States of Matter: Assessment for Young Scientists

Learning objective: To demonstrate understanding of solids, liquids, and gases, including changes of state and the water cycle.

Read each question carefully. Use your scientific knowledge of particles and properties to provide detailed, accurate answers. Ensure you use appropriate scientific vocabulary.

Nova the owl is observing a mountain lake. She notices the morning mist rising from the water, the ice forming on the pebbles near the shore, and the flowing water of the stream.

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

1. Identify the three states of matter Nova observed in the passage. For each state, describe how the particles are arranged. (3 marks)

2. Explain why a liquid can change its shape to fit a container, while a solid maintains a fixed shape. Use the word 'particles' in your answer. (2 marks)

3. If Max the monkey leaves a cup of ice cubes in the sun, describe the change of state that occurs. Is this process reversible? Justify your answer. (3 marks)

4. Compare and contrast the processes of evaporation and condensation. In what way is temperature involved in both? (4 marks)

5. Bea the honeybee observes steam rising from a kettle. Explain what is happening to the water particles as they transition from a liquid to a gas. (3 marks)

6. A scientist wants to separate a mixture of sand and salt. Suggest a method involving water and state changes to achieve this. Explain the steps involved. (5 marks)

7. What might happen if the Earth's temperature rose significantly, affecting the polar ice caps? Discuss the impact on the water cycle. (5 marks)

Draw: Draw a diagram representing the particle arrangement of a solid, a liquid, and a gas. Label each state clearly.

Extension challenge: Total: /25. Challenge: Write a short paragraph explaining why gases are more easily compressed than liquids or solids, referencing the space between particles.