Teachers Guide: Discover wind energy

Year 7: Science & Geography

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	
AC9S7H03	Examine how proposed scientific responses to contemporary issues may impact on society and explore ethical, environmental, social and economic considerations
AC9S7I01	Develop investigable questions, reasoned predictions and hypotheses to explore scientific models, identify patterns and test relationships
AC9S7I06	analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions
AC9S7I02	Plan and conduct reproducible investigations to answer questions and test hypotheses, including identifying variables and assumptions and, as appropriate, recognising and managing risks, considering ethical issues and recognising key considerations regarding heritage sites and artefacts on Country/Place.
AC9S7I07	Construct evidence-based arguments to support conclusions or evaluate claims and consider any ethical issues and cultural protocols associated with using or citing secondary data or information
AC9S7I08	write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, including selection of appropriate language and text features, using digital tools as appropriate
Year 7 Geography	
AC9HG7K01	classification of environmental resources and the way that water connects and changes places as it moves through environments

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 • What are the benefits and disadvantages of wind farms?
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