INDIAN SCHOOL AL WADI AL KABIR		
CLASS: VIII	**DEPARTMENT: SCIENCE** **2026 - 2027**	**DATE: 08/08/2026**
WORKSHEET NO: 4 **WITH ANSWERS**	**TOPIC:** **PARTICULATE NATURE OF MATTER**	**NOTE: A4 FILE FORMAT**
NAME OF THE STUDENT:	**CLASS & SEC:**	**ROLL NO.**

I. OBJECTIVE-TYPE QUESTIONS:

1. A student transfers the same amount of water into a bottle, a bowl, and a glass. The water changes its shape in each container, but the amount of water remains unchanged. What does this show about liquids?
   (a) Liquids have a fixed shape and a fixed volume in all containers.
   (b) Liquids can be compressed easily when pressure is applied to them.
   (c) Liquids have neither a fixed shape nor a fixed volume at all.
   (d) Liquids have a fixed volume but no fixed shape of their own.
2. Which statement best explains why the smell of perfume spreads quickly across a room?
   (a) Gas particles are packed tightly together.
   (b) Gas particles remain fixed in one place.
   (c) Gas particles move rapidly and have large spaces between them.
   (d) Gas particles are larger than liquid particles.
3. Kaizad added a spoonful of sugar to a beaker of water and stirred it well. After the sugar dissolved completely, he noticed that the water level did not rise as expected. What best explains this observation?
   (a) Sugar particles slowly evaporate into the air.
   (b) Sugar particles fit into spaces between water particles.
   (c) Water particles completely disappear during the mixing process.
   (d) Sugar particles change into a gas during dissolving.

4. Meera added a small crystal of potassium permanganate to a beaker of water and left it undisturbed. After some time, the purple colour spread evenly throughout the water. What does this observation show about particles in liquids?
   (a) Particles in liquids remain fixed at one position.
   (b) Particles in liquids move freely and cause mixing.
   (c) Particles in liquids are much heavier than water.
   (d) Particles in liquids disappear completely during mixing.
5. Rohan heats a metal wire over a burner for a long time. At first, the wire becomes very hot and starts to glow. Later, it changes from a solid into a liquid. Why does this happen?
   (a) Particles gain energy and overcome attraction forces.
   (b) Particles stop moving and remain fixed in place.
   (c) Particles attract each other with a much greater force.
   (d) Particles lose energy and move at a slower speed.
6. A student trapped air in a syringe by blocking its nozzle and then pushed the plunger inward. The plunger moved easily, and when released, it returned to its original position. What does this observation show about gases?
   (a) Gas particles are close together and cannot move.
   (b) Gas particles have spaces and can be compressed.
   (c) Gas particles stay very close to each other and are arranged in fixed layers.
   (d) Gas particles have no spaces between each other.
7. While observing a burning candle, Priya noticed hard wax at the bottom, melted wax near the flame, and wax vapour above the wick. Her teacher asked her to relate these forms of wax to the arrangement of particles in different states of matter. Which option correctly matches the states with their particle arrangement?
   (a) Solid– closely packed, Liquid– loosely packed, Gas– far apart.
   (b) Solid– far apart, Liquid– closely packed, Gas– loosely packed.
   (c) Solid– loosely packed, Liquid– far apart, Gas– closely packed.
   (d) Solid– far apart, Liquid– loosely packed, Gas– closely packed.

For question numbers 8-10, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below -

(A) Both A and R are true, and R is the correct explanation of the assertion.

(B) Both A and R are true, but R is not the correct explanation of the assertion.

(C) A is true, but R is false.

(D) A is false, but R is true

8. **Assertion (A):** Suspended Particulate Matter (SPM) refers to the constituent particles of matter, such as atoms and molecules, present in air.
   Reason (R): Dust particles suspended in the air are made up of a very large number of atoms and molecules.
9. **Assertion (A):** Potassium permanganate spreads faster in hot water than in ice-cold water.
   Reason (R): Water particles move faster when heated, which increases the rate of diffusion.
10. **Assertion (A):** Soap helps remove oil stains from clothes during washing.
    Reason (R): One end of a soap particle attaches to oil, while the other end mixes with water, helping to lift and wash away the oil.

II. VERY SHORT ANSWER TYPE QUESTIONS (2M):

1. What is matter? Give three examples of matter around you.
   [Hint: Matter is anything that occupies space and has mass. Three examples of matter around us: Air, Water and Stone]
2. Why does the Earth's atmosphere remain around the planet despite the weak attraction between gas particles? (WB-HOTS-2)
   [Hint: The Earth's atmosphere is held in place by its gravity. The weak attraction between gas particles is not enough to keep the air around Earth. Instead, Earth's strong gravitational force pulls gas molecules toward its surface and prevents them from escaping into space.]
3. What do you understand by the term 'interparticle attraction'? Explain what happens to the particles of a solid when heat is applied to it.
   [Hint: Interparticle attraction is the force that holds particles of a substance together. When a solid is heated, its particles vibrate faster, weakening the forces between them and eventually changing the solid into a liquid.]
4. Explain why a solid like a block of wood is difficult to move your hand through, but you can easily move it through the air.

[Hint: A solid block of wood has particles that are tightly packed and held together by very strong attractive forces. This rigid structure makes it difficult to separate the particles. In contrast, the attractive forces in air (a gas) are negligible, and the particles are far apart, so it is easy to move your hand through them.]

5. Why does the sugar seem to "disappear" when it dissolves in water?

   [Hint: Sugar seems to disappear because its particles become uniformly distributed among water particles, occupying the spaces between them, forming a homogeneous solution.]

6. What is diffusion?

   [Hint: Diffusion is the process of particles of a substance spreading out evenly throughout another substance, moving from an area of higher concentration to an area of lower concentration.]

III. SHORT ANSWER TYPE QUESTIONS: (3M)

1. What role does temperature play in the movement of particles? Explain with examples. (WB-LA-5)

   [Hint: When the temperature increases, particles gain more energy and move faster. This makes diffusion faster and may also change the state of matter. For example, potassium permanganate spreads faster in warm water than in cold water. Similarly, when ice is heated, its particles move faster, and it melts into water. On further heating, water boils and changes into steam. So, higher temperature increases particle movement, while lower temperature slows it down.]

2. Explain the diffusion of potassium permanganate in water.

   [Hint: When a few grains of potassium permanganate are added to water, the purple colour slowly spreads throughout the water. This happens because the particles of potassium permanganate move randomly and mix with water particles. This shows that matter is made of tiny particles that are always in motion.]

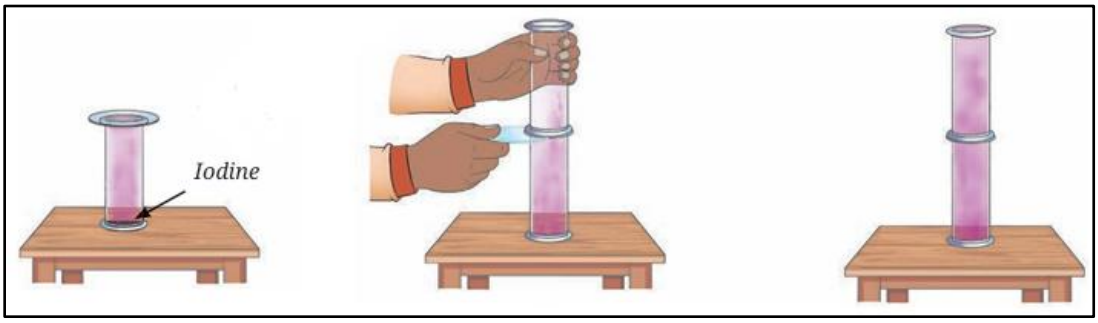
3. What happens to air when compressed in a syringe and then released?

   [Hint: When air is compressed in a syringe, the air particles are forced closer together, which decreases the volume and increases the pressure. The particles move faster and collide more frequently. When the plunger is released, the compressed air expands, the particles move apart, and the air returns to its original volume and pressure. This shows that air can be compressed and also can expand.]

4. You sprayed perfume on one corner of a room. After a few minutes, the fragrance is sensed on the other side. Which property of matter explains this? (WB-CT-2)

   [Hint: This happens due to the property of diffusion. Perfume vapour particles move continuously and mix with air particles. Because gas particles move freely in all directions, the fragrance spreads throughout the room and can be sensed even far from the place where it was sprayed.]

5. (a) What does the following activity demonstrate?



   [Hint: Initially, iodine is seen as a solid at the bottom. As it sublimates, a purple vapour begins to rise and spread. Eventually, the entire jar takes on a uniform purple colour, showing that the vapour has diffused throughout.]

   (b) What does the uniform colour of iodine vapour in the jar indicate about particle movement?

   [Hint: It shows that the iodine particles have moved from areas of high concentration to low concentration, resulting in a uniform distribution.]

   (c) Explain why iodine vapour can be used instead of incense smoke in particle motion experiments.

   [Hint: Iodine vapour is preferred over incense smoke because it spreads on its own and shows how gas particles move. It doesn't need burning, so it's safer and easier to use in a closed jar. The purple colour makes it easy to see how it spreads.]

   (d) Why should we be careful while using solid iodine?

   [Hint: Because iodine vapours can irritate the eyes, nose, and skin.]

IV. LONG ANSWER TYPE QUESTIONS (5M):

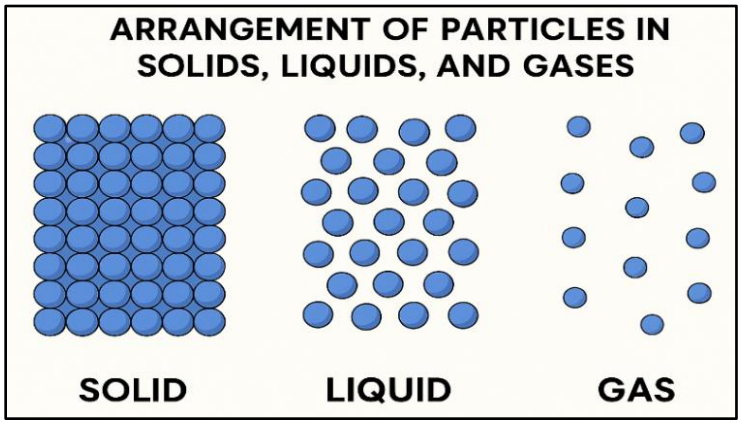
1. Explain the changes in the arrangement and movement of particles when ice changes from a solid state to water and finally into water vapour. Describe how the particles behave in each state during this change of state.

[Hint: In ice (solid state), the water particles are tightly packed in a fixed and regular arrangement. They have very little energy and can only vibrate around their fixed positions. When ice is heated and melts, the particles gain energy and vibrate more strongly. At the melting point, they overcome the attractive forces holding them in place and start moving freely.

In water (liquid state), the particles are arranged randomly and are close together. They have more energy and can move or slide past one another, allowing water to flow.

With further heating, water changes into water vapour (gas state). The particles gain much more energy and move rapidly in random directions. The attractive forces between particles become very weak, and the particles spread out to fill the available space.]

2. Compare solids, liquids, and gases on the basis of shape, volume, particle arrangement, and movement. (WB-LA-4)



[Hint: <u>1. Solids:</u>

Arrangement: Particles are closely packed in a fixed, regular pattern.

Movement: Particles vibrate in their fixed positions but do not move freely.

Properties: Solids have definite shape and definite volume because the particles cannot move from their positions.

<u>2. Liquids:</u>

Arrangement: Particles are close together but not in a fixed pattern.

Movement: Particles can slide past one another, giving liquids the ability to flow.

Properties: Liquids have definite volume but no definite shape; they take the shape of the container.

<u>3. Gases:</u>

Arrangement: Particles are far apart, and there is a lot of space between them.

Movement: Particles move freely at high speeds in all directions.

Properties: Gases have no definite shape and no definite volume; they expand to fill the container.]

V. CASE STUDY- BASED QUESTIONS/PASSAGE-BASED QUESTIONS:

While studying the particulate nature of matter, Class 8 students learned that all matter is made up of tiny particles. These particles are held together by forces called interparticle attractions. The strength of these forces depends on the nature of the substance and the distance between its particles. If the distance between particles increases, the attractive forces decrease rapidly. The strength of these forces determines whether a substance exists as a solid, liquid, or gas.

The students were also introduced to India's rich scientific heritage. More than 2000 years ago, the ancient Indian philosopher Acharya Kanad proposed that matter is made up of tiny, indivisible particles called Parmanu. He believed that these particles are eternal and form all substances around us. His ideas were recorded in the Vaisheshika Sutras, making him one of the earliest thinkers to describe the atomic nature of matter.

1. What are interparticle attractions, and why are they important?
   [Hint: Interparticle attractions are the attractive forces that hold the particles of matter together. They are important because they determine how closely the particles remain packed and influence the physical state of a substance, such as solid, liquid, or gas.]
2. What did Acharya Kanad mean by the term 'Parmanu'?
   [Hint: According to Acharya Kanad, Parmanu refers to the smallest indivisible particle of matter. He believed that these particles are eternal and combine in different ways to form all the substances found in nature.]
3. Why is Acharya Kanad's work considered an important part of India's scientific heritage?
   [Hint: Acharya Kanad's work is considered important because he proposed the idea that matter is composed of tiny particles long before modern atomic theory was developed. His ideas, recorded in the Vaisheshika Sutras, show the advanced scientific thinking that existed in ancient India.]

ANSWERS FOR OBJECTIVE TYPE QUESTIONS [1 to 10] –

1. **(d) Liquids have a fixed volume but no fixed shape of their own.**
2. **(c) Gas particles move rapidly and have large spaces between them.**
3. **(b) Sugar particles fit into spaces between water particles.**
4. **(b) Particles in liquids move freely and cause mixing.**
5. **(a) Particles gain energy and overcome attraction forces.**
6. **(b) Gas particles have spaces and can be compressed.**
7. **(a) Solid– closely packed, Liquid– loosely packed, Gas– far apart.**
8. **(D) A is false, but R is true**
9. **(A) Both A and R are true, and R is the correct explanation of the assertion.**
10. **(A) Both A and R are true, and R is the correct explanation of the assertion.**

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