Name_____ Date_____ Class _____

CHAPTER 7 TAKS TEST PREPARATION FOR MATH IN SCIENCE

Math Mini-Test TEKS

Section 1

1 All of the following sets of lines are found on the blueprints for a new building. Which describes two perpendicular lines?

A Lines that stay the same distance apart

B Lines that form an X

C Lines that form a right angle

D Lines that form an acute angle

2 The distance light travels in one year is 9,460,000,000,000 km. Which of the following is the best way to represent this number?

F 9×10^{12}

G 9.46×10^{11}

H 9.46×10^{12}

J 9.46×10^{13}

3 Occasionally, earthquakes under the ocean create water waves called tsunamis that can rise 30 m above the ground. About how many times taller is this type of wave than a building that is 18 m tall?

A 1.2

B 1.5

C 1.7

D 2.0

4 A particle moves 0.8 mm as a result of a longitudinal wave. Which of the following is greater than this distance?

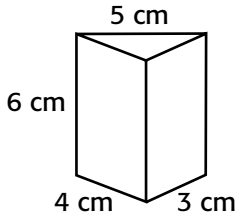
F 8.0×10^{-3} m

G 8.0×10^{-4} m

H 8.0×10^{-5} m

J 8.0×10^{-1} mm

5 Two sides of this triangular prism are right triangles. Using this information and the information presented in the diagram below, calculate the prism's surface area.



A 48 cm^2

B 120 cm^2

C 72 cm^2

D 84 cm^2

6 Circle B has a radius of 2 cm. If the radius is doubled, what will be the change in the area of the circle?

F 2 times as great

G 4 times as great

H Half as great

J 8 times as great

STOP

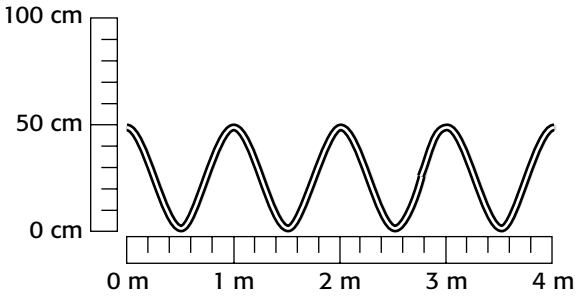
Name_____ Date_____ Class _____

CHAPTER 7 TAKS TEST PREPARATION FOR MATH IN SCIENCE

Math Mini-Test TEKS

Section 2

1 This wave was generated by vibrating one end of a rope. What is its wavelength?



A 1.0 m
B 2.5 m
C 3.0 m
D 3.5 m

2 What is a reasonable estimate of the amplitude of the wave shown above?

F .25 m
G 1 m
H 1.5 m
J 2 m

3 If a wave's wavelength can be found using the formula

$$wavelength = \frac{wave\ speed}{frequency},$$

what is the wave speed of a wave with a wavelength of 2 m and a frequency of 12 Hz?

A 0.17 m/s
B 6 m/s
C 14 m/s
D 24 m/s

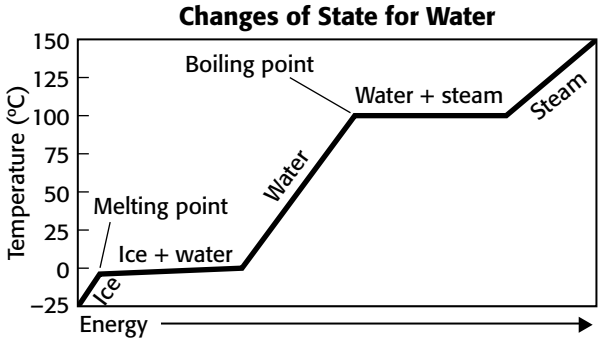
4 Rafael bought supplies for his new puppy. Including tax, he paid $10.95 for food, $7.49 for a collar, and $8.25 for toys. How much did he spend altogether?

F $25.59
G $25.69
H $26.69
J $30.59

5 If $9a - 10 = 26$, what is the value of a?

A 1.8
B 4
C 25
D 27

6 According to the graph, what happens to the temperature of water while it is changing from liquid water into steam?



F It increases.
G It decreases.
H It remains the same.
J It increases, then decreases.

STOP

Name_____ Date_____ Class _____

CHAPTER 7 TAKS TEST PREPARATION FOR MATH IN SCIENCE

Math Mini-Test TEKS

Section 3

1 A wave travels away from its source, reaches a wall, and bounces back to its source. If this entire process occurs in 3 seconds, how long does it take for the wave to travel from the source to the wall?

A 1.5 s

B 1.7 s

C 3 s

D 6 s

2 What is the length of the hypotenuse of a right triangle if the triangle's other two sides measure 9 cm and 12 cm?

F 9 cm

G 12 cm

H 15 cm

J 21 cm

3 Mariah traveled to Tokyo, Japan, where the unit of currency is the yen. One night she spent 3936 yen for dinner. If the exchange rate was 123 yen to each U.S. dollar, which is the best estimate of how much she paid for dinner in U.S. dollars?

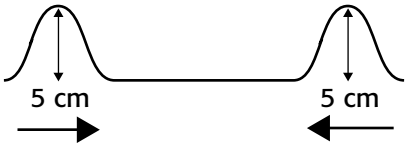
A $0.03

B $484,128

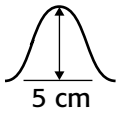
C $32

D $13

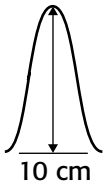
4 Which answer shows the result if the two waves shown below interfere constructively?



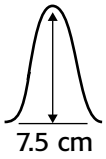
F



G



H



J

STOP

Name_____ Date_____ Class _____

CHAPTER 7 TAKS TEST PREPARATION FOR READING IN SCIENCE

Reading Mini-Test TEKS

Section 1

Read the passage. Then read each question that follows the passage. Decide which is the best answer to each question.

When a particle vibrates, or moves back and forth, it can pass its energy to a particle next to it. The second particle will vibrate like the first particle does. The second particle can then pass its energy to another particle. In this way, energy is transmitted through a medium.

Sound waves require a medium. Sound energy travels by the vibration of particles in liquids, solids, and gases. If there are no particles to vibrate, no sound is possible. If you put an alarm clock inside a jar and removed all the air from the jar, you would cease to hear the alarm.

1 What is the main idea of the second paragraph?

A A particle can pass its energy to a particle near to it.

B Particles are not affected by energy.

C All energy comes from the sun.

D Sound waves require a medium.

2 The author probably wrote this passage to

F convince the reader that sound waves travel faster than light waves.

G entertain the reader by relating how sound waves were discovered.

H inform the reader about how some waves travel through a medium.

J express how powerful a sound wave can be.

3 In this passage, the word medium means

A between low and high.

B between large and small.

C a substance through which something travels.

D someone who channels spirits.

4 Light waves do not require a medium. Therefore, if you put a flashlight inside a jar and removed all the air from the jar, then

F you would cease to see the light from the flashlight.

G the light from the flashlight would be transmitted as usual.

H the light would make a noise.

J the light would replace the air in the jar.

STOP

Name_____ Date_____ Class _____

CHAPTER 7

TAKS TEST PREPARATION FOR READING IN SCIENCE

Reading Mini-Test TEKS

Section 2

Read the passage. Then read each question that follows the passage. Decide which is the best answer to each question.

If you tie one end of a rope to the back of a chair, you can create waves by moving the other end up and down. Moving the rope a small distance makes a short wave. Moving the rope a greater distance makes a taller wave.

The property of waves that is related to the height of a wave is known as amplitude. The amplitude of a wave is the maximum distance the particles of the medium vibrate from their rest position. The rest position is the place where the particles of a medium stay when there are no disturbances.

1 According to the information in the passage, which of the following is a valid conclusion?

A Ropes are the best medium for displaying the properties of waves.

B The rest position is the distance the particles of a medium vibrate.

C Moving a rope tied to a doorknob a small amount will produce a large wave.

D The amplitude of a wave is related to its height.

2 When there is not a wave passing through a medium, the particles are at

F the amplitude.

G their rest position.

H the maximum distance.

J the maximum height.

3 If the rope in the first paragraph was moved up and down a very great distance, the wave created would

A have a very large amplitude.

B have a very large rest position.

C be a very short wave.

D have a very small amplitude.

4 It can be inferred from the passage that

F a wave with greater amplitude is taller.

G a wave with greater amplitude is shorter.

H waves can only be made with ropes.

J a wave cannot be made with a rope tied to a chair.

STOP

Name_____ Date_____ Class _____

CHAPTER 7 TAKS TEST PREPARATION FOR READING IN SCIENCE

Reading Mini-Test TEKS

Section 3

Read the passage. Then read each question that follows the passage. Decide which is the best answer to each question.

Reflection occurs when a wave bounces back after hitting a barrier. All waves—including water, sound, and light waves—can be reflected. Reflected sound waves are called echoes. And light waves reflecting off an object allow you to see that object. For example, light waves from the sun are reflected when they hit the surface of the moon. These reflected waves allow us to enjoy moonlight at night. In fact, you could say that moonlight is reflected sunlight.

1 What is the main idea of the passage?

A Moonlight is reflected sunlight.

B Sunlight is reflected moonlight.

C Echoes are the name for reflected sound waves.

D All waves can be reflected.

2 From the passage, it is clear that a wave in a swimming pool

F can be reflected off of the side of the pool.

G is not one of the types of waves that can be reflected.

H is called an echo.

J is a type of sound wave.

3 If a room is dark, that means there are no

A sound waves.

B light waves.

C echoes.

D waves of any kind.

4 The author probably wrote this passage to

F explain what reflection is, and to give some examples of reflection.

G convince the reader to look at the next full moon.

H convince the reader to try to stop reflection.

J explain what waves are, and to give some examples of waves.

STOP

CHAPTER 7

TAKS TEST PREPARATION FOR MATH IN SCIENCE

Answer Key and TAKS Doctor for Mini-Tests

Section 1

Answers	TEKS Correlation	TAKS Objectives
1 C	M 8.7B	3
2 H	M 8.1D	1
3 C	M 8.3B	2
4 F	M 8.1A	1
5 D	M 8.8A	4
6 G	M 8.10A	4

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 4 *asks students to find the answer that is greater than 0.8 mm.*

F **Correct.** This answer is found by converting millimeters to meters using the conversion 1 m = 1000 mm. Thus, 0.8 mm is equal to 0.0008 m, which is 8.0×10^{-4} m. The only answer that is greater than this value is 8.0×10^{-3} m, which is 0.008 m.

G **Incorrect.** This answer is equal to 0.8 mm and is neither greater nor smaller.

H **Incorrect.** This answer is equal to 0.00008 m, which is smaller than 0.8 mm.

J **Incorrect.** This answer is equal to 0.8 mm, which is neither greater nor smaller.

Item 5 *asks the students to calculate the surface area of a triangular prism using the dimensions given in a diagram.*

A **Incorrect.** This answer is found by adding only the surface areas of the faces that can be seen in the diagram. The total, therefore, is the sum of 6 cm × 4 cm, $\frac{1}{2}$(3 cm × 4 cm), and 6 cm × 3 cm, or 48 cm^2. These calculations result in an incorrect total surface area because they do not include the surface area of the two sides of the triangular prism which cannot be seen, but which are implied by the diagram.

B **Incorrect.** This answer is found by assuming that the length and width of the rectangular sides are the same. This answer, therefore, is found by calculating (6 cm × 6 cm) + (6 cm × 6 cm) + (6 cm × 6 cm) = 108 cm^2, instead of (6 cm × 5 cm) + (6 cm × 4 cm) + (6 cm × 3 cm) = 72 cm^2. The rest of the calculations were completed correctly, but the total surface area that results, 120 cm^2, is wrong because of the surface area of the rectangular faces was calculated incorrectly.

C **Incorrect.** This answer was found by calculating the surface areas of the three rectangular sides correctly, but failing to include the surface areas of the two triangular sides in the final sum of surface areas.

D Correct. The surface area of a triangular prism is calculated by adding the area of each of the prism's sides. The area of the two triangular sides can be found using the formula $a = \frac{1}{2}(base \times height)$, where the base is 4 cm and the height is 3 cm. This product, $\frac{1}{2}(4 \text{ cm} \times 3 \text{ cm}) = 6 \text{ cm}^2$, must be doubled, $2(6 \text{ cm}^2) = 12 \text{ cm}^2$, because there are two sides with these dimensions (top and bottom, as shown in the diagram). The area of the three rectangular faces of the prism can be calculated using the formula $a = width \times height$. According to the label in the diagram, the height of each face is 6 cm, and the width of each face is determined by the side of the triangle it shares. The three faces, therefore, have surface areas of $6 \text{ cm} \times 3 \text{ cm} = 18 \text{ cm}^2$, $6 \text{ cm} \times 4 \text{ cm} = 24 \text{ cm}^2$, and $6 \text{ cm} \times 5 \text{ cm} = 30 \text{ cm}^2$. The surface areas of these three faces can then be added to the surface area of the combined triangular faces to find the surface area of the entire rectangular prism. $18 \text{ cm}^2 + 24 \text{ cm}^2 + 30 \text{ cm}^2 + 12 \text{ cm}^2 = 84 \text{ cm}^2$

Answer Key and TAKS Doctor for Mini-Tests

Section 2

Answers	TEKS Correlation	TAKS Objectives
1 A	M 8.4	
2 F	M 8.2C	1
3 D	M 8.2B	1
4 H	M 8.2B	1
5 B	M 8.5A	2
6 H	M 8.4	

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 3 *asks students to find the wave speed of a wave given its wavelength and frequency.*

A **Incorrect.** This answer is found by dividing the wavelength by the frequency instead of multiplying the frequency by the wavelength.

B **Incorrect.** This answer is found by dividing the frequency by the wavelength instead of multiplying the frequency by the wavelength.

C **Incorrect.** This answer is found by adding the wavelength to the frequency instead of multiplying the frequency by the wavelength.

D **Correct.** This answer is found by correctly multiplying the frequency by the wavelength.

Item 5 *asks students to solve for* a *in the equation* $9a - 10 = 26$.

A **Incorrect.** This answer is found by subtracting 10 from both sides of the equation instead of adding it, then dividing both sides by 9.

B **Correct.** To solve for a, add 10 to both sides of the equation, and then divide both sides of the equation by 9. $9a - 10 = 26$; $9a = 36$; $a = 4$

C **Incorrect.** This answer is found by adding 9 to -10 to find -1, and then adding -1 to the other side of the equation.

D **Incorrect.** This answer is found by adding 9 to -10 to find -1, and then adding 1 (by dropping the negative sign) to each side of the equation.

CHAPTER 7 TAKS TEST PREPARATION FOR MATH IN SCIENCE

Answer Key and TAKS Doctor for Mini-Tests

Section 3

Answers	TEKS Correlation	TAKS Objectives
1 A	M 8.2B	1
2 H	M 8.9A	4
3 C	M 8.2C	1
4 G	M 8.15A	6

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 2 *asks students to figure out the length of the hypotenuse of a right triangle given that the other two sides are 9 cm and 12 cm.*

F **Incorrect.** This is one side of the triangle, but it is not the length of the hypotenuse.

G **Incorrect.** This is one side of the triangle, but it is not the length of the hypotenuse.

H **Correct.** The length of the hypotenuse can be found using the Pythagorean Theorem, $a^2 + b^2 = c^2$, and solving for c.
$(9\text{cm})^2 + (12\text{ cm})^2 = c^2$; $81\text{ cm}^2 + 144\text{ cm}^2 = c^2$; $225\text{ cm}^2 = c^2$, $\sqrt{225\text{ cm}^2} = c$; $c = 15$ cm

J **Incorrect.** This answer is found by adding the two given sides of the triangle. To find the missing side of the triangle, however, the Pythagorean Theorem must be used.

Item 3 *asks students to convert 3936 yen to U.S. dollars if the exchange rate is 123 yen to the dollar.*

A **Incorrect.** This answer is found by dividing the number of yen to the U.S. dollar, 123, by the number of yen spent, 3936.

B **Incorrect.** This answer is found by setting up an incorrect proportion of $\frac{1\text{ U.S. dollar}}{123\text{ yen}} = \frac{3936\text{ yen}}{x\text{ U.S. dollars}}$. The equation is then solved for x by multiplying 3930 by 123 and then dividing that number by 1.

C **Correct.** This answer is found by setting up the proportion $\frac{123\text{ yen}}{1\text{ U.S. dollar}} = \frac{3936\text{ yen}}{x\text{ U.S. dollars}}$, then solving for x by multiplying 3936 by 1 and dividing the product by 123.

D **Incorrect.** This answer is found by subtracting the number of yen to the dollar, 123, from the number of yen she spent on dinner, 3936, instead of setting up the correct proportion.

Answer Key and TAKS Doctor for Mini-Tests

Section 1

Answers	TEKS Correlation	TAKS Objectives
1 D	R 8.10F	1
2 H	R 8.12A	3
3 C	R 8.9B	1
4 G	R 8.10H	4

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 to identify the main idea of the second paragraph.*

A **Incorrect.** This idea is the main idea of the first paragraph, not the second.

B **Incorrect.** This statement is not true, as explained in the first paragraph, and is not discussed in the second paragraph.

C **Incorrect.** Though much of Earth's energy comes from the sun, this is not mentioned in either paragraph.

D **Correct.** The first sentence of the second paragraph states the main idea of that paragraph. The rest of the paragraph goes on to expand this idea with an explanation and the description of an experiment.

Item 4 *asks students to make an inference about light waves.*

F **Incorrect.** This answer would be correct if light waves were similar to sound waves in that they require a medium. However, the question states that light waves do not require a medium.

G **Correct.** Because light waves do not require a medium to travel, removing the medium would have no effect on the flashlight in the jar.

H **Incorrect.** The passage does not imply that light waves make a noise when the surrounding air is removed.

J **Incorrect.** Nothing in the passage implies that light waves would replace the air in the jar.

Answer Key and TAKS Doctor for Mini-Tests

Section 2

Answers	TEKS Correlation	TAKS Objectives
1 D	R 8.10H	4
2 G	R 8.10E	3
3 A	R 8.10K	
4 F	R 8.10H	4

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 2 *asks students to identify a supporting detail from the passage.*

F **Incorrect.** According to the fourth sentence, amplitude is a wave characteristic, not a characteristic of particles before a wave arrives.

G **Correct.** The last sentence states that the rest position is where the particles of a medium stay when there are no disturbances.

H **Incorrect.** The particles are at their maximum distance when they are farthest from their resting point, which can only happen when a wave is passing through them.

J **Incorrect.** The particles are at their maximum height when a wave is passing through them and they are farthest from their resting point.

Item 4 *asks students to make an inference based on the information given in the passage.*

F **Correct.** In the second paragraph, it is stated that amplitude is related to height and that amplitude reflects the maximum distance of a wave's particles from their resting point. Therefore, a wave with greater amplitude is taller.

G **Incorrect.** The height of a wave increases as the amplitude increases. It does not decrease.

H **Incorrect.** The passage does not imply that waves can only be made with ropes, though a rope tied to a chair is used as an example.

J **Incorrect.** The first paragraph demonstrates that a wave can be made with a rope tied to a chair.

Answer Key and TAKS Doctor for Mini-Tests

Section 3

Answers	TEKS Correlation	TAKS Objectives
1 D	R 8.10F	1
2 F	R 8.10H	4
3 B	R 8.10K	
4 F	R 8.12A	3

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 2 *asks students to interpret the passage in order to predict the behavior of a wave in a swimming pool.*

F **Correct.** As stated in the second sentence, all waves can be reflected. A water wave could be reflected by the side of the pool.

G **Incorrect.** The second sentence, which states that all waves can be reflected, contradicts this answer choice.

H **Incorrect.** As stated in the third sentence, echoes are reflected sound waves, not reflected water waves.

J **Incorrect.** The passage does not mention or imply that a water wave is a type of sound wave.

Item 3 *asks students to use the information in the passage to make an inference about a darkened room.*

A **Incorrect.** According to the fourth sentence, it is the reflection of light waves which allows us to see. From this, it can be inferred that a darkened room is one with no reflected light waves. Sound waves, as evidenced by noises, can exist in a darkened room.

B **Correct.** A darkened room is one with no reflected light waves.

C **Incorrect.** Sound can travel through the air in a darkened room, so it is possible for a darkened room to have echoes.

D **Incorrect.** Sound can travel through the air in a darkened room, so it is possible for a darkened room to have at least one kind of wave.