Waves Worksheet

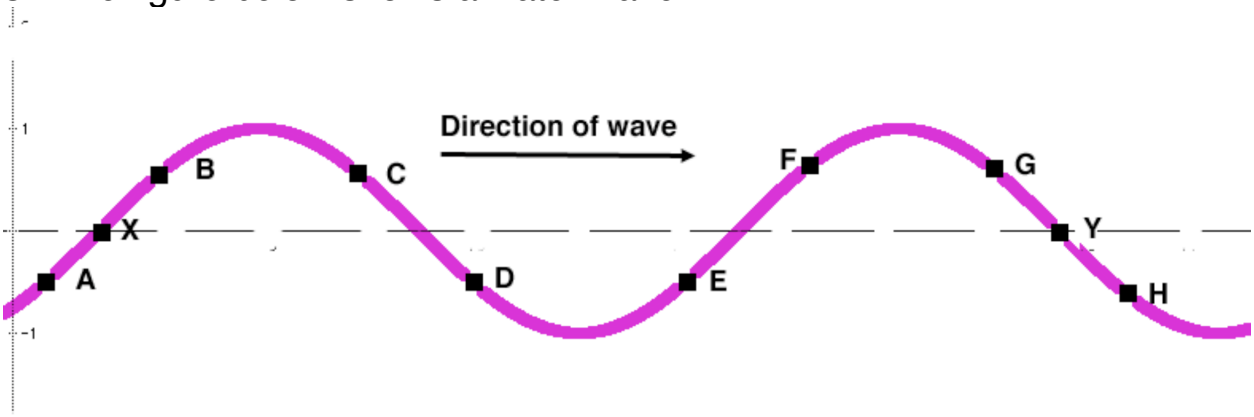
1. The period of a tuning fork is 0.136 seconds. What is its frequency?

2. If a if pendulum oscillates thirty-two times in two minutes,

   a. What is Its frequency?

   b. Its period In seconds?

3. The figure below shows a water wave.



   i. With an arrow, give the direction of motion of a marker placed at each letter.

   ii. Which pair of points are in phase?

   iii. Measure the wavelength in centimeters.

   iv. Label a crest and a trough.

4. A vibrator in a ripple tank vibrates with a frequency of three hertz and an amplitude of 2.5 centimeters. The resulting waves travel away from the source with the speed of 5.7 cm/s passing under various markers for the water.

   I. In what direction do the markers move?

   II. At what frequency do the markers oscillate?

   III. If the frequency of this source is changed to 4.5 Hz what will happen

to

A. the speed of the waves?
B. The frequency of the markers oscillation?

IV. If the amplitude of the source is changed to 1.6 cm. What will happen to

A. The speed of the waves?

B. The frequency of the markers oscillation?

5. The waves created by a stone dropped into a pool of water decrease in amplitude as they radiate out from the source. Why?

6. A pond is 12 m across The crest of two successive waves are 60.0 cm apart and they move across the pond in fifteen seconds.

a. What is the velocity of the waves?

b. What is the frequency of the waves?

c. What is the period of the waves?

7. A swing has a frequency of 0.20 Hz. Its amplitude is of 1.2 m. What total distance does the spring travel in one minute?

8. The period of some ocean waves is 2.7 s.

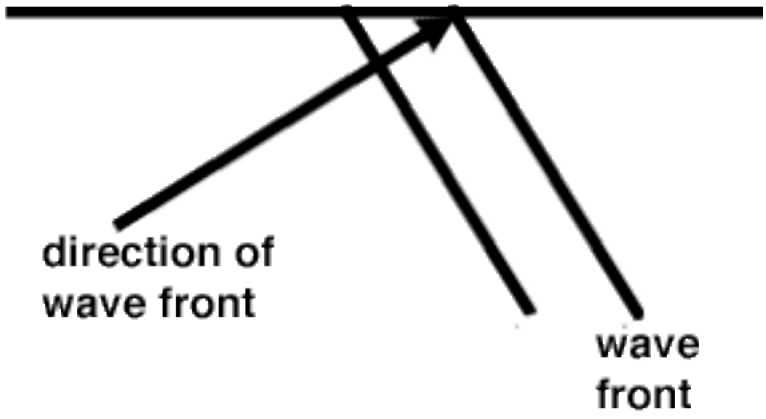
A. How many wave crests will hit the boat into 2.5 minutes?

B. If these waves travel at a speed of 1.3 m/s, what is their wavelength?

C. If these waves slowdown to 0.9 m/s near shore

i. What is their wavelength?
ii. by how much has their frequency changed?
iii. How many wave crests will hit the shore in 2.5 minutes?

9. The figure shows straight incident waves approaching a barrier.



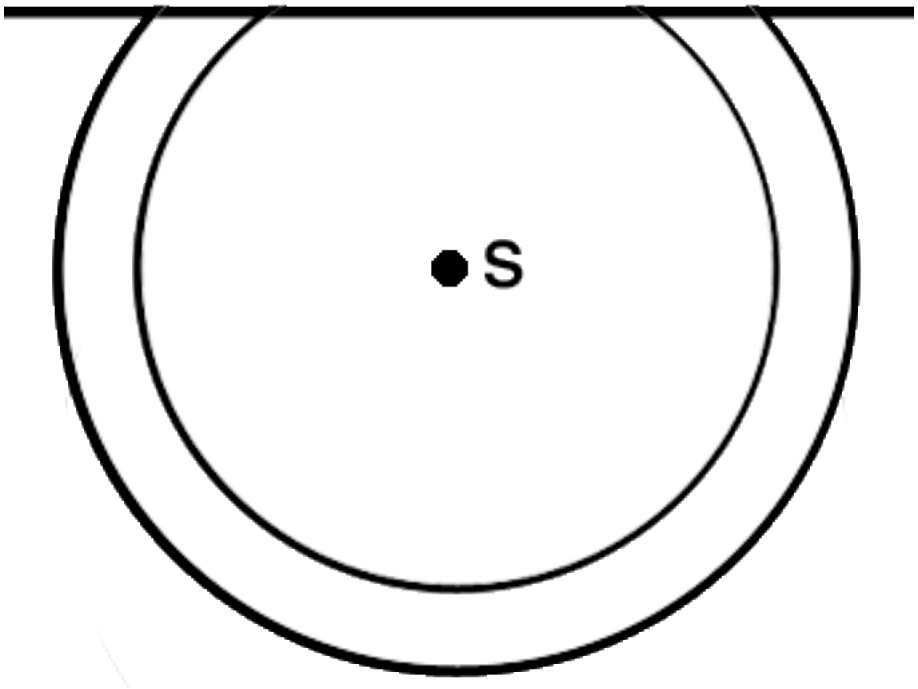
a. With a protractor, measure the angle of incidence. What is this angle?

b. As accurately as you can, draw in the reflected waves, remembering that each reflected wave joins up with the corresponding incident wave at the barrier.

c. With an arrow, indicate the direction of the reflected waves from point X.

d. What is the angle of reflection?

10. The diagram below show circular waves from a point source S approaching a straight barrier.



a. With a ruler, measure the distance from the source to the barrier. Show with a dot labeled S' the point where the reflected waves appear to be coming from.

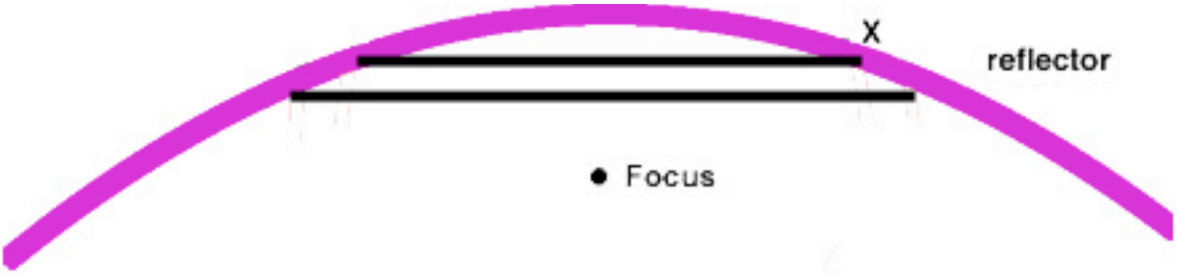
b. With an arrow, indicate the direction of the incident waves toward point X.

c. With a drawing compass, draw in the reflected waves, remembering that each reflected wave joins up with the corresponding incident wave at the barrier

d. With an arrow, indicate the direction of the reflected waves from point X.

e. Are the reflected waves converging or diverging?

11. The diagram below shows straight waves approaching a parabolic reflector. The focus f of the reflector is marked.



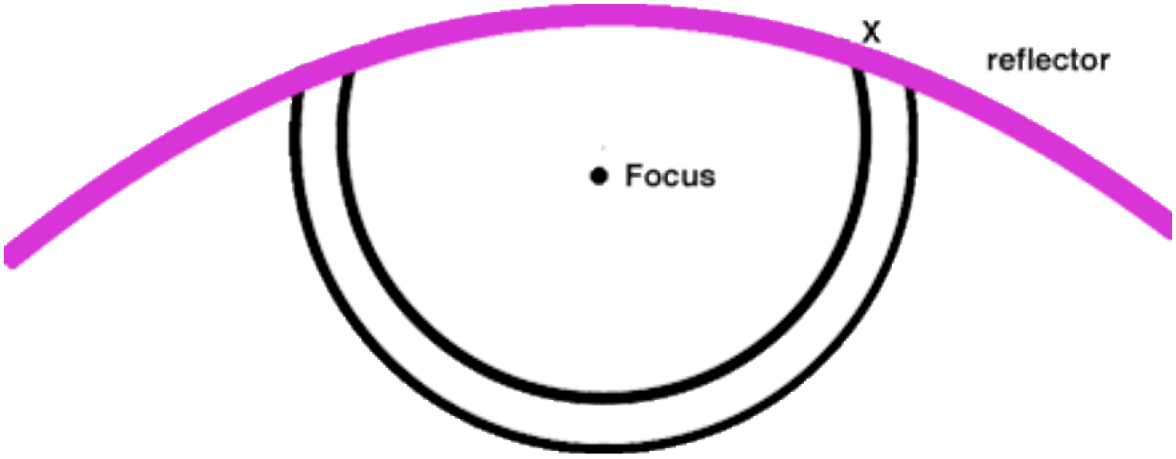
a. With an arrow, indicate the direction of the incident waves toward point x.

b. What is the shape of the reflected waves? Where is their centre? Using a drawing compass, draw in the reflected waves, remembering that each reflected wave joins up with the corresponding incident wave at the barrier.

c. With an arrow, indicate the direction of the reflected waves from point X.

d. Are the reflected waves converging or diverging?

12. The diagram below shows a circular waves diverging from focus F of a parabolic reflector.

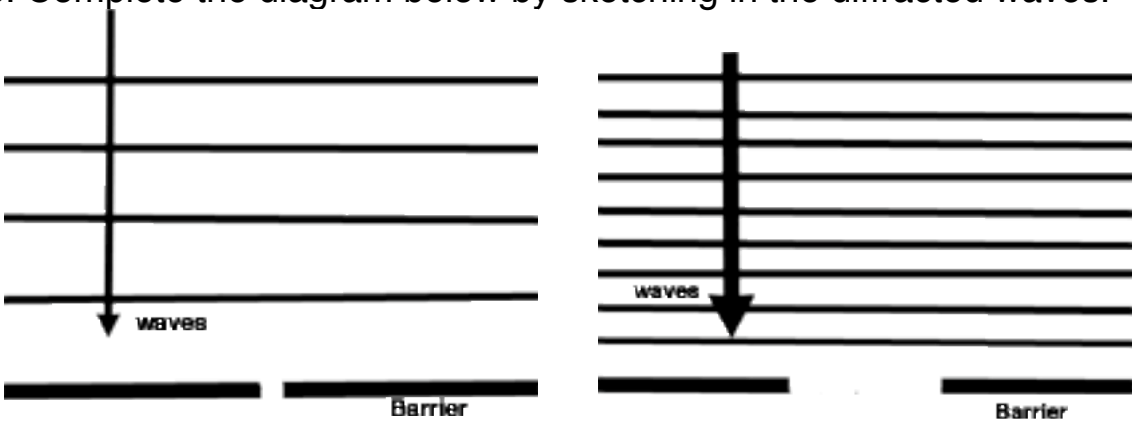


a. With an arrow indicate the direction of the incident waves at point X.

b. What is the shape of the reflected waves? Using a ruler draw in the reflected waves, remembering that each reflected wave joins up with the corresponding incident wave at the barrier.

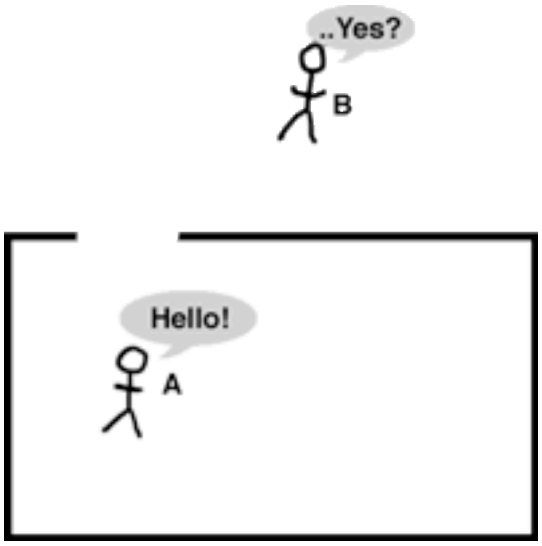
c. With an arrow, indicate the direction of the reflected waves from point X.

13. Complete the diagram below by sketching in the diffracted waves.



14. If light is a wave, what would be the reason we do not notice it bending around corners?

15. The figure below shows person B standing outside a room in which a person A is talking. B can hear A clearly. What does this observation suggest about the wavelength of sound waves? Explain.
Wavelength of sound waves is at least as large as the width of the doorway, since the waves must be bending around the wall almost completely.



16. A bat uses sound waves of wavelength 0.4 cm with which to view the world. Could a bat detect a thin wire hanging in a cave? Explain.

Sound waves of wavelength .4 centimetres will diffract around a thin wire, hence the bat cannot detect the thin wire hanging in the cave.

17. Water waves of wavelength 16 cm cross a boundary into shallow water with an angle of incidence of a 35 degrees. If their wavelength in the shallow water is 12 cm, what is their angle of refraction?

25°

18. Water waves traveling at 1.5 m/s pass from the shallow water into deep with an angle of incidence of 27 degrees. If the angle of refraction is 46 degrees, what is their speed in deep water?

2.4 m/s