

Science – Y6 Sp2 - Heat





Subject Knowledge Notes:

- In this lesson, we develop understanding of heat transfer by looking at two categories of materials – thermal conductors and thermal insulators
- The key idea is that thermal conductors all heat to pass through themselves very easily and thermal insulators do not allow heat to pass through easily
- Students should be able to state what each are, give examples of each and be able suggest why different types of material might be used in different applications based on whether they are conductors or insulators
- Note –the prefix ‘thermal’ is used because some materials are also ‘electrical’ conductors/insulators






For this lesson you will need:

- Ideally some examples of materials that are thermal conductors and thermal insulators to show students
- Some ice cubes
- A metal surface (such as a frying pan) and a surface that is a thermal insulator (such as cardboard)

Lesson Five: what are thermal conductors and thermal insulators?

 5 minutes	<ul style="list-style-type: none"> • Ask children to try their best to recall the information previously learnt. • If they struggle to do this, ask them to move onto the next question. • After 5 mins, pick children to share their answers aloud, ask children to use a different coloured pen to tick or fix their answers.
 10 minutes	<ul style="list-style-type: none"> • Inform children that the following questions we will answer will be based on this text about thermal conductors and thermal insulators. • Begin reading aloud and ask children to follow under each word with their finger. • Switch readers every so often. • Emphasise any words in bold as key words/phrases.
 10 minutes	<ul style="list-style-type: none"> • Ask children to answer the following questions using the text just read about thermal conductors and thermal insulators to find the answer. • Inform children that some of the words are in bold; this gives us a clue about where the key information is, which will help us to find the answers. • Model doing this for the first question • Highlight the answer in the text and talk aloud about the clues that helped you to find the answer e.g. <i>“I have to fill in the gap, so I’m looking for a word in the text that begins with an a”</i> • Continue reading the text and stop children to answer the questions. • Cold call children to share their answers aloud, ask children to use a different coloured pen to tick or fix their answer.
 10 minutes	<ul style="list-style-type: none"> • Ask students to look through the list of items that are available • Explain what each item is to ensure they know what each material is (e.g. copper is a reddish metal, aluminium is a silver coloured metal) • Instruct students to discuss with a partner whether they think each item will be a thermal insulator or a thermal conductor • Write in the correct answers as a class <p>Conductors: Copper, Silver, Diamond, Aluminium</p> <p>Insulators: Wood, Glass, Rubber, Plastic, Cotton wool</p>

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 15 minutes	<ul style="list-style-type: none">• Get out a metal container (e.g. a metal plate or pan) and a material that is an insulator (e.g. cardboard) and place an ice cube on each• Ask students to discuss in pairs what they think will happen• Over a few minutes, the ice cubes will melt at different rates• Guide the students with annotations on each diagram to show what has happened in each case (heat has passed much more quickly from the surroundings into the ice cube on the metal plate) <p><i>There is an opportunity here to return to independent, dependent and control variables – one key control variable is place each object with the ice cube on top of the same surface (e.g. both on the same table top) to ensure that the starting temperature of the surroundings is the same</i></p>
 10 minutes	<ul style="list-style-type: none">• Discuss in partners why plastic is used as the material for handles on saucepans and why iron is used to make radiators.• Encourage students to use the sentence structure ‘plastic is used on the handles on saucepans because it is an insulator/conductor. This is important because...’• Students should think of their own applications of conductors and insulators and add them to the space provided (e.g. cotton used for gloves, saucepan bottoms are made from metal, cloth is used on oven gloves)
 10 minutes	<ul style="list-style-type: none">• A chance for students to recap this knowledge from earlier in the lesson. Explain the task and give them 5 minutes to fill in the answers independently.• Students then check answers with a partner• Mark/adjust answers with a different coloured pen
 10 minutes	<ul style="list-style-type: none">• Look at the pictures of wooden and metal benches.• Ask students if anyone has ever noticed a difference when you sit on each of these types of material on a cold day (the metal always feels colder. Students to discuss why they think this is the case based on their knowledge of thermal conductors and thermal insulators• Explain that as the metal is a conductor, it will quickly transfer heat away from you when you sit on it which makes it feel cold. As the wood is an insulator, it will not easily allow your heat to be drawn away from you and passed through the material so it does not feel as cold.
 5 minutes	<ul style="list-style-type: none">• Return to page 3 and explain what thermal insulators and thermal conductors are in a couple of sentences.