

# Hydro Turbine

**Curriculum  
Levels 1-2  
Science**

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## Activity Description

Students will make and play with a 3D printed water turbine and explore a range of concepts such as force, motion, renewable energy, electricity.



## Teaching rationale

### Students will:

- Discover how natural resources like moving water contain energy and how this energy can be harnessed
- Explore physical phenomena such as movement, forces, energy and electricity
- Find out how science is part of their everyday lives
- Explore how technology is developed and used in society

**Note:** The activity addresses the Science strands of Physical World, Planet Earth and Beyond and the Nature of Science.

## Curriculum Links

SCIENCE	Level 1-2 Achievement Objectives	Student Learning Outcomes
Nature of Science	Exploration, play, asking questions, and discussing simple models.	<ol style="list-style-type: none"> <li>1. Explore movement, energy, force and electricity using the hydro turbine model.</li> <li>2. Harness falling water to make the turbine spin and to identify (through experience) the best place for water to hit the blades (transfer of energy.)</li> </ol>
Physical World	Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.	<ol style="list-style-type: none"> <li>3. Identify the parts that make up the turbine.</li> <li>4. Describe the motion of the turbine at different parts of the waterfall and identify that it changes depending on the speed of the water at that point.</li> </ol>
Planet Earth & Beyond	<p>Describe how natural features are changed and resources affected by natural events and human actions.</p> <p>Share ideas and observations about the Sun and the Moon and their physical effects on the heat and light available to Earth.</p>	<ol style="list-style-type: none"> <li>5. Identify (on the poster) the sun's energy as causing water to evaporate into the clouds.</li> <li>6. Identify (on the poster) rain as the source of water for rivers and lakes.</li> <li>7. State that turbines can be connected to generators (involves magnetism) to make electricity.</li> <li>8. Identify ways in which people use electricity.</li> </ol>

## Running the activity

- Use the 'How to make a hydro turbine' video and steps on [schoolgen.co.nz](http://schoolgen.co.nz).
- Use the Student worksheet below
- The worksheet is designed to be done after the students have played with the turbine and discussed how it works as a class.

## Extending your students

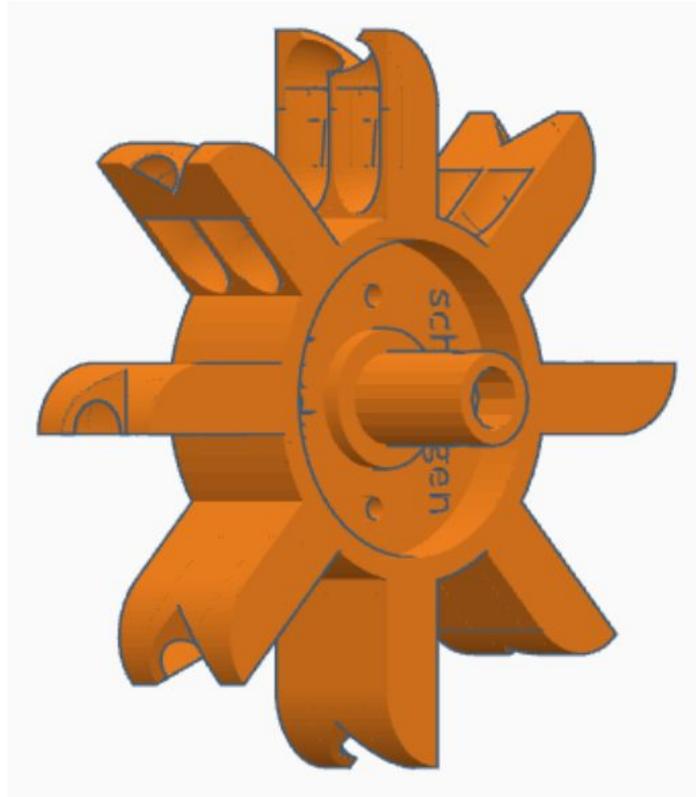
- Design, make and test a hydro turbine with a different number of blades (less or more) and see how this changes the efficiency of the turbine. Think about what you need to keep the same to make it a fair test.
- Design and build your own turbine housing (casing) using materials you can find (reuse / recycle).
- Use the 'How to make a hydro turbine with housing' video and steps on [schoolgen.co.nz](http://schoolgen.co.nz).

## Supporting resources

- 'How to make a hydro turbine' video and steps on [schoolgen.co.nz](http://schoolgen.co.nz).
- 'How to make a hydro turbine with housing' video and steps on [schoolgen.co.nz](http://schoolgen.co.nz).
- Hydroelectricity background on [schoolgen.co.nz](http://schoolgen.co.nz).
- History of hydroelectricity in New Zealand on [schoolgen.co.nz](http://schoolgen.co.nz).
- Poster: All of our energy comes from the sun on [schoolgen.co.nz](http://schoolgen.co.nz).

# Hydro Turbine

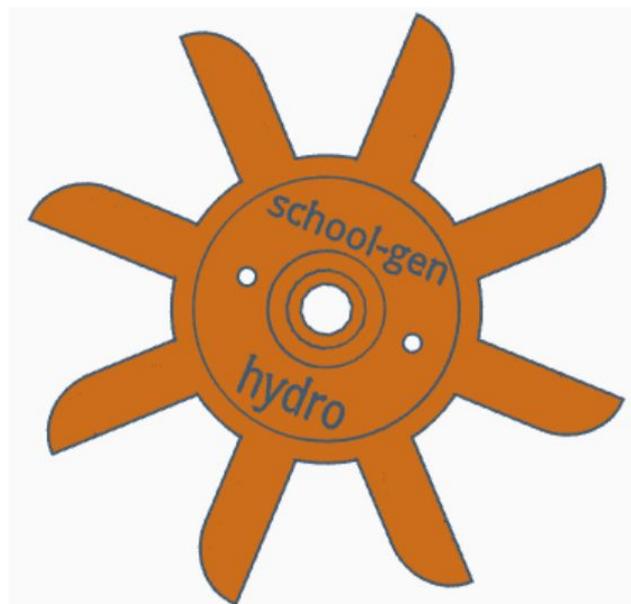
1. Label the different parts of the turbine- use the words “axis”, “blades”, “centre” “shaft”, “spoons”, “buckets”



## Class discussion

Some of these words might refer to the same part - do you think they are the same, or just quite similar?

2. Using an arrow show where the best place (or part) on the turbine for the water to hit to make it spin with the most energy from the water:





3. Describe what is happening to the turbine as it moves further down from the tap.

Use the words 'spinning', 'faster', 'slower', 'increasing', 'speed', 'turbine' (you can use each word more than once):

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4. Why do you think the turbine is spinning faster when it gets lower? What are some of your ideas and what do your class mates think?

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5. Look at the 'All of our Energy comes from the Sun Poster' on [schoolgen.co.nz](http://schoolgen.co.nz).

(a) Name 3 places where water is found on the Earth's surface:

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(b) What is the word on the poster that describes how water gets up into the clouds?

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(c) On the poster, is there a good place to put a hydro turbine and generator? Explain your answer.

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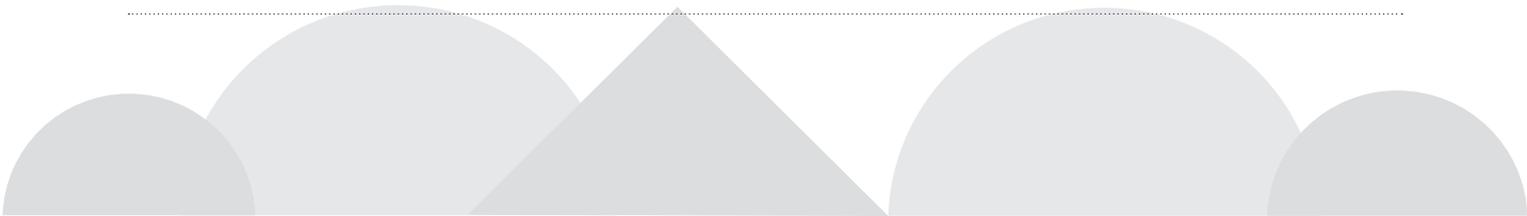
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6. Electricity is very important as it can be used for so many things.

(a) List 3 things that you need electricity for in your daily life?

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(b) List 2 of your favourite uses of electricity in your daily life?

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(c) List 3 ways to generate electricity?

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