

St. Andrews Scots School

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Session: 2026-2027 – Answer Key

Class: VIII

Subject: Science

Chapter: Particulate Nature of Matter

Big Question: Page No. 90

Matter is made up of tiny particles. The arrangement and movement of these particles explain the differences in the physical properties of solids, liquids and gases. In solids, particles are packed very closely and can only vibrate in their fixed positions. This gives solids a definite shape and volume. In liquids, particles are close but can slide past one another. This allows liquids to flow and take the shape of their container while keeping a fixed volume. In gases, particles are far apart and move freely in all directions. This is why gases have neither a fixed shape nor a fixed volume and can be compressed easily. Thus, the differences in particle arrangement and movement explain the physical properties of the three states of matter.

Think Beyond: Page No. 91

The smell reaches us because of a process called diffusion. The air contains tiny particles that are always moving. When a flower gives off fragrance or gas leaks, its particles mix with the air and spread in all directions. These moving particles reach our nose, allowing us to smell it even without anyone carrying it.

Self-Assessment: Page No. 93

A. Multiple Choice Questions: Tick (✓) the correct options:

1. (b) 2. (c) 3. (b)

B. Assertion-Reason Based Questions:

1. (c) Explanation: Assertion is true because grinding chalk into powder does not change its chemical composition; it's still calcium carbonate, only its form changes.

Reason is false because grinding does not change the chemical nature of chalk; it only changes its size and surface area.

2. (a)

Think Beyond: Page No. 94

When a solid is heated continuously, its particles gain energy and start vibrating faster. The force of attraction between the particles becomes weaker and they begin to move farther apart. As heating continues, the particles break free from their fixed positions and start moving more freely, changing the solid into a liquid. This process is called melting. So yes,

continuous heating can change the state of a solid because the increase in heat energy allows its particles to overcome the strong forces holding them together.

Self-Assessment: Page No. 96

A. Fill in the blanks:

1. closely 2. weaker 3. far 4. volume 5. melting

B. Give a reason:

1. Particles in a solid do not move freely because they are tightly packed and have very strong forces of attraction between them.
2. Liquids can flow and take the shape of the container because their particles are less tightly packed and can move or slide past each other.

Look Beyond: Page No. 97

The smell of an incense stick spreads throughout the room because gas particles move freely and mix with air by a process called diffusion. The tiny particles of the fragrance move rapidly in all directions, spreading from an area of high concentration (near the stick) to areas of low concentration (the rest of the room). This shows that gas particles move constantly and have large spaces between them.

Self-Assessment: Page No. 101

	Column A	Column B
	Observation	Reason
(i)	Air in the syringe gets compressed	b. Gas particles have large empty spaces.
(ii)	Water resists the plunger	a. Water particles are closely packed.
(iii)	Water doesn't overflow with sugar	c. Dissolved solids fit into water's spaces.

Critical Thinking: Page No. 102

Some everyday situations where we experience the movement of gas particles are:

1. Smelling perfume or deodorant from across a room.
2. The aroma of food spreading from the kitchen.
3. Smoke from incense sticks or candles spreading in the air.
4. The smell of petrol spreading near a fuel station.
5. Air freshener fills the whole room after spraying.

These examples show that gas particles move freely and mix with air by diffusion.

Self-Assessment: Page No. 104

A. Multiple Choice Questions: Tick (✓) the correct options:

1. (b) 2. (c)

B. Define the following:

1. Diffusion: The process by which particles move from an area of higher concentration to an area of lower concentration.
2. Melting point: The temperature at which a solid changes into a liquid.
3. Evaporation: The process by which a liquid changes into vapour at any temperature below its boiling point.
4. Compressibility: The property of matter that allows its particles to be pressed closer together, reducing its volume.

EXERCISE

SECTION-A

A. Oral Questions:

1. As temperature increases, the solubility of most solids in liquids also increases because heat allows particles to move faster and mix more easily.
2. The smell of perfume spreads quickly because of diffusion — the perfume particles move rapidly in all directions and mix with air particles, reaching every part of the room.

B. Multiple Choice Questions: Tick (✓) the correct options:

1. (b) 2. (c) 3. (c) 4. (a) 5. (d) 6. (b)

C. Assertion-Reason Based Questions:

1. (a)
2. (c) Explanation: The Assertion is true because sugar particles fill the spaces between water molecules, so the water level does not rise. The Reason is false as sugar does not settle at the bottom; it dissolves.

D. Case-Based Questions:

Case 1:

- (a) The space between water particles is called interparticle space.
- (b) The salt appears to vanish because its particles fit into the spaces between the water particles.

(c) This activity proves that matter is made up of tiny particles and that there are spaces between them.

Case 2:

- (a) The process is called evaporation.
- (b) Evaporation occurs slowly at all temperatures, while boiling takes place rapidly at a fixed temperature (boiling point).
- (c) Boiling requires more heat energy than evaporation.

SECTION-B

A. Very Short Answer Questions:

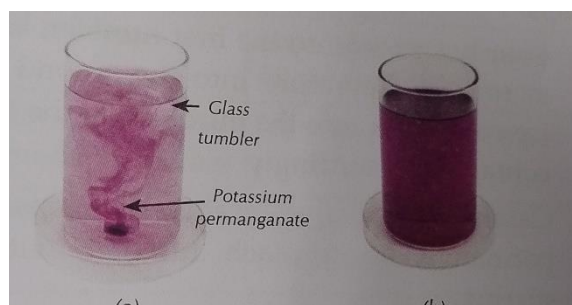
1. Solid, liquid and gas
2. 0°C
3. Interparticle attraction is the force that holds particles of matter together.

B. Short Answer Questions:

1. Sugar disappears when stirred in water because its particles break down and fit into the spaces between water particles, forming a solution.
2. Gases do not have a fixed shape or volume because their particles are far apart and move freely in all directions.
3. In solids, particles are tightly packed and can only vibrate, whereas in liquids, particles are less tightly packed and can slide past one another.

C. Long Answer Questions:

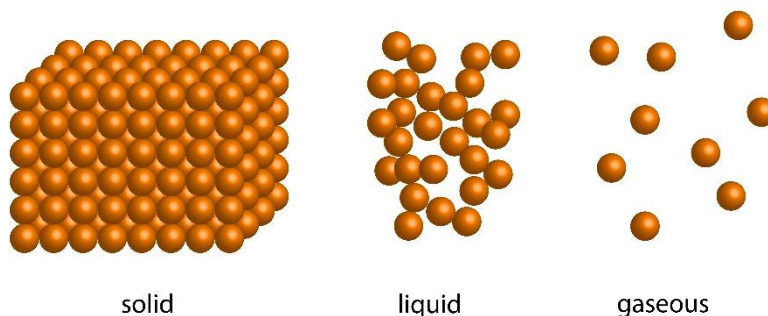
1. Activity to show matter is made up of particles:
 - Take a beaker of water and add a few crystals of potassium permanganate.
 - Stir gently and observe the water turning purple.
 - The colour spreads evenly, showing that the tiny particles of potassium permanganate mix with the particles of water — proving that matter is made up of particles.



Particles of potassium permanganate spread uniformly

2. Comparison of particle arrangement and movement:

- Solids: Particles are closely packed and can only vibrate; strong forces of attraction; definite shape and volume.
- Liquids: Particles are close but can slide over each other; moderate forces of attraction; definite volume but no fixed shape.
- gases: Particles are far apart and move freely; very weak forces of attraction; neither fixed shape nor fixed volume.



Molecular arrangement of solid, liquid and gas

3. Difference between evaporation and boiling:

- Evaporation is the slow change of a liquid into vapour at any temperature (e.g., drying of wet clothes).
- Boiling is the rapid change of a liquid into vapour at a fixed temperature (e.g., water boiling at 100°C).
- Boiling requires more heat energy than evaporation.

D. Application-Based Questions:

1. When food colour spreads slowly in still water, it shows that water particles are constantly moving and allow the colour particles to mix through diffusion.
2. Water does not overflow when sugar is added carefully because sugar particles fit into the spaces between water particles. This proves that matter has interparticle spaces.

E. Picture-Based Questions:

1. (a) The marbles represent the solid state of matter, as the particles are closely packed.
(b) The box with cotton balls shows the weakest particle attraction, as the particles are loosely arranged.
(c) The box with cotton balls allows particles to move freely in all directions, representing gases.

2. Arrangement of particles:

(a) Juice – Particles are close but can slide past each other (liquid).

(b) Cake – Particles are tightly packed and fixed in position (solid).

(c) Cloud – Particles are far apart and move freely (gas).

F. Life Skills:

When gas particles move rapidly and spread evenly, it teaches us to cooperate, share space and work together harmoniously. Just like gas particles fill the entire room without conflict, we should work as a team, respect everyone's ideas and contribute equally during group work.