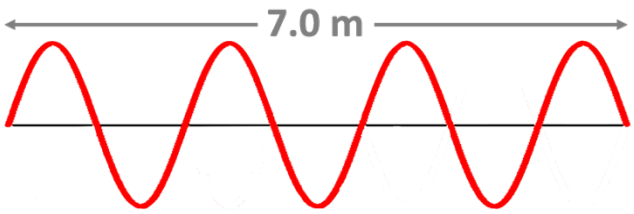
How to Determine the Wavelength from a Wave Pattern
Video Notes

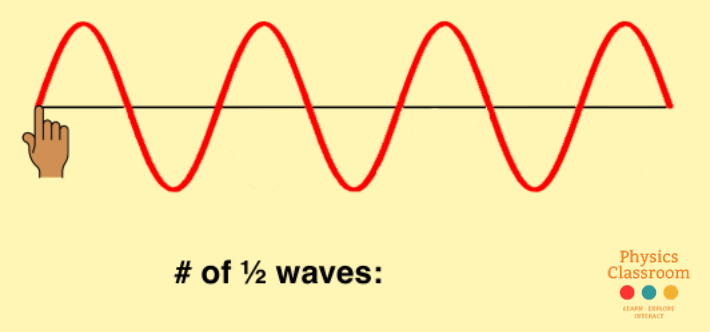
The Big Idea

Suppose you're given a diagram of a wave in a rope. And you know the length of the rope. How do you determine the wavelength? The process involves three steps.



Step 1: Count the Number of Waves in the Pattern

Start at the beginning and trace over the pattern with your finger to count the number of waves.
Counting by half-waves or quarter-waves is recommended.
There are seven half-waves in the rope.
That's equivalent to 3.5 waves.



Step 2: Write an Equation for L and λ

The length of the rope is related to the wavelength and the number of waves in the rope. The relationship follows the pattern shown below.

$$\text{Length} = \#\text{ of Waves} * \text{Wavelength}$$

For the given example:

$$7.0\text{ m} = 3.5 * \lambda$$

Step 3: Solve the Equation for λ

Like any equation, the above equation can be solved for the unknown variable wavelength (λ). Doing so requires that you divide both sides of the equation by 3.5, yielding …

$$7.0\text{ m} / 3.5 = \lambda$$

And so …

$$\boxed{2.0\text{ m} = \lambda}$$