

Nova's Material Investigation Log

Learning objective: To identify, compare, and explain the properties of everyday materials, justifying their suitability for specific purposes based on scientific evidence.

Join Nova the owl in her laboratory! Your task is to select three different objects from your classroom or home. For each object, identify what it is made from, test its physical properties (such as transparency, conductivity, or solubility), and explain why that material was chosen for its specific function.

Word bank: Transparent · Opaque · Thermal conductor · Thermal insulator · Flexible · Rigid · Permeable · Impermeable · Durability · Solubility

1. Identify your chosen object and the material it is made from. Explain why this material is suitable for the object's purpose. Justify your answer using at least two scientific properties. (3 marks)

2. Compare and contrast: How would the function of your object change if it were manufactured from a different material? Give a specific example. (3 marks)

3. Explain why thermal insulators are essential when designing kitchen equipment. What might happen if a saucepan handle was made from a metal rather than a plastic or wood? (3 marks)

4. Consider the property of permeability. Why is it vital that a raincoat is impermeable, whereas a tea bag must be permeable? Analyse the scientific difference. (3 marks)

5. If you were designing a new school bag, which material would you choose for the straps versus the main body? Justify your choice based on durability and flexibility. (3 marks)

6. Nova wants to build a new nest that is waterproof but allows light to pass through. Suggest a suitable material and explain why it satisfies both criteria. (2 marks)

Extension challenge: Design a 'Future Material' for a space-faring astronaut. Write a paragraph explaining its properties (e.g., extreme heat resistance or self-repairing texture) and why it is superior to materials we currently use on Earth.