Unit 5: Geometry
6th Grade Honors Mathematics

11 Class Meetings

Revised May 2024

Essential Questions

- How can you find the area of a polygon by decomposing (deconstructing) it into other shapes?
- How can objects be represented and compared using geometric attributes?
- What strategies could you use to recognize the existence of, and visualize components of three-dimensional shapes that are not visible from a given viewpoint?

Enduring Understandings with Unit Goals

EU 1: The area of polygons can be found by decomposing the polygon into familiar shapes or by building around the polygon and subtracting the extra area.

- Find area of polygons by composing and decomposing into other shapes such as triangles and parallelograms.

EU 2: Coordinates can be used to draw polygons on the coordinate plane and to find the length of the sides of those polygons.

- Solve problems by drawing polygons on the coordinate plane using the coordinates as vertices.

EU 3: The volume of any rectangular prism can be found by multiplying the length, width, and height.

- Use the formula to find the volume of rectangular prisms and triangular prisms, and a missing side.

EU 4: A three-dimensional figure can be represented by two-dimensional nets, which can help determine the surface area of three-dimensional figures.

- Create nets to represent three-dimensional figures to find surface area.

Standards

Common Core State Standards:

- **6.G.A.1:** Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
- **6.G.A.2:** Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
- **6.G.A.3:** Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
- **6.G.A.4:** Represent three-dimensional figures using nets made up of rectangles and triangles, and

use the nets to find the surface area of these figures. Apply these techniques in the context of solving 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. **Area of Triangles, Quadrilaterals, and Polygons**
   - Calculate the area of parallelograms
   - Compute the area of triangles using base and height
   - Determine the area of polygons using composition and decomposition
   - Solve problems involving area of polygons
   - Vocabulary-right triangle, parallelogram, polygon, composition, decomposition, area, acute triangle, obtuse triangle, base, volume, height
2. **Polygons in the Coordinate Plane**
   - Draw polygons in the coordinate plane
   - Find area and perimeter of polygons on coordinate plane
   - Solve real-world problems involving distance, area, and perimeter of polygons
   - Vocabulary-polygon, area, perimeter, coordinate plane, unit cube
3. **Volume of Rectangular Prisms**
   - Find volume of rectangular prisms
   - Use the formulas to solve for volume
   - Find missing measurements
   - Find volume of figures with composite prisms
   - Vocabulary-prism, volume, base, height, length, width, base, face
4. **Nets and Surface Area**
   - Identify nets that match prisms and pyramids
   - Create nets and use them to find surface area of three-dimensional figures
   - Find the surface area of three-dimensional figures without nets
   - Find surface area and volume in real-world problems
   - Vocabulary-net, volume, area, surface area, pyramid, prism

Interdisciplinary Connection:

- Language Arts - Word Problems
- Science –
  - Unit 1: Earth and the Universe

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Daily Learning Objectives with *Do Now Activities*

Students will be able to…

- Compute the area of parallelograms.
  - *TWPS- Would you rather share equal slices of cake from pan A (15" x15")with 8 friends or share equal slices of cake from pan B (12" x 17") with 6 friends? Explain your mathematical reasoning.*
- Calculate the area of triangles using height and base.
  - *TWPS- Would you rather have a rectangular bedroom with a length of 20 ft and a perimeter of 58 ft or a length of 14 ft and a perimeter of 56ft? Explain your mathematical reasoning.*
- Construct and deconstruct polygons to find their area.
  - *TWPS- Which of the three statements below is a lie? Explain your mathematical thinking. Two Truths and a Lie book, GR6 #25*
- Solve real-world and mathematical problems involving area of polygons.
  - *TWPS- Which of the three statements below is a lie? Explain your mathematical thinking. Two Truths and a Lie book, GR6 #26*
- Create polygons in the coordinate plane and find area and perimeter
  - *TWPS- Which of the three statements below is a lie? Explain your mathematical thinking. Two Truths and a Lie book, GR6 #27*
- Calculate the volume of rectangular prisms with whole number and fractional edge lengths using unit and fractional unit cubes.
  - *TWPS- Would you rather have enough Cheez-Its to cover a rectangle with a length of 9in and a perimeter of 22in or a length of 5 in and a perimeter of 20in? Explain your mathematical reasoning.*
- Apply volume concepts to solve real-world and mathematical problems, including finding volume of figures with composite prisms.
  - *TWPS- SBAC practice: This solid was created by joining two right rectangular prisms. Enter the volume of the solid, in cubic millimeters.*
- Describe features of, identify, and create nets that match prisms and pyramids.
  - *TWPS- Which of the three statements below is a lie? Explain your mathematical reasoning. Two Truths and a Lie book, GR6 #30*
- Calculate the surface area of three-dimensional figures with and without nets.
  - *TWPS- Which of the three statements below is a lie? Explain your mathematical reasoning. Two Truths and a Lie book, GR6 #28*
- Evaluate real-world problems to find surface area and volume.
  - *TWPS- SBAC practice: Alecia builds a box in the shape of a cube with an open top. She plans on painting the box. Alecia calculates that there are 256 square inches to be painted. Which condition will make Alecia's calculation correct?*

Instructional Strategies/Differentiated Instruction

- Whole group instruction
- Guided notes
- Student-led instruction/discussions
- Independent problem-solving
- Collaborative problem-solving

- Graphic Organizer
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Homework
- Word walls with visuals
- Small group instruction
- Manipulatives
- Interactive Notebook
- Highlighted directions

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
- Modified classwork and homework

Assessments

FORMATIVE ASSESSMENTS:

- Warm-ups
- TWPS
- Whiteboards
- Mid-class check-ins (Fist of 5; Thumbs up/mid/down)
- Exit Slips
- Accountable Talk Discussions
- Student-led instruction
- Classwork
- Homework

SUMMATIVE ASSESSMENTS:

- Quiz - EU 1 and EU 2 (Edulastic)
- Quiz – EU 3(Edulastic)
- Performance Task – Painting the Room- Isaac Rubric (#4- Problem Solving)
- Edulastic Unit 5 Summative Assessment

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Unit Task

Unit Task Name: Painting the Room

Description: This task is designed to help students visualize 3-dimensional figures by drawing and analyzing their corresponding nets. Surface area can then be found by adding areas of the individual parts of the net (EU4). A hands on manipulative is used to help students "see" how the net is formed. Students will find the volume of each net (EU3). Then students are asked to visualize the net of a 3-dimensional object. Students should also know how to find the area of common 2-dimensional figures such as squares, rectangles, and triangles (EU1). Students need to be able to multiply decimals and Fractions (Unit 2-Rational Numbers)

Evaluation: Summative Assessment and Teamwork Rubric

Unit Resources

- Engageny
- Math in Focus
- Math Antics
- Edulastic
- Match Fishtank
- Khan Academy
- Dan Meyers 3 Act Tasks
- www.map.mathshell.org
- Worksheets
- Calculator
- Laptops
- SBAC Prep Online
- Two Truths and One Lie