

## **Green STEM Project:**

### **Solar Panels and Heat Energy**

Type	Lesson plans
Purpose	The lessons are aimed at a Year 9 group to reinforce SC1 skills needed for SATs. The purpose of the solar water heater is to help people in Less Economically Developed Countries save fuel for heating water for washing or cooking. It could also be used by people camping. Perhaps the solar water heater could be manufactured cheaply by local people thereby providing employment also. There is a lot that could be done on this in D&T or even business studies!
Description	<ul style="list-style-type: none"><li>• Using scientific ideas to explain the causes of climate change, students examine various possible effects of climate change and consider the ethical dilemmas of whether to take action.</li><li>• Convection currents in terms of particles, Insulation prevents transfer of heat energy. Students consider the basic construction and function of the solar water heater with particular emphasis on heat energy transfer.</li><li>• Variables in the manufacture of a solar water heater, investigate suitability of various materials. Identify the best materials to make a solar water heater for villagers in Mexico. Everyone can make a difference to climate change.</li><li>• Possibly using data loggers, students record results of investigations using solar water heaters.</li><li>• Analysis of group's results and presentation to the class.</li><li>• Recommendation regarding materials for manufacture. Class agreement is sought on the best materials. This is an opportunity to consider multi-variant analysis.</li></ul>
Cross-Curricular links:	Links with Maths would include calculating heat energy transferred, rate of flow of water, how long it would take to heat particular volumes of water, the cost of materials and labour to manufacture the solar water heater, calculation of carbon footprint of each heater and how long it would take to "pay back" its carbon emissions. Following on from these lessons in Science could be a set of lessons in D&T constructing a full size solar water heater using the recommendations for materials agreed on in Lesson 6.
Keystage	KS3

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Breakdown of hours<sup>1</sup>

1. Climate change, its causes and effects
2. Heat loss and insulation
3. Planning - identifying solar heating variables
4. Obtaining Results
5. Analysing group results
6. Evaluating

Links to other materials

With differentiated materials, however, the suite of lessons could be used with Year 7 or 8 students, or even KS4 students needing a refresher in SC1 before coursework investigations. This set of lessons could work well within the Year 8 Heating and Cooling topic.

"Understanding that designing and making has aesthetic, environmental, technical, economic, ethical and social dimensions and impacts on the world".

**If you would like more information regarding this project, please contact Klaus Selke on 01482 372677 or [klaus@heta.co.uk](mailto:klaus@heta.co.uk).**

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<sup>1</sup> Guideline only, can be varied within the total time

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