Unit 1: Foundations of Geometry
Honor's Geometry
10 Meetings
Revised May 2023

Essential Questions

- How can you represent a three-dimensional figure with a two-dimensional drawing?
- How can you find the lengths and midpoints of segments and the measures of angles?

Enduring Understandings with Unit Goals

EU 1: Three-dimensional objects can be represented with a two-dimensional figure using special drawings.
- Represent three-dimensional objects with various two-dimensional drawings.

EU 2: Number operations can be used to find and compare the lengths of segments and measures of angles.
- Write equations to calculate and compare measures of segments and angles.

EU 3: Special angle pairs can be used to identify geometric relationships and to find angle measures.
- Identify relationships using special angle pairs.

EU 4: Formulas can be used to find information about a figure.
- Utilize formulas to calculate midpoints and distance.
- Find the perimeter and area of basic shapes.

Standards

Common Core State Standards:

- **HSG.CO.A.1:** Know precise definitions of angle, and line segment, based on the undefined notions of point, line, and distance along a line.
- **HSG.GPE.B.6:** Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
- **HSG.GPE.B.4:** Use coordinates to prove simple geometric theorems algebraically.
- **HSG.GPE.B.7:** Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
- **HSN.Q.A.1:** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

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.

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Unit Content Overview

1. **Nets and Drawings for Visualizing Geometry**
   - Nets
   - Isometric Drawings
   - Orthographic Drawings
   - Cube Activity

2. **Points, Lines, and Planes**
   - Naming Points, Lines, and Planes
   - Naming Segments and Rays
   - Finding the Intersection of Two Planes

3. **Measuring Segments**
   - Solving Equations warm-up
   - Measuring Segment Lengths
   - Using the Segment Addition Postulate
   - Comparing Segment Lengths
   - Using the Midpoint

4. **Measuring Angles**
   - Naming Angles and Types of Angles
   - Measuring and Classifying Angles
   - Angle Addition Postulate

5. **Exploring Angle Pairs**
   - Identifying types of Angle Pairs
   - Finding Missing Angle Measures (Linear Pair Postulate)
   - Using an Angle Bisector to Find Angle Measure

6. **Midpoint and Distance in the Coordinate Plane**
   - Finding the Midpoint
   - Finding an Endpoint
   - Finding Distance

7. **Perimeter, Circumference, and Area**
   - Finding the Perimeter and Area of a Rectangle
   - Finding Circumference and Area of a Circle
   - Finding Perimeter in the Coordinate Plane
   - Finding Area of an Irregular Shape

<u>Interdisciplinary Connection:</u>
- Language Arts - Word Problems
- Science – Word Problems

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Daily Learning Objectives with *TWPS Activities*

Students will be able to…

- Identify nets and drawings of three-dimensional figures.
  - *TWPS – How does a net relate to its 3D shape?*
- Explain how to name and describe points, lines, and planes.
  - *TWPS – Describe and explain the differences between points, lines, and planes.*
- Assess and compare lengths of segments.
  - *TWPS – Which of the three statements about the diagram is a lie? Explain.*
- Calculate and compare the measures of angles.
  - *TWPS – What is the difference between a point on the angle bisector and a point on the interior of the angle?*
- Explain special angle pairs and use their relationships to find angle measures.
  - *TWPS – What is the difference between supplementary angles and a linear pair?*
- Identify the midpoint of a segment.
  - *TWPS – Find the error in the student's work.*
- Solve for the distance between two points in the coordinate plane.
  - *TWPS – How is calculating distance in the coordinate plane related to using the Pythagorean Theorem?*
- Find the perimeter or circumference of basic shapes.
  - *TWPS - How are circumference and perimeter similar? How are they different?*
- Calculate the area of basic shapes.
  - *TWPS – Find the error in the student's work.*

Instructional Strategies/Differentiated Instruction

- Whole-group instruction
- Creating authentic connections for students
- Rephrasing and restatement of information and concepts
- Guided notes
- Student-led instruction
- Independent problem-solving
- Collaborative problem-solving
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Manipulatives
- Cumulative Homework
- Visuals to support instruction
- Small group instruction
- Pre-teaching and reteaching

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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:

- Accountable Talk Discussions
- Daily Think-Write-Pair Share (TWPS)
- Daily Do Now
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Cumulative Homework
- Performance Task – Colored Flags
    - Problem Solving Rubric

SUMMATIVE ASSESSMENTS:

- Edulastic Quiz – EU 1, EU 2
- Unit 1 Test
- Performance Task – Colored Flags

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Unit Task

Unit Task Name: Colored Flags

Description: Students will use information learned in this unit about how three-dimensional objects can be represented with a two-dimensional figure using special drawings (EU 1), how number operations can be used to find and compare the lengths of segments and measures of angles (EU 2), how special angle pairs can be used to identify geometric relationships and to find angle measures (EU 3), how formulas can be used to find the midpoint, length of any segment in the coordinate plane, perimeter, and area (EU 4), in order to determine how much fabric is needed to replicate a flag. Students will be given a picture and description of a flag with measurements. They will be asked to calculate perimeters and areas of different parts of the flag and finally, asked to determine how much fabric of each color will be needed in order to create the flag again. Students will defend their responses in well-developed paragraphs accompanied by equations and solutions they used to find their answers.

Evaluation: Problem Solving Rubric

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Unit Resources
● Worksheets ● Calculator ● Laptops ● SBAC Prep Online ● Edulastic ● Kahn Academy ● Gimkit ● Quizizz ● Individual Whiteboards ● 2 Truths & One Lie ● State Common Core Standards Transition Tasks ● Online resources