC template with new Cohort 2 resources from Live Binder and provide Rural LDC Best Practice Newsletter and Concept Design posters. Diana will schedule a Zoom conference in early fall to finalize details.

2. Rural LDC Science Best Practice Newsletter for District Use

Status: Final Rural LDC Best Practice Newsletter emailed to districts May 3, 2017
Next Steps/Deliverables: Hard copies available to districts upon request for use to legislators, board members, administrators, teachers and community

3. HSTW Supporting Loudonville in Hosting Cohort 2 Workshops

- May 10 & 17, Cohort 2 Rural LDC Science (Days 1 & 2)
  Status: Workshops completed
  Deliverables: Sign-in Sheet for May 10 & 17; New training documents - will be uploaded to Live Binder; Google Folder Cohort 2 – by district by teacher
  Next Steps: Need to send email and provide feedback to teachers on RFPs; Identify who will be trained in each district to provide feedback
- Aug 31 & Sep1, Sep 12 - Cohort 2 Rural LDC Science (Days 1 & 2 & 3)
  Status: No registration/confirmations, workshop logistics (AV, supplies, food), or list of new potential teachers; No location or training/trainers identified (Scott will ask Black River/Mapleton to host Aug 31/Sep 1; Sep 12 Loudonville – New Hope Church)
  Deliverables: Need to develop everything
  Next Steps: Need to work with Catherine on re-design – uploading to Live Binder; HSTW will contract with high school - Amanda and middle school - Kori to co-facilitate these three days

4. HSTW Supporting Battelle with Rural LDC Science Modules for National Review

- LDC Science Modules for National Review - July 10-12, 2017 in Nashville TN
  Status: Kara Mitchell, HSTW LDC Coach, will assist with the peer review of the Rural LDC Science Modules and other modules submitted for national review
  Deliverables: Kara will produce a report of all Rural LDC Modules and feedback received by July 18, 2017
  Next Steps: Work with Battelle on module review and feedback; make the national LDC Library more searchable

5. HSTW Virtual/On-Site Coaching Support

- **Cohort 2**
  Status: New proposal for support sent to Scott Smith for HSTW coaching support in 2017-2018; Request for Rural LDC support from ODE/HSTW; Barb Nichols assigned to Hillsdale, Loudonville and Northwestern; Barb Baltrinic assigned to Black River and Mapleton; Diana Rogers and Barb Nichols attended May trainings
  Deliverables: Working on a new coaching report for next year
  Next Steps: Waiting for proposal and district decisions on level of HSTW coaching services; work with PAST Foundation on a new coaching report before June 23.
- **Cohort 1 –** Provide a Personal Service Contracts to Cohort 1 Co-Facilitators; Coach Cohort 1 Teachers in Mentoring/Providing Feedback to Cohort 2

6. HSTW LDC Science Rubric Customized for Loudonville-Perrysville

- May 11 – Special Requested Workshop by Loudonville-Perrysville to create an LDC Science Rubric using Loudonville writing rubrics and input from ELA teachers to create a LP LDC Science Rubric for use within the district and offered to Cohort 2 teachers
  Status: Workshops completed
  Deliverables: Customized Rural LDC Science Rubric - will be uploaded to Live Binder
  Next Steps: Meet with LP HS ELA teacher to reach consensus on the Rural LDC Rubric; share the rubric with Cohort 2 on Sep 12; offer to customize the rubric with ELA teachers from the other 4 districts

RURAL LITERACY DESIGN COLLABORATIVE

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

Science & Literacy – Module 2

March 24, 2016

Northwestern High School

Battelle Education

HIGH SCHOOLS THAT WORK

THE PAST FOUNDATION

It all began…

- 27 weeks ago with a Straight A Grant
- 15 teachers and 5 liaisons from 5 rural school districts
- trained by Battelle Education in the Literacy Design Collaborative (LDC) approach to teaching science and literacy --- working like a scientist
- supported by High Schools That Work (HSTW) and the PAST Foundation
- completed their second LDC modules featured here today!!!

RURAL LITERACY DESIGN COLLABORATIVE

THANKS TEACHERS!!!

Also…Michele, Sonya, Clayton, Lindsay, Mike

Tony

Leanna

Joe

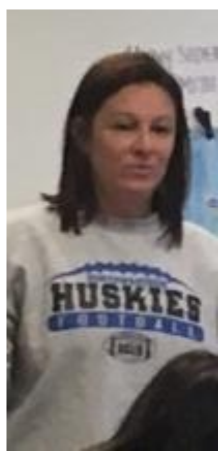
Trevor

Jim

Kori

Julie

Amanda



Kelly

Kendra

RURAL LITERACY DESIGN COLLABORATIVE

Black River Michele Yocum, 5th Grade Science

LDC Module: To INFINITY and Beyond

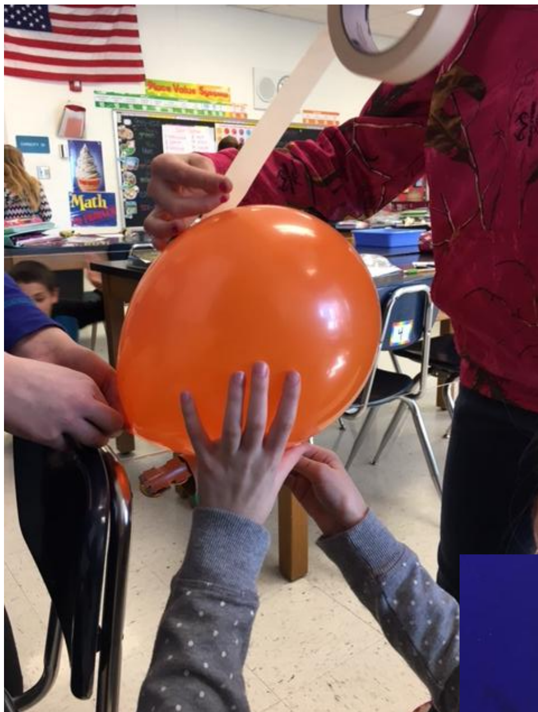
How can students most effectively create a model satellite that will orbit the Earth?

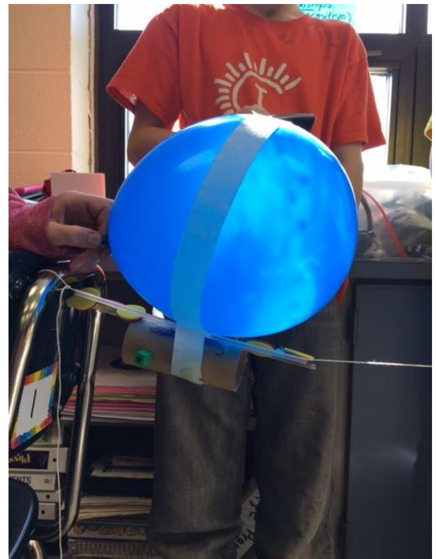
After reading RFP, conducting background research on Satellites, and designing and testing model Satellite, write design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include charts, tables, and/or illustrations to help convey your message to your readers. Identify any gaps or unanswered questions.

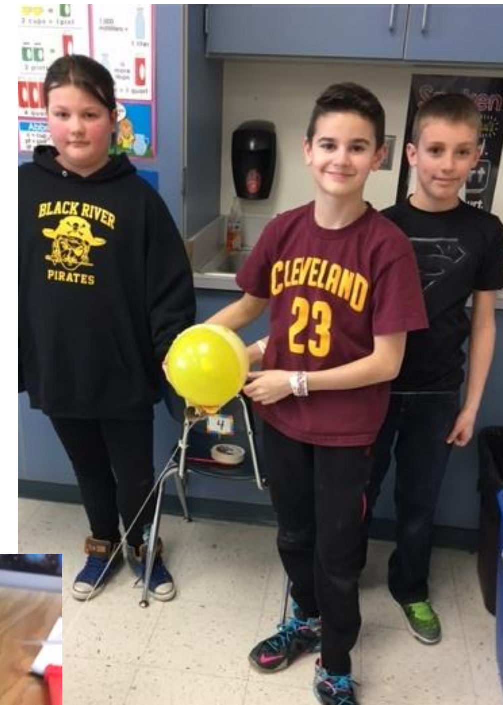
RURAL LITERACY DESIGN COLLABORATIVE

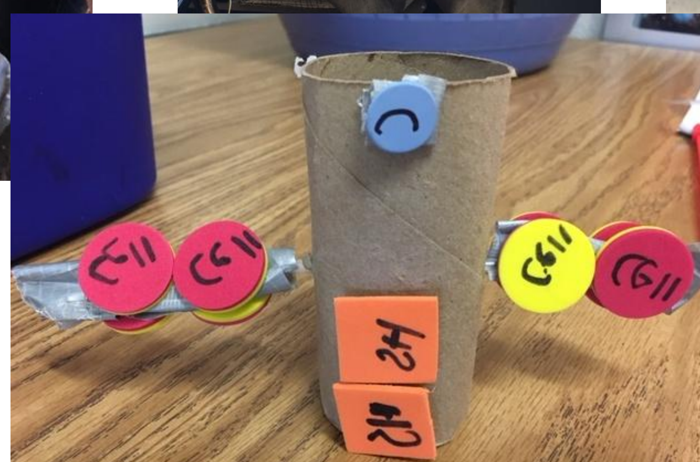
Black River Michele Yocum, 5th Grade Science

LDC Module: To INFINITY and Beyond









RURAL
LITERACY DESIGN
COLLABORATIVE

Black River Sonya Infantino, Middle School Science

LDC Module: Mousetrap Cars

How can you build an originally designed vehicle powered solely by the energy of one standard-sized mousetrap?

After reading the RFP, conducting background research on the basic components of the mousetrap car, and designing and testing the mousetrap car, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include (charts, tables, illustrations, and/or stylistic devices) to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL
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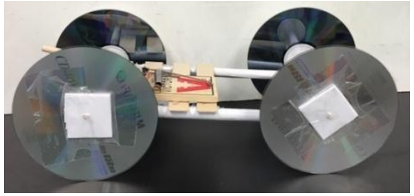
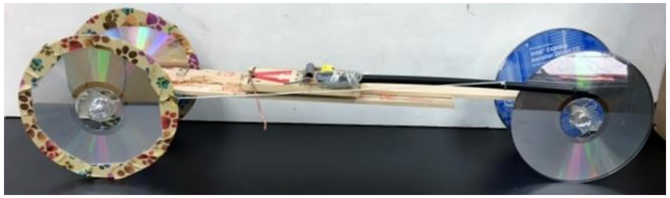
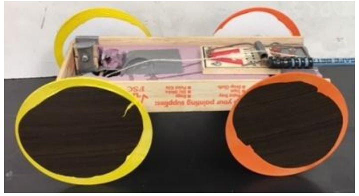
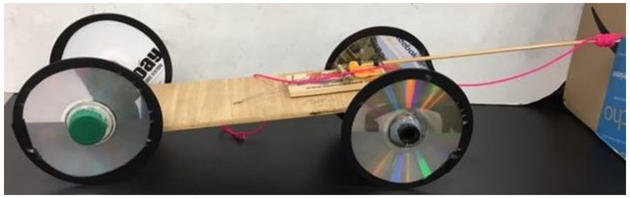
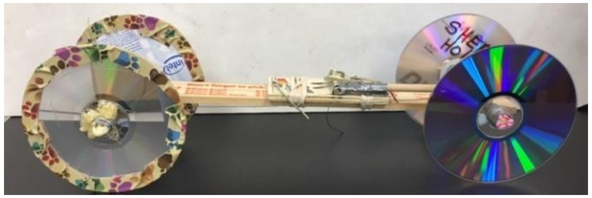
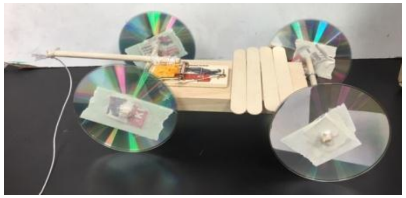
COLLABORATIVE

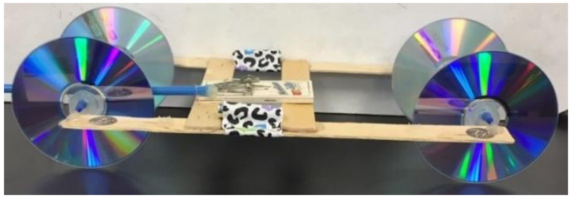
Black River Sonya Infantino, Middle School Science

LDC Module: Mousetrap Cars





RURAL LITERACY DESIGN COLLABORATIVE

Black River Clayton VanDoren, High School Science

LDC Module: Veneers Versus Voids: Radioactive Gauging

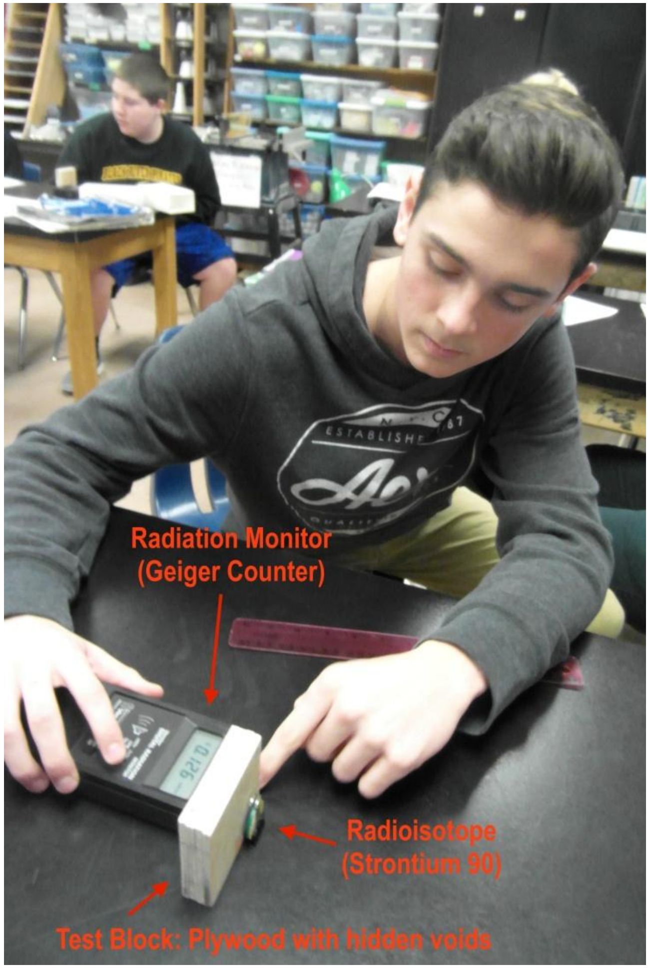
Rigid quality control is extremely important in the construction products industry. A hollow space within the interior layers of plywood weakens the material and can produce cosmetic defects in finished pieces like furniture and cabinets.

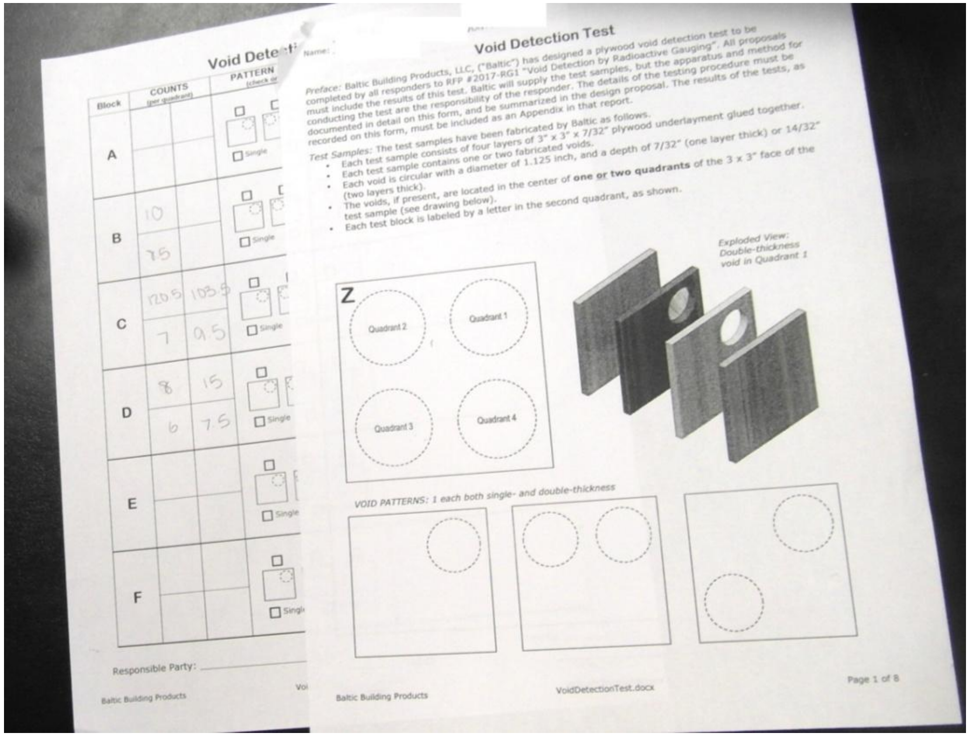
After reading the RFP from Baltic Building Products LLP, conducting background research on the energy and penetration depth of ionizing radiation (alpha , beta and gamma), and designing and testing a measurement procedure, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP; namely: the ability to detect and measure the size of hollow spaces in plywood. Support your response with evidence from your research. Include measurements, data (graphs, charts, or tables) and technical drawings to help convey your message to your readers. Connect the basic physics of ionizing radiation and the practical demands of the application in your response.

RURAL LITERACY DESIGN COLLABORATIVE

Black River — Clayton VanDoren, High School Science

LDC Module: Veneers Versus Voids: Radioactive Gauging





RURAL LITERACY DESIGN COLLABORATIVE

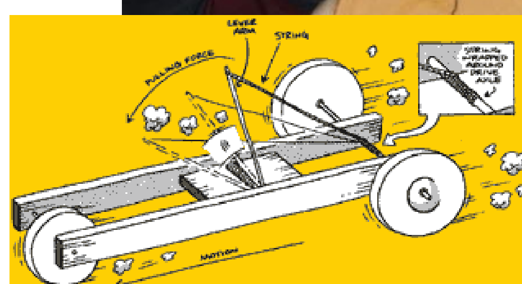
Hillsdale Trevor Cline, Middle School Science

LDC Module: Mousetrap Car Project

After reading the RFP, conducting background research on potential and kinetic energy, and designing and testing a mousetrap car, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research.

LDC Module: Mousetrap Car Project

Each team completed a Mousetrap Car kit and added different things to increase speed or distance.



RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale — Michael Williams, High School Science

LDC Module: The Falcon River Project Bridging the Literacy-Design Gap with a Bridge Efficacy Investigation

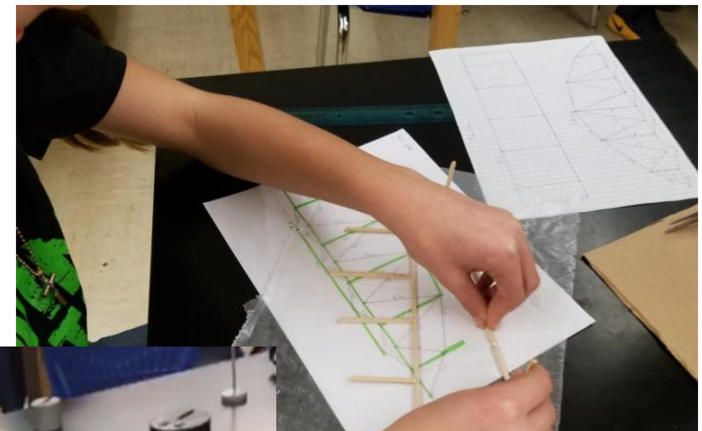
Effectively design and create a balsa wood bridge to maximize efficacy based on a ratio of load supported to bridge mass.

After reading RFP, conducting background research on bridge design and force distribution, and designing and testing the efficiency of the bridge, write proposal in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and/or stylistic devices to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Michael Williams, High School Science

LDC Module: The Falcon River Project Bridging the Literacy-Design Gap with a Bridge Efficacy Investigation



RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Lindsay Bowen, High School Ag Science

LDC Module: Soil pH

When starting with a base potting soil (or growth media) for greenhouse use, which items when added to the growth media will provide a neutral pH while creating optimal conditions for germinating seedlings from seeds?

After reading RFP, conducting background research on growth media, and designing and testing your prototype, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include charts, tables, and illustrations to help convey your message to your readers. Identify any gaps or unanswered questions. Include in-text citations and works cited in APA format. Connect the AFNR curriculum and connect it to the proposal in your response.

RURAL
LITERACY DESIGN
COLLABORATIVE

Hillsdale Lindsay Bowen, High School Ag Science

LDC Module: Soil pH

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Kori Aubel, Middle School Science

LDC Module: Earthworm Explosion

Can students create a functioning ecosystem for earth worms?

After reading the RFP, conducting background research on earthworm ecosystems , and designing and testing ecosystem prototypes, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research.

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Kori Aubel, Middle School Science

LDC Module: Earthworm Explosion

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Jim Conley, High School Science

LDC Module: Name That Bird

Can students design and develop a dichotomous key and identification guide that is the most accurate and efficient in identifying winter songbirds and raptors commonly found in Ohio?

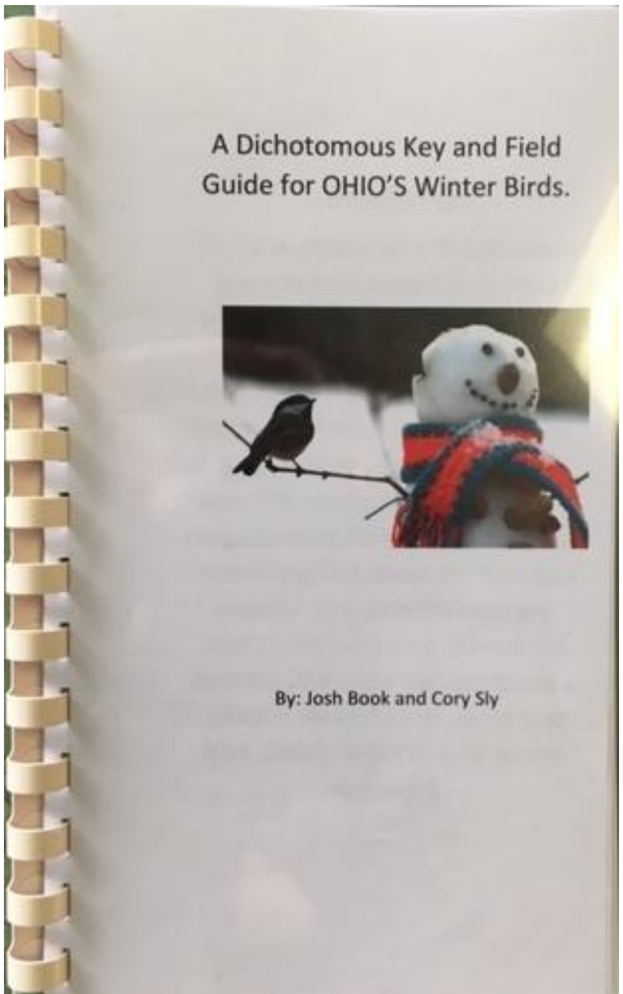
After reading RFP, conducting background research on Ohio's winter bird species, and designing and testing a dichotomous key for identifying 35 of Ohio's common songbirds and raptors, based upon their taxonomic and physical features. Be sure to connect avian taxonomy and physical attributes to the design of your dichotomous key, then, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include a dichotomous key to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville

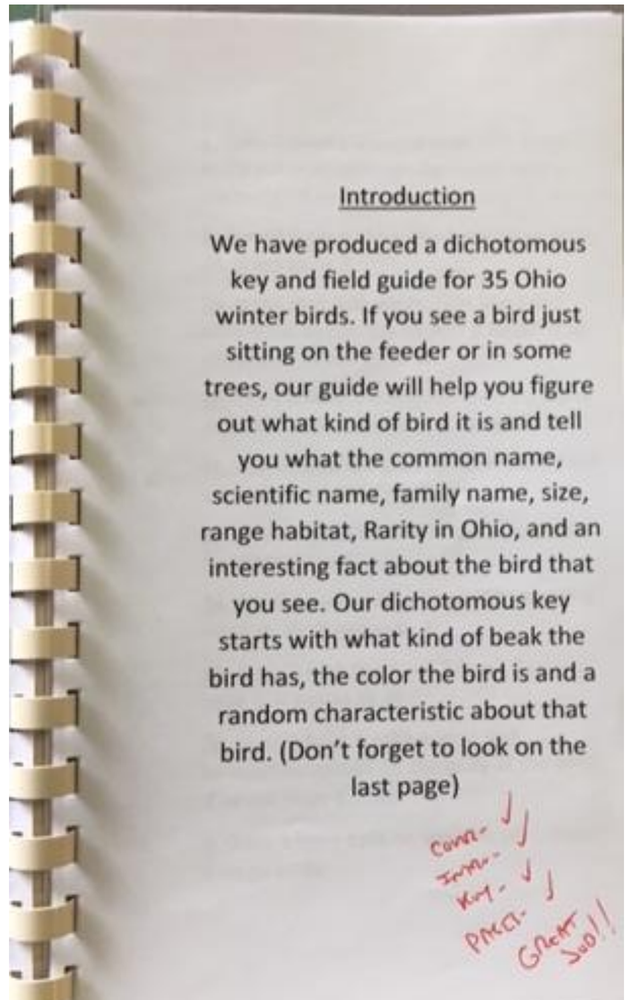
Jim Conley, High School Science

LDC Module: Name That Bird



A Dichotomous Key and Field Guide for OHIO'S Winter Birds.

By: Josh Book and Cory Sly



Introduction

We have produced a dichotomous key and field guide for 35 Ohio winter birds. If you see a bird just sitting on the feeder or in some trees, our guide will help you figure out what kind of bird it is and tell you what the common name, scientific name, family name, size, range habitat, Rarity in Ohio, and an interesting fact about the bird that you see. Our dichotomous key starts with what kind of beak the bird has, the color the bird is and a random characteristic about that bird. (Don't forget to look on the last page)

Conn- ✓
Key- ✓
Prac- ✓
Great Job!!

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Kendra Carnegie, High School Ag Science

LDC Module: Growth Media for Greenhouse Plants

When starting with a base potting soil (or growth media) for greenhouse use, which items when added to the growth media will provide a neutral pH while creating optimal conditions for germinating seedlings from seeds?

After reading RFP, conducting background research on growing media, and designing and testing your prototype, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include (charts, tables, and illustrations to help convey your message to your readers. Identify any gaps or unanswered questions. Include in-text citations and works cited in APA format. Connect the AFNR curriculum and connect it to the proposal in your response.

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Kendra Carnegie, High School Ag Science

LDC Module:
Growth Media for Greenhouse Plants

RURAL
LITERACY DESIGN
COLLABORATIVE

Mapleton Joe Ortiz, Middle School Science

LDC Module: Insulated Drink Tumbler Reform: Make Yeti Great Again

What materials and design can best replicate an insulated drink tumbler without the use of metal, limited Styrofoam, and no vacuum technology?

After reading the RFP design requirements, conducting background research on materials and tumbler designs that insulate effectively, and designing and testing ice resisting melting, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP design requirements. Support your response with evidence from your research. Include charts of ice melting time to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Joe Ortiz, Middle School Science

LDC Module: Insulated Drink Tumbler Reform: Make Yeti Great Again

The winning tumbler design kept ice from melting for 5 hours and 53 minutes. Most cups lasted over 3 hours. Without an insulating design the ice in our control beaker melted in 1 hour and 40 minutes.

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Tony Bunt, High School Science

LDC Module: Pollution Solutions

Can a device be created inexpensively that efficiently helps remove floating plastics from bodies of water; via a small boat operated by a single person?

After reading request for proposal in which a non-profit environmental aid firm seeks affordable, efficient, and durable equipment for extracting plastic liter from a body of water , conducting background research on the Great Pacific Garbage Patch, plastic buoyancy, and environmental effects of plastic litter on wildlife, habitats, and humans, and designing and testing a scale model of the equipment , write a design proposal in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include empirical data and detailed technical drawings to help convey your message to your readers.

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Tony Bunt, High School Science

LDC Module: Pollution Solutions

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Leanna Colosimo, High School Science

LDC Module: Lights Color Spectrum

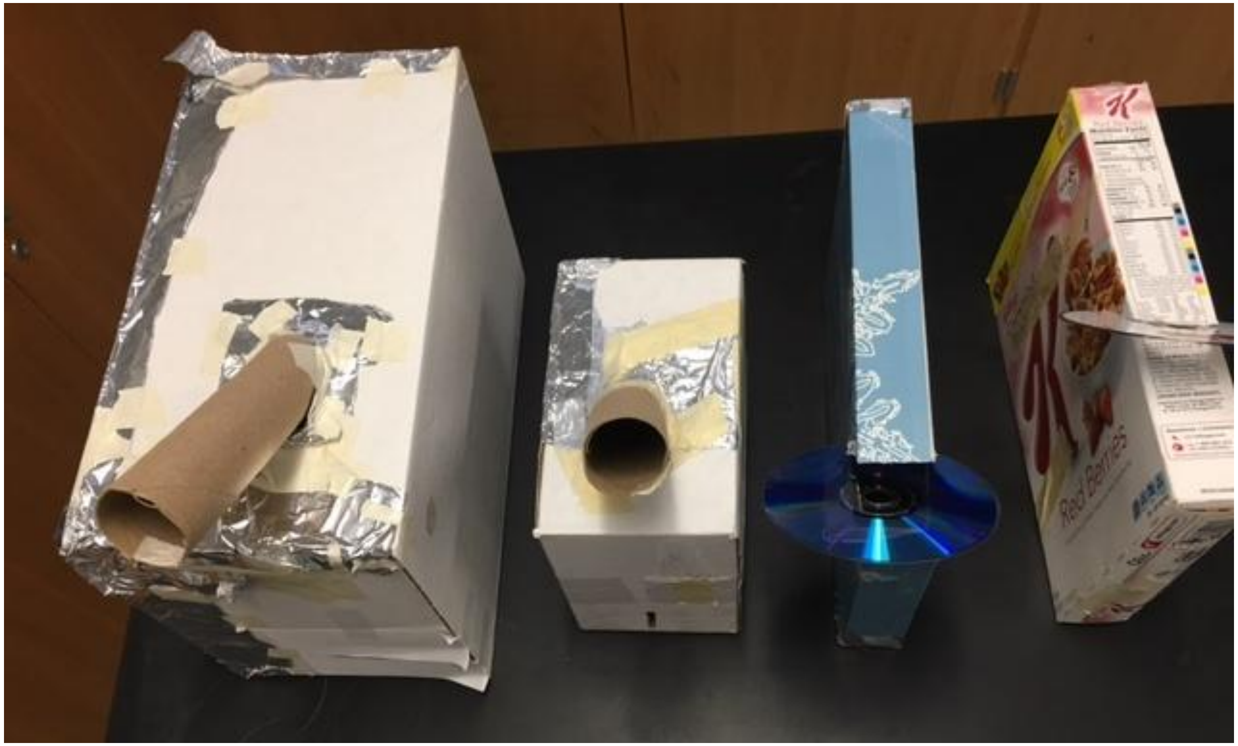
Is it possible to construct a spectrometer from disposable items commonly found in the classroom?

After reading the RFP, conducting background research on spectrometers, line emission spectra, and light, and designing and testing the prototype, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research.

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Leanna Colosimo, High School Science

LDC Module: Lights Color Spectrum



RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Julie Hagans, Middle School Science

LDC Module: Insane Insulators

How can one create an effective and efficient product to insulate a container to reduce thermal energy transfer?

After reading RFP, conducting background research on convection, conduction, radiation, how containers are insulated, and designing and testing your insulated container, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and notes to help convey your message to your readers. Identify any gaps or unanswered questions. Connect background research and the requirements from the RFP in your response.

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Julie Hagans, Middle School Science

LDC Module: Insane Insulators

RURAL
LITERACY DESIGN
COLLABORATIVE

Northwestern Amanda Michalak, High School Science

LDC Module: Bioenergy

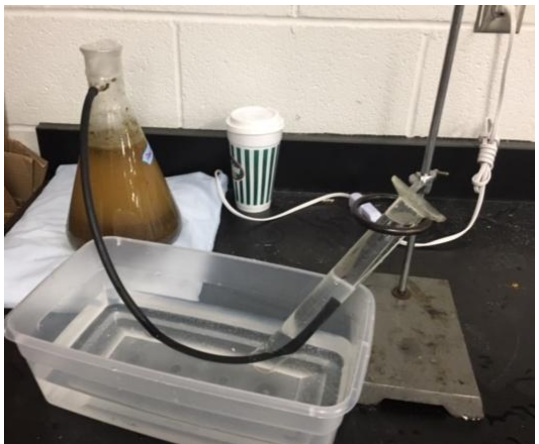
How can we produce fuel and electricity from waste efficiently and effectively?

After reading the RFP, conducting background research on microbial fuel cells, and designing and testing a batch anaerobic digester for consuming food and animal waste, write an engineering report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. A presentation will also be required. Support your response with evidence from your research. Include charts, tables and illustrations to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Amanda Michalak, High School Science

LDC Module: Bioenergy



RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Kelly Woodruff, High School Science

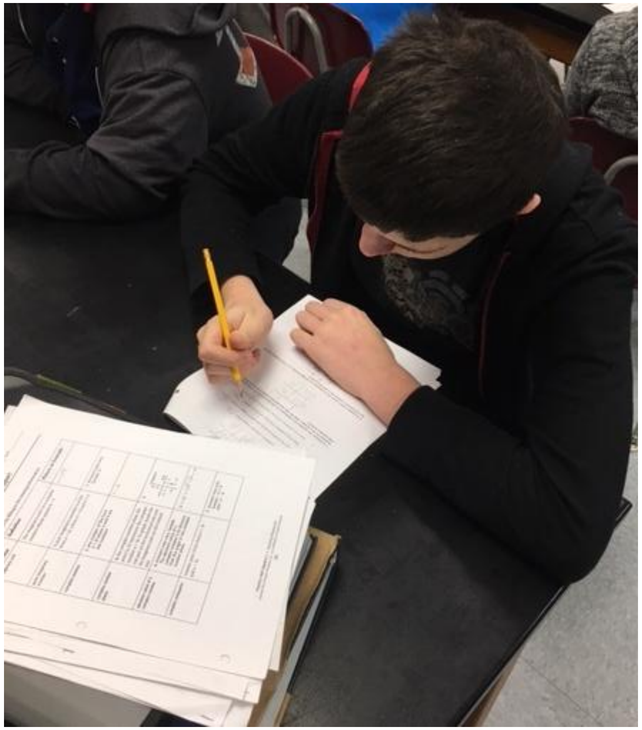
LDC Module: Mendel's Mesozoic Mutants

After reading the design requirements, conducting background research on Mendelian genetics, and designing and testing a baby dinosaur, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the design. Support your response with evidence from your research. Include calculations, budget constraints, and illustrations/models to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Kelly Woodruff, High School Science

LDC Module: Mendel's Mesozoic Mutants



RURAL LITERACY DESIGN COLLABORATIVE

FOR MORE INFORMATION

Scott Smith, Project Manager

Rural LDC Science & Literacy

Northwestern Local Schools

nrws_ssmith@tccsa.nwr

RURAL
LITERACY DESIGN
COLLABORATIVE

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

Middle Schools
Science & Literacy

End of Year Reconnect, May 3, 2017

Battelle Education

HIGH SCHOOLS THAT WORK

THE PAST FOUNDATION

WHY RURAL LDC SCIENCE & LITERACY?

- Increase student achievement in mastering science content and building science and literacy skills through a real world problem-solving approach engaging students in reading, researching, testing a prototype and writing an argumentative design report.
- Opportunities for science teachers from rural school districts to network and collaborate with science teachers from other rural school districts.

RURAL LITERACY DESIGN COLLABORATIVE

WHAT IS LDC?

The principal component of the LDC Framework is the design and delivery of a **module**—a subject-specific reading and writing assignment, or "teaching task," with an instructional plan that is taught over a two- to four-week period. The LDC Framework "hardwires in" the Common Core Standard, targeting the literacy skills students will need to be successful in school, college, and career.

Year 1 2016-2017

July 1, 2016

- 5 rural school districts: Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern
- Received a Straight A Grant for Rural LDC Science & Literacy to implement over 5 years

September 7, 2016 through March 24, 2017

- Trained Cohort 1 - 15 science teachers during a series of Battelle trainings, and HSTW on-site coaching sessions with PAST Foundation evaluation support
  to design and teach 30 modules

RURAL LITERACY DESIGN COLLABORATIVE

Preparing for Year 2 2017-2018

May 10 through September 13, 2017

- Train Cohort 2 - 15 new science/ELA teachers during a series of district sponsored trainings

June and July 2017

- Submit Cohort 1 Rural LDC Science Modules for national review

RURAL LITERACY DESIGN COLLABORATIVE

Welcome/Introductions

2 of the 5 Cohort 1 Middle School Science Teachers

Julie Hagans
Northwestern Middle School

Kori Aubel
Loudonville Junior High School

RURAL LITERACY DESIGN COLLABORATIVE

Sharing Best Practices

Kori Aubel

Loudonville Junior High School

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Kori Aubel, Middle School Science

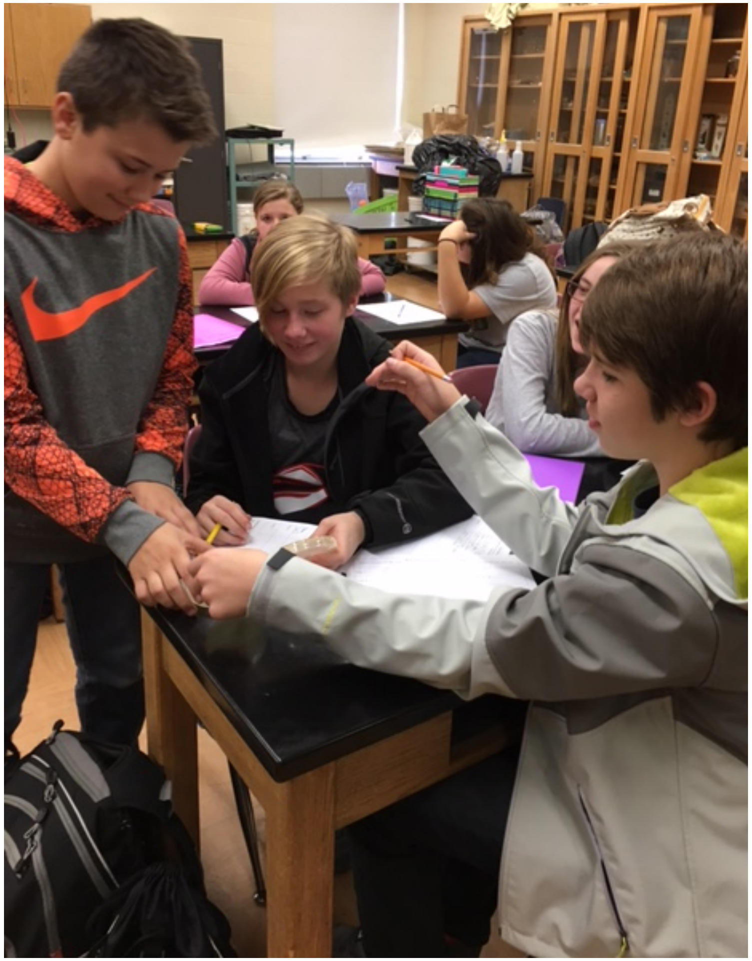
LDC Module: Battle of the Bacteria Blasters

How can we create a safe, effective, and cheap homemade surface cleaner?

After reading the RFP, conducting background research on “How bacteria pass on their traits”, “How disinfectants work, and effects of harmful chemicals in cleaners”, and designing and testing cleaner made with different concentrations of different safe cleaning solutions, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research.

Loudonville Kori Aubel, Middle School Science

LDC Module: Battle of the Bacteria Blasters



RURAL
LITERACY DESIGN
COLLABORATIVE

Loudonville Kori Aubel, Middle School Science

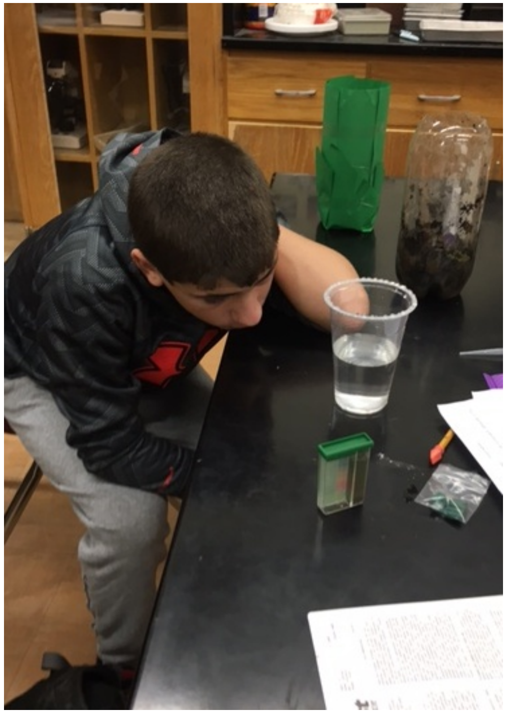
LDC Module: Earthworm Explosion

Can students create a functioning ecosystem for earth worms?

After reading the RFP, conducting background research on earthworm ecosystems, and designing and testing ecosystem prototypes, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research.

Loudonville Kori Aubel, Middle School Science

LDC Module: Earthworm Explosion



RURAL LITERACY DESIGN COLLABORATIVE

Sharing Best Practices

Julie Hagans

Northwestern Middle School

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Julie Hagans, Middle School Science

LDC Module: Crude Oil Catastrophe

How can one create an effective and efficient product to remove oil from a bird after a catastrophic spill?

After reading the RFP, conducting background research on oil spills, environmentally safe cleansers, oil removal, and designing and testing your oil spill clean up kit, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, illustrations and notes to help convey your message to your readers. Identify any gaps or unanswered questions. Include bibliography, citations, references, endnotes.

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Julie Hagans, Middle School Science

LDC Module: Crude Oil Catastrophe

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Julie Hagans, Middle School Science

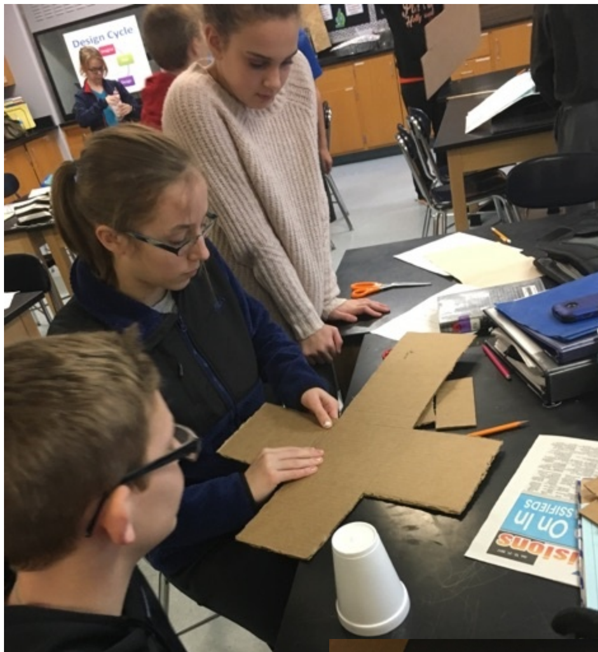
LDC Module: Insane Insulators

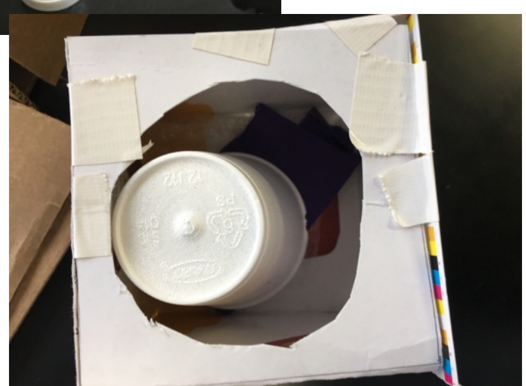
How can one create an effective and efficient product to insulate a container to reduce thermal energy transfer?

After reading the RFP, conducting background research on convection, conduction, radiation, how containers are insulated, and designing and testing your insulated container, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and notes to help convey your message to your readers. Identify any gaps or unanswered questions. Connect background research and the requirements from the RFP in your response.

Northwestern Julie Hagans, Middle School Science

LDC Module: Insane Insulators





RURAL LITERACY DESIGN COLLABORATIVE

Sharing Best Practices

Middle School Teachers

Cohort 1

Rural LDC Science & Literacy

Black River Michele Yocum, 5th Grade Science

LDC Module: There's No Place Like Home

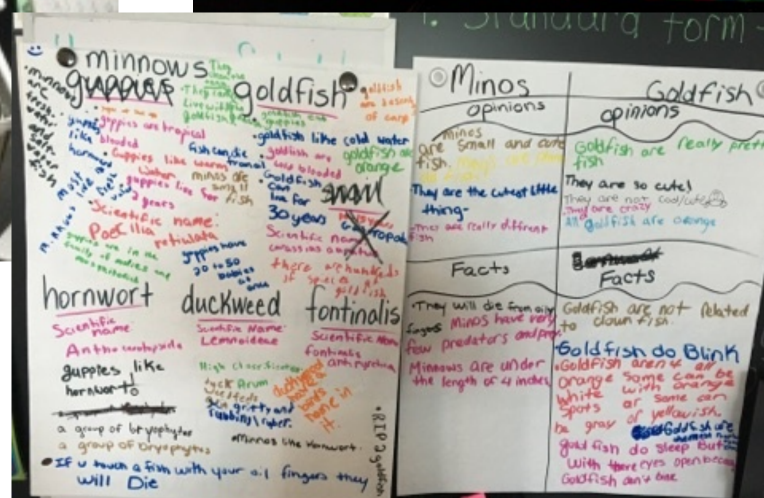
How can we most effectively create an aquatic ecosystem that sustains 5 out of 15 species for a period of 30 days?

After reading an RFP from a local pet store, your challenge is to design a prototype that can be purchased for $20.00 and sustain life for a minimum of 30 days, conducting background research on ecosystems, and designing and testing a habitat. Write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research.

RURAL LITERACY DESIGN COLLABORATIVE

Black River Michele Yocum, 5th Grade Science

LDC Module: There's No Place Like H[ome]



RURAL LITERACY DESIGN COLLABORATIVE

Black River Michele Yocum, 5th Grade Science

LDC Module: To INFINITY and Beyond

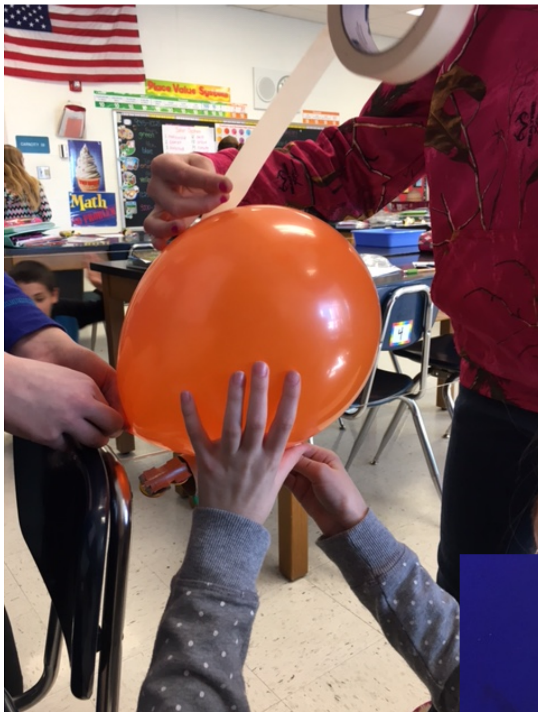
How can students most effectively create a model satellite that will orbit the Earth?

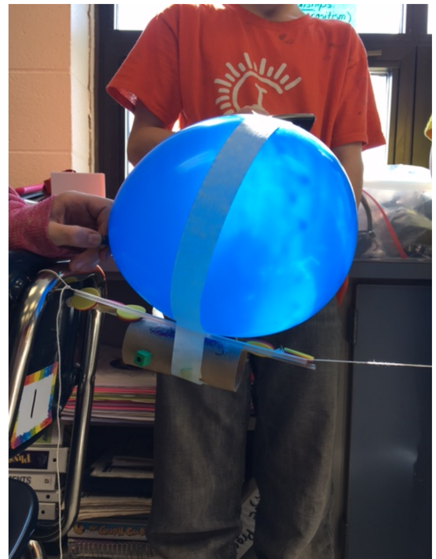
After reading RFP, conducting background research on Satellites, and designing and testing a model Satellite, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include charts, tables, and/or illustrations to help convey your message to your readers. Identify any gaps or unanswered questions.

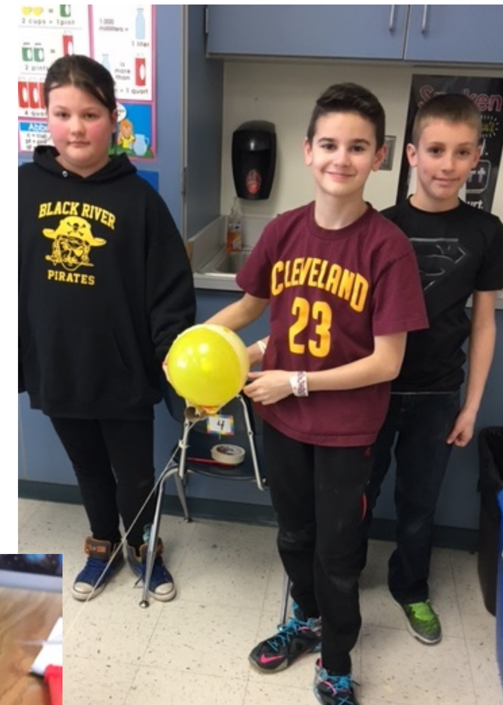
RURAL LITERACY DESIGN COLLABORATIVE

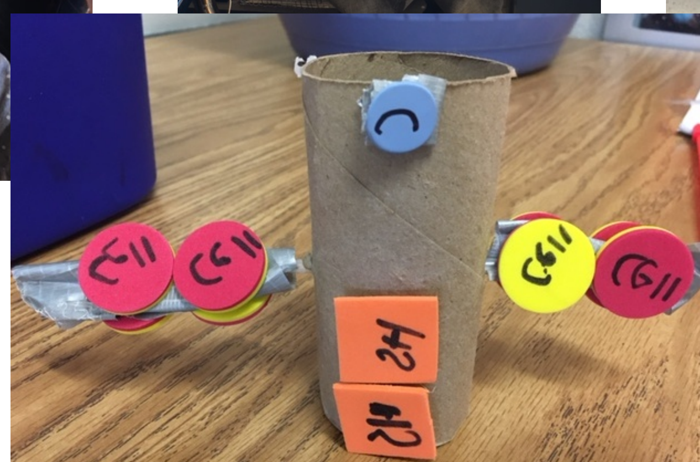
Black River Michele Yocum, 5th Grade Science

LDC Module: To INFINITY and Beyond









RURAL
LITERACY DESIGN
COLLABORATIVE

Black River Sonya Infantino, Middle School Science

LDC Module: Water, Water Everywhere

Can you build a water filtration device that separates out the pollutants for the least amount of money?

After reading the RFP, conducting background research on the components within the water mixture, and designing and testing a filtration device, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include (charts, tables, illustrations, and/or stylistic devices) to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

LDC Module: Mousetrap Cars

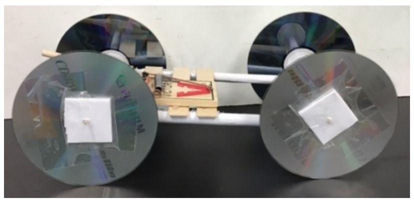
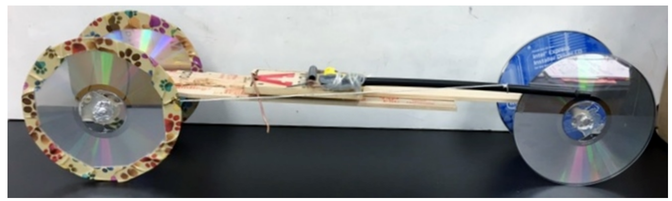
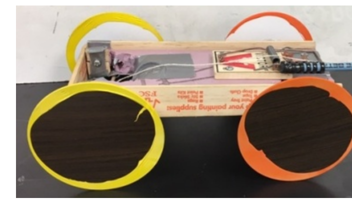
How can you build an originally designed vehicle powered solely by the energy of one standard-sized mousetrap?

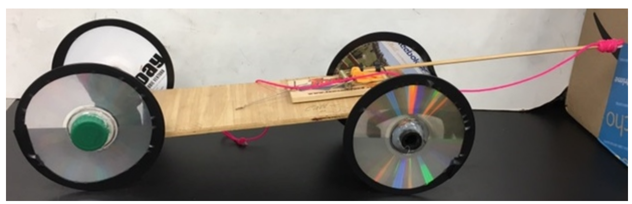
After reading the RFP, conducting background research on the basic components of the mousetrap car, and designing and testing the mousetrap car, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include (charts, tables, illustrations, and/or stylistic devices) to help convey your message to your readers. Identify any gaps or unanswered questions.

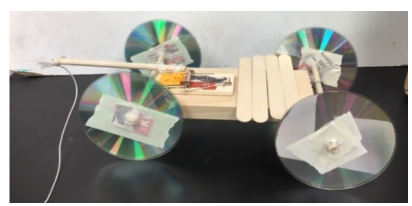
RURAL LITERACY DESIGN COLLABORATIVE

Black River Sonya Infantino, Middle School Science

LDC Module: Mousetrap Cars



RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Trevor Cline, Middle School Science

LDC Module: Erosion/Deposition

After reading an RFP, conducting background research on erosion and deposition, and designing and testing three-dimensional dams, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP.
Support your response with evidence from your research.

Include illustrations/stylistic devices to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Trevor Cline, Middle School Science

LDC Module: Erosion/Deposition

RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Trevor Cline, Middle School Science

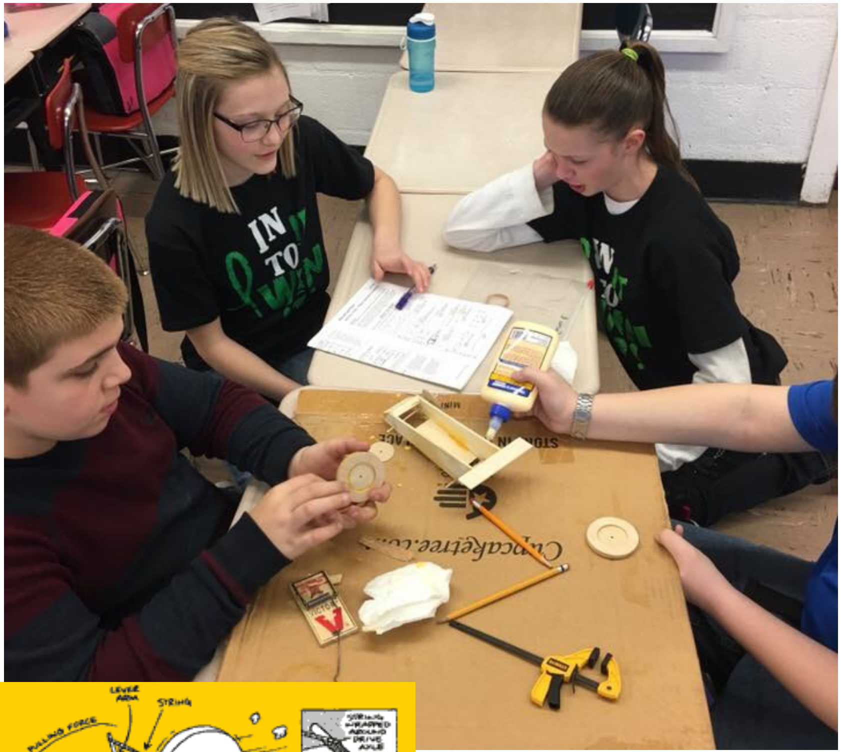
LDC Module: Mousetrap Car Project

After reading the RFP, conducting background research on potential and kinetic energy, and designing and testing a mousetrap car, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research.

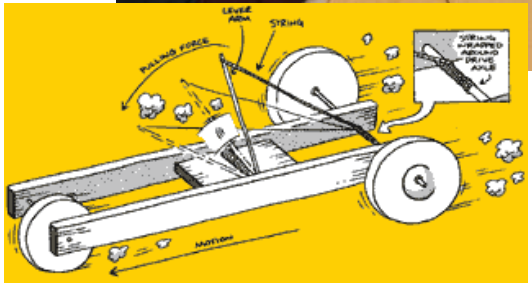
RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Trevor Cline, Middle School Science

LDC Module: Mousetrap Car Project



Each team completed a Mousetrap Car kit and added different things to increase speed or distance.



RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Joe Ortiz, Middle School Science

LDC Module: Unlocking Soil Secrets

What combinations of local organic and geological material can create the most successful soil for the purpose of growing plants?

After reading design requirements, conducting background research on rock & mineral uses and composition, the rock cycle, and soil composition and uses, and designing and testing soil creation and plant growth from that soil, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of design requirements. Support your response with evidence from your research. Include charts of soil composition and tables of plant growth to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Joe Ortiz, Middle School Science

LDC Module: Unlocking Soil Secrets

RURAL
LITERACY DESIGN
COLLABORATIVE

Mapleton Joe Ortiz, Middle School Science

LDC Module: Insulated Drink Tumbler Reform: Make Yeti Great Again

What materials and design can best replicate an insulated drink tumbler without the use of metal, limited Styrofoam, and no vacuum technology?

After reading the RFP design requirements, conducting background research on materials and tumbler designs that insulate effectively, and designing and testing ice resisting melting, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP design requirements. Support your response with evidence from your research. Include charts of ice melting time to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton — Joe Ortiz, Middle School Science

LDC Module: Insulated Drink Tumbler Reform: Make Yeti Great Again

The winning tumbler design kept ice from melting for 5 hours and 53 minutes. Most cups lasted over 3 hours. Without an insulating design the ice in our control beaker melted in 1 hour and 40 minutes.

RURAL LITERACY DESIGN COLLABORATIVE

FOR MORE INFORMATION

www.ldc.org

Diana Rogers, Regional Coordinator &

Rural LDC Science Lead Coach

HSTW NE Ohio Region

hstwdr@gmail.com

RURAL LITERACY DESIGN COLLABORATIVE

RURAL LITERACY DESIGN COLLABORATIVE

Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern

High School Science & Literacy

End-of-Year Reconnect, May 3, 2017

Battelle Education

HIGH SCHOOLS THAT WORK

THE PAST FOUNDATION

WHY RURAL LDC

SCIENCE & LITERACY?

- Increase student achievement in mastering science content and building science and literacy skills through a real world problem-solving approach engaging students in reading, researching, testing a prototype and writing an argumentative design report.

- Opportunities for science teachers from rural school districts to network and collaborate with science teachers from other rural school districts.

RURAL LITERACY DESIGN COLLABORATIVE

WHAT IS LDC?

The principal component of the LDC Framework is the design and delivery of a **module**—a subject-specific reading and writing assignment, or "teaching task," with an instructional plan that is taught over a two- to four-week period. The LDC Framework "hardwires in" the Common Core Standard, targeting the literacy skills students will need to be successful in school, college, and career.

RURAL LITERACY DESIGN COLLABORATIVE

Year 1 2016-2017

July 1, 2016

- 5 rural school districts: Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern
- Received a Straight A Grant for Rural LDC Science & Literacy to implement over 5 years

September 7, 2016 through March 24, 2017

- Trained Cohort 1 - 15 science teachers during a series of Battelle trainings, and HSTW on-site coaching sessions with PAST Foundation evaluation support to design and teach 30 modules

RURAL LITERACY DESIGN COLLABORATIVE

Preparing for Year 2 2017-2018

May 10 through September 13, 2017

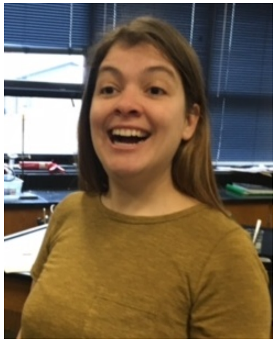
- Train Cohort 2 - 15 new science/ELA teachers during a series of district sponsored trainings

June and July 2017

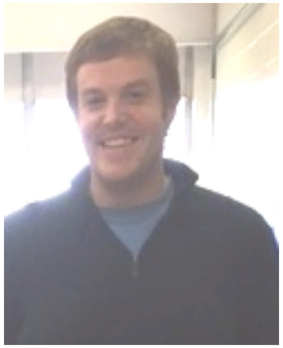
- Submit Cohort 1 Rural LDC Science Modules for national review

Welcome/Introductions

4 of the 9 Cohort 1 High School Science Teachers



Amanda Michalak
Northwestern High School



Jim Conley
Loudonville High School

Leanna Colosimo
Mapleton High School

Tony Bunt
Mapleton High School

RURAL LITERACY DESIGN COLLABORATIVE

Sharing Best Practices

Amanda Michalak

Northwestern High School

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Amanda Michalak, High School Science

LDC Module: Shipping Apples

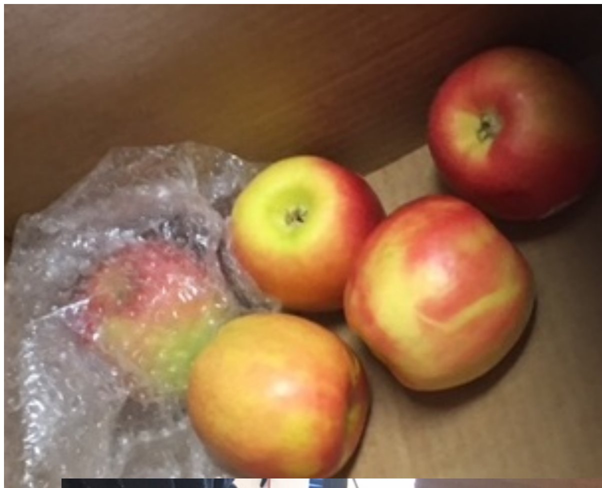
How can a student design a shipping container to ship six Pink Lady apples without bruising or decay across the country?

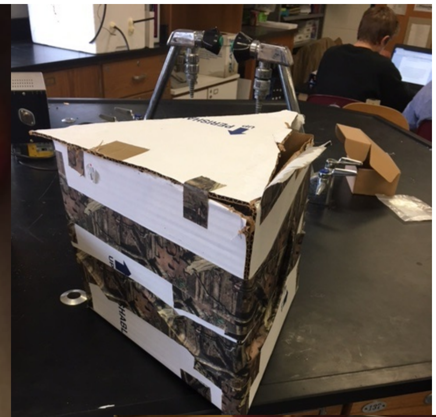
After reading the RFP, conducting background research on decay of apples, reaction chambers, closed systems and packaging of products, and designing and testing a shipping container that will allow for transport of six Pink Lady apples without bruising and decay, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include data, tables, illustrations, and/or stylistic devices to help convey your message to your readers. Identify any gaps or unanswered questions.

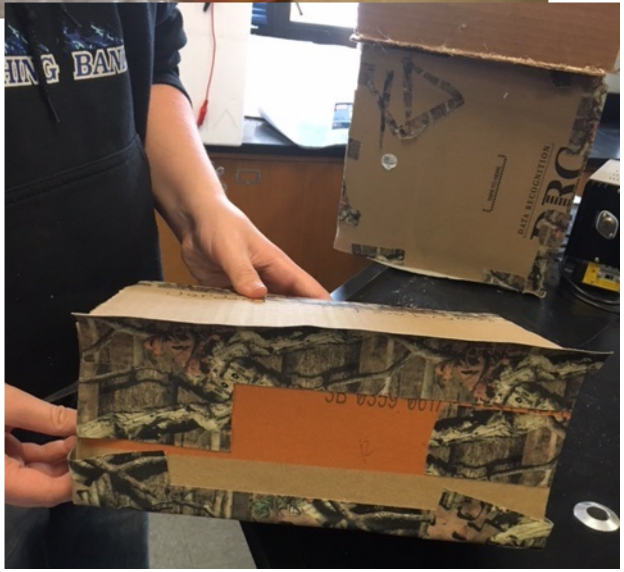
RURAL LITERACY DESIGN COLLABORATIVE

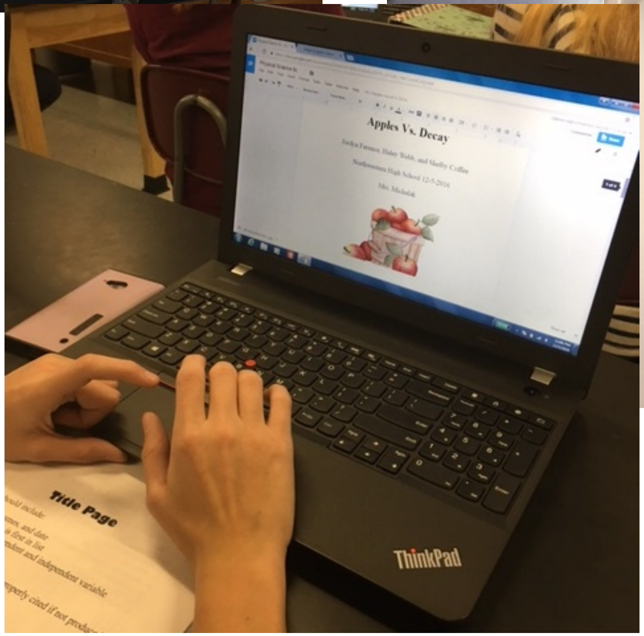
Northwestern Amanda Michalak, High School Science

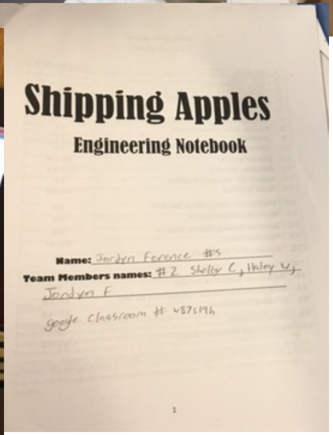
LDC Module: Shipping Apples











RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Amanda Michalak, High School Science

LDC Module: Bioenergy

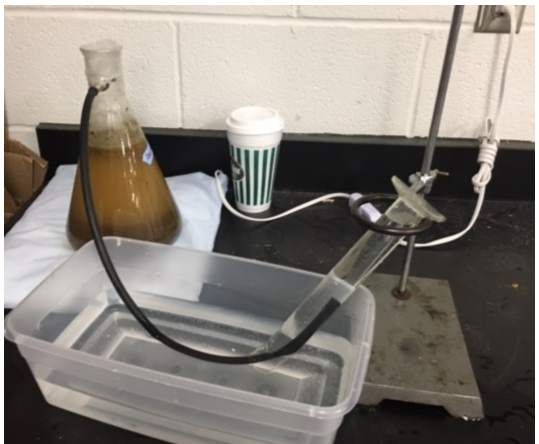
How can we produce fuel and electricity from waste efficiently and effectively?

After reading the RFP, conducting background research on microbial fuel cells, and designing and testing a batch anaerobic digester for consuming food and animal waste, write an engineering report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. A presentation will also be required. Support your response with evidence from your research. Include charts, tables and illustrations to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Amanda Michalak, High School Science

LDC Module: Bioenergy



RURAL LITERACY DESIGN COLLABORATIVE

Sharing Best Practices

Jim Conley

Loudonville High School

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Jim Conley, High School Science

LDC Module: Kombucha Design Project

What ingredient combinations can students produce to make a fermented tea drink that is marketable and profitable through the processes of cellular metabolism?

After reading the RFP, conducting background research on fermentation, cell respiration, and ecology of microbes, and designing and testing fermented tea/various formulas, write a proposal in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and/or stylistic devices to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville — Jim Conley, High School Science

LDC Module: Kombucha Design Project

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Jim Conley, High School Science

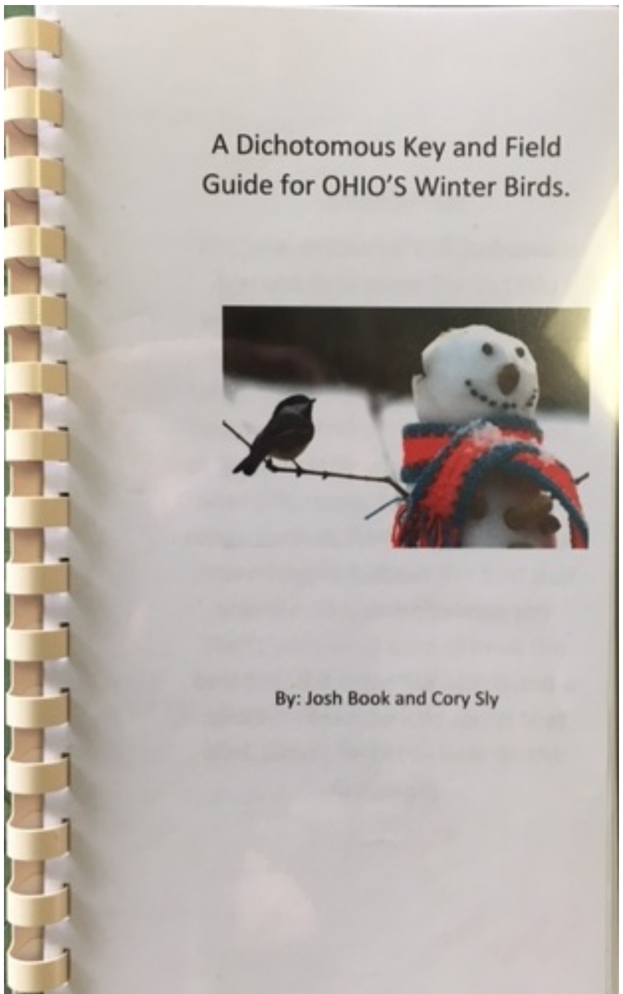
LDC Module: Name That Bird

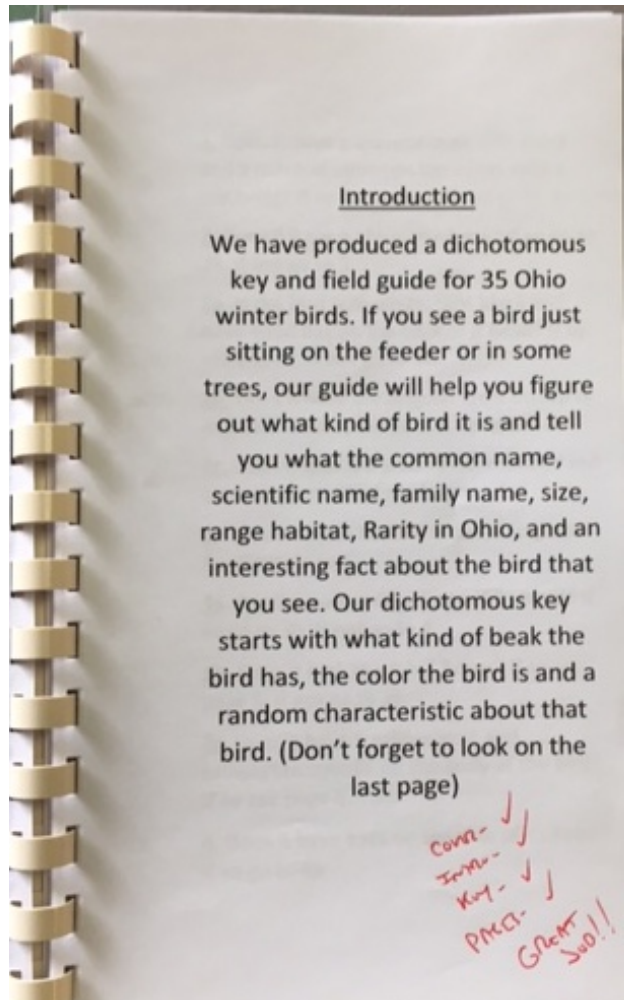
Can students design and develop a dichotomous key and identification guide that is the most accurate and efficient in identifying winter songbirds and raptors commonly found in Ohio?

After reading the RFP, conducting background research on Ohio's winter bird species, and designing and testing a dichotomous key for identifying 35 of Ohio's common songbirds and raptors, based upon their taxonomic and physical features. Be sure to connect avian taxonomy and physical attributes to the design of your dichotomous key, then, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include a dichotomous key to help convey your message to your readers. Identify any gaps or unanswered questions.

Loudonville — Jim Conley, High School Science

LDC Module: Name That Bird





RURAL LITERACY DESIGN COLLABORATIVE

Sharing Best Practices

Leanna Colosimo

Mapleton High School

RURAL
LITERACY DESIGN
COLLABORATIVE

Mapleton Leanna Colosimo, High School Science

LDC Module: Dig This

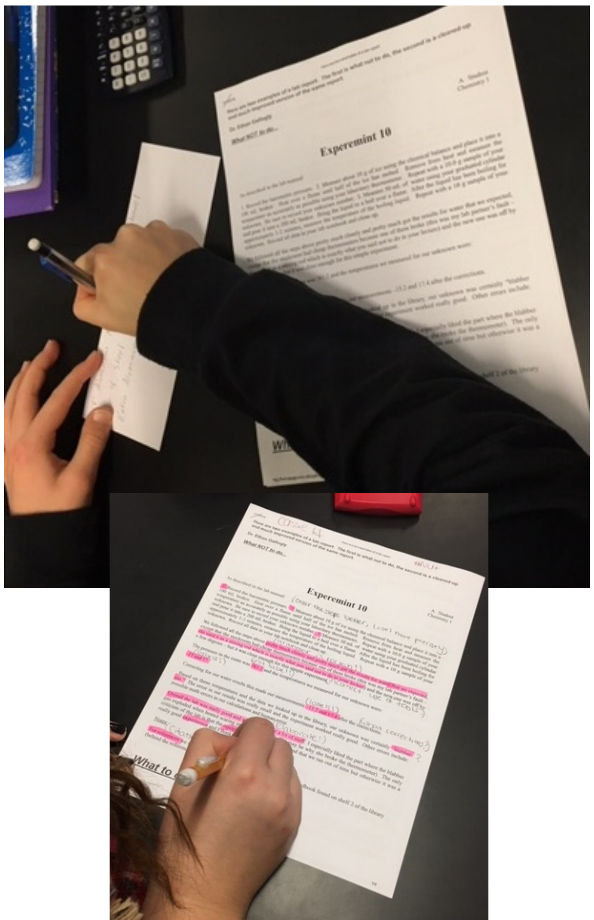
How can a shovel be designed so that it would decrease the amount of force and work necessary to move dirt, mulch, straw/ hay, and other agricultural debris?

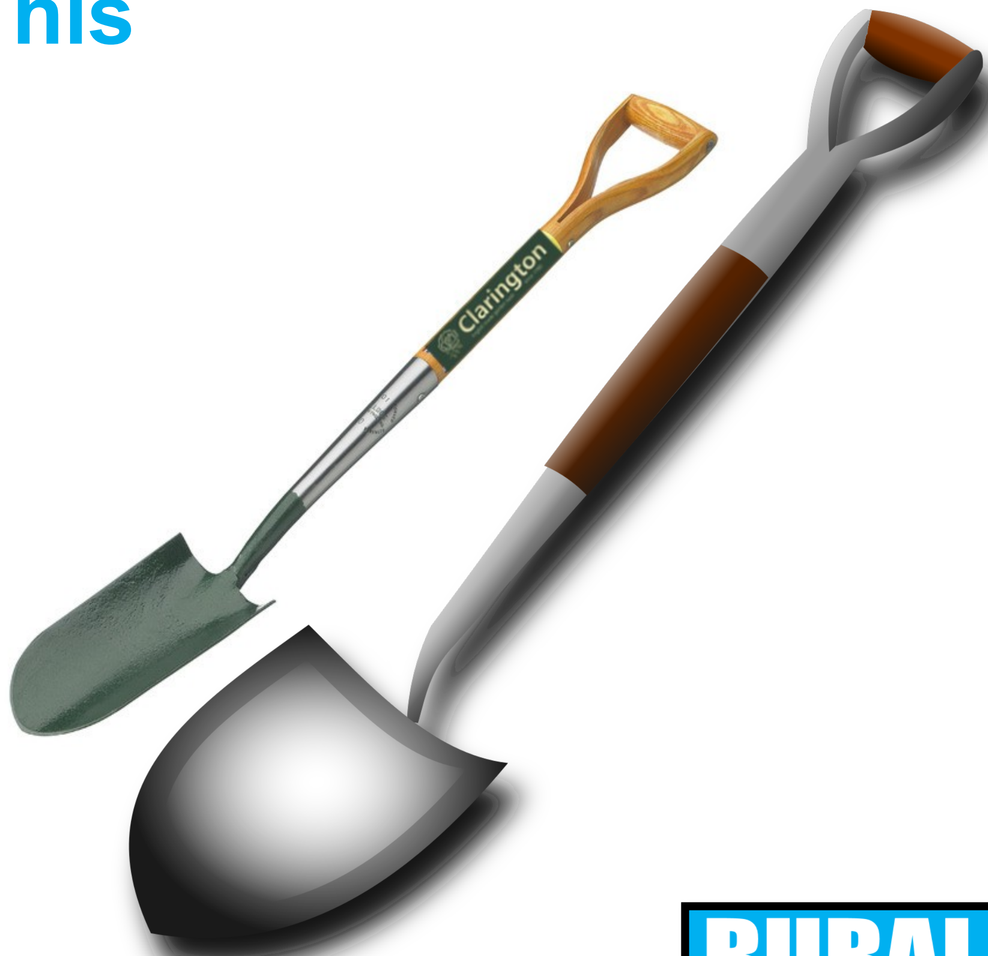
After reading the RFP, conducting background research on forces, work, power, shovel design (handle and blade), types of materials, human factors, cost and levers, and designing and testing a shovel, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and any other relevant diagrams to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Leanna Colosimo, High School Science

LDC Module: Dig This





RURAL LITERACY DESIGN COLLABORATIVE

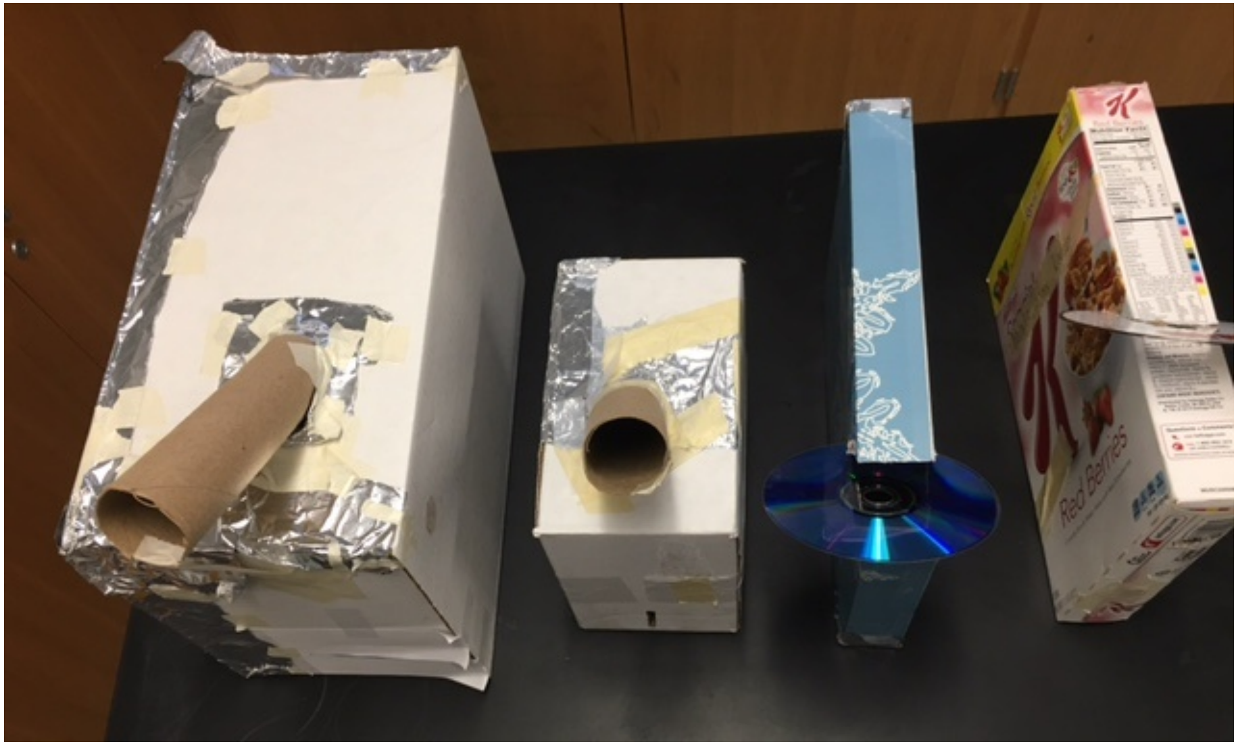
LDC Module: Lights Color Spectrum

Is it possible to construct a spectrometer from disposable items commonly found in the classroom?

After reading the RFP, conducting background research on spectrometers, line emission spectra, and light, and designing and testing the prototype, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research.

Mapleton Leanna Colosimo, High School Science

LDC Module: Lights Color Spectrum



RURAL LITERACY DESIGN COLLABORATIVE

Sharing Best Practices

Tony Bunt

Mapleton High School

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Tony Bunt, High School Science

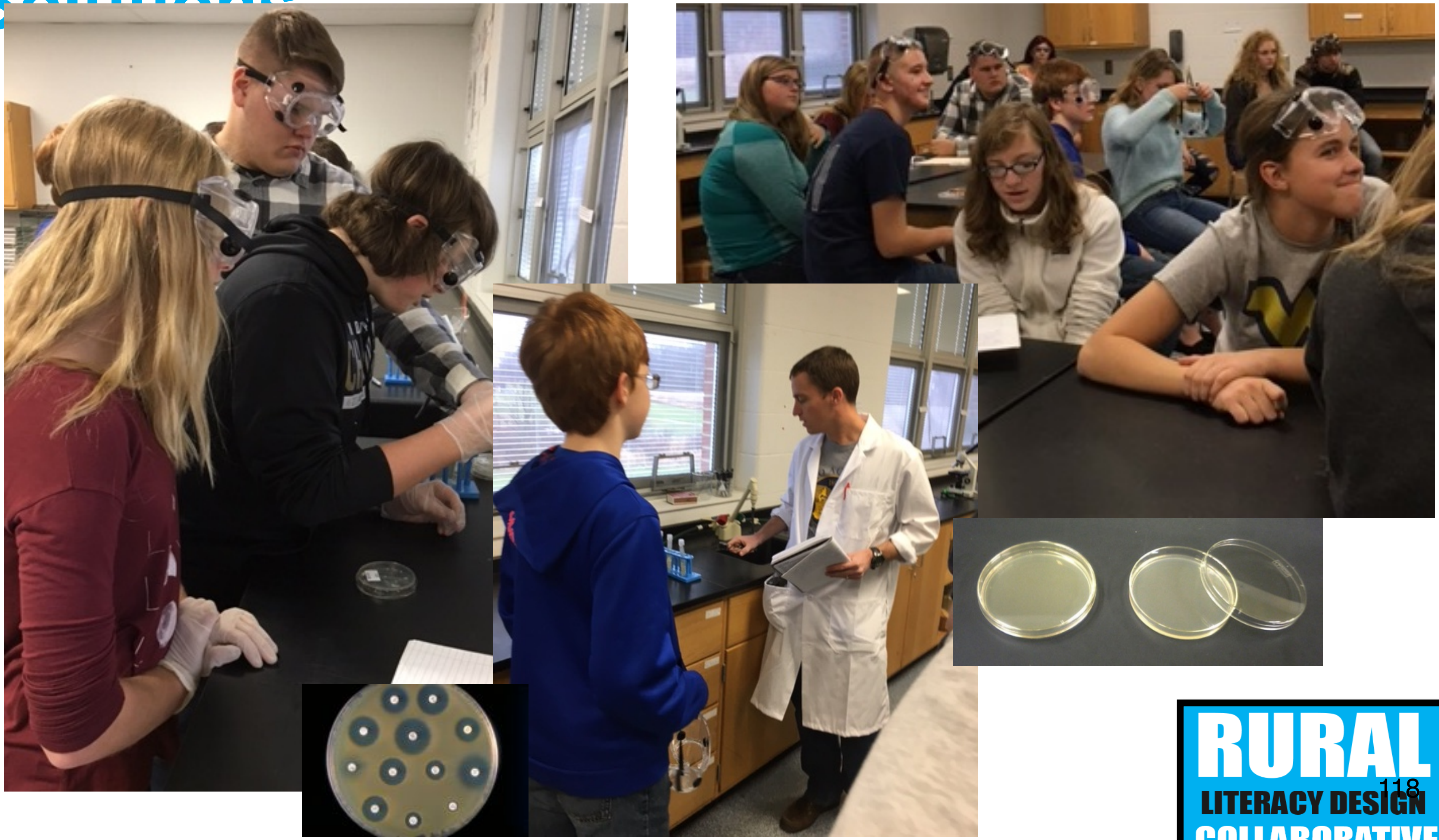
LDC Module: Germ Masters Agar Solutions

What are the optimum environmental and nutritional conditions to grow bacteria quickly and affordably?

After reading a Request For Proposal (RFP) in which a pharmaceutical company is seeking an affordable, efficient protocol for culturing bacteria and a unique nutrient agar in which to grow the bacteria , conducting background research on prokaryotic cell reproduction, bacteria growth mediums, microbial metabolism, and environmental effects on bacteria growth, and designing and testing a series of bacteria growth protocols, write a protocol for growing bacteria cultures and develop a unique agar recipe in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include research and results gathered in the process of developing a growth protocol to help convey your message to your readers. Identify any gaps or unanswered questions.

Mapleton Tony Bunt, High School Science

LDC Module: Germ Masters Agar Solutions



RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Tony Bunt, High School Science

LDC Module: Pollution Solutions

Can a device be created inexpensively that efficiently helps remove floating plastics from bodies of water; via a small boat operated by a single person?

After reading the RFP in which a non-profit environmental aid firm seeks affordable, efficient, and durable equipment for extracting plastic liter from a body of water , conducting background research on the Great Pacific Garbage Patch, plastic buoyancy, and environmental effects of plastic litter on wildlife, habitats, and humans, and designing and testing a scale model of the equipment , write a design proposal in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include empirical data and detailed technical drawings to help convey your message to your readers.

RURAL LITERACY DESIGN COLLABORATIVE

Mapleton Tony Bunt, High School Science

LDC Module: Pollution Solutions

RURAL LITERACY DESIGN COLLABORATIVE

Sharing Best Practices

High School Teachers

Cohort 1

Rural LDC Science & Literacy

RURAL LITERACY DESIGN COLLABORATIVE

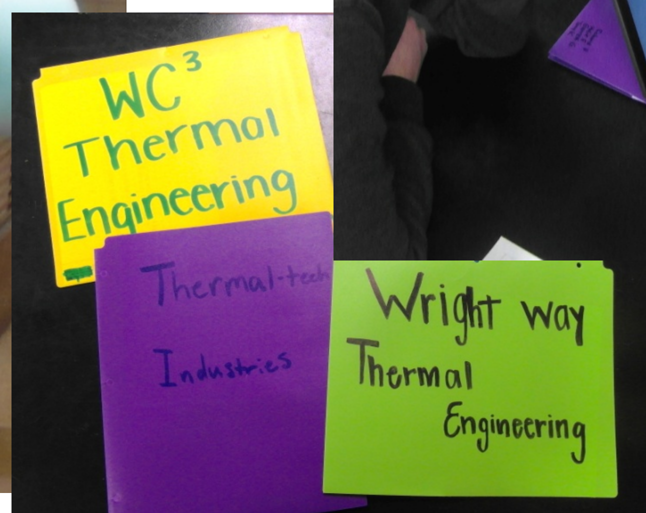
LDC Module: The Balto Challenge: Heat Transfer & Thermal Insulation

Can you design a passive insulated container that can deliver refrigerated medicine to a remote location -- such as an African village -- and be carried by a rescue dog?

After reading the RFP from Balto Pharmaceuticals LLP, conducting background research on kinetic theory (heat and temperature) and mechanisms of heat transfer, and designing and testing a working prototype, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP; namely: temperature stability, shock resistance, durability, size and weight, ease of handling and cost. Support your response with evidence from your research. Include measurements, data (graphs, charts, or tables) and technical drawings to help convey your message to your readers. Identify any gaps or unanswered questions. Include a portfolio of supporting documents.

RURAL LITERACY DESIGN COLLABORATIVE

LDC Module: The Balto Challenge: Heat Transfer & Thermal Insulation



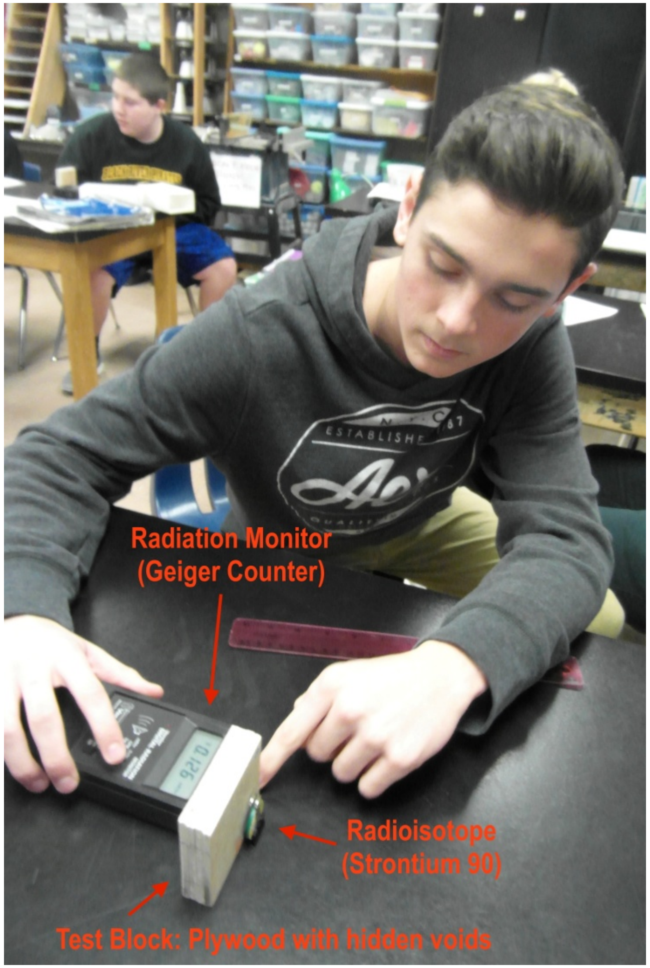
RURAL LITERACY DESIGN COLLABORATIVE

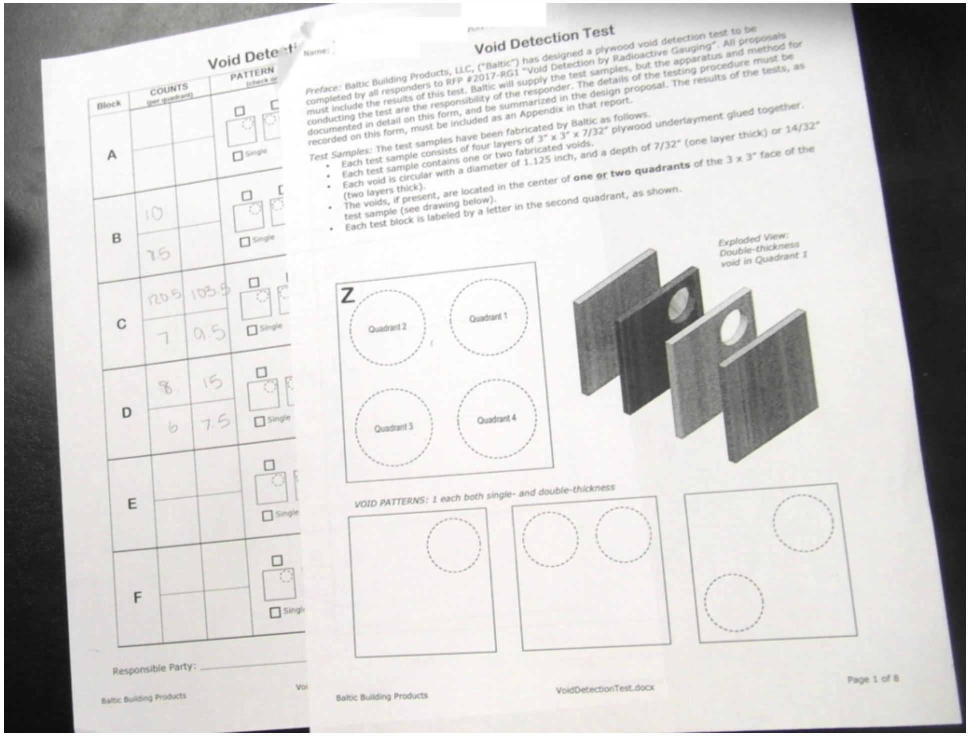
LDC Module: Veneers Versus Voids: Radioactive Gauging

Rigid quality control is extremely important in the construction products industry. A hollow space within the interior layers of plywood weakens the material and can produce cosmetic defects in finished pieces like furniture and cabinets.

After reading the RFP from Baltic Building Products LLP, conducting background research on the energy and penetration depth of ionizing radiation (alpha , beta and gamma), and designing and testing a measurement procedure, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP; namely: the ability to detect and measure the size of hollow spaces in plywood. Support your response with evidence from your research. Include measurements, data (graphs, charts, or tables) and technical drawings to help convey your message to your readers. Connect the basic physics of ionizing radiation and the practical demands of the application in your response.

LDC Module: Veneers Versus Voids: Radioactive Gauging





RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Michael Williams, High School Science

LDC Module: Falcon Fuel Energy Bars

Effectively design and create a low cost, low calorie, nutritious energy bar for either pre or post-activity and compare the effectiveness, nutritional value, and taste preference to a selected market energy bars. Then create and record a 30 second radio ad to promote your product.

After reading the RFP, conducting background research on human nutrition needs and homeostasis, and designing and testing energy bar variation, write a proposal in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and/or stylistic devices to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Michael Williams, High School Science

LDC Module: Falcon Fuel Energy Bars

Hillsdale Michael Williams, High School Science

LDC Module: The Falcon River Project Bridging the Literacy-Design Gap with a Bridge Efficacy Investigation

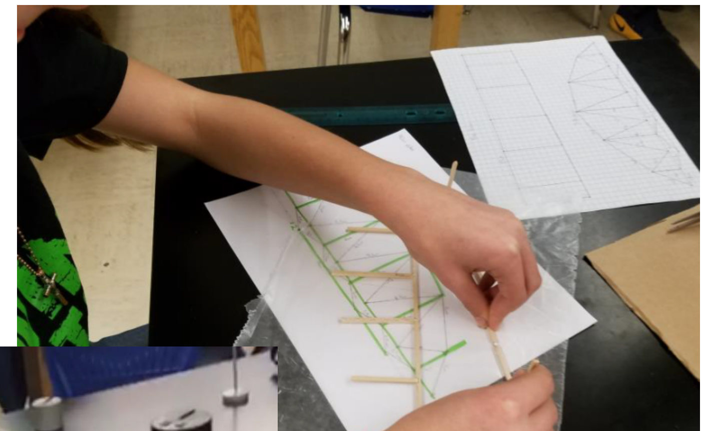
Effectively design and create a balsa wood bridge to maximize efficacy based on a ratio of load supported to bridge mass.

After reading the RFP, conducting background research on bridge design and force distribution, and designing and testing the efficiency of the bridge, write proposal in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include charts, tables, illustrations, and/or stylistic devices to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Michael Williams, High School Science

LDC Module: The Falcon River Project Bridging the Literacy-Design Gap with a Bridge Efficacy



RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Lindsay Bowen, High School Ag Science

LDC Module: Food Science

How can we most effectively develop a new food prototype?

After reading the RFP, conducting background research on food product development, and designing and testing your prototype, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include tables, illustrations and data to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Hillsdale Lindsay Bowen, High School Ag Science

LDC Module: Food Science

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Kendra Carnegie, High School Ag Science

LDC Module:
Creating a Bovine Reproductive Tract

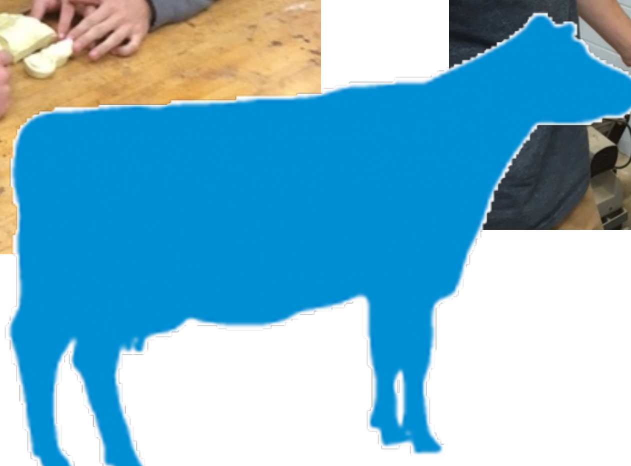
How can students design a 3D female reproductive tract manipulative to enhance the OSU Extension Learning Lab Kit for Beef?

After reading the RFP, conducting background research on the reproductive track of beef, and designing and testing a 3D beef female reproductive tract manipulative, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. Support your response with evidence from your research. Include charts, tables, and illustrations to help convey your message to your readers.
Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Kendra Carnegie, High School Ag Science

LDC Module:
Creating a Bovine Reproductive Tract



RURAL
LITERACY DESIGN
COLLABORATIVE

Loudonville Kendra Carnegie, High School Ag Science

LDC Module: Growth Media for Greenhouse Plants

When starting with a base potting soil (or growth media) for greenhouse use, which items when added to the growth media will provide a neutral pH while creating optimal conditions for germinating seedlings from seeds?

After reading the RFP, conducting background research on growing media, and designing and testing your prototype, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include (charts, tables, and illustrations to help convey your message to your readers. Identify any gaps or unanswered questions. Include in-text citations and works cited in APA format. Connect the AFNR curriculum and connect it to the proposal in your response.

RURAL LITERACY DESIGN COLLABORATIVE

Loudonville Kendra Carnegie, High School Ag Science

LDC Module:
Growth Media for Greenhouse Plants

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Kelly Woodruff, High School Science

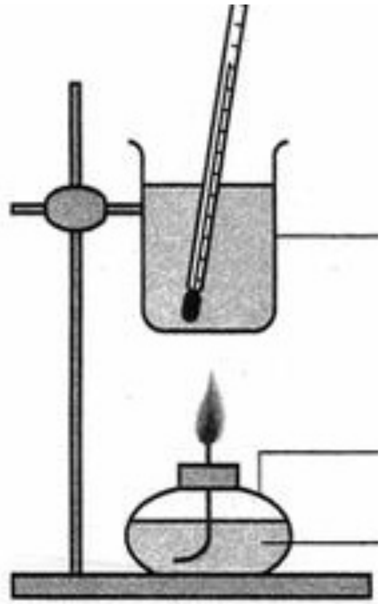
LDC Module: Calorimeter

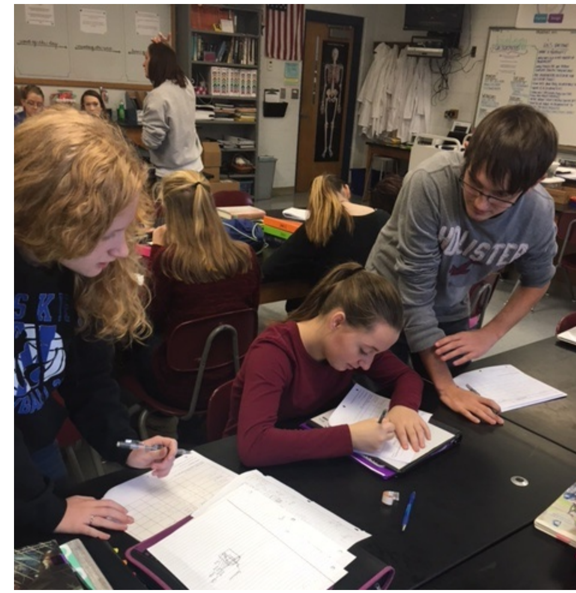
After reading the RFP, conducting background research on chemistry of life and calorimeter design, and designing and testing a calorimeter, write design proposal in which you describe your design and argue its effectiveness in meeting the requirements of RFP. Support your response with evidence from your research. Include tables, graphs, and illustrations to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Kelly Woodruff, High School Science

LDC Module: Calorimeter





RURAL
LITERACY DESIGN
COLLABORATIVE

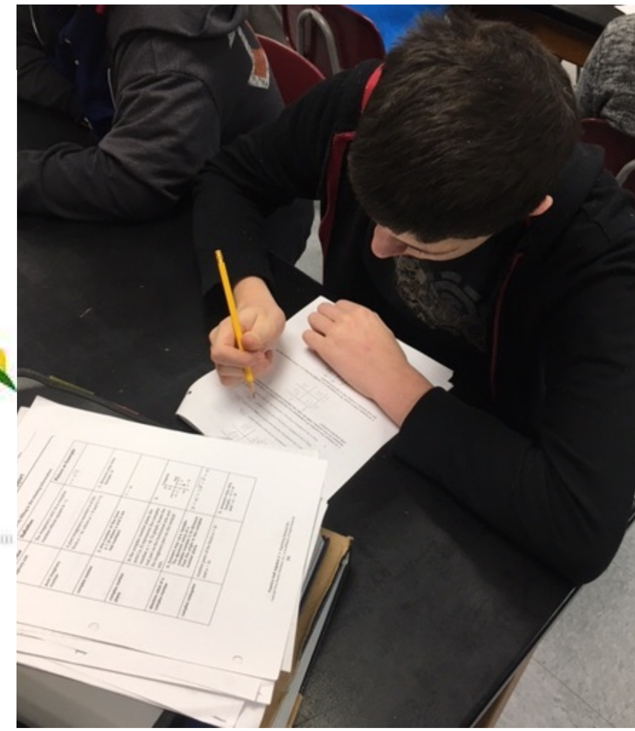
LDC Module: Mendel's Mesozoic Mutants

After reading the design requirements, conducting background research on Mendelian genetics, and designing and testing a baby dinosaur, write a design report in which you describe your design and argue its effectiveness in meeting the requirements of the design. Support your response with evidence from your research. Include calculations, budget constraints, and illustrations/models to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Kelly Woodruff, High School Science

LDC Module: Mendel's Mesozoic Mutants



RURAL LITERACY DESIGN COLLABORATIVE

FOR MORE INFORMATION

www.ldc.org

Diana Rogers, Regional Coordinator &

Rural LDC Science Lead Coach

HSTW NE Ohio Region

hstwdr@gmail.com

High Schools That Work - Live Binder Resource List - July 18, 2017
Submitted by Diana Rogers, Rural LDC HSTW Coach & Partner

Report Components:

- Live Binder Resource List
    - May 10 & 17 Agenda
    - May 10 & 17 PowerPoint
    - Cohort 1 and 2 Contact List
    - LDC Definitions
    - Concept Design
    - Teaching Task Components
    - Request for Proposal template
    - LDC Module – Cohort 2 Teacher Planner
    - Backward Design Cycle
    - LDC Science Rubric 6 – 8
    - LDC Science Rubrics 9 – 12
    - LDC Standards – Curriculum Alignment
    - Samples Modules: Battle of the Bacteria, Dig This, Earthworm Explosion, Insane Insulators, Veneers
    - LDC Overview
    - Battelle LDC Design Template

HSTW Ohio Network
115 Mountainview Court
Mount Sterling, OH 43143
hstwohionetwork@twc.com
Phone/Fax 740.869.2650

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Terry Wheeler
Educational Consultant

Barbara Williams
Akron Public Schools

March 7, 2017

Mr. Mike Burkholder, Principal
Northwestern High School
7473 North Elyria Road
West Salem, OH 44287

RE: $750 Rural LDC Science Presentation Grant for the College and Career Readiness Conference, Nashville, TN

Dear Mike:

On behalf of the LDC Science Grant, we would like to offer a **$750 Presentation Grant to Northwestern High School** for the cost associated with Amanda Michalak to present on Rural LDC Science at the College and Career Readiness Conference, July 10-12, 2017, Nashville, TN.

To receive this grant, Amanda must:

- Agree to meet with Diana Rogers no later than May 25 to plan the panel presentation to include, in addition to Amanda: Jill Beiser, Curriculum Director, Black River Local Schools, and Leanna Colosimo, 11-12 Teacher, Mapleton Local Schools
- Prepare for the presentation as requested by Diana after the meeting, deadline date to be determined.

Upon receipt of this signed award letter, Cindy Rolfe, Treasurer, HSTW Ohio Network will process a check for $750 and send it to the NWLSD treasurer. All grant funds must be spent for the above described *HSTW* activities between July 1 and August 1, 2017.

This grant is provided by the Rural LDC Science grant and HSTW Ohio Network, a nonprofit 501(c)3 organization that supports *HSTW* and *MMGW* sites in the northeast region of Ohio. Should you have any questions concerning this grant award, please contact Diana Rogers at 614/871-9002 or Cindy Rolfe, Treasurer, at 740/869-2650.

Sincerely,

Diana L. Rogers

Diana Rogers, Executive Director
HSTW Ohio Network

cc. Jeffry Layton, Superintendent
Amanda Michalak, Teacher
Cindy Rolfe, Treasurer
Scott Smith, Rural LDC Project Director

If you accept the terms of this award letter, please sign, date and email to hstwne@gmail.com.

Mike Burkholder, Principal — Date
Northwestern High School

HSTW OHIO NETWORK

HSTW Ohio Network
115 Mountainview Court
Mount Sterling, OH 43143
hstwohionetwork@twc.com
Phone/Fax 740.869.2650

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Jason Gray
Trumbull Career & Technical Center

Dennis Honkala
Ravenna City Schools

Dan Stacy, Ex-Officio
Ohio Department of Education

Terry Wheeler
Educational Consultant

Barbara Williams
Akron Public Schools

March 7, 2017

Jill Holland Beiser, Curriculum Director
Black River Local Schools
256-A County Rd 40
Sullivan, OH 44880

RE: $1,200 Rural LDC Science Presentation Grant for the College and Career Readiness Conference, Nashville, TN

Dear Jill:

On behalf of the LDC Science Grant, we would like to offer a **$1,200 Presentation Grant to Black River Local Schools** for the cost associated with presenting on Rural LDC Science at the College and Career Readiness Conference, July 10-12, 2017, Nashville, TN.

To receive this grant, you must:

- Agree to meet with Diana Rogers no later than May 25 to plan the panel presentation to include: you discussing a district perspective, and two teachers sharing their modules - Amanda Michalak, 9 - 10 Teacher, Northwestern Local Schools; and Leanna Colosimo, 11-12 Teacher, Mapleton Local Schools
- Prepare for the presentation as requested by Diana after the meeting, deadline date to be determined.

Upon receipt of this signed award letter, Cindy Rolfe, Treasurer, HSTW Ohio Network will process a check for $1,200 and send it to the BRLSD treasurer. All grant funds must be spent for the above described *HSTW* activities between July 1 and August 1, 2017.

This grant is provided by the Rural LDC Science grant and HSTW Ohio Network, a nonprofit 501(c)3 organization that supports *HSTW* and *MMGW* sites in the northeast region of Ohio. Should you have any questions concerning this grant award, please contact Diana Rogers at 614/871-9002 or Cindy Rolfe, Treasurer, at 740/869-2650.

Sincerely,

Diana L. Rogers

Diana Rogers, Executive Director
HSTW Ohio Network

cc. Chris Clark, Superintendent
Cindy Rolfe, Treasurer
Scott Smith, Rural LDC Project Director

If you accept the terms of this award letter, please sign, date and email to hstwne@gmail.com.

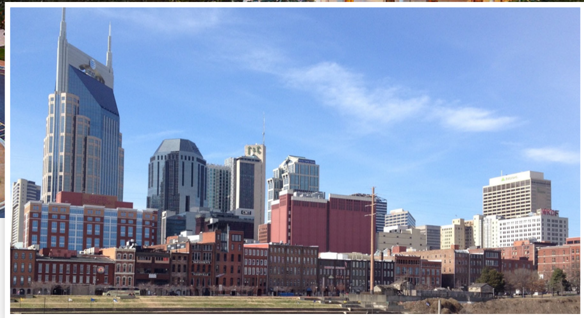
Jill Holland Beiser 3-16-2017

Jill Holland Beiser, Curriculum Director — Date
Black River Local Schools

One Week, Two Great Conferences

Improving Teaching and Learning

July 10-15, 2017
Gaylord Opryland Resort & Convention Center,
Nashville, Tennessee



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31st Annual High Schools That Work Staff Development Conference

July 12-15, 2017

HSTW Conference Highlights

Instructional Practices
Preparing Students for College and Careers
Counseling for Careers
Project-Based Learning
Technology in the Classroom
Transformational School Leadership
Advanced Career Studies
Essential Elements of Effective Career Pathways

Fifth Annual College- and Career-Readiness Standards Networking Conference

July 10-12, 2017

Networking Conference Highlights

Disciplinary Reading and Writing
Transforming Assignments with Literacy
Procedural vs. Conceptual Math
Formative Assessment Tools and Strategies
College and Career Readiness
Literacy in the CTE Classroom
Using Data to Re-engage Students

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RURAL LITERACY DESIGN COLLABORATIVE

Fifth Annual College- and Career-Readiness Standards Networking Conference, Nashville

Working to Improve STEM Through LDC

July 11, 2017

Battelle Education

HIGH SCHOOLS THAT WORK

THE PAST FOUNDATION

SESSION FACILITATORS

- **Amanda Michalach**, 9th Grade Science/ Advanced Careers Clean Energy Teacher, Northwestern Local Schools
- **Diana Rogers**, Regional Coordinator, HSTW NE Ohio Region
- **Jill Beiser,** Curriculum Coordinator, Black River Local Schools

WELCOME & LET'S PLAY

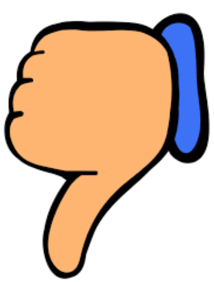
WHAT DO YOU KNOW?

Thumbs Up!

I can teach LDC

Thumbs Sideways!

I have some LDC experience



Thumbs Down!

My first LDC Session

RURAL LITERACY DESIGN COLLABORATIVE

WHAT IS LDC?

The principal component of the LDC Framework is the design and delivery of a **module**—a subject-specific reading and writing assignment, or "teaching task," with an instructional plan that is taught over a two- to four-week period. The LDC Framework "hardwires in" the Common Core Standard, targeting the literacy skills students will need to be successful in school, college, and career.

RURAL LITERACY DESIGN COLLABORATIVE

MUDDWATTS

RURAL
LITERACY DESIGN
COLLABORATIVE

THINK LIKE SCIENTISTS!!!

Make observations and record responses:

- What is it?
- What does it do?
- What is it made of?

RURAL LITERACY DESIGN COLLABORATIVE

Electron Flow Through the MudWatt

To understand how the MudWatt works, we need to follow the path of the electrons. Consider each step of the cycle below, using the diagram here as a reference:

- While munching up the nutrients in the mud, microbes deposit electrons onto the lower conductive disk, or anode.
- These electrons travel through the wire and power the electronics up top.
- The electrons then travel back down through the wire to the top conductive disk, or cathode.
- The electrons interact with oxygen and protons to form water.

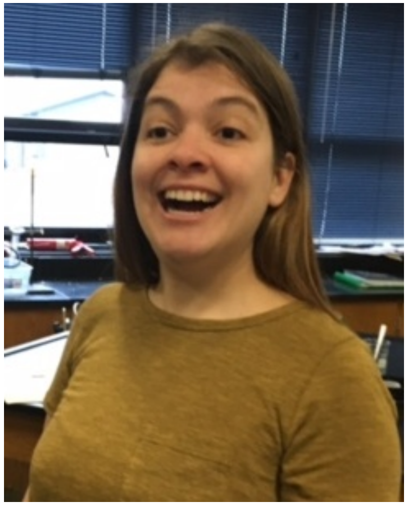
This sequence happens over and over, trillions of times every second!

COLLABORATIVE

AMANDA MICHALAK

9TH GRADE SCIENCE/ADVANCED CAREERS CLEAN ENERGY TEACHER

NORTHWESTERN LOCAL SCHOOLS



How Rural LDC has improved STEM education in my classroom?

RURAL LITERACY DESIGN COLLABORATIVE

coretools.ldc.org

ary | LDC Library | Resources | Reviews | Coach | Diana

Bioenergy

Create...

1 item

Sort by: relevance (desc)

MODULE

Bioenergy

How can we produce fuel and electricity from waste efficiently and effectively? After reading the RFP, conducting background research on microbial fuel cells, and designing and testing a batch anaerobic digester for consuming food and animal waste,

GRADES	DISCIPLINE	COURSE	ATTACHMENTS
10 - 12	Science	Clean Energy Applications	7

By: Amanda M. Michalak

Task Template: Task Template BETA A Argumentation

RURAL LITERACY DESIGN COLLABORATIVE

WHY RURAL LDC, STEM & LITERACY?

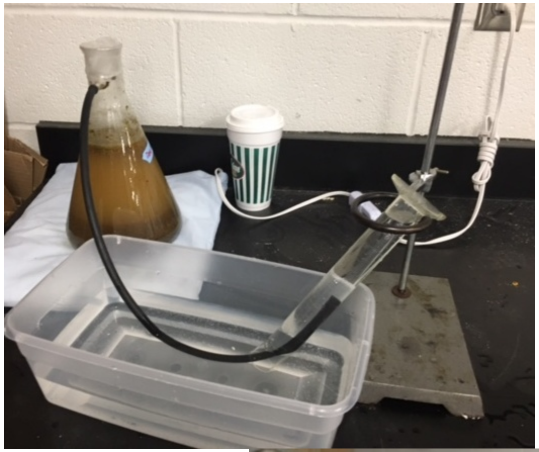
- Increase student achievement in mastering science content and building STEM science, technology, engineering, math and literacy skills

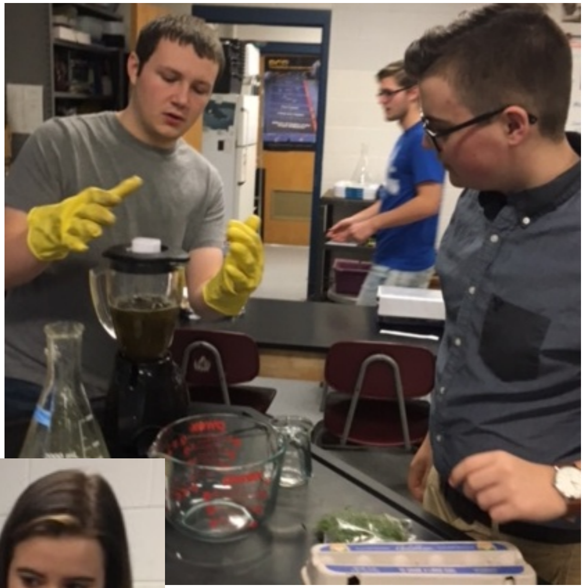
- Opportunities for science teachers from rural school districts to network and collaborate

RURAL LITERACY DESIGN COLLABORATIVE

Northwestern Amanda Michalak, High School Science

LDC Module: Bioenergy





RURAL LITERACY DESIGN COLLABORATIVE

UNIQUE COMPONENTS OF AN LDC SCIENCE MODULE

- LDC Science Teaching Task
- LDC Science Rubric
- Request for Proposal
- Skills & Mini-Task for LDC Science
- Design Report

LDC Module

RURAL LITERACY DESIGN COLLABORATIVE

LDC Module: Bioenergy

How can we produce fuel and electricity from waste efficiently and effectively?

After reading the RFP, conducting background research on microbial fuel cells, and designing and testing a batch anaerobic digester for consuming food and animal waste, write an engineering report in which you describe your design and argue its effectiveness in meeting the requirements of the RFP. A presentation will also be required. Support your response with evidence from your research. Include charts, tables and illustrations to help convey your message to your readers. Identify any gaps or unanswered questions.

RURAL LITERACY DESIGN COLLABORATIVE

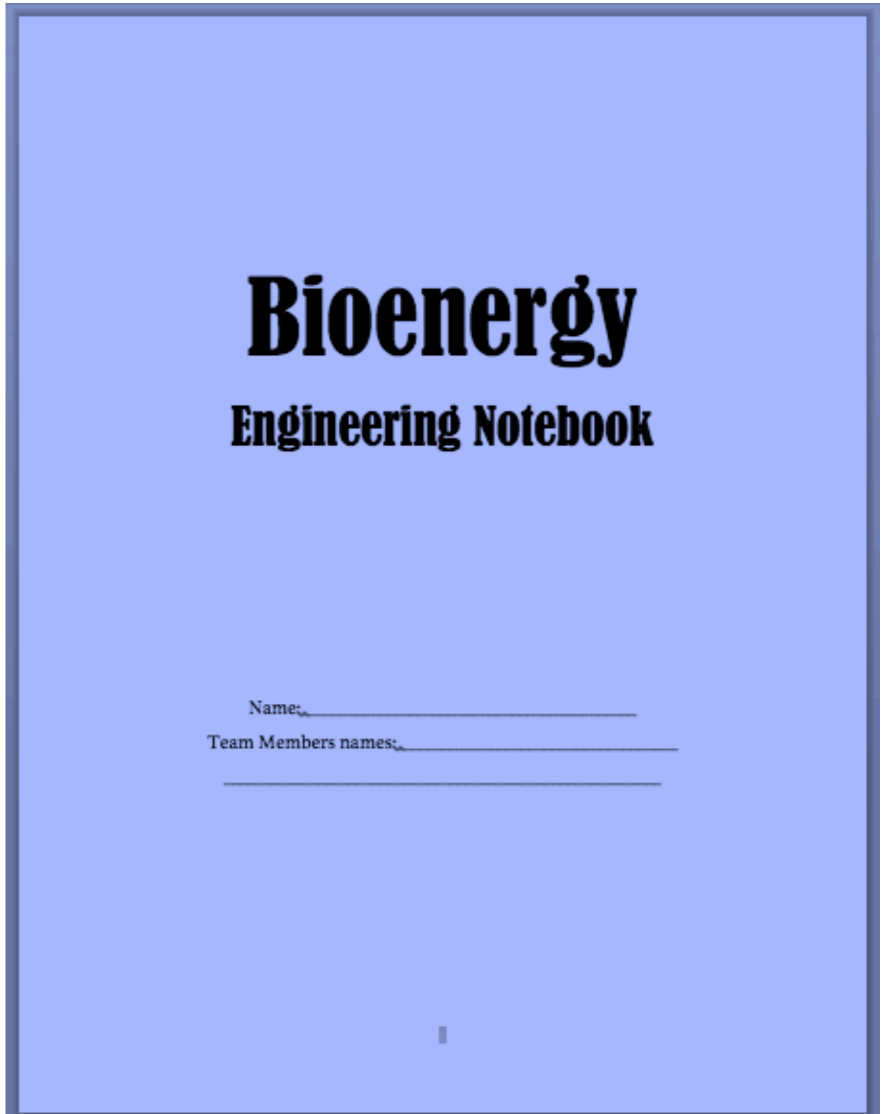
LDC Science Rubric – Bioenergy page 1 of 2

Scoring Elements	Emerging		Approaches Expectations		Meets Expectations		Advanced
	1	1.5	2	2.5	3	3.5	4
Controlling Idea	Makes a general claim with an unclear focus.		Establishes a **clear** claim **that addresses the prompt**, with an **uneven focus**.		Establishes **and maintains** a **clear, specific, and credible claim** that addresses **all aspects** of the prompt.		Establishes and maintains a **precise, substantive** claim that addresses all aspects of the prompt. **Acknowledges limitations and/or the complexity of the issue or topic**.
Selection & Citation of Evidence	Includes minimal details from sources. Sources are used without citation.		Includes **details, examples, and/or quotations** from sources that are **relevant to the claim**. **Inconsistently** cites sources.		Includes details, examples, and/or quotations from sources that **support** the claim and **supporting ideas**. **Consistently** cites sources **with minor formatting errors**.		Includes **well-chosen** details, examples, and/or quotations from sources that **fully support** the claim and supporting ideas. Consistently cites sources **using appropriate format**.
Development / Explanation of Sources	Explanation of ideas and source material is irrelevant, incomplete, or inaccurate.		Explains ideas and source material **to support the argument**, with **some incomplete reasoning or explanations**.		**Accurately** explains ideas and source material and **how they support** the argument.		**Thoroughly** and accurately explains ideas and source material, **using logical reasoning to support and develop** the argument.
Organization	Lacks an evident structure. Makes unclear connections among claims, reasons, and/or evidence.		**Groups ideas and uses transitions** to develop the argument, with **some lapses in coherence or organization**.		**Groups and sequences** ideas to **develop a cohesive argument**. Uses transitions **to clarify the relationships among claim(s), reasons, and evidence**.		Groups and sequences ideas **in a logical progression in which ideas build to create a unified whole**. Uses **varied** transitions to clarify the **precise** relationships among claim(s), reasons, and evidence.
Conventions	Major errors in standard English conventions interfere with the clarity of the writing. Language or tone is inappropriate.		Errors in standard English conventions **sometimes interfere** with the clarity of the writing. Uses language and tone that are **sometimes inappropriate** for the audience and purpose.		**Consistently applies** standard English conventions; **minor errors**, while noticeable, **do not interfere** with the clarity of the writing. Uses language and tone **appropriate to the audience and purpose**.		Consistently applies standard English conventions, **with few errors**. Demonstrates **varied syntax** and **precise word choice**. **Consistently** uses language and tone appropriate to the audience and purpose.

LDC Science Rubric – Bioenergy

Scoring Elements	Emerging		Approaches Expectations		Meets Expectations		Advanced
	1	1.5	2	2.5	3	3.5	4
NGSS Practice: Define Problems	Defines a problem or design statement that partially matches the intent of the problem or the constraints.		Defines a problem or design statement that matches the intent of the problem and identifies the constraints.		Defines a problem and explains specific design elements necessary for a suitable design (e.g., fit to the problem, addresses the constraints, etc.).		Defines a problem precisely and thoroughly explains why specific design elements are necessary for a suitable design (e.g., fit to the problem, addresses the constraints, etc.).
NGSS Practice: Plan The Design	Proposes a design plan and description that misses one or more important aspects of the criteria, constraints, OR intent of the problem.		Proposes a design plan and provides a general description that addresses the criteria, constraints, or intent of the problem.		Proposes a design plan with detailed explanation that completely addresses the criteria, constraints, and intent of the problem.		Proposes a design plan and evaluates the suitability of the design to address the criteria, constraints, AND intent of the problem.
NGSS Practice: Design Solutions	Uses inaccurate or irrelevant evidence (data or scientific knowledge) to explain how the design addresses the problem/constraints OR identifies an impractical redesign without explanation or supporting evidence.		Uses minimal relevant evidence (data or scientific knowledge) to explain how the design addresses the problem/constraints OR identifies a potential redesign with limited explanation and supporting evidence.		Uses relevant and adequate amounts of evidence (data or scientific knowledge) to explain how the design addresses the problem/constraints AND uses the evidence to explain an appropriate redesign of the original model or prototype.		Uses detailed and multiple sources of evidence (data or scientific knowledge) to evaluate how well the design addresses the problem as well as constraints AND provides a detailed rationale with supporting data for the appropriate redesign of the original model or prototype.
NGSS Practice: Analyze & Interpret Data	Attempts to analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to identify patterns, to make scientific claims, or to determine an optimal design solution. Analysis or explanation includes major errors or omissions.		Analyzes and explains data using tools, technologies, and/or models (e.g., computational, mathematical) in order to identify patterns, to make reasonable scientific claims, or to determine an optimal design solution. Analysis or explanation includes minor errors or omissions.		Analyzes and explains data using tools, technologies, and/or models (e.g., computational, mathematical) in order to identify patterns, to make reasonable and supported scientific claims, or to determine an optimal design solution.		Analyzes and evaluates data using tools, technologies, and/or models (e.g., computational, mathematical) in order to identify patterns, to make reasonable and well-supported scientific claims, or to determine an optimal design solution.
Content Understanding (Generic)	Attempts to include disciplinary content in explanation or argument but understanding of content is weak; content is irrelevant, inappropriate, or inaccurate.		Briefly notes disciplinary content relevant to the prompt; shows basic or uneven understanding of content; minor errors in explanation.		Accurately presents disciplinary content relevant to the prompt with sufficient explanations that demonstrate understanding.		Integrates relevant and accurate disciplinary content with thorough explanations that demonstrate in-depth understanding.

REQUEST FOR PROPOSAL (RFP)


Bioenergy

Engineering Notebook

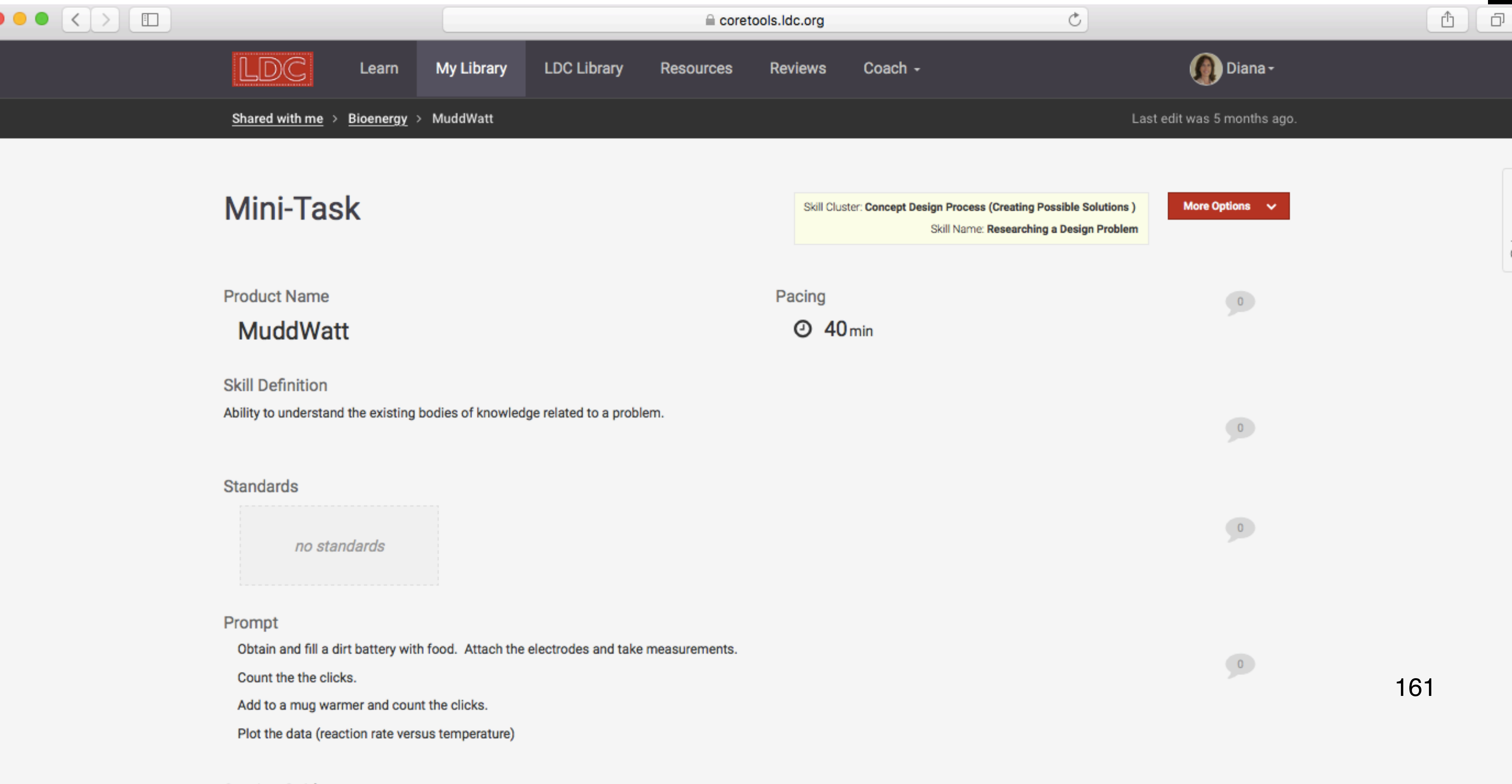
Name: ______________________________

Team Members names: ______________________________

____

RURAL LITERACY DESIGN COLLABORATIVE

RURAL LDC SCIENCE SKILLS & MINI-TASKS

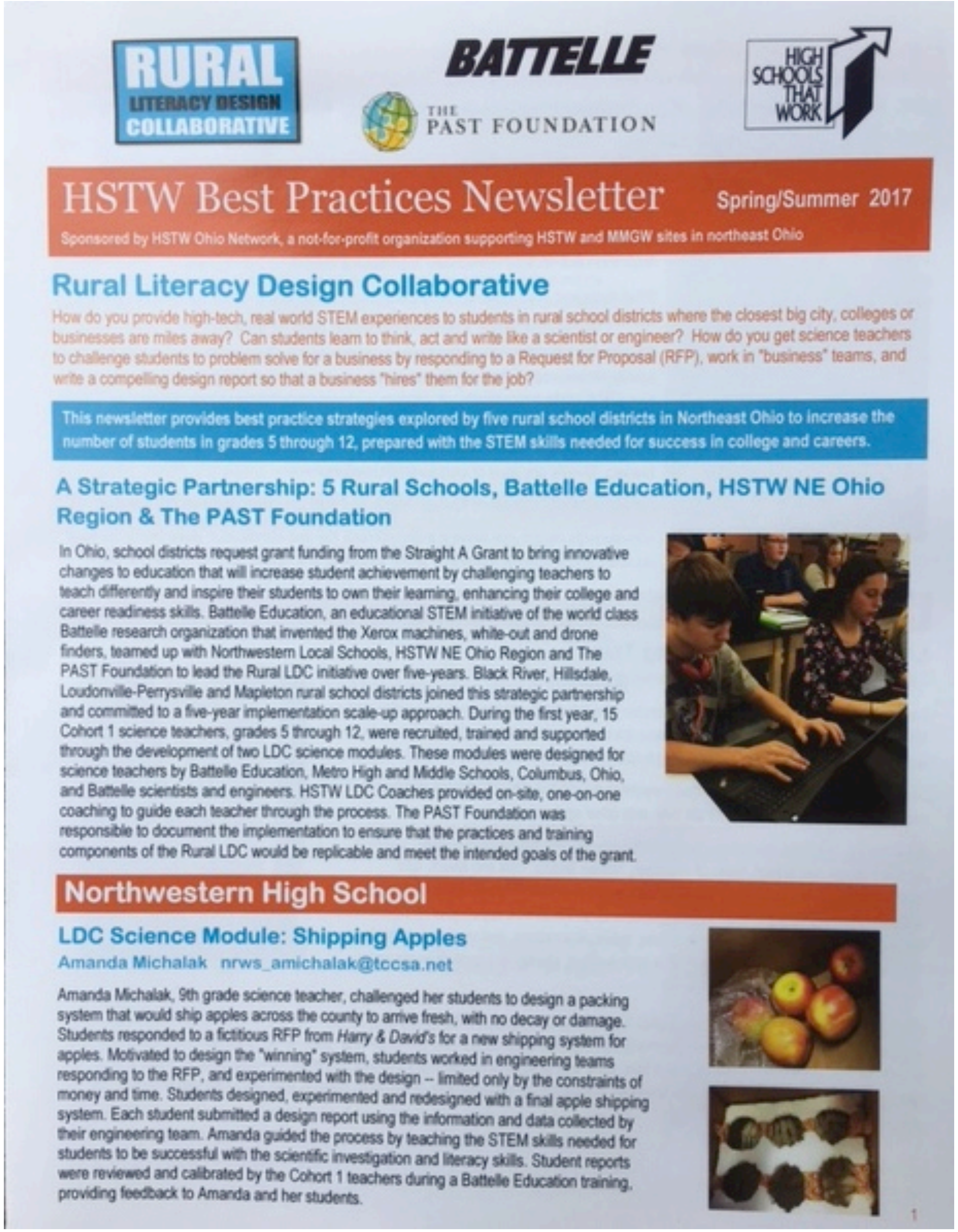


LDC SCIENCE MODULE: BIOENERGY TEAM DESIGN REPORT

Title page should include:

- Lists title, names, and date
- Author's name is first in list
- Title includes dependent and independent variable
- Location of Design
- Supervisor/Instructor
- Graphics and/or clip art is properly cited if not produced by yourself.

RURAL LITERACY DESIGN COLLABORATIVE



RURAL LITERACY DESIGN COLLABORATIVE

BATTELLE

THE PAST FOUNDATION

HIGH SCHOOLS THAT WORK

HSTW Best Practices Newsletter Spring/Summer 2017

Sponsored by HSTW Ohio Network, a not-for-profit organization supporting HSTW and MMGW sites in northeast Ohio

Rural Literacy Design Collaborative

How do you provide high-tech, real world STEM experiences to students in rural school districts where the closest big city, colleges or businesses are miles away? Can students learn to think, act and write like a scientist or engineer? How do you get science teachers to challenge students to problem solve for a business by responding to a Request for Proposal (RFP), work in "business" teams, and write a compelling design report so that a business "hires" them for the job?

This newsletter provides best practice strategies explored by five rural school districts in Northeast Ohio to increase the number of students in grades 5 through 12, prepared with the STEM skills needed for success in college and careers.

A Strategic Partnership: 5 Rural Schools, Battelle Education, HSTW NE Ohio Region & The PAST Foundation

In Ohio, school districts request grant funding from the Straight A Grant to bring innovative changes to education that will increase student achievement by challenging teachers to teach differently and inspire their students to own their learning, enhancing their college and career readiness skills. Battelle Education, an educational STEM initiative of the world class Battelle research organization that invented the Xerox machines, white-out and drone finders, teamed up with Northwestern Local Schools, HSTW NE Ohio Region and The PAST Foundation to lead the Rural LDC initiative over five-years. Black River, Hillsdale, Loudonville-Perrysville and Mapleton rural school districts joined this strategic partnership and committed to a five-year implementation scale-up approach. During the first year, 15 Cohort 1 science teachers, grades 5 through 12, were recruited, trained and supported through the development of two LDC science modules. These modules were designed for science teachers by Battelle Education, Metro High and Middle Schools, Columbus, Ohio, and Battelle scientists and engineers. HSTW LDC Coaches provided on-site, one-on-one coaching to guide each teacher through the process. The PAST Foundation was responsible to document the implementation to ensure that the practices and training components of the Rural LDC would be replicable and meet the intended goals of the grant.

Northwestern High School

LDC Science Module: Shipping Apples

Amanda Michalak nrws_amichalak@tccsa.net

Amanda Michalak, 9th grade science teacher, challenged her students to design a packing system that would ship apples across the county to arrive fresh, with no decay or damage. Students responded to a fictitious RFP from *Harry & David's* for a new shipping system for apples. Motivated to design the "winning" system, students worked in engineering teams responding to the RFP, and experimented with the design -- limited only by the constraints of money and time. Students designed, experimented and redesigned with a final apple shipping system. Each student submitted a design report using the information and data collected by their engineering team. Amanda guided the process by teaching the STEM skills needed for students to be successful with the scientific investigation and literacy skills. Student reports were reviewed and calibrated by the Cohort 1 teachers during a Battelle Education training, providing feedback to Amanda and her students.

1

DIANA ROGERS

REGIONAL COORDINATOR

HSTW NE OHIO REGION

HSTWDR@GMAIL.COM

RURAL LITERACY DESIGN COLLABORATIVE

5 RURAL DISTRICT PARTNERSHIP

BLACK RIVER, HILLSDALE, LOUDONVILLE-PERRYSVILLE, MAPLETON & NORTHWESTERN

- The project was funded by a Straight A Grant in Ohio
- Support provided by: Battelle Education, HSTW NE Ohio Region and PAST Foundation

RURAL LITERACY DESIGN COLLABORATIVE

Year 1 2016-2017

July 1, 2016

- 5 rural school districts: Black River, Hillsdale, Loudonville-Perrysville, Mapleton, Northwestern
- Received a Straight A Grant for Rural LDC Science & Literacy to implement over 5 years

September 7, 2016 through March 24, 2017

- Trained Cohort 1 - 15 science teachers during a series of Battelle trainings, and HSTW on-site coaching sessions with PAST Foundation evaluation support to design and teach 30 modules

RURAL LITERACY DESIGN COLLABORATIVE

Preparing for Year 2 2017-2018

May 10 through September 13, 2017

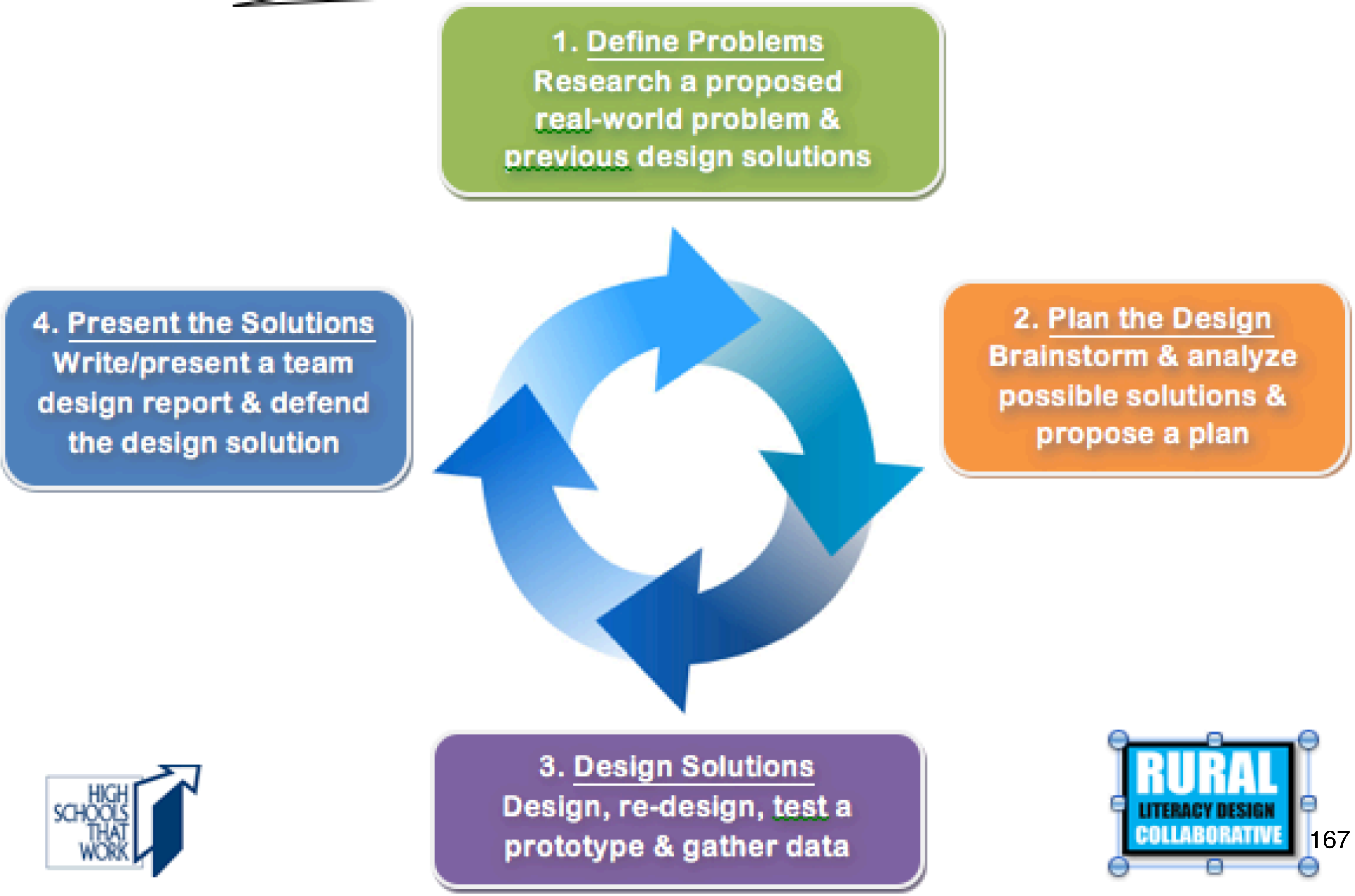
- Train Cohort 2 - 15 new science/ELA teachers during a series of district sponsored trainings

June and July 2017

- Submit Cohort 1 Rural LDC Science Modules for national review

RURAL LITERACY DESIGN COLLABORATIVE

The Concept Design



HIGH SCHOOLS THAT WORK

RURAL LITERACY DESIGN COLLABORATIVE

JILL BEISER

CURRICULUM COORDINATOR

BLACK RIVER LOCAL SCHOOLS

Rural LDC Collaborative

Rural LDC Science has increased STEM education in my school district

RURAL LITERACY DESIGN COLLABORATIVE

RURAL LDC COLLABORATIVE

Challenges unique to rural schools

RURAL
LITERACY DESIGN
COLLABORATIVE

RURAL LDC COLLABORATIVE

Benefits of a collaborative approach in delivering STEM education in rural school districts

RURAL
LITERACY DESIGN
COLLABORATIVE

CONTACT US:

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  hstwdr@gmail.com

- **Jill Beiser**

  jbeiser@blackriver.k12.oh.us

Kara L. Mitchell
LDC Advanced Peer Review Workshop Summation
July 13-14th Gaylord Opryland Convention Center Nashville, TN

Objectives for LDC Advanced Peer Review:

- Understand the purpose of LDC peer review
- Continue aligning yourself to the LDC Curriculum Alignment Rubric
- Identify and understand "Common Pitfalls" of LDC Task and Instructional Ladder design
- Learn to provide productive and helpful feedback to revise modules to higher levels of quality
- Review colleagues' LDC work and revise your own work based on colleagues' reviews and feedback
- Engage in calibration review work to get on track for the Certified and Expert LDC Reviewer badges
- Begin participating as a peer reviewer and module author/coach in your local context

Day One Summation:

Throughout the course of Day 1, participants were lead through session objectives by National LDC Workshop Trainers, Dr. Suzanne Simmons and Nicole Renner. Together, they discussed and highlighted the importance of juror confidence, specificity, and ultimate clarity when approaching the growing bank of LDC Modules.

To date, the largest call for submissions is currently in review process, with over 100 teacher-generated modules from across the country. LDC is leading the way towards producing a guaranteed curriculum with rigorously reviewed and calibrated modules. With the implementation of a refined LDC Rubric, the first creation of a National Faculty of calibrated jurors, a Curriculum Alignment Rubric directly correlated to task pitfalls, and Curriculum Mapping directly tied to Standards, LDC is working to increase learning in all classrooms K-12.

LDC is committed to providing authentic support while the community continues to grow and demonstrate new learning across the country. Reflected opinions of the LDC Community directly tied to the LDC Rubric called for stronger substantive language, requests for a recommendation of limited of focus standards for the task, and task pitfall reminders were clear targets of the newly revised LDC Rubric. Much of the agenda for Day One focused on these items.

Participants were also exposed to Beta Reading Rubrics that are directly tied to each level of the reading standards for grades K-12. These rubrics are in production and being field tested within the community. They provide an excellent framework for mapping the production of modules across both individual curriculum areas or across multiple cross-curricular instructional modules.

> *These rubrics attempt to describe how students develop and demonstrate the skills embedded within the CCSS Reading Literature and Reading Informational Text standards. They are specifically designed to be used with performance assessments (mini-tasks or full LDC teaching tasks) that demand students apply the skills at a higher DOK than selected-response assessments, which is why in some cases the descriptors may seem to demand more complexity than what is explicitly described in the language of the standards. Rather than describing "correct" or "incorrect" responses, these rubrics describe degrees of complexity or quality in how a student demonstrates interpretive reading skills.   LDC 2017*

Participants were lead through multiple activities that focused on practicing giving short, concise, and meaningful feedback through the use of the Task Pitfall Graphic Organizer. During this activity, jurors were timed and provided essentially one minute per Module Task to spot check for Task Pitfalls.

It was during this activity that I encountered two Module Tasks from the NE Ohio Region Rural Science Co-Hort. These were not labeled as such; I simply had a familiarity with the tasks. The tasks related to Mendelian Genetics and Hydraulic Fracturing. During the consensus discussion, it was determined that the Mendelian Genetics Module had Pitfall Number 2: A Grand Thematic or Flawed Question and Pitfall Number 8: Lack of Centrality to the Discipline. The Hydraulic Fracturing Module had Pitfall Number 3: Template and Task Mismatch. These were discussed in a group of 20 tasks and the reviews given were not documented officially, as these examples were simply utilized for Juror Practice. No feedback for the Instructional Ladders was provided, as this activity was directly tied to task. A Science Content Juror will review each individual module officially during the current round of calibration.

The feedback stems that were offered for Coaches are listed below:

Pitfall Number 2:

- *Does this question give students support that is not already present in the task? If not, consider omitting the question to avoid redundancies or wordiness.*

- *Do you expect students to answer the question as part of their written product? If not, perhaps this question is better used as an essential question as part of the Background for students to guide the big-picture thinking of the module or unit as a whole, or as an essential question to guide a specific mini-task's big-picture thinking.*

- *The question (as written) is a strong way to frame the larger thinking of your content, but might lead the student away from the targeted work of your task. Consider moving the question in an extension activity/ using the question as the title of your module/ posing the question in the student background and/or overview*

Pitfall Number 8:

- *How is this content important in your discipline?*

- *How are the literacy skills students use as they read and write for this module specific to your discipline?*

- *How will engaging in this module help your students think, read, and write like (scientists, literary critics, historians, mechanics, artists, etc.)?*

Pitfall Number 3:

- *Does the template's writing mode match the writing mode of the selected writing standard?*
- *What are your goals for your students with this module?*
- *How does this task fit into your broader goals for your students?*
- *How does this task help fulfill these goals for your students?*
- *Does it make more sense for students to make an argument about this content, or to develop an explanation?*
- *Does the thinking work of the template build, support, or extend the thinking work of your content standard?*
- *Feedback tip: Use the selected focus standards to provide examples of templates that might be a better fit. Fill in the content blanks using the language of the task and/or standards in a couple of sample rewrites. Include both recommended blank template/s and sample language for the content blank/s.*

Day Two Summation:

Participants worked in multiple settings during Day Two: individually, in a small group setting, with a consensus partner, and ultimately then as a whole group for final reflections.

Individually: Participants were asked to individually work through the LDC Badging and Credentials section of Core Tools, which has been updated with new modules for practice and calibration. These were preselected and available for use both during the conference and also off-site upon conclusion of the conference. It was here, that I was able to understand my current rankings and worked through the next level to not only maintain my current Certified Juror Task and Ladder Reviewer Status, but also move forward to calibrate consistently with 75% or higher accurately to be designated nationally as an Expert Task and Ladder Reviewer.

Small Group Setting: Participants were lead through examples of Module Ladders and worked as a small group to determine the effectiveness of the relationship between the Focus Standards and the Skills/Instruction selected to meet those standards. Here, the small groups worked in connection with the LDC Rubric to determine if in fact the ladder could be implemented and assessed accurately in accordance with the rubric. The ladders used were created for practice and did not reflect current modules in calibration.

Consensus Partner Work: Each participant was assigned a live module to review and provide polished feedback for practice. Jurors were only provided 60 minutes to review the module in its entirety, work through consensus, and then create a formulated feedback review for the activity.

I was not successful in finding Rural LDC Modules for this activity. I spoke directly with Nicole and learned that the Rural LDC Science Modules submitted will be reviewed through consensus with Science Specialists available in the current Juror Pool. Nicole noted, that while some elements of the modules submitted were used, as samples for practice and discussion, Nicole and the LDC team did not select any of the current submissions for full review during this workshop. Nicole also shared that LDC would not assign me as a juror for these modules outside of the workshop, as I may bring a potential bias to the review having had first-hand access to the modules during development.

Whole Group: The whole group was lead through a Guaranteed Curriculum Mapping demonstration with schools in both Kentucky and Pennsylvania. We examined how the Beta Reading Rubrics were used to help identify areas of strengths and weaknesses within the current curriculums. We also discussed the use of the Analytics options through Core Tools. This tool is being used to help understand where teachers are implementing LDC and what coaching areas they are seeking assistance with. Data collected has demonstrated that the Task drives and predicts student performance; therefore understanding module implementation within the curriculum framework is crucial.