Year 6 - Science

Teacher Guide: How does solar energy work?

Solar energy is energy created by the sun – this energy is heat and light. Throughout history, solar energy has provided most of the world's energy.

The sun keeps Earth's temperature warm enough for life to exist. Plants rely on the sun to grow. They transform the sun's energy during photosynthesis. This creates both food and oxygen for animals and humans.

Solar power is generated when the sun's energy is converted into electricity. There are two major ways of doing this:

1. **Photovoltaic (PV) cells**
   (photo meaning light, voltaic meaning electricity)

- PV cells convert sunlight directly into electricity
- PV cells are usually made from silicon and are found in roof top solar panels, digital watches and some calculators
- Concentrating solar PV uses large number of sun-tracking mirrors called heliostats to direct sunlight onto PV cells

2. **Solar thermal electricity generating plants**

- Solar thermal energy is harnessing the heat energy from the sun. It is used for solar hot water heating.
- Heat energy can be used to run a refrigeration cycle or to make steam, which can generate electricity through a steam turbine
- Concentrating solar thermal (also known as concentrated solar power, or solar thermal electric) uses large numbers of mirrors to reflect sunlight onto a thermal energy storage system. Energy can then be released as needed both day and night

Australian Curriculum

Learning Area Science	Content Descriptions
ACSSU097	Electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources
ACSHE098	Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions
ACSHE100	Scientific knowledge is used to solve problems and inform personal and community decisions
Cross-curriculum Priorities	Sustainability
General Capabilities	Literacy, Numeracy, Critical and Creative Thinking

Learning goals

Know:

- Energy can be transformed from one form to another

Understand:

- Solar energy is a form of renewable energy
- How energy is transferred

Do:

- Explore how the sun can be used to heat water

Achievement standard

By the end of Year 6, students:

> … analyse requirements for the transfer of electricity and describe how energy can be transformed from one form to another when generating electricity … Students explain how scientific knowledge helps us to solve problems and inform decisions and identify historical and cultural contributions.

Teaching and learning resources

King Island Renewable Energy Integration Project

https://www.hydro.com.au/clean-energy/hybrid-energy-solutions/success-stories/king-island

YouTube video
https://www.youtube.com/watch?v=UJ8XW9AgUrw

Published by SciToons on 30 April 2018

It is recommended that the video is set up prior to class or student viewing.

Materials	Number
Smart board or projector	1
Internet connection	1
Activity Sheet 1 – solar hot water	1 each
Activity Sheet 2 – solar radiation	1 each
Ref: Living Through South Australia's Power Outage	1 each

Adjustments / strategies to include all students

	Enabling	Extending
Content	Spend time introducing students to the language of solar energy.	Have students investigate costs and schemes of solar power that various Australian governments have introduced.
Process	Guide students one to one with experiments and assist students with materials for their research, including visual materials.	Invite students to contact relevant scientists and politicians requesting information on solar power. Have them compare and contrast the information they receive.
Product	Have students take photos or find pictures of solar power for their PowerPoint presentation. Encourage students to work and contribute to a group presentation.	Have students create a question to research about solar power. Ask them to email government, local councils, Hydro Tasmania, a university or similar institutions to investigate their information. Have students prepare a report on the methods of their research and their new knowledge to date.

Assessment

Refer to *Options for assessment and extension* in each Lesson Plan

Evidence of Student Learning

- explains the transfer of electricity
- describes how energy can be transformed from one form to another when generating electricity
- understands scientific knowledge helps us to solve problems and inform decisions
- identifies solar energy as renewable energy

Group Reflection

Refer to *Elaborate and Review* in each Lesson Plan

Teacher Reflection

- What went well?
- What could be improved?
- How might you deliver this lesson differently next time?

Feedback

If you would like more information or to provide feedback please contact our Education Coordinator at education@hydro.com.au