

Nova's Material Mystery: The Great Invention Challenge

Learning objective: To identify, compare, and group materials based on their properties, including hardness, solubility, transparency, conductivity, and magnetism.

Nova the owl is designing a new birdhouse for the forest, but she needs to choose the right materials! Read the property descriptions provided in the question list. For each design challenge, identify the best material from the word bank and justify your choice using scientific vocabulary. Remember to consider how the material behaves under different conditions.

Word bank: Transparent plastic · Copper wire · Hardwood · Wool · Rubber · Magnetic steel · Waterproof nylon · Glass

1. Nova wants to create a window that lets light in but keeps the rain out. Why is 'transparent plastic' a more suitable choice than 'wood' for this purpose? Explain your reasoning. (2 marks)

2. Nova needs to build a roof that does not let water soak through during a storm. Which material from the word bank would be most effective? Justify your answer by describing its property. (2 marks)

3. If Nova wants to build a latch for the birdhouse door that stays closed using a force of attraction, which material should she select? Explain how this material interacts with a magnet. (2 marks)

4. Compare and contrast 'Copper wire' and 'Wool'. Why would copper be a poor choice for a bird's nesting material, even though it is a strong material? (2 marks)

5. Justify why 'Hardwood' is an excellent choice for the structural frame of the birdhouse, rather than using 'Glass'. What might happen if Nova built the entire structure out of glass instead? (2 marks)

6. If Nova accidentally drops her birdhouse in a puddle, which of the materials in the word bank might be considered 'soluble' or likely to degrade? Explain why you would avoid these for an outdoor project. (2 marks)

Draw: Draw a labelled sketch of Nova's finished birdhouse. Use arrows to point to at least four different parts of the house and label them with the material used (e.g., 'Roof: Waterproof nylon') and the key property that makes that material useful for that specific part.



Extension challenge: Imagine Nova discovers a brand new, mysterious material in the forest that is transparent, stretchy, and magnetic. Write a short paragraph explaining how she could use this 'super-material' to improve her birdhouse design and why it would be superior to the standard materials we use today.