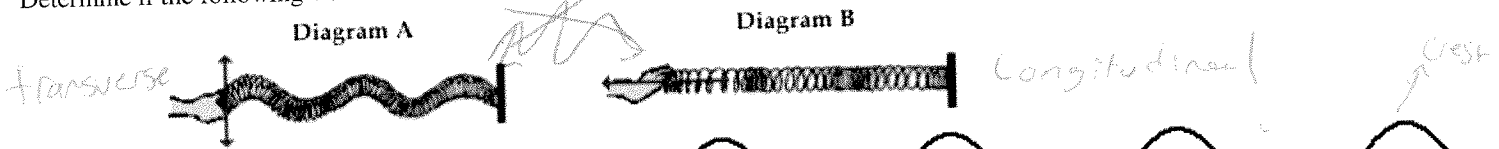


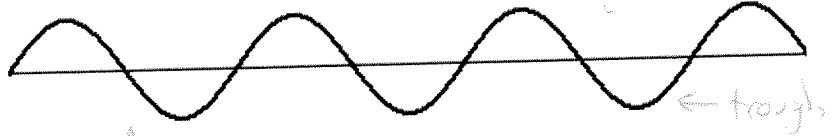
# Physics Study Guide

Name: Key  
 Date: \_\_\_\_\_ Period: \_\_\_\_\_

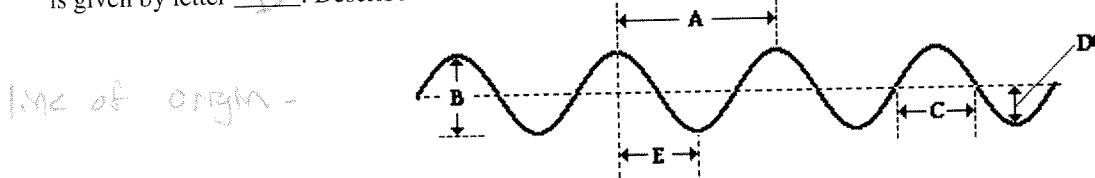
1. TRUE or FALSE: True Waves are created by a vibration.
2. Determine if the following waves are transverse or longitudinal.



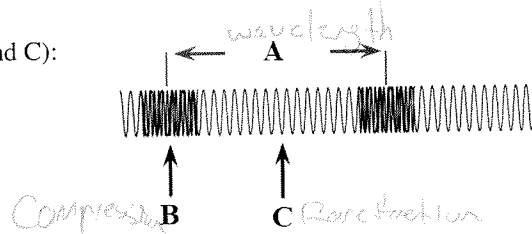
3. On the following wave indicate the crests and troughs.



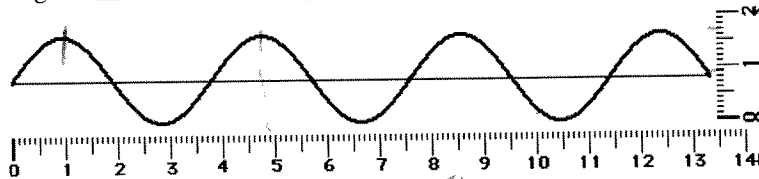
4. The wavelength of the wave in the diagram below is given by letter A and the amplitude of the wave in the diagram below is given by letter D. Describe what the horizontal dashed line represents.



5. Label the following regions (a, B, and C):



6. A sine curve that represents a transverse wave is drawn below. Use the centimeter ruler to measure the wavelength and amplitude of the wave (show units). a. Wavelength = 4 cm b. Amplitude = 0.7 cm



7. The number of cycles of a periodic wave per unit time is called the wave's frequency.

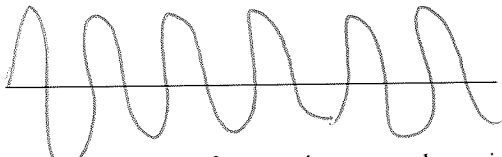
8. When looking at a transverse wave how do you know?

a. Where it is loudest? Quietest? High Amplitude / low Amplitude

b. Highest pitch? Lowest pitch? High frequency / low frequency

Draw a loud high pitch wave

Draw a quiet low pitch wave



9. As the frequency of a wave increases, the period of the wave decreases.

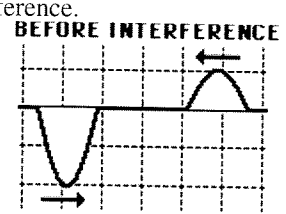
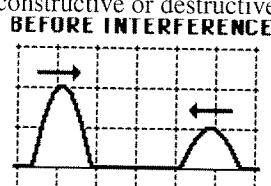
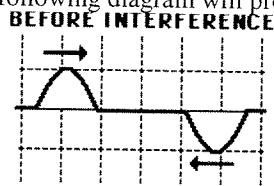
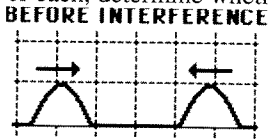
10. As the wavelength of a wave in a uniform medium increases, its frequency must have decreased.

11. The speed of a wave depends upon (i.e., is causally effected by) ... **Select all that apply**

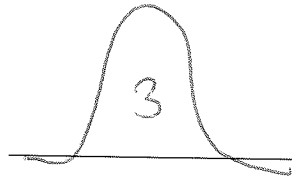
- a. the properties of the medium through which the wave travels
- b. the wavelength of the wave.
- c. the frequency of the wave.
- d. both the wavelength and the frequency of the wave.

tension only effects wave speed

17. **TRUE** or **FALSE**: True Constructive interference occurs when a crest meets up with another crest at a given location along the medium.
18. **TRUE** or **FALSE**: False Destructive interference occurs when a trough meets up with another trough at a given location along the medium.
19. For each, determine whether the following diagram will produce constructive or destructive interference.



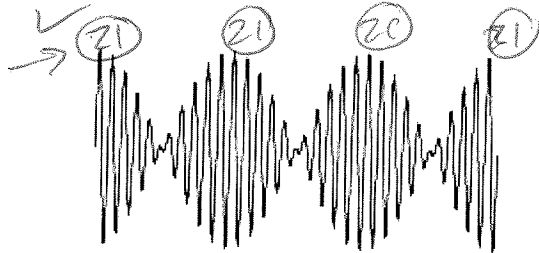
Draw the resulting waves when the overlap in question 17.



20. What are the main equations of the unit? For each equation, define what the symbol represent and the units of the symbols

$$v = \lambda f \quad f = \frac{1}{T} \quad T = \frac{1}{f} \quad n = \frac{c}{v}$$

21. Given the wave to the right, what parts of the wave is the loudest?



22. What affects the speed of a wave? the medium
23. What affects the frequency of a wave? wavelength
24. What affects the wavelength of a wave? frequency

25. A wave has 20 oscillations over 30 seconds. What is the period and frequency of the wave?

$$f = \frac{20}{30} \text{ or } \frac{2}{3} \text{ Hz} \quad T = \frac{30}{20} \text{ or } \frac{3}{2} \text{ s}$$

26. To hunt, bats emit a sound wave with a frequency of 100,000 Hz (humans can only hear up to 20,000 Hz). If the speed of sound through air is 343 m/s, what is the wavelength of the sound waves that bats emit? (this is the length of the small bug it can detect).

$$v = \lambda f \quad 343 = \lambda (100,000) \quad \lambda = 0.00343 \text{ m}$$

27. The period of a wave is 0.0300 seconds. It travels at a velocity of 10.0 m/s. Determine the frequency and the wavelength of the wave.

$$f = \frac{1}{T} = \frac{1}{0.03} \quad f = 33 \text{ Hz} \quad 10 = 33.3 \lambda \quad \lambda = 0.3 \text{ m}$$

28. If 6 waves hit a ship every 42 seconds, what is the frequency of the waves?

$$f = \frac{\text{waves}}{\text{sec}} = \frac{6}{42} = 0.142 \text{ Hz}$$

29. A pendulum swings with a period of 5s. What is the speed of the pendulum if the wavelength is 2m?

$$T = 5 \text{ s} \text{ so } f = \frac{1}{5} \text{ Hz} \quad \lambda = 2 \text{ m} \quad v = \lambda f \quad v = 0.4 \text{ m/s}$$

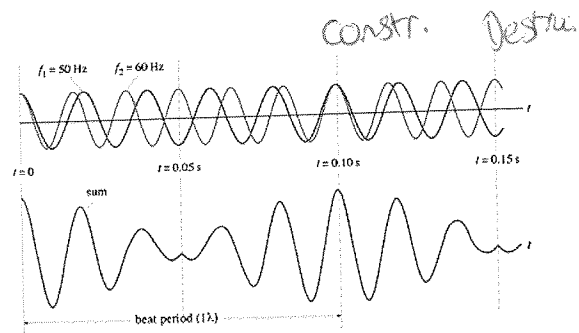
30. How do you know when there is constructive interferences vs destructive interference? Draw an example of each showing before the waves collide and as they collide

Constructive - sound or wave gets bigger

Destructive - waves get smaller



31. Two waves occupied the space to make up the wave above (these two waves are to the right). Label on the wave above, where there is constructive and destructive interference.



32. A wave hits a medium and bends towards the surface (not the normal line). What happened to the speed of the wave in the medium the wave hit?

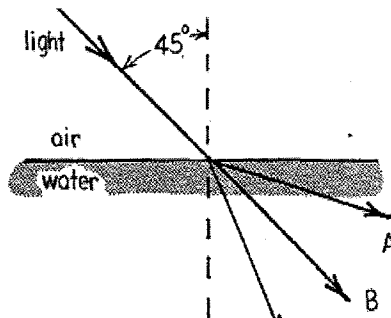
*Refracted & sped up*

a. Does the medium a larger or smaller index of refraction as the medium it came from?  
*smaller*

**Reflection vs Refraction.**

1. The sketch to the right shows a light ray moving from air into water, at 45° to the normal. Which of the three rays indicated with capital letters is most likely the light ray that continues inside the water?

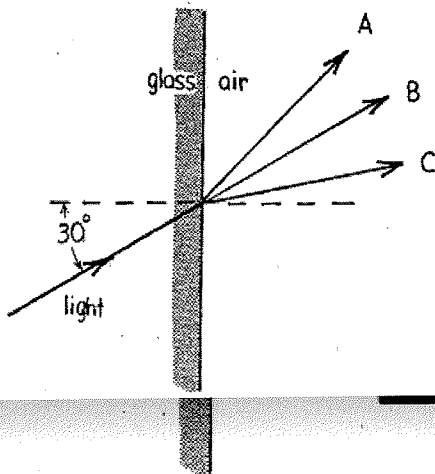
C



Index of Reflection	Material
0.5	Air
1	Water
1.5	Glass

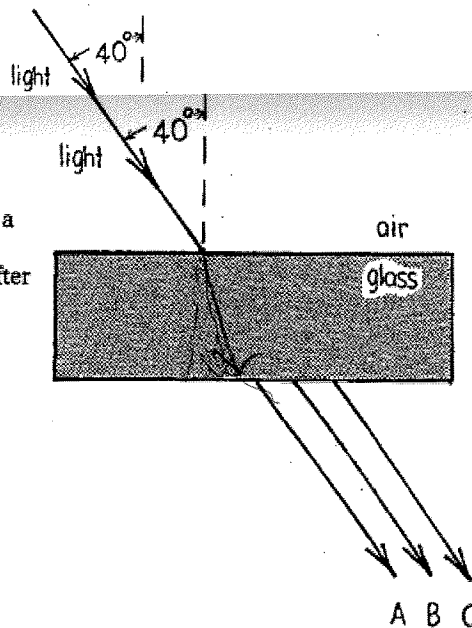
2. The sketch on the left shows a light ray moving from glass into air, at 30° to the normal. Which of the three is most likely the light ray that continues in the air?

A

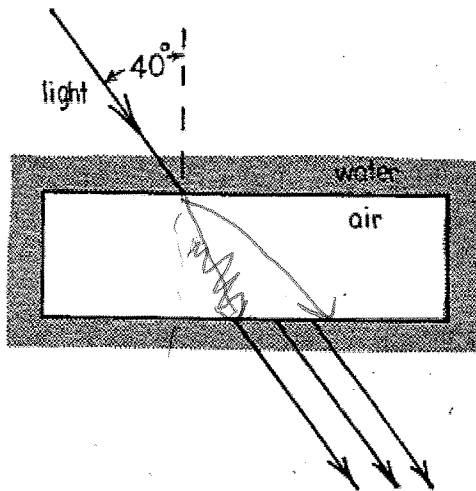


3. To the right, a light ray is shown moving from air into a glass block, at 40° to the normal. Which of the three rays is most likely the light ray that travels in the air after emerging from the opposite side of the block?

A



Sketch the path the light would take inside the glass.



4. To the left, a light ray is shown moving from water into a rectangular block of air (inside a thin-walled plastic box), at 40° to the normal. Which of the three rays is most likely the light ray that continues into the water on the opposite side of the block?

C

Sketch the path the light would take inside the air.

