

Visualizing Water Pressure (page 1)

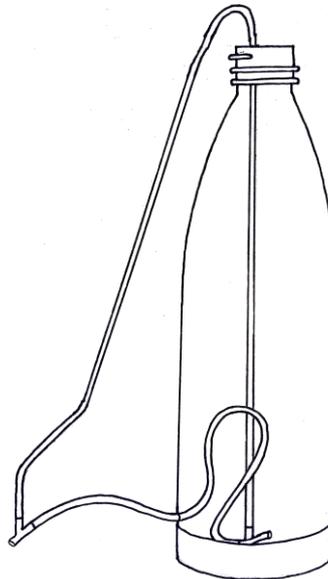
Activity

Introduction: Scientists have confirmed that the Earth's interior is made up of three main layers: crust, mantel, and core. Temperature and pressure increase as we go deeper inside the Earth. The high temperature at the Earth's core is a result of several complex factors including, the heat from the formation of the planet, the heat from the decay of radioactive elements, and from frictional heating between materials in the core. The explanation for the pressure increase is more straightforward: more material (mass of rock) is pressing down on the deeper layers than on the shallower layers. In this activity, we will visualize the behaviour of pressure with change in depth, with water, instead of with rocks.

Lesson Objective: To observe the change of pressure at different depths of water.



PLASTIC CUP



CUSTOM ACTIVITY SETUP

Materials:

1. Custom activity setup
2. Plastic cup (18 oz.)
3. Water (from the classroom)

Note: This custom activity setup is a delicate mechanical device. Carefully inspect the two points where the metal pipe is joined to the two ends of the tube. If the white adhesive tape seems to be coming apart: press the ends with your fingers to secure it in place again before using the device.

Visualizing Water Pressure (page 2)

Activity

Method

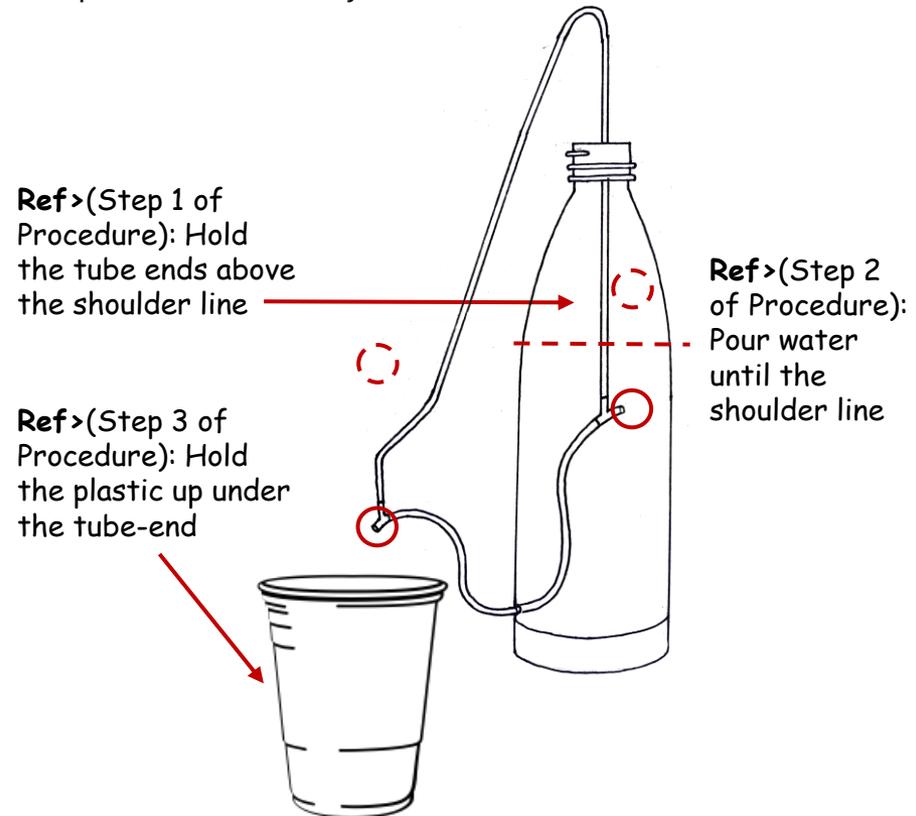
Part A - Preparation:

1. Observe the custom activity setup carefully. You will notice that as you move the metal pipe up and down, the two ends of the tube move up and down with it.
2. Using your estimation powers, make sure that the two ends of the tube are moving up and down together, (same height) both inside the plastic bottle and outside it (hint: bend the metal pipe if required to achieve the desired result).
3. Consult with your teacher and understand the arrangement of water required for this activity.

Method

Part B- Procedure:

1. One partner should hold the tube ends above the shoulder line of the bottle.
2. The other partner should carefully pour water into the bottle until the shoulder line.
3. While still holding the tube-end above the water line inside the bottle, one partner should hold the plastic cup under the tube-end, which is outside the bottle.
4. Slowly dip with tube-end (**inside the bottle**) into the water and observe what happens (hint: you may need to dip the entire tube inside the bottle under water for the setup to begin operating).

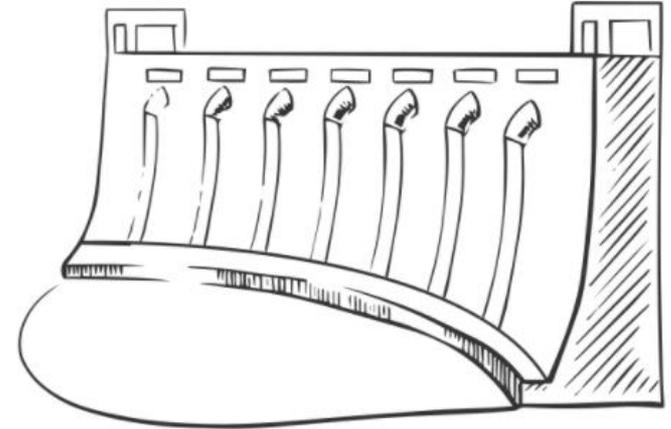


Visualizing Water Pressure (page 3)

Activity

Questions:

1. About the water stream coming out the tube-end, outside the bottle: where is it fastest and strongest, and where is it slowest and weakest?
2. Based on your observations, can you confirm that pressure is indeed increasing with depth?
3. Is the pressure acting equally on all directions? Use the setup to investigate.
4. The picture to the right shows the cross-section of a dam (look to the right of the picture). Discuss with your partner why all dams follow such a design principle.



Cause and Effect

Think about the cause and effect relationship: how does this apply generally to the phenomenon you have observed and discussed in this activity?