Nova’s Guide to the States of Matter

Learning objective: To understand the properties of solids, liquids, and gases and how they change state.

Read the passage carefully and answer the questions below using full sentences.

Nova the barn owl loves stargazing, but she also enjoys investigating the world around her. She explains that everything is made of tiny particles. In a solid, these particles are packed tightly together and only vibrate in place, which is why a table keeps its shape. In a liquid, the particles are close but can flow past each other, allowing water to take the shape of its container. Gases are different; their particles are far apart and zoom around at high speeds, filling any space available. Matter can change state when heated or cooled. When ice melts, it gains energy and becomes liquid water. If you heat water further, it will evaporate into steam, a gas. Conversely, if you cool steam, it will condense back into liquid droplets. Some materials can even skip the liquid phase entirely through a process called sublimation. By understanding these tiny building blocks, we can explain how clouds form in the sky or why your ice lolly melts on a sunny day. Science is simply the art of observing these tiny, invisible changes in the world we share.

Word bank: particles · vibrate · condense · evaporate · properties · sublimation

1. According to the passage, how do the particles in a solid move compared to those in a gas? (2 marks)

2. What happens to steam when it is cooled down? (1 mark)

3. Why does a liquid take the shape of its container, but a solid does not? (2 marks)

4. Based on the text, why might Nova suggest that the state of matter is linked to the energy the particles possess? (2 marks)

5. Do you think it is useful for scientists to understand how states of matter change? Justify your answer. (3 marks)

Draw: Draw three boxes. In the first, illustrate solid particles packed tightly. In the second, show liquid particles with some space to move. In the third, draw gas particles spread far apart.

Extension challenge: Research the process of 'sublimation' and find one example of a substance that changes directly from a solid to a gas at room temperature.