

Reflecting on 'How can sunlight charge my phone?'

The Sun's energy warms our planet, driving its winds and ocean currents, powering its water cycle, and providing the energy for life to flourish. Today it's used as a way to produce the electricity our society relies so heavily upon.

This short video and accompanying resources explain how electromagnetic radiation produced by the Sun can be converted into the electricity technology such as our smart devices rely upon.

Video summary

(Approximate running time: 3 minutes)

- Solar energy is an important energy resource in our community.
- Our Sun is a star that produces light energy.
- Light energy can be absorbed by atoms, making them move randomly. We experience this as heat.
- Some forms of power production use the heat produced by sunlight to create electricity through steam power.
- Light energy absorbed by some materials can also make their electrons move in ways that create electric currents.
- Silicon can release electrons when it absorbs light.
- Arrangements of silicon can be used to create an electrical current.

Literacy links

- Electromagnetic radiation: A spectrum of waves carrying various amounts of energy, which we experience as colours of light as well as gamma rays, X-rays, ultraviolet radiation, infrared, microwaves and radio waves.

- Photovoltaics: Technology that arranges materials to collect light and transform it into an electrical voltage

Research tasks: Want to know more?

Use the following facts to inspire your students to research more about solar energy.

- Large scale solar thermal farms use mirrors to collect light for generating temperatures up to 300 degrees Celsius. Ask the students to compare solar thermal technology with photovoltaics, and compare which they think will be more common in the future.
- Roughly 58 million petajoules (PJ) of solar radiation falls on Australia each year. Ask students to find ways to explain the value of a petajoule, and compare this with the amount of energy we might use.
- While the principles behind photovoltaics date back to the 19th century, it wasn't until the 1950s when American industrial research and scientific development company Bell Labs showed they could be used in technology. The first cells converted only around 6% of the light energy into electricity. Today, experimental silicon cells can convert nearly 27% of light energy. Ask students to research experiments on photovoltaics, and predict whether we might one day improve on this efficiency even more.

TEACHER NOTES

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Curriculum links

Australian Curriculum Science, year 8

- Energy appears in different forms, including movement (kinetic energy), heat and potential energy, and energy transformations and transfers cause change within systems (ACSSU155)
- Solutions to contemporary issues that are found using science and technology, may impact on other areas of society and may involve ethical considerations (ACSHE135)
- Cross curricular priorities: Sustainability
- General capabilities: Numeracy, Literacy, Ethical understanding

NSW Curriculum Science, stages 3 and 4

- Discusses how scientific understanding and technological developments have contributed to finding solutions to problems involving energy transfers and transformations (SC4-11PW)
- Appreciates the importance of science in their lives and the role of scientific inquiry in increasing understanding of the world around them (SC4-1VA)
- Cross curricular priorities: Sustainability
- General capabilities: Numeracy, Literacy

Victorian Curriculum Science, Levels 7 and 8

- Energy appears in different forms including movement (kinetic energy), heat, light, chemical energy and potential energy; devices can change energy from one form to another (VCSSU104)
- Science and technology contribute to finding solutions to a range of contemporary issues these solutions may impact on other areas of society and involve ethical considerations (VCSSU090)
- Cross curricular priorities: Sustainability
- General capabilities: Numeracy, Literacy

Worksheet Answers:

Question 1

D) Electromagnetic radiation

Question 2

C) About half

Question 3

C) The salt absorbs heat to produce steam for turning turbines in a generator

Question 4

C) Photovoltaics

Question 5

B) Silicon