Ripples on the Move

Model wave patterns and the motion they cause

4-PS4-1 "Develop a model of waves to describe patterns in terms of amplitude and wavelength and to provide evidence that waves can cause objects to move. (SEP: 2; DCI: PS4.A; CCC: Patterns)"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the words that tell how to measure amplitude and wavelength. Circle observations that show what happens to the cork as ripples pass.

A Cork in the Ripples

1. At a science table, Nia watches ripples cross a tray of water. Before the ripples start, she marks the still-water level on the clear side of the tray. A crest is the high part of a wave, and a trough is the low part. Amplitude is the distance from the still-water level to a crest. Wavelength is the distance from one crest to the next crest.

2. Nia uses a moving bar to make two sets of ripples. In test A, each crest rises 1 centimeter above the still-water level, and neighboring crests are 6 centimeters apart. In test B, each crest rises 2 centimeters above that level, and neighboring crests are 3 centimeters apart. The water depth stays the same in both tests. Nia watches a cork floating near the middle of the tray.

3. In both tests, the ripples travel from the bar toward the far end of the tray. As each crest reaches the cork, the cork rises. It sinks back down after the crest passes. The cork stays near the middle instead of traveling to the far end. Nia can draw each wave as a line with repeating high and low parts. She can add arrows to show distances and the cork's motion.

2 ANSWER WITH EVIDENCE

Use the passage

1. In a model of test A, how long should an arrow from the still-water level to a crest be?

2. In a model of test B, how far apart should you draw two neighboring crests?

3. Which test would you model with taller crests that are closer together? Use both measurements to explain.

4. What motion should arrows beside the cork show in your model? Which observations support your choice?

3 YOUR TURN

Your own words

Draw a third wave in the box with an amplitude of 3 centimeters and a wavelength of 4 centimeters. Label the still-water level, two neighboring crests, and both distances, add arrows showing a cork's motion, then write one sentence explaining how the wave moves the cork.

ANSWER KEY

Ripples on the Move

GRADE 4 · 4-PS4-1

PART 1 · READ AND MARK

Underline the words that tell how to measure amplitude and wavelength. Circle observations that show what happens to the cork as ripples pass. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	In a model of test A, how long should an arrow from the still-water level to a crest be?	**1 centimeter.**
2	In a model of test B, how far apart should you draw two neighboring crests?	**3 centimeters.**
3	Which test would you model with taller crests that are closer together? Use both measurements to explain.	**Test B. Its crests rise 2 centimeters above the still-water level and are 3 centimeters apart, compared with 1 centimeter and 6 centimeters in test A.**
4	What motion should arrows beside the cork show in your model? Which observations support your choice?	**The arrows should show up-and-down motion. The cork rises when a crest reaches it and sinks back down after the crest passes.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Sketch: A wave line has two neighboring crests with a trough between them and a marked still-water level. A vertical arrow from that level to a crest is labeled 3 centimeters, a horizontal arrow between the crests is labeled 4 centimeters, and arrows beside a cork point up and down. Sentence: The cork rises as a crest passes and sinks back down after it passes.

Accept models with correctly labeled distances even if they are not drawn to scale. The cork's arrows must show up-and-down motion, not travel across the tray.