

Pre-Content/Content Post Content	Learning Outcomes/ Objectives	
	General	Specific
<u>Pre Content</u> They have the pre content knowledge of: Matter, they are aware of the various states of matter. Like they know water exists in three states: solid, liquid and gas. <u>Content</u> • Characteristics of states of matter • Three states of matter • Change of state by changing temperature • Change of state by changing pressure • Evaporation and boiling <u>Post-content:</u> The students appreciate and understand the importance of three different states of matter.	Students will be able to: • develop the scientific attitude for matter. • classify states of matter • analyze characteristic properties of each state of matter • identify the three states of matter • identify change of state of matter under the effect of temperature • define the units of heat • identify change of state of matter under the effect of pressure • define evaporation and boiling • analyze the factors affecting the rate of evaporation • list the characteristic properties of matter and important definitions	Students will be able to: • identify things which can be termed as: • Solid • Liquid and • Gas. • demonstrate activity to comprehend the particulate nature of matter • differentiate between the three states of matter on the basis of inter molecular spaces and forces of attraction, of shape, volume, rigidity, fluidity, compressibility and density. • analyze and record the procedure to measure the MP of ice and BP of water. • define and differentiate between latent heat of fusion and latent heat of vaporization and convert Celsius into Kelvin scale and vice-versa • analyze the effect of change in temperature on volume of a gas. • analyze the process of sublimation and identify the sublimable substances in a mixture • differentiate between evaporation and boiling. • correlate the factors affecting evaporation with day to day life • appraise the practical applications of evaporation in daily life

Home Work /Assignments

- NCERT exercise
- Worksheets from assignment booklet

Teacher's Activity	Student's Activity	Teacher's Observation and Remedial action taken
Teacher will: begin the chapter by showing some examples and ask students about their state of matter <u>Annexure 1 (A)</u> divide the students in group of 4 each and give instructions for the activity depicting: - that matter is made up of tiny particles. - particles of matter have spaces between them. <u>Annexure 1(B)</u> divide the class into groups of 4 each and give instructions for conduction of the activity- To show effect of pressure on solid, liquid and gas explain the process of measurement of MP and BP of given sample of water using a video: <u>Annexure 1(C)</u> demonstrate the activity-To show the effect of temperature on the volume of a gas explain the process of sublimation using a video explain the process of evaporation using a video ask questions for recapitulation of concepts	Students will: answer the questions asked <u>Annexure 1(a)</u> perform the activity, record observations and answer the questions in their notebook. <u>Annexure 1(b)</u> perform the activity, record the observations and solve the following worksheet. observe the video and solve the related questions <u>Annexure 1(c)</u> perform the activity, record the observations and solve the following worksheet. observe the video and solve the related questions observe the video and solve the related questions solve the problem based questions and practice NCERT back exercise	

Teaching Aids: Apparatus for all the above activities, ICR, assignments, activity worksheets and reference Books.

Methodology/Innovative Methods: Explore and discover through the various activities.

Interdisciplinary links: Geography: the amount of water in the oceans, rivers remains constant.

Life skills: recording reading of thermometer, applications of evaporation in daily life.

ANNEXURE 1A, 1a

ACTIVITY - MATTER IS MADE UP OF VERY SMALL PARTICLES.

CLASS IX

Duration: 30 min

Nature of the Activity- Group

Learning Outcome-

Students will be able to analyze that Matter is made up of very small particles

What we have to do?

To show that Matter is made up of very small particles.

What we require?

Potassium Permanganate, Water and Beaker(100ml)

What do we need to know? :

Any substance which occupies space and has mass is known as matter. All matter is made up of very small particles that are not visible to naked eye. The characteristics of particles of matter are

- (i) Particles of matter have spaces between them.
- (ii) Particles of matter are continuously moving.
- (iii) Particles of matter attract each other.
- (iv) Kinetic energy of particles increases with increase in temperature.

How will you proceed?

➤ **Teacher's Activity-**

Teacher will brief the activity and make necessary arrangements.

➤ **Students' Activity-**

1. Take two or three crystals of potassium permanganate and add in 100ml of water. We will see that the colour of the water gets changed.
2. Now take 10ml of this solution and add it to 90mL of fresh water
3. Now repeat this procedure three more times

What have you observed?

This activity shows that just a _____ crystals of potassium permanganate can colour a _____ volume of water

What have you learnt?

We have learnt that there must be millions of _____ particles in just one crystal of potassium permanganate, which keep on dividing themselves into _____ particles. Therefore, we conclude that Matter is _____ continuous like a block but is made up of _____ like sand.

What would you be interested to know?

1. What is diffusion?

2. What will happen if we add a crystal of potassium permanganate to hot water? How does diffusion get affected by change in temperature?

3. Can diffusion take place from one solid to another?

ANNEXURE1B,1b

LET US CHECK THE COMPRESSIBILITY OF THE THREE STATES OF MATTER.

Subject	Science
Class	IX
Chapter/Unit	Matter in our surroundings
Topic	States of Matter
Time	45 minutes
Nature of Activity	Group

What will I learn (Learning Outcome)?

To compare the compressibility of solids, liquids and gases.

Skills:

Analyzing, Applying and Collaborating

What I have to do?

To compare the compressibility of pieces of chalk, water and air filled in three different syringes.

What do I require?

Three syringes, rubber cork/cap, pieces of crushed brick, water and vaseline.

What do I need to know?

In solids particles are very closely packed and have very high intermolecular forces of attraction. In liquids, particles have larger intermolecular spaces and weaker intermolecular forces of attraction as compared to solids whereas, gases have maximum intermolecular spaces and least intermolecular forces of attraction.

➤ Teacher's Activity

Teacher will

1. divide the class into groups of 3 each
2. will brief the activity to the students
3. make the necessary arrangements for the activity.

How will I proceed?

➤ Student's Activity

1. Take three 100 mL syringes and Label them as syringe 1 syringe 2 and syringe 3. Close their nozzles by rubber corks/caps.
2. Remove the pistons from all the syringes.
3. Leave syringe-1 untouched, fill water in syringe-2 and pieces of crushed brick in syringe-3. Insert the pistons back into the syringes.
4. You may apply some Vaseline on the pistons before inserting them into the syringes for their smooth movement.
5. Now, try to compress the compressibility by pushing the piston in each syringe.

What have I observed?

S. No.	Syringe No.	Observation
1.	1	
2.	2	
3.	3	

What have I learnt?

Solids_____be compressed, Liquids are_____compressible than solids and gases are_____compressible as compared to solids and liquids.

What am I curious to learn?

- Let us take liquids of various densities like honey and oil and try to compress them. Are you able to compress them with the same ease as in the case of water. Why?
- Let us take small cut pieces of sponge or thermocol and try to compress them. Is it difficult to compress sponge and thermocol like pieces of chalk?

Let me evaluate myself

Q1. What do you understand by the term compressibility?

Q2. Why do we notice different observations in the three syringes taken in the above activity?

Q3. Give any two applications of gases stored under very high pressure.

Q4. How will the compressibility change upon changing the liquid taken in the syringe from water to (i) oil and (ii) honey?

Q5. A curious child from the class, inserted a small inflated balloon inside the syringe and closed the nozzle of the syringe from one side. What do you think she will observe upon pulling the piston from the other side?

ANNEXURE 1C.1c

EXPANSION AND CONTRACTION OF GASES

Subject	Science
Class	IX
Chapter/Unit	Matter in our surroundings
Topic	Effect of temperature on volume of a gas.
Time	45 minutes
Nature of Activity	Group

What will I learn (Learning Outcome)?

To analyze the effect of temperature on volume of a gas.

Skills:

Analyzing, Applying and Critical thinking

What I have to do?

To demonstrate the effect of temperature on the volume of a gas

What do I require?

A glass bottle, a balloon, a trough containing boiling hot water and a trough containing cold water.

What do I need to know?

Particles of gas are always moving randomly at a very high speed hitting the walls of the container in which it is kept. As kinetic energy is directly proportional to the temperature, with increase in the temperature, kinetic energy of the particles increase. They move farther apart from each other, thereby increasing the volume.

➤ Teacher's Activity

Teacher will:

1. divide the class into groups of 4 each.
2. make the necessary arrangements.
3. brief the activity to the students.

Caution: *The activity requires hot water, therefore it must be performed strictly under the teacher's supervision*.

How will I proceed?

➤ Student's Activity

1. Fit a balloon around the neck of a glass bottle.
2. Place this bottle in a trough containing boiling hot water.
3. Record your observations.
4. Now remove the bottle from this trough and keep it in a trough containing cold water
5. Record your observations.

What have I observed?

S. No.	Balloon	Observation (increases/decreases)
1.	Size of balloon in hot water	
2.	Size of balloon in cold water	

What have I learnt?

Air _____ on heating and _____ on cooling.

What am I curious to learn?

- Let us take an inflated balloon and keep its mouth above an ice cube. What will you observe?
- Let us keep a very small inflated balloon in a syringe with a piston. Close the mouth of the syringe with a cap and try to push and pull the piston. What do you think will happen upon changing the pressure on the gas inside the balloon by pushing and pulling the piston of the syringe?

Let me evaluate myself

Q1. What do you understand by Brownian movement?

Q2. What will be you observe when the balloon fitted bottle is kept in hot water? Justify your answer.

Q3. What will be you observe when the balloon fitted bottle is kept in cold water? Justify your answer.

Q4. What will happen if we cool a gas of low density at super low temperatures?

Q5. Predict any one application of the principle learnt in the above activity.
