

P2 - ENERGY TRANSFER BY HEATING 2.1 Energy transfer b

Aiming for Grade 4

What is meant by a "good thermal conductor"?

A material that allows heat to pass through it quickly

What is meant by a "good thermal insulator"?

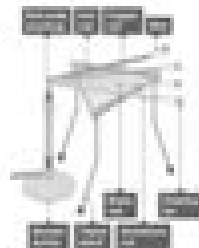
A material that does not allow heat to pass through it quickly

List the materials in the most appropriate group

Copper, Glass, Plastic, Wood, Steel, Aluminium, Rubber, Brass

Good thermal conductor	Good thermal insulator
Copper Steel Aluminium Brass	Glass Plastic Wood Rubber

In the experiment, four metal rods are with a blob of wax and a drawing pin on the end are heated at the other end with a Bunsen burner.



Rank in order which metal is the best thermal conductor.

Copper, Aluminium, Brass, Iron

How would you determine which metal is the best thermal conductor?

The metal whose wax melted first and the pin dropped first

Assessment
Grade 4

Aiming for Grade 6

An experiment was carried out where metal cans containing hot water were allowed to cool. Each can had a different insulating material wrapped around them.

Here are the results:

Insulator	Starting temperature ($^{\circ}\text{C}$)	Temperature after 300s ($^{\circ}\text{C}$)
Paper	60	51
Cotton wool	60	56
Foil	60	49
Felt	60	54

Which material is the most conductive?

Foil

Which material is the most insulating?

Cotton wool

When a substance is heated, what happens to the particles?

The particles vibrate more and move around more. They gain kinetic energy

A good insulator needs to be a material with low thermal conductivity. This means that thermal energy transfer is as low as possible.

Metals are good conductors but plastics are good insulators so are a good choice for making insulating materials.

Metals, Conductivity, Plastics, energy, low

Assessment
Grade 6

- I can analyse temperature change data to compare the thermal conductivity of materials. □

Aiming

Use the diagram to explain thermal conductors. You electrons, ions, lattice thermal energy



Thermal energy and the free electrons in the metal lattice vibrate more and move around more. The ions vibrate more and move around more through the metal.

Explain what is meant by Similar results can be obtained from an experiment with the same materials. Explain what is meant by Similar results can be obtained from the same or a different experiment.

Explain why you would use a copper bottom and a plastic handle on a cooking spoon. Copper is more conductive than plastic. The metal conducts the heat to the plastic handle so the handle does not get too hot to hold.

Assessment
Grade 8

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Marco Cascella



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Table of Contents Grade 1physics P2 June 2014

1. Understanding the eBook Grade 1physics P2 June 2014
 - The Rise of Digital Reading Grade 1physics P2 June 2014
 - Advantages of eBooks Over Traditional Books
2. Identifying Grade 1physics P2 June 2014
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Grade 1physics P2 June 2014
 - User-Friendly Interface
4. Exploring eBook Recommendations from Grade 1physics P2 June 2014
 - Personalized Recommendations
 - Grade 1physics P2 June 2014 User Reviews and Ratings
 - Grade 1physics P2 June 2014 and Bestseller Lists
5. Accessing Grade 1physics P2 June 2014 Free and Paid eBooks
 - Grade 1physics P2 June 2014 Public Domain eBooks
 - Grade 1physics P2 June 2014 eBook Subscription Services
 - Grade 1physics P2 June 2014 Budget-Friendly Options

6. Navigating Grade 1physics P2 June 2014 eBook Formats
 - ePub, PDF, MOBI, and More
 - Grade 1physics P2 June 2014 Compatibility with Devices
 - Grade 1physics P2 June 2014 Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Grade 1physics P2 June 2014
 - Highlighting and Note-Taking Grade 1physics P2 June 2014
 - Interactive Elements Grade 1physics P2 June 2014
8. Staying Engaged with Grade 1physics P2 June 2014
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Grade 1physics P2 June 2014
9. Balancing eBooks and Physical Books Grade 1physics P2 June 2014
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Grade 1physics P2 June 2014
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Grade 1physics P2 June 2014
 - Setting Reading Goals Grade 1physics P2 June 2014
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Grade 1physics P2 June 2014
 - Fact-Checking eBook Content of Grade 1physics P2 June 2014
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements

- Interactive and Gamified eBooks

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