Chapter 11: 3-Dimensional Geometry

Content Area: **Mathematics**
Course(s): **Math 1**
Time Period: **May**
Length: **8 Days**
Status: **Published**

Unit Summary

In unit 11, children continue to extend their understanding of three-dimensional shapes. Children classify different three-dimensional shapes by the number and type of surfaces each shape has by identifying whether the surfaces are curved or flat. This helps children distinguish between defining attributes versus non-defining attributes (1.G.A.1). They also compose three-dimensional shapes into composite shapes and extend this skill by composing new shapes from composite shapes (1.G.A.2). Children use their knowledge of composing three-dimensional shapes to decompose three-dimensional shapes into two-dimensional shapes. They learn that a flat surface of the three-dimensional shapes forms a two-dimensional shape. Academic vocabulary within this unit includes the following terms: cone, cube, curved surface, cylinder, flat surface, rectangular prism, sphere, three-dimensional shape, two-dimensional shape, attribute, shape.

Standards

MA.1.G.A.1	Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.
MA.1.G.A.2	Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.
MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.7	Look for and make use of structure.
CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
TECH.8.1.2.A.CS1	Understand and use technology systems.
TECH.8.1.2.A.CS2	Select and use applications effectively and productively.
	Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7 × 8 equals the well remembered 7 × 5 + 7 × 3, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2 × 7 and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.
	Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the

solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

Student Learning Objectives

Students will learn to...

- identify and describe three dimensional shapes according to defining attributes
- Compose a new shape by combining three dimensional shapes
- Use composite three dimensional shapes to build new shapes
- Identify three dimensional shapes used to build a composite shape using the strategy act it out
- Identify two dimensional shapes on three dimensional shapes

Essential Questions

- How can you identify and describe three-dimensional shapes?
- How can you combine three-dimensional shapes to make new shapes?
- How can you use a combined shape to build new shapes?
- How can acting it out help you take a apart combined shapes?
- What two-demensional shapes do you see on the flat surfaces of three-dimensional shapes?

Enduring Understandings

Students will understand that...

- Shapes can be found everywhere in our environment in both natural and man-made objects.
- Shapes can be sorted by a variety of attributes.
- There are relationships among shapes.
- Shapes can be identified and described.

Application

Students will be able to independently use their learning to...

- identify, describe and sort 3-dimensional shapes according to their attributes.
- create new shapes from 3 dimensional shapes.

Skills

Students will be skilled at...

- Identifying and describe three-dimensional shapes according to defining attributes
- Composing a new shape by combining three-dimensional shapes
- Using composite three-dimensional shapes to build new shapes
- Identifying three-dimensional shapes used to build a composite shape using the strategy "act it out"
- Identifying two-dimensional shapes on three-dimensional shapes