

Nova's Guide to the States of Matter

Learning objective: To describe the differences between solids, liquids, and gases based on the arrangement of particles.

Use this writing scaffold to explain how materials change and behave. Use your scientific knowledge to complete each section, ensuring you use the correct terminology for particle theory.

As Nova the owl gazes at the night sky, she wonders about the invisible particles that make up everything in our universe.

Word bank: particles · vibrate · fixed position · flow · compress · kinetic energy · intermolecular forces · substance · conversely · furthermore · consequently

1. Introduction: Define what matter is and name the three primary states of matter. Start by saying: Matter is anything that has mass and takes up space, and it can exist as... (2 marks)

2. Solids: Describe the arrangement and movement of particles in a solid. Start by saying: In a solid, the particles are packed closely together in a regular pattern and they... (3 marks)

3. Liquids: Explain how liquid particles differ from solids. Start by saying: Unlike solids, the particles in a liquid are able to slide over one another, which allows the substance to... (3 marks)

4. Gases: Describe the behaviour of gas particles. Start by saying: Gases have the most energy, meaning the particles move rapidly in all directions and... (3 marks)

5. Changes of State: Explain what happens when heat is added or removed. Start by saying: When heat is added to a solid, the particles gain kinetic energy and... (4 marks)

Extension challenge: Research a real-life example of a material that is difficult to classify as a solid or a liquid (such as oobleck or custard) and explain why it behaves the way it does using your knowledge of particle theory.