

Nova's States of Matter Investigation

Learning objective: To identify, compare, and group materials according to whether they are solids, liquids, or gases, and to explain how they change state through heating and cooling.

Read each question carefully. Use your scientific knowledge of particles and properties to provide detailed explanations. Remember to use precise vocabulary.

Nova the owl is observing the world from her oak tree. She notices the morning dew on the leaves, the solid ice forming on the birdbath, and the steam rising from a nearby chimney. She wants you to help her understand how these substances behave.

Word bank: solid · liquid · gas · particle · evaporation · condensation · freezing · melting · reversible · temperature

1. Explain why a solid like an ice cube keeps its shape, whereas a liquid like water takes the shape of its container. Refer to the movement of particles in your answer. (3 marks)

2. Nova watches a puddle disappear on a sunny day. Identify the process occurring and justify why this is considered a state change. (2 marks)

3. Compare and contrast the properties of a gas and a liquid. What is one key similarity and one key difference? (2 marks)

4. If you were to place a metal spoon in a cup of hot cocoa, the spoon becomes warm. Is this a change of state? Explain your reasoning. (2 marks)

5. A shopkeeper sells ice lollies for £1.20. If the shopkeeper leaves them out in the sun, they melt into a puddle. Is this a reversible or irreversible change? Justify your answer. (2 marks)

6. What might happen if the particles in a substance were suddenly given a large amount of thermal energy? Describe the movement of the particles. (2 marks)

Draw: Draw three boxes. Inside each, sketch how particles look in a solid, a liquid, and a gas. Use dots to represent the particles and add arrows to show how they move.



Extension challenge: Imagine you are a scientist attempting to separate a mixture of sand, salt, and water. Create a step-by-step procedure using your knowledge of filtering, evaporation, and condensation to recover each substance.