



# Topic 16: Analyzing, Comparing, & Composing Shapes

## Lessons 1-5 Math Intervention Resources

### Reteach

MDIS:

D49: 16-1, 16-3, 16-5,

D50: 16-4

D52: 16-2,

### Reinforce

Envision Math Games:

Topic Games:

- Lin's Shape Hunt

envision Online Games

- Geometry

Symbaloo

Building Blocks (Golden CD)

10 Block Materials:

### Guided Practice

Children may call three-dimensional shapes by two-dimensional names. For example, they might call a sphere a "circle", a cube a "square", and a cone a "triangle". These children are observing important attributes of solid figures. Use questioning strategies with children to help them become more precise in describing solid figures.

Have children press solid figures into modeling clay and identify the flat surfaces made by the imprints. First, have them predict what flat surface they will see. Then, have them press the shape into the clay to confirm.

### Assessments

# K

## Topic 16: Analyzing, Comparing, & Composing Shapes

Lesson 16-1

MDIS: D49

### Same Size, Same Shape

**Quick and Easy**

Lesson Overview

Objective	Essential Understanding	Vocabulary	Materials
Children will identify and draw figures that are the same size and the same shape.	Shapes in the plane can be the same size and shape.	<b>same size</b> <b>same shape</b>	Pattern blocks (or Teaching Tool 35), crayons



#### Math Background

This lesson provides the foundation for learning about congruent figures. Congruent figures are exactly the same size and the same shape.

The figures do not need to have the same orientation.

#### Common Core

**Domain**  
Geometry

**Cluster**  
Analyze, compare, create, and compose shapes.

**Standards**  
**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). Also **K.G.2**

- Mathematical Practices**
- ✓ Make sense of problems and persevere in solving them.
  - Reason abstractly and quantitatively.
  - ✓ Construct viable arguments and critique the reasoning of others.
  - Model with mathematics.
  - ✓ Use appropriate tools strategically.
  - ✓ Attend to precision.
  - ✓ Look for and make use of structure.
  - Look for and express regularity in repeated reasoning.

2

### Guided Practice

Remind children that they need to compare both shape and size.

#### Error Intervention

**If** children are confused about which pattern blocks to use, **then** tell them to pick one block and try it to see if it exactly matches two of the outlines in the box.

**Do you understand?** *How do you know when two figures have the same shape and size?* [They will match exactly.] *Does changing the position of the figures change their size or shape?* [No]

**Reteaching** Display four paper circles and include two that are the same size. Ask children to find the two circles that match exactly. Continue with other shapes.

# K

## Topic 16: Analyzing, Comparing, & Composing Shapes

Lesson 16-2

MDIS: D52

### Making Shapes from Other Shapes

#### Quick and Easy Lesson Overview

Objective	Essential Understanding	Vocabulary	Materials
Children will recognize that shapes can be combined to make other shapes.	Shapes can be combined to make other shapes.		Pattern blocks (or Teaching Tool 35)



#### Math Background

It is helpful to provide ample time for children to explore with pattern blocks before they begin the lesson. When they use pattern

blocks to cover a shape, demonstrate how to cover the shape completely before tracing any of the blocks.

2

#### Guided Practice

Point out that children use the type of pattern block pictured on the student page to cover the shape outline. Have them write the number of blocks they used.

#### Error Intervention

**If** children have difficulty making a new shape, **then** have them experiment with moving and rotating the pattern blocks to create another shape.

**Do you understand?** Display 3 pattern blocks: a hexagon, trapezoid, and triangle. *Would you use more green blocks or red blocks to cover the yellow block?* [Green]

**Reteaching** Trace a hexagon, a parallelogram, and a trapezoid pattern block on 3 index cards, one shape on each card. Model how to fit smaller pattern blocks into the outline of one of the shapes. Complete the puzzle and ask children to count the blocks used. Then have children take turns solving the puzzles.



#### Common Core

##### Domain

Geometry

##### Cluster

Analyze, compare, create, and compose shapes.

##### Standards

**K.G.6** Compose simple shapes to form larger shapes. For example, "Can you join these two triangles with full sides touching to make a rectangle?" Also **K.G.4**

##### Mathematical Practices

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

# K

## Topic 16: Analyzing, Comparing, & Composing Shapes

Lesson 16-3

MDIS: D49

### Comparing Solid Figures

#### Quick and Easy

#### Lesson Overview

Objective	Essential Understanding	Vocabulary	Materials
Children will identify solid figures that roll, stack, and/or slide on a flat surface.	Solid figures can be compared in different ways. Some solid figures can be compared by their flat surfaces (faces) and vertices/corners.	<b>roll</b> <b>stack</b> <b>slide</b>	Geometric solids: sphere, cube, cone, cylinder; classroom objects in the shape of solid figures, (per child) crayons



#### Math Background

The attributes of a three-dimensional, or solid figure determine whether it can roll, stack, or slide. Attributes of a solid figure, such as curved or flat, should be emphasized. Children at this age can use the informal

word “corner” to describe the vertex of both two- and three-dimensional shapes. The formal words “vertex” and “vertices” will be introduced in Grade 1.

## 2

### Guided Practice

Remind children that solids can roll, slide, and stack.

#### Error Intervention

**IF** children confuse roll, stack, and slide,

**then** have them handle and experiment with each solid to see which ones roll, stack, and/or slide. Remind children that some solid figures in the exercises will have more than one correct marking.

**Do you understand?** *Do all objects stack? Why or why not?*

[No, things that are round or only have curved sides do not stack. They need a flat side.]

**Reteaching** Give groups of children solid figures—cube, sphere, cone, cylinder—and classroom objects of these shapes. Using the solids, model rolling, stacking, and sliding. Ask children to stack some objects to make a tower. Next, have them slide some objects next to the tower. Last, have them roll an object near the tower. Discuss with children which shapes they used for rolling, stacking, and sliding and have them explain why.



#### Common Core

##### Domain

Geometry

##### Cluster

Analyze, compare, create, and compose shapes.

##### Standards

**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). Also **K.G.2**

##### Mathematical Practices

- ✓ Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- ✓ Model with mathematics.
- ✓ Use appropriate tools strategically.
- ✓ Attend to precision.
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# K

## Topic 16: Analyzing, Comparing, & Composing Shapes

Lesson 16-4

MDIS: D50

### Building with Solid Figures

**Quick and Easy**

Lesson Overview

Objective	Essential Understanding	Vocabulary	Materials
Children will make shapes by combining 2 solid figures.	Solid figures can be combined to make other solid figures.		10 or more cubes, clay, craft sticks, geometric solids: sphere, cube, cone, cylinder



#### Math Background

The attributes of a solid figure determine whether it can stack. Discuss shapes that can be stacked to make new shapes. Understanding the attributes of two-dimensional shapes and three-dimensional solids is critical for this task. Attributes such as

curved or flat surfaces should be emphasized. In addition, children can draw their block creations. In this case, children are taking three-dimensional shapes and making two-dimensional representations.

2

### Guided Practice

#### Error Intervention

**If** children have difficulty identifying the solid figures used to make the new shape,

**then** have them use geometric solids to build the shape.

**Do you understand?** *Which shapes were used to make the new shape?* [Cube and cone]

**Reteaching** Give children 2 shapes. Have them identify the shapes and then have them see if they can build a new shape using geometric solids. Give the children clay and craft sticks and have them see if they can build two-dimensional and three-dimensional shapes from those components.



### Common Core

#### Domain

Geometry

#### Cluster

Analyze, compare, create, and compose shapes.

#### Standard

**K.G.5** Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes. Also **K.G.2**

#### Mathematical Practices

- Make sense of problems and persevere in solving them.
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## Topic 16: Analyzing, Comparing, & Composing Shapes

Lesson 16-5

MDIS: D49

### Problem Solving: Use Logical Reasoning

#### Quick and Easy Lesson Overview

Objective	Essential Understanding	Vocabulary	Materials
Children will use logical reasoning to solve problems.	Some problems can be solved by reasoning about conditions in the problem.		Shapes (Teaching Tool 2), blunt-tipped scissors



#### Math Background

In this lesson, children will apply their knowledge of geometry by using logical reasoning to solve riddles about plane and solid shapes. Children will identify shapes based on clues given about their attributes, such as the number of sides or corners. These types of problems require children to have a

strong understanding of both two- and three-dimensional shapes.

Ask questions to help children think logically about identifying shapes. *How many sides does a square have? Can a sphere stack? What shape are a cube's flat surfaces?*

2

#### Guided Practice

##### Error Intervention

**If** children have difficulty identifying attributes of shapes, **then** have them use pattern blocks or geometric solids to identify the attributes described in the clue.

**Do you understand?** *Which shapes have 4 sides and 4 corners?* [Yellow and blue shapes] *Which of those shapes have slanted sides?* [Blue shape]

**Reteaching** Give children a pattern block or a geometric solid. Have them think of an object in the classroom that resembles that shape. Have them describe the object.



#### Common Core

**Domain**  
Geometry

**Cluster**  
Analyze, compare, create, and compose shapes.

##### Standards

**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). Also **K.G.3**

##### Mathematical Practices

- ✓ Make sense of problems and persevere in solving them.
- ✓ Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- ✓ Model with mathematics.
- ✓ Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
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