

08: Two-Dimensional Geometry

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **3 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students will deepen their understanding of the area and perimeter of rectangular and non-rectangular shapes. They will develop and use formulas for finding the area and perimeter of rectangles. They will also discover how the area of a parallelogram and a triangle are related to the area of a rectangle and use this knowledge to develop formulas for finding the area of a parallelogram and a triangle.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Objectives:

- Develop and apply the formulas for finding the area and perimeter of rectangles.
- Discover relationships between perimeter and area of rectangles, including that each can vary while the other stays constant
- Develop and apply the formula for finding the area of triangles
- Develop and apply the formula for finding the area of parallelograms
- Find the area of figures composed of rectangles & triangles
- Name coordinates of polygons on a coordinate grid
- Use coordinates to find side lengths and areas of polygons
- Draw polygons with given and missing vertices on a coordinate grid

Essential Questions:

- What does it mean to measure area and perimeter?
- How are the area of a parallelogram and triangle related to the area of a rectangle?
- Is it possible to find the perimeter and/or area of an irregular figure?

Essential Understandings:

- Spatial sense and geometric modeling can help to describe and interpret our physical environment and to solve problems.
- Side lengths and angle measure determine the shapes of triangles, rectangles, parallelograms and other polygons.
- Polygon properties are important in design of natural and man-made objects.
- How to solve practical problems using perimeter and area.

CONTENT AREA STANDARDS

6.NS

A. Apply and extend previous understandings of multiplication and division to divide fractions by fractions

6.G

A. Solve real-world and mathematical problems involving area, surface area, and volume

MA.6.G.A.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
MA.6.G.A.3	Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
MA.6.EE.A.2	Write, read, and evaluate expressions in which letters stand for numbers.
MA.6.EE.A.3	Apply the properties of operations to generate equivalent expressions.
MA.6.EE.A.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).
MA.6.EE.A.2a	Write expressions that record operations with numbers and with letters standing for numbers.
MA.6.EE.A.2c	Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations).
MA.6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
MA.6.NS.C.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

Standards are Required)

9.1.8.RM.2: Analyze the need for and value of different types of insurance and the impact of deductibles in protecting assets against loss. • 9.1.8.RM.3: Evaluate the need for different types of warranties.

CS.K-12.3	Recognizing and Defining Computational Problems
CS.K-12.3.a	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
CS.K-12.3.c	Evaluate whether it is appropriate and feasible to solve a problem computationally.
LA.K-12.NJSLSA.R10	Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
LA.K-12.NJSLSA.SL1	Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
WRK.K-12.P.4	Demonstrate creativity and innovation.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.

STUDENT LEARNING TARGETS

Refer to the 'Declarative Knowledge' and 'Procedural Knowledge' sections.

Declarative Knowledge

Students will understand that:

- Content-specific vocabulary: area, coordinates, equilateral triangle, formula, isosceles triangle, base, height, length, width, perimeter, polygon, right angle, scalene triangle, x-coordinate, y-coordinate
- That area is the number of squares needed to cover a plane figure.
- How to manipulate polygons to discover formulas for area.
- Why a formula works and how a formula relates to the measure (area) and the figure

Procedural Knowledge

Students will be able to:

- Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes.
- Apply composing and decomposing area techniques in the context of solving real-world and mathematical problems.
- Draw polygons in the coordinate plane given coordinates for the vertices.
- Find the length of a side of a polygon joining points with the same first coordinate or the same second coordinate in a coordinate plane.

- Apply coordinate techniques in the context of solving real-world and mathematical problems.

EVIDENCE OF LEARNING

Refer to the 'Formative Assessments' and 'Summative Assessments' sections.

Benchmark Assessment

- BOY Diagnostic Snapshot Assessment
- MP1 Quarterly Assessment
- MP2 Quarterly Assessment
- MP3 Quarterly Assessment
- MP4 Quarterly Assessment
- EOY Diagnostic Snapshot Assessment

Alternate Assessments

- Portfolios
- Verbal Assessment (instead of written)
- Multiple choice
- Modified Rubrics
- Performance Based Assessments

Formative Assessments

- Observations
- Classwork
- Homework Assignments
- Do Now Questions
- Exit Tickets
- Self Assessment Questions

- Proficiency Scale

Summative Assessments

- Quizzes
- Unit Assessments
- Graded Assignments
- Projects

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Instructional Materials

- *CMP3 Covering & Surrounding (Investigations 1-3)*
- [Savvas Realize](#) (teacher and student resources)

Supplemental Instructional Materials

- Additional Resources linked [HERE](#)
- Math 6 Enriched Covering & Surrounding folder linked [HERE](#)
- [Khan Academy](#)
- [Delta Math](#)
- Illustrative Math Performance Tasks:
 - [6.G.A.1, 6.EE.A.1 Sierpinski's Carpet](#)
 - [6.G.A, 6.RP.A.3 Painting a Barn](#)
 - [6.G.A.1, 6.A.G.3 Polygons in the Coordinate Plane](#)
- [IXL - Recommended](#) Skills Practice
 - FF.2 Area of Rectangles and Squares
 - FF.4 Area of Parallelograms
 - FF.6 Area of Triangles
 - FF.11 Area of Compound Figures

INTERDISCIPLINARY CONNECTIONS

- Computations

- Financial/Economic/Business/Entrepreneurial Literacy

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.