

Unit 4 (Part 2): Transformations & Volume

Algebra Prep

8 Class Meetings

Created May 2022

Essential Questions

- 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: Shapes can change shape position on the coordinate plane.

- Transform shapes on the coordinate plane using translations, reflections, rotations, and dilations.

EU 2: Volume can be measured in various shapes including cylinders, cones, and spheres.

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

Standards

Common Core State Standards:

- **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.C.9:** Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

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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. 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

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

- Find the volume of a cylinder, cone, and sphere.
- Vocabulary: 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

Daily Learning Objectives with *Do Now Activities*

Students will be able to...

- Translate a shape on the coordinate plane
 - *Do Now – Plotting Points on the Coordinate Plane*
- Reflect a shape on the coordinate plane
 - *Do Now – Re-writing and solving an equation with fractions and decimals*
- Rotate a shape on the coordinate plane
 - *Do Now – Combining like terms (revisited)*
- Dilate a shape on the coordinate plane
 - *Do Now – Solving an equation with variables on both sides (revisited)*
- Find the volume of a cylinder, cone, and sphere
 - *Do Now - Writing and Evaluating an Algebraic Expression*

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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
- Student-led instruction
- Small group instruction
- Independent problem-solving
- Collaborative problem-solving
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Manipulatives
- Homework

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)
- ABCD Cards
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Student-led instruction
- Homework
- Accountable Talk Discussions
- Daily Do Now

SUMMATIVE ASSESSMENTS:

- EIAB – Geometry – EU 1, EU 2, EU 3
- Performance Task – Building a Playground

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Unit Task

Unit Task Name: Building a Playground

Description: Students were provided with a schematic for a proposed playground. Students needed to determine the perimeter, area and volume of various shapes on the playground. Students were provided with an amount of fencing. Students were tasked of finding if the provided fencing was enough to enclose the playground.

Evaluation: Summative Assessment and Problem-Solving Rubric

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Unit Resources

- Flipped Google Classroom Videos
- Worksheets
- Calculator
- Laptops
- SBAC Prep Online
- Edulastic
- Kahn Academy
- Match Fishtank
- Map.Mathshell.org
- Online resources