

Your First Water Wheel

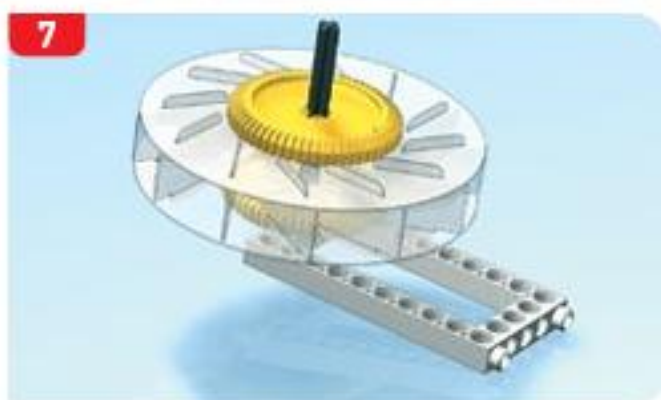
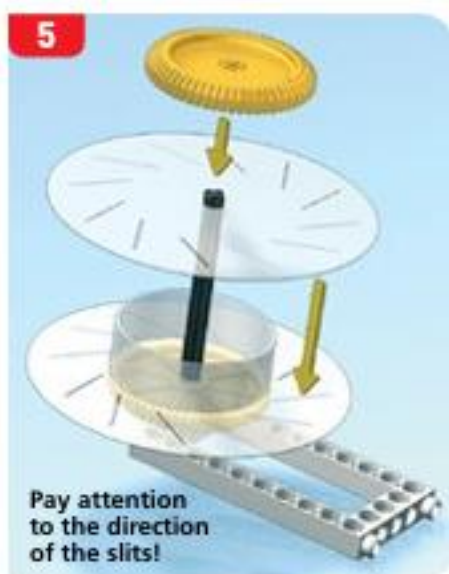
01 Workshop

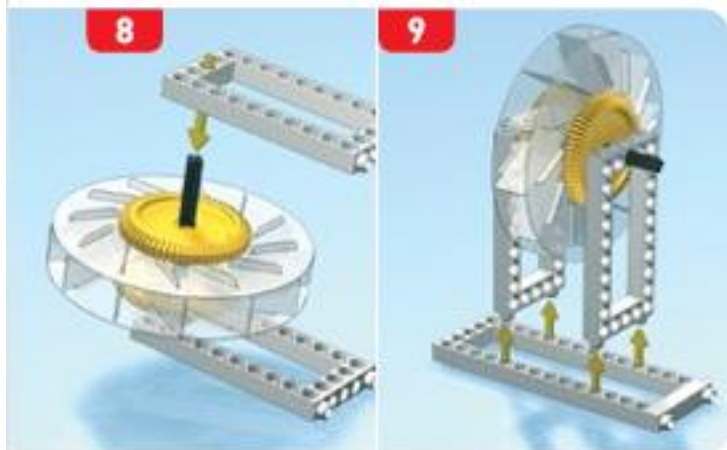
Water Wheel

For this and all other workshops in this kit, first follow the instructions to build the model, and then read and conduct the experiment immediately following the workshop to put your model in motion.

You will need:

- ☐ 2 water wheel disks (from plastic sheet)
- ☐ 12 water wheel paddles (from plastic sheet)
- ☐ 1 plastic strip to make a ring (plastic sheet)
- ☐ 2 small frames (13)
- ☐ 1 large frame (14)
- ☐ 2 large gear wheels (16)
- ☐ 1 long axle (19)
- ☐ transparent cellophane tape





01 Experiment

The weight of water drives a water wheel

Set up your water wheel in a wide, shallow basin or plastic bin. This will allow you to catch the water that you use to power the water wheel, so that you can reuse the water over and over again. This is highly preferable to letting the water run down the drain or into the ground, as we do not want to waste any water while doing these experiments! Water is a very precious resource.

It is best to do your experiments in the sink, on a balcony, outside in your yard, or in the bathtub, to prevent "water damage" from splashes and spills.

Fill a tall, narrow drinking glass or water bottle with water and pour it over the water wheel. When you do this, hold the glass just above the wheel, because we don't want to create a strong "waterfall" — we just want the weight of the water. Watch how the paddles fill up with water, one after the other, and then empty themselves again as they drop down. Try to find the optimal location for pouring water onto the ring of paddles in order to make the wheel turn the fastest.

The weight of the water on the paddles turns the wheel and performs work as it falls. Water wheels have lent their energy to oil mills, flour mills, and sawmills. They used to be set up along streams and rivers, where the water was diverted through canals

and shafts and routed onto the blades. They are still turning in a few out-of-the-way places around the world. Some have been modernized to generate electricity.

There are **overshot** and **undershot** water wheels. With overshot water wheels, the water is directed from above, while with undershot water wheels, the water runs through them from below.

