



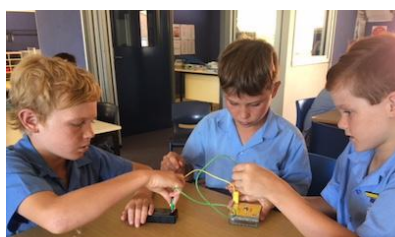
Warrumbungle National Park

Environmental Education Centre



Education

eSTEM - Energy and renewable energies Stage 3 Science and Technology

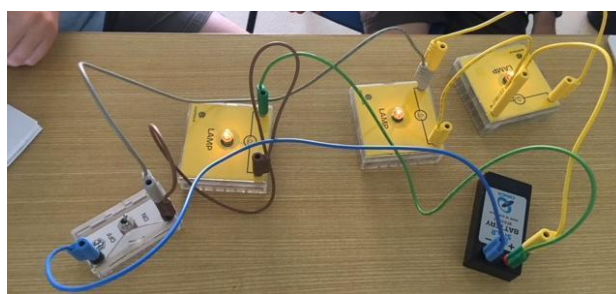


Students through inquiry work as scientists to focus on:

- types and sources of energy
- energy transformations and energy transfers
- different ways for generating renewable electrical energy
- designing experiments
- recording and analysing data and drawing conclusions.

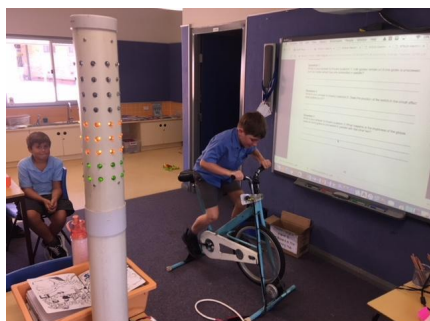
Key questions

- How can we make a force stronger or weaker?
- What types of energy transformations can be observed?
- How can electricity be used in a product or system?



Program overview

This program comprises pre-work, incursion/excursion and post-work to target scientific and environmental literacy. This involves a large extent of inquiry-based learning consisting of first-hand practical investigations using STELR equipment to answer a range of questions on energy and electrical renewable energies. These are in the form of directed investigations and guided student-designed investigations. Most are small group investigations with some whole class experiments and also explicit teaching.



Outcomes Science and Technology 2024 • Uses evidence to explain how scientific knowledge can be used to develop sustainable practices ST3-SCI-01 • Poses questions to identify variables and conducts fair tests to gather data ST3-PQU-01 Science and Technology 2017 Physical World • Plans and conducts scientific investigations to answer testable questions, and collects and summarises data to communicate conclusions ST3-1WS-S • Plans and uses materials, tools and equipment to develop solutions for a need or opportunity ST3-2DP-T • Explains how energy is transformed from one form to another ST3-8PW-ST • Investigates the effects of increasing or decreasing the strength of a specific contact or non-contact force ST3-9PW-ST	Content Science and Technology 2024 • Recognise that an electrical circuit transfers electrical energy from a source, through a pathway, to a device that transforms electrical energy into other forms of energy • Plan and construct simple electrical circuits to model the transfer and transformation of energy • Pose questions, identify variables and safely conduct fair tests to identify materials that act as electrical conductors or insulators • Explain how electrical insulators can ensure electrical safety in everyday life • Identify renewable and non-renewable energy sources • Research and present information describing the impact on resources and the environment of using a renewable or a non-renewable resource to generate electricity Science and Technology 2017 • Investigate how electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources • Describe examples where light, sound, heat and electrical energy transform from one type of energy to another • Investigate how electrical energy can control movement, sound, or light in a product or system • Design, test and evaluate a product or system that involves an energy transformation to meet an identified need using electrical energy
---	--

Indicative schedule

Time	Activity
9.30	Acknowledgement of Country and introduction
9.40	Energy transfer and energy transformations
10.30	Investigating electric circuits - series vs parallel
11.20	Investigating electric circuits - series vs parallel - continued
11.40	Renewable generation of electricity - solar
12.45	Lunch
1.15	Renewable generation of electricity - wind
3.00	Finish



Learning experiences

Energy transfers and transformations

Students investigate why we need energy, the types of energy and students solidify their understanding of the difference between energy transfer and energy transformation.

Electric circuits

Students are led through a series of investigations to answer what does a circuit need to allow electricity to flow? How does the position of the switch in the circuit affect which globes go on? What materials conduct electricity? What happens to the brightness of the globes when an extra globe is connected into a circuit?

Generating electricity

Working in small teams students undertake a number of practical investigations to answer:

- How can electricity be generated?
- How does moving water generate electricity?
- What affects the amount of electricity generated by solar cells?
- How do wind turbines deliver electrical energy?
- Is there a best design for wind turbines?
- What are the advantages and disadvantages of the different ways of generating electricity?
- Which energy sources are sustainable?

Science and Technology K-6 Syllabus © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2024

Science and Technology K-6 Syllabus © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2017