CULMINATING TASK: Shapely Pairs& Logic of Shapes

Adapted from Bridges in Mathematics

Students will identify the relationships between various shapes.

STANDARDS FOR MATHEMATICAL CONTENT

MCC5.G.3 Understanding that attributes belonging to a category of two-dimensional figures also belong to all subcategories.

MCC5.G.4 Classify two-dimensional figures in a hierarchy based on properties.

STANDARDS FOR MATHEMATICAL PRACTICE

SMP 1. Make sense of problems and persevere in solving them.
SMP 2. Reason abstractly and quantitatively.
SMP 3. Construct viable arguments and critique the reasoning of others.
SMP 5. Use appropriate tools strategically.
SMP 6. Attend to precision.
SMP 7. Look for and make use of structure.

BACKGROUND KNOWLEDGE

The students will use the knowledge that they have gained throughout this unit to perform these task.

COMMON MISCONCEPTIONS

Students think that when describing geometric shapes and placing them in subcategories, the last category is the only classification that can be used.

ESSENTIAL QUESTIONS

- How can plane figures be categorized and classified?
- How can you classify different types of shapes into a hierarchy?
- How can angle and side measures help us classify shapes?

MATERIALS

- Cardstock or construction paper for Shapely Pair cards
- Paper
- Small re-sealable bags to store the Shapely Pair cards

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT AND DISCUSSION:

Warm Up Activity: Shapely Pairs

Copy the Shapely Pair cards onto cardstock. You will need one set per student. You might want to copy the cards on different colors of cardstock or construction paper so that the partners don't get their cards mixed up. Also, you might want to number the back of the sets for quick organization and clean up. You can place these in a re-sealable bag to use for a review game later on.

Rules:
1.You can only ask yes or no questions.
3. You CAN'T look at your cards in your stack.
4. You have to ask three questions before guessing the name of your shape.

Game (Informal Assessment):
Divide your students into pairs and distribute two sets of Shapely Pair cards to each set of students. The students should shuffle the cards and set them face down. One set (color) per student. Determine ahead of time if the students get a limited amount of guesses per card. The pair of students will first need to determine who will go first and then they can alternate after the first round.

Each player picks up one card and holds that card to their forehead. The students can't look at their own cards in their stack or while it is on their forehead. They will lose a point if they look. The students will ask their partner yes or no questions about their polygon card on their forehead. They will try to guess the name of the polygon as they identify properties/attributes of the shape. Both players will need to know their vocabulary and hierarchy to play this game. This can be used as an informal assessment to see if the students are ready for the Culminating activity or if more instruction is needed. Demonstrate to your students how to play the game before letting them play independently. (Teacher versus a student) The students can record their answers on the record sheet provided. After the students have had time to finish their game, check answers as a whole group and discuss any misconceptions.

TASK:

a. Display the Think-Pair-Share on a Smart Board or provide a copy for each student. Ask the students to jot their answers down and be prepared to explain and justify each. After a few minutes, reconvene the class. Invite a different volunteer to answer and explain his or her response to each question.
b. Could it be called a kite? Why or why not? No
c. Could it be called a square? Why or why not? No
d. After answering the opening questions and getting their brains working, give each student a copy of the Logic of Shapes Task Sheet. The diagram on the task sheet illustrates the relationships between various shapes. Students are asked to label each shape, and then answer a series of questions designed to help them think about how the shapes have been placed in relation to one another, and why. *Read ahead of time- especially consider question #6.*
e. Modified Assessment-The Polygon Family Tree can be used as a modified assessment and/or an additional whole class review. The students are to use the word bank to fill in the Polygon Family Tree. They can also be required to use the Shapely Pair cards to have to match the polygons to their definitions. If you choose to do this,

students will have to match the cards to the definitions and write the corresponding number from the Shapely card beside the Polygon name.

FORMATIVE ASSESSMENT QUESTIONS

- How do you know this quadrilateral is a _____ (square, rectangle, parallelogram, trapezoid, or rhombus)?
- What is meant by the term "opposite sides"?
- What does "parallel" mean? How can you show that those sides parallel?
- What does "perpendicular" mean? How can you show that those sides are perpendicular?
- How can you show that 2 sides are equal?
- What are some ways we can show an angle is a right angle?

DIFFERENTIATION

Extension

- Allow the students to create an I Have, Who Has game with polygon pictures and attribute clues and play the game with their peers.

Intervention

- Allow students to work in pairs.
- Allow students to use their notes or the internet.
- Allow students to use their hierarchy diagram
- Allow students to use their Investigating Hierarchy Table from a previous activity
- Limit the number of guesses to increase the level of difficulty
- Allow students to have their vocabulary list with them during the Shapely Pair Game

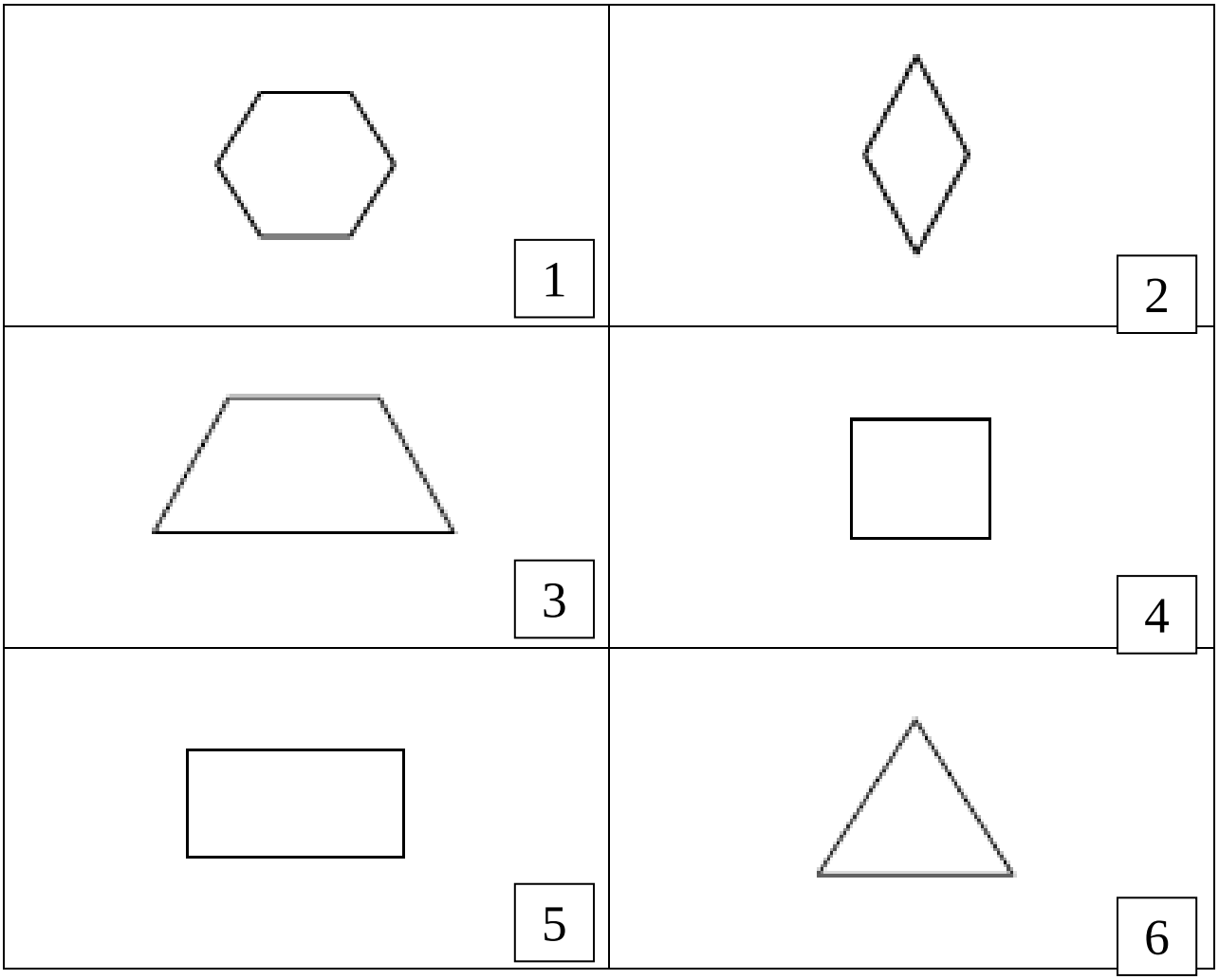
TECHNOLOGY CONNECTION

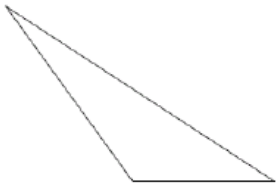
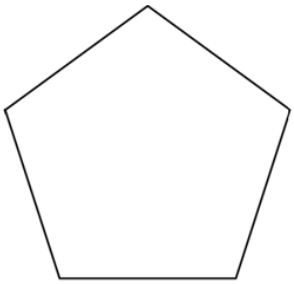
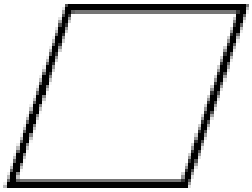
- http://illuminations.nctm.org/Lessons/Architect/Architect-AS-HomeShapes.pdfThis reproducible chart, from an Illuminations lesson, prompts students to search for and list shapes they find as they walk home from school. They record each shape's name, where it was found and whether it is a plane or solid figure.
- http://illuminations.nctm.org/LessonDetail.aspx?ID=L202In this lesson, one of a multi-part unit from Illuminations, students participate in activities in which they focus on connections between mathematics and children's literature. They listen to the poem "Shapes" from Shel Silverstein's "A Light in the Attic" and then recognize, draw, and describe geometric figures.
- http://illuminations.nctm.org/LessonDetail.aspx?ID=L554In this lesson, one of a multi-part unit from Illuminations, students review different geometric terms. They explore these and other geometric concepts by modeling on the geoboard.

Shapely Pairs

Copy onto cardstock and laminate 1 set per pair of students

*You might want to alternate set colors in case pairs are sitting next to each other. This will help during clean up and in case they get mixed up. You could also number the back of the sets. Example: Label set one (1) on the back of all of the cards.



 7	 8
 9	 10
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Shapely Pairs Game

Rules:
1. Only ask yes or no questions.
3. You CAN'T look at your cards in your stack.
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1. _____
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