Grade 2 Mathematics, Quarter 4 Unit 4.3

Shapes, Fractions and Time

Overview

Number of Instructional Days: **15** (1 day = 45-60 minutes)

Content to Be Learned	Mathematical Practices to Be Integrated
• Tell and write time within 5 minutes from analog and digital clocks using a.m. and p.m. notation. • Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. • Identify triangles, quadrilaterals, pentagons, hexagons, and cubes. • Partition circles and rectangles into two, three or four equal shares. • Describe equal shares using the words halves, thirds, half of, a third of, etc. • Describe wholes as having two halves, three thirds and four fourths. • Recognize equal shares of the same whole may not have the same shape.	**3. Construct viable arguments and critique the reasoning of others.** • Describe strategies for drawing shapes with specified attributes. • Describe how to partition circles and rectangles into equal shares. • Analyze and critique the strategies and arguments of classmates. **6. Attend to precision.** • Accurately tell and write time within 5 minutes • Correctly use fraction and geometry vocabulary in written work and discourse. • Recognize the importance of equal shares when partitioning circle and rectangles. **7. Look for and make use of structure.** • Understand the attributes and properties of geometric shapes. • Partition circles and rectangles into equal shares to develop an initial understanding of fractions.

Essential Questions	
• How do you tell time using digital and analog clocks? • Why is it important to use math vocabulary when explaining ideas? • How many halves (thirds/fourths) does it take to make one whole rectangle/circle? How do you know?	• What strategy would you use to draw and identify a geometric shape? • What is an equal share? Why are equal shares important? • Do equal shares always have the same shape?

Common Core State Standards for Mathematical Content

Measurement & Data 2.MD

Work with time and money.
7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.

Geometry 2.G

Reason with shapes and their attributes.
1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.[1] Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

[1] Sizes are compared directly or visually, not compared by measuring.

Common Core Standards for Mathematical Practice

3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

6. Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

7. Look for and make use of structure.

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.

Clarifying the Standards

Prior Learning

Grade 1 Critical Area:
Students compose and decompose plane or solid figures (e.g., put two triangles together to make a quadrilateral) and build understanding of part-whole relationships as well as the properties of the original and composite shapes. As they combine shapes, they recognize them from different perspectives and orientations, describe their geometric attributes, and determine how they are alike and different, to develop the background for measurement and for initial understandings of properties such as congruence and symmetry.

Geometry 1.G

Reason with shapes and their attributes.
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.
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.[1]
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.

Current Learning

Grade Critical Area:
Students describe and analyze shapes by examining their sides and angles. Students investigate, describe, and reason about decomposing and combining shapes to make other shapes. Through building, drawing, and analyzing two- and three-dimensional shapes, students develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades.

Future Learning

Grade 3 Critical Areas:
Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.
Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

Additional Findings
Valuable information can be gained from accessing the following resources:

CCSS Progression Documents:
http://ime.math.arizona.edu/progressions/

Arizona's College and Career Ready Standard (provides examples of each standard):
http://www.azed.gov/azccrs/mathstandards/k-2/

PARCC Model Content Frameworks (K-2):
http://parcconline.org/parcc-model-content-frameworks