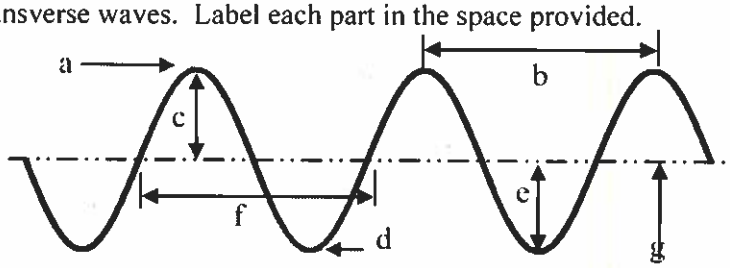
Name Key Period

2019

Waves ~~Review~~ properties Practice

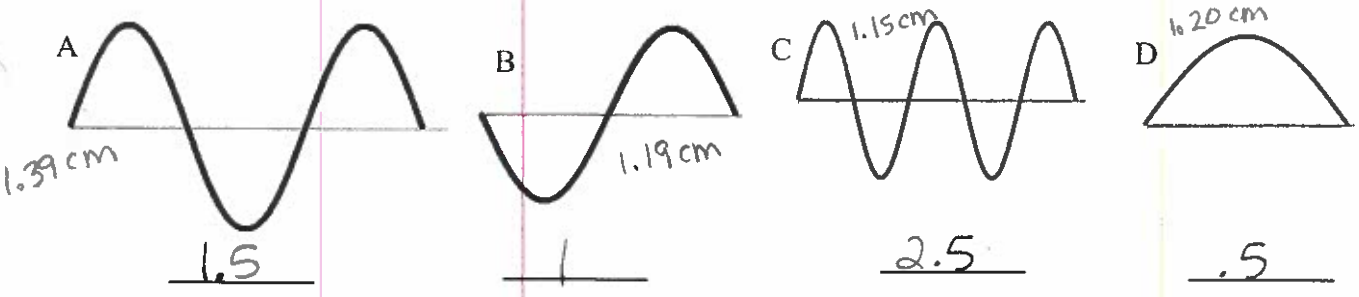
1. The illustration below shows a series of transverse waves. Label each part in the space provided.

a. crest
b. λ
c. Amp
d. trough
e. Amp
f. λ
g. Resting Position



Fill in the blanks:

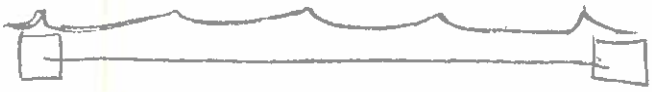
2. Waves carry Energy from one place to another.
3. The highest point on a transverse wave is the crest while the lowest part is the trough.
4. The amplitude is the height of the wave.
5. The distance from one crest to the next is the wavelength.
6. Below are a number of series of waves. Underneath each diagram write the numbers of waves in the series.



a. Which of the above has the biggest amplitude? A
b. Which of the above has the shortest wavelength? C
c. Which of the above has the longest wavelength? D

7. Express in words and mathematically the relationship between $T=\frac{1}{f}$ $f=\frac{1}{T}$
   a. period and frequency T is time it takes for 1 wave to pass a pt., f is the waves per second
   b. wavelength and frequency λ - a pt on a wave to the same pt on the next wave - ↑f = ↓λ
   c. wavelength and period ↑λ = ↑T

8. Consider a wave generator that produces 10 pulses per second. The speed of the waves is 300. cm/s.
   $\frac{10}{1\,sec} = 10\,Hz$
   a. What is the wavelength of the waves? $v = \lambda \cdot f$ $300.\,cm/s = \lambda \cdot 10\,Hz$ $\lambda = 30\,cm$
   b. What happens to the wavelength if the frequency of pulses is increased?
   λ↓ if f↑



9. A wave on Beaver Dam Lake passes by two docks that are 40.0 m apart.

   a. If there is a crest at each dock and another three crests between the two docks, determine the wavelength. 10.0 m
   b. If 10 waves pass one dock every 16.0 seconds, determine the period and frequency of the wave.
   c. What is the speed of the wave?

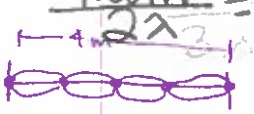
$\frac{10 \text{ waves}}{16.0 \text{ s}} = .625 \text{ Hz}$ $\quad \frac{16.0 \text{ s}}{10\lambda} = 1.60 \text{ s}$

$v = 10.0 \text{ m} \times .625 \text{ Hz} = 6.25 \text{ m/s}$

10. Sally Sue, an enthusiastic physics student enjoyed the opportunity to collect data from standing waves in a spring. She and her partner held the ends of their spring 4.00 meters apart. There were 5 nodes in the standing wave produced. Sally moved her hand from the rest position back and forth along the floor 20 times in 4.00 s. Sketch the situation and determine the following:

   a. the wavelength of the wave Sally Sue sen $\lambda = 2.00 \text{ m}$
   b. the frequency of the wave produced $\frac{20}{4.00 \text{ s}} = 5.00 \text{ Hz}$
   c. the speed of the wave $v = 2.00 \text{ m} \times 5.00 = 10.0 \text{ m/s}$

$\frac{4.00 \text{ m}}{2\lambda} = 2.00 \text{ m}$



11. What frequency and period would be required for Sally and her cheerful, pleasant, hard-working partner to produce a standing wave with three nodes? Explain your reasoning by identifying your steps.

4.00 m, 1λ $\quad \lambda = 4.00 \text{ m}$ $\quad 10.0 \text{ m/s} = 4.00 \text{ m} \times f$ $\quad f = 2.50 \text{ Hz}$ $\quad T = \frac{1}{f} = .400 \text{ s}$

12. The wavelength of a sound wave in this room is 1.13 m and the frequency is 301 Hz.

   a. What is the speed of the wave in the room? $v = 1.13 \text{ m} \times 301 \text{ Hz} = 340. \text{ m/s}$
   b. If you double the frequency of the sound wave, determine its speed. same
   c. What happens to the wavelength if you cut the frequency in half? How do you know?
      if f is halved, the λ is doubled - speed stays same

13. The crest of Wave A (amplitude 1.5 meters) meets up with the crest of Wave B (amplitude 1.5 meters) and produces Wave C.

   a. Draw Wave A, draw Wave B, and draw the resulting Wave C.
   b. What is this phenomenon called? constructive interference
   c. What would happen if the crest of Wave A met the trough of Wave B? Draw the three waves to illustrate

destructive interference

14. Explain why owl hoots are able to diffract more in the forest than a songbird's tweets? Draw a picture to illustrate diffraction.

owl hoots have longer wavelengths that tweets. The longer the λ, the more the wave will diffract. The owl hoots will be able to bend around trees easier.