Year 10 Science: Waves: oscillations, amplitude, wavelength and frequency

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. A buoy rises and falls 12 times in one minute. What is the frequency of the waves, and their period?

2. On a diagram, 5 complete waves span 2.0 m. What is the wavelength?

3. A wave is 0.6 m from crest to trough. What is its amplitude?

4. Explain why a duck on a pond is not carried to the shore by ripples.

5. Why can astronauts on a spacewalk not hear an explosion nearby, even though they could see it?

Fix the mistake

6. Correct this statement: "Waves carry the water towards the beach."

7. Correct this statement: "A wave that is 1.6 m from trough to crest has an amplitude of 1.6 m."

8. Correct this statement: "30 waves in 10 s, so the frequency is 10 ÷ 30 = 0.33 Hz."

9. Correct this statement: "One wavelength is the distance from a crest to the next trough."

Answer key (for parents and tutors)

1. A buoy rises and falls 12 times in one minute. What is the frequency of the waves, and their period?
   f = 12 ÷ 60 = 0.2 Hz; T = 1 ÷ 0.2 = 5 s.
2. On a diagram, 5 complete waves span 2.0 m. What is the wavelength?
   λ = 2.0 ÷ 5 = 0.4 m.
3. A wave is 0.6 m from crest to trough. What is its amplitude?
   0.3 m, because amplitude is half the crest-to-trough height.
4. Explain why a duck on a pond is not carried to the shore by ripples.
   Waves carry energy, not water: the water and the duck oscillate up and down in place as the energy passes under them.
5. Why can astronauts on a spacewalk not hear an explosion nearby, even though they could see it?
   Sound is a mechanical wave and needs particles to travel; space has almost none. Light needs no medium, so they can see it.
6. Correct this statement: "Waves carry the water towards the beach."
   The water only moves in small loops and stays roughly where it was; it is the energy that travels to the beach.
7. Correct this statement: "A wave that is 1.6 m from trough to crest has an amplitude of 1.6 m."
   Amplitude is measured from the rest line to a crest, so it is half of that, 0.8 m.
8. Correct this statement: "30 waves in 10 s, so the frequency is 10 ÷ 30 = 0.33 Hz."
   Frequency is waves divided by time, 30 ÷ 10 = 3 Hz; the 0.33 s is the period, the time for one wave.
9. Correct this statement: "One wavelength is the distance from a crest to the next trough."
   That is only half a wave; a wavelength is one complete wave, from a crest to the next crest.