Year 5 – Properties and changes of materials – How do materials change? Lesson 2

Lesson	2 of 7

Learning objective

I can explain that some materials keep heat in better than others.

National Curriculum links

NC Y5:
Children will:
- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
- compare and group together everyday materials on the basis of their properties, including thermal conductivity

Working scientifically:
- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

Key lesson question	Which material will keep a hot drink warm the longest?

Resources

- lesson presentation (ppt)
- science focus assessment sheet
- investigation sheet
- mini task - plastic, metal and wooden spoon and hot water
- identical cups, thermometers, heated water…
- materials for 'sleeve': foil, paper, cardboard, fabric, bubble wrap, plastic

Teaching input

- **Scientific enquiry types and skills** – Review the 'scientific enquiry types' and 'working scientifically skills' the children will use in this lesson, highlighted on the slide.
- **How do materials change?** – The slide shows the lesson questions the children will answer in this unit. The current lesson's question is highlighted on the slide.
- **Key vocabulary for this lesson** – Go through the key vocabulary for this lesson and their definitions. Have any of the children heard these words before? Did they already know their meanings?
- **Testing** – Introduce Hannah. Choose a child to read what Hannah says about the scientific enquiry type, 'Testing'.
- **Let's recap** – Read through the information on the slide. Revisit learning from the last lesson by talking about the materials objects are made from and the properties that make them suitable. The children are to look at the photos on the slide, name the object and the material, and then think of a property of the material that makes it useful with their learning partners, in groups or as a class. Take feedback from the class before the answers are revealed on the following slide.
- **Properties of materials** – Read through the information on the slide. The children are to discuss the question on the slide with their learning partners, in groups or as a class. Take feedback from the class.
- **Let's investigate** – The children are to follow the instructions on the slide to test out how the different materials respond to heat. Take feedback from the class before the answers are revealed on the following slide.
- **Thermal conductors** – Read through the information on the slide. Introduce thermal conductivity. Go through the keywords and their definitions in the 'New word alert!' boxes.
- **What do we need to find out?** – Read through the information on the slide. The children are to read the questions on the slide with their learning partners, in groups or as a class and decide which of these questions Hannah needs to investigate. Take feedback from the class before the answer is revealed on the following slide.
- **Variables** – Read through the information on the slide.
- **Independent variable** – Read through the information on the slide. This is the one thing in the investigation that will be changed by us. The children are to discuss the question on the slide with their learning partners, in groups or as a class. Take feedback from the class before the answers are revealed on the following slide.
- **Dependent variable** – Read through the information on the slide. This is what we will measure in the investigation. We are looking for a relationship between the variable we change and the variable we measure.
- **Control variables** – Read through the information on the slide. Children should consider other factors that could change in this investigation. The children are to discuss the question on the slide with their learning partners, in groups or as a class. Take feedback from the class before the answers are revealed on the following slide.
- **Investigation** – The children are to follow the instructions on the following four slides to complete their investigation worksheets.
- **Interpreting results** – Read through the information on the slide. A sample set of results models how to identify the best thermal insulator.
- **Investigation** – Read through the information on the slide. The children are to complete the final section of their investigation worksheets. Children should look at their own set of data, identify which material kept the drink hot the longest, and then write the conclusion.
- **What have we learnt?** – Read through the information on the slide. Summarise the learning about conductors and insulators.
- **Challenge** – Read through the information on the slide. The children are to discuss the question on the slide with their learning partners, in groups or as a class. There are sentence starters on the slide to help them. Take feedback from the class before the answers are revealed on the following slide.

Activity

Children will have listed the variables that need to be controlled and made a prediction during the presentation. They should follow the simple method, ensuring they continue to control those variables throughout their testing. They should record the material and the temperatures on the investigation sheet. After analysing their results, they should add a conclusion.

Challenge

Children consider the challenge question and discuss with their partner. A cafe also sells ice cream, and customers say it melts too quickly. What material might keep ice cream cold for the longest, and why?

Cumulative quiz questions

4. Will the hat work as a thermal insulator or a thermal conductor when worn? Explain.
5. Look at the information in the table and label each material as either a thermal conductor or a thermal insulator.
6. True or false: Heat always moves from the cooler object to the warmer object.

Self-assessment

- I can explain that some materials are good thermal insulators because they slow heat loss.
- I can interpret results to identify which materials are good insulators or conductors.
- I can give examples of materials that are thermal conductors.

Key vocabulary

compare – to see how things are the same and how they are different
conclusion – a statement that uses our results to explain what we find out
measure – to find out the size, amount or degree of something using a tool
prediction – a statement saying what we think will happen
temperature – how hot or cold something is
variable – something that can be changed