The Curious World of Matter with Nova

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

Read the passage below carefully and answer the questions. Ensure your responses use scientific vocabulary where appropriate.

Nova the barn owl loves to observe the world from her high branch in the old oak tree. She knows that everything around us is made of matter, which exists in three primary states: solid, liquid, or gas. Solids, like the sturdy wood of her tree, have particles packed tightly together, meaning they hold their own shape. Below her, the babbling brook flows as a liquid; its particles are close but can slide past one another, allowing it to take the shape of its container. Finally, there is the air—a gas that fills the sky. Gas particles move rapidly and freely, spreading out to fill any space available. Nova often watches the morning mist, a process called condensation, where water vapour cools to become tiny liquid droplets. Conversely, when the sun warms the dew, evaporation occurs, turning the liquid back into an invisible gas. By observing these changes, Nova understands that matter is never truly lost; it simply transitions between states, governed by the invisible energy of heat.

Word bank: solid · liquid · gas · particles · evaporation · condensation · vibrate · matter

1. Identify the three states of matter mentioned in the text and give one example of each from the passage. (2 marks)

2. Describe the movement of particles in a solid compared to the movement of particles in a gas. (2 marks)

3. Why does the author describe the brook's particles as being able to 'slide past one another'? (2 marks)

4. Explain the relationship between temperature and the state changes Nova observes in the mist and the dew. (2 marks)

5. Justify why it is important for scientists to understand how matter changes state. How might this knowledge help us in our daily lives? (3 marks)

Draw: Draw a scientific diagram showing the three states of matter. Use circles to represent particles, showing how they are arranged in a solid, a liquid, and a gas.

Extension challenge: Nova is curious about what would happen to an ice cube if it were left in a vacuum compared to a warm room. Write a short paragraph explaining your prediction and justify your reasoning using your knowledge of particle theory.