

## Unit 3: Transformations and Triangles

### Geometry

10 Class Meetings

Revised May 2023

#### Essential Questions

- How can you change a figure's position without changing its size and shape?
- How do you use and apply properties of triangles to solve problems?

#### Enduring Understandings with Unit Goals

**EU 1:** Figures in a coordinate plane can be mapped onto each other using a translation, reflection, or rotation.

- Transform figures from pre images to images in a coordinate plane.

**EU 2:** There are special properties that can be applied to triangles.

- Apply the Triangle Sum Theorem and Exterior Angle Theorem.
- Solve triangles using properties of mid-segments and angle bisectors.

#### Standards

##### Common Core State Standards:

- **HSG.CO.A.2:** Represent transformations in the plane.
- **HSG.CO.A.4:** Develop definitions of rotations, reflections, and translations.
- **HSG.CO.A.5:** Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure.
- **HSG.CO.B.6:** Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.
- **HSG.CO.C.10:** Prove theorems about triangles.
- **HSG.MG.A.3:** Apply geometric methods to solve design problems.
- **HSG.CO.C.9:** Prove theorems about lines and angles.

#### 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. Translations

- Identifying a Rigid Motion
- Naming Images and Corresponding Parts
- Finding the Image of a Translation
- Writing a Rule to Describe a Translation

##### 2. Reflections

- Graphing a Reflection Image
- Writing a Reflection Rule

##### 3. Rotations

- Graphing a Rotation Image
- Using Properties of Rotations (Rules)

##### 4. Triangles

- Using the Triangle-Sum Theorem
- Using the Triangle Exterior Angle Theorem

##### 5. Isosceles and Equilateral Triangles

- Isosceles Triangle Theorem
- Converse of Isosceles Triangle Theorem
- Equilateral Triangle Theorem
- Finding Angle Measures of Isosceles and Equilateral Triangles

##### 6. Mid-segments of Triangles

- Using Triangle Mid-segment Theorem

##### 7. Perpendicular and Angle Bisectors

- Using the Perpendicular Bisector Theorem (and converse)
- Using the Angle Bisector Theorem (and converse)

##### Interdisciplinary Connection:

- Language Arts - Word Problems
- Science – Word Problems

#### Daily Learning Objectives with *TWPS Activities*

##### Students will be able to...

- Graph and write rules for translation images of figures
- Create and write rules for reflection images of figures
  - *Where do you see reflections in your everyday life? (iPad picture)*
- Create and identify rotation images of figures
- Calculate measures of angles in triangles using Triangle-Sum Theorem
- Use and apply properties of isosceles and equilateral triangles

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- Solve problems using properties of mid-segments
- Solve problems using properties of perpendicular bisectors and angle bisectors

### Instructional Strategies/Differentiated Instruction

- **HLP:** Academically Productive Talk
- **HLP:** Writing to Learn (TWPS)
- **HLP:** Effective Feedback
- 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

#### 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

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- Cumulative Homework
- Performance Task – Company Logo
  - Problem Solving Rubric

#### **SUMMATIVE ASSESSMENTS:**

- Edulastic Quiz – EU 1
- Unit 3 Test – EU 1, EU 2
- Performance Task – Company Logo

### Unit Task

**Unit Task Name:** Company Logo

**Description:** Students will use information learned in this unit about how figures in a coordinate plane can be mapped onto each other using a translation, reflection, or rotation (EU 1) and how there are special properties that can be applied to triangles (EU 2) in order to create a company logo that follows specific instructions. Students will need to explain the transformation rules that they used in order to create the logo. They will write a well-developed paragraph about how they created the logo using transformations.

**Evaluation:** Problem Solving Rubric

### 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