Algebra 2 Level A Unit 7

Marking Period	Unit Title	Recommended Instructional Days
2	Transformations	10-12 days

Domain: Geometry

NJSLS Strand:

Key:

Major Cluster
Supporting Cluster
Additional Cluster

G.CO.A.2: Represent transformations in the plane using transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

G.CO.A.3: Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

Progress Indicator:
Tests ● Quizzes ● Practice problems for homework ● Online textbook ● Worksheets ● Leveled assessments

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Questions:
How are the properties of reflection used to transform a figure?
What are the properties of a translation?
What are the properties that identify a rotation?
How can rigid motions be classified?
How does dilation affect the side lengths and angle measures of a figure?

Activity Description:
Reflection, Translation, and Rotation
Dilation around origin and not around origin
Center of Dilation
Scale Factor

Interdisciplinary Connections:Career Readiness, Life Literacies and Key Skills Content: Design. NJSLS#: G.CO.A.2, G.CO.A.4, G.CO.A.5, G.CO.B.6)
(Next Generation Science Standards ETS1-2)
Create an Animation
Starting with the pixels (points) of a simple geometric figure, you and your classmates will use translations and reflections to move the figure through a series of frames.

G.CO.A.4: Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

G.CO.A.5: Given a geometric figure and a rotation, reflections, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

G.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.

G.SRT.A.1: Verify experimentally the properties of dilations given by a center and a scale factor.

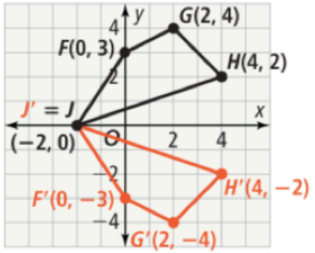
G.SRT.A1a: A dilation takes a line not passing

Example Tasks:

Task 1:

Quadrilateral $FGHJ$ has coordinates $F(0, 3)$, $G(2, 4)$, $H(4, 2)$, $J(-2, 0)$.

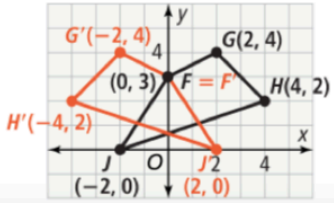
A. Graph and label $FGHJ$ and $R_{x\text{-axis}}(FGHJ)$. What is a general rule for reflecting a point across the x-axis?



The reflection of any point (x, y) across the x-axis is the point $(x, -y)$.

Quadrilateral $FGHJ$ has coordinates $F(0, 3)$, $G(2, 4)$, $H(4, 2)$, $J(-2, 0)$.

B. Graph and label $FGHJ$ and $R_{y\text{-axis}}(FGHJ)$. What is a general rule for reflecting a point across the y-axis?



The reflection of any point (x, y) across the y-axis is the point $(-x, y)$.

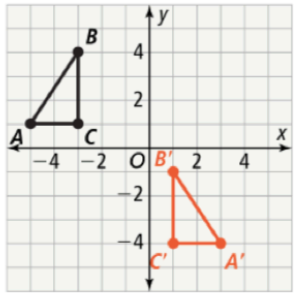
$R_{y\text{-axis}}(x, y) = (-x, y)$

Task 2:

through the center of the dilation to a parallel line, and leaves the line passing through the center unchanged.

G.SRT.A1b: The dilation of a line segment is longer or shorter in the ration given by the scale factor.

Is there a rigid motion that maps $\triangle ABC$ to $\triangle A'B'C'$?



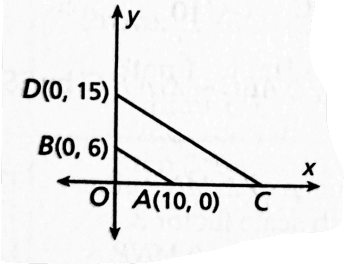
Observe that $m\angle A = m\angle A'$, $m\angle B = m\angle B'$, and $m\angle C = m\angle C'$.

Also, $AB = A'B'$, $AC = A'C'$, and $BC = B'C'$.

Length and angle measure are preserved, so the transformation is a rigid motion.

Task 3:

Given that $\triangle AOB \sim \triangle COD$, find the coordinates of C and the scale factor.



Answer:

$C(25, 0); \frac{5}{2}$

At the end of each topic please review the Assessment Practice and Performance Tasks questions.

ASSESSMENT PRACTICE

Which set of vertices describe a triangle that is a dilation with scale factor 3 of ABC with vertices at $A(12, 6)$, $B(-18, 24)$, $C(0, 12)$?

(A) $X(4, 2)$, $Y(-3, 4)$, $Z(0, 4)$

(B) $X(9, 3)$, $Y(-21, 21)$, $Z(-3, 9)$

(C) $X(15, 9)$, $Y(-15, 27)$, $Z(3, 15)$

(D) $X(36, 18)$, $Y(-54, 72)$, $Z(0, 36)$

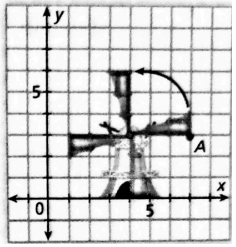
(E) $X(36, -18)$, $Y(54, 72)$, $Z(0, -24)$

Performance Task

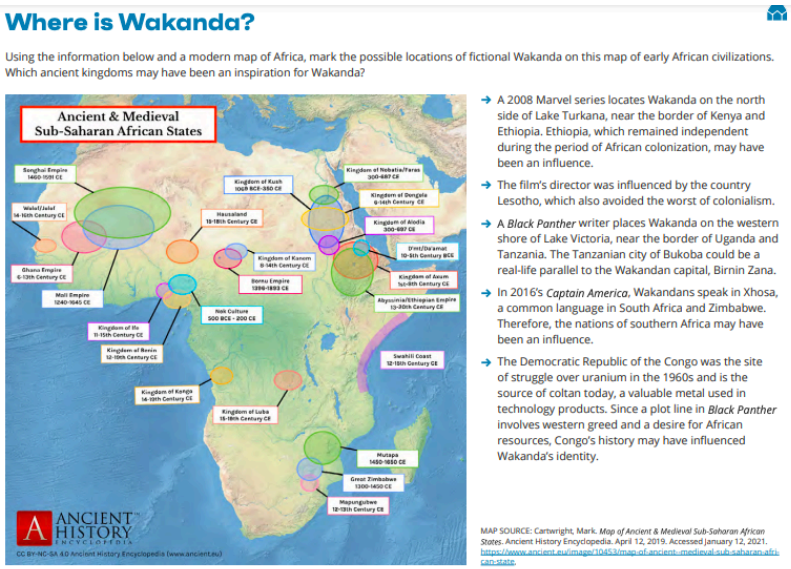
A miniature golf course includes a hole with a windmill. Players must hit the ball through the opening at the base of the windmill while the blades rotate.

a. The blades take 20 seconds to make a complete rotation. Through what angle do the blades rotate in 4 seconds? **72°**

b. Find the coordinates of point A after 4 seconds. (*Hint:* $(4, 3)$ is the center of rotation.) **$(4.9, 5.9)$**



Spot Light On:
Amistad Law



Mathematics Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reason of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***

Self- awareness Social Awareness Self- Management Relationship Skills Responsible Decision-Making	Recognizing the importance of self-confidence in handling daily tasks and challenges. Demonstrate an awareness of the expectations for social interactions in a variety of ways. Demonstrate an understanding of the need for mutual respect when viewpoints differ. Recognize the skills needed to establish and achieve personal and educational goals. Utilize positive communication and social skills to interact effectively with others. Develop, implement, and model effective problem solving and critical thinking skills.	

Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: ● Entry and Exit Slips ● Quizzes ● Self Assessments	**Benchmarks:** ● Chapter Tests ● Projects ● LinkIT! **Summative Assessments:** ● District Assessments ● Standardized Tests

Differentiated Student Access to Content:
Teaching and Learning *Resources/Materials*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**

• Savvas Envision • Achieve the core • Khan Academy • Desmos	• Skill building worksheets • Math Manipulatives	• Dictionary for native languages • Videos in their native language.	• Leveled Assessments • Enrichment worksheets

Supplemental Resources

Technology:
- **Chromebooks, Graphing Calculators, smartboards**

Other:
- **Zoom and Google Meets, Schoology, Interactive Textbook**

Differentiated Student Access to Content:
Recommended *Strategies & Techniques*

Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
• **Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat**	• **Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.**	• **Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.**	• **Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related**

	Disciplinary Concept: Creativity and Innovation

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	***Core Ideas:***	**With a growth mindset, failure is an important part of success**
	Performance Expectation/s:	**9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).**
	Career Readiness, Life Literacies, & Key Skills Practices	
	Act as a responsible and contributing community member and employee. **Attend to financial well-being.** **Consider the environmental, social and economic impacts of decisions.** **Demonstrate creativity and innovation.** **Utilize critical thinking to make sense of problems and persevere in solving them.** **Model integrity, ethical leadership and effective management.** **Plan education and career paths aligned to personal goals.** **Use technology to enhance productivity, increase collaboration and communicate effectively.** **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
X	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*