# Teachers Guide: Discover wind energy

## Year 7: Science & Maths

### Key understandings and learning intentions

This inquiry-based unit helps students discover the basic fundamentals of wind power technology by building and testing wind turbines. The challenge is to generate the greatest amount of electricity by varying the numbers, angles, sizes and shapes of turbine blades. Students will examine the concept of renewable energy, and identify the challenges and complexities in wind turbine design and engineering. Students will understand;

- how wind energy has been used in the past
- how wind energy forms
- how we use it to generate electricity and;
- the advantages and disadvantages of wind energy generation.

**Fast facts**

**Lesson Plan: One (divided into two parts)**

**Duration: 180 minutes**

**Resources: See the lesson plan for materials list**

### Achievement standards

Students will:

- *analyse* how the sustainable use of resources depends on the way they are formed and cycle through Earth systems
- *describe* situations where scientific knowledge from different science disciplines and diverse cultures has been used to solve a real-world problems
- *identify* questions that can be investigated scientifically
- *plan* fair experimental methods, identifying variables to be changed and measured
- *select* equipment that improves fairness and accuracy and describe how they considered safety. Students draw on evidence to support their conclusions.

## Guiding questions

1) How can we harness energy from the wind in the most efficient way, and generate as much electricity as we can in the process?

2) What are challenges and complexities of wind energy generation and wind turbine engineering?

| Learning Area | Content Description |
|---|---|
| **Year 7 Science** | |
| **ACSSU116** | Some of Earth's resources are renewable, including water that cycles through the environment, but others are non-renewable. |
| **ACSHE120** | Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations. |
| **ACSIS124** | Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge. |
| **ACSIS126** | Measure and control variables, select equipment appropriate to the task and collect data with accuracy. |
| **ACSIS131** | Reflect on scientific investigations including evaluating the quality of the data collected, and identifying improvements. |
| **ACSIS132** | Use scientific knowledge and findings from investigations to evaluate claims based on evidence. |
| **ACSIS133** | Communicate ideas, findings and evidence-based solutions to problems using scientific language, and representations, using digital technologies as appropriate. |
| **Year 7 Maths** | |
| **ACMNA155** | Round decimals to a specified number of decimal places. |

## General capabilities

Critical and creative thinking, literacy, numeracy, and information and communication.

## Cross curriculum priorities

Sustainability.

## Adjustments/strategies to include all students

| | Enabling | Extending |
|---|---|---|
| **Content** | Introduce students to vocabulary before lesson and allow more time to finish. Use videos and other materials in extension section | Research the various styles of wind energy generating turbines and how they are used |
| **Process** | Peer assistance to work through folios and build turbines | Design and build a wind turbine from scratch from recycled or found objects and materials |

| Extensions Options | |
|---|---|
| **Class Talks** | • Get in touch with an engineer of wind turbines or other scientists in this field of study. Contact us at education@hydro.com.au to set up a class visit or Zoom call for your class. |
| **Website** | • **Check out information on wind power on our website:** https://www.hydro.com.au/clean-energy/our-power-stations/wind-power |
| **Video** | • A more in-depth look into wind farms in Tasmania and what is involved in planning and building them: A 20-minute video of the Musselroe wind farm – the full story: https://www.youtube.com/watch?v=ZxeQeJ4jW-4&list=PL7A385BA4EFEA54EE&index=3<br>• What are the benefits and disadvantages of wind farms? |
| **Math Challenge** | • Cross-curricular math connection: Research and calculate the amount of power available at given wind speeds: https://www.aginnovators.org.au/initiatives/energy/information-papers/farm-scale-wind-power |
| **Science Investigation** | • Cross-curricular human and social sciences connection: Watch the movie: *The Boy Who Harnessed the Wind* based on the true story of a boy named William Kamkwamba from Malawi who turned misfortune into opportunity through his curiosity in science. A good resource to accompany a follow-up to this movie: https://study.com/academy/lesson/the-boy-who-harnessed-the-wind-summary.html |