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Wednesday, October 12, 2011

KnowAtom: A Science Curriculum That's Working for a Few Lynn Schools

In 2010, the Lincoln-Thomson Elementary School in Lynn implemented a new science program which was initially created by a Salem-based elementary science organization called **KnowAtom** (see here). The change was precipitated by the 5th grades students poor performance on the science MCAS exam in 2008 and 2009. At Lincoln-Thomson, 38% of 5th grade students achieved proficient or higher on the 2008 science MCAS exam; this number decreased to just 36% in 2009. After implementing the KnowAtom Science Program mid-school year, Lincoln-Thomson saw the percentage of students achieving proficient or higher increase by 33 points and the percentage of students failing in science decrease to zero on 2010 MCAS exam. In 2011, the percentage of students achieving proficient or higher decreased slightly to 61% but the percentage of students who failed the exam amazingly remained zero.

So what is KnowAtom?

Developed by former Lynn Classical math and science teacher Francis Vigeant in 2005, KnowAtom is "a collection of curriculum, pedagogy, materials, and professional development that work together to advance elementary school knowledge and application of science, engineering, and technology." The science program is geared toward elementary and middle school students and includes all of the curricular elements, materials and professional development that teachers need in order to focus science instruction on literacy and critical thinking. Specifically, the curriculum, which is hands-on and inquiry-based, utilizes the following components:

- **Stepped Units** - Unites are designed to create a complete picture of the many areas that science reaches.
- **Stepped Progression** - As students progress through each grade level, basic concepts are reinforced and applied with new concepts
- **Stepped Processes** - Students master specific goals within the Scientific Method and Engineering Design Process at every grade level.
- **Pacing** - Each year of the KnowAtom curriculum is comprised of 10-15 units. Breaking down larger concepts into specific topics increases the diversity of material exposed to student. Furthermore, a topic like

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> electrical energy can be discussed through circuits, magnetism, batteries, motors and generators over different grade levels. This approach has been found to help students continuously review concepts from year to year.

The KnowAtom curriculum includes lesson plans, visual aids and non-fiction readers while the pedagogy itself is based on common language across grade levels and personal relevance (integrating students' experiences within classroom discussions around scientific topics). The system also uses various classroom materials kits and consumable materials for hands-on activities. Students also learn scientific thinking through the laboratory notebooks they maintain in all grade levels; these notebooks also help with literacy and writing skills and reinforcing knowledge. KnowAtom also provides professional development for teachers in order to help them create "inquiry based learning environments for science and engineering." Professional development workshop topics include "The Scientific Method in the Elementary Classroom," "and "Developing Critical Thinking with Inquiry in the Classroom;"other workshops, like one entitled "Physical Science Abridged," help educators translate biology or physics terminology into language that young students can easily understand.

Here's a sample of some of the topics covered using this system:

First Grade
Changing Matter
Air
Storms
Water Flow
Insects

Second Grade
Solar System
Grow a Garden
Moth vs. Butterfly
Simple Circuits
Walls and Dams

Third Grade
Understanding Atoms
Anatomy of Earth
The Food Chain
Electricity
Engineering Bridges

Fourth Grade
Measuring Matter
Living Cells
Plant and Animal Life Cycles
Sound Waves
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Since KnowAtom's successful implementation at Lincoln-Thomson, four other Lynn elementary schools, including the Tracy and Harrington Elementary Schools, have begun using this particular science program. At Tracy, the percentage of students who failed the 5th grade science MCAS exam has steadily decreased from 45% in 2008 to 31% in 2011. Between 2008 and 2010, zero to one percent of students at Harrington scored advanced on the science MCAS exam. This number increased to 3% in 2011 after the KnowAtom science program was implemented; the percentage of students failing the exam has decreased from 50% in 2008 to 37% in 2011. Perhaps because of the results it produces, the KnowAtom program has received support from a number of Lynn principals and the Lynn Teacher's Union. Funding has been an issue, however, as replenishing the essential pre-packaged kits costs money and as one principal lamented, "Our prioritized district and school focus has been in the ELA [English Language Arts] and Math content areas. Science was secondary in the chain of funding, especially with federal, state, and city budget cuts (here)." As KnowAtom has proven to effectively teach and engage children in science, it would behoove other Lynn school principals along with the Lynn School Committee to consider ways to implement this program in all of the 16 elementary schools and possibly in the three middle schools as well. Despite standardized testing pressures, Lynn students deserve a strong, well-rounded education which, in addition to language arts and math, includes science.

***For more information about KnowAtom, see:** http://www.knowatom.com/

***MCAS -related data taken from:** www.doe.mass.edu

Posted by CCH at 8:57 AM

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