Chapter 12: 2-Dimensional Geometry

Content Area: **Mathematics**
Course(s): **Math 1**
Time Period: **June**
Length: **13 Days**
Status: **Published**

Unit Summary

In unit 12, children continue to extend their understanding of two-dimensional shapes. Children categorize and describe shapes based on their attributes such as sides and vertices (1.G.A.1). Children then learn how to combine two-dimensional shapes to make a composite shape (1.G.A.2). Children continue to build composite shapes and extend this skill by composing new shapes from these composites. As the chapter progresses, children learn to decompose shapes into smaller shapes. This work leads into identifying whether the smaller shapes that were decomposed are equal. Children are then introduced to the concept of equal shares and partitioning circles into two or four equal shares and describe these equal shares as halves, quarters, or fourths (1.G.A.3). This is the conceptual basis for understanding fractions. Academic vocabulary within this unit include the following terms: geometry, shapes, two-dimensional shapes, three-dimensional shapes, shapes, equal shares, wholes, halves, fourths.

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.1.G.A.3	Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.
MA.K-12.4	Model with mathematics.
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 can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw

conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

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.

Student Learning Objectives

Students will learn to...

- Describe attributes of two dimensional shapes and use defining attributes to sort shapes
- Compose a new shape by combining two dimensional shapes
- Make new shapes from composite two dimensional shapes using the strategy act it out
- Decompose combined shapes into shapes
- Identify equal and unequal parts (or shares) in two dimensional shapes
- Partition circles and rectangles into two or four equal shares

Essential Questions

- How can we represent two-dimensional and three-dimensional shapes in different ways?
- How can we use shapes to make other shapes (including using smaller shapes to represent a larger shape)?
- What are the similarities and differences among shapes?
- How are geometric shapes related to one another?
- What is a whole?
- How is a shape divided into equal shares?
- How do we describe the equal shares?
- What happens to the shares when we divide the shapes in different ways?

Enduring Understandings

Students will understand that...

- 2-D shapes can be composed of or decomposed from other shapes.
- There is a relationship among 2-D and 3-D shapes.
- A whole can be partitioned into an equal number of parts.
- There are terms we can use to describe these parts.

- The more a whole is divided into equal parts, the smaller the size of the parts.

Application

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

- identify, desciribe and sort 2-dimensional shapes, compose and decompose shapes made of 2-dimensional shapes, and divide shapes in 1/2 and 1/4.

Skills

Students will be skilled at...

- Use defining attributes to sort shapes
- Describe attributes of two-dimensional shapes
- Use objects to compose new two-dimensional shapes
- Compose a new shape by combining two-dimensional shapes
- Make new shapes from composite two-dimensional shapes using the strategy "Act it Out"
- Decompose combined shapes into shapes
- Decompose two-dimensional shapes into parts
- Identify equal and unequal parts (or shares) in tow-dimensional shapes
- Partition circles and rectangles into two equal shares
- Partition circles and rectangles into four equal shares