Algebra 2 Level A Unit 5

Marking Period	Unit Title	Recommended Instructional Days
2	Pythagorean Theorem and Trigonometry	10-15 days

Domain: Geometry

NJSLS Strand:

Key:

Major Cluster
Supporting Cluster
Additional Cluster

G.SRT.B.4: Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

G.SRT.C.6: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G.SRT.C.7: Explain and use the relationship between the sine and cosine of complementary angles.

G.SRT.C.8: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. ⋆

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 similarity in right triangles and the Pythagorean Theorem related?
How do trigonometric ratios relate angle measures to side lengths of right triangles?
How can trigonometry be used to solve real-world and mathematical problems?

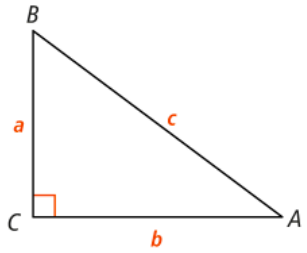
Activity Description:
Pythagorean Theorem and Applications
Trigonometric Functions
Trigonometric Ratios of Similar Triangles
Trigonometric Application Problems

Interdisciplinary Connections: Career Readiness, Life Literacies and Key Skills Content: Engineering; Construction. NJSLS#: G.SRT.C.6, G.SRT.C.7, G.SRT.D.11)
(Next Generation Science Standards ETS1-2)
Measure a Distance
Trigonometry is a powerful tool for measuring lengths and distances indirectly. You and your classmates will use trigonometry and indirect measurement to find the height of an object that is too tall to measure directly.

Example Tasks:

Task 1:

If $a = 9$, $b = 12$, and $c = 15$, what are sin A, cos A, and tan A?



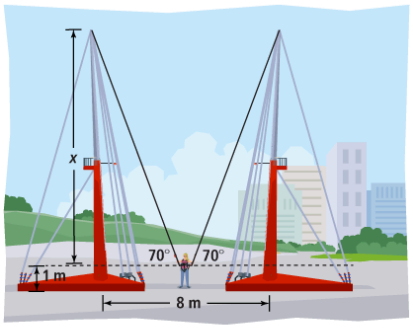
Use the definition of the trigonometric ratios.

$$\sin A = \frac{a}{c} \qquad \cos A = \frac{b}{c} \qquad \tan A = \frac{a}{b}$$

$$\sin A = \frac{3}{5} \qquad \cos A = \frac{4}{5} \qquad \tan A = \frac{3}{4}$$

Task 2:

For a reverse bungee ride, Reagan stands halfway between two vertical posts. Two bungee cords extend from the top of the posts to Reagan's waist at a height 1 m above the ground. How tall are the vertical posts?



Write an equation to determine x m, the vertical distance from the top of a post to a point 1 meter above the ground. The unknown length and the 4 m length are opposite and adjacent to a 70° angle. So use the tangent function.

$$\tan 70° = \frac{x}{4}$$

$$x = 4 \tan 70°$$

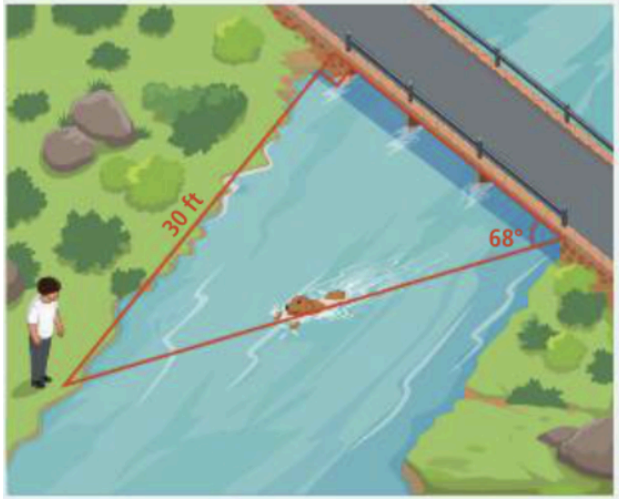
$$x \approx 10.9899$$

Find the height of the vertical posts.

$$11 + 1 = 12$$

The vertical posts are about 12 meters tall.

		At the end of each topic please review the Assessment Practice and Performance Tasks questions. **ASSESSMENT PRACTICE** **38.** Match each trigonometric ratio in the left column with its reciprocal expression in the right column. I. $\sin\theta$ II. $\sec\theta$ III. $\tan\theta$ IV. $\cos\theta$ V. $\csc\theta$ VI. $\cot\theta$ A. $\frac{1}{\cos\theta}$ B. $\frac{1}{\sin\theta}$ C. $\frac{1}{\cot\theta}$ D. $\frac{1}{\sec\theta}$ E. $\frac{1}{\tan\theta}$ F. $\frac{1}{\csc\theta}$

		Performance Task Simon's dog jumped into a stream at a 68° angle from the corner of a bridge. Simon crossed the bridge and walked downstream to meet the dog.  **Part A** How long is the bridge, in feet? about 12 ft **Part B** How many feet did the dog swim? about 32 ft **Spot Light on: Diversity and Inclusion** Essential Questions: What is respect and how can we, as an individual/community express respect for ourselves and others at home or in the classroom? Objective: Students will learn how to appreciate diversity, respect others and their differences and build relationships with mutual respect in school, at home and within the community. EOD artwork and quotes along with other educational sources, will be used.

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:***
<u>Formative Assessments:</u> ● Entry and Exit Slips ● Quizzes ● Self Assessments	**<u>Benchmarks:</u>** ● Chapter Tests ● Projects ● LinkIt! **<u>Summative Assessments:</u>** ● 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 Textbooks**

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**

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept: Creativity and Innovation**	
	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)									
	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*	X	Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*