

# out&about

## School grounds focus:

- Where are we now?
- Where do we want to be?
- How can we get there?
- Making the changes
- Using your grounds

## Curriculum focus:

- Science
- Design and technology
- History

## Purpose of this activity:

- To find out about hydropower
- To understand forces
- To introduce ideas of renewable energy

## Equipment/materials needed:

- Sheets of cardboard
- A round object to use as a template (a dinner plate, for example) or a supply of sturdy paper plates
- Ruler and pencil
- Length of dowling
- Scissors
- Straws or similar
- Sticky tape
- Plastic cups
- Stapler
- Stanley knife
- Watering can
- Water source

## Preparation:

- Introduce the idea of the water wheel with pictures. Talk about how a flow of water makes the wheel turn, and how this energy can be harnessed via the shaft of the wheel.
- Look at pictures of watermills through history and discuss how the energy they created was used – for example, to grind corn, supply drinking water to villages, irrigate crops, power textile mills.
- Talk about water as a renewable energy source – what does this mean? What other sources of energy are renewable? What are non-renewable sources of energy?

## What to do:

- In pairs and using a template, get the children to draw two large identical circles on their piece of cardboard and cut them out.
- Using their ruler they need to measure and mark the centre point of each circle, and at this point – under adult supervision if necessary – push through a hole with a pencil.
- Get the children to place a piece of dowling through the holes in the centre of the cardboard circles.
- They then need to staple plastic cups (minimum three) between the cardboard circles. These should be evenly spaced to ensure the water wheel turns properly.
- Fix a coloured straw to the wheel so it sticks out like an arm.
- Fill watering cans up with water.
- In pairs, one child holds the wheel by the ends of the dowling while the other pours the water from the watering can in a steady flow into the cups. Switch over so each child has a turn pouring the water.
- Get the children to measure how many rotations their wheel achieves for each watering can of water – they can do this by counting how many times the straw arm appears at the top of the rotation – and to gather their information on the sheet over page.
- Experiment by changing the height and speed of the flow of water. For example, if they stand on a chair to pour the water does the wheel rotate faster? What difference does a faster flow of water make?

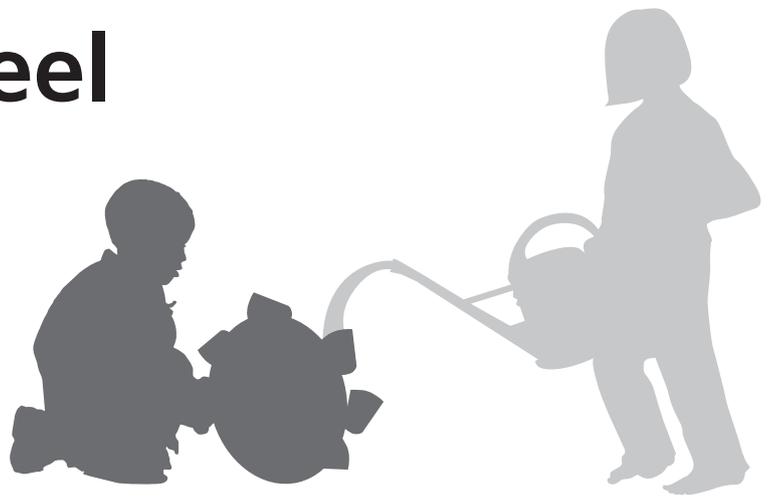
## Extensions:

- Design and construct a larger water wheel – using plywood, buckets and a broom handle, for example.
- Investigate ways of harnessing the energy from the water wheel – for example, by attaching a string and bucket, to find out how much weight the mechanism can lift, or by connecting the water wheel to a small light source.

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# My water wheel



Use this chart to record your findings.

	Test 1 Number of rotations	Test 2 Number of rotations	Test 3 Number of rotations
Fast flow			
Slow flow			
From a height of ..... cm			
From a height of ..... cm			
From a height of ..... cm			
From a height of ..... cm			