



DISCOVERING PHOTOVOLTAIC TECHNOLOGY AND ITS USES

This inquiry learning resource guides students to investigate aspects of photovoltaic technology; its origins, materials, energy transformations and wide range of applications. Students have the opportunity to consider how they could utilise the free solar energy falling on their own roofs.

Teacher notes

Rationale for the activity

This resource allows students to conduct their own science-focused inquiry into a key technology for utilising the sun's energy to generate electricity. Four mini-inquiries require the students to carry out some targeted background research around the general topic of photovoltaic technology. Each mini-inquiry has 3 or 4 "supporting" questions to be considered before addressing the central question.

Students carry out their own research about photovoltaic technology individually or in a small group. Students should be encouraged to explore around each question in the spirit of inquiry.

The first inquiry guides students to consider the origins of the word photovoltaic (PV) and could be seen within the Nature of Science strand of the New Zealand Curriculum,

as it prompts the student to consider the usefulness of specific words with a precise meaning while appreciating the historical context.

The second inquiry guides students to appreciate the extremely varied uses of electricity generated from sunlight- from a pocket calculator to the International Space Station. Students are also asked to consider beneficial ways in which they could apply/use solar generated electricity in their own lives.

The third inquiry topic guides students to consider how the properties of materials used in PV panels relates to chemical structure, and how this relates to how they can be used.

The final inquiry has students think about the physical aspects of generating their own electrical energy at home – how much solar radiation is received by their roof, how much north-facing area they might have, and how much electrical energy this could generate?

New Zealand Curriculum Links

This learning resource explicitly or implicitly involves the following areas of the Level 5 Science curriculum, and is therefore generally suited to Year 10 to Year 11 students.

| Science Strand | Focus | Inquiry |
|---|--|------------|
| Nature of Science – Communicating in science | Use a wider range of science vocabulary, symbols and conventions. | 1 |
| Nature of Science – Participating & contributing | Develop and understanding of socio-scientific issues by gathering relevant scientific information to draw evidence based conclusions and to take action where appropriate. | 1, 2 |
| Material World – The structure of matter | Describe the structure of the atoms of different elements. | 3 |
| Material World – Chemistry & society | Link the properties of different groups of substances to the way they are used in society or occur in nature. | 3 |
| Physical World – Using physics | Explore a technological application of physics. | 1, 2, 3, 4 |
| Physical World – Physics concepts | Identify and describe the patterns associated with physical phenomena found in simple everyday situations involving ... electricity and ... light. | 1, 4 |

| Values | Key Competencies | Principles |
|---|--|----------------------------|
| Innovation, inquiry, curiosity. Ecological sustainability. | Thinking, Managing self Participating and contributing Learning to learn | Future Focus, Coherence |

Link to the Student Inquiry

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http://www.schoolgen.co.nz/pdf/SE_L5-6_SI_Discovering_photovoltaic.technology.uses.pdf