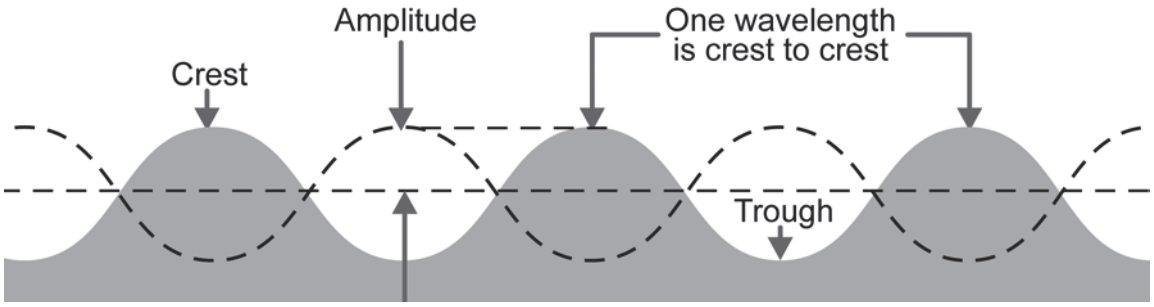
Name: _____ Date: _____

PRACTICE 112m = 4 sec 20.1

Waves

READ CPO Science

A **wave** is a traveling oscillator that carries energy from one place to another. A high point of a wave is called a **crest**. A low point is called a **trough**. The amplitude of a wave is half the distance from a crest to a trough. The distance from one crest to the next is called the **wavelength**. Wavelength can also be measured from trough to trough or from any point on the wave to the next place where that point occurs.



The speed of a wave

Speed (m/sec) → $v = f\lambda$ ← Wavelength (meters)

Frequency (hertz) →

EXAMPLE

The frequency of a wave is 40 Hz and its speed is 100 meters per second. What is the wavelength of this wave?

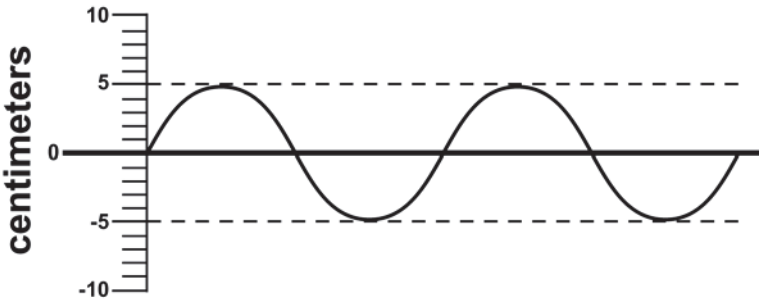
Given	**Solution**
Frequency = 40 Hz; Speed = 100 m/sec	$\frac{100 \text{ m/sec}}{40 \text{ Hz}} = \frac{100 \text{ m/sec}}{40 \text{ cycles/sec}} = \text{Wavelength}$
Looking for	2.5 meters = Wavelength
The wavelength	The wavelength of this wave is 2.5 meters.
Relationships	
Speed = Frequency × Wavelength, therefore	
Speed ÷ Frequency = Wavelength	

PRACTICE

1. On the graphic at right label the following parts of a wave: one wavelength, half of a wavelength, the amplitude, a crest, and a trough.

   a. How many wavelengths are represented in the wave above?

   b. What is the amplitude of the wave shown above?



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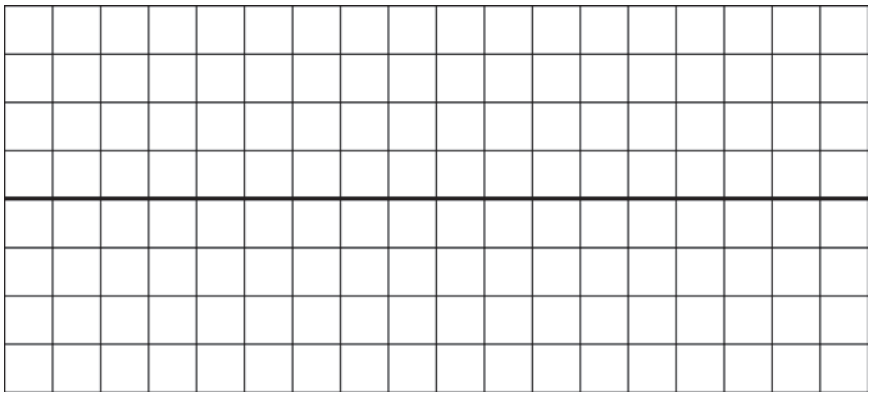
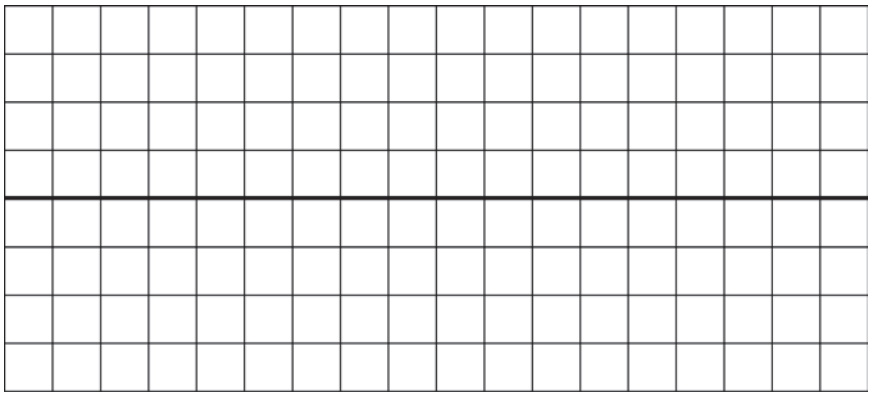
2. Use the grids below to draw the following waves. Be sure to label the *y*-axis to indicate the measurement scale.

   a. A wave with an amplitude of 1 cm and a wavelength of 2 cm



   b. A wave with an amplitude of 1.5 cm and a wavelength of 3 cm



3. A water wave has a frequency of 2 hertz and a wavelength of 5 meters. Calculate its speed.

4. A wave has a speed of 50 m/sec and a frequency of 10 Hz. Calculate its wavelength.

5. A wave has a speed of 30 m/sec and a wavelength of 3 meters. Calculate its frequency.

6. A wave has a period of 2 seconds and a wavelength of 4 meters.Calculate its frequency and speed.
   Note: Recall that the frequency of a wave equals 1/period and the period of a wave equals 1/frequency.

7. A sound wave travels at 330 m/sec and has a wavelength of 2 meters. Calculate its frequency and period.

8. The frequency of wave A is 250 hertz and the wavelength is 30 centimeters. The frequency of wave B is 260 hertz and the wavelength is 25 centimeters. Which is the faster wave?

9. The period of a wave is equal to the time it takes for one wavelength to pass by a fixed point. You stand on a pier watching water waves and see 10 wavelengths pass by in a time of 40 seconds.

   a. What is the period of the water waves?

   b. What is the frequency of the water waves?

   c. If the wavelength is 3 meters, what is the wave speed?