Unit 4 - Geometry

Content Area: **Mathematics**
Course(s):
Time Period: **March**
Length: **6-8 weeks**
Status: **Published**

Unit Overview

Unit 4 focuses on the Geometry (G) domain. The unit addresses the following grade 8 standards:

Understand congruence and similarity using physical models, transparencies, or geometry software.

Understand and apply the Pythagorean Theorem.

Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

Essential Questions

"How can you use different measurements to solve real-life problems?"

"How can algebraic concepts be applied to geometry?"

"How can we best show or describe the change in position of a figure?

"How can you determine congruence and similarity?"

"Why are formulas important in math and science?"

Content

Lines

Geometric Proofs

Angles of Triangles

Polygons and angles

The Pythagorean Theorem

Distance on the Coordinate Plane

Translations, Reflections, Rotations, Dilations

Congruence and Similarities of Transformations

Properties of Similar Polygons

Similar Triangles and Indirect Measurement

Slope and Similar Triangles

Area and Perimeter of Similar Figures

Volume of Cylinders, Cones, Spheres

Surface Area of Cylinders, Cones

Changes in Dimensions

Skills

Solve problems involving angles created by parallel lines cut by transversals: vertical, alternate interior, alternate exterior, and corresponding angles.

Demonstrate that the sum of the angles in a triangle is 180 degrees.

Find measures of unknown angles and the sum of angles in polygons.

Use the Pythagorean Theorem to solve problems with right triangles.

Use the Pythagorean Theorem to find the distance between points on the coordinate plane.

Predict the results of transformations and draw transformed figures, with and without the coordinate plane.

Use transformations to prove congruence and similarity.

Determine missing corresponding sides of similar polygons.

Use similar triangles to solve problems that include height, distance, perimeter, and area.

Find the volume and surface area of cylinders and cones.

Find the volume of spheres.

Assessments

Self-Check Quiz

Chapter Tests

Online Standardized Test Practice

Chapter Project

Teacher Observation

Lessons/Learning Scenarios

Glencoe Math Course 3 Text

Chapter 5 Lessons 1-7

Chapter 6 Lessons 1-4

Chapter 7 Lessons 1-7

Chapter 8 Lessons 1-6

Standards

CCSS.Math.Content.8.G.A.1.a	Lines are taken to lines, and line segments to line segments of the same length.
CCSS.Math.Content.8.G.A.1.b	Angles are taken to angles of the same measure.
CCSS.Math.Content.8.G.A.1.c	Parallel lines are taken to parallel lines.
CCSS.Math.Content.8.G.A.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
CCSS.Math.Content.8.G.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
CCSS.Math.Content.8.G.A.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
CCSS.Math.Content.8.G.A.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.
CCSS.Math.Content.8.G.B.6	Explain a proof of the Pythagorean Theorem and its converse.
CCSS.Math.Content.8.G.B.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
CCSS.Math.Content.8.G.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
CCSS.Math.Content.8.G.C.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
CCSS.Math.Content.8.EE.A.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.
CCSS.Math.Content.8.EE.B.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.

Resources

Glencoe Math, Course 3, McGraw-Hill, 2013

protractors
Centimeter Grid Master
Coordinate Planes Master

straightedge
ruler
protractor
tracing paper
index cards
rubber bands

patty paper

soup cans
centimeter grid paper

cylinder shaped container with lid
scissors
compass