Marking Period	Unit Title	Recommended Instructional Days
3	**Transformational Geometry**	**24 - 29**

Domain

Strand:

8.G.A.1 Verify experimentally the properties of rotations, reflections, and translations:
a. Lines are transformed to lines, and line segments to line segments of the same length.
b. Angles are transformed to angles of the same measure.
c. Parallel lines are transformed to parallel lines.

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 A.4 Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

Key:

Major Cluster **Supporting Cluster** **Additional Cluster**

Progress Indicator: ◊ Tests ◊ Homework / Classwork ◊ Projects ◊ Formative assessments ◊ Summative assessments

Mathematical 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.

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

Essential Questions:

Module 9:

Where do you see the various transformations in the real-world?
How do you describe the properties of translation and their effect on the congruence and orientation of figures?
How do you describe the properties of reflection and their effect on the congruence and orientation of figures?
How do you describe the properties of rotation and their effect on the congruence and orientation of figures?
How can you describe the effect of a translation, rotation, reflection on coordinates using an algebraic representation?
What is the connection between transformations and figures that have the same shape and size?

Module 10:

How do you describe the properties of dilations?
How can you describe the effect of a dilation on coordinates using an algebraic representation?
What is the connection between transformations and the orientations of similar figures?
What are some key things to look for when trying to identify a transformation on a coordinate plane?
What is the difference between the orientation of a figure and the orientation of a figure's vertices?
Which transformations preserve congruence? Orientation?

Essential Understandings:

Module 9:

Two-dimensional figures can be changed by various transformations.
Translations, reflections, and rotations are transformations that preserve the size and shape of the preimage.

Module 10:

Transformations may change the figure's coordinates, orientation and/or size.
Transformations will change certain properties about a figure while preserving others.
If two figures are similar, then there exists a sequence of translations, reflections, rotations, and/or dilations that transforms one figure into the other.

Vocabulary:

- transformation

- preimage
- image
- translation
- reflection
- line of reflection
- rotation
- center of rotation
- congruent
- dilation
- center of dilation
- enlargement
- reduction
- scale factor
- similar

**Encourage students to practice using the unit vocabulary as they talk and write about mathematics. Understanding vocabulary will aid their understanding of the concepts.*

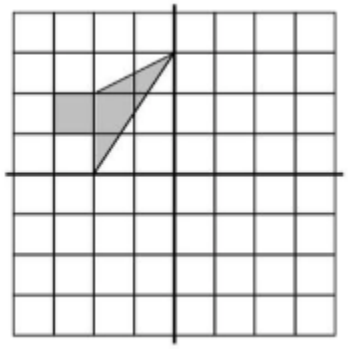
Suggested Activity Descriptions:

- Visit the TeacherTube website and search "Geometry Transformations Video" for a quick, simple video that introduces all 4 transformations through different real-world examples.
- GoMATH Activity 10.3 Copy-Cat (GoMATH TB pages 322A - 322B)
- GoMATH Unit 4 Review Project: TRANSFORMING THE WORLD

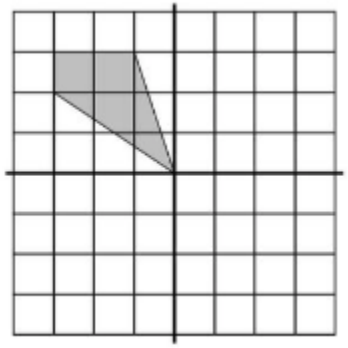
◊ Suggested Sample Tasks:
Activity Description: Aaron's Designs
Interdisciplinary Connections: Visual and Performing Arts

Aaron is drawing some designs for greetings cards. He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant. He then reflects, rotates or translates the shape into the other three quadrants.

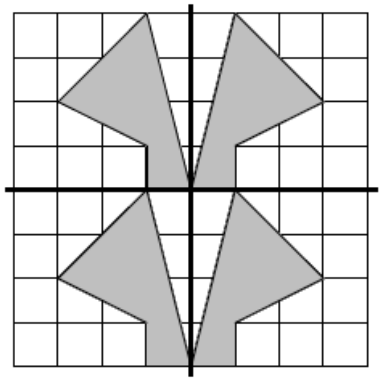
1. Finish Aaron's first design by reflecting the gray shape over the vertical line. Then reflect both of the shapes over the horizontal line. This will make a design in all four quadrants.



2. To finish drawing Aaron's second design, rotate the gray shape 1/4 of a turn in a clockwise direction about the origin. Then draw the second shape. Rotate the second shape 1/4 of a turn in a clockwise direction about the origin. Then draw the third shape. Rotate the third shape 1/4 of a turn in a clockwise direction about the origin. Then draw the fourth shape. This will make a design in all four quadrants.

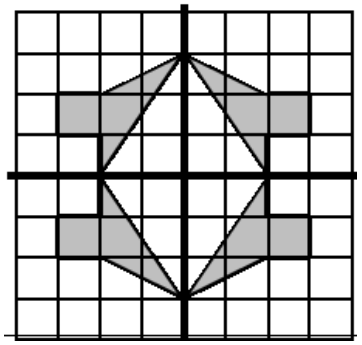


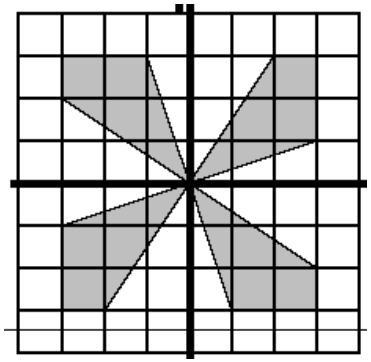
3. This is Aaron's third design. He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

KEY:

1) 

2) 

3) Reflect the shape over the vertical line. Then translate the 2 shapes down 4 squares.

Interdisciplinary Connections:
Science:
1. Have students discuss various ways they have seen shrinking and stretching in their daily lives. Remind them that they may have seen movies, cartoons, or other entertainment that used this basic principle, as well as read about it in books such as Gulliver's Travels. Ask them what models they have seen, such as toy cars, action figures, and dolls. Then show them a figure, such as a model car or doll (or have them bring one in), and ask them to calculate the scale compared to the real thing. For example, they can compare their own heights to that of the action figure, and measure other dimensions of the figure to see if they are realistic or exaggerated.
2. Ask them to make a conjecture whether the model could realistically exist as an actual person or car, given the dimensions of the toy, and what those measurements would be if enlarged.

Social Studies:
1. Throughout history, specific events, such as wars, tragedies, and decisions transformed our country. Different transformations have been used in art, architecture, crafts, and quilts throughout history.

Language Arts:
1. Vocabulary Preview Activity on GoMATH pg. 274
2. Reading Startup Activities on GoMATH pages 277 and 313.

Spot Light On: Tyler Kelly

Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***
SEL 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. • Identify and apply ways to persevere through alternative methods to achieve 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: • Teacher Observations • Exit Tickets • Quizzes • Self Assessments • Math Journals • Homework/Classwork • Teacher created assessments	**Benchmarks & Summative Assessments:** • Chapter/Unit Assessments • Standardized Tests • District Assessments • Project-based Assessments

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**
Go Math Workbook, IXL, Personal Math Trainer, Math on the Spot Videos, My HRW, Khan Academy, Illustrative Mathematics, Learn360, TeacherTube, BrainPOP, Freckle, LearnZillion, MobyMax, 60 minutes of weekly ST Math, Edulastic, Achieve the Core, Desmos	Reteaching worksheets, Skill building workbook, Math manipulatives, Leveled practice worksheets	Dictionary for native language, Video tutorial in native language, Success for English Learners worksheets, GoMATH Leveled Strategies for English Learners, GoMATH Linguistic Support	ST Math Challenge Objectives, G&T tasks, Enrichment worksheets, Art of Problem Solving, Leveled assessments, GoMATH Teaching for Depth, GoMATH Extend-the-Math Activity, Math Olympiad

Supplemental Resources			
Technology: • Chromebooks • Scientific/Graphing Calculators (upper grades only) • Online math manipulatives **Other:** • Google Classroom, Google Meets, Schoology, Interactive Workbooks • Illustrative Mathematics • insidemathematics.org • National Library of Virtual Manipulatives			
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.	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 content.

NJSLS CAREER	**Disciplinary Concept(s):** Creativity and Innovation	
	Core Ideas:	Gathering and evaluating knowledge and information from a variety of sources, including global perspectives, fosters creativity and innovative thinking.

READINESS, LIFE LITERACIES & KEY SKILLS	***Performance Expectation/s:***	9.4.8.CI.4: Explore the role of creativity and innovation in career pathways and industries.
	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)									
	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*	**X**	LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*	**X**	Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*