

## Teacher notes for activity: What is energy?

### Resources for this activity

- Powerpoint slides to support activity, including printable worksheets, available on [www.ashdenawards.org/schools/activities](http://www.ashdenawards.org/schools/activities).
- 5-minute Ashden Awards films, available on [www.ashdenawards.org/schools/films](http://www.ashdenawards.org/schools/films):
  - **IDEI, India**: using cheap, human-powered treadle pumps, instead of diesel pumps, to supply water for irrigating crops.
  - **Seaton Primary School, UK**: generating renewable electricity from a photovoltaic array and wind turbine, and solar water-heating for the swimming pool.
  - **Woodheys Primary School, UK**: reducing energy consumption through energy efficiency. Pupils read meters and check classrooms for energy wastage.
  - **Eastchurch Primary School, UK**: developing a culture of 'Good Energy Housekeeping', led by classroom Energy Monitors, and an 'E-team' of Year 4 pupils.
  - **Making a difference** (9 minutes): combining pupil ideas on global warming with visual illustrations of how this problem is affecting us and examples of some practical solutions.
- Thermometers, data logger (further activities).

### Curriculum areas and topics

- Main activity: Science, English, Geography, Education for sustainable development (ESD).
- Further activities: Science, Mathematics, English, ICT (Information and computer technology).
- Links to topics: Electricity, Light, Contrasting locality – India.

### Suitability

- Key Stage One – age approximately 5 to 7 years.
- Main activity needs approximately one lesson.
- The detailed objectives and approach can be adapted for use with different age groups.

### Grouping

- Whole class for discussion and introduction.
- Less able to complete picture worksheets and use phrase prompts.
- More able to complete written worksheets.
- Extension activity - linking energy pictures.

## **Background**

This activity is a useful starter if pupils have limited knowledge about what energy is and where it comes from. There are some key energy facts that pupils should be aware of. The activity gives simple definitions and allows pupils to explore their understanding of what energy can do and where it comes from.

Key ideas to bring out are:

- Energy is a supply or source of electrical, mechanical or other form of power.
- Energy is in everything. It cannot be destroyed, only changed.
- There are two main types of energy – stored (potential) energy and working (kinetic) energy.
- Energy is stored in different ways in the energy sources we use in our everyday lives.
- Nearly all our energy comes from the sun (approximately 99%). A very tiny amount comes from geothermal energy – residual heat beneath the earth's surface from when the planet formed and cooled down.

## **Prior knowledge**

This is an introductory lesson to begin to think about what energy is and where it comes from, so pupils need very little prior knowledge. It is helpful if they are able to voice their ideas about what energy might be.

## **Purpose of the activity**

- To be able to say what energy is and what it can do.
- To begin to think about where energy comes from.

## **How to use the resources**

### **Powerpoint**

Introduce the idea of energy and see what pupils have to say about it. This is useful to gauge their understanding and misconceptions. The term energy is used in lots of different contexts and a useful approach is to help the pupils think about how they feel when they are 'full of energy' or when they 'have no energy'. This will help them to identify what they can and can't do with and without energy and to realise that energy is needed for our bodies to do work. Expanding on this idea can help pupils to identify that energy can warm things up, cool them down, move them and make them change their structure and how they look. Everything has energy.

It is important that pupils know that energy can never be destroyed, only changed. In the short experiment (perhaps planned into a PE lesson) ask pupils where they think the energy comes from that makes them able to run about. Encourage them to think of food as a fuel for their bodies just like petrol is a fuel for cars to move.

Explain that when we use energy we often waste some. This does not mean that energy is 'lost', but that it has been changed to another form of energy which we cannot make use of. Ask the pupils if they think they will be wasting any energy and tease out the ideas of moving energy, light energy and heat energy as examples of what they might see. After the pupils have run about, reflect on what has happened to their bodies (i.e. they have moved about a lot and got hotter – so energy has been used for movement and heat).

Use the statements given on the Powerpoint to encourage pupils to think about what other things energy can do. They can do this verbally, or through using the worksheets provided for written or drawn responses. There are some phrases already given that pupils can read and use to support their thinking. As an extension activity, some pupils may be able to complete the 'Linking energy pictures' worksheet.

### **Plenary**

Extend thinking by asking the pupils to think about where the energy comes from. Using examples and structured questioning it is possible to help pupils realise that we get our energy from food and that this food grows by getting energy from the sun. Choose a plant-based example such as bread, fruit or vegetables for initial simplicity. More complex links can be introduced if pupils are ready for it. The key idea here is that all our energy ultimately comes from the sun.

### **Films**

Watch and discuss one or more of the Ashden Awards films (details on page 1).

### **Further activities**

- 1) Leave a bowl of water in the sunshine and measure the temperature of the water with a thermometer. Ask pupils to predict what will happen to the water after half an hour in the sun. Decide how often to take measurements, record and discuss. Has the water temperature changed? How? Where has the energy come from?  
**Science, Mathematics**
- 2) Using thermometers, measure the temperature in sunny and shady spots in the classroom and compare. If available, use data loggers to monitor the temperatures over time.  
**Science, Mathematics, ICT**
- 3) Make lists of all the effects of energy use that you can see in your classroom. Sort them by things that show energy as light, heat or movement. What does this tell us?  
**Science, English**
- 4) Using the 'energy picture link' worksheet, work in groups to draw and link bigger energy chains.  
**Science, Geography**
- 5) Use the 'Making choices' activity: the Powerpoint and Teacher notes are available on [www.ashdenawards.org/schools/activities](http://www.ashdenawards.org/schools/activities).

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