Grade K Math Unit 5- Geometry

UNIT OVERVIEW

In Kindergarten, there are 2 Critical Areas of Focus. This unit is connected to **Focus Area #2, Describing shapes and space**. (See Connections for further explanation).

This unit includes emphasis in 2 clusters: *Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders and spheres)* and *Analyze, compare, create, and compose shapes.*

STANDARDS

CC_Common Core State Standards - Mathematics (2010) - k
Domain K.G Geometry
Cluster Statement: Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).
Standard K.G.1 Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.
Standard K.G.2 Correctly name shapes regardless of their orientations or overall size.
Standard K.G.3 Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").
Cluster Statement: Analyze, compare, create, and compose shapes.
Standard K.G.4 Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).
Standard K.G.5 Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.
Standard K.G.6 Compose simple shapes to form larger shapes.

CONTENT ELABORATIONS

K.G.1	**K.G.1** expects students to use positional words (above, below, beside, in front of, behind, and next to) to describe objects in the environment. Kindergarten students need to focus first on location and position of two-and-three-dimensional objects in their classroom prior to describing location and position of two-and-three-dimensional representations on paper. Teachers should work with children and pose 4 mathematical questions: Which way? How far? Where? And what objects? To answer these questions, children develop a variety of important skills contributing to their spatial thinking. **MP.6 and MP.7** should be emphasized.
K.G.2	**K.G.2** addresses students' identification of shapes based on known examples. Students at this level do not yet recognize triangles that are turned upside down as triangles, since they do not "look like" triangles. Students need many experiences looking at and manipulating shapes with various typical and atypical orientations. Through these experiences, students will begin to move beyond what a shape "looks like" to identifying particular geometric attributes that define a shape. Students should be exposed to many types of triangles in many different orientations in order to eliminate the misconception that a triangle is always right-side-up and equilateral. Students should also be exposed to many shapes in many different sizes. **MP.6 and MP.7** should be emphasized.
K.G.3	**K.G.3** asks students to identify two-dimensional (flat objects) and three-dimensional (solid objects). This standard can be done by having students sort 2-D and 3-D objects, or by having students describe the appearance or thickness of shapes. **MP.6 and MP.7** should be emphasized.

K.G.4	**K.G.4** asks students to note similarities and differences between and among 2-D and 3-D shapes using informal language. These experiences help young people begin to understand how 3-D shapes are composed of 2-D shapes. Students analyze and compare 2- and 3-D shapes by observation. Their visual thinking enables them to determine if things are alike or different based on the appearance of the shape. Students sort objects based on appearance. Even in early explorations of geometric properties, they are introduced to how categories of shapes are subsume (contained) within other categories. For instance, they will recognize that a square is a special type of rectangle. Students should be exposed to triangles, rectangles, and hexagons whose sides are not all congruent. They first begin to describe these shapes using everyday language and then refine their vocabulary to include sides and vertices/corners. Opportunities to work with pictorial representations, concrete objects, as well as technology helps student develop their understanding and descriptive vocabulary for both 2- and 3-D shapes. **MP.4, MP.6, MP.7** should be addressed.
K.G.5	**K.G.5** asks students to apply their understanding of geometric attributes of shapes in order to create given shapes. For example, a student may roll a clump of clay into a sphere or use their finger to draw a triangle in the sand table, recalling various attributes in order to create that particular shape. **MP.1, MP.4 and MP.7** should be emphasized.
K.G.6	**K.G.6** moves beyond identifying and classifying simple shapes to manipulating two or more shapes to create a new shape. this concept begins to develop as students first move, rotate, flip and arrange puzzle pieces. Next students use their experiences with puzzles to move given shapes to make a design (e.g., "Use the 7 tangram pieces to make a fox."). Finally, using these previous foundational experiences, students manipulate simple shapes to make a new shape. **MP.1, MP.3, MP.4, MP.7** should be emphasized.

UNIT VOCABULARY

above	vertex	sphere
below	side	cube
in front of	circle	cylinder
behind	round	cone
next to	triangle	roll
beside	straight	stack
square	hexagon	slide
rectangle		

BIG IDEAS

ENDURING UNDERSTANDINGS	ESSENTIALS QUESTIONS Choose a few questions based on the needs of your students

* Properties determine when shapes are alike or different.
* Geometry helps us describe, represent, and make sense of our environment.
* Shapes are everywhere.
* All objects have a shape with a specific name.
* Shapes have sides and 'corners' which can be counted.
* Objects can be similar to others in one way and different in other ways.
* Words can be used to describe the location of an object.
* Some shapes are flat (2-dimensional) while other shapes are solid (3-dimensional).
* Smaller shapes can be used to compose larger shapes and larger shapes can be decomposed from smaller shapes.

* How do I identify positions?
* How can I compare shapes?
* How do I identify and compare three-dimensional shapes?

CONNECTIONS

In **Critical Focus Area #2**, students describe their physical world using geometric ideas (e.g., shape, orientation, spatial relations) and vocabulary. They identify, name, and describe basic two-dimensional shapes, such as squares, triangles, circles, rectangles, and hexagons, presented in a variety of ways (e.g., with different sizes and orientations), as well as three-dimensional shapes such as cubes, cones, cylinders, and spheres. They use basic shapes and spatial reasoning to model objects in their environment and to construct more complex shapes.
*These clusters are connected to *Reason with shapes and their attributes* in Grade 1

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

IDENTIFY AND DESCRIBE SHAPES

CONTENT	SKILLS

	Content	Skills
K.G.1	Describe objects in the environment using names of shapes and relative positions.	Describe objects in the environment using names of shapes and relative positions. 1. Identify shapes in the environment: squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders and spheres. 2. Describe positions such as above, below, beside, in front of, behind, and next to. 3. Determine the relative position of the 2-dimensional or 3-dimensional shapes within the environment, using the appropriate positional words.
K.G.2	Name shapes regardless of orientation or size.	Name shapes regardless of orientation or size. 1. Know that size does not affect the name of the shape. 2. Know that orientation does not affect the name of the shape.
K.G.3	Identify shapes as two-dimensional or three-dimensional.	Identify shapes as two-dimensional or three-dimensional. 1. Identify 2-dimensional shapes as shapes that are lying in a plane or flat and can only be measured in two ways (length and width) 2. Identify 3-dimensional shapes as shapes that are solid (not flat) and can be measured in three different ways (length, width, height/depth)

ANALYZE, COMPARE, CREATE AND COMPOSE SHAPES

	CONTENT	SKILLS
K.G.4	Analyze and compare two-dimensional and three-dimensional shapes in different sizes and orientations.	Analyze and compare two-dimensional and three-dimensional shapes in different sizes and orientations. 1. Identify and count number of sides, vertices/"corners", and other attributes of shapes. 2. Describe similarities of various two- and three-dimensional shapes. 3. Describe differences of various two- and three-dimensional shapes. 4. Analyze and compare two-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, and other attributes (e.g. having sides of equal length). 5. Analyze and compare three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g. number of sides and vertices/"corners") and other attributes (e.g. having sides of equal length).
K.G.5	Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.	Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes. 1. Recognize and identify (square, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, spheres) 2. Identify shapes in the real world. 3. Analyze the attributes of real world objects to identify shapes. 4. Construct shapes from components (e.g., sticks and clay balls) 5. Draw shapes.

K.G.6	Compose simple shapes to form larger shapes.	Compose simple shapes to form larger shapes. 1. Identify simple shapes (squares, triangles, rectangles, hexagons) 2. Analyze how to put simple shapes together to compose a new or larger shape. 3. Compose a new or larger shape using more than one simple shape.

McGraw-Hill, **My Math** Chapters 10-12
Georgia Math frameworks; Grade K, Unit 1
Common core Model Curriculum
Debbie Diller Math Work Stations materials and process