

The Particle Model of Matter

Time: 15 min. 6 questions.

Instructions

Answer all six questions. For multiple choice, write the letter of the best answer. For short answer, write one or two sentences. For true or false, write the word True or False. For numeric questions, write the number with its unit. You may use a pencil and paper to help you work through your thinking.

Questions

1. In the particle model of matter, which statement describes how particles behave in a solid?

- A) Particles are far apart and move in all directions.
- B) Particles are close together and vibrate in place.
- C) Particles slide past each other with small spaces between them.
- D) Particles have no spaces between them and do not move.

([Knowledge](#))

2. Explain why a gas takes up more space than a solid made of the same amount of matter. ([Knowledge](#))

3. True or false: Attractive forces between particles are strongest in gases. ([Knowledge](#))

4. A block of wood has a mass of 240 grams and a volume of 300 millilitres. Calculate the density of the wood block in grams per millilitre. ([Knowledge](#))

5. In a liquid, how are the particles arranged and how do they move?

- A) Particles are packed tightly together and vibrate.
- B) Particles are separated by spaces and can slide past each other.
- C) Particles are far apart and bounce around randomly.
- D) Particles are stationary and touching.

([Knowledge](#))

6. If you squeeze a balloon filled with air, the air inside takes up less space. What property of matter does this show, and which state of matter is being compressed? ([Knowledge](#))

Curriculum Coverage

Question	Learning Outcome / Knowledge
1	Knowledge (particle arrangement and movement in solids)
2	Knowledge (particle spacing and state of matter)
3	Knowledge (attractive forces between particles)
4	Knowledge (density calculation)
5	Knowledge (particle arrangement and movement in liquids)
6	Knowledge (compressibility and state of matter)

Answer Key

1. **B**, In solids, particles are held close together by strong attractive forces and can only vibrate in place, which explains why solids have a fixed shape and volume.
2. **Acceptable answer:** Gas particles are separated by large spaces and move constantly in all directions, so they spread out to fill all available space, whereas solid particles are close together and stay in a fixed arrangement., This shows understanding that particle spacing and movement determine how much space matter occupies.
3. **False**, Attractive forces between particles are strongest in solids and weakest in gases, which is why gases are easy to compress and solids hold their shape.
4. **0.8 g/mL**, Density is calculated by dividing mass by volume: 240 grams divided by 300 millilitres equals 0.8 grams per millilitre.
5. **B**, Liquids have particles separated by spaces that allow them to slide past each other, which is why liquids can flow and take the shape of their container.
6. **Compressibility is the property being shown, and gas is the state of matter being compressed.**, Air can be squeezed into a smaller volume because gas particles are far apart with large spaces between them, making gases compressible.