



CURRICULUM LINKS

SOC 2-19A: By comparing the lifestyle and culture of citizens in another country with those of Scotland, I can discuss the similarities and differences.

SOC 3-19A: I can describe how the interdependence of countries affects levels of development, considering the effects on people's lives.

SEE ALSO TCH 2-02B AND TCH 3-02A

TIME

Ideal: 2 x 45 mins.

Minimum: 1 hour

QUICK LINKS

Refer to Quick links sheet on DVD

RESOURCES

SolarAid PowerPoint presentation

Reward map

Atlases

Blindfolds

Photocard 22

Case Studies 1-7

KEYWORDS:

Kerosene

Energy

Electricity

Solar

OBJECTIVES

Most pupils will:

- begin to recognise how solar power can be used to help people around the world;
- plan and carry out an assembly to share their learning with peers and adults.

PRE-UNIT KNOWLEDGE

Ideally some experience of diary writing.

STIMULUS

Use the Unit 5 SolarAid PowerPoint presentation on the Sunny Schools DVD to support this lesson. Look at slide 1 and explain that it shows the earth by night: 1.6 billion people in the world have no access to electricity. Ask pupils to close their eyes and imagine they get home from school and there is no electricity. Discuss in pairs using the questions below and then complete the 'Consequences' activity as a class: demonstrate a flow chart of consequences on the board (on slide 2, example below) considering an aspect of home life. Pupils can independently create their own consequence flow diagram for an aspect of their school lives.

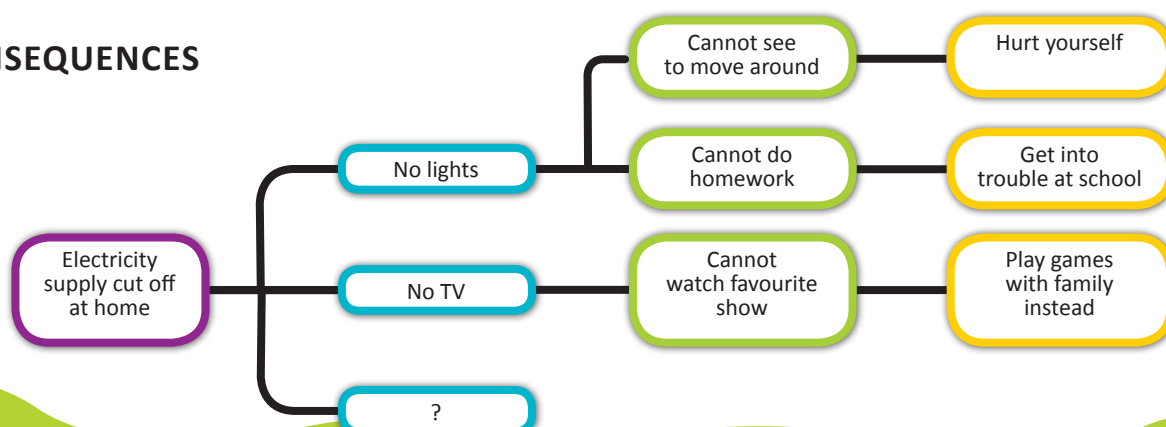
What would change?

What would you not be able to do?

What would you use for light?

Geography extension: Students could use atlases to explore the areas in the world without electricity.

CONSEQUENCES



Activity 1: Life without light?

Look at slide 3. **What would life be like without light?** Ask pupils to try and carry out a simple task whilst blindfolded – such as drawing a self-portrait, choosing the right jumper to put on, or pouring and drinking a glass of water without spilling it. This could be extended into a role play.

Activity 2: How do people manage without electricity?

Do people without electricity just live in darkness? Some do because they cannot afford to buy any candles or fuel. Look at slide 4. Many burn kerosene, a liquid fossil fuel, also called paraffin, which is a bit like petrol that we put in our cars. Read Case Study 1, an account of a kerosene lamp being used in a home. **Why is kerosene bad?** Explore with pupils: kerosene is bad for people's health, especially children's; it is dangerous (starting fires, accidental consumption); it is very expensive; it is bad for the environment (burning fossil fuel, air pollution).

Activity 2: How is solar power helping people around the world?

Show slide 5. **How can we capture the power of the sun?** Explain that for most of the people who do not have electricity, solar power would be the cheapest and most reliable form of energy. Show the film 'A Long Wait' on the DVD (also linked from slide 6). Explain that SolarAid is a charity that aims to banish the kerosene lamp from Africa by helping people to capture the power of the sun with small solar lamps. Read Case Study 2 of a family that now has solar lamps at home. **What was their life like before they had solar power? How has it changed?** Discuss and record in a comparison table. Encourage pupils to consider these key themes:

1. **People: how does it change the way people work and play together?**
2. **Environmental: how does this affect the environment and is it in good or bad ways?**
3. **Money: how does it affect the ways in which people earn a living?**

Use slides 7 - 12 to support understanding of how solar can transform lives. In groups, give out Case Studies 3 - 7 to read and discuss. Ask the pupils to put themselves in the shoes of one of the children and write a diary entry, reflecting on the day they got solar power and how it changed their lives. Find out more at [Quicklink 5.1](#).

Plenary

Explain that their action for this unit will be completed as a whole class by holding an assembly to share their learning with the rest of the school. As a class, discuss what type of assembly they would like to hold and list some of their ideas. Look at the Assembly Sheet on the Sunny Schools DVD for inspiration.

NOW LET'S TAKE SOME ACTION!

Allow pupils to select an action from below. When it is completed they should colour in one of the continents on their reward map.

Sunny, Sunnier, Sunniest! Plan and hold an assembly on what you have been learning about solar around the world.

You could share poems, perform a play or give a presentation or demonstration.



“ Speak to SolarAid about supporting their work in East Africa and borrowing solar lamps to use in your classroom. ”



Solar Circuits

Solar circuits work like normal circuits except the battery is replaced with a solar cell which is powered by sunlight. Work in pairs to build your own solar circuit.

You will need:

- An LED (bulb)
- 2 crocodile clip wires
- A PV solar panel

Instructions to light an LED

1. Gently bend the 'legs' of the LED outwards.
2. Attach the longer 'leg' of the LED to the positive wire on the solar panel using a crocodile clip wire.
3. Attach the shorter 'leg' of the LED to the negative wire on the solar panel, ensuring the crocodile clips do not touch. (Note: the LED will not work if it is attached the other way round)
4. Place the solar panel in direct sunlight or close to a desk lamp and see the LED light up!

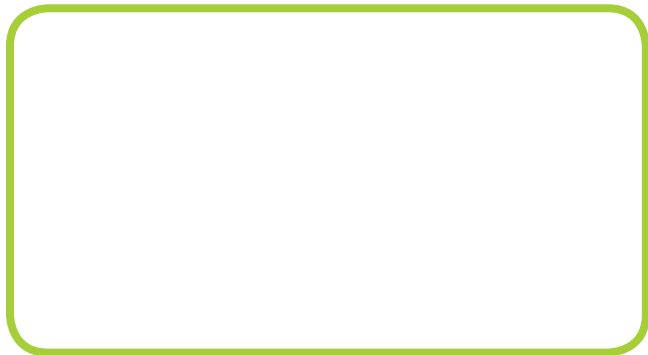
This is the symbol for a solar cell.



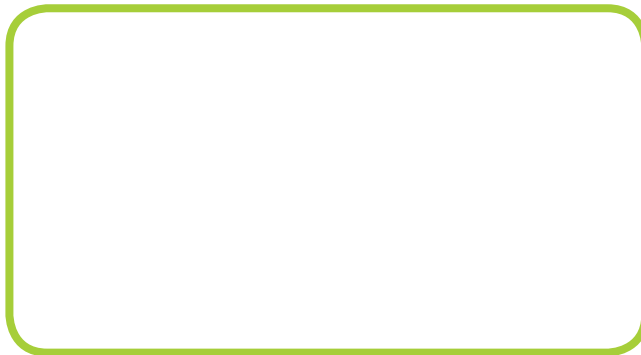
This is the symbol for an LED.



Draw a picture of your circuit.



Now draw a diagram using symbols.



When you tested your circuit, what happened to the brightness of the LED when you moved it further towards the light or further away from it? Describe what you saw.

Troubleshooting – if your bulb won't light up, double-check:

- the LEDs are connected the right way to the panel,
- the crocodile clips are not touching each other,
- the panel is in direct sunlight or very close to a desk lamp.

Solar Circuits - Extension

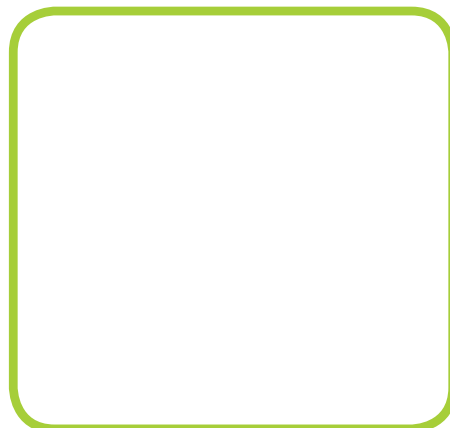
Now join together with another group and try adding the components together to make different circuits. Try creating these circuits, then drawing them in the boxes using symbols:



1 panel with 2 LEDs



2 panels with 1 LED



2 panels with 2 LEDs

What did you notice about the brightness of the LEDs with the different numbers of panels? Write what you found out below:

If your teacher has buzzers, try using one in the circuit instead of the LED. What happens to the noise as you move the solar panel nearer the light or further away from it?

Did you know...?

- In solar lights, like the ones you might find in a garden, the solar cell is linked to a battery which is charged during the day by the sunlight. This means that the electricity is stored and can be used to turn on lights when it is dark, even though there is no sunlight.
- Most solar cells can last 25-30 years without losing efficiency.
- PV solar cells are made from an element called silicon which comes from sand. Silicon from one ton of sand used in PV cells could produce as much electricity as burning 500,000 tonnes of coal.
- Most satellites in space are powered by solar cells.