

Unit Plan by Prioritized Standards

Content Area	Math
Grade/Course	12/Pre-Calculus
Unit of Study	Unit 1 - Introduction to Trigonometric Functions
Duration of Unit	20 Days

Insert priority standards below (include code). **CIRCLE or Highlight** the **SKILLS** that students need to be able to do and **UNDERLINE** the **CONCEPTS** that students need to know. (address “supporting” standards in daily lesson plans)

MGSE9-12.F.IF.4 Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

MGSE9-12.F.TF.2 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.

MGSE9-12.F.TF.5 Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline. Prove and apply trigonometric identities.

Skills (what must be able to do)	Concepts (what students need to know)	DOK Level / Bloom's
Use	Tables, graphs and verbal descriptions	2
Interpret	Key characteristics of a function	1
Model	Relationships between two quantities	2
Sketch a graph	Showing key features including intercepts; intervals where function increases or decreases, positive or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.	2
Explain	How the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers	3
Interpret	Radian measures of angles traversed counterclockwise around the unit circle.	1
Model	Periodic phenomena with specified amplitude, frequency, and midline.	2
Prove and Apply	Trigonometric Identities	3

Step 5: Determine BIG Ideas (enduring understandings students will remember long after the unit of study)	Step 6: Write Essential Questions (these guide instruction and assessment for all tasks. The big ideas are answers to the essential questions)
An angle can be thought of as the rotation of a ray about its endpoint. Angles can be measured in degrees and in radians. Trigonometric functions are extended to the set of real numbers when we relate a real number to a point on the unit circle. Trigonometric functions can be used to model periodic phenomena.	How do I think of an angle as the rotation of a ray about its endpoint? What is meant by the radian measure of an angle? What is the connection between the radian measure of an angle and the length of the arc on the unit circle the angle intercepts? What does the unit circle have to do with trigonometric functions? How can we model a real-world situation with a trigonometric function? How are the amplitude, midline, period, and frequency of a trigonometric function related to the transformation of the parent graph?
Essential Unit Vocabulary	
An angle is in <u>standard position</u> when the vertex is at the origin and the initial side lies on the positive side of the x-axis. The ray that forms the <u>initial side</u> of the angle is rotated around the origin with the resulting ray being called the <u>terminal side</u> of the angle. An angle is <u>positive</u> when the location of the terminal side results from a counterclockwise rotation. An angle is <u>negative</u> when the location of the terminal side results from a clockwise rotation. Angles are called <u>coterminal</u> if they are in standard position and share the same terminal side regardless of the direction of rotation. The <u>reference number</u> t' associated with a real number t is the shortest distance along the unit circle between the terminal point determined by t and the x-axis. The reference number is always positive. The <u>unit circle</u> is a circle with a radius of 1 and center at the origin. If a central angle in a circle intercepts an arc equal to the length of the radius of the circle, the measure of the angle is <u>1 radian</u>. An <u>identity</u> is an equation that is true for all values of the variable for which the expressions in the equation are defined.	

A function is a **sinusoidal function** if its graph has the shape of $y = \sin(x)$ or a transformation of $y = \sin(x)$.

The **midline** of the graph of a sinusoidal function is a horizontal line located halfway between the maximum and minimum values.

The **amplitude** of the graph of a sinusoidal function is the distance from the midline to either the maximum or minimum value. The amplitude is $\frac{1}{2}$ the distance between the maximum and minimum values.

The **period** of a trigonometric function is the horizontal length of one complete cycle. It is the distance between any two repeating points on the function.

The **frequency** of a trigonometric function is the number of cycles the function completes in a given interval. The frequency is defined to be the reciprocal of the period.

Next step, create assessments and engaging learning experiences