

MA.1.GR.1.3

Overarching Standard: MA.K.GR.1 *Identify and analyze two- and three-dimensional figures based on their defining attributes.*

Benchmark of Focus

MA.1.GR.1.3: Compose and decompose two- and three-dimensional figures. Figures are limited to semi-circles, triangles, rectangles, squares, trapezoids, hexagons, cubes, rectangular prisms, cones and cylinders.

Example: A hexagon can be decomposed into six triangles.

Example: A semi-circle and a triangle can be composed to create a two-dimensional representation of an ice cream cone.

Benchmark Clarifications

Clarification 1: Instruction focuses on the understanding of spatial relationships relating to part-whole, and on the connection to breaking apart numbers and putting them back together.

Clarification 2: Composite figures are composed without gaps or overlaps.

Clarification 3: Within this benchmark, it is not the expectation to compose two- and three- dimensional figures at the same time.

Related Benchmark/Horizontal Alignment

- MA.1.NSO.1.3
- MA.1.FR.1.1

Vertical Alignment

Previous Benchmarks MA.K.GR.1.5	Next Benchmarks MA.2.GR.1.3 MA.3.GR.2.4
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Terms from the K-12 Glossary

- Cone
- Cube
- Cylinder
- Hexagon
- Rectangle
- Rectangular Prism
- Square
- Trapezoid
- Triangle

Purpose and Instructional Strategies

The purpose of this benchmark is to promote students' spatial reasoning. Students should begin to see figures as compositions of other figures. In Kindergarten, students combined triangles, rectangles, and squares to form composite figures.

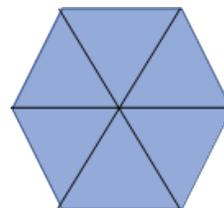
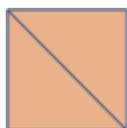
- Instruction should include guiding students to ensure that when composing a new three-dimensional figure those figures should have one set of the faces touching without gaps or overlaps.
 - For example, the flat surface of a cone touching one face of a cube.
- Instruction includes making a connection to partitioning shapes.

Common Misconceptions or Errors

- Students may not initially recognize that a figure can be made using other figures. Class activities should promote exploring what figures could make a given figure.
 - For example, using pattern blocks a student could manipulate two triangles to make a square, four triangles to make a rectangle, or six triangles to make a hexagon.

Strategies to Support Tiered Instruction

- Instruction provides opportunities to identify shapes around the school while transitioning between the classroom to other areas of the school. When possible, trace shapes with sidewalk chalk (such as the rectangles that make up sections of the sidewalks or the bricks in the wall). Students could include using colorful tape to highlight shapes around the classroom (windows, doors, cupboards, desks, etc.) to make them visible.
 - For example, students may use pattern blocks to manipulate two triangles to make a square, four triangles to make a rectangle and six triangles to make a hexagon.



Questions to ask students:

- **What does it mean to compose and decompose a shape?**
 - Sample answer that indicates understanding: *To **compose** means to arrange or put shapes together to make a new shape or whole.*

To **decompose** a shape means to break shapes apart into smaller shapes.

- **What figure could you compose using these shapes?**
 - Sample answer that indicates understanding: *Students are able to compose a new shape given a set of shapes. For example, we can compose a trapezoid using 3 triangles.*
- **What attributes do we look for when trying to compose/decompose a shape?**
 - Sample answer that indicates understanding: *We can look at shape's defining attributes such as the sides, angles, and vertices.*

Instructional Tasks

Instructional Task 1 (MTR.5.1)

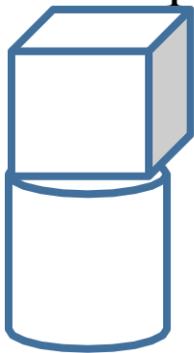
Provide pattern blocks to students; be sure students get at least six triangles, two squares, two trapezoids and one hexagon. Read the directions to students and give students time to explore to find possible solutions. After students have come up with solutions, have discussion around whether all students found the same solution or if they had different solutions. Ask students if they could come up with a different response.

Directions:	Response:
<p>1. Compose a new figure from these triangles.</p> 	<p><i>Possible Student Response:</i> The student rearranges the triangles to create a hexagon. Students may create two trapezoids prior to making a hexagon.</p> 
<p>2. Josiah created a figure using two trapezoids. What new figure did he create?</p> 	<p><i>Possible Student Response:</i> The student rearranges the trapezoids to create a hexagon by aligning the bottom sides or an hour-glass figure by aligning the top sides.</p>
<p>3. What figures could you use to make up the figure below?</p> 	<p><i>Possible Student Response:</i> The student arranges two squares to make a two-inch rectangle. Students may also recognize that the rectangle can be decomposed into two triangles. The student cuts the rectangle into two triangles.</p> 

Instructional Items

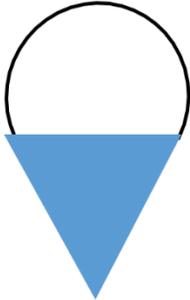
Instructional Item 1

What three-dimensional figures make up the composite figure below?



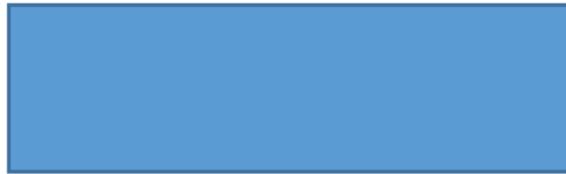
Instructional Item 2

What two-dimensional figures make up the figure below?



Instructional Item 3

How many of the squares would you need to tile the rectangle below with no gaps or overlaps?



Additional Resources:

[CPALMS](#)

Lessons

[Composing Shapes](#) (Khan Academy)

[Composing and Decomposing Shapes](#) Lesson (Blog Post)

[Lesson: Composing and Decomposing 2D Shapes](#) (Blog Post)

[Compose/Decompose Shapes](#)

[Composing and Decomposing 3D Shapes](#) (Blog Post)

Activities and Resources

[Identify Shapes Traced From Solids](#) (IXL)

[Composing and Decomposing 2D Shapes](#) (video)

[Composing and Decomposing Shapes](#) (Worksheets)

[How to Draw 3D Shapes](#) (Blog Post)

[Composition and Decomposition of Shapes](#) (Blog Post)

[Composing 2D Shapes Cards](#) (Blog Post)

[Composing and Decomposing](#) (Blog Post)

Resources/Tasks to Support Your Child at Home:

[Compose Shapes](#) (Online Game)

[Shape Construction](#) (Online Game)

Tape Shape Activity: Tape and outline of some shapes down on the floor and have your child use shapes to fill the outline. Have your child record how many of each shape was used and explain how they knew to use the shape (i.e. it has a straight side like this rectangle).

[3D Shapes](#) Games