Name: _____ Group: _____ Date: _____

LAB 29
OBSERVATION

THE CHARACTERISTICS OF WAVES

STUDENT BOOK | Chapter 4, page 92

Goal

Observe characteristics of waves.

Observation criteria

1. What is a wave?

_____

_____

_____

2. What differentiates a transverse wave from a longitudinal wave?
Identify observable characteristics that will allow them to be distinguished in this lab.

Transverse wave: _____

_____

_____

Longitudinal wave: _____

_____

_____

_____

3. What are characteristics of waves? For each characteristic, identify at least one observable indicator for each type of wave.

Characteristic	Transverse wave	Longitudinal wave

Name: _____ Group: _____ Date: _____

Materials

Part I: Spring

- 10-m spring of large diameter
- ribbon (15 cm)
- masking tape *or* chalk
- stopwatch *or* watch indicating seconds
- 1-m ruler *or* tape measure

Part II: Ripple tank

- ripple tank
- large sheet of white paper
- cork stopper tied to nail
- light source
- dropper bottle of water
- stopwatch *or* watch indicating seconds
- 30-cm ruler

Procedure

Part I: Spring

1. Assign tasks to each team member:
  – Experimenter A: Hold one end of spring.
  – Experimenter B: Hold other end of spring.
  – Experimenter C: Observe and record results.

2. Lay out the spring on the ground.

3. Tie the ribbon around a coil midway between the centre and one end of the spring.

4. Stretch the spring to a length of 5 m.

5. Mark the position of the ribbon and the centre of the spring on the ground using masking tape or chalk.

6. Create a wave by firmly compressing one end of the spring slightly.

7. When the wave reaches the centre mark, start the timer.

8. When a full cycle of the wave passes the centre mark, stop the timer and record the time.

9. Observe the displacement of the wave. Record the type of wave and amplitude (big or small).

10. Mark the length of the full cycle on the ground.

11. Measure and record the length of the wave.

12. When the spring stops moving, compare and record the final position and the initial position of the ribbon.

13. Repeat the procedure by displacing the spring sharply to the right.

Name: _____ Group: _____ Date: _____

Part II: Ripple tank

1. Pour into the ripple tank about 7 mm of water.
2. Place the sheet of paper under the tank.
3. Mark the paper at one-third the distance from the edge of the tank.
4. Set the cork stopper on the water about 10 cm from the centre of the tank.
5. Place the light source above the tank so the shadow of the cork stopper is seen on the sheet of paper.
6. Mark the location of the shadow on the paper.
7. Use the dropper bottle to apply a drop of water at the centre of the tank.
8. When the wave reaches the one-third mark of the tank, start the timer.
9. When a full cycle of the wave passes the one-third mark, stop the timer and record the time.
10. Observe the displacement of the wave. Record the type of wave and the amplitude (big or small).
11. Mark the length of the full cycle on the paper.
12. Measure and record the length of the wave.
13. Compare and record the final position and the initial position of the stopper.
14. Clean up and put away materials.

Observations

Record your observations in the table below. Give the table a title.

Title:

	Duration of cycle (s)	**Wave type**	**Amplitude (big or small)**	**Length (cm)**	**Position of marker (ribbon or cork)**
Spring compressed					
Spring displaced from left to right					
Ripple tank					

Name: _____ Group: _____ Date: _____

Reflecting on your observations

1. Do your observations help you to better understand the characteristics of waves? Explain your answer.

_____

_____

2. What causes variation in the amplitude of a wave?

_____

_____

3. What can be concluded after comparing the positions of the ribbon or the stopper before and after the passing of a wave?

_____

_____

4. Is the frequency of each wave identical? Explain your answer.

_____

_____

_____

5. How could you improve the protocol for this lab?

_____

_____