



Unit Plan

Properties of Two-dimensional Shapes

Chester / Littleville Elementary / Grade 4 / Mathematics

Week 33 - Week 34 | 5 Curriculum Developers | Last Updated: Mar 20, 2024 by LeBlanc, Deanna

[Style Guide](#)

What is the purpose of the unit? What are the major take-aways?

Standards

MA: Mathematics (2017)

MA: Grade 4

Number & Operations in Base Ten

4.NBT Generalize place value understanding for multi-digit whole numbers less than or equal to 1,000,000.

3. Use place value understanding to round multi-digit whole numbers to any place.

4.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic of whole numbers less than or equal to 1,000,000.

5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Number & Operations—Fractions

4.NF Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers for fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.

- 4b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. [Show Details](#)

4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

- 3c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

4.NF Understand decimal notation for fractions, and compare decimal fractions.

5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. [Show Details](#)

Measurement & Data

4.MD Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. [Show Details](#)

1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. [Show Details](#)

2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

4.MD Geometric measurement: understand concepts of angle and measure angles.

- 7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.
- 5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
- 5a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $1/360$ of a circle is called a "one-degree angle," and can be used to measure angles.
- 5b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.
- 6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.

Geometry

4.G Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

- 1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
- 2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
- 3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

© 2019 Massachusetts Department of Elementary and Secondary Education.

Enduring Understandings

Essential Questions

Content

In this unit, students deepen their understanding of the attributes and measurement of two-dimensional shapes. Prior to this unit, students learned about some building blocks of geometry—points, lines, rays, segments, and angles. They identified parallel and intersecting lines, measured angles, and classified angles based on their measurement. Here, they apply those insights to describe and reason about characteristics of shapes. In the first half of the unit, students analyze and categorize two-dimensional shapes—triangles and quadrilaterals—by their attributes. They classify two-dimensional shapes based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Students also learn about symmetry. They identify line-symmetric figures and draw lines of symmetry.

The second half of the unit gives students opportunities to apply their understanding of geometric attributes to solve problems about measurements (side lengths, perimeters, and angles). Included in this unit are three optional lessons that offer opportunities for students to strengthen and extend their understanding of symmetry and other attributes of two-dimensional shapes.

Throughout the unit

The Number Talk routines in this unit offer opportunities for students to look for structure to mentally multiply whole numbers and fractions and add multi-digit numbers.

Skills

Section A Goals

- Classify triangles (including right triangles), parallelograms, rectangles, rhombuses, and squares based on the properties of their side lengths and angles.
- Identify and draw lines of symmetry in two-dimensional figures.


Section B Goals

- Solve problems involving unknown side lengths, perimeter, area, and angle measurements using the known attributes and properties of two-dimensional shapes.

How will you gauge student learning?

Assessments

4.8 End-of-Unit Assessment | Summative | Written Product

 Grade4-8-End-of-Unit-Assessment-assessment.pdf

3 State Standards Assessed

How will students learn?

Learning Activities

Section A:

This section prompts students to consider different ways of looking at two-dimensional shapes: by the number of sides, length of sides, size of angles, presence of parallel or perpendicular lines, and symmetry. Students examine these attributes in shapes, classify the shapes by the attributes, and explain their classifications. For example, they identify quadrilaterals as parallelograms if they have two pairs of parallel sides, as squares if they have four equal sides and four right angles, and so on.

In studying symmetry, students characterize shapes based on whether they can be folded into two equal halves that match up exactly, draw lines of symmetry, and complete drawings of figures that are halved by a line of symmetry.

The section includes one optional lesson in which students apply their understanding of two-dimensional shapes to complete or create drawings of figures with specified attributes.

Section B:

In this section, students apply their knowledge of geometric attributes to reason about measurements in various two-dimensional shapes. They find the perimeter of shapes where the side lengths are all given. Then, they move on to cases where the side lengths are not explicitly given but can be deduced based on information about the shapes.

Later, students are given the perimeter and some information about a shape and find any unknown side lengths. The activities also enable students to practice performing operations on whole numbers and fractions.

In the last two lessons, students use what they have learned about symmetry to solve problems related to perimeter and unknown angle measurements in two-dimensional shapes. This work deepens students' understanding of the concepts from this unit and offers opportunities to practice reasoning about angle measurement, but it is not required by grade 4 standards. These lessons are therefore optional.

Differentiated Instruction

Technology Integration

21st Century Skills

Positive Behavior

CASEL

Collaborative for Academic, Social, and Emotional Learning

Resources

Teacher Notes and Reflections

