

The Particle Model of Matter

Time: 20 min. 6 questions.

Instructions

Answer all six questions. For multiple choice, select the letter of the best answer. For short answer, write your response in complete sentences. For true or false, write the word True or False. For numeric questions, write the number and the unit. You may use a pencil and paper to sketch or work through your thinking.

Questions

1. According to the particle model of matter, what is always happening to the particles that make up all matter?

- A) They stay completely still.
- B) They are moving all the time.
- C) They move only in solids.
- D) They stop moving when matter cools down.

[\(Details\)](#)

2. Explain why a gas takes up more space than a liquid made of the same type of matter. Use what you know about particles and spaces between them.

[\(Details\)](#)

3. True or False: In a solid, the particles are close together and vibrate in place, while in a liquid, the particles are separated by spaces and can slide past each other.

[\(Details\)](#)

4. A student measures the mass of a rock using a balance scale. The rock has a mass of 150 grams. What is this mass in kilograms?

[\(Details\)](#)

5. Which state of matter has the strongest attractive forces between its particles?

- A) Gas
- B) Liquid
- C) Solid
- D) All states have equal attractive forces.

[\(Details\)](#)

6. A piece of wood floats in water, but a rock sinks. What does this tell you about the density of the wood compared to the density of the water?

[\(Details\)](#)

Curriculum Coverage

Question	Learning Outcome
1	Details (particle movement)
2	Details (particle arrangement and spaces)

3	Details (particle arrangement in solids and liquids)
4	Details (SI units of mass)
5	Details (attractive forces between particles)
6	Details (density and floating/sinking)

Answer Key

1. **B) They are moving all the time.** The particle model states that particles of matter are always moving, whether the matter is a solid, liquid, or gas.
2. **In a gas, the particles are separated by large spaces and move constantly in all directions, so the gas spreads out and takes up much more space than a liquid where particles are closer together and only slide past each other.** This explains why gases expand to fill their containers while liquids stay contained.
3. **True.** In solids, particles are close together and vibrate in place, and in liquids, particles are separated by spaces and can slide past each other.
4. **0.15 kg.** Since 1 kilogram equals 1000 grams, divide 150 by 1000 to get 0.15 kilograms.
5. **C) Solid.** Attractive forces between particles are strongest in solids and weakest in gases, which is why solids hold their shape while gases spread out.
6. **The wood is less dense than the water.** A solid, liquid, or gas that is less dense than the fluid in which it is placed will float, so the wood's lower density allows it to float while the rock's higher density causes it to sink.