

Nova's States of Matter Investigation Log

Learning objective: To identify, compare, and explain the properties of solids, liquids, and gases, and understand how materials can change state.

Welcome, young scientist! Nova the owl needs your expertise to document the properties of materials found in our world. Use this log to observe, classify, and analyse how different substances behave. Ensure you use scientific vocabulary to justify your observations.

Word bank: particle · vibrate · compress · viscosity · reversible · irreversible · condensation · evaporation · solidify · fluidity

1. Properties of Solids: Observe a solid object. Describe its shape, volume, and how its particles are arranged. Why does it maintain its fixed shape? (3 marks)

2. Properties of Liquids: Explain the behaviour of a liquid when it is poured from one container to another. How do the particles move compared to a solid? (3 marks)

3. Properties of Gases: Justify why gases are easy to compress compared to solids and liquids. What happens to gas particles when they are trapped in a container? (3 marks)

4. Comparing States: Compare and contrast a block of ice and a puddle of water. Explain the scientific process that causes this change. (4 marks)

5. Reversible vs Irreversible: If you heat chocolate until it melts and then cool it down, is this change reversible or irreversible? Explain your reasoning. (3 marks)

6. Scientific Prediction: What might happen if you left a balloon filled with air in a very cold freezer overnight? Justify your answer using your knowledge of particle theory. (4 marks)

Extension challenge: Design a 'Matter Mystery' experiment for Nova. Write a step-by-step procedure to prove that a gas has mass, even though it is invisible. How would you measure it accurately?