Ripples in Motion

Read wave patterns and model how they move a floating object.

4.PS4.1 "Develop and use a model of waves to describe patterns in terms of amplitude and wavelength and to show that waves can cause objects to move."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the words that tell how high the crests are, circle the words that tell how far apart they are, and put a star beside each sentence about the cork's movement.

Waves in a Water Tray

1. At a pond, Mina watches ripples spread past a floating cork. A wave is a moving pattern in water. A model can show its high points, called crests, and the still water level. Amplitude is the height from the still water level to a crest. Wavelength is the distance from one crest to the next. The cork can bob as waves pass.

2. Mina sketches three wave patterns from a water tray. Pattern A has tall crests that are far apart. Pattern B has low crests that are far apart. Pattern C has low crests that are close together. She draws the same still water level through all three sketches. Each sketch shows crests rising above that line and dipping back down.

3. Mina puts a cork in the tray and watches waves like each pattern pass it. With A, the cork bobs higher. With B, it bobs only a little. With C, it also bobs only a little, but crests pass more often. The cork stays near the same spot while the moving waves travel across the tray.

2 ANSWER WITH EVIDENCE

Use the passage

1. Which two patterns have the same wavelength but different amplitudes? Explain using their crest spacing and height.

2. Which two patterns have the same amplitude but different wavelengths? Explain using their crest height and spacing.

3. Which pattern would Mina use to model the wave that makes the cork bob highest? How should she draw its crests?

4. If Mina models B and C across equal lengths of the tray, which model should have more crests? Why?

3 YOUR TURN

Your own words

In two panels, sketch your own water-wave models. Give each a still water line, at least three crests, a floating leaf with an up-and-down arrow, and labels for amplitude and wavelength. Make one wave both taller and more closely spaced than the other, then write one sentence explaining how the leaf moves as waves pass.

ANSWER KEY

Ripples in Motion

GRADE 4 · 4.PS4.1

PART 1 · READ AND MARK

Underline the words that tell how high the crests are, circle the words that tell how far apart they are, and put a star beside each sentence about the cork's movement. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Which two patterns have the same wavelength but different amplitudes? Explain using their crest spacing and height.	**A and B. Both have crests far apart, but A has tall crests and B has low crests.**
2	Which two patterns have the same amplitude but different wavelengths? Explain using their crest height and spacing.	**B and C. Both have low crests, but B's crests are far apart and C's are close together.**
3	Which pattern would Mina use to model the wave that makes the cork bob highest? How should she draw its crests?	**Pattern A. She should draw tall crests that are far apart.**
4	If Mina models B and C across equal lengths of the tray, which model should have more crests? Why?	**C should have more crests because its crests are closer together.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Panel 1: A still water line with three tall, closely spaced crests. A label marks amplitude from the line to a crest, and another marks wavelength between two crests. A floating leaf has an up-and-down arrow. Panel 2: A still water line with three low, widely spaced crests, the same two distance labels, and a floating leaf with an up-and-down arrow. Sentence: The leaf bobs up and down as the waves pass.

Accept models with clearly different crest heights and spacing, even if the waves are not drawn to scale. Amplitude must be marked from the still water line to a crest, and wavelength from one crest to the next.