

Switch on to Renewables

Season: All	Duration: 1-1.5 hrs	
<p>Overview: Switch on to energy: What is it?; How do we use it?; and Where does it come from? Discover the environmental impacts of using fossil fuels and identify how to save energy at home and in school. Once you've got the basics, time for the challenge—can you engineer a more sustainable future? Investigate the sustainable alternatives to fossil fuels by making a solar powered boat or cook up some treats by making a solar powered oven (alternative indoor activities available during inclement weather).</p>		
<p>Learning Objectives:</p> <ul style="list-style-type: none"> • understand what energy is. • identify what we use electricity for and have a basic understanding of how it is made. • the environmental impacts of using fossil fuels to produce electricity. • how we can save energy at home and school and why this is important. • sustainable alternatives to fossil fuels and discuss the advantages and disadvantages of these. 	<p>Key Vocabulary:</p> <p>energy electricity fuel coal oil gas solar power wind power wave power renewable non-renewable power station pylon generator pollution</p>	<p>global warming climate change photo-voltaic cell wind turbine motor circuit solar oven reflect absorb insulate thermometer Celsius degree radiation</p>
<p>National Curriculum Links: Science: Sc4 Physical Processes: Electricity 1 a: Simple circuits: to construct circuits, incorporating a battery or power supply and a range of switches, to make electrical devices work [for example, buzzers and motors]. Geography: Knowledge and understanding of environmental change and sustainable development. 5a: Recognise how people can improve the environment or damage it and how decisions about places and environments affect the future quality of people's lives; 5b: Recognise how and why people may seek to manage environments sustainably, and to identify opportunities for their own involvement. Breadth of study: 6e: an environmental issue caused by change in an environment and attempts to manage the environment sustainably. Citizenship: Preparing to play an active role as citizens: 2 j :that resources can be allocated in different ways and that these economic choices affect individuals, communities and the sustainability of the environment Design and technology: 3: Evaluating processes and products. 4: Knowledge and understanding of materials and components: c: How mechanisms can be used to make things move in different ways, using a range of equipment including an ICT control program; d: how electrical circuits, including those with simple switches, can be used to achieve results that work.</p>		

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Resources to be provided by school:

Interactive whiteboard or projector and screen

For solar boats: Outside area to site paddling pool (close to a tap or hose where possible)

For solar ovens: Sunny area outside (weather permitting), scissors, rulers, pencils, PVA glue.

Materials to be brought by children:

For solar ovens: Shoe box or similar (must have a lid), 1 box between 2 children.

Newspaper and/or bubble wrap for insulation.

Outline of Activities with approximate timings:

Please note: We can tailor activities to suit the abilities of your class and time available.

Introduction (20 mins)

Children will learn some basic energy facts to enhance their understanding. What is energy, how do we use it, and where does it come from? Followed by a discussion about the problems associated with fossil fuels, how we can save energy, and sustainable alternatives (renewable energy sources).

Solar Scrap-heap Challenge (minimum 40 mins)

Ahoy me hearties! Children will put their team work and ingenuity to the test by taking part in our boat-building challenge. Can your team make a 'sea-worthy' craft using only scrap materials and powered only by renewable energy? Once completed we'll be testing the boats' 'floatability' and speed – let's hope for some calm seas!

OR

Solar Ovens (minimum 40 mins)

How do you cook a tasty treat in a shoe box? By turning it into a solar oven! In pairs children will shape their box into a solar reflector using aluminium foil, and absorb the radiation using a black covering for their oven base. Weather permitting pairs can test their ovens outdoors using thermometers and improve their efficiency by adding insulation.

Eco– Schools Links:

Curriculum-linked activities and practical action on energy consumption in school could be used as evidence towards an Eco Schools Award. For more information visit:

<http://www.keepbritaintidy.org/ecoschools/>

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Suggested follow-up activities:

- Make a Light switch surround — Children use cereal boxes to make a frame for a light switch to encourage people to switch off when they leave the room and save energy. Children decorate their frame with key words and pictures, either written and drawn themselves, or cut out and stuck on from a selection provided.
- Practice making electric circuits with different components
- Organise a regular school energy audit to measure the school's energy consumption over a given period to identify a baseline of typical energy use. Follow up by establishing a group of student energy monitors to record areas where energy is wasted and run an energy awareness campaign to reduce consumption.

Useful websites:

http://www.create.org.uk/schools/teachers_resources.asp (various resources highlighting where energy can be embedded in the curriculum).

<http://www.carbontrust.co.uk/cut-carbon-reduce-costs/products-services/sector-advice/pages/schools-2.aspx> (advice for teachers managing energy use in your school)

<http://www.carbondetectiveseurope.org/StandardPage.aspx?intPageID=2>
(a full programme of activities and projects to cut carbon in your school).

<http://www.ashdenawards.org/schools> (guidance for sustainable energy use in schools, good examples of best practice from participating schools)