Unit 7: Geometry

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Week 27**
Length: **4 Weeks**
Status: **Published**

Unit Overview

In this unit, students will classify regular polygons and know their properties. They will name corresponding and congruent parts of similar polygons. Students will identify angles that are formed when parallel lines are cut by a transversal. They will use facts about supplementary, complementary, vertical, and adjacent angles to write and solve equations for unknown angles in a figure. Students will know and apply the formulas for finding areas of two-dimensional figures, and will use these formulas to help find areas of irregular figures. They will also know and apply formulas for finding volumes and surface areas of three-dimensional space figures. Students will study transformations in the coordinate plane including rotations, reflections, translations, and dilations. The unit will conclude with solving problems by applying the Pythagorean Theorem

Standards

MA.8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations:
MA.8.G.A.1a	Lines are transformed to lines, and line segments to line segments of the same length.
MA.8.G.A.1b	Angles are transformed to angles of the same measure.
MA.8.G.A.1c	Parallel lines are transformed to parallel lines.
MA.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.
MA.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.
MA.8.G.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
MA.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.
MA.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.
MA.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.
MA.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.
MA.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.
MA.8.G.B.6	Explain a proof of the Pythagorean Theorem and its converse.
MA.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.
MA.8.G.B.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
MA.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.

Essential Questions

1. How can algebra be used to solve problems in geometry?
2. When is it important to have precise measurements instead of an approximations?
3. How can geometric relationships help to solve problems and/or make sense of phenomena?

Application of Knowledge and Skills...

Students will know that...

1. regular polygons can be classified based on their sides and angles.

2. similar figures have corresponding sides and angles.

3. missing angles can be found by using the properties of angle relationships such as complementary, supplementary, vertical, corresponding, alternate interior, and alternate exterior angles

4. transformations include translations, reflections, rotations, and dilations

5. area calculates the space inside a two-dimensional figure, surface area is the sum of the exterior area of a three-dimensional solid, and volume calculate the space inside a three-dimensional figure

Students will be able to:

a. classifying regular polygons, lines, and angles

b. identify supplementary, complementary, and vertical angles

c. recognize angle relationships and use their properties to find missing angles

d. identify special angles given parallel lines cut by a transversal

e. find the sum of interior and exterior angles measures in a polygon

f. classify and identify three-dimensional figures.

g. complete transformations of geometric figures on the coordinate plane

h. identify rotational symmetry

i. calculate area of parallelograms, triangles, trapezoids, circles, and irregular figures

j. calculate the perimeter of regular and irregular figures.

j. calculate circumference of circles

k. calculate volume of prisms, cylinders, spheres, pyramids, and cones

l. calculate surface area of rectangular prisms, cylinders, and spheres.

m.measure objects using metric and customary units.

Assessments

Daily Do Now Problems
Diagnostic: Other written assessments

Students will complete daily Do Now problems to assess readiness.

Tickets to Leave
Formative: Other written assessments

One or two problems will be used to determine whether students mastered material taught during the lesson.

Communicator Practice
Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Angles Quiz
Formative: Written Test

Students will take a quiz to demonstrate understanding of angle relationships and interior angles of polygons.

Transformations Quiz
Formative: Written Test

Students will take a quiz to demonstrate understanding of translations, reflections, rotations, and dilations.

Geometry Test
Summative: Written Test

Topics will include: angle relationships, polygons, transformations, area, surface area, volume, and measurement.

Activities

See links for activities

- Transformations Investigation
- volume_surface area_kooshball.notebook
- Pythagorean theorem.notebook
- Angles_transversal_G8.notebook
- Area of Shaded Regions_G8.notebook

Activities to Differentiate Instruction

Mixed-ability grouping

Interactive Smart Board activities

Multi-Step Problem Solving

Math stations

Cooperative learning

Study guides (teacher and student completed)

Modify tests and homework as needed

Modified grading rubrics

Graphic organizers

Communicator response boards

Extended response questions

Challenge and enrichment homework and worksheets

Optional weekly challenge problems

Integrated/Cross-Disciplinary Instruction

Students will use writing skills when answering extended response questions.

Resources

McDougal-Littell Algebra 1 textbook and resource materials

website: www.classzone.com

Kuta Software

Bridge to Algebra

Smart Exchange resources

website: www.exchange.smarttech.com

NJ Ask Review Workbook Grade 8

- exchange.smarttech.com/
- www.classzone.com

21st Century Skills

CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are

	excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.
CRP.K-12.CRP11.1	Career-ready individuals find and maximize the productive value of existing and new technology to accomplish workplace tasks and solve workplace problems. They are flexible and adaptive in acquiring new technology. They are proficient with ubiquitous technology applications. They understand the inherent risks-personal and organizational-of technology applications, and they take actions to prevent or mitigate these risks.
CRP.K-12.CRP12.1	Career-ready individuals positively contribute to every team, whether formal or informal. They apply an awareness of cultural difference to avoid barriers to productive and positive interaction. They find ways to increase the engagement and contribution of all team members. They plan and facilitate effective team meetings.