

# Water Pressure

## Focus

Certainly you have tried to dive to the bottom of a swimming pool. It's not so easy. On the bottom, you felt the pressure of water on your body and especially in your ears. Pressure can be used to move water through pipes and appliances in your home.

## a) Where is pressure greatest?

### Materials

- 2 x 2L plastic bottle, with lid
- Heated sewing needle
- Tidy tray
- Water
- Food dye
- Plastic piping or straw

### Preparation

- Using the needle, heat end with a match and place four holes equidistant up the 2L bottle.
- Place a strip of sticky tape over the holes firmly.
- Place in tidy tray.
- Using food dye to make water clearer to see, fill with water.

### Procedure

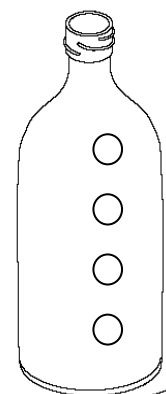
- Show the bottle to the students.
- When the tape is pulled off what will the water do as it comes out?
- Sketch your idea on Diag 1.
- Pull off the strip of tape with one movement.

Q What did the water do as it came out? Sketch your observations onto Diag.2

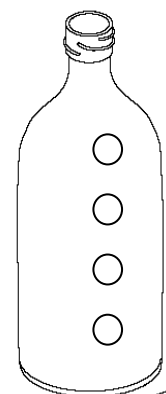
Q Was your guess correct? Explain your observations:

Q Why did the squirts of water go different lengths?

Q Where do you think the pressure (push) is greater?



Diag 1.



Diag. 2

## ACTIVITY ALTERNATIVE

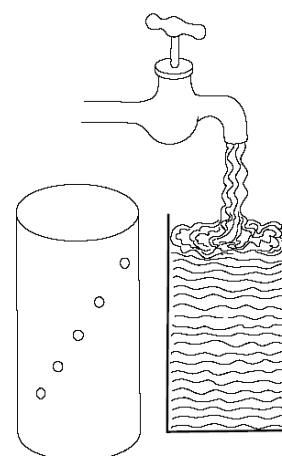
### Materials

- A running tap or bucket
- Container with holes
- Sink with a plug

### Procedure

- Put the box with holes under the tap.
- Regulate the spout such that the water level in the box stays the same.
- Put the plug in. Re-use water; don't waste it.

**NB** Use the same discussion points as above.



## b) Measuring the difference?

### Focus

What might happen if a water tank sprung a leak? Suppose you fill a plastic soft drink bottle with water and put a hole in its side, what will happen to the water? What if the bottle is only half full?

### Materials

- can or plastic box
- 1 litre funnel
- pan
- rule
- bottle cap
- soft drink bottle
- thumb tack or blue tack
- water

### Procedure

- Put the can or plastic box upside down in one corner of the pan.
- The 1 litre bottle has a hole in it near the bottom. Put the thumb-tack in the hole.
- Fill the 1 litre bottle with 5cms of water.
- Put the bottle on the can or box with hole pointing to the opposite corner. Pull out the thumb-tack and measure how far the water squirts into the pan from the edge of the bottle.
- Put the thumb tack back in. Record your result.
- Repeat the steps 3-5 for each of the entries in the following table.
- When you have finished, graph your results. Remember to label your graph.

### Results

Height of water in bottle	Distance water squirts (cm)	Average
5cm		
10cm		
15cm		
20cm		
25cm		

### CHALLENGE

- While the water is still squirting out of the bottle, put on the cap.
- Observe what happens. Try to explain why this happened.

**Source:** *My Interactions with Water*, Kiel University, Germany, 1998 (courtesy USQ Faculty of Education)

## c) Applying pressure to water in pipes

### Focus

Students have the opportunity to investigate the effect of height changes to water pressure and flow in this activity.

### Materials

- Short section of garden hose (or clear plastic piping)
- Water source
- Bucket or basin to collect the water.

### Procedure

- Take a garden hose and fill it with water. (Curl up in a large basin or bucket filled with water).
- Once all the air bubbles are out place a thumb over the end so the water cannot pour out.
- Also block the other end using a thumb.

### Inquiry

- Q If the two ends are held up together at the same height, will any water come out when the thumbs are removed? Explain the result.
- Q What is the best position for the hose ends so that the longest squirt possible can be achieved?
- Q If one end of the hose is held higher will this make the water come out faster?
- Q Why does the volume of water pouring out reduce after a few seconds?
- Q What would you have to do to maintain the pressure?
- Design an experiment to measure what is happening. (Use the height as the variable; ie the thing that is changed, while everything else stays the same)

### EXTENSION

- Q How could this hose filled with water be used to measure and mark a fixed height around the room?