

When Waves Meet

Track how waves change when they meet materials or other waves.

PS.6.c "waves can interact; and"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each sentence that describes waves interacting, and circle the word or phrase that names the interaction so you can connect the wave's action to its result.

Echoes, Curtains, and Water Waves

- ① At the entrance to a tunnel, Maya clapped once. The sound wave traveled through air until it reached the hard concrete wall. Much of the wave bounced back, or reflected, and Maya heard an echo a moment later. The wall did not create a new sound. It changed the direction of part of the incoming wave. Smooth, hard surfaces such as cliffs, gym walls, and empty hallways often produce noticeable reflections because they absorb little of the sound energy.
- ② A wave can also meet a material and pass into it. This is transmission. A window lets much of a light wave transmit through glass, so objects on the other side can be seen. Other materials absorb wave energy. Thick curtains absorb some sound energy, making a room less echoey. When absorption occurs, the wave's energy is transferred to the material, often producing tiny vibrations and a small temperature increase. A single encounter can include both transmission and absorption.
- ③ Interactions also occur when two or more waves meet in the same place. Their displacements combine, an effect called interference. Two water waves with crests together make a taller wave, called constructive interference. A crest meeting a trough can make a smaller wave or briefly flatten the surface, called destructive interference. After overlapping, the water waves continue moving. This does not mean the waves permanently disappear. At a concert, interference can make sound louder at one location and softer at another.

2 ANSWER WITH EVIDENCE Use the passage

- 1 What interaction occurred when Maya's sound wave reached the concrete wall? What evidence from the passage shows this?

- 2 Compare transmission and absorption. What happens to wave energy in each interaction?

- 3 What happens when a crest meets a trough, and what is this interaction called?

- 4 How can interference affect sound at different locations during a concert?

3 YOUR TURN Your own words

Write three sentences about a new wave situation. Describe one wave interacting with a material and two waves interfering, using accurate terms and explaining the result.

PART 1 • READ AND MARK

Underline each sentence that describes waves interacting, and circle the word or phrase that names the interaction so you can connect the wave's action to its result. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What interaction occurred when Maya's sound wave reached the concrete wall? What evidence from the passage shows this?	Reflection occurred. Much of the sound wave bounced back, and Maya heard an echo.
2	Compare transmission and absorption. What happens to wave energy in each interaction?	In transmission, a wave passes into or through a material. In absorption, wave energy is transferred to the material, causing tiny vibrations and sometimes a small temperature increase.
3	What happens when a crest meets a trough, and what is this interaction called?	The waves can make a smaller wave or briefly flatten the surface. This is destructive interference.
4	How can interference affect sound at different locations during a concert?	Interference can make sound louder at one location and softer at another.

PART 3 • YOUR TURN (SAMPLE ANSWER)

On a lake, a water wave struck a wooden dock and reflected back across the surface. Farther out, two crests met, so constructive interference made a taller wave. When a crest later met a trough, destructive interference made the water surface lower for a moment.

Accept scientifically accurate original situations that include an interaction with a material and interference between waves. Students should correctly connect reflection, transmission, or absorption to its result and identify constructive or destructive interference accurately.