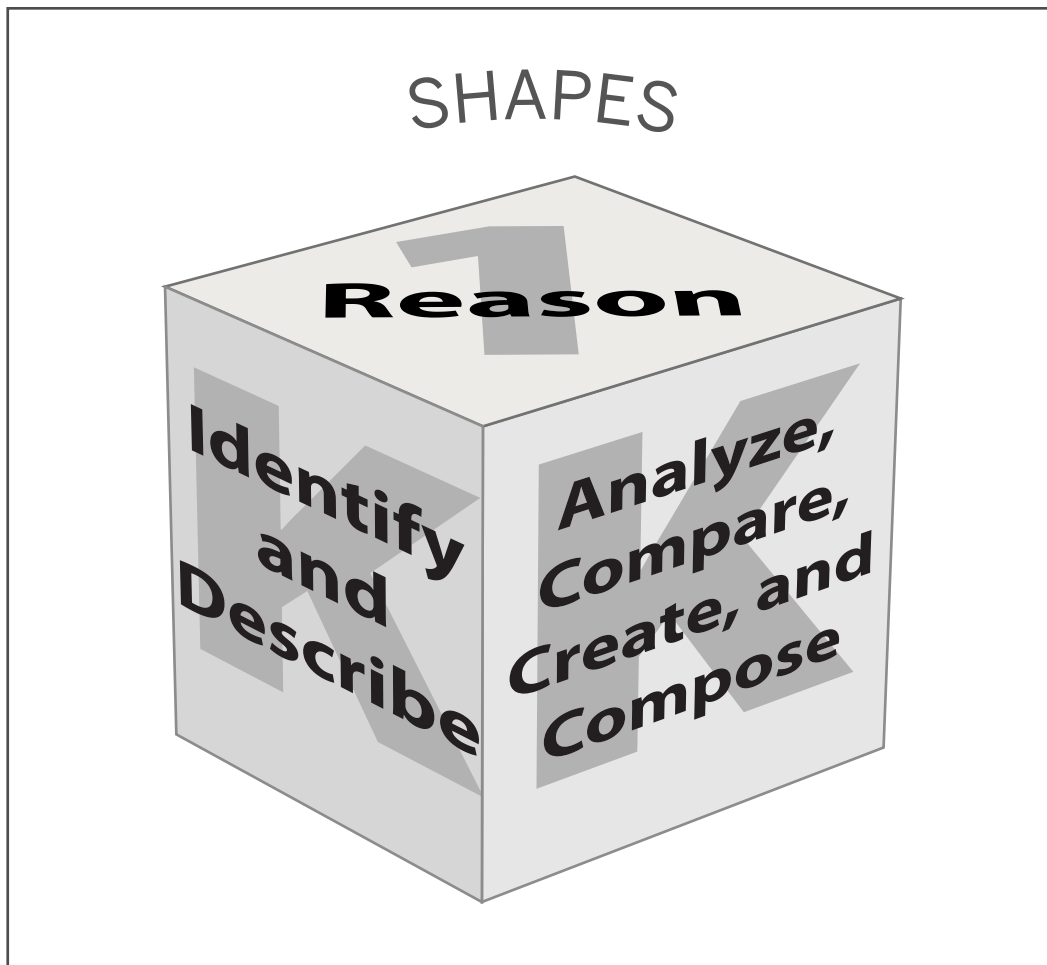


MATH K-1 Common Core Assessments

Kindergarten/Grade 1

INTRODUCTION



fluence

Introduction to Shapes

The assessments associated with the shape progression are designed to help you assess student understanding of shapes and space. Early understanding of shape and space involves several semi-independent aspects:

- Learning spatial vocabulary such as inside, outside, and between;
- Recognizing and classifying shapes based on visual clues and eventually based on properties;
- Analyzing and comparing shapes using properties;
- Creating shapes from common objects like string and toothpicks and also making drawings;
- Composing and decomposing shapes to make patterns and coverings.

Spatial orientation is a precursor of the ability to use coordinate systems, maps, and other tools. This learning progression extends into subject areas other than mathematics. In early years the focus is on understanding and using vocabulary related to spatial orientation (e.g., inside, outside, left, right.) Spatial vocabulary and orientation is the most independent of the concepts listed above.

In developing student understanding of shape and early geometry it is important for students to:

- have experience with a wide variety of examples and non-examples of shapes;
- learn which attributes of shapes are most important to consider when comparing and classifying shapes;
- experience a wide variety of tasks involving shapes.

Students develop mental images of shapes that can dominate their thinking. If students always see the standard equilateral triangle, they may not learn to recognize long skinny triangles or other less common examples. They also may not have the same opportunities to discuss shapes and their attributes

It is important for teachers to model and encourage appropriate reasoning about shapes. This is how students learn which attributes are important and which are irrelevant to defining shapes. Encourage students to consider the number of edges, vertices (corners), and faces. This helps students learn to explain why a shape belongs or does not belong to a certain category (e.g., this is not a rectangle because one of the sides is not straight.)

To develop strong spatial reasoning and shape concepts students need experience with a wide variety of tasks. Be sure to include tasks such as constructing shapes from common objects, composing shapes to make patterns, working with 3D and 2D shapes, classifying shapes and discussing different classification schemes, and computer activities.

All of the tasks in the shape progression are tied to the learning progressions below. The assessments include:

- a blueprint (showing the specific common core standards targeted);
- appendices with shapes that can be copied on to thick paper and cut out for use during the assessment;

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- directions for administration;
- a student document for tasks that require a specific visual stimulus
- a scoring sheet/interpretation guide;
- a copy of the learning progressions;
- a guide to creating instructional groups.

The scoring sheet/interpretation guide makes it easy to record student responses and interpret students' approximate developmental levels with respect to the learning progressions. You can use the instructional grouping guide to create groups of students at approximately the same level who need experience working on the same or similar activities

Learning Progressions

Spatial Orientation

Developmental Level	Description
Early kindergarten spatial vocabulary	Understands the terms in, on, under, up, and down
Middle kindergarten spatial vocabulary	Understands the terms inside, outside, next to, beside, and between (K.G.1).
Advanced kindergarten spatial vocabulary	Understands the terms above, below, in front of and behind (K.G.1).
Grade one spatial vocabulary	Understands the terms left and right

Recognize and Classify Shapes

Developmental Level	Description
Recognizes typical circles, squares, and triangles	Recognizes typical examples of circles, squares (oriented with an edge on the bottom and top), and triangles (close to equilateral, point up).
Recognizes less typical squares, as well as cubes and spheres	Recognizes some less typical squares as well as cubes and spheres. Maybe confused by less typical triangles (tall and skinny or short and wide, scalene). May accept long parallelograms or right trapezoids as rectangles.
Recognizes rectangles	Recognizes more sizes, shapes, and orientations of rectangles
Recognizes more shapes	Recognizes typical examples of hexagons, cones, and cylinders in addition to previously mastered shapes.
Identifies shapes	Names common shapes without making mistakes(e.g. calling ovals or spheres circles, calling a cube a square). Recognizes right angles (square corners)and can distinguish between a rectangle and a parallelogram that does not have right angles. (K.G.1, K.G.2)
Distinguish between two- and three-dimensional shapes	Identifies and sorts shapes based on dimensionality (e.g. two-dimensional shapes here and three dimensional over there) (K.G.3).
Identifies shapes by parts	Identifies shapes based on their parts, (e.g. it is a triangle because it has three sides and three angles). Uses descriptions based on parts to justify classification of non-typical examples, (e.g. even though it is long and skinny it is a rectangle because it has four sides and four square corners). (1.G.1 to 2.G.1)
Identifies and sorts shapes based on attributes	Uses properties explicitly to sort and classify shapes,(e.g. which shapes have opposite sides parallel, which shapes have one right angle). Identifies defining attributes versus non-defining attributes. (3.G.1)

Analyze and Compare Shapes

Developmental Level	Description
Compares some parts	Looks for differences in attributes but examines only part of shape. May incorrectly match shapes based on matching only one side.
Identifies parts of shapes	Identifies parts of shapes as distinct geometric objects. Students generally recognize sides first, then angles in the context of corners, then angles more generally in the context of crossings or bends as well as corners.
Compares most attributes	Looks for differences in attributes, examining full shapes, but may ignore some spatial relationships (e.g. may say a skinny rectangle and a wider rectangle are the same if two of the side lengths are the same).
Analyzes shapes	Analyzes shapes by comparing all attributes and all spatial relationships. Can determine congruence by comparing all sides and all angles. Advanced students will place objects on top of each other to show congruence.(K.G.4)

Create Shapes

Developmental Level	Description
Draws or constructs approximate shapes	Draw shapes or uses toothpicks or other objects to construct approximate shapes, but does not attend to the details of shapes (e.g. parts representing sides of a triangle may overlap at an angle, or angles of a rectangle may not look like right angles)
Draws or constructs accurate shapes	Draws or constructs shapes from parts paying careful attention to right angles, straight sides, and other details. (K.G.5)
Draws or constructs shapes based on attributes	Draws or constructs shapes based on defining attributes. (1.G.1 to 2.G.1)

Compose and Decompose Shapes

Developmental Level	Description
Make pictures	<p>2D-Places shapes next to each other to form pictures in which several shapes play a single role using trial and error. Students do not anticipate or intentionally create a specific shape (e.g. students put two triangles together and discover that they formed a rectangle, but do not set out to create a rectangle).</p> <p>3D-Builds shapes extending in multiple directions (not just vertical or horizontal) with multiple points of contact among pieces. May produce arches, corners, and enclosed areas but uses trial and error without anticipating the results of putting specific pieces together.</p>
Compose shapes	<p>2D-Combines shapes to make new shapes or fill puzzles. Students know what will fit into a pattern before trying the pieces and what shape will result from putting two or more shapes together.</p> <p>3D-Puts pieces together understanding what shape will be produced. Can systematically and intentionally build arches, corners, and enclosed areas from blocks or other 3D pieces. (K.G.6)</p>
Use composite shapes as units	<p>2D-Make composite shapes from smaller shapes and recognize and use substitution relationships among these shapes (e.g. use two smaller rectangles to make a rectangle and use two triangles to make a congruent rectangle, use the rectangle as part of a larger pattern)</p> <p>3D-Substitutes composite shapes for congruent shapes composed from different pieces. Builds complex structures with multiple components. (1.G.2)</p>
Decompose shapes with support	Decompose shapes with support from the imagery or task setting (e.g. divide a shape into smaller shapes given instructions on how to do it or a picture with dotted lines or fairly obvious ways to break apart the shapes).
Independently decompose shapes	Decomposes shapes with flexibility and growing anticipation of resulting shapes. (1.G.3)
Use composite shapes as units of units	<p>2D-Build and apply units of units. Creates composite shapes and uses them to compose other complex shapes and patterns with intention (e.g. continue a pattern of shapes to create a covering). Advanced students can create and apply units of units of units.</p> <p>3D-Builds complex structures such as towers and bridges with multiple levels and substructures. (extension of 1.G.2)</p>

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