Nova’s Material Investigation

Learning objective: To identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard, for particular uses.

Read the passage carefully and answer the questions below. Use your scientific knowledge to justify your answers.

Nova the barn owl is preparing for a chilly night of stargazing in the forest. To stay warm and dry, she has been investigating the properties of different materials. She knows that some materials are transparent, allowing light to pass through, while others are opaque. For her telescope lens, Nova needs a material that is transparent and smooth, so she chooses glass. However, for her shelter, she needs something more durable. She avoids paper, as it is neither waterproof nor strong enough to withstand a gust of wind. Instead, she looks at wood and metal. Nova discovers that metal is an excellent thermal conductor, which might make her nest too cold in winter. Wood, on the other hand, is a natural insulator. It is sturdy, opaque, and provides a cosy barrier against the night air. Nova decides that a combination of wood and soft, flexible feathers will create the perfect environment. By understanding the physical properties of her surroundings, Nova ensures she can observe the constellations in total comfort, protected from the elements by materials chosen for their specific, functional traits.

Word bank: transparent · opaque · thermal · conductivity · durable · flexible · properties

1. Why does Nova choose glass for her telescope lens instead of wood? (2 marks)

2. Identify two properties of paper that make it unsuitable for Nova's outdoor shelter. (2 marks)

3. Explain why metal would be a poor choice for a nest if Nova wants to stay warm. (2 marks)

4. Based on the text, what might happen if Nova used a transparent material to build her entire shelter? (2 marks)

5. Do you think wood is the best material for a bird's nest? Justify your answer using evidence from the text. (3 marks)

Draw: Draw a diagram of Nova’s shelter, labelling the different materials used (wood, glass, feathers) and stating one specific property for each material that makes it useful.

Extension challenge: Compare and contrast the properties of metal and wood. If you were designing a new school lunchbox, which material would you choose and why? Justify your decision by considering durability, thermal insulation, and weight.