

Nova's States of Matter Challenge

Learning objective: To identify, describe, and compare the properties of solids, liquids, and gases, and observe how materials change state.

Read each question carefully. Use your scientific knowledge to explain your answers clearly. Remember to use scientific vocabulary where possible.

Nova the barn owl is observing the world from her oak tree. She notices that the morning dew on the grass, the hard bark of the tree, and the mist rolling over the hills all behave differently. Help Nova categorize these states of matter.

Word bank: solid · liquid · gas · particles · melt · evaporate · condense · freeze · vibrate · flow

1. Nova has a block of ice, a cup of water, and a balloon filled with air. Which one of these has a fixed shape and a fixed volume? Explain why in terms of particles. (2 marks)

2. If Max the monkey leaves a chocolate bar in the sun, it changes from a solid to a liquid. What is the scientific name for this process, and what happens to the energy of the particles? (2 marks)

3. Why can you compress (squash) a gas into a smaller space, but you cannot easily compress a liquid? (2 marks)

4. Look at these examples: A) A stone, B) Orange juice, C) Steam. Sort these into the correct state of matter categories. (3 marks)

5. When the mirror in the bathroom mists up after a shower, what state of matter change is occurring? Explain how the water vapour becomes liquid water. (2 marks)

Draw: Draw a diagram showing how particles are arranged in a solid, a liquid, and a gas. Use small circles to represent the particles in each box.

A large, empty rectangular box with a thin black border, intended for a student to draw a diagram showing the arrangement of particles in a solid, liquid, and gas. The box is currently blank.

Extension challenge: Nova wants to know what happens if you boil a kettle. Write a short paragraph explaining the difference between boiling and evaporation. Include the word 'temperature' in your answer.