Nova’s Guide to the Changing States

Learning objective: To understand that materials can exist as solids, liquids, or gases and can change state when heated or cooled.

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

Nova the owl loves watching the night sky, but she also enjoys investigating the world around her. One chilly morning, Nova noticed that the water in her birdbath had turned into a solid block of ice. She knew that the water had undergone a change of state. In a solid, particles are packed tightly together, holding a fixed shape. When the sun rose and the air warmed up, the ice began to melt, turning back into a liquid. In a liquid, particles move around more freely, which is why water flows to take the shape of its container. Later, as Nova boiled a kettle for her herbal tea, she watched steam rise into the air. This steam is a gas. In a gas, particles are spread far apart and move quickly in all directions. Nova realised that by adding or removing heat, she could make materials change state. Whether it is ice turning to water or steam turning into tiny droplets on a cold window, the particles are always there, just behaving in different ways depending on how much energy they have.

Word bank: solid · liquid · gas · particles · melt · freeze · evaporate · condense

1. According to the passage, how are the particles arranged in a solid? (2 marks)

2. What happens to the water in the birdbath when the air temperature rises? (1 mark)

3. Why does a liquid take the shape of the container it is poured into? (2 marks)

4. What does the author imply about the relationship between heat and the state of matter? (2 marks)

5. If you wanted to turn a liquid into a solid, would you add or remove heat? Explain your reasoning. (2 marks)

Draw: Draw three boxes. In the first, draw a solid (like an ice cube), in the second a liquid (like water), and in the third a gas (like steam). Inside each, draw small circles to represent the particles and how they are spaced out.

Extension challenge: Research what happens to chocolate when you put it in a pan over a low heat. Write a sentence explaining if this is a reversible change and why.