

LESSON PLAN
SUBJECT - SCIENCE
CLASS - 9

CONSOLIDATED PLAN

Chapter Number and Title of Chapter	Chapter No. - 1 Title of the Chapter - Matter In Our Surroundings
No. of Periods	Total: 7 periods (approx. 40 min each)
Learning Objectives	1. Students will be able to define the term Matter. 2. Students will be able to explain the nature of matter. 3. Students will be able to classify the matter depending upon its physical nature. 4. Students will be able to compare the characteristics of solid, liquid and gas. 5. Students will be able to explain the concept of Diffusion and its applications. 6. Students will be able to describe the Interconversion of three states of matter. 7. Students will be able to understand the effect of temperature and pressure on Interconversion of three states of matter. 8. Students will be able to compare two phenomena ie. Evaporation and Boiling. 9. Students will be able to define the terms : Latent heat of fusion, Latent heat of vaporisation. 10. Students will be able to convert degree Celsius into Kelvin scale and vice versa. 11. Students will be able to define Plasma and BEC (Bose Einstein Condensate) 12. Students will be able to use units of basic measurable quantities.

Teaching Aids / Resources	Teaching Video Explanation Video Experiential Learning Video PPT Concept Map
Previous Knowledge/ Curiosity Questions	Q1. State whether fragrance of incense stick a matter or not ? Ans: On burning, incense stick forms vapours. Vapours are matter. Fragrance (sweet smell) is caused by vapours (Matter). Q2. How many states of matter are known ? Ans: There are main five states of matter. Main five states are solid,liquid,gas,plasma and BEC Q3. Give an example of plasma? Ans:The interior of the sun is plasma. Q4. State whether a liquid and a fluid same? Ans. : Fluid is a condition. Liquid is the state of Matter that has definite volume but indefinite shape. Liquid and gases both flow. Therefore liquid and gas, both are fluids
Announcement of topic	On finding that the students were unable to answer last two questions, the teacher would announce that the students have already studied basic concept of solid , liquid and gas in previous classes. Today, we will begin with the Chapter - Matter in our surroundings. in which comparison of properties of solid,liquid and gas and interconversion of three states of matter will be done.

Teaching Methodology/ Strategy	Transaction would proceed in the following manner- Suggestive Methodologies: 1. Brain Storming / Curiosity Questioning- Short Answer Type Questions Q1. Define Matter? Q2. Name three physical states of Matter? Q3. What is meant by particulate nature of Matter? Q4. Name the process which occurs when a drop of dettol/acetone/alcohol/Potassium permanganate is added to water. Q5. Define the terms: Latent heat of fusion, Latent heat of vaporisation? 2. Active learning- Explanation of the Content will be started with real life examples of solid, liquid and gases followed by power point Presentation. Students will easily grasp the nature of Matter and comparison of properties of solid, liquid and gas. 3. Group learning- It fosters discussion which is essential for understanding in science. Students will perform experiments collaboratively to understand the particulate nature of Matter and to compare rate of diffusion of different states of Matter which develops critical thinking. 4. Guided practice followed by Independent Practice- NCERT questions to be discussed in the classroom. 5. Peer learning- Students will be asked to draw concept map of inter conversion of states of Matter.
Content Obligatory Vocabulary (Keywords)	Mass, volume, particulate, compressibility, density, Fusion, Freezing, Evaporation, Boiling, condensation, sublimation, deposition, Latent heat, atmospheric pressure, kinetic energy.

Learning Concepts/ Teaching Points	Modern Concept of Matter. Nature of matter. Characteristics of Particles of Matter. To compare the characteristics of solid, liquid and gas. Diffusion and its applications. Interconversion of States of Matter. Effect of Temperature and Pressure on Interconversion of States of Matter. Latent heat of fusion. Latent heat of vaporisation. Factors affecting the rate of evaporation. Evaporation causes cooling. Conversion of degree Celsius into Kelvin scale. Conversion of Kelvin scale into degree Celsius. Plasma and BEC. Basic Measurable Quantities and their S.I. Units.
Hard Spots/ Focus Spots	First Focus Spot Note : Students find difficult to understand the concept and definition of boiling and boiling point. Reason : Students find difficult to understand the difference in the definitions of boiling and boiling point (ie. atmospheric pressure). Second Focus Spot/ Hot Spot: Note : Students find difficult to define Latent heat of fusion and Latent heat of vaporisation. Reason : Students find difficult to understand the word 'unit mass' in the definition of Latent heat of fusion and Latent heat of vaporisation.
Experiential Content	Activity 1.- To Illustrate that Particles of Matter have vacant spaces between them. Activity 2. To Illustrate diffusion by dissolving Potassium Permanganate in water. Activity 3. To illustrate that the rate of diffusion in gaseous state is more than that in liquid state by using a burning candle or incense stick.

Subject Enrichment Activities for Internal Assessment	1. To draw flow chart of interconversion of three states of Matter. 2. Observe daily life activities- Drying clothes and boiling water. Differentiate between Evaporation and Boiling.
Recapitulation :	Q.1 Define matter? Ans. Matter is a thing which has mass and occupies space . Q.2. A substance has a definite volume but no definite shape. State whether this substance is a solid , a liquid or a gas? Ans. Liquid. Q.3. Arrange the following substances in increasing order of force of attraction between the particles. (a) Milk (b) Salt (c) Oxygen? Ans. Oxygen, milk, Salt. Q.4 A substance has neither a fixed shape nor a fixed volume . State whether it is a solid , a liquid or a gas? Ans. Gas. Q.5. The melting point of a substance is below the room temperature . Predict its physical state? Ans. Liquid. Q.6. What is vapour ? Ans. Vapour is a substance in gaseous state. Q.7. Name the temperature at which the solid and liquid states of substance can exist together? Ans. Melting point. Q.8. Name any two substances which sublime? Ans. Camphor, iodine. Q.9. Define: Melting,Vaporisation , Sublimation? Ans. Melting - Conversion of solid state into liquid state. Vaporisation - Change of a liquid into its vapours. Sublimation - The changing of solid directly into vapours on heating without going into liquid state.

Assignment: LOTS	LOTS Very Short Answer Type Questions Q1. Define Matter? Q2. Name three physical states of Matter? Q3. What is meant by particulate nature of Matter? Short Answer Type Questions Q1. When a spoon of Salt is mixed in a glass full of water, there is no rise in water level. What characteristic of matter is illustrated by this observation? Q2. Name the process which occurs when a drop of dettol/acetone/alcohol/Potassium permanganate is added to water. Q3. Define the terms: Latent heat of fusion, Latent heat of vaporisation? Q4. Explain the terms: plasma, BEC? Long Answer Type Questions Q1. Compare the properties of solid ,liquid and gas on the basis of shape,volume, intermolecular attractions, Diffusion, density, compressibility ? Q2. Differentiate between Evaporation and boiling? Q3. Define the term: Fusion, Freezing, Evaporation, Condensation, Sublimation, Deposition?
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**Assignment:
HOTS**

HOTS

Very Short Answer Type Questions

Q1. The temperature at which a given liquid boils, varies from place to place. Why?

Q2. What is the physical state of water at 100 degree Celsius and zero degree Celsius?

Q3. Why does Naphthalene balls disappear with time in warm clothes?

Short Answer Type Questions

Q1. The aroma of hot food travel faster as compared to aroma of cold food. Give reason?

Q2. Although Chalk piece and an iron piece, both are solids. It is quite easy to break a chalk piece but it is very difficult to break an iron. Why?

Q3. Why does the temperature remains constant during fusion and Evaporation?

Q4. Why does a cooler works better on a hot dry day?

Q5. How does water kept in an earthen pot becomes cooler during summer?

Q6. Why does our hand feel cold when a drop of acetone/petrol/ether /perfume is kept on it?

Long Answer Type Questions

Q 1. Compare the rate of diffusion in solids, liquids and gases? Explain three applications of diffusion?

Q2. Draw flow diagram showing interconversion of states?

Q3. Explain effect of temperature and pressure on interconversion of three states of Matter?

PERIOD - ONE

Chapter Number and Title of Chapter	Chapter No. - 1 Title of the Chapter - Matter In Our Surroundings
Period Number	One (approx. 40 min each)
Learning Objectives	Students will be able to define the Matter. Students will be able to define the nature of matter. Students will be able to classify the matter depending upon its physical nature.
Teaching Aids / Resources	Explanation Video Experiential Learning Video PPT
Previous Knowledge/ Curiosity Questions	Q1. State whether fragrance of incense stick a matter or not ? Ans: On burning, incense stick forms vapours. Vapours are matter. Fragrance (sweet smell) is caused by vapours (Matter). Q2. How many states of matter are known ? Ans: There are main five states of matter. Main five states are solid,liquid,gas,plasma and BEC Q3. Give an example of plasma? Ans:The interior of the sun is plasma. Q4. State whether a liquid and a fluid same? Ans. : Fluid is a condition. Liquid is the state of Matter that has definite volume but indefinite shape. Liquid and gases both flow. Therefore liquid and gas, both are fluids
Announcement of topic	On finding that the students were unable to answer last two questions, the teacher would announce that the students have already studied basic concept of solid , liquid and gas in previous classes. Today, we will begin with the Chapter - Matter in our surroundings in which nature of Matter will be discussed.

Teaching Methodology/ Strategy	Transaction would proceed in the following manner- Suggestive Methodologies: 1. Brain Storming / Curiosity Questioning- Q1. Out of the following, which is Matter? Air, thought, smoke, love, hate, Table. Q2. Compare spaces between particles of solids, liquid and gas? 2. Active learning- Students get engaged in learning process, increasing understanding and memory. Explanation of the Content will be started with real life examples of solid, liquid and gases followed by power point Presentation. Students will easily grasp the nature of Matter. 3. Group learning- It fosters discussion which is essential for understanding in science. Students will perform experiments to understand the particulate nature of Matter. It develops collaboration, critical thinking and creativity skills in students. 4.Guided practice followed by Independent Practice- NCERT questions to be discussed in the classroom.
Content Obligatory Vocabulary (Keywords)	Mass, volume, particulate.

Learning Concepts/ Teaching Points	Ancient Philosophy of Matter : According to ancient philosophy, the matter consists of five basic elements, –Air , Earth , Fire , Sky and Water. Modern Concept of Matter: Matter is anything in universe that occupies space and has mass. For example: Air, Food, Stones, Clouds, Stars, Plants, Animals, Chair, bed, river, mountain, building, etc.- everything is matter. But love, thought, fragrance, heat, cold etc. are not Matter. Nature of matter: Matter shows particulate nature. PARTICULATE means it is made up of small particles. Particles could be atoms, ions or molecules. Characteristics of Particles of Matter : 1. The particles are too small to be observed with naked eye. 2. The particles are continuously moving. The particles show random (zig-zag) and ceaseless movement known as Brownian movement. 3. These particles have spaces between them. 4. Particles of matter attract each other.
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Experiential Content	Activity - To Illustrate that Particles of Matter have vacant spaces between them. Particles of Matter have vacant spaces between them. Take a glass container and fill it with small pebbles . Apparently it appears that the container is full. Then try to pour some sand in the container. Now one can see that the vacant spaces between the pebbles is occupied by sand particles. Again it appears that there is no vacant space available in the container. Then try to pour some water in the container and observe. Water gets accommodated in the glass indicating that there were still vacant spaces between sand particles. From this activity, it is proved that Particles of Matter have vacant spaces between them.
Subject Enrichment Activities for Internal Assessment	Q. Compare spaces between particles of solids, liquid and gas? Ans. In solid, Constituent particles are very closely packed. Space between particles is minimum. In liquid, Constituent particles are less closely packed. Space between particles is larger in liquid than that in solid. In gaseous state, Constituent particles are far apart from each other. Space between particles of a gas is maximum.
Recapitulation :	Q1. Out of the following, which is Matter? Air, thought, smoke, love, hate, Table. Ans. Air, smoke, Table.

Assignment:	Q1. Define Matter? Ans. Matter is a thing in universe that occupies space and has mass. Q2. Name three physical states of Matter? Ans. Solid, Liquid and Gas. Q3. What is meant by particulate nature of Matter? Ans. It means that Matter is made up of tiny particles. Q4. When a spoon of Salt is mixed in a glass full of water, there is no rise in water level. What characteristic of matter is illustrated by this observation? Ans. This shows that the particles have spaces between them. Salt particles get into the vacant spaces between the particles of water.
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PERIOD- TWO

Chapter Number and Title of Chapter	Chapter No. - 1 Title of the Chapter - Matter In Our Surroundings
Period Number	TWO (approx. 40 min each)
Learning Objectives	Students will be able to compare the characteristics of solid, liquid and gas.
Teaching Aids / Resources	Explanation Video Experiential Learning Video PPT

Previous Knowledge/ Curiosity Questions	Q1. Define Matter? Ans. Matter is a thing in universe that occupies space and has mass. Q2. Name three physical states of Matter? Ans. Solid, Liquid and Gas. Q3. What is meant by particulate nature of Matter? Ans. It means that Matter is made up of tiny particles. Q4. Which state has definite shape? Ans: Solid has definite shape.
Announcement of topic	On finding that the students were not able to answer the last question, the teacher told the students that Solid has definite shape and announced that today, we will compare the properties of solid, liquid and gas.
Teaching Methodology/ Strategy	Transaction would proceed in the following manner- Suggestive Methodologies: 1. Brain Storming / Curiosity Questioning- It allows students generate a large number of ideas. Q1.Which state has definite shape? Q2. Which state has indefinite volume? Q3. In which state, kinetic energy of particles is maximum? Q4. In which state, the rate of diffusion is maximum? 2. Active learning- Students get engaged in learning process, increasing understanding and memory. Explanation of the Content will be started with real life examples of solid, liquid and gases followed by power point Presentation.Students will easily grasp the comparison of properties of solid, liquid and gas. 3. Group learning-It fosters discussion which is essential for understanding in science. Students will perform experiments to compare rate of diffusion of different states of Matter in collaboration. 4.Guided practice followed by Independent Practice- NCERT questions to be discussed in the classroom.

Content Obligatory Vocabulary (Keywords)	Shape, volume, kinetic energy, Diffusion, Concentration
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**Learning Concepts/
Teaching Points**

To compare the characteristics of solid, liquid and gas :

1. Space Between Particles-

In solid, Constituent particles are very closely packed. Space between particles is minimum. In liquid, Constituent particles are less closely packed. Space between particles is larger than that in solid. In gas, Constituent particles are far apart from each other. Space between particles is maximum.

2. Shape

Solid has definite shape. Liquids have indefinite shape. Gases have indefinite shape .

3. Volume : space occupied by a subst

Solids have definite volume. liquids have definite volume. Gases do not have definite volume.

4. Attraction Between Particle

Force of attraction between particles is very strong in solid. Force of attraction between particles of liquid is weaker than in solid. Force of attraction between particles of a gas is weakest.

5. Kinetic Energy:

It is the energy that an object has because of its motion.

Particles in solid have minimum kinetic energy. Kinetic energy of particles in liquid is more than that in solids. Particles of a gas have maximum kinetic energy.

6. Diffusion :

Diffusion is flow or movement of particles from the region of their high concentration to the region of their less concentration.

During diffusion, the particles get into the spaces between them. It results in the intermixing of particles of two different types of matter.

Rate of diffusion is minimum in solid due to strong forces of attraction. In liquid, Rate of diffusion is more than that of solid. In gases, Rate of diffusion is maximum due to weakest forces of attraction.

Experiential Content	Activity: To Illustrate diffusion by dissolving Potassium Permanganate in water. Take a glass of water and put few crystals of Potassium permanganate in it. Observe What happens next? The students can easily observe the flow (movement) of Potassium permanganate particles from the region of their high concentration to the region of their low concentration.
Subject Enrichment Activities for Internal Assessment	Compare solid, liquid and gas on the basis of their shape, volume and rigidity?
Recapitulation :	Q1. Which state has definite shape? Ans. Solid Q2. Which state has indefinite volume ? Ans. Gas Q3. In which state, kinetic energy of particles is maximum? Ans. Gaseous state. Q4. In which state, the rate of diffusion is maximum? Ans. Gaseous state.
Assignment:	Q1. Define the term Diffusion? Ans. Diffusion is flow or movement of particles from the region of their high concentration to the region of their less concentration. Q.2. A substance has a definite volume but no definite shape. State whether this substance is a solid , a liquid or a gas? Ans. Liquid. Q.3. Arrange the following substances in increasing order of force of attraction between the particles. (a) Milk (b) Salt (c) Oxygen? Ans. Oxygen, milk, Salt. Q.4 A substance has neither a fixed shape nor a fixed volume . State whether it is a solid , a liquid or a gas? Ans. Gas.

PERIOD- THREE

Chapter Number and Title of Chapter	Chapter No. - 1 Title of the Chapter - Matter In Our Surroundings
Period Number	THREE (approx. 40 min each)
Learning Objectives	Students will be able to apply diffusion in day to day life. Students will be able to define the terms : fusion, Freezing,Evaporation,condensation,sublimation and deposition. Students will be able to compare compressibility and density of solid, liquid and gas.
Teaching Aids / Resources	Explanation Video Experiential Learning Video PPT
Previous Knowledge/ Curiosity Questions	Q1. Which state has definite shape? Ans. Solid Q2. Which state has indefinite volume? Ans. Gas Q3. In which state, kinetic energy of particles is maximum? Ans. Gaseous state. Q4. In which state, the rate of diffusion is maximum? Ans. Gaseous state.
Announcement of topic	On finding that the students were not able to answer last question, the teacher told the students that it has been discussed in previous topic that the rate of diffusion is maximum in gaseous state. Then the teacher announced that today, we will discuss applications of Diffusion, Compressibility And density of solid, liquid and gas, Interconversion of States of Matter.

Teaching Methodology / Strategy	Transaction would proceed in the following manner- Suggestive Methodologies: 1. Brain Storming / Curiosity Questioning- Define the terms: fusion,Freezing,Evaporation,condensation, sublimation,deposition. 2. Active learning- Students get engaged in learning process, increasing understanding and memory. Explanation of the Content will be started with real life examples of solid, liquid and gases followed by power point Presentation.Students will easily grasp the comparison of properties and inter conversion of states of matter . 3. Group learning- It fosters discussion which is essential for understanding in science. Students will be asked to draw a flow chart to show inter conversion of three states of matter. Students will also be asked to tabulate the properties of solid,liquid and gas in collaboration. 4.Guided practice followed by Independent Practice- NCERT questions to be discussed in the classroom.
Content Obligatory Vocabulary (Keywords)	Potassium permanganate, compressibility, density,fusion,Freezing,Evaporation,condensation, sublimation,deposition.

Learning Concepts/ Teaching Points	Applications of Diffusion: 1. Dissolving a solid in a liquid: When a crystal of potassium permanganate is placed in a beaker of water, the water slowly turns purple on its own. Both potassium permanganate crystal and water are made up of tiny particles. The particles get into the vacant spaces between them. This shows that the particles have spaces between them and are continuously moving on their own. 2. Fragrance of an incense stick (agarbatti): An incense stick (agarbatti) is lightened in one corner of a room, its fragrance spreads in the whole room quickly. Because the rate of diffusion of vapours (particles of a gas) is more due to weak forces of attraction between them. This shows that the particles are continuously moving on their own. 3. Diffusion of Carbondioxide and Oxygen : The gases from the atmosphere diffuse and dissolve in water. Especially Oxygen and Carbondioxide are essential for the survival of aquatic animals and plants. 4. Smell of hot food: The smell of hot cooked food reaches our nostrils from far away. Due to high temperature, the kinetic energy of particles is more. Thus rate of diffusion of particles will be more.
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**Learning
Concepts/
Teaching Points
Continues.**

7. Compressibility:

It is the tendency of a substance to get compressed.

Solid can not be easily compressed because particles are already closely packed.

Liquid can be compressed but to very less extent.

Gas is highly compressible.

e.g. LPG (liquified petroleum gas), CNG (Compressed Natural Gas)

8. Density:

Density is the measure of mass per unit volume of a substance.

Solid have high density. As Particles are closely packed, thus the mass of particles per unit volume is more.

Density of liquid is lower than that of solids . Density of gases is least. As Particles are far apart, thus the mass of particles per unit volume is less.

Learning Concepts/ Teaching Points Continues.	Interconversion of States of Matter Physical states of Matter ie. solid, liquid and gas can be interconverted into each other. Melting or Fusion: Conversion of a substance from solid state into liquid is called melting or fusion. Freezing: Conversion of a substance from liquid state into solid is called freezing. Evaporation: Conversion of a substance from liquid state into gaseous state is called evaporation. Condensation: Conversion of a substance from gaseous state into liquid is called condensation or liquefaction. Sublimation: Conversion of a substance from solid state into gaseous state without going into liquid state is called sublimation. Deposition: Conversion of a substance from gaseous state into solid state without going into liquid state is called deposition.
Subject Enrichment Activities for Internal Assessment	Q1. Tabulate the properties of solid, liquid and gas? Q2. Draw a flow chart to show inter conversion of three states of Matter?
Recapitulation :	Define the terms: fusion, Freezing, Evaporation, condensation, sublimation, deposition.

Assignment:	Compare the properties of solid ,liquid and gas on the basis of shape, volume,intermolecular attractions, Diffusion,density,compressibility ?
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PERIOD- FOUR

Chapter Number and Title of Chapter	Chapter No. - 1 Title of the Chapter - Matter In Our Surroundings
Period Number	FOUR (approx. 40 min each)
Learning Objectives	Students will be able to describe the effect of temperature and pressure on Interconversion of three states of matter. Students will be able to define two terms : Melting point and Boiling point.
Teaching Aids / Resources	Teaching Video PPT
Previous Knowledge/ Curiosity Questions	Define the terms: fusion - conversion of solid state into liquid state. Evaporation - conversion of liquid state into gaseous state. condensation - conversion of gaseous state into liquid state.
Announcement of topic	On finding the students were able to define all the terms, the teacher praised the students and announced that today, we will discuss Melting Point, Boiling & Boiling Point.

Teaching Methodology/ Strategy	Transaction would proceed in the following manner- Suggestive Methodologies: 1. Brain Storming / Curiosity Questioning- Q1. Define the term: Melting point, boiling point? Q2. Why does a liquid boil at different temperature at different places? 2. Active learning- Students get engaged in learning process, increasing understanding and memory. Explanation of the Content will be started with real life examples of solid, liquid and gases followed by power point Presentation. Students will easily grasp the concept of melting point and boiling point. 3.Guided practice followed by Independent Practice- NCERT questions to be discussed in the classroom. 6. Peer learning- Students receive more time for individualised learning. Peers strengthen their own learning by instructing others.
Content Obligatory Vocabulary (Keywords)	Temperature, Pressure, Forces of attraction, LPG, CNG, melting point, boiling point

**Learning Concepts/
Teaching Points**

Effect of Temperature on Interconversion of States of Matter:

On increasing the temperature of solids, the kinetic energy of the particles increases which overcomes the forces of attraction between the particles thus solid state gets converted into liquid state. e.g. melting of ice.

On cooling, liquid state gets converted back into solid state. eg. Freezing of ice cream.

On increasing the temperature of a liquid, the kinetic energy of its particles increases, the liquid state gets converted into gaseous state. eg. Formation of steam.

On cooling, gaseous state gets converted back into liquid state. eg. water droplets on surface of glass container having ice.

Effect of Pressure on Interconversion of States of Matter:

When a high pressure is applied on a gas, it gets compressed. Particles come closer and gaseous state is converted into liquid state. eg. LPG, CNG.

On applying more pressure, liquid state gets converted into solid state. eg. carbon dioxide is solidified to form dry ice.

Melting point/Freezing Point :

Melting point is the temperature at which solid state is converted into liquid state.

Freezing point is the temperature at which liquid state is converted back into solid state.

Many pure substances have same melting and freezing points.

Eg. At zero degree Celsius, ice melts and is converted into water. At same temperature ie. at zero degree Celsius, water is converted into ice.

Thus

Melting point of ice = Freezing point of water = 0°C

Hard Spots/ Focus Spots	Note : Students find difficult to understand the concept and definition of boiling and boiling point. Reason : Students find difficult to understand the difference in the definitions of boiling and boiling point (ie. atmospheric pressure). Boiling: Boiling is the phenomenon of conversion of a substance from liquid state into gaseous state by heating at atmospheric pressure. Concept : As atmospheric pressure varies from place to place, thus the actual boiling point of a substance also differs. Boiling point: Boiling point is the temperature at which a liquid changes rapidly into a gas at One atmospheric pressure(1 atmospheric pressure). Boiling point of water = 100° C
Recapitulation :	Q 1. What is the melting point of ice? Ans. Zero degree Celsius. Q2. Is melting point of ice and freezing point of water is same? Ans. Yes.
Assignment:	Q1. Define the term: Melting point, boiling point? Q2. Why does a liquid boil at different temperature at different places? Q3. Explain the effect of temperature on interconversion of states? Q4. Explain the effect of pressure on interconversion of states?

PERIOD - FIVE

Chapter Number and Title of Chapter	Chapter No. - 1 Title of the Chapter - Matter In Our Surroundings
Period Number	FIVE (approx. 40 min each)
Learning Objectives	Students will be able to observe factors affecting Evaporation. Students will be able to define the terms : Latent heat of fusion, Latent heat of vaporisation.
Teaching Aids / Resources	Teaching video
Previous Knowledge/ Curiosity Questions	Q 1. What is the melting point of ice? Ans. Zero degree Celsius. Q2. Is melting point of ice and freezing point of water is same? Ans. Yes. Q3. Define the term: Melting point ? Ans. Melting point is the temperature at which solid state is converted into liquid state.
Announcement of topic	On finding that the students were not be able to answer last question ,the teacher told the students that the melting point has been discussed in previous period and defined the term. The teacher announced that today, we will discuss factors affecting Evaporation,Cooling effect of Evaporation, Latent heat of fusion, Latent heat of vaporisation.
Teaching Methodology/ Strategy	Transaction would proceed in the following manner- Suggestive Methodologies: 1. Brain Storming / Curiosity Questioning- Q1. Define the term :Latent heat of fusion? Q2.Define the term : Latent heat of vaporisation? Q3. How does surface area affect Evaporation? 2. Active learning - Students get engaged in learning process, increasing understanding and memory. Explanation of the Content will be started with real life examples of evaporation and its cooling effects.Students will easily grasp the factors affecting evaporation and its cooling effect. 3. Guided practice followed by Independent Practice- NCERT questions to be discussed in the classroom.

Content Obligatory Vocabulary (Keywords)	Surface area,temperature,humidity,wind speed, fusion,vaporisation,Latent heat.
Learning Concepts/ Teaching Points	Factors affecting the rate of evaporation: 1. Surface area: If the surface area of the liquid is more, the rate of Evaporation will be more. 2. Temperature: The rate of evaporation increases with an increase in temperature. 3. Humidity: If humidity is more, the rate of Evaporation will be less. 4. Wind speed: In windy weather , the rate of Evaporation will be more. Evaporation causes cooling: During evaporation, the particles of liquid absorb energy (Latent heat of vaporisation) from the surrounding to get converted into its gaseous state. Absorption of energy from the surroundings results in lowering in temperature of surroundings. Thus Evaporation causes cooling.

Hard Spots/ Focus Spots	Note : Students find difficult to define Latent heat of fusion and Latent heat of vaporisation. Reason : Students find difficult to understand the word ‘unit mass’ in the definition of Latent heat of fusion and Latent heat of vaporisation. Concept: Latent heat is the heat required or heat released during conversion of a substance from one state into another state. Heat is required to overcome forces of attraction between the particles. If number of particles are more , then more heat is required and vice versa. Thus Latent heat is measured for unit mass (1kg. or 1g.) of the substance. Latent heat of fusion: Latent heat of fusion is the heat required to convert 1 kg. of a substance from its solid state into its liquid state at its Melting point. Latent heat of vaporisation : Latent heat of vaporisation is the heat required to convert 1 kg. of a substance from its liquid state into its vapour state at its boiling point.
Recapitulation :	Q1. Define the term :Latent heat of fusion? Ans.Latent heat of fusion is the heat required to convert 1 kg. of a substance from its solid state into its liquid state at its Melting point. Q2. Define the term : Latent heat of vaporisation ? Ans.Latent heat of vaporisation is the heat required to convert 1 kg. of a substance from its liquid state into its vapour state at its boiling point. Q3. How does surface area affect Evaporation? Ans. If the surface area of the liquid is more, the rate of Evaporation will be more.

Assignment:	Q1. Temperature remains constant during interconversion of states. Why? Ans: Because energy absorbed is utilised to overcome forces of attraction. Q2. How Does the water in an earthen pot become cool? Ans. Due to latent heat of vaporisation. Q3. Why does a desert cooler works better in hot weather? Ans. Because Evaporation occurs at faster rate. Evaporation causes cooling. Q4. When a drop of ether/ petrol/ acetone is put on our palm, it feels cold. Why? Ans. Due to latent heat of vaporisation.
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PERIOD - SIX

Chapter Number and Title of Chapter	Chapter No. - 1 Title of the Chapter - Matter In Our Surroundings
Period Number	SIX (approx. 40 min each)
Learning Objectives	Students will be able to convert degree Celsius into Kelvin scale and vice versa. Students will be able to define Plasma and BEC (Bose Einstein Condensate) Students will be able to use units of basic measurable quantities.
Teaching Aids / Resources	Explanation Video Experiential Learning Video PPT Concept Map

Previous Knowledge/ Curiosity Questions	Q1. Define the term :Latent heat of fusion? Ans.Latent heat of fusion is the heat required to convert 1 kg. of a substance from its solid state into its liquid state at its Melting point. Q2. Define the term : Latent heat of vaporisation ? Ans.Latent heat of vaporisation is the heat required to convert 1 kg. of a substance from its liquid state into its vapour state at its boiling point. Q3. How does surface area affect Evaporation? Ans. If the surface area of the liquid is more, the rate of Evaporation will be more.
Announcement of topic	On finding that the students were able to answer all the questions ,the teacher praised the students and announced that today, we will discuss Conversion of degree Celsius into Kelvin scale,Conversion of Kelvin scale into degree Celsius,Plasma and BEC,Basic Measurable Quantities and their S.I. Units.
Teaching Methodology/ Strategy	Transaction would proceed in the following manner- Suggestive Methodologies: 1. Brain Storming / Curiosity Questioning- Q 1. Write relation between degree Celsius and Kelvin scale? Q2. What is plasma? Q3. What is BEC ? 2. Active learning- Students get engaged in learning process, increasing understanding and memory. Explanation of the Content will be started with real life examples of plasma. Students will easily understand the Conversion of degree Celsius into Kelvin scale,Conversion of Kelvin scale into degree Celsius,Plasma and BEC,Basic Measurable Quantities and their S.I. Units. 3.Guided practice followed by Independent Practice- NCERT questions to be discussed in the classroom.
Content Obligatory Vocabulary (Keywords)	Degree Celsius, Kelvin, plasma, Bose Einstein Condensate.

**Learning Concepts/
Teaching Points**

Conversion of degree Celsius into Kelvin scale:

Common unit of temperature: degree Celsius. ($^{\circ}\text{C}$)

S.I. Unit : Kelvin (K)

$$- 273^{\circ}\text{C} = 0\text{ K}$$

Eg.1. To convert 100°C into Kelvin.

$$100^{\circ}\text{C} + 273 = 373\text{ K}$$

Eg. 2. To Convert 25°C into Kelvin.

$$25^{\circ}\text{C} + 273 = 298\text{ K}$$

Conversion of Kelvin scale into degree Celsius:

Eg.1. To Convert 273K into degree Celsius.

$$273\text{K} - 273 = 0^{\circ}\text{C}$$

Eg. 2. To Convert 173 K into degree Celsius.

$$173\text{ K} - 273 = - 100^{\circ}\text{C}$$

Plasma and BEC:

Plasma -

Plasma is the fourth state of Matter. In simple words, It consists of a gas made of ions (ie. positively charged atoms formed due to removal of electrons or free electrons).

BEC (Bose Einstein Condensate)

Bose Einstein Condensate is a state of Matter.

It is formed by cooling a gas (separate atoms) to a temperature very close to zero Kelvin.

Basic Measurable Quantities and their S.I. Units :

1. S.I. Unit of temperature is Kelvin.
2. S.I. Unit of length is metre.
3. S.I. Unit of mass is kilogram.
4. S.I. Unit of weight is Newton.
5. S.I. Unit of volume is cubic metre.
6. S.I. Unit of density is kilogram per cubic metre.
7. S.I. Unit of pressure is pascal.

Subject Enrichment Activities for Internal Assessment	To make a list of Basic Measurable Quantities and their S.I. Units .
Recapitulation :	Q 1. Write relation between degree Celsius and Kelvin scale? Ans. Degree Celsius + 273 = Kelvin Q2. What is plasma? Ans. Plasma is the fourth state of Matter. In simple words, It consists of a gas made of ions. Q3. What is BEC ? Ans. Bose Einstein Condensate is a state of Matter. It is formed by cooling a gas (separate atoms) to a temperature very close to zero Kelvin.
Assignment:	To solve NCERT intext and back exercise.

FOCUS SPOT - 1

CHAPTER	Matter in our surroundings
TOPIC/CONCEPT	Boiling and Boiling Point
FOCUS SPOT	First Focus Spot Note : Students find difficult to understand the concept and definition of boiling and boiling point.

WHY	Reason : Students find difficult to understand the difference in the definitions of boiling and boiling point (ie. atmospheric pressure).
IMPACT	Students will not be able to define the terms : Boiling and Boiling Point.

FOCUS SPOT- 2

CHAPTER	Matter in our surroundings
TOPIC/CONCEPT	Latent heat of fusion & Latent heat of vaporisation
FOCUS SPOT	SECOND FOCUS SPOT Note : Students find difficult to define Latent heat of fusion and Latent heat of vaporisation.
WHY	Reason : Students find difficult to understand the word ‘unit mass’ in the definition of Latent heat of fusion and Latent heat of vaporisation.
IMPACT	Students will not be able to define the term: Latent heat of fusion, Latent Heat Of Vaporisation

EXPERIENTIAL LEARNING ACTIVITY- 1

CHAPTER	Matter In Our Surroundings
TOPIC/CONCEPT	To Illustrate that Particles of Matter have vacant spaces between them.
NAME OF THE ACTIVITY	Activity done by using pebbles, sand and water.
TYPE OF ACTIVITY	Individual Activity
LEARNING OUTCOME	Particles of Matter have vacant spaces between them.
PROCEDURE/ METHODOLOGY	Take a glass container and fill it with small pebbles . Apparently it appears that the container is full. Then try to pour some sand in the container.Now one can see that the vacant spaces between the pebbles is occupied by sand particles. Again it appears that there is no vacant space available in the container. Then try to pour some water in the container and observe.Water gets accommodated in the glass indicating that there were still vacant spaces between sand particles. From this activity, it is proved that Particles of Matter have vacant spaces between them.
QUESTIONS	Compare spaces between particles of solids, liquid and gas?
SOLUTIONS/ HINTS	In solid, Constituent particles are very closely packed. Space between particles is minimum. In liquid, Constituent particles are less closely packed. Space between particles is larger in liquid than that in solid.In gaseous state, Constituent particles are far apart from each other. Space between particles of a gas is maximum.

EXPERIENTIAL LEARNING ACTIVITY- 2

CHAPTER	Matter In Our Surroundings
TOPIC/CONCEPT	To Illustrate diffusion by dissolving Potassium Permanganate in water.
NAME OF THE ACTIVITY	Activity by dissolving Potassium Permanganate in water.
TYPE OF ACTIVITY	Individual Activity
LEARNING OUTCOME	To understand the concept of diffusion.
PROCEDURE/ METHODOLOGY	Take a glass of water and put few crystals of Potassium permanganate in it. Observe What happens next? The students can easily observe the flow (movement) of Potassium permanganate particles from the region of their high concentration to the region of their low concentration.
QUESTIONS	Explain the term : Diffusion?
SOLUTIONS/ HINTS	Diffusion is flow or movement of particles from the region of their high concentration to the region of their less concentration. During diffusion, the particles get into the spaces between them. It results in the intermixing of particles of two different types of matter.

EXPERIENTIAL LEARNING ACTIVITY- 3

CHAPTER	Matter In Our Surroundings
TOPIC/CONCEPT	To illustrate that the rate of diffusion in gaseous state is more than that in liquid state
NAME OF THE ACTIVITY	Activity by using a burning candle or incense stick.
TYPE OF ACTIVITY	Individual Activity
LEARNING OUTCOME	The rate of diffusion in gaseous state is more than that in liquid state by using a burning candle or incense stick.
PROCEDURE/ METHODOLOGY	Take a burning candle or matchstick or an incense stick. Extinguish It. One can easily observe smoke coming from the extinguished candle, which disappears soon. Smoke particles flow from the region of their high concentration to the region of their low concentration. The rate of diffusion of smoke is fast.
QUESTIONS	Compare the rate of diffusion of solid, liquid and gas?
SOLUTIONS/ HINTS	In solid, Rate of diffusion is minimum due to strong forces of attraction. In liquid, Rate of diffusion is more than that of solid. In a gas, Rate of diffusion is maximum due to weakest forces of attraction.