

Nova's States of Matter Investigation

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

Use this scaffold to write your scientific report on the three states of matter. Use the word bank to help explain how particles behave in different states.

Nova the owl has been observing the mysterious way that water changes from a solid block of ice into a flowing liquid and eventually into an invisible gas.

Word bank: particles · vibrate · fixed shape · flow · compress · thermal energy · evaporation · condensation · solidify · consequently · furthermore · in contrast

1. Properties of Solids: Describe the arrangement of particles in a solid and explain why a solid maintains a fixed shape. Start your sentence with: 'In a solid, the particles are...' (2 marks)

2. Properties of Liquids: Compare the behaviour of particles in a liquid to those in a solid. Why can a liquid pour? Start your sentence with: 'Unlike solids, the particles in a liquid...' (2 marks)

3. Properties of Gases: Explain why gases can spread out to fill any container. Start your sentence with: 'Gases behave differently because...' (2 marks)

4. Changing States: Describe what happens to the particles when thermal energy is added to a block of ice. Start your sentence with: 'When thermal energy is applied, the particles...' (2 marks)

5. Justification: If you were to trap a gas in a sealed syringe, why might it be easier to compress than a solid? Justify your answer using your knowledge of particle spacing. (3 marks)

6. Critical Thinking: What might happen to the water cycle if the Earth's temperature significantly decreased? Explain the effect on evaporation and condensation. (3 marks)

Extension challenge: Imagine you are a particle trapped inside a melting ice cube. Write a short, creative diary entry describing how your movement and energy levels change as you transition from a solid state to a liquid state.