Year 6: Science and Mathematics

Activity Sheet 2: Water head and pressure

In this experiment you will set up your own reservoir and measure the effect of the height of the water head on the kinetic energy of the water as measured by the distance water is squirted from a hole near the bottom of a plastic bottle.

Materials

Materials required	Per experiment
1.25 litre soft drink bottle	1
2.00 litre soft drink bottle	1
Rulers	2
Blu tac or plasticine or tape	1
Paper	1
Graph paper	
Pencils	1
Skewer (adult supervision advised)	1
Block of wood or brick.	1
Bottle connector (for ext work)	1

Method

1. Set up the equipment as shown below using a 1.25 litre bottle.
2. Make a hole at the base of a 1.25 litre bottle on the line just above the 'stand section', (a hot metal meat skewer could be effective but consider safety precautions).
3. Mark the bottle each 2 cm to the 14 cm mark.
4. Set the bottle on a brick with a ruler under the brick. The ruler should either protrude into a sink or over an area that can get wet.
5. Plug the hole with Blu tac and the fill bottle to above the 14 cm mark with water.
6. One student analyses and reports the height of the water head; another student analyses and reports the distance water is squirted and another student documents the results.
7. Do a trial run of the experiment without recording any results. Discuss any difficulties you have and agree on how the experiment is to be conducted before starting.

Explore

1. To begin, unplug the hole and allow water to run out.
2. Read the water head aloud each time it passes one of the marks on the bottle.
3. Measure the distance water is 'squirted' at each of the two centimetre marks.
4. Record the distance of the squirted water. *Hint*: one student needs to get down near the ruler at eye height and read the distance off the ruler. (Be careful that readings are taken straight and not on an angle giving a distorted reading and that a zero distance is determined before any recordings are taken).

5. For each 2 cm the water drops in the bottle, record the distance water is squirted. Do this until the water run outs.
6. Repeat the experiment twice more and record the results in a table. Jobs should be rotated during the three trials.

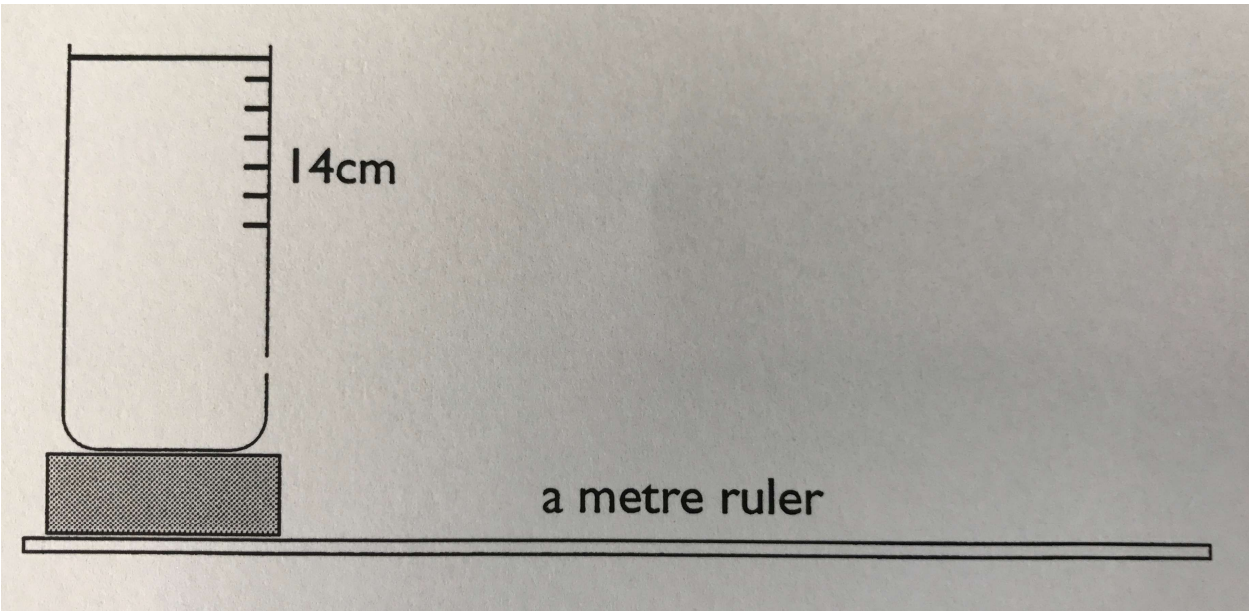

Figure 1 Set up of experiment

Table of Results

Water Head cm	Squirt 1 Cm	Squirt 2 cm	Squirt 3 cm	Average Squirt cm
14				
12				
10				
8				
6				
4				
2				

7. Document the team's results.
8. Consider: What is the relationship between the water head and the average distance water is squirted?
9. Data like this is often better presented as a graph. Using your graph paper, draw a graph of water head verses average distance water is squirted, plotting each point as a small x and the draw a 'line of best fit' that best shows the relationship you have described.

   (Use the heading 'water head cm' on the x axis and 'average distance water is squirted cm' on the y axis.)
10. What do you notice about your graph?
11. How could you describe the relationship between the height of the water head and the water pressure?

Extension

1. What factors could you predict would alter the distance water is squirted by a hose?