



Engaging Places

A resource to support teaching and learning through buildings and places



Sustainable buildings (2), by Rob Deane, Oak Hill School

Curriculum subject/s	Science
Key stage/s	KS2
Curriculum outcomes	Sc3 materials and their properties 1a, b, 2c.
Lesson objectives	Pupils can test materials for their insulation properties. Pupils understand that some materials are better thermal insulators than others.

Pupils will test the thermal insulating properties of a variety of materials. There could be a number of different ways to approach this depending on the resources the teacher can easily get. In this lesson they'll line a shoe box (include base and lid to represent floor and roof) with the insulating material. The idea is that the shoe box represents a house and pupils will see that by effective insulation they will use less energy to heat the house. The teacher will have to consider the ambient temperature in the classroom. The test may work more effectively if done outside where it is cooler. The lesson could be extended by asking pupils to include windows. They could experiment with size, glazing (clear plastic) and aspect, i.e. facing the sun or not

Starter

- Ask pupils how houses keep heat in and how is it lost. Put their answers on the board. (5)
- Explain that the class will test the properties of materials that could be used to insulate a house. Explain that the shoe box represents a house.

Main

- Split pupils into groups and give each group a shoe box, insulating material, thermometer, beaker and stopwatch. If you wish you could have one box with no insulation. Each group should quickly make a recording sheet to show time and temperature. Ask them to set up their experiment as this is being done by one of the group. (10)

Main (cont.)

- When each group is ready, give them all a beaker of warm water to place in their 'house'. Place the thermometer in the beaker and record the temperature – they should all be the same at the start. Then keep recording the temperature every 2 minutes for 10 minutes. Get pupils to complete the wordsearch as they do this. (10)
- Stop the experiment and ask each group to report back on their findings. Display these on the board and ask the class to come to a conclusion about the insulating properties of each material. Through questioning ask if other things might need to be considered – e.g. cost, the pollution caused in making the material, etc. (10)
- Ask pupils to repeat the experiment but this time have a fan blowing towards the boxes (representing wind). Ask for predictions about the data. (10)
- Display the data next to the data from the original experiment. Discuss how accurate their predictions were. (10)

Just around the corner

Find out if there are any local buildings that have been designed to be sustainable and see if you can visit them. Or contact a construction company and see if they have an Education Officer – many do, e.g. BAM have an excellent department. They can organise visits to buildings still under construction, and pupils will be able to investigate sustainable features of the building.

Plenary

- As pupils clear away discuss the benefits of insulating a home well. Explain that it can be expensive to insulate but that you get your money back quite quickly if your heating bill goes down. Show them how the arithmetic of this works on the board. (5)

Homework

Ask pupils to find out how their homes are insulated.

Assessment for learning

Formative:

Through initial questioning during starter.

Summative:

Continuous observation of pupils' performance. Marking of pupils' ability to carry out test and record the data.

This resource is from a bank of resources created for Engaging Places by practising teachers and education professionals. If you have ideas for using buildings and places in teaching and learning, and would like to help us create further resources, please email: engagingplaces@cabe.org.uk