



# Construct a water wheel

## Primary lesson ideas

### Science / Science and Technology / Design, Creativity and Technology / Technology and Enterprise / Vocational and Applied Learning / ICT

- Students to investigate hydroelectric power. What is it? Is a hydroelectric power generator a modern-day interpretation of a water wheel? Where are some of Australia's hydroelectric power stations located? What is it about the location of these power stations that makes them suitable for generating hydroelectric power?
- Students to complete the '**What is Engineering?**' activity sheet.
- Discuss with students the types of simple machines demonstrated in the 'Simple Machines' animation. Discuss what work the water wheel does. Discuss what other simple machines contribute to the work done by the water wheel.
- Students to view the 'Simple Machines' animation and then investigate alternative designs to replace the water wheel with a combination of other simple machines that perform the same work (*i.e. closing the drawbridge and releasing Dare Bear*).
- Students to investigate kinetic and potential energy. As a class, discuss how kinetic and potential energy apply to water wheels.
- Students to create a list of where they have seen wheels and axles at work. What work was being done by each of the wheels and axles they observed? Discuss findings.
- Paddle steamers have water wheels. Students to identify some current examples of operating paddle steamers and investigate how they work. How does the functioning of the paddle steamer water wheel compare to that of an 'undershot' water wheel operating in a running stream?
- Students to complete the '**How Water Wheels Work**' activity sheet. They will be required to briefly explain how various types of historical water wheels worked.
- Students to complete the '**How Do Simple Machines Help Us?**' activity sheet.
- Students to complete the '**Wheels and Axles**' activity sheet.
- Students to sort and classify several simple machines using the printable '**Simple Machine Cards**' (*Printable cards can be found with the activity sheets.*)
- Class discussion: Why do we need machines and tools?
- Brainstorm as many machines and tools as possible and ask the students to classify them into categories.
- Students to go for a walk around the school looking for different types of simple machines. Where can they see a wheel and axle? Students to complete the '**Machines Are All Around Us**' activity sheet.



## Mathematics / Mathematics - Numeracy

- Water wheels have 'paddles' that are equally spaced around a circle. Students to use items, including a protractor and a compass, to practice ways of dividing various-sized circles into equal sections.
- Students to estimate and then use various measuring containers to explore what constitutes a litre. Students to record their results. Students could also convert findings into millilitres.
- Students to investigate how much water is needed to make a water wheel turn. Investigate different-sized wheels.

## SOSE / Society and History / The Humanities / HSIE / Social Sciences / Civics and Citizenship

- In groups, students to research the history of water wheels. Where were they used and for what purpose? What sources of power have replaced most water wheels? Why are traditional water wheels still operating in some parts of the world? Students to present their findings to the class in assignment format.
- Class discussion: How would our lives be different if we had no machines or tools? In groups, students to prepare a speech for the class in response to this question.
- Students to discuss the importance of water as a valuable and precious resource. What would we do without water? Students can investigate 'water wise' activities and ways in which they can conserve water.

## English / English - Literacy

- Students to brainstorm as many engineering words as possible, then create a page in their Science books on which to record these words (*with definitions*). Students will add to this as they learn new words.
- Students to investigate the saying 'grist to the mill'. What does it mean and what is its connection to water wheel-driven grain mills?
- Students to complete the '**Water Wheel Words**' activity sheet.
- Students to research the origin of the word 'machine'.
- Students to complete the '**KWL**' or '**TWLH**' activity sheet.
- Class discussion: Which machine or tool is the most valuable and why? Write an exposition text based on this question, giving at least three reasons for their answer.
- Students to write a procedure of how to make a water wheel.



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## The Arts / Creative Arts

- Students to design their own 'wacky water wheel', labelling its unique features.
- For a drama activity, provide students with a card that has the name of a simple machine on it. In pairs, students to think of a mime which portrays the movement of that simple machine. The class has to guess what simple machine it might be.
- Students to make a diorama of a scene containing a water wheel.
- Students to create an illustrated non-fiction book for younger students, explaining how water wheels work. Use the KidPix program, or just cardboard and paper.

## Health and Physical Education / Health and Wellbeing / PDHPE / Interpersonal Development / Personal Learning

- Students to brainstorm how water wheels have helped human beings and impacted on our current way of life.

## LOTE / Languages

- Students to learn how to say and write words such as 'water', 'machine' and 'wheel' in various languages.