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CHAPTER 7

TEKS/TAKS TEST PREPARATION FOR SCIENCE

Practice Test A

1 Joy generated 2 waves at the same time, 1 in a tank of water and the other in a tank of oil. What is the difference between these 2 waves?

A The direction each wave travels

B The medium through which each wave travels

C The time each wave began

D The size of the tank in which each wave travels

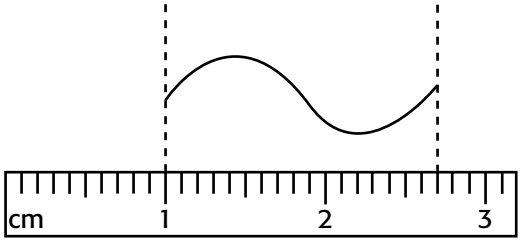
2 Scott is removing laundry from a slack clothesline. He generates a wave in the clothesline that causes a shirt in the middle of the clothesline to bob up and down. Scott wants to move the shirt to the end of the clothesline using the wave. Why can't he do this?

F He has generated a transverse wave.

G He has generated a longitudinal wave.

H Waves carry energy, not matter.

J Waves cannot be used to do work.



3 This wave was generated in a laboratory investigation. What is its wavelength?

A 1.5 cm

B 1.7 cm

C 2.0 cm

D 2.7 cm

Sound Waves in Water

Time (s)	Distance traveled (km)
1	1.5
2	3.0
3	4.5
4	?

4 The data above were collected for sound waves traveling through water. If all other factors were the same, how far would the sound wave travel after 4 seconds?

F 5.0 km

G 5.5 km

H 6.0 km

J 6.5 km

5 Heidi wanted to find out in which medium a wave would have a higher amplitude. She dropped a marble in a pan filled with water. She dropped a golf ball in a pan filled with dish soap. Heidi measured the height of the resulting waves. Her experiment could be improved by

A dropping the objects from a greater height.

B weighing the pan.

C generating the waves at the same time.

D using the same object to generate the waves.

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CHAPTER 7 TEKS/TAKS TEST PREPARATION FOR SCIENCE

Practice Test B TEKS

1 Which of the following waves require a medium?

A Electromagnetic waves
B Mechanical waves
C Light waves
D X rays

2 How does the sun's energy travel to Earth?

F As electromagnetic waves
G As sound waves
H As longitudinal waves
J As mechanical waves

3 Josephine performed a laboratory experiment about wave movement. She and a partner each held the end of a rope and generated a wave crest in the rope at the same time. The two crests overlapped in the middle of the rope. Which of the following is a valid conclusion from the experiment?

A The waves were longitudinal.
B When the waves met, the amplitude of the new wave was smaller than the amplitude of the original waves.
C When the waves met, the amplitude of the new wave was larger than the amplitude of the original waves.
D As the waves met, they cancelled each other out.

4 Josephine's experiment is an example of which of the following?

F Refraction
G Constructive interference
H Diffraction
J Destructive interference

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SUPER-BLASTER SPACE SPEAKER

Buy one today!

Listen to your voice echo through space.

Buy one for a friend, too!

5 Look at the advertisement above. Why wouldn't you buy this speaker if you lived on the moon or in space?

A The speaker wouldn't work in space because sound waves require a medium, and space is empty.

B The speaker wouldn't work in space because there is no light in space.

C The speaker wouldn't work in space because sound waves move as transverse waves.

D The speaker wouldn't work in space because sound waves have more compressions than rarefactions in space.

6 Which of the following things would work well in space?

F Drum set

G Cello

H Flashlight

J Not Here

7 Through which of the following do electromagnetic waves travel the fastest?

A Empty space

B Glass

C Ocean water

D Air

8 A light year describes the distance light travels in one year. How does light travel?

F As a mechanical wave

G As a longitudinal wave

H As a transverse wave

J As a rarefaction

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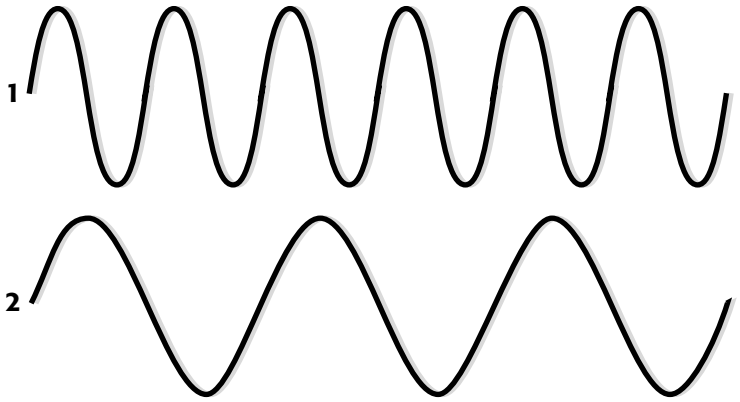

9 Pierre is constructing a laboratory experiment on waves, and sketched the figure above based on his observations. Which of the following analyses is true?

A The first wave has a greater amplitude than the second wave.

B The second wave has a greater amplitude than the first wave.

C The first wave has a greater frequency than the second wave.

D The second wave has a greater frequency than the first wave.

10 Look at the figure above. Which of the following is NOT a valid conclusion?

F The first wave has a higher frequency than the second wave.

G The second wave carries less energy than the first wave.

H The second wave has a longer wavelength than the first wave.

J The first wave carries less energy than the second wave.

11 Giovanni observed overlapping waves during a field experiment. Which of the following accurately describes the constructive interference he observed?

A Two waves overlap, and the crests of one wave overlap the crests of another wave.

B Two waves overlap, and the crests of one wave overlap the troughs of another wave.

C Two waves overlap, and the waves bounce off of each other.

D Two waves overlap, and the waves cancel each other out.

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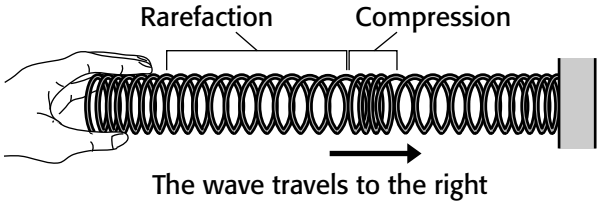

12 How does the wave in the figure above travel through the spring?

F The coils of the spring move up and down perpendicular to the direction in which the wave is travelling.

G The coils of the spring move in a circular motion parallel to the direction in which the wave is travelling.

H The coils of the spring move in a circular motion perpendicular to the direction in which the wave is travelling.

J The coils of the spring move back and forth parallel to the direction in which the wave is travelling.

13 What is the energy source that generated the wave above?

A The person's hand

B The compressions

C The rarefactions

D Waves do not have to be generated.

14 Seismic waves are created by earthquakes. Like all mechanical waves, seismic waves need to travel through

F space.

G air.

H a medium.

J glass.

15 Marie wants to conduct an experiment to see how diffraction works. Which of the following would be a testable hypothesis for her experiment?

A Light waves will bend as they move from air to water.

B Light waves will bend as they pass around the edge of a wooden block.

C Light waves always bend as they travel.

D Light waves will bounce off of objects.

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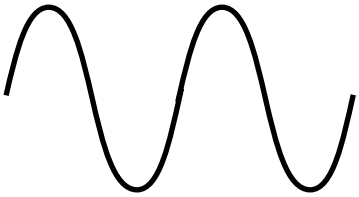
16 For a laboratory experiment, Antoine wanted to measure the amplitude of a transverse wave he had created using a rope. Which of the following distances should he measure?

F The distance from one crest to the next.

G The distance from one trough to the next.

H The distance between the highest and lowest points on the wave.

J The distance from the rest position of the wave to the wave's highest point.



17 Shira drew the figure above while performing an experiment about transverse waves. Which of the following statements accurately describes transverse waves?

A Transverse waves cause particles to vibrate in an up-and-down motion, perpendicular to the direction the wave is traveling.

B Transverse waves cause particles to vibrate in an up-and-down motion, parallel to the direction the wave is traveling.

C Transverse waves cause particles to vibrate in a circular motion perpendicular to the direction the wave is traveling.

D Transverse waves cause particles to vibrate in a back-and-forth motion, parallel to the direction the wave is traveling.

18 Jim and Lyle were fishing in the ocean. Jim bet Lyle that the ocean waves moving quickly by the floating boat would not carry away a piece of bread Jim threw in the water. Which of the following is a valid explanation for this claim?

F Ocean waves are longitudinal waves, which move the particles of their medium in circles.

G Ocean waves are transverse waves, which cannot move along a surface.

H Ocean waves are surface waves, which move the particles of their medium in circles.

J Ocean waves are sound waves, which move the particles of their medium up and down.

CHAPTER 7

TEKS/TAKS TEST PREPARATION FOR SCIENCE

Answer Key and TAKS Doctor for Practice Test A

Answers	TEKS Correlation	TAKS Objectives
1 B	8.7B	5
2 H	8.7B	5
3 B	8.2B	1
4 H	8.4B	1
5 D	8.2A, 8.7B	1, 5

TAKS Doctor

The following TAKS questions have been diagnosed by the TAKS Doctor. Find out what might be causing your "ailing" answers. The TAKS Doctor will see you now!

Item 1 *asks students the difference between a wave generated in a tank of water and a wave generated in a tank of oil.*

A **Incorrect.** Both waves will travel in all directions on the surface of the medium until they meet the sides.

B **Correct.** Oil and water are two different media through which waves can travel.

C **Incorrect.** The problem states that the two waves were generated at the same time.

D **Incorrect.** No information is given about the size of the tanks in which the waves are generated.

Item 2 *asks students why you cannot use a wave to move an item in the direction that the wave is traveling.*

F **Incorrect.** He has generated a transverse wave, but this answer is not the best one.

G **Incorrect.** He has generated a transverse wave, not a longitudinal wave.

H **Correct.** The wave in the clothesline carries energy along the clothesline, but the wave cannot carry matter, so the shirt will not move along the clothesline.

J **Incorrect.** Waves can be used to do work. However, the wave's evergy in this example is used to move the shirt up and down, not along the clothesline.

Item 5 *asks students how to improve an experiment to determine the amplitude of waves traveling in two different media.*

A **Incorrect.** The larger amplitudes that result from dropping the objects from a greater height might make discerning a difference between the two waves easier, but this answer is not the best one.

B **Incorrect.** The weight of the pan likely does not affect the waves that are generated in the pan.

C **Incorrect.** The waves do not interact with one another, so there is no need to take the measurements at the same time.

D **Correct.** This answer is the best one. Objects of different sizes can generate waves of different amplitudes, so eliminating this variable would improve the experiment.

Answer Key and TAKS Doctor for Practice Test B

Answers		TEKS Correlation	TAKS Objectives
1	B	8.7B	5
2	F	8.7B	5
3	C	8.2C	1
4	G	8.2C	1
5	A	8.3B, 8.7B	5
6	H	8.7B	5
7	A	8.7B	5
8	H	8.7B	5
9	C	8.2C	1
10	J	8.2D	1
11	A	8.2C	1
12	J	8.7B	5
13	A	8.7B	5
14	H	8.7B	5
15	B	8.2A	1
16	J	8.2A	1
17	A	8.2C	1
18	H	8.3A	1

The following TAKS questions have been diagnosed by the TAKS Doctor. Find out what might be causing your "ailing" answers. The TAKS Doctor will see you now!

Item 2 *asks student to identify how the energy of the sun travels to Earth.*

F **Correct.** The sun produces light, which travels to Earth as electromagnetic waves.

G **Incorrect.** Sound cannot travel through empty space, so sound waves could not travel from the sun to Earth.

H **Incorrect.** Light is a transverse wave, not a longitudinal wave.

J **Incorrect.** Mechanical waves require a medium, so they could not travel through empty space from the sun to Earth.

Item 3 *asks students to communicate valid conclusions.*

A **Incorrect.** Josephine and her partner generated crests in the rope, and longitudinal waves do not have crests.

B **Incorrect.** Destructive interference occurs when a crest and trough of two different waves overlap and produce a wave with a smaller amplitude than the original waves. Josephine and her partner generated crests in the rope. When the crests of two different waves overlap, constructive interference occurs.

C **Correct.** Josephine and her partner generated crests in the rope. Constructive interference occurs when the crests of two different waves overlap and produce a wave with a larger amplitude than the original waves.

D **Incorrect.** Total destructive interference occurs when a crest and trough of two different waves of equal amplitude cancel each other out. Josephine and her partner generated crests in the rope. When the crests of two different waves overlap, constructive interference occurs.

Item 6 *asks student to identify whether items that produce sound waves or light waves would work well in space.*

F **Incorrect.** A drum set is used to produce sound. Sound waves cannot travel through empty space, so a drum set would not serve its purpose in space.

G **Incorrect.** A cello is used to produce sound. Sound waves cannot travel through empty space, so a cello would not serve its purpose in space.

H **Correct.** A flashlight is used to produce light. Light waves can travel through empty space, so a flashlight would serve its purpose in space.

J **Incorrect.** Because a flashlight would work well in space, a suitable answer is provided.

Item 9 *asks students to analyze wave diagrams and identify the most accurate analysis.*

A **Incorrect.** A wave's amplitude is the maximum distance the particles of a medium vibrate from their rest position. As the diagram shows, the amplitude of the first wave is approximately the same as the amplitude of the second wave.

B **Incorrect.** According to the diagram, the amplitude of the second wave is approximately the same as the amplitude of the first wave.

C **Correct.** The waves are closer together in the first wave than in the second wave. Because frequency measures the number of waves in a given amount of time, the closer waves indicate a higher frequency.

D **Incorrect.** The waves are farther apart in the second wave than in the first wave. The farther apart the waves, the lower the frequency.

Item 10 *asks students to communicate valid conclusions.*

F **Incorrect.** More waves pass in the same amount of time in the first wave than in the second wave, so the first wave has a greater frequency.

G **Incorrect.** If amplitudes are equal, high-frequency waves carry more energy than low-frequency waves. The second wave has a lower frequency, therefore it carries less energy.

H **Incorrect.** The distance between crests is greater for the second wave than the first wave, so the second wave has a longer wavelength.

J **Correct.** If amplitudes are equal, high-frequency waves carry more energy than low-frequency waves. The first wave has a higher frequency, so it therefore carries more energy.

Item 11 *asks students to describe constructive interference.*

A **Correct.** Constructive interference happens when the crests of one wave overlap the crests of another wave, producing a wave with a larger amplitude than the original waves had.

B **Incorrect.** Destructive interference happens when the crests of one wave overlap the troughs of another wave, producing a wave with a smaller amplitude than the original waves had.

C **Incorrect.** When two waves overlap, they do not bounce off of each other. When a wave encounters a barrier, such as a wall, the wave can reflect (or bounce) off of the barrier.

D Incorrect. Total destructive interference happens when a crest and a trough of two waves with the same amplitude overlap and cancel each other out.

Item 14 *asks students to describe a characteristic of mechanical and seismic waves.*

F Incorrect. Mechanical waves require a medium, so they cannot travel through empty space.

G Incorrect. Air is a medium through which mechanical waves can travel, but seismic waves travel through the ground.

H Correct. Waves that require a medium are called mechanical waves.

J Incorrect. Glass is a medium through which mechanical waves can travel, but seismic waves travel through the ground.

Item 15 *asks students to identify the testable hypothesis for an experiment on diffraction.*

A Incorrect. Refraction, not diffraction, concerns the way light waves behave as they pass from one medium to another.

B Correct. Diffraction is the bending of waves around a barrier or through an opening. This hypothesis is testable and addresses the subject of diffraction.

C Incorrect. This hypothesis does not address the way diffraction works, and is too broad to be testable.

D Incorrect. This hypothesis does not explain the way diffraction works, and is too broad to be testable.

Item 16 *asks students how to measure the amplitude of a wave.*

F Incorrect. The distance between any two adjacent crests on a wave is the wavelength of the wave.

G Incorrect. The distance between any two adjacent troughs on a wave is the wavelength of the wave.

H Incorrect. The distance between the highest and lowest parts of a wave is twice the amplitude of the wave.

J Correct. The amplitude of a wave is the maximum distance the particles of the medium vibrate from their rest position.

Item 18 *asks students to communicate valid conclusions.*

F Incorrect. Ocean waves are surface waves, which move the particles of their medium in circles, while longitudinal waves move the particles of their medium back and forth.

G Incorrect. Ocean waves are surface waves, which move the particles of their medium in circles, while transverse waves move the particles of their medium up and down.

H Correct. When waves occur at or near the boundary between two media, a transverse wave and a longitudinal wave can combine to form a surface wave. Ocean waves are surface waves that occur at the boundary between the air and the ocean water.

J Incorrect. Ocean waves are surface waves, which move the particles of their medium in circles, while sound waves are longitudinal waves, which move the particles of their medium back and forth.