Shapes Project Lesson Plan

A Math Project

Overview & Purpose

In this project, students working in teams are going to explore shapes, by understanding their basic properties, identify their similarities and differences and learn to classify them accordingly.

Each student in the team picks a unique shape she will focus on. Each then will perform research about their shape and start asking lots of questions about it. The questions will guide students to identify the properties of the shape and understand the process by which the perimeter and the area of the shape can be calculated.

The final goal of the team is to create a comparison of the shapes by laying them next to each other to reflect differences in their properties, such as: sides, angles, etc. Students are also going to explore the hierarchical structure by which polygons are classified and create a mind map to display that relationship. As a proof of their understanding, students should use material they gathered about their shape, to create a profile of their shape, showing all the aspects that the shape can be described by.

This collaborative work encourages all team members to look at each other's shapes, see their differences and similarities and visualize how they are classified and relate to each other.

Education Standards

- CCSS.MATH.CONTENT.3.G.A.1
- CCSS.MATH.CONTENT.3.G.A.2
- CCSS.MATH.CONTENT.4.G.A.2
- CCSS.MATH.CONTENT.5.G.B.3
- CCSS.MATH.CONTENT.5.G.B.4
- CCSS.MATH.CONTENT.6.G.A.1
- CCSS.MATH.CONTENT.7.G.B.4
- CCSS.MATH.CONTENT.7.G.B.6

Objectives

- Students learn to identify shapes and their properties and create a meaningful visual representation of the shapes
- Students reason deductively that shapes in different categories may share properties that can define a larger category
- Students learn to classify two dimensional shapes
- Students learn to calculate the perimeter and the area of shapes
- Students create a base of knowledge about shapes in Project Pals

Materials Needed

- Project Pals account

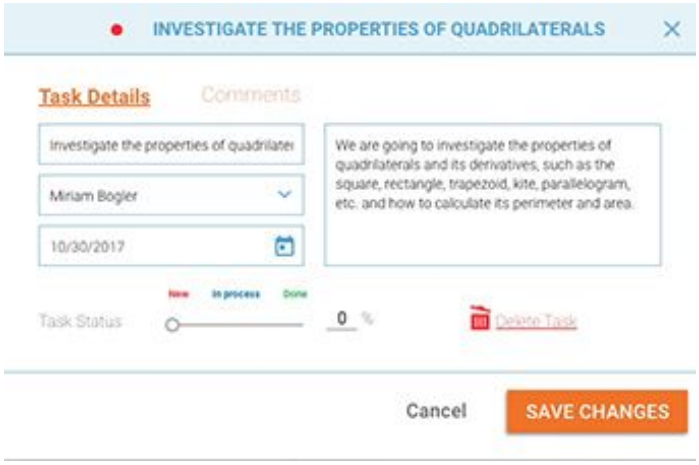
Verification

- Did the student ask all the right questions about his shape
- Did the student come up with the right properties of his shape
- Does the student understand how shapes relate to each other and why
- Can the student classify shapes based on that classification
- Can the student point to the similarities and differences between shapes
- Can the student describe the processes of calculating perimeter and area of his shape
- Did the student gather relevant supporting media (images, videos, etc.)

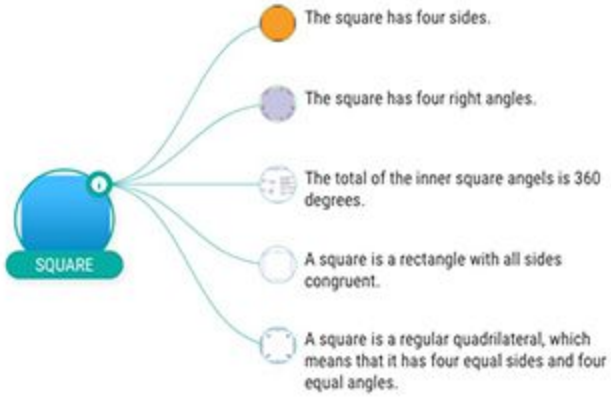
Activity

- Each student should decide which type of polygon they want to focus on.
- Then they need to read about their shape in books or the internet.
- A typical source in the internet would be 'Square Shape,' that describes its properties and how to calculate its perimeter and area.
- Students need to add these resources to their Shapes project in Project Pals.
- Students need to ask a lot of questions about their shape.

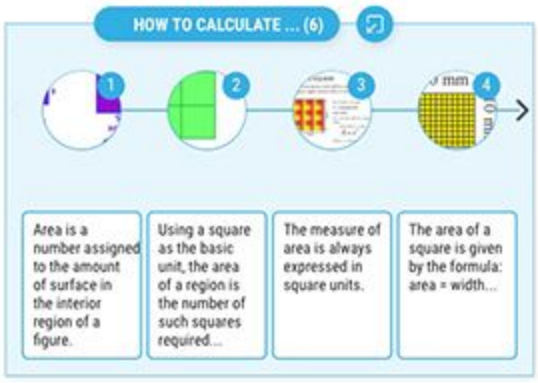
- Based on the research and the focus questions, students can create tasks for themselves in the 'Tasks' section.



- Based on what they read in their research, they can create a component of their shape and add its defining features (properties). While doing that, students should also add relevant supporting media (images, videos, etc.).



- Once they learned how to calculate their shape's perimeter and area, they can list the process in an event. This is an opportunity to create a Google Sheet with the calculation steps and formula, that they can attach as supporting media to the event.



Area of a Square Calculation

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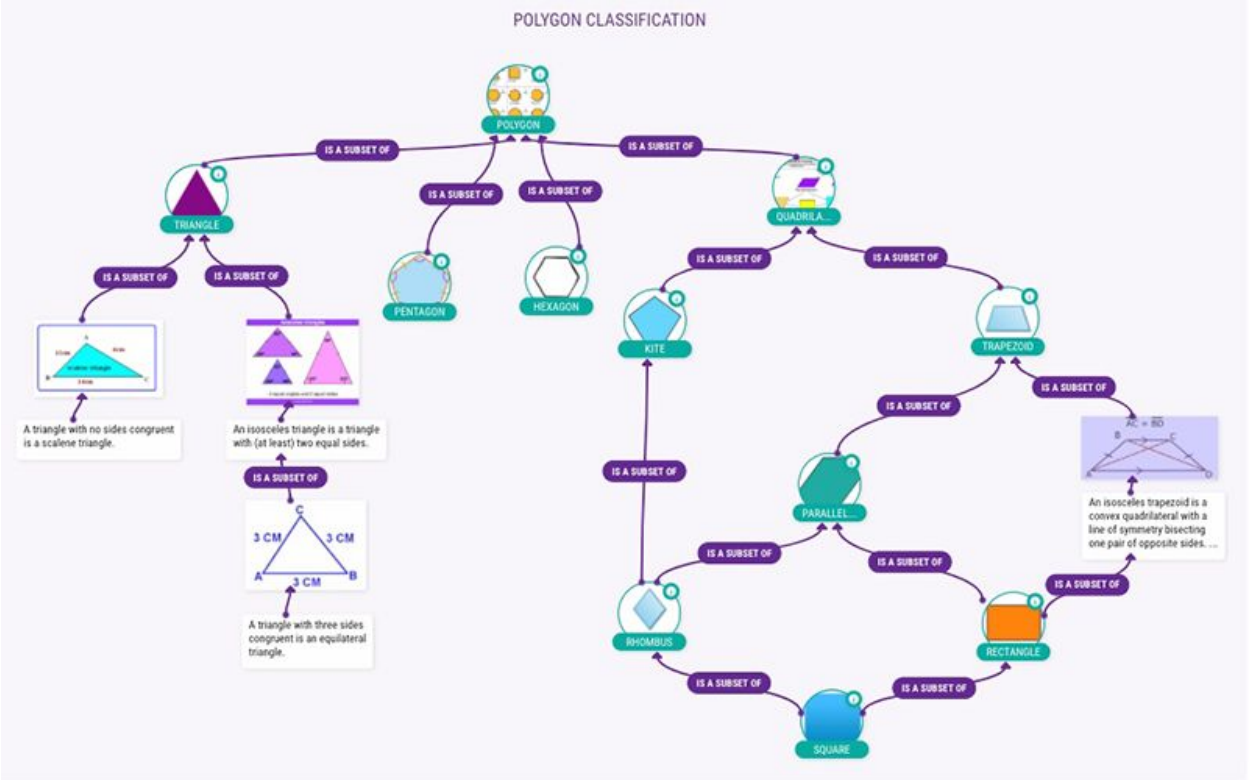
100% $ % .0 .00 123

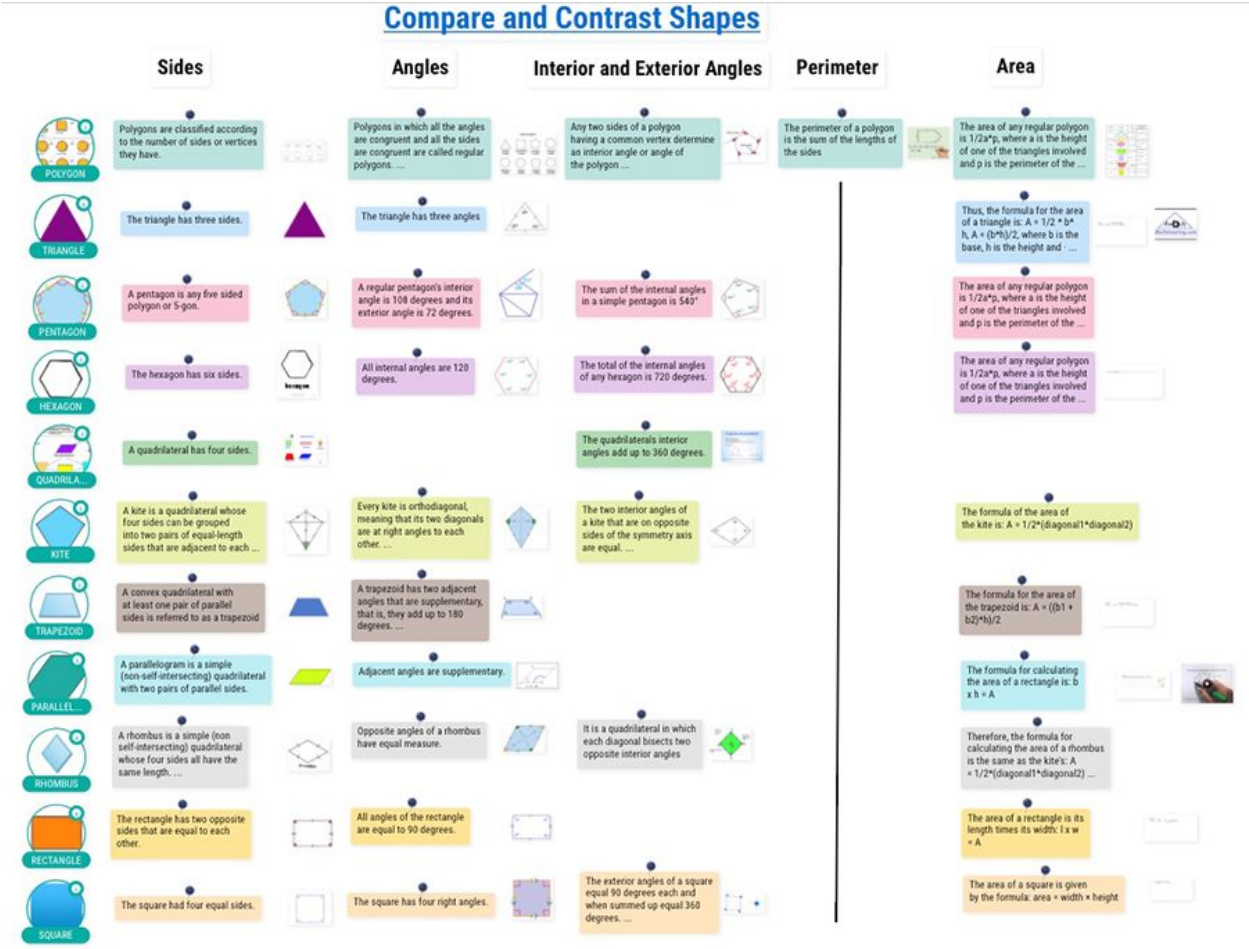
fx unit = cm

	A	B	C	
1	**unit = cm**		**Formula is: Area =**	
2	**Side of square**	**Area**	**Area with units**	
3	5	25	25	cm
4				

- All students in the team can now lay out their shapes on the 'Relationships' tab and connect them in a hierarchical structure to the Polygon tree, like this:



- Students can now create a ‘Compare & Contrast’ tab and each will add their own entry to the table that compares the shapes along several categories. As you see, students are also adding their supporting media to the table, including images, Google sheets and videos, as shown below:



- Finally, as a culmination of their shape investigation, each student in the team should create their shape profile, just like creating a profile for a person. Students will use the ‘Scenes’ tool to create the profile, as shown below:

A TRAPEZOID PROFILE

Profile: Trapezoid

Picture

I am a convex quadrilateral with at least one pair of parallel sides

Summary

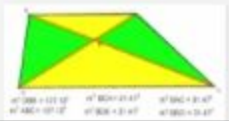
The parallel sides are called the bases of the trapezoid and the other two sides are called the legs or the lateral ...

The angle between a side and a diagonal is equal to the angle between the opposite side and the same diagonal. ...

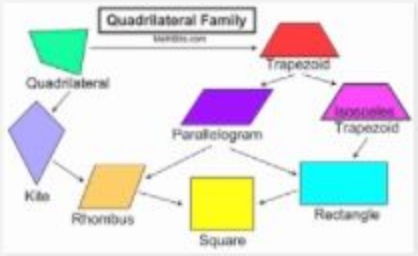
The product of the areas of the two triangles formed by one diagonal equals the product of the areas of the two triangles ...

A trapezoid has two adjacent angles that are supplementary, that is, they add up to 180 degrees. ...

The diagonals cut the quadrilateral into four triangles of which one opposite pair are similar.



Groups and Associations

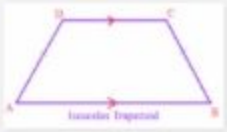


My Family

My name is Acute Trapezoid

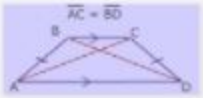
An acute trapezoid is also an isosceles trapezoid, if its sides (legs) have the same length, and the base angles ...

An acute trapezoid has two adjacent acute angles on its longer base edge



My name is Isosceles Trapezoid

An isosceles trapezoid is a convex quadrilateral with a line of symmetry bisecting one pair of opposite sides. ...

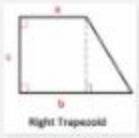


My name is Obtuse Trapezoid

An obtuse trapezoid has one acute and one obtuse angle on each base.

My name is Right Trapezoid

A right trapezoid (also called right-angled trapezoid) has two adjacent right angles.



My name is Scalene Trapezoid

A scalene trapezoid is a trapezoid with no sides of equal measure

My Value

Add the sum of its bases.

Multiply the sum by the height of the trapezoid.

Divide the result by 2.

The formula for the area of the trapezoid is: A = ((b1 + b2)*h)/2

My value is the calculated area