Cluster 4: Identifying, Describing, Classifying and Composing Shapes

Duration: 3-4 weeks

Content Standards:

This list includes standards addressed in this cluster, but not necessarily mastered, since all standards are benchmarks for the end of the year. Note strikethroughs and recommendations in the Important Considerations section for more information.

NC.K.CC.3
Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20, with 0 representing a count of no objects.

NC.K.CC.5
Count to answer "How many?" in the following situations:

- Given a number from 1-20, count out that many objects.
- Given up to 20 objects, name the next successive number when an object is added, recognizing the quantity is one more/greater.
- Given 20 objects arranged in a line, a rectangular array, and a circle, identify how many.
- Given 10 objects in a scattered arrangement, identify how many.

NC.K.CC.6
Identify whether the number of objects, within 10, in one group is greater than, less than, or equal to the number of objects in another group, by using matching and counting strategies.

NC.K.G.1
Describe objects in the environment using names of shapes, and describe the relative positions of objects using positional terms.

NC.K.G.2
Correctly names squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres regardless of their orientations or overall size.

NC.K.G.3
Identify squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres as two dimensional or three-dimensional.

NC.K.G.4
Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, attributes and other properties.

NC.K.G.5
Model shapes in the world by building shapes from components and drawing shapes.

NC.K.G.6
Compose larger shapes from simple shapes.

NC.K.MD.1
Describe measurable attributes of objects; and describe several different measurable attributes of a single object

NC.K.MD.3
Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

Mathematical Practices:

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.

What is the Mathematics?

The mathematical discourse established in Cluster 1 should continue to be embedded and utilized throughout each successive cluster.

- Shapes have attributes that are the same and different. We can talk about these similarities and differences with words and numbers. Some of these differences help us know what to call each shape (ex. number of sides). Other differences do not change the name of the shape (ex. color, size, orientation).
- Students recognize and correctly name various representations of the same shape (tan and blue pattern blocks are both rhombus; triangles that are non-regular in addition to the green pattern block triangle).
- Students find shapes in their environment by noticing attributes of real-world objects as curvy or straight or like a circle (ex. The column on the building is like a cylinder).
- As students work on writing numerals, they can notice that some have curvy lines and others only straight lines. Some face one way and some another way (directionality), but other attributes don't change the numeral (ex. blue marker, teeny-tiny, etc.). The numerals still represent the same quantity.
- Students distinguish between two-dimensional (flat) and three- dimensional (solid) shapes.
- Students use informal language to discuss the attributes and properties (ex. curvy, straight, long, short, number of sides, number of angles).
- Students compose and decompose shapes by working with blocks, cubes, pattern blocks, and through drawings. Students model 2-D and 3-D shapes (ex. using playdough to build a cube, cone, cylinder) including shape they see in the world (ex. using blocks to build a replica of a famous building).

Important Considerations:

- Students have already completed significant work on K.G.1 coming into this cluster through their experiences in Clusters 1-3 including sorting activities and using positional words in natural settings.
- Students should continue to work on counting and comparing by using numbers to describe mathematical situations (ex. the number of triangles used to cover pattern block puzzle, the number of circles found on a shape hunt). These experiences will allow students opportunities to solidify concepts of counting and comparing before moving to number relationships in Cluster 5.
- Students communicate precisely by engaging in discussion about their reasoning using informal geometric language. Student are not expected to memorize definitions of shapes; rather they become increasingly more precise through use of the terms as they describe, sort, and compare and contrast various 2-D and 3-D shapes.
- Students need many experiences to recognize shapes that are not in the typical orientation (ex. an upside-down triangle or a triangle that is not regular). Looking at examples and non-examples and sorting can help students begin to recognize shapes and their attributes.
- Concrete experiences are essential in developing spatial reasoning. Students need to be able to manipulate objects to explore orientation, positionality, and composition.
- Experiences should go beyond the standard set of pattern and attribute blocks found in math kits. Special attention should be paid to instructional materials such as posters and literature used in the classroom as some may display inaccurate or imprecise examples of shapes. In addition, manipulatives like patterns blocks are 3-D shapes that are often used and named as models of 2-D figures. Discussions as students are sorting, modeling, and drawing provide an opportunity for students to make sense of the difference between 2-D and 3-D figures.