

Build your own water wheel

Key Stage 2

Items you will need:

- Straw
- Plastic cup (with two small holes on either side at the bottom)
- Scissors
- 8 x lollipop sticks (with holes drilled into them)
- 8 x bottle caps
- BBQ stick
- Water bottle with top cut off and small hole at side
- Glue gun



Step 1: Take the big plastic bottle and use the glue gun to stick the end with the top on into the cup.

Step 2: Insert the straw into the hole at the side and cut about 5cm off the end so it has a short spout.

Step 3: Thread the lollipop sticks onto the BBQ stick to make sure they spin round smoothly.

Step 4: Glue two sticks together to form a cross shape, being careful not to get glue in the holes. Repeat with the other six sticks. You should have four cross shapes.

Step 5: Glue two of the crosses together to form a star shape with eight spokes. Repeat with the remaining two cross shapes.

Step 6: Glue the eight bottle caps onto the ends of the spokes. They must be facing in the same direction.

Step 7: Glue the other star shape onto the other side of the spokes.

Step 8: Cut the plastic cup in half.

Step 9: Put a BBQ stick through the centre of the wheel. Insert the end of the stick into the plastic cup halves on either side of the wheel.

Place your wheel and water supply in a waterproof tray/sink and test your water wheel.

Try raising the height at which the water is poured – the head height. What difference does this make?

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Key Stage 1

Items you will need:

- 2 x pieces of circular cardboard with a hole at the centre
- 40 x plastic cups – 20 small ones and 20 large ones
- Stapler (with staples!)
- Axle (dowel rod)



Step 1: Take one circular piece of cardboard. Staple a plastic cup to the edge so that the top of the cup is at the outer edge of the wheel.

Step 2: Staple the next plastic cup beside the first one. Repeat until all the cups have been used.

Step 3: Fix the second piece of circular card to the other side. Staple each of the cups securely.

Step 4: Push your dowel rod (axle) through the middle.

Now try out your water wheel. Hold it over a bucket and pour water from the bucket into a cup, two or three down from the top to start it turning. See what difference it makes if you use more or less water, or drop the water from a greater height. If you have time, you could experiment with making a wheel with bigger 'buckets' (cups). What difference does this make?

Draw a diagram of a water wheel



WW_HO2

Write the instructions to build an 18th century water wheel

- a) Discuss how instructions were passed down by word of mouth, from craftsman to apprentice, perhaps using simple drawings. How have computer programmes made it easier to design things?
- b) Imagine you are an 18th century wheelwright. Draw a diagram of a water wheel that you plan to build. Decide whether you want it to be overshot, undershot or breast shot.

Explain which one is best for the location. Is it on a fast flowing river with varying water levels, or fed by a small dam which is sometimes dry? Or perhaps lots of water is available from a big reservoir?

Name the parts on your diagram and what they are made of.

Identify the materials you have used and explain why.

Here are some tips:

- Wood: light, locally sourced (from Sherwood Forest).
- Part iron (i.e. for the axle): last long and won't catch fire.
- All iron: more durable and less leakage, therefore more efficient, as parts can be more precisely shaped. More expensive.



Write the instructions to build an 18th century water wheel

A large, empty rectangular box with a light pink border, intended for writing instructions.

