

Nova's Material Investigation

Learning objective: To compare and group together everyday materials on the basis of their properties, including hardness, solubility, transparency, conductivity, and response to magnets.

Read each question carefully and use your scientific knowledge to provide detailed explanations. Remember to use accurate scientific vocabulary.

Word bank: transparent · opaque · translucent · conductor · insulator · soluble · insoluble · magnetic · flexible · durable

1. Nova is building a birdhouse. She needs to choose a material for the roof that is waterproof and durable. Explain why a sponge would be an unsuitable material for the roof compared to a sheet of plastic. (2 marks)

2. Max is conducting an experiment with his kitchen cupboard. He places a metal spoon and a wooden spoon into a beaker of boiling water. Predict which spoon will become hot to the touch first and justify your answer using the term 'thermal conductor'. (2 marks)

3. Compare and contrast the properties of glass and cardboard. In your answer, consider their transparency and how they might react if you dropped them onto a hard floor. (3 marks)

4. Kit has a mixture of iron filings and sand. Describe a method he could use to separate them effectively, and explain the property of the iron that makes this possible. (2 marks)

5. Explain why it is important for electrical wires to be covered in plastic rather than being left as bare copper wire. (2 marks)

6. Zara is designing a new umbrella. She wants it to be translucent so light can pass through, but it must not be soluble in water. Justify why she should choose a thin, wax-coated fabric rather than a sheet of paper. (3 marks)

Draw: Draw a diagram of a 'Super Scientist's Backpack'. Label three items within the backpack and identify the specific property of the material each item is made from (e.g., a metal water bottle for durability, a eraser band for flexibility).



Extension challenge: What might happen if all objects in the world were made of the same material? Choose one material (e.g., glass, wood, or metal) and write a paragraph explaining how daily life would change if your house, your clothes, and your toys were all made exclusively from that single substance. Consider the advantages and the significant problems this would cause.