

Name: _____

Date: _____

Properties of Waves

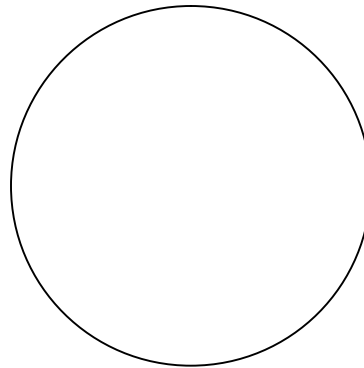
Procedure:

1. The wave tank has been set up for you. Turn on the light. Observe the screen at the base of the tank as you produce a pulse by touching your finger or pencil tip once to the water surface. Answer Data question #1.
2. Place the dowel in the water. Produce a straight wave from rolling the dowel forward 1 cm with the palm of your hand. Answer Data question #2.
3. Place a paraffin block in the tank. With the dowel generate a pulse that strikes the barrier straight on. Answer Data question #3.
4. Move the paraffin block to change the angle at which the plane strikes it. Answer Data question #4.
5. Produce a circular wave pulse with water drops from the dropper pipet. Answer Data question #5.
6. Bend a length of large-diameter rubber hose into the approximate shape of a parabola. Place it in the tank. Answer Data question #6.
7. Find the **point** at which the straight pulses reflected by the hose meet and mark it on the screen with your finger. This is the **focus** of the parabola. Generate a circular pulse with the pipet held straight above the focus of the parabola. Answer Data question #7.
8. Start the wave generator to produce a straight wave. The distance between the bright bars in the wave is the wavelength. Adjust the frequency of the wave generator. Answer Data question #8.
9. Place a paraffin barrier halfway across the middle of the tank. Observe the part of the straight wave that strikes the barrier as well as the part that passes by it. Adjust the frequency of the wave generator so that the combination of the incoming and reflected wave appears to stand still. The combination then forms a standing wave. Answer Data question #9.
10. Support a piece of rectangular slab of glass with rubber stoppers so it is 1.5 cm from the bottom of the tank and its top is just covered with water. Arrange the glass so that incoming wave fronts are parallel to one edge of the glass. Answer Data question #10.
11. Now turn the glass so that its edge is no longer parallel to the incoming wave fronts. Answer Data question #11.

12. Place paraffin blocks across the tank until they reach from side to side with a small opening in the middle. Generate straight waves with the wave generator. Answer Data question #12.
13. Using a piece of paraffin about 4 cm long, modify your paraffin barrier so it has two openings about 4 cm apart near the center. Generate a straight wave and allow it to pass through the pair of openings. Answer Data question #13.
14. Put two point sources about 4 cm apart on the bar of the wave generator. Turn on the wave generator to produce overlapping circular waves. Answer Data question #14.

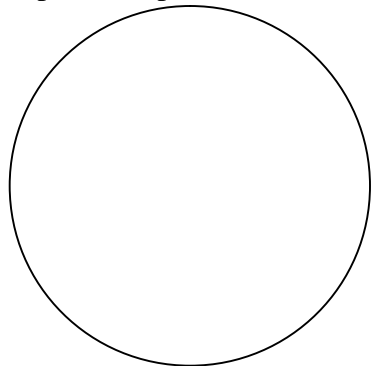
Data:

1. What is the shape of the pulse?

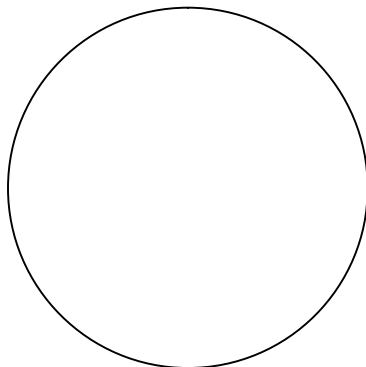


Does the speed of the pulse appear to be the same in all directions?

2. What is the shape of the pulse?

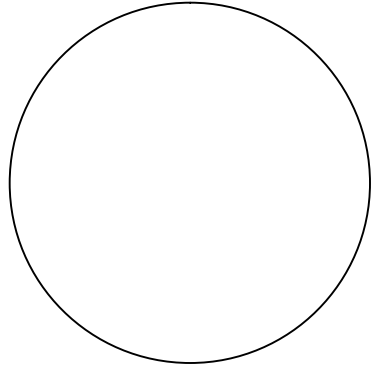


3. What does the pulse do when it reaches the barrier? Draw it.



After the pulse strikes the barrier, what is the new direction of the pulse?

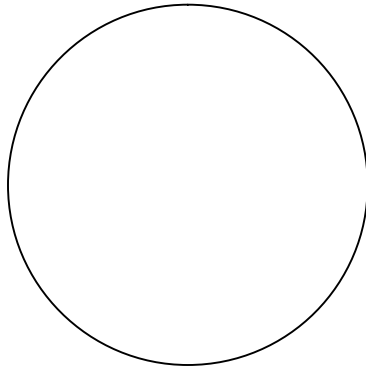
4. What is the shape of the reflected pulse?



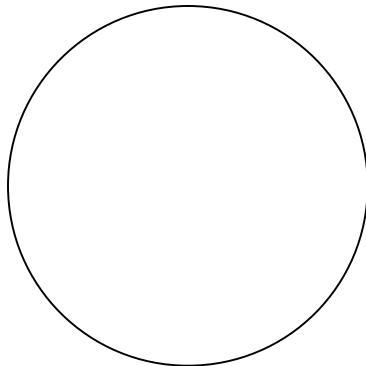
5. How do the pulses reflect from the paraffin block?

From what point do the reflected pulses appear to be originating?

6. What do you observe when you see this tubing as a reflector for straight pulses?



7. What is the shape of the reflected pulse?

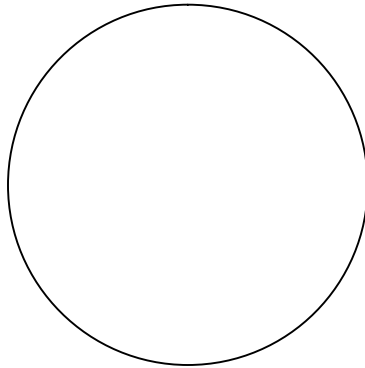


Do any other points give the same pulse shape?

8. What effect does increasing the frequency have on the wavelength?
9. How does the wavelength of the standing wave compare with the wavelength of the wave traveling past the barrier?
10. What happens as waves pass from deep to shallow water?
11. Are the wave fronts straight both outside and over the glass?

How do the speeds of the waves compare?

12. How does the straight wave pattern change as it passes through the opening?



13. What wave pattern do you observe?
14. What pattern do you now observe?

