

## Investigation 12 Water power

There are two parts to this investigation: the first involves building a rain gauge and the second involves building a water wheel.

If suitable, the class can be divided into groups, each preparing either the rain gauge or the water wheel.

**YOU WILL NEED** A number of one litre plastic bottles • Water resistant plasters or duct tape • A graduated cylinder • A permanent black marker • A number of large plastic funnels • Hard plastic sheeting (available in a stationery shop) • A compass • A pencil or wooden rod • A nail • A bunsen burner • Scissors •

### Building the rain gauge

- 1 Cut the tops off the one-litre bottles. Using a graduated cylinder filled with water, pour 10ml increments of water into the bottles and mark off measurements (10ml, 20ml etc.) on the side of the bottle using a black permanent marker.
- 2 Heat a nail in a Bunsen burner for one minute. Carefully use the heated nail to melt a hole approximately 1.5 cm above the base of the bottles.
- 3 The holes should be just big enough to tightly fit a drinking straw.
- 4 Block the holes with water resistant plasters or duct tape.
- 5 Place a funnel in each bottle. You now have rain gauges. Place the gauges in different locations around the school grounds - under trees, in fields and windowsills.
- 6 Leave the funnels for one to two weeks.
- 7 Collect all the rain gauges - perhaps different groups could be in charge of different gauges.

- 8 Record on a chart the amount of rain water collected in ml and the location of each gauge.

### Building the water wheel

- 1 Using a compass (with a radius of 4cm) trace a circle on a piece of plastic sheeting.
- 2 Draw six rectangles on the remaining plastic, each measuring 3cm wide x 4cm high.
- 3 Before cutting out the rectangles, draw a 2 cm line up the middle of each rectangle, starting at the short side.
- 4 Cut out the circle and the rectangles.
- 5 Cut out a central hole in the circle just big enough to hold a pencil.
- 6 Cut a single line in the rectangles as far as the 2cm mark you previously made.
- 7 Slide each slit through the circle and secure them in place with duct tape.
- 8 Thread a pencil/rod through the hole in the centre of the wheel.

- 9 Using one of the bottles of rainwater already collected, tilt the bottle so the sealed hole has no water beside it.

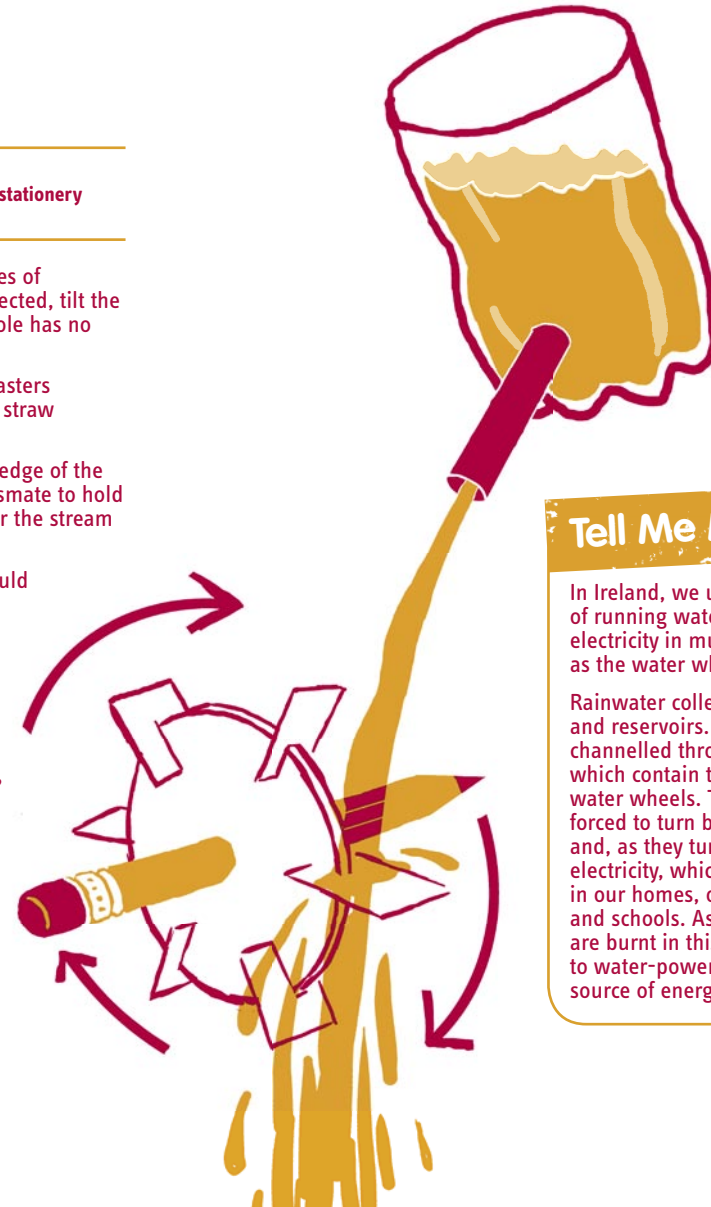
- 10 Remove the seal of plasters and thread a drinking straw into the hole.

- 11 Hold the bottle at the edge of the sink. Get another classmate to hold the water wheel under the stream of water.

- 12 Your water wheel should start turning.

### Consider this

Can you think of a way to combine the water wheel and the rain gauge so it could remain outside the school, to run permanently?



### Tell Me More!

In Ireland, we use the power of running water to generate electricity in much the same way as the water wheel you designed.

Rainwater collects in rivers, lakes and reservoirs. This water is then channelled through large pipes, which contain turbines like big water wheels. The turbines are forced to turn by the moving water and, as they turn, they generate electricity, which we can use in our homes, offices, factories and schools. As no fossil fuels are burnt in this process, we refer to water-power as a renewable source of energy.