

**Characteristics of Waves** ▪ Guided Reading and Study

**Interactions of Waves** (pp. 521-527)

This section describes how waves bounce back, bend and interact with each other.

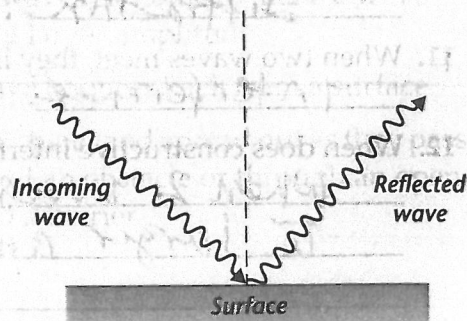
**Use Target Reading Skills**

Before reading the section, write questions based on the red headings and record them in the graphic organizer below. As you read, write the answers to your questions in the graphic organizer.

Interactions of waves	
Question	Answer
How are waves reflected?	Waves are reflected ... when they hit a surface they can't pass thru.
What is refraction?	Bending of waves due to speed change
When does diffraction occur?	When a wave moves around a barrier.
What is a standing wave?	A wave that appears like it is standing in one place, BUT it is really <del>interfering</del> 2 waves interfering

**Reflection** (p. 522)

1. On the illustration below, write labels and draw arrows to show the location of the angle of incidence and the angle of reflection.
2. The bouncing back of a wave when it hits a surface through which it cannot pass is called reflection.
3. What does the law of reflection state?  
 $\angle$  of incidence =  $\angle$  of reflection.



4. Is the following sentence true or false? All waves obey the law of reflection.  
TRUE

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**Interactions of Waves** (continued)

**Refraction** (p. 523)

5. What happens when a wave moves from one medium into another medium at an angle?

One side of the wave changes speed before the other side, causing the wave to bend.

6. The bending of waves as they enter a different medium is called

Refraction.

7. All waves change speed when they enter a new medium, but they don't always bend. When does bending occur?

Bending occurs when one side of the wave enters the medium before the other side.

8. The bending of a wave entering a new medium occurs because the two sides of the wave are traveling at different

speeds.

**Diffraction** (p. 524)

9. What happens when a wave passes a barrier or moves through a hole in a barrier?

It bends and spreads out.

10. The bending of waves around the edge of a barrier is known as

diffraction.

11. When two waves meet, they interact. This interaction is called

interference.

12. When does constructive interference occur?

When 2 waves interact to make a wave with larger amplitude.

13. What happens when the crests of two waves overlap?

They make a higher crest.

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**Interference** (pp. 524–525)

14. When two waves interact to produce a wave of larger amplitude, the interaction is called constructive interference
15. In Figure 10, why does the wave labeled 2 on the right have an amplitude of zero?

The crest of one wave meets the trough of the other wave and the 2 waves cancel each other out because both have the same amplitude.

16. What happens when destructive interference occurs between waves with different amplitudes?

The amplitude of the resulting wave will be reduced but not equal to zero.

Match the type of wave interaction with its description.

Interaction	Description
<u>b</u> 17. refraction	a. Two waves combine to make a wave with a smaller amplitude.
<u>e</u> 18. diffraction	b. A wave bends as it moves from one medium to another.
<u>c</u> 19. constructive interference	c. Two waves combine to make a wave with a larger amplitude.
<u>a</u> 20. destructive interference	d. A wave bounces back from a surface.
<u>d</u> 21. reflection	e. Waves bend and spread out as they pass around an obstacle or through an opening in a barrier.

### Interactions of Waves (continued)

#### Standing Waves (pp. 526-527)

- 22. What is a standing wave?  
A standing wave is a wave that appears to be standing still, even though it is really 2 waves interfering as they pass through each other.
  
- 23. A point of zero amplitude on a standing wave is called a(n) node.
  
- 24. The points of maximum amplitude on a standing wave are called antinodes.
  
- 25. Is the following sentence true or false? Most objects have a natural frequency of vibration. TRUE
  
- 26. When does resonance occur?  
Resonance occurs when external vibrations match an object's natural frequency.