Scaffolding Task: What Makes a Shape?

STANDARDS FOR MATHEMATICAL CONTENT

MCC. 4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

STANDARDS FOR MATHEMATICAL PRACTICE

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

BACKGROUND KNOWLEDGE

As students begin their explorations of geometric figures and their properties, it is important to make sure that students have some common vocabulary. This lesson can be used at the onset of the unit to introduce and teach students conventions for notating certain properties of figures or it can be used throughout the unit as these different properties come up. You should keep an anchor chart clearly displayed in your classroom for the geometric terms that come up throughout the unit, as well as the mathematical conventions/symbols that are used to represent those geometric objects.

Ideally, we want students to have a purpose or need for these conventions before introducing them. This means that these terms must be explored in context by students in order for that need to exist. This task can serve as a context for helping to develop that common vocabulary and mathematical notation at the onset of the Geometry unit. Many of these geometric objects and parts will be developed in depth later in the unit. You may choose to wait until they are developed to provide the conventional notation to students.

ESSENTIAL QUESTIONS

- What are the geometric objects that make up figures?
- What are the mathematical conventions and symbols for the geometric objects that make up certain figures?

MATERIALS

- "Sorting Shapes" for each group
- Math journals/notebooks

GROUPING

Small group task

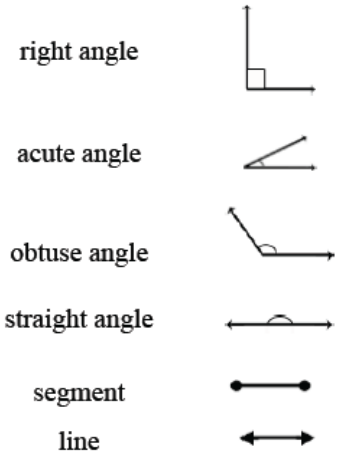
TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

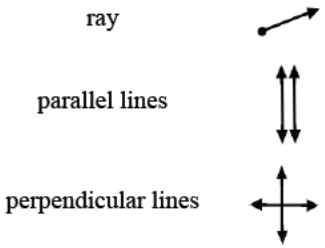
Task Directions

Students will sort the "Sorting Shapes" cards based on any attributes they choose. Have them share and discuss their sorts, highlighting the key vocabulary they use to describe their sorts (angles, number of sides) as students discuss these various parts and properties of the angles that they already know. Make sure they can answer the following questions.

- How did you group your shapes?
- What makes a shape a shape?
- What are the parts of a shape?
- How can you tell the differences between shapes?

Use this as a launching point for discussing the geometric objects listed below and their conventional notation. This would be a time to discuss the differences between lines, line segments, and rays. As students discuss these geometric objects, have them record the conventions that you are recording on an anchor chart into their math journal for reference throughout the unit. You may wish to show the notations below in several orientations. For instance, showing multiple orientations of a right angle (where one side of the angle is NOT parallel to the bottom of the paper)





FORMATIVE ASSESMSENT QUESTIONS

- What characteristics did you use to group your shapes?
- What are the geometric objects used to form various figures?
- Where do you see your geometric objects in the real world?
- Can students consider more than one attribute at a time?
- Can students justify the placement of the shapes in their groups?
- Are students able to recognize the difference between essential and non-essential properties of geometric object?

DIFFERENTIATION

Extension

- Have students identify the geometric objects discussed in various shapes and record this in their journals.

Intervention

- Have students use Wiki sticks or pieces of straw to create different shapes. Have them label the parts of the shape (line segments, points, etc.) and then mark these using the mathematical convention.

Sorting Shapes