Nova’s States of Matter Investigation

Learning objective: To identify, compare, and group materials as solids, liquids, or gases, and describe how they change state when heated or cooled.

Read each question carefully and use your scientific knowledge to provide detailed explanations. Use the word bank to help with your terminology.

Nova the owl is observing the world from her oak tree. She notices the morning dew on the leaves, the solid bark of the tree, and the chilly mist rising as the sun begins to warm the forest floor. Help Nova classify the materials she sees and understand how they transform.

Word bank: solid · liquid · gas · particles · evaporation · condensation · melting · freezing · vibrate · flow

1. Nova finds a piece of ice and a puddle of water. Explain why the ice is a solid while the water is a liquid, focusing on the behaviour of particles. (2 marks)

2. When the sun warms the puddle, it disappears. Name this process and explain where the water has gone. (2 marks)

3. Compare and contrast a solid and a gas. How does the arrangement of particles differ in these two states? (2 marks)

4. Justify why a gas can fill the entire shape of a container, whereas a solid maintains its own shape. (2 marks)

5. If you place a bowl of water in a freezer, it changes state. Identify the process and explain what happens to the energy of the particles. (2 marks)

Draw: Draw a scientific diagram representing the particles inside a solid, a liquid, and a gas. Label your drawings to show how closely packed the particles are in each state.

Extension challenge: What might happen if we lived on a planet where the average temperature was always below zero degrees Celsius? Write a short paragraph justifying how the states of matter for common items like water or syrup would change in that environment.