









Marking Period	Unit Title	Recommended Instructional Days
3 (Modules 11 and 12) and 4 (Module 13)	Measurement Geometry	28 - 33
Domain		
<p><i>Strand:</i></p> <p> 8.G.A.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.</p> <p> 8.G.B.6 Explain a proof of the Pythagorean Theorem and its converse.</p> <p> 8.G.B.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.</p> <p> 8.G.B.8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</p> <p> 8.G.C.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</p> <p>Key:</p> <p> Major Cluster  Supporting Cluster  Additional Cluster</p>		
<p><i>Progress Indicator:</i> ◇ Tests ◇ Homework / Classwork ◇ Projects ◇ Formative assessments ◇ Summative assessments</p>		
Mathematical Practices:		
<ol style="list-style-type: none"> 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 NJSL-CLKS within Unit

Essential Questions:

Module 11:

When might you see parallel lines cut by a transversal in real-life?

What can you conclude about the angles formed by parallel lines that are cut by a transversal?

What can you conclude about the measures of the angles of a triangle?

How can you determine when two triangles are similar?

How are the interior and exterior angles of a triangle related?

Module 12:

What are two different ways to determine which side in a right triangle is the hypotenuse?

How are the side lengths of right triangles related?

How can you prove the Pythagorean Theorem and use it to solve problems?

How can you visualize or draw a representation to explain the Pythagorean theorem?

How can you determine whether a triangle is a right triangle?

How can you test the converse of the Pythagorean Theorem and use it to solve problems?

How can you use the Pythagorean Theorem to find the distance between two points on a coordinate plane?

Module 13:

What is meant by the volume of a figure, and when might you need to calculate volume?

How do you find the volume of a cylinder?

How do you find the volume of a cone?

How are the volumes of cones and cylinders related?

What are the different variables in the formulas for volume of cones and cylinders, and what do they represent?

How do you find the volume of a sphere?

How is finding the volume of a sphere different from finding the volume of a cone or cylinder? How is it similar?

Essential Understandings:

Module 11:

Angles in parallel lines and transversals as well as triangles are related in such a way that missing angles can be found by setting up and solving equations. Angles in triangles can be used to problem solve and determine similarity in triangles.

Module 12:

The side lengths of all right triangles are related in such a way that the sum of the squares of the two shorter sides equals the square of the longest side. The Pythagorean theorem helps us find missing lengths of right triangles and can also be used to determine if a triangle is a right triangle.

Module 13:

Formulas can be used to find the volume of cones, cylinders and spheres, and calculating volume can help us solve both mathematical and real-world problems.

Vocabulary:

- transversal
- corresponding angles
- alternate interior angles
- alternate exterior angles
- same-side interior angles
- interior angle
- exterior angle
- remote interior angle
- similar figures
- similar
- legs
- hypotenuse
- cylinder
- cone
- sphere
- radius

**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:

- Use masking tape or duct tape to make a large diagram of parallel lines cut by a transversal on the floor. Then have pairs of students stand on the diagram to represent different angle relationships.
- Have students cut out a triangle from scratch paper. Then, students should tear one angle from the triangle off. They can then rearrange the

torn piece next to the other 2 angles to show that the sum of the interior angle in a triangle is 180° , or a straight line.

- Use an online triangle constructor (the MathWarehouse website offers one), to explore similar side lengths of triangles and the angles generated. For example, enter side lengths 3, 4 and 5 and observe the angle measures. Then, enter side lengths 6, 8 and 10, and the angles will be the same.
- Visit the Illuminations website and search “Pythagorean Review” for a visual proof of the Pythagorean Theorem. The tool allows you to change the side lengths of the triangles and observe how it changes the area of the connected squares. Great for visualizing the theorem.
- Consider bringing in a rectangular prism box (a shoebox would work well) and allow students to measure the length and width of the base. Then use the Pythagorean theorem to calculate the diagonal of a box. Lastly, use a string or tape measure to directly measure the diagonal of the box, thus showing the students that the theorem works.
- Take a cylinder and a cone with the same sized base and same height, and have students predict how many of the cones would fit inside the cylinder. Then, demonstrate by filling the cone with rice (or another substance) and pouring it into the cylinder three times.
- GoMATH Going Further 11.3 Similar Triangles and Slope (GoMATH TB pages 368A - 368B)
- GoMATH 12.2 Triple Concentration Game (GoMATH TB pages 386A - 386B)
- Unit 5 Review Project: THE WHEEL OF THEODORUS

◇ Suggested Sample Tasks:

Interdisciplinary Connections: Earth and Space Science

Content: Earth and Human Activity

Matchsticks are rectangular prisms of wood measuring approximately $\frac{1}{10}$ inch by $\frac{1}{10}$ inch by 2 inches. A tree trunk can be thought of as an approximate cone of wood. The volume of a cone is found using the formula $\frac{1}{3}\pi r^2 h$, where r feet is the radius of the base of the cone and h feet is the height of the cone.

How many matchsticks can be made from a tree with a trunk with a base radius of 1 foot and a height of 80 feet?

KEY:

7.2 million matchsticks

Interdisciplinary Connections:

Science:

1. A tree casts a shadow that is 20 feet long. Frank is 5 feet tall, and while standing next to the tree he casts a shadow that is 4 feet long. How long is the tree? How much taller is the tree than Frank?

Social Studies:

1. Main Street and Washington Avenue meet at a right angle. A large park begins at this corner. Joe’s school lies at the opposite corner of the park. Usually Joe walks 1.2 miles along Main Street and then 0.9 miles up Washington Avenue to get to school. Today he walked in a straight path across the park and returned home along the same path. What is the difference in distance between the two round trips? Explain.

Language Arts:

1. Vocabulary Preview Activity on GoMATH pg. 342
2. Reading Startup Activities on GoMATH pages 342, 373, and 397.

***Grade 8 Math/Science Connection**

Marking Period: 3

Science Module: L Math Module(s): 12

Topics that Overlaps: Waves and Pythagorean Theorem

Wave Performance Task

Science Aspects: Hand-On Lab: Model Specific Wave Properties (Unit 1 Lesson 1) Make observations and collect data about the energy and amplitude in mechanical waves and relate the data to the brightness of light.

Skills: Recording data, graphing, measurement, wave properties

Math Aspects: Using the results in your table from the Model Specific Wave Properties Hands-On Land, find the length of the hypotenuse of each triangle formed by using the wavelength and amplitude measures as the legs.

Skills: Finding a hypotenuse using Pythagorean Theorem.

Spot Light On: Katherine Johnson

Social and Emotional Learning: <i>Competencies</i>	Social and Emotional Learning: <i>Sub-Competencies</i>
<p>SEL Competencies:</p> <ul style="list-style-type: none"> • Self-Awareness • Social Awareness • Self-Management • Relationship Skills • Responsible Decision-Making 	<ul style="list-style-type: none"> • 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.

Grade 8 Mathematics
Unit 5: Measurement Geometry

September
2022

				•Develop, implement, and model effective problem solving and critical thinking skills.
Assessments (Formative) <i>To show evidence of meeting the standard/s, students will successfully engage within:</i>		Assessments (Summative) <i>To show evidence of meeting the standard/s, students will successfully complete:</i>		
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 <i>Resources/Materials</i>				
Core Resources	Alternate Core Resources <i>IEP/504/At-Risk/ESL</i>	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 <i>Strategies & Techniques</i>			
Core Resources	Alternate Core Resources <i>IEP/504/At-Risk/ESL</i>	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 READINESS, LIFE LITERACIES & KEY SKILLS	Disciplinary Concept(s): Critical Thinking and Problem Solving	
	Core Ideas:	Multiple solutions often exist to solve a problem.
	Performance Expectation/s:	9.4.8.CT.2: Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option.
	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.	

Grade 8 Mathematics
Unit 5: Measurement Geometry

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