



Laboratory Activity

Waves in Motion

Have you ever tossed a pebble into a puddle and watched the ripples? The ripples are actually small water waves. Have you wondered what affects those ripples? In this Lab Activity, you will look at ripples and how they behave.

Strategy

You will observe wave phenomena in a ripple tank.

Materials

ripple tank with light source and
bottom screen

ripple bar

**3/4-in dowel, about 5 cm shorter than
ripple tank*

paraffin block

dropper

glass plate, about 1/4 the area of the
ripple tank

rubber stoppers cut to 1.5 cm high (2)

**Alternate materials*

Procedure

1. Turn on the light of the ripple tank. Allow the water to come to rest. Touch your finger once to the water surface to produce a wave. On the screen at the base of the tank, observe the shape of the wave. Does the speed of the wave seem to be the same in all directions? Record your observations in the table in the Data and Observations section.
2. Place the ripple bar in the water. Allow the water to come to rest. Using the flat of your hand to touch *only* the ripple bar, roll the ripple bar forward 1 cm. Observe the wave you produce. Record your observations in the table in the Data and Observations section. NOTE: Be careful to touch only the ripple bar when generating waves, do not touch the water with your hand.
3. Place a paraffin block in the tank parallel and closer to the deep end of the ripple tank. Orient the ripple bar to be parallel to the long edge of the paraffin block. Allow the water to come to rest. Use the flat of your hand to roll the ripple bar forward 1 cm, generating a wave that strikes the paraffin block barrier straight on. Observe what happens to the wave when it reaches the barrier. How does the wave move after it strikes the barrier? Record your observations in the Data and Observations section.
4. Reposition the paraffin block so that it is not aligned with the edges of the tank. This will change the angle at which the wave strikes it. Position the ripple bar so that it is parallel and closer to the shallow edge of the tank. After the water has come to a rest, move the ripple bar forward 1 cm with the flat of your hand. Observe the shape of the waves that reflect off the paraffin block. Record your observations. Remove the ripple bar from the water.
5. Allow the water to come to rest. Use the dropper to drop one drop of water onto the water surface. Observe the circular wave shape. Take note of how the wave reflects from the paraffin block and the point from which the reflected wave appears to originate. Record your observations in the Data and Observations section.
6. Place a paraffin barrier on one side of the tank, halfway between the shallow end and the deep end of the tank. Place the ripple bar parallel and closer to the shallow end. Again use a ripple bar to produce a straight wave. See step 3. Observe the part of the wave that strikes the barrier as well as the part that passes by it. Record your observations in the table.

Laboratory Activity 2 (continued)

7. Support a piece of glass with rubber stoppers so that the glass is in the shallow end of the tank 1.5 cm from the bottom of the tank and its top is just covered with water. Position the glass so that the edges of the glass are parallel to the edges of the tank. Place the ripple bar in the deep end of the tank, parallel to the edge. Allow the water to come to rest. Then move the ripple bar 1 cm to create a wave. Observe what happens as the waves pass from the deep to the shallow end of the tank. Record your observations in the Data and Observations section.
8. Turn the glass so that its edges are no longer parallel to the edges of the ripple tank. Allow the water to come to rest, and then repeat step 7. Observe the shape of the waves that pass over the glass and that pass around the glass. Also note the speed of these waves. Record your observations.

Data and Observations

Step	Question	Observation
1	What is the shape of the wave?	1.
1	Is the speed of the wave the same in all directions?	2.
2	What is the shape of the wave?	3.
3	What happens to the wave at the barrier?	4.
3	What is the direction of the wave after it strikes the barrier?	5.
4	What is the shape of the reflected wave?	6.
5	How does the wave reflect from the paraffin block?	7.
5	From what point does the reflected wave appear to originate?	8.
6	What happens to the wave that hits the block?	9.
6	What happens to the wave that does not hit the block?	10.
7	What happens as waves pass from deep to shallow water?	11.
8	What is the shape of the wave that passes over the glass?	12.
8	What is the shape of the wave that does not pass over the glass?	13.
8	How do the speed of the two different waves compare?	14.

Laboratory Activity 2 (continued)**Questions and Conclusions**

1. What is the shape of a wave produced at one point, such as with a drop of water or your fingertip?

2. What does a wave do when it hits a paraffin barrier?

3. Does a circular wave remain circular when it is reflected? Explain why this happens.

4. What happens to waves as they move into shallower water?

Strategy Check

_____ Can you identify behavior of waves?