

The Particle Model of Matter

The particle model of matter explains how all substances are made up of tiny moving particles with spaces between them ([Knowledge](#), [PDF p.1](#)). Understanding this model helps you explain why solids, liquids, and gases behave the way they do ([Outcome](#)).

Exercises

1. Draw a diagram showing how particles are arranged in a solid, a liquid, and a gas. Label each state and show the spaces between particles. Use circles or dots to represent particles.
2. A wooden block and a sponge have the same volume. The wooden block is heavier. Which one is denser?
A) The sponge is denser.
B) The wooden block is denser.
C) They have the same density.
D) You cannot tell without measuring.
3. In solids, particles vibrate in place and are close together. In gases, particles move in all directions and are far apart. Explain why the attractive forces between particles are stronger in a solid than in a gas ([Knowledge](#)).

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4. Match each property of matter to its description.

Property	Description
Mass	The ability of a gas or liquid to reduce in volume when squeezed
Volume	The amount of space something takes up
Compressibility	The amount of matter in an object
Density	A comparison of mass to volume

5. Water and oil are both liquids. When you pour oil into water, the oil floats on top. Use the particle model of matter to explain why oil is less dense than water ([Knowledge](#)).
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6. A balloon filled with air can be squeezed and made smaller. A balloon filled with water cannot be squeezed and made smaller. Which substance is more compressible, and why? Use what you know about particle spacing to explain your answer ([Knowledge](#), [Knowledge](#)).
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Answer Key

1. Diagrams should show: solid particles tightly packed with tiny spaces; liquid particles with medium spaces between them; gas particles far apart with large spaces. Particles shown as dots or circles.
2. B) The wooden block is denser.
3. In solids, particles are very close together, so the attractive forces between them are strong. In gases, particles are far apart, so the attractive forces are weak because particles are not close enough to pull on each other as strongly.
4. Mass = The amount of matter in an object; Volume = The amount of space something takes up; Compressibility = The ability of a gas or liquid to reduce in volume when squeezed; Density = A

comparison of mass to volume.

5. Oil has less mass packed into the same volume as water, so it is less dense. Because oil is less dense, it floats on the water.
6. Air (gas) is more compressible. Gases have large spaces between particles, so they can be pushed closer together. Water (liquid) has particles already separated by only small spaces, so it cannot be squeezed much smaller.