Unit Title		Science lesson 3 - Key Stage 3 Investigating Heat Loss and Insulation
Learning Objective		Understand the importance of insulation in limiting heat loss in the built environment
Aims		**Equipment & Resources**
• Explore different types of insulation • Test the effectiveness of different typical insulation materials • Explore the effect of insulation on energy use in the home		**Sc3** Lesson Resource – Investigating Heat Loss and Insulation, insulation samples, insulation testing equipment (x7, each containing a different insulator, Rockwool, sheep's wool, straw, polybeads, foil wrap, feathers and a control with no insulation. Insulation testing kits with a probe thermometer), stopwatches x 7, kettle/Bunsen burners to heat water for the kits, funnels to fill testing kits with hot water, record sheet, Excel sheet "Sc3a – Investigating Heat Loss and Insulation - experiment results tables and charts"
Time	**Objectives**	**Activities**
10 mins	Introduce topic, demonstrate various types of insulation, discuss benefits of insulation	• Hand round some samples of insulation and ask the students to identify their use • Briefly explain using the short multiple choice quiz the impact insulation can have on heat loss in the home and the consequences if homes are not well insulated – cost, comfort levels, damp and mould, fuel poverty
30 mins	Main activity – testing different types of insulation	• Split students into 7 groups and assign each group a different material to test • Students (or teacher/lab technician depending on health and safety requirements) fill the testing equipment with boiling water, replace lids and take a reading of the temperature every 2 minutes for 20 minutes
10 mins	Sharing results and conclusion	• Ask each group to feedback their results, as they give results enter them into the Excel sheet 'Insulation Experiment Results' and display on whiteboard • Discuss as a group which were the best insulators • Discuss how the different insulators would be used in a home – use fact sheets about insulation in the Sc3 lesson resource for prompts
Homework		**Learning Outcomes**
• Complete graphs if not done during experiment		• The importance of insulation in the built environment and the consequences of having inadequate insulation • The most effective types of insulation

Curriculum links

1.1 Scientific thinking

a. Using scientific ideas and models to explain phenomena and developing them creatively to generate and test theories

b. Critically analysing and evaluating evidence from observations and experiments

1.2 Applications and implications of science

a. Exploring how the creative application of scientific ideas can bring about technological developments and consequent changes in the way people think and behave

2.1 Practical and enquiry skills

a. Use a range of scientific methods and techniques to develop and test ideas and explanations

b. Assess risk and work safely in the laboratory, field and workplace

c. Plan and carry out practical and investigative activities, both individually and in groups

2.2 Critical understanding of evidence

a. Obtain, record and analyse data from a wide range of primary and secondary sources, including ICT sources, and use their findings to provide evidence for scientific explanations

b. Evaluate scientific evidence and working methods

2.3 Communication

a. Use appropriate methods, including ICT, to communicate scientific information and contribute to presentations and discussions about scientific issues

3.1 Energy, electricity and forces

a. Energy can be transferred usefully, stored, or dissipated, but cannot be created or destroyed