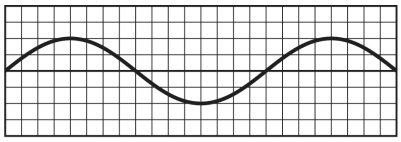
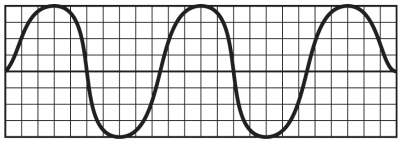
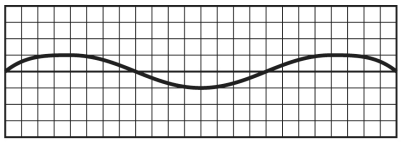
2023-2024 Gr8 Science Benchmark Unit 4

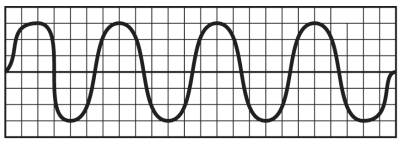
Question 1.

The volume of a sound depends on the amplitude of the sound waves. The lower the amplitude of a sound wave, the quieter the sound. Which of the following sound waves illustrates the quietest sound?

A. 

B. 

C. 

D. 

Question 2.

Which best compares the reliability of analogy signals and digital signals?

A. Only analog signals are reliable.

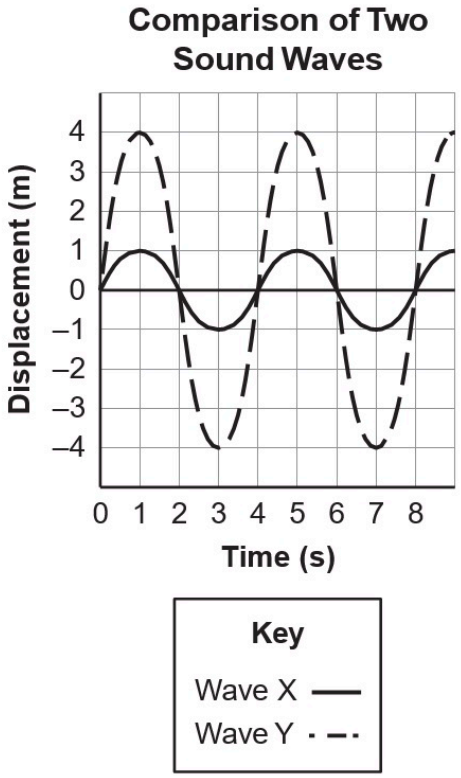
B. Analog signals are more reliable than digital signals.

C. Digital signals are more reliable than analog signals.

D. Both types of signals are equally reliable.

Question 3.

This graph represents sound waves generated by a vibrating string at two energy levels.



Which statement best describes the difference in energy between Wave X and Wave Y?

A. The energy of Wave Y is one-fourth of the energy of Wave X.

B. The energy of Wave Y is 4 times greater than the energy of Wave X.

C. The energy of Wave Y is one-sixteenth of the energy of Wave X.

D. The energy of Wave Y is 16 times greater than the energy of Wave X.

Question 4.

When we look at a box of crayons, our eyes perceive the crayons to be different colors.

Which of the following statements explains why this is true?

A. Crayon wax transmits light, so the transmitted light determines the color of each individual crayon.

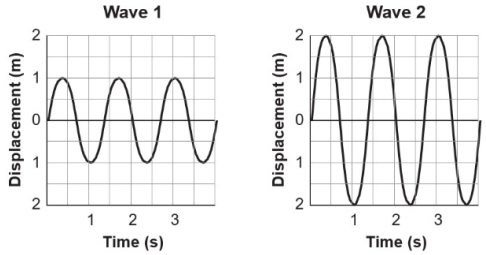
B. The crayons appear to be different colors because they are emitting colored light.

C. We see the color of light that is absorbed by the crayon pigments.

D. We see the color of light that is reflected by the pigments in the wax.

Question 5.

Weichung and Suzi use a long piece of rope to model wave motion. They each hold one end of the rope, and Weichung moves his end up and down, forming a wave. They form Wave 1 under one set of conditions and Wave 2 under a different set of conditions, as represented in the graphs.



a. Compare each of the following wave characteristics for Wave 1 and Wave 2.

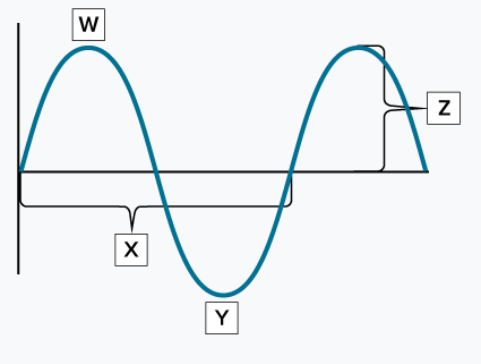
- wavelength
- amplitude
- frequency

Use specific information from the graphs to support your comparisons.

b. Describe how many times greater the amount of energy carried by Wave 2 is than the amount of energy carried by Wave 1. Explain your reasoning.

Question 6.

A student constructed a model of a wave, as shown.



The student wants to add another wave to their model. The wave will have the same frequency as the original wave but will come from a much greater energy source.

Which part of the student's original wave will not change in the new wave?

A. Part W

B. Part X

C. Part Y

D. Part Z

Question 7.

A scientist compares two waves. Wave A has crests that are 5 meters apart and moves at a speed that results in 25 crests passing a point in 120 seconds. Wave B has crests that are 8 meters apart; 10 crests move past a point in 30 seconds.

Which statement best compares the frequencies of the waves?

A. Wave A has a frequency of 0.21 Hz, which is greater than the frequency of wave B.

B. Wave B has a frequency of 0.33 Hz, which is greater than the frequency of wave A.

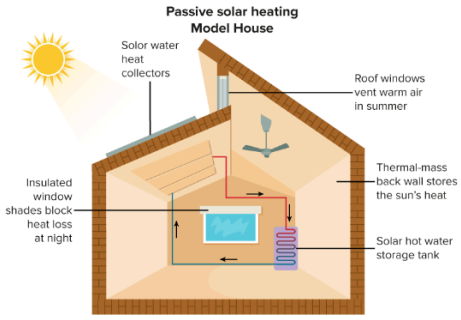
C. Wave A has a frequency of 0.86 Hz, which is greater than the frequency of wave B.

D. Wave B has a frequency of 0.60 Hz, which is greater than the frequency of wave A.

Question 8.

A student wants to build a model house to illustrate how certain home designs allow more natural sunlight to enter the home than other designs.

The student finds a model house, shown below, to use to design a solution to amount of sunlight a home would receive during the winter and the summer.



Which house material shown in the model best reflects light waves?

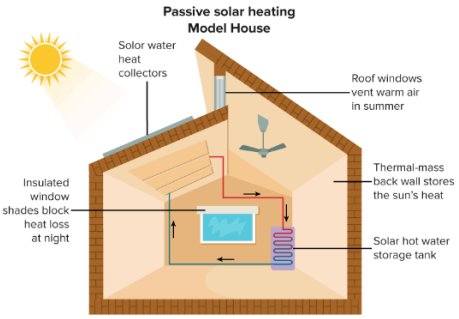
A. concrete floors

B. glass windows

C. metal roof

D. wooden beams

Question 9.



The student wants to determine how light would move in the house.

Describe how light would be absorbed and transmitted through the house.

Describe a change the student could make to the design to increase the amount of light that the house absorbs and transmits in the evening. Refer to the student's diagram of the model house in your answer.

Question 10.

Identify three devices that were developed to send or receive signals carried by electromagnetic waves.

Question 11.

Which does NOT help explain why digital signals are more reliable than analog signals?

A. Noise is more easily filtered from digital signals.

B. Digital signals are smooth and continuous.

C. Digital signals consist of two values only.

D. Analog signals deteriorate due to noise.

Question 12.

For a wave, the _____ the amplitude, the _____ energy the wave carries.

A. larger, more

B. smaller, more

C. larger, less

D. smaller, same

Question 13.

In recent years, most television stations have converted their broadcasts from analog transmissions to digital transmissions.

A. Analog transmissions are much slower.

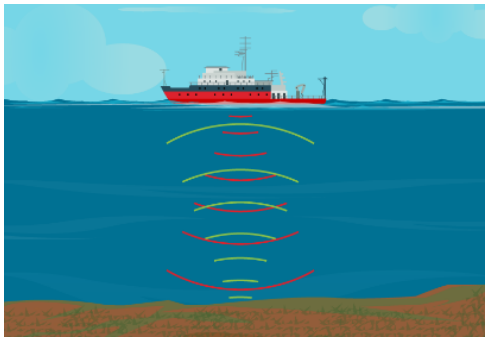
B. The picture is clearer with digital signals.

C. Digital signals can be encrypted for security.

D. The sound is not as reliable in analog transmissions.

Question 14.

Ships on the surface of the ocean rely on sound waves to find objects on the sea floor and to map what the seafloor looks like. Sound waves are ideal for this because they travel very easily and quickly through water. To show this, a student created a model of a ship on the surface of the ocean and an uneven sea floor.



How do the sound waves help the ship on the surface find objects on the sea floor?

A. The ship sinks a receiver to the bottom that collects the sound waves and transmits them back to the surface.

B. The waves sent from the ship are absorbed by the bottom before they get rearranged and sent back to the surface.

C. The water reflects the sound waves as they head towards the bottom, and then refocuses them back towards the ship.

D. The waves reflect off the

bottom and are collected by a receiver on the ship, which creates a picture of what things look like.

Question 15.

Diversity among members of a species is important because diversity

A. ensures high levels of competition.

B. increases the available ecosystem resources.

C. ensures the variety of reproductive methods for a species.

D. increases the chances of survival under changing conditions.

Question 16.

Which of these adaptations is LEAST important for human survival?

A. having thumbs

B. eye color

C. walking upright

D. developing language