

High School Functions Playlist: Choosing Trigonometric Functions to Model Periodic Phenomena

Aligns with *CCSS.MATH.CONTENT.HSF.TF.B.5*: Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

Related Standards

- *CCSS.MATH.CONTENT.HSF.BF.A.1*: Write a function that describes a relationship between two quantities.
- *CCSS.MATH.CONTENT.HSF.LE.A.2*: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
- *CCSS.MATH.CONTENT.HSF.TF.B.7*: Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.

PREVIEW



Objectives

In this module, you will learn and practice the following skills:

- Describing the characteristics of periodic functions
- Choosing periodic function characteristics to model phenomena

Let's get started!

Key Terms

- The **amplitude** of a periodic function is half the distance between the maximum and minimum values of the function. In the case of the function $y = A\sin(f\theta) + B$, the amplitude is A .
- The **frequency** of a periodic function is the number of complete cycles the function goes through over a horizontal interval of 2π radians. In the case of the function $y = A\sin(f\theta) + B$, the frequency is f since, when θ changes by 2π radians, the function goes through f complete cycles. The frequency is inversely related to the period T by the equation $f = \frac{2\pi}{T}$.
- The **midline** is the horizontal line that is located halfway between the maximum and minimum values of the periodic function. In the case of the function $y = A\sin(f\theta) + B$, the line $y = B$ is the midline.

Connections

- <https://openstaxcollege.org/textbooks/algebra-and-trigonometry>; section 8.1
- www.ck12.org/book/CK-12-Trigonometry-Second-Edition; section 2.5

