

The Particle Model of Matter

This worksheet checks your understanding of the particle model of matter and how it explains the physical properties of solids, liquids, and gases ([Outcome](#), [Knowledge](#)). You will also practise relating particle movement and arrangement to properties like density and compressibility ([Knowledge](#), [Understanding](#)).

Exercises

1. Fill in the blanks

Use these words to complete the sentences: *moving, particles, spaces*

All matter is made up of small _____ ([Knowledge](#)).

Particles of matter are always _____ ([Knowledge](#)).

Particles of matter have _____ between them ([Knowledge](#)).

2. Matching

Match each state of matter to the correct description of its particles. Write the matching letter on the line.

State of Matter	Answer	Description
Solid	_____	A) Particles are far apart and move quickly in all directions
Liquid	_____	B) Particles are close together and vibrate in place
Gas	_____	C) Particles are close but can slide past each other

([Knowledge](#))

3. Multiple choice

In which state of matter are the attractive forces between particles the strongest?

- A) Gas
- B) Liquid
- C) Solid
- D) Attractive forces are the same in all states

_____ (write your chosen letter here)

([Knowledge](#))

4. Short answer

Kiran has two cubes of metal that are the same size (the same volume), but one cube feels much heavier than the other.

Explain what this tells you about the density of the two cubes. Use the word "mass" in your answer.

([Knowledge](#))

5. Compressibility investigation

Priya pushes down on the plunger of a syringe filled with air, and then tries the same thing with a syringe filled with water.

a) Which one is easier to compress (squeeze into a smaller volume): the air or the water?

b) Explain why, using an idea about particle spacing.

([Knowledge](#), [Skills](#))

6. Draw and label

In the box below, draw a simple particle diagram (using dots for particles) to show how particles are arranged in a gas. Add one label describing the movement of the particles and one label describing the spacing between them.

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([Knowledge](#), [Skills](#))

Answer key

1. particles; moving; spaces
2. Solid !' B, Liquid !' C, Gas !' A
3. C) Solid
4. The cube that feels heavier has more mass than the other cube, even though both cubes take up the same amount of space (volume). Since it has more mass in the same volume, the heavier cube is denser.
5. a) The air is easier to compress. b) Particles in air (a gas) have large spaces between them, so they can be pushed closer together. Particles in water (a liquid) are already close together with little space left to compress.
6. Diagrams will vary but should show particles spread far apart with random dots, one label noting the particles move constantly in all directions, and one label noting the large spaces between particles.