# Unit 5: Geometry
# Algebra Prep Honors

12 Class Meetings

*Revised May 2025*

## Essential Questions

- Why are geometry and geometric figures relevant and important?
- What are the major classifications and relationships of angles, polygons and solids?

## Enduring Understandings with Unit Goals

**EU 1:** Geometric shapes can be used to determine missing values and solve formulas.

- Evaluate two interesting lines to determine the angles that are created.
- Apply facts about supplementary, complementary, vertical, and adjacent angles to solve for an unknown angle.
- Apply radius, diameter, circumference, and area of a circle to determine the size of the circle.

**EU 2:** Two- and three- dimensional figures can be measured or drawn with given conditions.

- Create two-dimensional figures using rulers, protractors, and compasses.
- Analyze given conditions to construct a unique triangle, more than one triangle, or no triangle.
- Create two-dimensional figures from slicing three-dimensional figures.
- Apply surface area and volume to three-dimensional figures.

## Standards

**Common Core State Standards:**

- **7.G.A.2:** Draw (freehand, with ruler and protractor, and with technology) 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.

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## ISAAC Vision of the Graduate Competencies

**Competency 1:** Write effectively for a variety of purposes.
**Competency 2:** Speak to diverse audiences in an accountable manner.
**Competency 3:** Develop the behaviors needed to interact and contribute with others on a team.
**Competency 4:** Analyze and solve problems independently and collaboratively.
**Competency 5:** Be responsible, creative, and empathetic members of the community.

## Unit Content Overview

1. **Angle Relationships**
   - Identify values of angles in complementary relationships
   - Identify values of angles in supplementary relationships
   - Use vertical, complementary, and supplementary angle relationships to find missing angles
   - Solve for unknown angles using equations
   - **Vocabulary and Key Terms –** Obtuse, Acute, Right, Angles, Adjacent, Opposite, Hypotenuse, Altitude, Collinear, Complementary Angles, Supplementary Angles, Congruent, Cross Section, Dimensions, Intersect, Perpendicular, Protractor, Quadrilateral, Ray, Rhombus, Right Prism, Segment, Straight line, Surface Area, Trapezoid, Triangle, Vertical Angles, Volume, Approximation, Area, Centimeter, Cone, Coordinates, Cylinder, Diagonal, Distance, Endpoint, Feet, Inch, Kilometers, Line, Meter, Percent, Perimeter, Rotation, Yard

2. **Circles**
   - Identify measurements for radius, diameter, **π** and circumferenatce,
   - Draw circles
   - Label parts of a circle
   - Calculate circumference of a circle
   - Solve for area of a circle
   - Relate area to circumference
   - Solve word problems using the relationship between the circumference and diameter
   - Solve problems using the relationship between area and radius
   - Evaluate partial circle area and arc length
   - Evaluate images of a circle inscribed in another figure
   - **Vocabulary and Key Terms –** Altitude, Collinear, Cross Section, Dimensions, Perpendicular, Protractor, Quadrilateral, Ray, Rhombus, Right Prism, Segment, Straight line, Surface Area, Trapezoid, Triangle, Vertical Angles, Volume, Approximation, Area, Center of a circle, Centimeter, Circle, Circumference, Cone, Coordinates, Cylinder, Diagonal, Diameter, Distance, Endpoint, Feet, Inch, Kilometers, Line, Meter, Percent, Perimeter, Pi, Radius, Rotation, Yard

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**3. Polygons and Triangles**

- Draw two-dimensional geometric shapes using rulers, protractors, and compasses
- Solve problems using area of two-dimensional figures
- Evaluate side lengths using the Triangle Inequality Theorem
- Construct triangles
- **Vocabulary and Key Terms –** Obtuse, Acute, Right, Angles, Adjacent, Opposite, Hypotenuse, Altitude, Collinear, Complementary Angles, Supplementary Angles, Congruent, Cross Section, Dimensions, Intersect, Perpendicular, Protractor, Quadrilateral, Ray, Rhombus, Right Prism, Segment, Straight line, Surface Area, Trapezoid, Triangle, Vertical Angles, Volume, Approximation, Area, Center of a circle, Centimeter, Circle, Circumference, Cone, Coordinates, Cylinder, Diagonal, Diameter, Distance, Endpoint, Feet, Inch, Kilometers, Line, Meter, Percent, Perimeter, Pi, Radius, Rotation, Yard, Compass

**4. Three-Dimensional Figures**

- Slice geometric shapes
- Solve volume and surface area word problems
- **Vocabulary and Key Terms –** Obtuse, Acute, Right, Angles, Adjacent, Opposite, Hypotenuse, Altitude, Collinear, Complementary Angles, Supplementary Angles, Congruent, Cross Section, Dimensions, Intersect, Perpendicular, Protractor, Quadrilateral, Ray, Rhombus, Right Prism, Segment, Straight line, Surface Area, Trapezoid, Triangle, Vertical Angles, Volume, Approximation, Area, Center of a circle, Centimeter, Circle, Circumference, Cone, Coordinates, Cylinder, Diagonal, Diameter, Distance, Endpoint, Feet, Inch, Kilometers, Line, Meter, Percent, Perimeter, Pi, Radius, Rotation, Yard

**5. Formulas**

- Use the area of a circle
- Calculate the circumference of a circle
- Apply the Triangle Inequality Theorem
- Solve for complementary and supplementary angles
- Determine the surface area and volume of three-dimensional figures
- **Vocabulary and Key Terms –** Obtuse, Acute, Right, Angles, Adjacent, Opposite, Hypotenuse, Altitude, Collinear, Complementary Angles, Supplementary Angles, Congruent, Cross Section, Dimensions, Intersect, Perpendicular, Protractor, Quadrilateral, Ray, Rhombus, Right Prism, Segment, Straight line, Surface Area, Trapezoid, Triangle, Vertical Angles, Volume, Approximation, Area, Center of a circle, Centimeter, Circle, Circumference, Cone, Coordinates, Cylinder, Diagonal, Diameter, Distance, Endpoint, Feet, Inch, Kilometers, Line, Meter, Percent, Perimeter, Pi, Radius, Rotation, Yard

**Interdisciplinary Connection:**

- Language Arts – Word Problems
- Science – Word Problems

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## Daily Learning Objectives with *TWPS Activities*

**Students will be able to…**

- Solve for an unknown angle in a figure using supplementary, complementary, vertical, and adjacent angles.
    - *TWPS – SBAC Practice Questions*
- Determine complementary and supplementary angles that are not adjacent using angles measure
    - *TWPS – SBAC Practice Questions*
- Write and solve simple algebraic equations involving supplementary, complementary, vertical, and adjacent angles
    - *TWPS – SBAC Practice Questions*
- Apply the Triangle Inequality Theorem or the angle measures to determine a unique triangle or no triangle
    - *TWPS – SBAC Practice Questions*
- Construct a geometric shape given side lengths or side angles
    - *TWPS – SBAC Practice Questions*
- Compare and contrast the relationship between the circumference and area of a circle and calculate the area and circumference of a circle to solve problems.
    - *TWPS – SBAC Practice Questions*
- Evaluate and discuss the slicing of three-dimensional shapes to the two-dimensional figure
    - *TWPS – SBAC Practice Questions*
- Apply the formulas for volume and surface area of three-dimensional figures
    - *TWPS – SBAC Practice Questions*
- Differentiate between volume and the surface area to solve problem for three-dimensional figures
    - *TWPS – SBAC Practice Questions*
- Calculate and explain the area, volume, and surface area problems for two- and three-dimensional objects from real-world situations
    - *TWPS – SBAC Practice Questions*

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## Instructional Strategies/Differentiated Instruction

- TWPS
- Whole group instruction
- Guided notes
- Student-led instruction
- Small group instruction
- Independent problem-solving
- Collaborative problem-solving
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Manipulatives
- Homework
- Highlighted words
- Fill in the blanks
- Access to multiplication chart
- Access to calculator
- Color coded notes
- Pre-teaching/Reteaching

**EL DIFFERENTIATED INSTRUCTION:**

- Word Walls with visuals
- TWPS (Think, Write, Pair, Share)
- Pre-reading strategies
- Culturally responsive teaching
- Explicit Modeling
- Key Vocabulary
- Graphic Organizers
- Strategic Grouping
- Non-verbal Assessments

## Assessments

**FORMATIVE ASSESSMENTS:**

- Warm-ups (SBAC)
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Accountable Talk Discussions
- Do Now
- Student-led instruction
- Homework
- Performance Task - Yum Yum Cereal
    - Summative Performance Task Assessment Rubric

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**SUMMATIVE ASSESSMENTS:**

- Pear Assessment Quiz 1 - EU 1
- Unit 5 Test – EU 1 & 2
- Performance Task - Yum Yum Cereal

## Unit Task

**Unit Task Name:** Yum Yum Cereal Performance Task

**Description:** Students will use information learned from this unit about how different angles can be used to write and solve simple equations of unknown angles, how to apply radius, diameter, area and circumference for a circle (EU 1), how to construct two-dimensional figures, and how to solve for surface area and volume of three-dimensional figures (EU 2) in order to design a cereal box that is space saving. Students will be asked to write and solve a series of problems as well as review and apply the geometric formulas and concepts learned in this unit.

**Evaluation**: Summative Performance Task Assessment Rubric

## Unit Resources

- Angle Problems
- Worksheets
- Calculator
- Laptops
- SBAC Prep Online
- Pear Assessment
- Blooket
- Individual Whiteboards
- 2 Truths & One Lie
- State Common Core Standards Transition Tasks