Geometry

Content Area: **Math**
Course(s):
Time Period: **MP4**
Length: **45**
Status: **Published**

Unit Overview

Unit Summary	Unit Rationale
Students know the scale factor to be a constant of proportionality, and use scale factors to compute actual lengths and areas from a scale drawing. They also reproduce scale drawings with different scales. Students understand by observation that the horizontal and vertical cross sections sliced parallel to a face of a rectangular prism are the same size and shape as the surfaces. Students also understand that the horizontal cross sections sliced parallel to the base of a rectangular pyramid are the same shape as the base. If the vertical cross section goes through the vertex, it will have the same height as the pyramid and the same base length as the side of the base that is parallel to the slice.	Unit 4a helps students relate proportional relationships to problems that can be solved using geometry. In this unit students also develop conceptual understanding related to using geometry to solve problems. Unit 4a allows students to apply previous understandings in a geometric context. The knowledge and skills obtained in this unit allow students to develop a mathematical view of their world.

NJSLS

7.NS.A.3	Solve real-world and mathematical problems involving the four operations with rational numbers.
7.EE.B.3	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
7.EE.B.4.a	Solve word problems leading to equations of the form □□ + □ = □ and □(□ + □) = □, where □, □, and □ are specific rational numbers. Solve equations of these forms with accuracy and efficiency. Compare an algebraic solution to an arithmetic solution, identifying the

	sequence of the operations used in each approach.
7.G.A.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
7.G.A.2	Draw (with technology, with ruler and protractor, as well as freehand) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
7.G.A.3	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
7.G.B.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
7.G.B.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
7.G.B.6	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Standards for Mathematical Practice

1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning

Unit Focus

Enduring Understandings	Essential Questions
• Use a scale drawing to calculate measurements and reproduce proportional scale drawings. • Understand that drawing a unique quadrilateral needs a combination of side lengths, angle measures, and side angle relationships. • Understand how to construct triangles given conditions and determine whether it is a unique triangle, more than one triangle, or no triangle. • The measure of angles that are formed by intersecting lines and rays can be determined	• How do scale drawings and actual measurements represent proportional relationships? • How can a shape that meets given requirements be drawn? • How can you determine when it is possible to draw a triangle given certain conditions? • How are angles formed by intersecting lines related? • How is the circumference of a circle related to the length of its diameter? • How can the area formula of a circle be used

when the relationships between different types of angles are known. • The circumference and diameter of a circle, regardless of size, have a unique constant ratio that is an irrational number symbolized by π • The formula for the area of a circle, $A = \pi r^2$ can be used to solve problems by substituting the known vales for area (A) and/or radius (r) to solve for the unknown value. • A cross section is a two-dimensional figure that is exposed when a three-dimensional figure is sliced by a plane. • The surface area of a composite figure is the sum of the areas of its surfaces. The surface area of a 3-dimensional figure is the combined surface area of all of the faces of the figure. • To find the volume of a prism, find the area of the base (B) and multiply it by its height.	to solve problems? • How do the faces of a three dimensional figure determine the two-dimensional shapes created by slicing the figure? • How is finding the area of composite two-dimensional figures similar to finding the surface area of three-dimensional figures? • How does the formula for volume of a prism help you understand what volume of a prism means? • How can geometry be used to solve problems?

Instructional Focus

Learning Targets
Learners will... • Use a scale drawing as a representation of actual lengths and area • Sketch quadrilaterals with given conditions • Name and classify quadrilaterals according to their properties • Construct triangles with given conditions • Conclude whether or not a triangle is formed and what type of triangle it is • Calculate the measures of angles by using angle relationships • Calculate the circumference, radius, or diameter of a circle • Recognize the relationship between the circumference and the diameter of a circle and π • Find the area of a circle • Use the area to find the radius and diameter • Solve problems involving the area of a circle • Describe cross sections of right rectangular prisms and pyramids • Solve problems involving cross sections • Find the surface area of two-dimensional composite shapes • Find the surface area of three-dimensional composite shapes • Calculate the volume of various three-dimensional figures

• Solve problems involving the volume of three-dimensional figures
Prerequisite Skills
• Find areas of triangles, special quadrilaterals, composite figures • The angles measurement of the whole equals the sum of the angle measures of its parts • Solving equations • Previous understandings of area, perimeter, volume, and surface area • Represent 3D figures made up of rectangles and triangles to form nets
Common Misconceptions
• Solving equations • Mixing up formulas • Substituting values into the wrong variables • Use of tools • Modeling the incorrect definition and meaning of mean, median, mode, and range • Converting decimals, percents, and fractions. Interpreting data from a graph • Reverse the position of the variables when writing equations.

Spiraling For Mastery

Current Unit Content/Skills	Spiral Focus	Activity
• Populations and Samples • Make Inferences • Compare Populations Informally • Simple Probability • Compound Probability	• Display Numerical Data (Grade 6) • Describe Numerical Data (Grade 6) • Summarize Numerical Data (Grade 6) • Proportional Reasoning (Grade 7) • Equivalent Ratios (Grade 7) • Data Sets (Grade 6) • Fractions (Grade 6) • Percent Problems and Drawing Inferences (Grade 7)	• Math Diagnostic and Intervention System Activities

Assessment

Formative Assessment	Summative Assessment
• Homework • Lesson Checks • MathXL • Quizzes • Exit Tickets • Lesson Reflections • Performance Tasks	• Topic Tests (Common Assessments) • Unit 4 Benchmark (Link-It)

Resources

Key Resources	Supplemental Resources
• Savvas EnVision Math 7 • Pacing Guide	• IXL • Delta Math • Desmos • Khan Academy

Career Readiness, Life Literacies, and Key Skills

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Interdisciplinary Connections

L.KL.7.2.A	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases.
SL.PE.7.1.A	Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

SL.PE.7.1.C	Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.
SL.PE.7.1.D	Acknowledge new information expressed by others and, when warranted, modify their own views.