

Unit 4: SBAC Success

Algebra 1

17 Class Meetings

Revised March 2026

Essential Questions

- How can we use the Pythagorean Theorem to solve problems?
- How do translations, reflections, rotations, and dilations relate to each other?
- How are the volumes of cylinders, cones, and spheres related?

Enduring Understandings with Unit Goals

EU 1: The Pythagorean Theorem can be used to solve problems about a right triangle.

- Determine the missing side of a right triangle using the Pythagorean Theorem
- Decide if a triangle is a right triangle by using the Pythagorean Theorem
- Calculate the distance between two points in the coordinate plane by using the Pythagorean Theorem

EU 2: Shapes can change shape position on the coordinate plane

- Transform shapes on the coordinate plane using translations, reflections, rotations, and dilations
- Identify a series of transformations that have occurred in the coordinate plane

EU 3: Lines, angles, and shapes have certain relationships

- Find interior and exterior angles of a triangle
- Identify and find angles formed when parallel lines are cut by a transversal.

EU 4: Volume can be measured in various shapes including cylinders, cones, and spheres.

- Use the formulas to calculate the volume of a cylinder, cone, and sphere.

Standards

Common Core State Standards:

- **8.G.B.6:** Explain a proof of the Pythagorean Theorem and its converse.
- **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.
- **8.G.B.8:** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.
- **8.G.A.1:** Verify experimentally the properties of rotations, reflections, and translations
- **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.
- **8.G.A.3:** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- **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.

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- **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.
- **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.

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. The Pythagorean Theorem

- Identify the sides of a right triangle
- Find the length of the hypotenuse using the Pythagorean Theorem.
- Find the length of a missing leg using the Pythagorean Theorem.
- Use the distance formula to find the distance between two points.
- Vocabulary: 90-degree angle, leg, hypotenuse, square-root, radicand, rounding, distance, axes, point, grid, coordinate plane, right triangle, base

2. Using Transformations on the Coordinate Plane

- Translate a shape on the coordinate plane
- Reflect a shape on the coordinate plane over the x- and y-axis.
- Rotate a shape on the coordinate plane
- Dilate a shape on the coordinate plane
- Vocabulary: ordered pair, coordinate plane, axes, translate, reflect, rotate, dilate, grid

3. Determine angles of triangles and parallel lines

- Find measures of interior and exterior angles of triangles
- Identify and find types of angles created when parallel lines are cut by a transversal
- Vocabulary: triangle, complementary angle, supplementary angle, interior angle, exterior angle, side, angle measure, degree, parallel lines, alternate-interior angle, alternate-exterior angle, vertical angles, line, transversal

4. Using formulas to find the volume of cylinders, cones, and spheres.

- Find the volume of a cylinder, cone, and sphere.
- Vocabulary: diameter, radius, pi, area, circle, denominator, exponent, formula, improper fraction, integer, irrational number, mixed number, number line, numerator, perimeter, rational number, rectangle, whole number, volume, decimal

Interdisciplinary Connection:

- Language Arts - Word Problems, CER, and TWPS

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Daily Learning Objectives with TWPS

Students will be able to...

- Solve for a missing side of a right triangle and determine if a triangle is right
 - TWPS – Solve for the hypotenuse of the right triangle and explain how you got your answer.
- Apply the Pythagorean Theorem to real-world scenarios to solve various problems
 - TWPS – Write a word problem using right triangles.
- Calculate the distance between two points in the coordinate plane using the Pythagorean Theorem and the distance formula
 - TWPS – How could Jeremy determine the direct distance between his house and the market?
- Translate a shape in the coordinate plane
 - TWPS – How can you tell whether to add or subtract values in an algebraic representation?
- Reflect a shape over a line of reflection in the coordinate plane
 - TWPS – Where do you see reflections in the real world. How can you tell?
- Rotate a shape about the origin in the coordinate plane
 - TWPS – What is different between rotations, reflections, and translations?
- Dilate a shape in the coordinate plane given the scale factor
 - TWPS – Are the ratios of corresponding sides of dilated figures the same as the ratio of their areas? Explain.
- Identify and describe a series of transformations that occurred to a shape in the coordinate plane
 - TWPS – In which order did the following transformations occur? Does the order matter? Explain.
- Find the measures of interior and exterior angles in a triangle
 - TWPS – Describe how you can determine the missing angle in the triangle below. Explain your work.
- Identify and find measures of angles formed by parallel lines being cut by a transversal**
 - TWPS – What is the error in the student's work when determining the measures of the angles below?
 - TWPS – How are corresponding angles related to vertical angles?
- Find the volume of a cylinder and a cone and determine missing measurements if given the volume
 - TWPS – Where do you see cylinders in your own life? How is the formula for a cone similar to that of a cylinder?
- Find the volume of a sphere and determine missing measurements if given the volume
 - TWPS – How could you determine the radius of the sphere if you are given the volume? How is this different from finding the radius of a cylinder?

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Instructional Strategies/Differentiated Instruction

- Whole-Group Instruction
- Creating Authentic Connections for Students
- Rephrasing and Restatement of Information and Concepts
- Guided Notes
- Interactive Notebooks
- Spiral Review
- Math Stations (Rotations)
- Student-Led Instruction
- Small Group Instruction
- Independent Problem-Solving
- Collaborative Problem-Solving
- Cross-Curricular Problem Solving (independent and collaborative)
- Accountable Talk
- Manipulatives
- Cumulative Homework

EL DIFFERENTIATED INSTRUCTION:

- Word Walls with Visuals
- Anchor Charts
- 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:

- Whiteboards
- Mid-Class Check-Ins
- Exit Slips
- Student-Led Instruction
- Homework
- Accountable Talk Discussions
- Daily Do Now: Spiral Review
- Daily Think-Write-Pair-Share (TWPS)
- Claim-Evidence Reasoning (CER)
- Performance Task – Baseball Tickets
 - Summative Performance Task Assessment Rubric

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SUMMATIVE ASSESSMENTS:

- Unit 10A Quiz – EU 1
- Unit 10B Quiz – EU 2
- Unit 10 Test – EU 1, EU 2, EU 3, and EU 4
- Performance Task – Baseball Tickets

Unit Task

Unit Task Name: Baseball Tickets

Description: In this IAB Performance Task, students are given a scenario involving season tickets and single tickets for three different locations to a baseball game. Students must write and solve a system of inequalities to determine which scenario is the best option for attendees. Based on attending a set number of games, students will write a formal recommendation explaining which ticket option is best for each of the three locations. Evaluation: Summative Performance Task Assessment Rubric

Evaluation: Summative Performance Task Assessment Rubric

Unit Resources

- Worksheets
- Calculator
- Laptops
- SBAC Prep Online
- Pear Assessment
- Blooket
- Quizizz
- Jeopardy Labs
- Task Cards
- Partner/Group Games
- Online Resources: Math Stations