KS2 Lesson Plan

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Lesson 9	Introduction to Solar Thermal Heating		
Level	Key Stage 2	**Time required**	30 minutes

National Curriculum Links

Science, Maths, English (view scheme of work for full details of links)

Aims

- The students will investigate how solar thermal panels use the sun's energy to heat water
- They will discuss the advantages and disadvantages of solar thermal panels energy to heat water
- They will experiment with the Solar Water Heater Kit to experience solar thermal energy

Resources required

Solar Water Heater Kit, timer, optional: lamp (with incandescent bulb)

Web search keywords

Solar thermal energy, solar water heater

Introduction

Lesson 7 and 8 involved discovering how the sun's power can be used to generate electricity. The infra-red energy from the sun can also be used to heat water for use in buildings.

During winter months when there is less sunlight a boiler or immersion heater will be needed to supplement the solar heating.

Solar Water Heater Kit

Ensure the students are familiar with the Solar Water Heater Kit and how it works before starting the experiments.

Instructions are included with the Solar Water Heater Kit. These can be downloaded in PDF format: http://www.ecostyle.co.uk/products/solar_water_heater_kit/solar_water_heater_kit_activity_sheets_v2.15.pdf

The digital thermometer is originally designed to monitor refrigerator temperatures. The instruction booklet contains further details including setting a minimum/maximum temperature alarm.

Risk assessment

The aluminium heating fin, copper heating tube and the water inside the tube may become very hot during use. Avoid leaving the kits in direct sunlight when not in use. Allow the kits to cool down before handling. Stop the experiment when the temperature exceeds 50°.

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Task 1

Remove the black solar collector fin, copper tube and digital thermometer from the plastic case.

If not already installed, fit the battery into the digital thermometer.

Remove the solid orange bung and fill the copper heating tube with cold tap water. Replace the bung.

Place the panel on a windowsill or outside in the sun. Record the ambient temperature and the temperature inside the copper heating tube by toggling the 'Room-Fridge' button. When the display shows 'Room' this is the ambient temperature, and 'Fridge' is the temperature inside the heating tube.

After 5 minutes have elapsed on the timer, record both the ambient temperature and the temperature inside the copper heating tube by toggling the 'Room-Fridge' button.

Record the weather conditions, e.g. the sun was behind thin cloud etc.

Conclusion

What happens to the temperature?

Plot a graph showing the results.

Ask the students to consider why the temperature has risen.

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