

REVIEW FOR WAVES QUIZ

Name: VH Key Quiz Date: 1/22

This quiz will cover information from the first part of our unit on waves. It will consist of some multiple choice, fill-in-the-blank, drawing, and short answer questions. You should review your DQs, labs, waves article, simulation, reading notes, and concepts from activities we've done. Be able to hit the following targets:

- I can diagram and describe the anatomy and characteristics of mechanical, electromagnetic, transverse, and longitudinal waves.
- I can describe and diagram how to change the wavelength, amplitude, and frequency of a wave.
- I can explain and calculate how the energy of a wave is related to the amplitude and wave speed.

1. Waves that do not require a medium to transfer energy are called _____ waves.

- A. mechanical
☒ B. electromagnetic
C. transverse
D. longitudinal

2. Waves whose particles vibrate in the same direction the wave travels are called _____ waves.

- A. mechanical
B. electromagnetic
C. transverse
☒ D. longitudinal

3. The number of waves produced in a given amount of time is better known as:

- A. amplitude
B. reflection
☒ C. frequency
D. wavelength

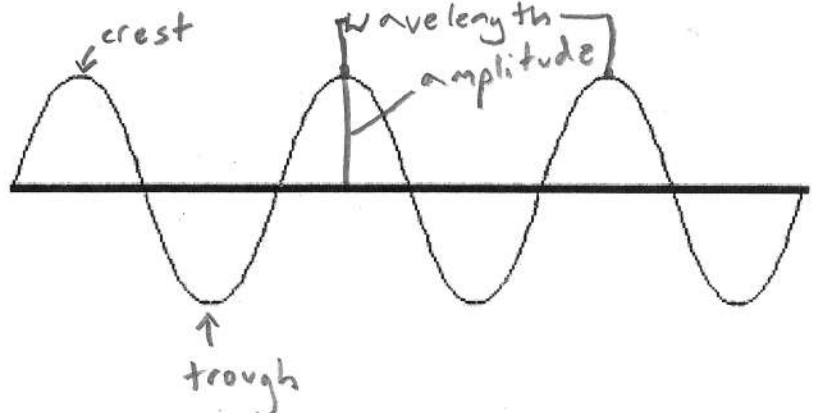
4. The energy of a wave is directly calculated using its _____.

- ☒ A. amplitude
B. wavelength
C. frequency
D. Hertz

5. An example of a medium is a:

- A. solid
B. liquid
C. gas
☒ D. all of the above

6. Clearly label the diagram of the transverse wave with the following terms: **crest**, **trough**, **wavelength**, and **amplitude**.

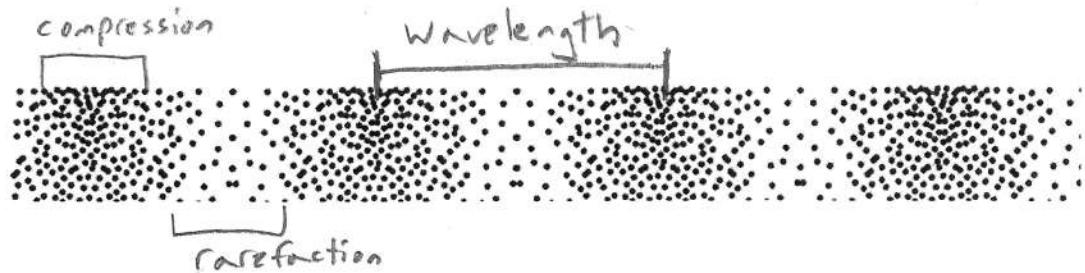


7. If the wave shown here is being created by moving a slinky back and forth along the ground, describe what you would have to do to increase its frequency?

Shake back
and forth faster.

You will create
more waves per
second.

8. Clearly label the diagram of the longitudinal wave with the following terms: **rarefaction**, **compression**, and **wavelength**.



What is an example of this kind of wave? sound

9. Which of these two waves has the **highest wave speed**? Show the formula used (or describe how you calculated this) and show your work.

Formula: $v = \lambda \cdot f$ speed = wavelength · frequency

$\text{Hz} = \frac{\text{Wave}}{\text{Second}}$

Wave 1 = 800 Hz and 3 meter wavelength

$v = \frac{800 \text{ waves}}{\text{second}} \cdot 3 \text{ m} = 2,400 \text{ m/s}$

Wave 2 = 6000 Hz and 0.5 meter wavelength

$v = \frac{6000 \text{ waves}}{\text{second}} \cdot 0.5 \text{ m} = 3,000 \text{ m/s}$

10. Why does a faster wave (higher wave speed) have more energy? Explain your answer in terms of **kinetic energy**.

We learned that $KE = \frac{1}{2} (\text{mass}) (\text{velocity}^2)$.

The more speed (velocity) something has, the more kinetic energy it has.

11. What is the formula for calculating the energy of a wave based on its amplitude? Use this formula to calculate the energy of a wave with a 4 meter amplitude. Show your work.

Formula:

$E = a^2$

$E = 4^2$

$E = 16$

12. Why does a wave with a bigger amplitude have more energy? Explain your answer clearly.



A wave with a bigger amplitude is a bigger disturbance. The higher the wave is, the more potential energy it has.

13. What creates ocean waves?

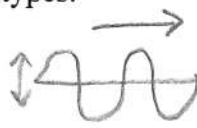
The wind creates waves in the ocean.

14. What's the difference between a swell and a breaking wave? Draw what each would look like.

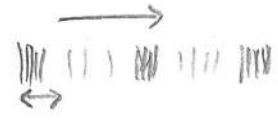
- Swells occur far from shore in the open ocean and gently bob up and down. 
- Breaking waves occur as ocean wave approach shore. The slow down and the water stacks up. 

15. Describe how the "particles" move in each of the following wave types:

- Light wave

- Particles vibrate up and down. 

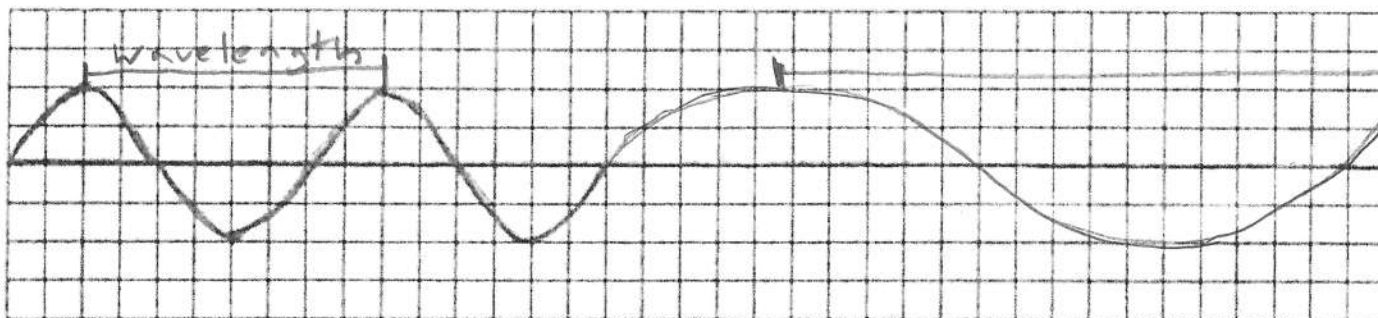
- Sound wave

- Particles vibrate back and forth in the direction of the wave. 

- Ocean wave

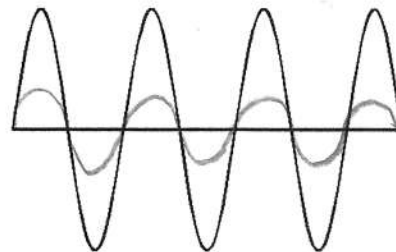
- Particles move in circles 

16. If you **increase** the **wavelength** of a wave, what do you automatically do to its **frequency**? Use the grid below to show what happens. Describe what happens to the frequency.



Frequency decreases.

17. a. Draw on this diagram a wave with the **same frequency** but a **lower amplitude**.



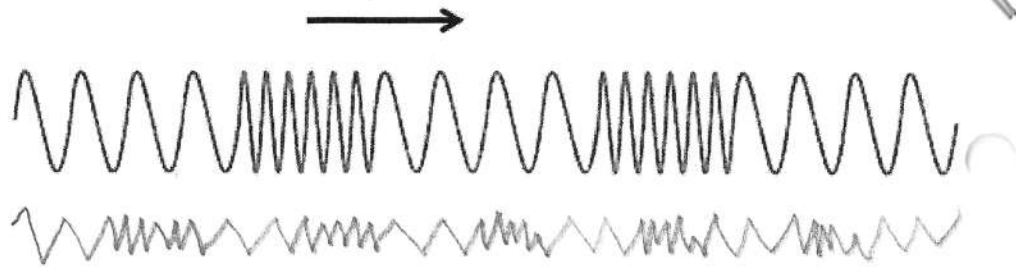
b. What kind of wave is this?

Transverse

c. What is an example of this kind of wave?

Light, rope going up and down, slinky moving side to side

18. a. Draw a picture below the one shown here of a wave with a **higher frequency**.



b. What kind of wave is this?

Longitudinal

c. What is an example of this kind of wave?

Sound, seismic wave, slinky pulsing in and out

Be sure you can define, give examples of, and draw (if appropriate) the following vocabulary words:

Mechanical waves	Electromagnetic waves	Transverse waves	Longitudinal waves
Swells	Breaking waves	Surface waves	Amplitude
Frequency	Wavelength	Wave speed	Crest
Trough	Rarefaction	Compression	Hertz