Unit 4 Geometry

Content Area: **Mathematics**
Course(s): **Honors Pre-Algebra 7, CCSS Math 7**
Time Period: **March**
Length: **1 Marking Period**
Status: **Published**

Unit Overview

This unit will allow students to solve for area and perimeter of different 2D geometrical shapes. They will calculate the area of rectangles, parallelograms, triangles, trapezoids, circles, irregular figures, and shaded figures. They will also explore special pairs of angles and the relationships they hold. This unit will also introduce students to different properties of 3D figures. They will be able to compute the surface area of 3D figures, as well as their volume. The unit will also provide problems of how 3D figures are found in every day life.

Enduring Understandings

- Formulas can be determined and used to calculate the area of both regular and irregular shapes.
- 3D figures have unique characteristics and properties.
- Perimeter and area of 2D figures are useful when finding volume and surface area of 3D figures.

Essential Questions

- Can we determine is three side lengths would create a triangle?
- What is difference between area and perimeter?
- How are 3D figures different from 2D figures?
- What is a cross section of a figure and how will that help compute properties of the figure?
- How are surface area and volume found for a 3D figure?

Student Learning Objectives (SLOs)

- Calculate the area of rectangles, parallelograms, triangles and trapezoids.
- Calculate the circumference and area of different circles.
- Calculate the perimeter of different 2D geometrical figures
- Compute the surface are of different 3D figures.
- Determine whether a triangle is possible or not with given lengths.
- Discover special pairs of triangles and the relationships they yield.
- Induction to 3D solids and cross sections of these figures

- Use previous knowledge of area formulates to calculate the area of irregular and shaded figures.
- Use the given formulas to compute the volume of different 3D figures.

Standards/Indicators

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.
MA.8.G	Geometry
MA.8.G.A	Understand congruence and similarity using physical models, transparencies, or geometry software.
MA.7.G	Geometry
MA.8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations:
MA.7.G.A	Draw, construct, and describe geometrical figures and describe the relationships between them.
MA.8.G.A.1a	Lines are transformed to lines, and line segments to line segments of the same length.
MA.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.
MA.8.G.A.1b	Angles are transformed to angles of the same measure.
MA.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.
MA.8.G.A.1c	Parallel lines are transformed to parallel lines.
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.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.8.G.A.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
MA.7.G.B	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
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.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.C	Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.
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.

Lesson Titles

- 3-D Figures
- Angles and Line Relationships
- Area of Circles
- Area of Composite Figures
- Area of Parallelograms, Triangles, and Trapezoids
- Circles and Circumference
- Congruent Triangles
- Polygons
- Quadrilaterals
- Similar Solids
- Surface Area of Prisms
- Triangles
- Volume of Cylinders
- Volume of Prisms
- Volume of Pyramids and Cones

Career Readiness, Life Literacies & Key Skills

WRK.K-12.P.1	Act as a responsible and contributing community members and employee.
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.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
WRK.K-12.P.9	Work productively in teams while using cultural/global competence.

Inter-Disciplinary Connections

- Art - Graphing

- History - Current Events
- History - Math History
- LAL - Key Terms
- LAL - Vocabulary
- LAL - Word Wall
- Note Taking
- Sci - Making Predictions
- Tech -Web

LA.RL.7.4	Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama.
SCI.7-8.5.1.8.B.2	Gather, evaluate, and represent evidence using scientific tools, technologies, and computational strategies.
SCI.7-8.5.1.8.B.b	Mathematics and technology are used to gather, analyze, and communicate results.
SCI.7-8.5.1.8.B.c	Carefully collected evidence is used to construct and defend arguments.
SCI.7-8.5.1.8.D.1	Engage in multiple forms of discussion in order to process, make sense of, and learn from others' ideas, observations, and experiences.

Anticipatory Set

- Current Events
- Display
- Mathematics History
- Relate to prior knowledge
- Videos

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK

- Apply and justify the formulas for area with a partner.
- Blooms # 6 Evaluation - Make and defend judgements based on internal evidence or external criteria
- Blooms #1 Knowledge - Remember Previously learned information.
- Blooms #2 Comprehension - Demonstrate an understanding of facts.
- Blooms #3- Application - Apply knowledge to actual situations
- Blooms #4 Analysis - Break down objects or ideas into simpler parts and find evidence to support generalizations.
- Blooms #5 Synthesis - Compile component ideas into a new whole or propose alternative solutions.
- Complete worksheets on area and perimeter
- Examples of area and perimeter of trapezoids, triangles, rectangles, parallelograms.
- Graphing ordered pairs on a coordinate plane.
- Introduction, notes and examples on area and perimeter

- Introduction, notes, examples on finding the area of pointed figures (Cones and Pyramids).
- Introduction, notes, examples on finding the volume of a cube, rectangular prism, and triangular prisms.
- Introduction, notes, examples on Surface Area of a 3D figure
- Note cards on formulas for area and perimeter
- Notes and examples of area of irregular figures
- Notes and examples on finding the shaded area of a figure
- Review homework - student work on board
- Students will work as a group or with a partner.
- Students will work independently.
- Tutoring during Academic Enrichment
- Worksheet on special pairs of triangles
- Worksheets with a partner on finding the area of irregular figures
- Worksheets with a partner on finding the shaded are of figure.

Modifications

ELL Modifications

Content specific vocabulary important for ELL students to understand include:

2-D Geometry

- Provide students pyramids and prisms with bases that are either a pentagon, hexagon, heptagon, octagon, nonagon, or decagon
- Discuss how to find the area of irregular figures that consist of circles or semi-circles
- Discuss how to find the two-dimensional figures formed by a diagonal slice of three-dimensional figure
- Investigate the angle relationships that are formed by two parallel lines and a transversal

3-D Geometry

- The volume of a solid represents how much substance a solid can hold. .
- Using a protractor will give you the specific number of degrees of a given angle. .
- These angles form a perfect "X" when put together. .

- Vertical angles are congruent to one another.

- Anticipate where needs will be
- Assign a peer to help keep student on task
- Break tests down in smaller increments
- Collaboration with ELL Teacher
- Graphic organizers
- Increase one-to-one time
- Modification plan
- Modifications & accommodations as listed in the student's IEP
- Modified or reduced assignments
- Position student near helping peer or have quick access to teacher
- Prioritize tasks
- Provide calculator to assist with calculations
- Provide graphic organizer for remembering angle relationships
- Provide guided notes and step-by-step instructions on solving equations
- Provide students with a formula sheet with one type of problem for each formula worked out for them already
- Provide worked out examples on classwork and homework that students can use as a guide when working independently
- Reduce length of assignment for different mode of delivery
- Strategy groups
- Teacher conferences
- Think in concrete terms and provide hands-on-tasks
- Tutoring during Academic Enrichment
- Use patterns that are easily discernible in function tables
- Working contract between you and student at risk

IEP & 504 Modifications

- Anticipate where needs will be
- Assign a peer to help keep student on task
- Break tests down in smaller increments
- Graphic organizer for remembering integer rules.

- Increase one-to-one time
- Modifications & accommodations as listed in the student's IEP
- Modified or reduced assignments
- Personal handout for remembering integer rules (can be taped to desk)
- Position student near helping peer or have quick access to teacher
- Prioritize tasks
- Provide a calculator to help with calculations
- Provide example list of rational and irrational numbers
- Provide guided notes and step-by-step instructions on solving equations
- Provide personal handout for integer rules
- Provide student with a formula sheet with one type of problem for each formula worked out for them already.
- Provide worked out examples on classwork and homework that students can use as a guide when working independently
- Reduce length of assignment for different mode of delivery
- Think in concrete terms and provide hands-on-tasks
- Tutoring during Academic Enrichment
- Working contract between you and student at risk

G & T Modifications

- Discuss how to find the area of irregular figures that consist of circles or semi-circles
- Discuss how to find the two dimensional figures formed by a diagonal slice of three-dimensional figure
- Investigate the angle relationships that are formed by two parallel lines and a transversal
- Provide students pyramids and prisms with bases that are either a pentagon, hexagon, heptagon, octagon, nonagon or decagon
- The volume of a solid represents how much substance a solid can hold
- These angles form a perfect "X" when put together
- Tutoring during Academic Enrichment
- Using a protractor will give you the specific number of degrees of a given angle
- Vertical angles are congruent to one another.

Formative Assessment

- Choral Responses
- Collaborative work
- Constructed Responses
- Crossmatics
- Exit Card - Order of Operations

- Guided Practice
- Hand Signals
- Independent Practice
- PARCC Questions - Area of Parallelograms, trapezoids, triangles and rectangles
- PARCC Questions - Areas of Circles
- PARCC Questions - circles and circumference
- PARCC Questions - Surface Area
- PARCC Questions - Volume of cones and pyramids
- PARCC Questions -Angle and line relationships
- PARCC Vocabulary
- Quiz - Angle and Line Relationships
- Quiz - Area of a circle
- Quiz - Area of Triangles, Trapezoids, Parallelograms, and Rectangles.
- Quiz - Circumference of a Circle
- Quiz - Surface area
- Quiz - volume of a rectangular prism
- Quiz - volume of pointed figures
- Rubrics
- Self Assessments
- Senteo Response
- Teacher Observation
- Think Pair Share
- Turn to your partner

Summative Assessment

- Marking Period Assessment
- Mid Chapter Test on Angle and Line Relationships, and Area of Rectangles, triangles, trapezoids and Paralellograms
- Mid Chapter Tests on 3D figures, cross sections and volume of rectangular prisms.
- Project
- Test on 2-D Geometery
- Test on 3-D Geometery
- Unit Tests

Bechmark Assessment

- MPA 1
- MPA 2

- MPA 3
- MPA 4
- Skills-based assessment- math practice

Alternative assessments:

- Performance tasks
- Presentations
- Problem-based assignments
- Project-based assignments

Resources & Materials

- Calculators
- Chromebooks
- PMI practice questions online
- Senteo Response Questions
- Smartboard

Technology

- Answer Garden
- Calculator
- Chromebooks
- GoGaurdian
- Google Classroom
- Kahoot
- Khan Academy - order of operations, integers, rational numbers
- PARCC Online Practice Assessment
- PMI - Senteo Response
- Quizlet - Volcabulary
- Smartboard

TECH.8.1.8.A.CS1	Understand and use technology systems.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
TECH.8.1.8.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.8.D.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.8.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.8.D.CS3	Exhibit leadership for digital citizenship.

TECH.8.1.8.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.