Summer Sun

Teachers' notes

What's it all about
2008 saw the dullest August in the UK since records began in 1929 according to the Met Office. There were just 105.5 hours of sunshine, far less than the average for the month of 165.1 hours.

In this activity children will investigate ways of measuring sunshine and discuss the validity of these methods.

Where it fits

Science:

QCA Unit 3F: Light and shadows

- that opaque objects/materials do not let light through
- that shadows of objects in sunlight change over the course of the day
- that shadows change in length and position throughout the day

Scientific enquiry

- consider what sources of information they will use to answer questions
- deciding what evidence to collect
- deciding whether evidence is sufficient to support conclusions

Literacy

- make contributions relevant to the topic and take turns in discussion
- present findings to other groups

Numeracy

- use standard measures
- use tables and bar charts to record results

What children will learn:

- that the light from the sun can be blocked by opaque objects

Children will demonstrate this by completing the task on page 2 successfully

- that shadows are formed on sunny days

Children will demonstrate this by completing the task on page 3 successfully

- that shadows can change through the day

Children will demonstrate this by completing the task on page 3 successfully

- that there are diffent methods of measuring sunshine and some are better than others

Children will demonstrate this by completing the task on page 4 successfully

What you need to do

Introducing the activity

- Display **Page 1** through a projector or as an OHT. What is the image showing? What do the children think? Did they notice that the weather in August 2008 was less sunny?

  Discussion starter:

  How can we measure how much sun we have had in a day?

  Children to talk about it in groups.

  Discuss their first ideas.

Leading the main activity

- Display **Page 2** through a projector or as an OHT. What are the images showing?

  Discussion questions:

  How come there is still a shadow even though the Sun is behind a cloud?

  What if the sky was totally cloudy?

  What happens when bright sun goes behind a cloud briefly?

  Can shadows be faint and dark? When?

  Children to talk about it in groups.

- Display **Page 3** through a projector or as an OHT.

  Discussion questions:

  Which activity would be the easiest to do? Why?

  Which activity would be the most useful?

  How will you do the investigation?

  What equipment do you need?

  What measurements will you take?

  How will you record your observations?

- Display **Page 4** through a projector or as an OHT. Print off copies for the children. Children to work in pairs to make observations from their practical investigation and display their findings

  Discussion questions:

  What are your conclusions? How did you make your conclusions?

  Do you think this investigation was a good way of measuring sunshine?

Would you change it? How?

Plenary
Discuss changes observed by the children.
Ask the children to offer suggestions as to why their shadows might have changed.
Illustrate using a torch or other light source, if necessary.

It is important to allow the children time to discuss their ideas.

Extension
More able children could extend the activity by recording the amount of light using a data logger. Numeric data can then be produced, interpreted, discussed and compared with the original method of collecting and recording data.
Some children may complete drawings of scenes in sun and under cloud to illustrate their understanding of shadows and the effect of cloud cover.

Extension Ideas . . . Cross Curricular Links

SEN
In pairs, children could play shadow tag to develop an awareness of shadows.
Draw shadows in a variety of places – playground, wall, desk

Research (History/Science)
Many years ago people thought that the world was flat – what did they think happened to the sun at night? Who discovered the world is round?

Research (Science)
How do meterologists measure sunshine hours? How do they make weather predictions?

Shadow Drawings (Art)
Draw a scene showing the shadows – where would they be, how big in relation to the object in the drawing?

Assessment for Learning: Smart Grid

Thumbs Up	We were great at the task because…
Thumbs Sideways	We were good at the task because…
Thumbs Down	We were OK at the task because…

We understand the scientific words opaque and translucent and can use them in our work
We can talk about and show how shadows are formed.
We can carry out investigations accurately and talk about our results.
We know how shadows change during the day and why it happens.
We know that some materials let light through and others don't. We know that opaque means it doesn't let light through.
We know a shadow is where there is no light.
We know how to do an investigation when shown.
We can find shadows on the playground or in the class.
We can carry out an investigation with help.
We know that the shape of a shadow is like the object.

Next time we will…

smart grid
Assessment *for* Learning

Science at your fingertips

Why are our shadows different in the winter and summer?
The Sun is highest in the sky at midday and casts a short shadow. In the afternoon, when the Sun is lower in the sky, the shadow is longer. The length of the shadow is also affected by the seasons. Winter shadows are longer than summer shadows. This is because the Sun is lower in the sky in winter.

Why are there four shadows on a football pitch?
There are four or more shadows because there are four or more sources of light i.e. the floodlights.

Do you have a shadow at the equator?
At this point neither hemisphere is tilted toward or away from the sun. People living near the equator do not see a shadow at noon during the equinox. But people living far away from the equator still see a shadow even at noon because, due to the curvature of the earth, the Sun's rays always strike the earth's surface at an angle there, and the Sun is never directly overhead.
http://www.peabody.yale.edu/education/curric/MPsci/MPsciIIAL4.pdf

Why is there less sun this year?
The Met Office said high pressure around the Azores, which usually brings warmer, brighter weather to Britain in the summer, simply had not materialised this year.

Where are the sunniest parts of the UK?
The sunniest parts of the United Kingdom are along the south coast of England. This is largely because the formation of convective (cumulus) cloud takes place over land and skies over the sea remain cloud-free. Many places along this south coast achieve annual average figures of around 1,750 hours of sunshine. The dullest parts of Britain are the mountainous areas, with annual average totals of less than 1,000 hours.

Web links

BBC News
http://news.bbc.co.uk/1/hi/uk/7592649.stm
News story behind the activity

Met Office
http://www.metoffice.gov.uk/climate/uk/2008/august.html
Weather information from the month of August

Met Office
http://www.metoffice.gov.uk/climate/uk/location/england/
General information about the British climate

Fact Monster
http://www.factmonster.com/dk/encyclopedia/weather.html
Weather definitions and information

BBC Science Clips
http://www.bbc.co.uk/schools/scienceclips/ages/7_8/light_shadows.shtml
Interactive activity on light and shadows

World Sunlight Map
http://www.die.net/earth/
Watch the sun rise and set around the world, in real time!

Virtual Science Fair
http://www.virtualsciencefair.org/2003/thoga3n/public_html/onepage.html
Interesting facts about sunlight
Morehead Planetarium
http://www.morehead.unc.edu/Shows/EMS/sunlight.htm
Facts about the sun

British Weather
http://www.british-weather.com/
Information and links about our great British weather

Primary upd8 is a joint initiative from ASE and the Centre for Science Education, Sheffield Hallam University.