Topic A

Attributes of Geometric Shapes

2.G.1, 2.MD.1

Focus Standard:		2.G.1	Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. (Sizes are compared directly or visually, not compared by measuring.)
Instructional Days:		5	
Coherence	**-Links from:**	G1–M5	Identifying, Composing, and Partitioning Shapes
	-Links to:	G3–M7	Geometry and Measurement Word Problems

In Module 8, students continue to develop their geometric thinking from Grade 1, progressing from a descriptive to an analytic level of thinking where they can recognize and characterize shapes by their attributes and properties.

In Lesson 1 of Topic A, students describe various two-dimensional shapes according to specified attributes, such as the number of sides or angles (**2.G.1**). The names of the shapes are intentionally omitted in this lesson in order to encourage students to use precise language in their descriptions. Students must attend to a shape's defining attributes in order to describe the difference between shapes. For example, rather than describing a shape as a quadrilateral, students describe it as a shape having four sides and four angles. In this lesson, students come to see the corner of a polygon as an angle. In Lesson 4, the right angle is introduced as a square corner. After students name the attributes of shapes, they use geoboards to create a shape given its attributes.

In Lesson 2, students build various polygons as they name them based on attributes. Using uncooked spaghetti of various lengths, they build a triangle, quadrilateral, pentagon, and hexagon (**2.G.1**), adding another piece of spaghetti for each construction. They then identify a collection of various polygons, both exemplars and variants of shapes (as shown below), including those with sides of unequal length. As they analyze shapes, the students expand their bank of mental images associated with names of shapes. Hence, this task serves to broaden, rather than limit, their understanding and to clarify common misconceptions about shapes.

Now that they have created, manipulated, and named shapes, students are ready to draw their own in Lesson 3. This lesson focuses on the four categories of polygons

Pentagons

Triangles

that students built in Lesson 2: triangles, quadrilaterals, pentagons, and hexagons. After the teacher-guided portion of the lesson, students use a ruler to draw straight lines and to create their own shapes, before trading with a partner. Partners take turns naming and analyzing shapes according to their attributes.

In Lesson 4, students use various attributes (e.g., side length, parallel lines, right angles) to identify different quadrilaterals. Along with recognizing trapezoids and rhombuses, seen in Grade 1, students are introduced to parallelograms. They learn to recognize parallel sides and square corners and to name quadrilaterals based on these attributes. For example, students might be questioned and guided as follows: "Draw a quadrilateral with both pairs of opposite sides parallel. We call this a parallelogram." Next, "Now, draw a quadrilateral with both pairs of opposite sides parallel and four square corners, or right angles. We call this a rectangle." Then, the teacher might continue with, "Can you draw another quadrilateral that also has opposite sides parallel, but this time use your ruler to show that all sides are equal? We call this a rhombus." While students learn the various names of shapes, the emphasis remains on analyzing shapes based on their varied attributes. In doing so, students begin to notice the similarities and differences between various quadrilaterals.

Finally, in Lesson 5, students focus solely on the square and build its three-dimensional counterpart, the cube. In this lesson, students use toothpicks of equal length and an adhesive (e.g., sticky tack) to construct a cube. After first creating a square and naming its attributes, students are tasked with building a cube with only a picture to guide them. After constructing the cube, students count the number of corners, and they see that right angles are formed at each corner. Then, they create faces for their cube by tracing the cube's bottom on a piece of paper, discovering that they need to trace six squares to cover the cube. Finally, with teacher guidance and modeling, students practice drawing cubes (**2.G.1**). From this lesson, students see a square as a face of the cube.

A Teaching Sequence Toward Mastery of Attributes of Geometric Shapes	
Objective 1:	**Describe two-dimensional shapes based on attributes. (Lesson 1)**
Objective 2:	**Build, identify, and analyze two-dimensional shapes with specified attributes. (Lesson 2)**
Objective 3:	**Use attributes to draw different polygons including triangles, quadrilaterals, pentagons, and hexagons. (Lesson 3)**
Objective 4:	**Use attributes to identify and draw different quadrilaterals including rectangles, rhombuses, parallelograms, and trapezoids. (Lesson 4)**
Objective 5:	**Relate the square to the cube, and describe the cube based on attributes. (Lesson 5)**