

WAVES, SOUND & PHYSICAL OPTICS DAY 2: PERIODIC WAVES AND GRAPHS

CED 14.2 · Skill 1.B · FRQ: TBR

PREDICT

You shake one end of a rope faster while its tension and material remain unchanged. What happens to the wavelength?

A. increases B. decreases C. stays the same D. becomes zero

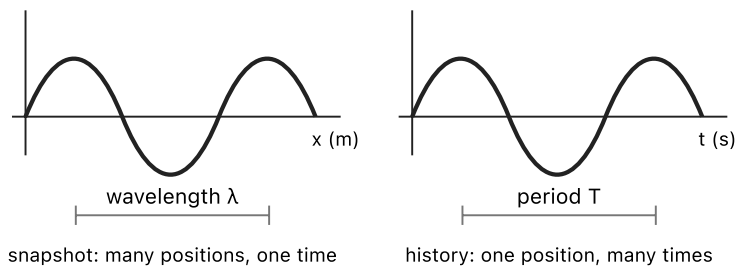
Commit before the demonstration or diagram is revealed.

ONE CYCLE TRAVELS ONE WAVELENGTH

$$v = f\lambda = \frac{\lambda}{T}$$

Wave speed is set by the medium. If the medium stays fixed and the source changes f , the wavelength adjusts.

NOTES / REASONING

SNAPSHOT OR HISTORY?**LABEL EACH HORIZONTAL INTERVAL**

1. Explain why the left graph gives λ and the right graph gives T .

2. Explain why a y -versus- x graph cannot directly give a time period.

The curves may look alike. The horizontal-axis quantity and unit determine what can be measured.

CALCULATE WITH UNITS

WE DO A periodic wave travels at 12.0 m/s with frequency 5.00 Hz . Find its wavelength.

YOU DO A different wave has wavelength 1.50 m . Its history graph shows $T = 0.250 \text{ s}$. Find its frequency and speed.

Do not read T from a distance axis or λ from a time axis.

REPRESENTATION CHECK

1. A wave in one medium has $v = 18 \text{ m/s}$. Calculate the wavelength at $f = 3.0 \text{ Hz}$, then at $f = 6.0 \text{ Hz}$.

2. Sketch a y -versus- x snapshot with amplitude 2.0 cm and wavelength 0.80 m .

3. Sketch a possible history if the same wave has $f = 2.5 \text{ Hz}$. Label T .

4. State one feature that must differ between your two graphs and one that may match.