Key Terms

The block of letters below contains 16 key terms from the chapter. You might find them across, down, or on the diagonal. Use the clues to identify the terms you need to find. Circle each of the terms in the block of letters.

Clues

1. A disturbance that transfers energy from place to place
2. The ability to do work
3. The material through which a wave travels
4. A repeated back-and-forth or up-and-down motion
5. The highest part of a transverse wave
6. The lowest part of a transverse wave
7. The maximum distance the particles of the medium carrying the wave move away from their rest position
8. The distance between two corresponding parts of a wave
9. The number of complete waves that pass a given point in a certain amount of time
10. The unit in which wave frequency is measured
11. The bending of waves due to a change of speed as waves enter a new medium at an angle
12. The bending and spreading out of waves around the edge of a barrier and spreading out
13. A point of zero amplitude on a standing wave
14. A point of maximum amplitude on a standing wave
15. What occurs when external vibrations match an object's natural frequency
16. A huge surface wave on the ocean caused by an underwater earthquake

d	t	s	u	n	a	m	i	p	a	q	w
i	v	i	b	r	a	t	i	o	n	m	a
f	r	e	q	u	e	n	c	y	t	a	v
f	u	n	n	p	w	b	v	x	i	m	e
r	e	f	r	a	c	t	i	o	n	p	l
a	x	e	n	e	r	g	y	u	o	l	e
c	i	w	a	v	e	z	a	p	d	i	n
t	z	e	e	v	s	z	u	j	e	t	g
i	o	d	d	e	t	x	w	e	g	u	t
o	o	u	t	r	o	u	g	h	y	d	h
n	i	r	e	s	o	n	a	n	c	e	r
n	y	h	m	e	d	i	u	m	r	t	z

Understanding Main Ideas

Complete the following table by filling in the correct word or phrase next to the number.

Seismic Waves

	P Waves	1._____	Surface Waves
Type of wave	2._____	transverse	combination of longitudinal and transverse
Speed of wave	move faster than other seismic waves	slower than primary waves	3._____
Mediums traveled through	4._____	only solid rock	travels on the surface of all mediums

Building Vocabulary

Write a definition for each of the following terms on the lines provided.

5. seismic waves

6. seismograph

7. tsunami

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Characteristics of Waves ▪ *Review and Reinforce*

What Are Waves?

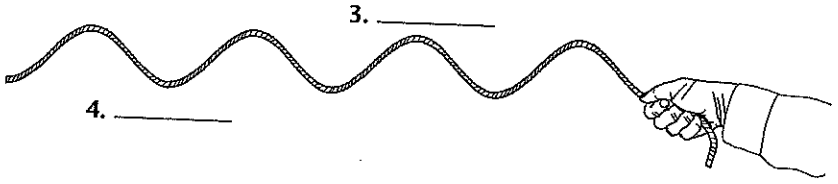
Understanding Main Ideas

Answer the following questions on a separate sheet of paper.

1. What causes waves?
2. Using a spring as an example, describe the compressions and rarefactions of a wave.

Building Vocabulary

Label the trough and crest of the wave in the illustration below.



Answer the following questions about the wave shown above in the spaces provided.

5. What medium is the wave traveling through?

_____

6. What is the source of energy causing the wave?

_____

_____

7. How do you know the wave is a mechanical wave?

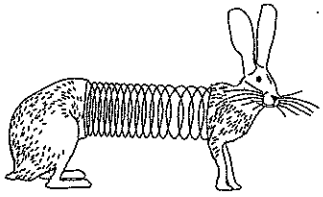
_____

_____

8. What type of mechanical wave is this?

_____

Label each wave shown below as longitudinal or transverse.



9. _____ 10. _____

You learned in this section about two types of mechanical waves: longitudinal and transverse. You learned how to generate and identify these types of waves in ropes and springs. As you may have noticed, waves are all around you, even in plants and animals. Have you ever looked closely at a slithering snake? Or a swimming eel? How do their bodies move? In this activity, you will use your knowledge of wave characteristics to identify waves in what may seem like unexpected places.

- The cowboy shown in Figure 1 is practicing his rope tricks. The whirling loop of the lasso spins in a circle just above the ground. As it spins, it develops a kink. This kink is a traveling wave.
- In Figure 2, the plastic frog "jumps" when the spring is compressed and then released. A wave travels through the spring with each jump the frog makes.
- The garter snake shown in Figure 3 is slithering across the ground. As it moves, two types of waves pass through its body. When the snake moves forward, its body makes an makes an S-shaped wave. In addition, contractions ripple down the snake's body as it slithers along. Muscles underneath the snake's skin extend from its head down its body towards its tail. These muscles contract and relax in a steady pattern in the direction of the arrows. The periodic contraction and relaxation of the snake's muscles propel it forward through the grass.

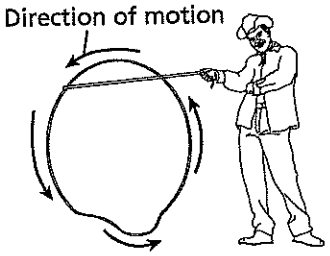


Figure 1

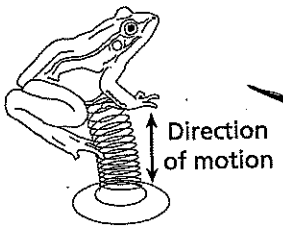


Figure 2

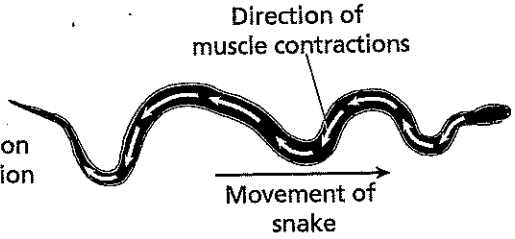


Figure 3

Answer the following questions on a separate sheet of paper.

1. Does the kink in the lasso travel as a transverse or longitudinal wave? Explain your answer.
2. What type of wave passes through the spring in the frog toy? Explain your answer.
3. What type of wave does the snake's body make as the snake moves forward? Explain your answer.
4. What type of wave do the contractions of the snake's muscles make as the snake moves forward? Explain your answer.
5. Describe another plant or animal in which you can observe wave motion.

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Characteristics of Waves

Multiple Choice

Write the letter of the correct answer on the line at the left.

____ 1. Waves produced by earthquakes are known as
- **a.** transverse waves.
- **b.** standing waves.
- **c.** longitudinal waves.
- **d.** seismic waves.

____ 2. All of the following are types of waves EXCEPT
- **a.** transverse waves.
- **b.** surface waves.
- **c.** longitudinal waves.
- **d.** antinode waves.

____ 3. The amplitude of a transverse wave is found by measuring the distance
- **a.** between two crests.
- **b.** between two troughs.
- **c.** from the rest position to a crest.
- **d.** from a crest to a trough.

____ 4. A longitudinal wave has a large amplitude if
- **a.** the compressions are dense.
- **b.** the troughs are very low.
- **c.** there are no rarefactions.
- **d.** the crests are far apart.

____ 5. If 300 waves pass a point in one minute, the frequency is
- **a.** 300 Hz.
- **b.** 18,000 Hz.
- **c.** 30 Hz.
- **d.** 5 Hz.

____ 6. Speed, frequency, and wavelength are related by all of the following formulas except
- **a.** Wavelength × Frequency = Speed.
- **b.** Frequency = Speed/Wavelength.
- **c.** Frequency = Wavelength/Speed.
- **d.** Wavelength = Speed/Frequency.

____ 7. An example of a reflected wave is
- **a.** an echo.
- **b.** a tsunami.
- **c.** a transverse wave.
- **d.** a surface wave.

____ 8. Constructive interference occurs when two waves
- **a.** are traveling in the same direction.
- **b.** combine to make a wave with a larger amplitude.
- **c.** change their speed and bend.
- **d.** combine to make a wave with a smaller amplitude.

____ 9. P waves, S waves, and surface waves are all types of
   a. transverse waves.
   b. seismic waves.
   c. longitudinal waves.
   d. standing waves.

____ 10. Scientists can tell how far away from them an earthquake occurred by
   a. the amplitude of surface waves.
   b. the wavelength of P waves.
   c. the speed of S waves.
   d. the time between the arrival of P waves and the arrival of S waves.

Completion

Fill in the line to complete each statement.

11. Waves that require a medium to travel through are called _____ waves.
12. The highest parts of a wave are called the _____.
13. The basic properties of waves are _____, wavelength, frequency, and speed.
14. The bending of waves around the edge of a barrier is known as _____.
15. In standing waves, _____ are points with zero amplitude.

True or False

If the statement is true, write true. *If it is false, change the underlined word or words to make the statement true.*

_____ 16. A wave transfers <u>a medium</u> from one place to another.

_____ 17. When a wave moves through a hole in a barrier, it <u>bends</u> and spreads out.

_____ 18. A toy boat bobbing up and down on a pond is being moved by <u>longitudinal</u> waves.

_____ 19. The distance from one compression to the next compression is the <u>amplitude</u> of a longitudinal wave.

_____ 20. The law of reflection states that the angle of incidence <u>equals</u> the angle of reflection.