MR SULLY UNFOLDS PHYSICS

States of matter and internal energy

AQA 4.3.1.2–4.3.2.1
Particle model · Paper 1
Foundation & Higher

Name _____ Class _____ Date _____

Heating a substance either raises its temperature or changes its state. The particle model explains both.

KEY IDEAS

- Solid: close, regular arrangement, vibrating. Liquid: close, random, moving past each other. Gas: far apart, fast, random.
- Changes of state are physical changes: **mass is conserved** and they can be reversed.
- **Internal energy** = total kinetic + potential energy of all the particles in a system.

Section A · Recall

Grade 4–5

1 Name the change of state for each. [4]

a Solid → liquid

b Gas → liquid

c Liquid → solid

d Solid → gas

2 Define internal energy. [2]

3 Explain why the mass of a substance stays the same when it melts. [1]

Section B · Explain

Grade 5–6

4 Describe the arrangement and movement of particles in a solid, a liquid and a gas. [3]

5 Explain what happens to the particles when a substance is heated, and how this can change the substance. [3]

Section C · Stretch

Grade 7+

6 A bath of warm water at 40 °C has more internal energy than a cup of boiling water at 100 °C. Explain how this is possible. [3]

Exam-style question

AQA style

7 Some ice cubes are taken from a freezer and left in a warm room.

a Describe what happens to the internal energy of the ice as it melts. [1]

b The temperature of the ice stays at 0 °C while it melts. Explain why. [3]

c Explain why this is a physical change, not a chemical change. [1]

Total: _____ / 21

How confident am I?	Not yet	Nearly	Got it
I can describe particles in solids, liquids and gases	☐	☐	☐
I can define internal energy	☐	☐	☐
I can explain what happens during a change of state	☐	☐	☐