

Curriculum Development Overview
Unit Planning for High School Mathematics

Unit Title	Trickster Trigonometry		Length of Unit	4 Weeks
Focusing Lens(es)	Relationships Modeling	Standards and Grade Level Expectations Addressed in this Unit	MA10-GR.HS-S.2-GLE.1 MA10-GR.HS-S.2-GLE.2 MA10-GR.HS-S.4-GLE.2	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> How does the periodicity in the unit circle correspond to the periodicity in graphs of models of periodic phenomena? (MA10-GR.HS-S.2-GLE.2-EO.c) Why can the same class of functions model diverse types of situations (e.g., sales, manufacturing, temperature, and amusement park rides)? 			
Unit Strands	Functions: Interpreting Functions Functions: Trigonometric Functions			
Concepts	unit circle, coordinate plane, trigonometric functions, angles, model, periodic phenomena			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
The unit circle in the coordinate plane represents the trigonometric functions for any angle. (MA10-GR.HS-S.2-GLE.1-EO.f.ii), (MA10-GR.HS-S.2-GLE.4-EO.d) and (MA10-GR.HS-S.4-GLE.2-EO.d)	<p>How is the circumference of a unit circle used to determine the radian measure of an angle?</p> <p>Given an angle, how is the unit circle used to determine each of the trigonometric functions?</p> <p>How are the relationships of right triangles used to determine the trigonometric functions of an angle?</p>	<p>How is the Pythagorean identity represented in the unit circle?</p> <p>How does the Pythagorean Identity illustrate the inverse nature of the relationship between sine and cosine?</p>
Trigonometric functions model periodic phenomena. (MA10-GR.HS-S.2-GLE.2-EO.c.i, iv)	<p>What situations would it be appropriate to model with trigonometric?</p> <p>How are period, midline and amplitude reflected in the equation of a trigonometric function?</p>	<p>Why would the parent trigonometric function change in period, midline and amplitude for a given situation?</p>

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Key Knowledge and Skills: My students will...	<i>What students will know and be able to do are so closely linked in the concept-based discipline of mathematics. Therefore, in the mathematics samples what students should know and do are combined.</i>
<ul style="list-style-type: none"> • Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle. (MA10-GR.HS-S.2-GLE.1-EO.f.i) • Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle. (MA10-GR.HS-S.2-GLE.1-EO.f.ii) • Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. (MA10-GR.HS-S.2-GLE.2-EO.c.i) • Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle. (MA10-GR.HS-S.2-GLE.4-EO.d) • Graph trigonometric functions expressed symbolically and show key features (e.g., period, midline, and amplitude) of the graph, by hand in simple cases and using technology for more complicated cases. (MA10-GR.HS-S.2-GLE.2-EO.c.iv) 	

<p>Critical Language: includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline. EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: <i>“Mark Twain exposes the hypocrisy of slavery through the use of satire.”</i></p>	
A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):	<i>I know the sine of an angle in the first two quadrants of the unit circle is always positive.</i>
Academic Vocabulary:	explain, prove, graph, key features, interpret, angles, model, counterclockwise, clockwise,
Technical Vocabulary:	unit circle, coordinate plane, trigonometric functions, periodic phenomena, radian measure, subtend, amplitude, frequency, midline, period, Pythagorean identity, sine, cosine, tangent, arc length, real numbers, quadrant