



**FORUM OF PHYSICAL SCIENCE TEACHERS
TELANGANA**

LESSON PLANS

Name: _____

School: _____



FORUM OF PHYSICAL SCIENCE TEACHERS TELANGANA STATE



YEAR PLAN PHYSICAL SCIENCES 9th CLASS

Name of the teacher :

Name of the school :



Foreword

We are pleased to present this comprehensive material comprising Year Plans, Lesson Plans, and Period Plans developed by the Forum of Physical Science Teachers, Telangana State. This material has been thoughtfully prepared to serve as a valuable guide and support system for all Physical Science teachers across the state.

In the process of its development, we have drawn upon the expertise of subject experts, ensuring both academic rigor and practical classroom relevance. Every element of the material has been aligned with the SCERT Telangana guidelines, with a focus on competency-based education, experiential learning, and meaningful student engagement.

This initiative stems from our shared commitment to enhancing science teaching and learning. We believe that with proper planning and a structured approach, Physical Science Teachers can, not only achieve learning outcomes but also spark curiosity, scientific thinking and creativity among the students.

We hope this material empowers teachers to deliver Physical Science content with confidence, clarity, and creativity.

We have tried a lot to give this module error free but even it is found, bring to our notice. You need not to follow as it is, it is a model. You can change as per your feasibility. We look forward your kind suggestions to improve the module.

With best wishes from
Forum of Physical Science Teachers State Body
Telangana State

ANNUAL PLAN
9TH CLASS

YEAR PLAN

1. Class : 9
2. Subject : Physical Sciences
3. No of periods : 140
 - i) For teaching : 120
 - ii) For lab : 20

4. Academic Standards:

I. Conceptual understanding

- Children can explain, cite examples, give reasons, and give comparison and differences, explain the process of given concepts in the textbook. Children can develop their own brain mappings.

II. Asking questions and making hypothesis

- Children can ask questions to understand concepts, to clarify doubts about the concepts and to participate in discussions. They can guess the results of ensure with proper reasoning, able to predict the results of an experiment.

III. Experimentation and field investigation

- Children can do the experiments given in the text book and developed on their own. Able to arrange the apparatus, record the observational findings, suggest alternative apparatus, takes necessary precautions while doing the experiments, able to do to alternate experiments by changing variables. They can participate in field investigation and prepare reports.

IV. Information skills and Projects

- Children can collect information related to the concepts given in the textbook by using various methods (interviews, checklist questionnaire) analyze the information and interpret it. Able to conduct project work.

V. Communication through drawing, model making

- Children can communicate their conceptual understanding by drawing pictures labeling the parts of the diagram by drawing graphs, flow charts and making models.

VI. Appreciation and aesthetic sense, values

- Children can appreciate the nature and efforts of scientists and human beings in the development of science and have an aesthetic sense towards nature. They are also able to follow constitutional values.

VII. Application to daily life, concerning biodiversity

- Children can apply the knowledge of scientific concepts they learned to solve the problem faced in daily life situations. Recognize the importance of biodiversity and take measures to protect the biodiversity.

5. Monthwise Division of units

S. No	Month	Name of the Unit	No. of Periods	Programs to be conducted in CCE
1	June	1.Matter Around Us	06	Lab Activity
2	July	2. Motion	11	Conducting activities, collecting information and FA-1
		3.Laws of Motion	10	
3	August	4.Refraction of Light at Plane Surfaces	10	Collecting information, model making
		5. Gravitation	10	
4	September	6. Is Matter Pure?	10	Model making, collecting information and FA-2

5	October	7.Atoms, Molecules and Chemical Reactions	12	Conducting activities, model making And SA-1
6	November	8.Floating Bodies	10	Conducting activities, collecting information and FA-3
		9.What is Inside the Atom	08	
7	December	10.Work and Energy	11	Preparing flowchart, drawing diagrams Collecting information
8	January	11. Heat	10	Lab Activity, collecting information, Model making
9	February	12. Sound	10	Conducting activities, collecting Information and FA-4
10	March	Revision		
11	April	SA 2 Exam		SA 2

6. Teacher Reflections:

Name of the Unit / Lesson	Teacher's Reflections	Signature with Date

7. Headmaster's hints and Suggestions:

Name of the Unit / Lesson	HM's Suggestions	Signature with Date

LESSON PLANS

LESSON PLAN

I. Name of the lesson : 1. Matter Around Us

II. Class : 9

III. No. of Periods : 6 + 1 Lab Activity

IV. Academic Standards

1. Conceptual Understanding:

- Classifies matter based on physical state.
- Explains the properties of solids, liquids, and gases. Explains diffusion and give examples from daily life (e.g., incense sticks, perfumes). Explains compressibility and compare it across different states of matter. Explains the role of temperature in changing the physical state of matter. Explains that matter is made up of tiny particles.
- Differentiates between solids, liquids, and gases based on shape, volume, compressibility.

2. Questioning - Making hypothesis

- Asks relevant questions about the properties and behaviour of solids, liquids, and gases.
- Questions why certain materials change shape or volume under different conditions.
- Predicts what will happen to the shape and volume of a substance when it changes state.
- Inquiries about the cause and effect of temperature and pressure changes on states of matter.
- Hypothesizes about the compressibility of different materials (e.g., sponge, wooden block, rubber band).

3. Experiments, Field trips:

- Conducts experiment to observe and record the shape and volume of solids, liquids, and gases in different containers.
- Demonstrates that solids have definite shape and volume, liquids take the shape of their container but have fixed volume, and gases fill the entire container.
- Observes and records the process of diffusion in gases (e.g., spreading of perfume in air), liquids (e.g., ink in water), and solids (e.g., dissolving salt in water).
- Investigates the effect of temperature on the change of state by heating or cooling substances like ice, wax, or water.

4. Information skills:

- Collects information about the properties and states of matter from textbooks, library books, science magazines, and reliable internet sources. Collects data on real-life examples of solids, liquids, and gases from the environment and daily experiences.
- Prepares short reports or presentations on topics such as diffusion, compressibility, and changes of state.
- Participates in group projects to collect and analyse data on topics such as evaporation or diffusion in daily life.

5. Drawing pictures - model making:

- Draws and labels diagrams showing the arrangement of particles in solids, liquids, and gases.
- Uses models to demonstrate how temperature affect the arrangement of particles.
- Creates models using beads, clay, or other materials to represent the arrangement and movement of particles in solids, liquids, and gases.

6. Appreciation, Aesthetic sense:

- Values the process of scientific inquiry, experimentation, and the creativity involved in understanding matter and its changes.
- Appreciates the contributions of scientists and thinkers who have advanced our knowledge of matter. Appreciates the beauty and order in natural phenomena related to matter, such as the diffusion in daily life.
- Admires the diversity of materials and states of matter in the environment.

7. Daily life application and concern towards Biodiversity

- Uses the concept of diffusion in real life situation.
- Uses the concept of compressibility in daily life.
- Uses the concept of temperature in change of state.

V. Period wise allotment:

Period	Content	Strategy	TLM/Resources	Evaluation
1	<ul style="list-style-type: none">• States of matter• Properties of solids, liquids and gases	Discussion Group activity	Chart and Text Book Different shaped containers having liquid of same volume	<ol style="list-style-type: none">1. Write one example each for solid, liquid, and gas.2. Do liquids have a fixed volume?3. Do gases have a fixed shape?
2	<ul style="list-style-type: none">• Compressibility	Discussion Group activity	Chart and Text Book 50ml syringe, piece of wood	<ol style="list-style-type: none">1. Compare the compressibility of solids, liquids, and gases with examples.2. What happens to a gas when it is compressed?3. Why is water slightly compressible unlike gases?4. Write one application of compressibility in daily life.

3	• Diffusion	Discussion Group activity	Chart and Text Book Incense stick, 250 ml round bottomed flask, Beaker, Dropper, Potassium permanganate solution or red ink	<ol style="list-style-type: none"> 1. Give one example of diffusion in gases. 2. In which state of matter is diffusion the fastest? 3. Compare diffusion in liquids and gases. 4. Explain the process of diffusion with examples from daily life.
4	• Diffusion of gases	Discussion Lab activity	Chart and Text Book Long glass tube with scale, liquid Ammonia, Hydrochloric acid, pieces of cotton, two rubber corks and pair of tongs.	<ol style="list-style-type: none"> 1. Which gas diffuses faster, hydrogen or oxygen? Why? 2. Explain the molecular weight affect the rate of diffusion in gases.
5	• Can matter change its state?	Discussion Group activity	Chart and Text Book Beaker, crystals of potassium permanganate, Salt.	<ol style="list-style-type: none"> 1. Which gas diffuses faster, hydrogen or oxygen? Why? 2. Explain the molecular weight affect the rate of diffusion in gases.
6	<ul style="list-style-type: none"> • Particles of matter attracts each other • How does diffusion take place? 	Discussion Group activity	Chart and Text Book Stream water, Chalk, Wood	<ol style="list-style-type: none"> 1. Compare the force of attraction between solids, liquids, and gases. 2. Give two examples each for substances with strong and weak forces of attraction. 3. Draw a neat diagram to show the arrangement of particles and force of attraction in solids, liquids, and gases.
7	• Improve your learning.	Discussion	Text Book	MCQ

VI. Teacher's Notes (Additional resources)

Period number	Teacher's notes	Teacher signature with date

VII Teacher's Reflections

Period number	Teacher's reflections	Teacher signature with date

LESSON PLAN

I. Name of the lesson : 2. Motion

II. Class : 9

III. No. of Periods : 11

IV. Academic Standards

1. Conceptual Understanding:

- Can explain relative motion
- Differentiates between speed and velocity, uniform and non-uniform motion.
- Can explain acceleration
- Differentiates between various slopes of acceleration
- Solves problems based on equations of motion.

2. Questioning - Making hypothesis

- Questions why speed and velocity are not same.
- Hypothesis the direction of velocity in circular motion at each point.
- Predicts the path of ball thrown upward making certain angle with earth surface.

3. Experiments, Field trips:

- Conducts an activity to measure velocity and acceleration of an object moving on a plane and on an inclined plane.

4. Information skills:

- Tabulates the detail of experiment to find the acceleration of an object moving on an inclined path or track and analyse the observations.

5. Drawing pictures - model making:

- Plots a graph based on the information given in table-1 for awareness of uniform motion and in table -2 for non-uniform motion
- Draws time distance graph for the experimental of moving object on an inclined plane
- Draws the displacement vectors for a cell moving in a crossed path between two points

6. Appreciation, Aesthetic sense:

- Appreciate the idea of acceleration by experiencing it when the train stops and when the bus changes its velocity while travelling in curved path

7. Daily life application and concern towards Biodiversity

- Apply the concepts of speed, velocity and acceleration while travelling in daily life situations.

5.Period wise allotment

Period	Content	Strategy	TLM/ Resources	Evaluation
1	<ul style="list-style-type: none">• What is relative?• Motion is relative.	Discussion Group activity	Chart, Text Book Globe, Toy cars.	<ul style="list-style-type: none">• Explain the term relative.• Is all the motion relative why?
2	<ul style="list-style-type: none">• Distance and displacement	Demonstration and discussion	Graph sheets, rulers, markers, text book	<ul style="list-style-type: none">• Mention the difference between scalar and vector• Explain the terms distance and displacement.• Explain how the distance is differed from displacement.
3	<ul style="list-style-type: none">• Average speed- Average velocity	Discussion Group activity	Stopwatch, measuring tape, toy car, text book	<ul style="list-style-type: none">• How can you measure the average speed of a body whose distance is 30km in 30 min?
4	<ul style="list-style-type: none">• Speed and velocity	Discussion	Visual aids showing, direction and magnitude, graph.	<ul style="list-style-type: none">• write the differences between speed and velocity.• Is instantaneous speed and average speed same? Explain.
5	<ul style="list-style-type: none">• Uniform motion	Discussion Group activity	graph papers, Digital aids	<ul style="list-style-type: none">• Explain the uniform motion with an example.• Is the speed of the uniform motion Body constant? Why?
6	<ul style="list-style-type: none">• Non uniform motion	Discussion Group activity	Inclined plane setup, ball, stopwatch, stone, thread	<ul style="list-style-type: none">• Explain which factors can change the velocity of a body.• Mention the where do you observe the non-uniform motion in your day to life.

7	• Acceleration	Discussion Group activity	Digital aids, chalk and board	• What is the different between acceleration and deacceleration?
8	• Equations of uniform accelerated motion	Discussion	Chalk and board, text book	• Initial velocity of a body is 10 m/s and after 20 seconds its speed raise to 60 m/s. find its acceleration.
9	• Lab activity	Discussion Lab activity	Inclined plane apparatus, stopwatch, measuring tape	• Write the situation where do you observe inclined plain in your daily life. • What would happen to the velocity of the body if angle of inclination is increased?
10	• Example problems	Discussion Group activity	Text book	A particle covers 10 m in first 5 sec and 10 m in next 3 sec. find its average speed.
11	• Improve your learning.	Discussion	Text Book	MCQ

VI. Teacher's Notes (Additional resources)

Period number	Teacher's notes	Teacher signature with date

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VII Teacher's Reflections

Period number	Teacher's reflections	Teacher signature with date

LESSON PLAN

I. Name of the lesson : 3. Laws of Motion

II. Class : 9

III. No. of Periods : 10 + 1 Lab Activity

IV. Academic Standards

1. Conceptual Understanding:

- Can explain Inertia, Linear momentum, Conservation of momentum and impulse.
- Give reasons why eggs are not broken when falls on pillow.
- Solve problems based on conservation of momentum.

2. Questioning - Making hypothesis

- Questions why larger mass has more inertia.
- Hypothesis the direction of resultant force applied on a body when multiple forces acting on the body.

3. Experiments, Field trips:

- Conducts an activity to understands Inertia.
- Arranges the apparatus and conducts an activity to observe action and reaction forces acting on two different bodies, demonstrating that they are equal in magnitude and opposite in direction.

4. Information skills:

- Collects information about objects or activities that work on the principle of Newton's Third Law of Motion.

5. Drawing pictures - model making:

- Draws a diagram showing the arrangement of apparatus used in the experiment to demonstrate that action and reaction forces are equal in magnitude and opposite in direction

6. Appreciation, Aesthetic sense:

- Appreciates Galileo's experiment as a foundation for understanding Newton's First Law of motion.
- Appreciates Newton for his remarkable contribution in formulating the three Laws of Motion, which laid the foundation for classical mechanics.

7. Daily life application and concern towards Biodiversity

➤ Students can apply laws of motion in their daily life.

V. Period wise Allotment

Period	Content	Strategy	TLM/Resources	Evaluation
1	<ul style="list-style-type: none"> • Introduction • Galileo Galilei experiment. 	Discussion Group activity	Text Book Inclined planes, glass marbles.	1. Explain what do you understand from Galileo experiment. 2. explain what can cause the motion of an object.
2	<ul style="list-style-type: none"> • Newton's first Law of motion 	Demonstration, Discussion group activity	Text book, Glass, Thick paper, coin, Carrom strikers, carrom coins	1. Give four examples for newton's first law of motion from your daily life.
3	<ul style="list-style-type: none"> • Inertia and mass 	Discussion Group activity	Text book, Scale, two wooden boxes of different sizes	1. Do all bodies have same inertia? 2. What factors can decide the inertia of a body?
4	<ul style="list-style-type: none"> • Linear momentum • Second law of motion 	Discussion	Visual aids, Text book,	1. calculate the linear momentum of a body whose mass is 10kg moving with a speed of 10 m/s.
5	<ul style="list-style-type: none"> • Example problems on second law of motion 	Discussion	Text book	1. Calculate the acceleration of a body when a force of 10N applied on the body whose mass is 10 kg.
6	<ul style="list-style-type: none"> • Third law of motion • Activity-6 & 7 	Discussion Group activity	Spring balances, Ballon, straw, thread	1. Give any two real life examples to Third law of motion. 2. Are action and reaction forces acting on the same body? Explain.
7	<ul style="list-style-type: none"> • Lab Activity (To show action and reaction forces acting on same body) 	Discussion Lab activity	Stand, Test tube, Thread, Bunsen burner, rubber cork	1. What are the precautions you take while conducting experiment to show action and reaction

				forces acting on two different bodies?
8	• Conservation momentum	Discussion	Chalk and board, text book	1.Explain conservation of momentum.
9	• Impulse	Discussion Group activity	Text book, two eggs, pillow	1.Is it safe to jump on sand rather than cement floor? Why?
10	• Numerical Example problems	Discussion	Text book	1.A man of mass 30 kg uses a rope to climb which bears 450N. What is the maximum acceleration with which he can climb safely.
11	• Improve your learning.	Discussion	Text Book	MCQ

VI. Teacher's Notes (Additional resources)

Period number	Teacher's notes	Teacher signature with date

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VII Teacher's Reflections

Period number	Teacher's reflections	Teacher signature with date

LESSON PLAN

I. Name of the lesson : 4. Refraction of light at plane surface

II. Class : 9

III. No. of Periods : 10+ 1 lab activity

IV. Academic Standards

1. Conceptual Understanding:

- Can explain Refraction of light, Refractive index, total internal reflection.
- Gives reasons why mirages are formed.
- Differentiates between absolute refractive index and relative refractive index.
- Solves numerical problems based on refractive index concept and Snell's law.
- Can explain the relation between brilliance of diamond and total internal reflection.

2. Questioning - Making hypothesis

- Questions why light rays are bent at the surfaces which separating two media.
- Hypothesis the path of light ray when it travels along a normal.
- Hypothesis appearance of a glass slab when it's placed in the liquid of same refractive index

3. Experiments, Field trips:

- Conducts activities to understand refractive index.
- Arranges the apparatus and conducts an activity to obtain relation between angle of incidence and angle of refraction.
- Conducts an activity to verify Snell's law.
- Conducts activities to understand total internal reflection.
- Arranges the apparatus and conducts an activity to determination of ray tracking by a glass slab and internal shift.

4. Information skills:

- Studies the refractive indices of various materials from Table-1. Uses them to answer questions related to the speed of light in those materials.
- Collects information about materials and devices that work on the principle of total internal reflection.

5. Drawing pictures - model making:

- Draws a diagram showing the path of light rays as they travel from a rarer medium to a denser medium and vice versa.
- Draws a diagram showing the lateral shift of a light ray passing through a glass slab.

6.Appriciation, Aesthetic sense:

- Appreciates the concept of total internal reflection and understands how it is useful in daily life, especially for providing fast internet access through optical fibres.

7. Daily life application and concern towards Biodiversity

- Students can relate the concept of total internal reflection to real-life situations such as the sparkling of diamonds and the appearance of mirages on hot roads.

Period wise allotment:

Period	Content	Strategy	TLM/Resources	Evaluation
1	<ul style="list-style-type: none">• Introduction• Pre requisites	Discussion Group activity	Text Book Glass tumbler, pencil, water.	1. Give two examples to each transparent materials and opa materials.
2	<ul style="list-style-type: none">• Activity-1, Activity-2 & Activity-3• Refraction	Discussion group activity	Text Book Glass tumbler, pencil, water. A coin, hallow vessel	1. Why does a pencil appear in a in a glass of water? 2. Give two daily life examples where refraction is observed.
3	<ul style="list-style-type: none">• Refractive Index• Relative refractive index	Discussion Group activity	Text book, Chalk and board	1. Calculate absolute refractive index of the medium when the speed of light in medium is 2×10^8 m/s.
4	<ul style="list-style-type: none">• Lab Activity-1 Find the relation between incidence angle and angle of refraction	Activity	A plank, white chart, protractor, scale, small black painted plank, semicircular glass disc, pencil and laser light.	1. What precautions you have to take while conducting experiment to establishing relation between incidence angle and angle of reflection.

5	<ul style="list-style-type: none"> • Snell's law • Activity-4 • Laws of refraction. 	Discussion, group activity	Text book. Metal disc, two straws, water, tumbler.	1. What is the angle of refraction when an incident ray incident on a medium of refractive index 1.732 with an angle of 60° ?
6	<ul style="list-style-type: none"> • Critical Angle • Activity-5 	Discussion Group activity	A plank, white chart, protractor, scale, small black painted plank, semicircular glass disc, pencil and laser light.	1. A light ray travels from denser to rarer medium with an angle of incidence 45° , then find the refractive index of denser medium with respect to rarer medium.
7	<ul style="list-style-type: none"> • Total internal reflection • Activity-6 & Activity-7 	Discussion, Group activity	Transparent glass tumbler, a coin, water.	1. Explain total internal reflection. 2. Is reflection of light and total internal reflection same? Explain.
8	<ul style="list-style-type: none"> • Mirages • Applications of Total Internal reflection 	Discussion	Chalk and board, text book	1. Why should you see mirage as a flowing water? 2. Write the daily life applications of optical fibres.
9	<ul style="list-style-type: none"> • Refraction through a glass slab • Lateral Shift • Lab activity-2 	Activity	Drawing board, chart, paper, clamps, scale, pencil, thin glass slab and pins	1. What are the precautions you have to take while conducting the experiment to determination of ray tracking by glass slab and lateral shift.
10	<ul style="list-style-type: none"> • Vertical Shift • Activity-8 	Discussion, Group activity	Drawing board, chart, paper, clamps, scale, pencil, thin glass slab and pins	1. Explain vertical shift.
11	<ul style="list-style-type: none"> • Improve your learning. 	Discussion	Text Book	MCQ

VI. Teacher's Notes (Additional resources)

Period number	Teachers notes	Teacher signature with date

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VII Teacher's Reflections

Period number	Teacher's reflections	Teacher signature with date

LESSON PLAN

I. Name of the lesson : 5. Gravitation

II. Class : 9

III. No. of Periods : 10

IV. Academic Standards

1. Conceptual Understanding:

- Can explain uniform circular motion, universal law of gravitation, acceleration due to gravity, mass, weight, centre of gravity, stability.
- Gives reasons why objects become unstable in relation to their centre of gravity.
- Differentiates between Mass and weight.
- Solves numerical problems based on universal law of gravitation.

2. Questioning - Making hypothesis

- Question why objects with greater height tend to be less stable
- Guess the direction in which an object moves at any point along its circular path.
- Predicts what would happen if there were no gravitational force.

3. Experiments, Field trips:

- Conducts activities to understand circular motion, centripetal force, centre of gravity.
- Arranges the apparatus and conducts an activity to locating centre of gravity for an irregular body.
- Conducts an activity to understand stability.

4. Information skills:

- Collects the information about the path of revolution of moon around the earth.
- Collects the information about the base area and stability of some objects.

5. Drawing pictures - model making:

- Draws a diagram to show the arrangement of apparatus in the experiment to locate centre of gravity of an irregular body.

6. Appreciation, Aesthetic sense:

- Appreciates Newton's efforts in discovering the Universal Law of Gravitation.
- Appreciates the role of the centre of gravity in maintaining the stability of objects.

7. Daily life application and concern towards Biodiversity

- Students can apply the relationship between centre of gravity and stability, as well as base area and stability, to daily-life situations
- Students can apply the concept of centripetal force to daily life situations, such as observing the working of a mixer grinder, washing machine, and similar devices.

V. Period wise allotment:

Period	Content	Strategy	TLM/Resources	Evaluation
1	<ul style="list-style-type: none"> • Introduction • Pre requisites 	Discussion	Text Book Chalk and board	1. Is the motion of the earth around the sun is uniform motion? Explain.
2	<ul style="list-style-type: none"> • Uniform circular motion • Activity-1 	Discussion group activity	Text Book Glass tumbler, pencil, water. A coin, hallow vessel	1. Explain uniform circular motion. 2. Write the difference between uniform circular motion and linear motion.
3	<ul style="list-style-type: none"> • Velocity vectors for a body in uniform circular motion • Activity-2 • Centripetal acceleration 	Discussion Group activity	Text book, Chalk and board	1. Identify which forces are acting on the object moving in circular motion. 2. Draw velocity vectors at three different points on the path of a body undergoing uniform circular motion.
4	<ul style="list-style-type: none"> • Universal law of gravitation 	Discussion	Text book, Chalk and board, AV Aids	1. Gravitational force exists between every two objects in a classroom. Why is this force not noticeable?
5	<ul style="list-style-type: none"> • Numerical problems based on universal law of gravitation. 	Discussion	Text book, Chalk and board	1. Two spherical balls of mass 10kg each are placed with their centre 10 cm apart. Find the gravitational force between them.
6	<ul style="list-style-type: none"> • Free fall • Activity-3 • Direction of “g” • Activity-4 	Demonstration, Discussion, Group activity	A stone, Stop clock, Text book	1. Is the value of ‘g’ the same for all objects? Why or why not? 2. In which direction does ‘g’ act during free fall? Explain using a diagram
7	<ul style="list-style-type: none"> • Weight • Activity-5 • Can we measure 	Discussion, Group activity	Spring Balances, weights, transparent	1. Write the differences between mass and weight. 2. Give any one example to

	the weight of the free fall body? • Activity-6		vessel, rubber bands, Stone.	weightlessness from your daily life.
8	• Centre of Gravity • Activity-7, 8, 9	Discussion, group activity	Glass tumbler, wooden match stick, forks, chair.	1. How can you find the centre of gravity of a meter scale? 2. Why is balancing important for long objects like ladders?
9	• Locating centre of gravity • Activity-10-11 • Stability • Activity-12	Discussion, group activity	Meter scale, irregular shaped card board, stand, thread.	1. How can you find the centre of gravity of a ring and an irregularly shaped object?
10	• Improve your learning.	Discussion	Text Book	MCQ

VI. Teacher's Notes (Additional resources)

Period number	Teacher's notes	Teacher signature with date

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VII Teacher's Reflections

Period number	Teacher's reflections	Teacher's signature with date

LESSON PLAN

I. Name of the lesson : 6. Is matter pure?

II. Class : 9

III. No. of Periods : 10

IV. Academic Standards

1. Conceptual Understanding

- Identifies and classifies substances as elements, compounds, and mixtures.
- Distinguishes between pure substances and mixtures based on their properties.
- Explains the concept of food adulteration and its harmful effects. Explains the terms solutions, solute, and solvent. in their own words. Explains and give examples for colloids, suspensions, and Tyndall effect. Explains the principle and process of separation methods like filtration, sublimation, evaporation, chromatography, distillation.
- Describes the characteristics and types of mixtures: homogeneous and heterogeneous. Describes the separation of components of air through fractional distillation. Describes differences between elements, compounds, and mixtures.
- Differentiates between saturated and unsaturated solutions. Differentiates between miscible and immiscible liquids.

2. Questioning – Making Hypotheses

- Predicts the solubility of different substances in water (e.g., sugar vs. salt). Predicts results of paper chromatography or sublimation.
- Forms hypotheses about rate of dissolving based on temperature or stirring.
- Raises questions about the safety of food items and identifies adulterants. Asks “what if” questions related to mixture separation (e.g., What if we mix oil and water?)

3. Experiments, Field Trips

- Performs lab activities to separate mixtures (filtration, chromatography, distillation, etc.).
- Conducts experiment to identify saturated and unsaturated solutions.
- Uses separating funnel to demonstrate immiscible liquid separation.
- Demonstrates sublimation using ammonium chloride or camphor.

- Observes Tyndall effect in milk or starch solutions. Observes and records findings from field trip/visit to water treatment plant or lab.
- Applies chromatography to separate ink colours.

4. Information Skills

- Uses textbooks, Diksha Portal, and videos to understand concepts like adulteration and separation techniques.
- Gathers and organizes data during experiments and group discussions.
- Refers to labels and safety data to detect food adulteration.
- Analyses and interprets the data obtained from experiments like solubility and chromatography.

5. Drawing Pictures / Model Making

- Draws diagrams of separation techniques (e.g., distillation setup, separating funnel).
- Creates models or flowcharts showing types of mixtures.
- Illustrates the process of chromatography or fractional distillation.
- Makes posters on "Adulteration in Food" or "Pure vs Impure Substances".

6. Appreciation / Aesthetic Sense

- Appreciates the beauty of scientific patterns in chromatography.
- Shows care while performing lab experiments (handling chemicals, lab tools).
- Develops a sense of order and neatness in writing records, drawing diagrams.
- Appreciates the importance of scientific classification in daily life.

7. Daily Life Application and Concern Towards Biodiversity

- Identifies adulteration in food and develops healthy consumption habits.
- Applies knowledge of separation techniques in everyday life (e.g., filtering tea, decanting oil from water).
- Understands the importance of water purification for health.
- Links separation techniques with environmental conservation (e.g., air purification).
- Learns safe disposal methods for chemicals and mixtures.
- Shows awareness of biodiversity by choosing eco-friendly products and practices.

V. Period wise allotment:				
Period	Content	Strategy	TLM/Resources	Evaluation
1	Introduction to-matter -pure -mixture	<ul style="list-style-type: none"> Brainstorming questions-Reading the textbook Activity-1-Is full cream milk pure? 	Text Book/Ppt Diksha Portal	What is pure and mixture? Give examples.
2	Types of mixtures Homogenous Heterogenous	Group Activity Activity 2: Finding out homogeneous and heterogeneous mixtures	Two test tubes, salt, kerosene, stirrer To prepare Lemonade drink we need water, sugar, lemon juice and salt Naphthalene and water -Oil and water	Differentiate pure and mixture substances. Explain types of mixtures.
3	Solutions -Properties of a solution -Concentration of a solution - solubility -Preparation of saturated and unsaturated solutions -Factors affecting the rate of dissolving - size of the particles -temperature	Group Activity Activity 3: Adding sugar to water Activity 4 Solute +Solvent = Solution Problems on concentration of a solution	sugar (solid), water (liquid) iodine in alcohol (tincture of iodine) iodine (solid) aerated drinks are liquid solutions containing carbon dioxide (gas) as solute and water as solvent. 50 ml Water, empty cup, one spoon sugar Take three glass beakers 100 ml water, two spoons of salt Example -1	What would happen if you add a little more solute to a solvent? How do you determine the percentage of the solute present in a solution? Differentiate saturated and unsaturated solutions. Explain the factors affecting rate of dissolving.
4	Suspensions and Collides -Finding the heterogeneous mixtures - Tyndal effect	Group discussion. Activity 5 Record your observations in the Table 1, 2 and 3	Text Book chalk powder, test tubes. Milk, water, stirrer/glass rod, torch or a laser beam	Find the heterogeneous mixtures. Differentiate collides and suspensions.
5	Separating the components of a mixture -Sublimation -Evaporation	Group discussion Lab activity Activity 6 Activity 7	Cotton plug, inverted funnel, ammonium chloride and salt, China dish, stove	Explain sublimation with examples.

	-Paper chromatography	Lab activity -paper chromatography	Watch glass, ink, beaker, water, stove Beaker, rectangular shaped filter paper, black marker (no permanent), water, pencil and cello tape.	Write an activity to understand chromatography.
6	Separation of immiscible and miscible liquids Separating mixture of two miscible liquids	Group discussion Activity 8	Text Book Separating funnel, Kerosene, oil, water	Differentiate miscible and immiscible liquids. How do you separate the mixture of two miscible liquids?
7	Separation of two miscible liquids -Distillation method	Discussion Group activity Activity 9	Text Book Acetone, water, condenser, flask Beaker, clamp, thermometer	Write an activity to understand, how the miscible liquids are separated by distillation.
8	-Fractional distillation -Separation of components of air	Group discussion Hands on activity Steps and process as given in the text book	Mixture of two liquids, condenser, fractional column, tube packed with glass beads, thermometer, flask, beaker, clamp Flow chart	How do you separate the two or more miscible liquids? Explain how to separate the components in air.
9	Types of pure substances -Compounds -Elements	Discussion Activity 10	Text Book	Differentiate compounds and elements.
10	Understanding the nature of elements, compounds and mixture	Group Activity Activity for Group -1 Activity for Group - 2	iron, Sulphur powder Magnet, Stove for heating	Explain the properties of mixtures.

VI. Teacher's Notes

Period number	Teacher's notes	Teacher signature with date

VII Teacher's Reflections

Period number	Teacher's reflections	Teacher signature with date

LESSON PLAN

I. Name of the lesson : 7. *Atoms and molecules and chemical reactions*

II. Class : 9

III. No. of Periods : 12

IV. **Academic Standards**

1. Conceptual Understanding:

- Explains the laws of chemical combination with examples. Explains conservation mass. Explains the fundamental postulates of Dalton's Atomic. Explains the law of constant proportion with an example.
- Describes Dalton's Atomic Theory and its significance in modern chemistry.
- Differentiates between atoms, molecules, elements, and compounds. Distinguishes between atomic mass and molecular mass and perform calculations involving both.
- Identifies symbols of elements and write chemical formulae of compounds using the criss-cross method.
- Classifies substances as elements, compounds, or mixtures based on atomic and molecular structure.
- Explains the term mole and calculate the number of particles using Avogadro's number.
- Gives examples for different reactions in our daily life.
- Analyses how chemical combinations follow fixed ratios and how this supports atomic theory.

2. Questioning – Making Hypotheses

- Predict the type of reaction based on given reactants.
- Hypothesize about the outcome of oxidation in food (rancidity) or metals (rusting).

3. Experimentation and field investigation

- Performs experiments to verify the Law of Conservation of Mass.
- Conducts simple reactions to observe combination, decomposition, and redox reactions.
- Observes chemical changes during cooking, burning, or rusting.
- Demonstrates of different types of chemical reactions through lab-based experiments.

4. Information Skills

- Reads and interprets periodic table symbols and chemical formulae.
- Uses textbooks, internet, and models to collect and organize information about atomic structure and chemical equations.
- Identifies reliable sources for understanding chemical safety and applications.

5. Drawing Pictures / Model Making

- Represents atomic models of different pictorially.
- Creates 3D models showing atoms combining to form molecules.
- Makes charts of types of reactions with examples.

6. Application to daily life concern to biodiversity

- Applies the Law of Conservation of Mass with the help of simple chemical equations.
- Calculates the molar mass of various substances using atomic masses of elements.
- Calculates the atomicity of different elements.
- Applies the mole concept to solve numerical problems.
- Gives real-life examples (e.g., rusting, digestion, burning) to types of chemical reactions
- Calculates the number of atoms, molecules or formula units in a sample.

V. Period wise allotment:

Period	Content	Strategy	TLM/Resources	Evaluation
1	Introduction Laws of Chemical Combination Verifying the Law of Conservation of Mass	Brainstorming Concept mapping Lab activity Group discussion	Lead nitrate, potassium iodide, distilled water, two conical flasks, spring balance, small test tube, retort stand, rubber cork, thread, etc. http://amrita.olabs.edu.in/?sub=73&brch=2&sim=118&cnt=4 Diksha Portal https://www.youtube.com/watch?v=JrUjHybVJdA/	Explain law of chemical combination? Are the weights of the reactants and products the same or different? How do you verify law of conservation mass?
2	Laws of Constant Proportion	Group discussion	Table from the book YouTube Video https://www.youtube.com/watch?v=08-96_wkUi8	How do you explain a given chemical substance always contains the same elements combined in a fixed proportions by mass?
3	• Dalton's Atomic Theory	Group Discussion	Show the video Khan Academy for understanding the Dalton Atomic theory	What are the important postulates of the Dalton's atomic theory?

			https://www.youtube.com/watch?v=syi3pXJNe58	
4	Atoms and molecules Symbols of elements	Group discussion.	Text Book Explaining by using Phet Simulation https://phet.colorado.edu/sims/html/build-a-molecule/latest/build-a-molecule_en.html	Who decides the official name of elements? What is the importance of names of elements?
5	• Atomicity and Valency	Group discussion	Text Book Explain by using Phet Simulation https://phet.colorado.edu/sims/html/build-a-molecule/latest/build-a-molecule_en.html	Calculate the atomicity of a few elements and compounds. Find the valency of different elements?
6	• Molecules and Compounds, Atomic mass	Group discussion	Text Book https://chem.libretexts.org/Bookshelves/Introductory_Chemistry/Map%3A_Introductory_Chemistry_(Tro)/05%3A_Molecules_and_Compounds Phet Simulation: https://phet.colorado.edu/sims/html/build-a-molecule/latest/build-a-molecule_en.html	What is difference between molecules and compounds? How do you find the atomic mass of elements?
7	Criss cross method and mole and molar mass .	Discussion Group activity	Text Book A video on Criss Cross method https://www.youtube.com/watch?v=VnzIqpdEims Phet Simulation https://phet.colorado.edu/sims/html/molarity/latest/molarity_en.html	Write the chemical formulae of Na_2CO_3 by using crisscross method. Calculate the molar mass of CaSO_4 .
8-9	Types of Chemical Equations Combination and Decomposition	Group Discussion Lab activity	Combination reactions: Activity 3: Magnesium ribbon, i. Coal ii. Slaked lime, Water Decomposition reaction:	What are the different types of decomposition reactions?

	Reactions. -thermal decomposition reaction.		<p>Activity 4: Stand, Clamp, calcium carbonate, Delivery tube, Bunsen burner, Burning match stick</p> <p>Activity 5: 0.5g of lead nitrate powder boiling test-tube, test-tube holder. boiling tube</p> <p>Activity 6: plastic mug, two ‘one holed, Acidified water, Switch rubber stoppers, two graphite electrodes, 9V battery</p> <p>Activity 7: (Sunlight)</p> <p>i. silver bromide</p> <p>ii. 2gms of AgCl, watch glass.</p> <p>ii. 1gm ferrous sulphate crystals boiling tube, spirit lamp.</p>	Give alternate activities for combination and displacement reactions.
10	Types of Chemical Equations Displacement and Double Displacement Reactions	- Discussion on Reactions occurring in our daily life - Lab activity Displacement Reaction:	<p>Activity 8: 1 gram of zinc dust, conical flask, dilute hydrochloric acid, balloon.</p> <p>Activity 9: Two iron nails, sand paper, 10 ml of copper sulphate Solution, copper sulphate solution</p> <p>Activity 10: potassium iodide, test tube, lead nitrate solution, potassium iodide solution.</p> <p>Double displacement reaction: Showing simulation and perform with the students http://amrita.olabs.edu.in/?sub=73&brch=3&sim=81&cnt=1</p> <p>Double displacement reaction http://amrita.olabs.edu.in/?sub=73&brch=3&sim=82&cnt=4</p>	Give examples for displacement reactions. Give examples for double displacement reactions.
11-12	Types of Chemical reactions Oxidation and reduction reactions Rancidity is an	Discussion on Reactions Conducts Lab activity Redox	Do the Experiments given in the textbook. Activity 11: 10g of copper powder, China dish, tripod stand, wire gauge, Bunsen burner, spirit lamp.	What is oxidation? Give example. What is reduction? Give example. Explain redox reactions with examples.

	oxidation reaction.	reactions in daily life.	<p>Showing the video by using Diksha portal</p> <p>https://diksha.gov.in/play/collection/</p> <p>https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Electrochemistry/Redox_Chemistry/Oxidation-Reduction_Reactions</p>	<p>What is corrosion? Give example.</p> <p>Why do the food materials containing oil and fat, left for a long time change their taste and smell?</p> <p>Write the examples for oxidation reactions in your daily life.</p>
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VI. Teacher's Notes (Additional resources)

Period number	Teacher's notes	Teacher signature with date

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VII Teacher's Reflections		
Period number	Teacher's reflections	Teacher signature with date

LESSON PLAN

I. Name of the lesson : 11. Heat

II. Class : 9

III. No. of Periods : 10

IV. Academic Standards

Academic Standards:

1. Conceptual Understanding

- Differentiates between heat and temperature.
- Relates the kinetic energy and temperature.
- Explains the heat, temperature, thermal equilibrium, and kinetic energy.
- Explains specific heat and its applications.
- Describes the processes of evaporation, condensation, boiling, melting, and freezing, and how they differ.
- Describes specific heat capacity and explains its applications (e.g., watermelons vs. samosas, oceans as heat reservoirs).
- Explains principle of mixtures in heat transfer using experimental data.

2. Questioning – Making Hypotheses

- Asks questions and makes predictions based on heat-related observations.
- Predicts outcomes of experiments related to heat transfer and changes of state.
- Frames hypotheses about the influence of surface area, wind, and humidity on evaporation.
- Wonders about natural phenomena like fog, dew, and cooling of the body.

3. Experiments / Field Trips

- Conducts experiment to observe temperature changes and heat transfer.
- Records findings and relates them to real-life situations.
- Performs experiments to determine specific heat of solids and liquids.
- Records observations during boiling, freezing, and evaporation.
- Participates in lab activities and discussions using real objects (water, oil, beakers, thermometers, etc.).
- Observes environmental phenomena (e.g., dew on grass, condensation on glass) and relates them to classroom learning.

4. Information Skills

- Uses thermometers and lab tools accurately.
- Collects, records, and interprets data from experiments.
- Accurately measures temperature using laboratory thermometers.
- Collects and organizes experimental data (time, temperature, material used).

5. Drawing / Model Making

- Draws labeled diagrams of:
 - Calorimeter setup

- Thermometers in beakers (heat transfer)
- Water cycle highlighting condensation and evaporation
- Prepares flowcharts showing processes like melting → evaporation → condensation.

6. Appreciation / Aesthetic Sense

- Appreciates natural effects of heat like dew, fog, and cooling.
- Shows interest in the beauty of natural heat-related phenomena.
- Appreciates the role of heat in nature, such as dew formation and cooling effects.

7. Daily Life Application & Biodiversity Concern

- Applies understanding of heat to daily activities like cooking, preserving food, drying clothes, and cooling.
- Appreciates the role of humidity and heat in agriculture and environment.
- Explains how climate change affects evaporation and rainfall patterns.
- Connects heat regulation in ecosystems (e.g., water bodies buffering temperature) with biodiversity protection.
- Advocates energy conservation and judicious use of natural resources.
- Applies heat concepts in daily life (cooking, cooling, drying).
- Appreciates the role of heat in environment and biodiversity.

V. Period wise allotment:

Period	Content	Strategy	TLM/Resources	Evaluation
1	Introduction to hot and cold Thermal equilibrium-heat and Temperature-transfer of heat energy	Brainstorming Activity- 1 Group discussion Reading the textbook Activity 2 Observe and note the readings	Piece of wood, piece of metal, fridge or ice box. Two glass tumblers, hot water, cold water. Laboratory thermometer	Where do we get heat energy from? How do we measure heat energy? What are the different effects of heat energy in our daily life?
2	Temperature and Kinetic energy	Reading the textbook Activity-3 Group discussion Activity -4	two bowls, hot water, cold water, food colour water, container, cylindrical transparent glass jar, hot water, coconut oil, two thermometers, lid with holes	What happens if the food colour sprinkled in the hot and cold water? How is the temperature of a substance related to the average kinetic energy of its particles? Explain with an example.
3	Specific Heat	Reading the textbook Activity -5 Observe and note down the temperature of the oil and water	large jar, water, heater, two identical boiling test tubes, single-holed corks. Water, 50g of oil, two thermometers, clamp, retort stand	In which test tube does the temperature rise quickly? Is the amount of heat given to the water and oil same? How much heat energy is required to raise the

		Activity -6 Observation Note down the reading temperature	Two beakers of equal volume, 250 grams of water, 1 kg of water, heater raise the temperature both beakers to 60 °C	temperature of unit mass of the substance by 1°C
4	Applications of Specific heat capacity Principle of method of mixtures Net heat loss = Net heat gain This is known as principle of method of mixtures	Reading the textbook Explaining with examples Situation -1 Heat the water in both beakers attain same temperature Situation- 2 Heat the water in both beakers 90°C, another 60°C Temperature. Situation -3	Oceans behave like “heat store house” Water melon Samosa two beakers, 200 ml of water, Heater, larger beaker (same temperature) two beakers, 200 ml of water, Heater, larger beaker (different temperature) 100 ml of water at 90°C and 200 ml of water at 60°C and mix the two.	Water melon brought out from the refrigerator retains its coolness for a longer time than any other fruit. Why? A samosa appears to be cool outside but it is hot when we eat it. Why? Explain the principle of method of mixtures.
5	Determination of Specific heat of a solid	Lab Activity Hands on practice Observe and measure the mass of the calorimeter	To find the specific heat of given Solid we need calorimeter, thermometer, stirrer, water, steam heater, wooden box and lead shots.	Explain the procedure and required material to find the specific heat of given solid.
6	Evaporation Effect of surface area, Humidity and wind speed on evaporation	Group discussion Activity 8 Activity 9 Record the observations	Spirit, petri dish 5ml of water, test tube, China dish 5ml of water China dish	What happens, when wet clothes dry, water in the clothes disappear? Explain how the surface area effects on evaporation. Using the concept of evaporation explain why dogs pant during hot summer days.

7	Condensation Humidity Dew and Fog	Activity 10 Observation Discussion Discussion	Place a glass tumbler on the table. Pour cold water up to half its height. Vapour on the rivers, lakes, ponds, drying clothes, sweat During winter, you might have noticed that water droplets form on window panes, flowers, grass etc.	Explain how the humidity, wind speed effects on evaporation.
8	Boiling Melting	Activity 11 Note the reading for every 2 minutes Activity 12 Observe the changes	Beaker, water, burner, thermometer ice cubes, beaker, thermometer, burner.	Are the processes of evaporation and boiling the same?
9	Freezing	Activity 13 observe	Water, glass bottle with a tight lid, deep freezer of a refrigerator	Why did the glass bottle break, when it kept in deep freezer for some time?
10	Improve your learning	Discuss and Practice with the children		MCQ

VI. Teacher's Notes (Additional resources)

Period number	Teacher's notes	Teacher signature with date

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VII Teacher's Reflections

Period number	Teachers' reflections	Teacher signature with date

LESSON PLAN

I. Name of the lesson : 12. Sound

II. Class : 9

III. No. of Periods :10

IV. Academic Standards

1. Conceptual Understanding

- Explains that sound is a form of energy produced by vibrating objects.
- Describes the characteristics of sound waves: wavelength, amplitude, frequency, time period, and speed.
- Differentiates between pitch, loudness, and quality of sound.
- Explains the concept of multiple reflections of sound and its applications (e.g., stethoscope, SONAR).
- Recognizes the audible range and applications of ultrasound.
- Recognizes how animals use infrasonic/ultrasound for communication and survival.

2. Questioning, Making Hypotheses

- Predicts outcomes of sound experiments (e.g., sound in water vs. air, use of tuning fork).

3. Experiments, Field Trips

- Conducts activities using tuning fork, rubber hammer, smoked glass to observe vibrations.
- Demonstrates sound traveling through solids, liquids, and gases
- Uses slinky spring to demonstrate wave motion.
- Participates in simple experiments on pitch, loudness, and frequency.

4. Information Skills

- Collects data about audible ranges of different animals.
- Prepares tables on frequency ranges (e.g., humans vs. bats vs. elephants).
- Reads and interprets graphs related to sound waves.

5. Drawing Pictures / Model Making

- Draws diagrams of sound waves showing amplitude and wavelength.
- Sketches models of stethoscope, tuning fork, or SONAR device.
- Represents graphical sound patterns for various instruments (violin, flute).

6. Appreciation / Aesthetic Sense

- Appreciates the role of sound in music, communication, and nature.
- Identifies the beauty in natural sounds (birds, water flow) and musical instruments.
- Recognizes the difference in sound quality among instruments and voices.

7. Daily Life Application and Concern Towards Biodiversity

- Applies sound concepts to understand devices used in daily life (mobile phone, loudspeaker, sonar in submarines).
- Applies SONAR concept through problem-solving with speed-distance-time calculations.

V. Period wise allotment:

Period	Content	Strategy	TLM/Resources	Evaluation
1	Introduction Sound is a form of energy Production of sound	Group discussion Activity Activity 1 Activity 2	Small activities by using wood, water and stones, Mobile phone and a container Tin, Balloon, rubber band, mirror, laser light tuning fork, rubber hammer, piece of smoked glass	Does the sound travels in solid, liquids and gases? Explain sound has energy. Explain the sound produces vibrations.
2	How the sound travel? -transfer of energy - Medium Types of waves	Group discussion Activity 3 Demonstration	Daily life examples Slinky spring,	What is a medium? How the sound travels in air?
3	Characteristics of Sound wave • Wavelength • Amplitude • time period and frequency • wave speed	Diagram Explaining the terms wavelength and amplitude	tuning fork, graph	What is wavelength of wave? Write the units for terms describing amplitude.
4	Relation between frequency and time period Speed of sound wave	Group discussion Group discussion problems	Pendulum clock Graph Example problems	What is the relation between time and frequency? Write the units for frequency. Write the formula to find the speed of sound wave. Explain the characteristics of sound wave.

5	Characteristics of a musical Sound <ul style="list-style-type: none"> • Pitch • Loudness • Quality -units for loudness of sound	Group discussion Examples	Pitch: Lion, Mosquito sounds Male and female voices Musical terms Sa, re, ga, ma, pa, da, ni, sa Loudness: School bell, MP3player, earplugs Quality: violin, piano, flute - graphical representation	Explain the pitch of sound. Explain the loudness of sound with suitable examples. Explain the characteristics of musical sound.
6	Uses of multiple reflection of sound	Group discussion	Stethoscope, megaphone, designing concert halls	Write the applications of multiples reflection of sound.
7	Range of hearing <ul style="list-style-type: none"> • Infrasonic • Audible range • Ultrasound 	Group discussion	Discussion on audible range of different animals and their frequency ranges. Prepares a table of frequency of animals.	Write the audible range of human beings. Why we cannot hear the frequencies below the 20Hz and above the 20KHz?
8	Application of ultrasound?	Group discussion	Applications in industries and medical applications <ul style="list-style-type: none"> - Drilling holes or making cuts of desired shape -Ultrasonic cleaning -Ultrasonic detection of defects in metals -imaging organs by Ultrasonography USG, X-ray, -surgical use of ultrasound for cataract removal, breaking the small stones in kidneys 	Write the application of ultrasound.

9	SONAR	Group discussion Solving problems	Showing the figure in the text book	What is SONAR? How it works? A research team sends a sonar signal to confirm the depth of a sea. They heard an echo after 6s. Find the depth of the sea, If the speed of sound in sea water is 1500 m/s.
10	Improve your learning	Group discussion		MCQ

VI. Teacher's Notes (Additional resources)

Period number	Teacher's notes	Teacher signature with date

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VII Teacher's Reflections

Period number	Teacher's reflections	Teacher signature with date

PERIOD PLANS
9th CLASS
LESSON -1

MATTER AROUND US

PeriodPlan-1

Steps	Teacher activity	Pupil Activity
1.1. Greetings and Introduction	Good morning, children! How are you?	<i>Good morning, sir</i>
1.2. Name of the lesson and Topic	States of matter Properties of solids, liquids and gases	
1.3. Mind Mapping		
1.4. Discussion of prerequisite competencies	Different types of substances, shape, volume, expand, compress	
2.1. Reading the lesson and identification of Key words		Matter, solids, liquids, gases, definite shape, fixed volume, fluids
2.2. Writing the key words on the blackboard and Discussion of the Meanings of key words	Keywords: Matter, solids, liquids, gases, definite shape, fixed volume, fluids	Students copy the key words and participate in the discussion. Keywords: Matter, solids, liquids, gases, definite shape, fixed volume, fluids
3. Conceptual Understanding concepts–activities, explanation, questions, and answers	Activity1: Identifying the shape and volume of liquids. Material required: Different shaped container shaving liquid of same volume.	Every student participates actively in the group work

4. Summary through discussion in the classroom.	Solids have definite shape and volume. Liquids have definite volume but no definite shape. Gases have no definite shape and no definite volume.	Students give responses to the questions.
5. Homework.	1. Write an example each for solid, liquid, and gas. 2. Do liquids have fixed volume? 3. Do gases have fixed shape?	

Period Plan-2

Steps	Teacher activity	Pupil Activity
1.1. Greetings and Introduction	Good morning, children! How are you?	Good morning, sir
1.2. Name of the lesson and Topic	1.3 Compressibility	
1.3. Mind Mapping		
1.4. Discussion of prerequisite competencies	CNG, LPG, shape, volume, expand, compress	
2.1. Reading the lesson and Identification of Key words		CNG, LPG, compressibility, fixed shape, fixed volume
2.2. Writing the key words on the blackboard and Discussion of the Meanings of key words	Keywords: CNG, LPG, compressibility, fixed shape, fixed volume.	Students copy the key words and participate in the discussion. Keywords: CNG, LPG, compressibility, fixed shape, fixed volume.
3. Conceptual Understanding the concepts–activities, explanation, questions, and answers	Activity 2: Visit the CNG Filling station and observe how to store CNG in cylinders. Activity 3: 50ml syringe, piece of wood	Every student participates actively in the group work.

4. Summary through discussion in the Class room.	<p>Compressibility is the property of a Substance that describes how much its volume decreases when pressure is applied.</p> <p>It depends on how closely the particles of matter are packed.</p>	Students give responses to the questions.
5. Homework.	<p>1. Compare the compressibility of solids, liquids, and gases with examples?</p> <p>2. What happens to a gas when it is compressed?</p> <p>3. Why is water only slightly compressible, unlike gases?</p> <p>4. Write one application of compressibility in daily life?</p>	

Period Plan-3

Steps	Teacher activity	Pupil Activity
1.1. Greetings and Introduction	Good morning, children! How are you?	<i>Good morning, sir</i>
1.2. Name of the lesson And Topic	1.4 Diffusion	
1.3. Mind Mapping		
1.4. Discussion of prerequisite competencies	Diffusion, spread, particles, area of higher Concentration, area of lower concentration	
2.1. Reading the lesson and Identification of Key words		Diffusion, Potassium permanganate, crystals of copper sulphate, spread, particles, concentration.

<p>2.2. Writing the key words on the blackboard and discussion of the Meanings of key words</p>	<p>Keywords: Diffusion, Potassium permanganate, crystals of copper sulphate, spread, particles, concentration.</p>	<p>Students copy the key words and participate in the discussion. Keywords: Diffusion, Potassium permanganate, crystals of copper sulphate, spread, particles, concentration.</p>
<p>3. Conceptual Understanding the concepts–activities, explanation, questions, and answers</p>	<p>Activity4:lit incense stick in one corner of the room and observe smell another corner of the room. Activity5: take2/3 water in round bottomed Flask add Potassium permanganate solution to it with help of dropper. Activity6: Take water in beaker and add few Crystals of copper sulphate.</p>	<p>Every student participates actively in the group work.</p>
<p>4.Summary through discussion in the classroom.</p>	<p>Diffusion is the process by which particles move from an area of high concentration to an area of low concentration. It happens because particles are always moving randomly. Diffusion takes Place in gases, liquids, and even solids, but it is fastest in gases because their particles are far A part and move quickly.</p>	<p>Students give responses to the questions.</p>
<p>5. Homework.</p>	<p>1. Give one example of diffusion in gases? 2. In which state of matter is diffusion the fastest? 3. Compare diffusion in liquids and gases. 4. Explain the process of diffusion with examples from daily life.</p>	

PeriodPlan-4

Steps	Teacher activity	Pupil Activity
1.1. Greetings and Introduction	Good morning, children! How are you?	Good morning, sir
1.2. Name of the lesson And Topic	Diffusion of gases	
1.3. Mind Mapping		
1.4. Discussion of Prerequisite competencies	Diffusion	
2.1. Reading the lesson And Identification of Key words		Liquid ammonia, hydrochloric Acid, white fumes of ammonium chloride.
2.2. Writing the key words on the blackboard and Discussion of the Meanings of key words	Keywords: Liquid ammonia, hydrochloric acid, white fumes of ammonium chloride.	Students copy the key words and participate in the discussion. Key words: Liquid ammonia, hydrochloric acid, white fumes of ammonium chloride.
3. Conceptual Understanding the concepts–activities, explanation, questions, and answers	Lab Activity Aim: To observe the speed of diffusion of two gases.	Every student participates actively in the group work.
4. Summary through discussion in the classroom.	Diffusion of gases is the process in which gas particles move from a region of higher Concentration to a region of lower concentration. Lighter gases diffuse faster than heavier gases	Students give responses to the questions.
5. Homework.	1. Which gas diffuses faster, hydrogen or oxygen?. Why? 2. Explain the molecular weight affect the rate of diffusion in gases.	

PeriodPlan-5

Steps	Teacher activity	Pupil Activity
1.1. Greetings and Introduction	Good morning, children! How are you?	<i>Good morning, sir</i>
1.2. Name of the lesson and topic	1.5 Can matter changes its state? What is matter made up of	
1.3. Mind Mapping		
1.4. Discussion of Prerequisite competencies	Sublimation, tiny particles, intensity of colour.	
2.1. Reading the lesson And Identification of Key words		Sublimation, tiny particles, Intensity of colour, crystal of potassium permanganate.
2.2. Writing the keywords on the blackboard and Discussion of the Meanings of key words	Keywords: Sublimation, tiny particles, intensity of colour, crystal of potassium permanganate.	Students copy the key words and participate in the discussion. Key words: Sublimation, tiny particles, intensity of colour, crystals of KMnO₄.
3. Conceptual Understanding the concepts–activities, explanation, questions, and answers	Activity 7: How small are the particles of matter? Take a beaker with water and add 1or2 crystals of potassium permanganate and dissolve them in water. Activity–8: There exists space between particles Take a graduated beaker and fill it with some water and mark the water level. Add some salt and stir it thoroughly with a glass rod. Observe if there is any change in water level.	Every student participates actively in the group work.

4.Summary through discussion in the classroom.	Diffusion of gases is the process in which gas particles move from a region of higher Concentration to a region of lower concentration. Lighter gases diffuse faster than heavier gases	Students give responses to the questions.
5. Homework.	1. Which gas diffuses faster– hydrogen or oxygen?. Why? 2. Explain the molecular weight affect the rate of diffusion in gases.	

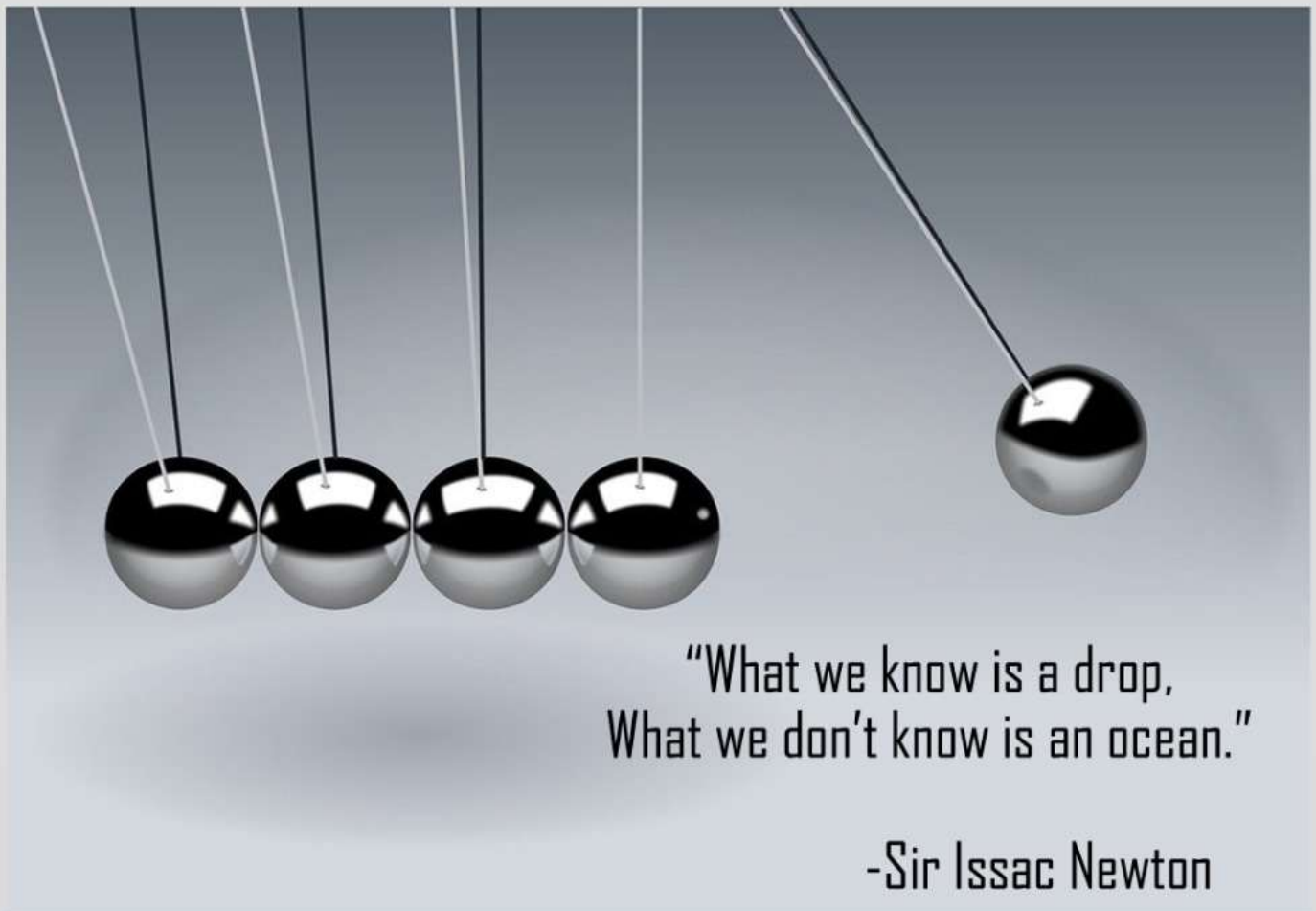
PeriodPlan-6

Steps	Teacher activity	Pupil Activity
1.1. Greetings and Introduction	Good morning, children! How are you?	<i>Good morning, sir</i>
1.2. Name of the lesson And topic	Particles of matter attract each other How diffusion takes place?	
1.3. Mind Mapping		
1.4. Discussion of Prerequisite competencies	Force of attraction, particles, matter, diffusion, vacuum.	
2.1. Reading the lesson and Identification of key words		Force of attraction, particles, matter, diffusion, bromine, vacuum.
2.2. Writing the keywords on the blackboard and Discussion of the Meanings of key words	Keywords: Force of attraction, particles, matter, diffusion, bromine, vacuum.	Students copy the key words and participate in the discussion. Keywords: Force of attraction, particles, matter, diffusion, bromine, vacuum.

<p>3. Conceptual Understanding the Concepts – activities, explanation, questions, and answers</p>	<p>Activity 9: Observing the force of attraction between the particles of matter The stream of water, chalk, How diffusion takes place? Observe the diagram</p>	<p>Every student participates actively in the group work.</p>
<p>4. Summary through discussion in the classroom.</p>	<p>Force of attraction is the intermolecular force between the particles of matter. Strength of Attraction: Strongest in solids–particles are tightly packed. Weaker in liquids–particles are loosely packed. Weakest in gases–particles are far apart and move freely.</p>	<p>Students give responses to the questions.</p>
<p>5. Homework.</p>	<p>1. Compare the force of attraction between solids, liquids, and gases? 2. Give two examples each for substances with strong and weak forces of attraction. 3. Draw a neat diagram to show the Arrangement of particles and force of attraction in solids, liquids, and gases.</p>	

PeriodPlan-7

Steps	Teacher activity	Pupil Activity
1.1. Greetings and Introduction	Good morning, children! How are you?	<i>Good morning, sir</i>
1.2. Name of the lesson and topic	Improve your learning	
1.3. Mind Mapping		
1.4. Discussion of Prerequisite competencies		
2.1. Reading the lesson and Identification of Key words		Each student reads the questions given in Improve your learning section and write answers to the questions.
2.2. Writing the key words on the blackboard and Discussion of the Meanings of key words	Teacher writes some answers on the black board and discusses the answers with the students.	Students copy the key words and participate in the discussion.
3. Conceptual Understanding the concepts– activities, explanation, questions, and answers	Discussion with some questions given in the Improve your learning and explain with students.	Every student participates actively in the group work.
4. Summary through discussion in the Class room.		Students give responses to the questions.
5. Homework.	Teacher writes the HOT's on the black board.	



“What we know is a drop,
What we don't know is an ocean.”

-Sir Issac Newton

Steps in Teaching the Lesson :

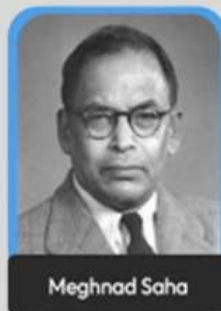
1. Introduction /perquisites (Mind mapping)
2. Reading the Lesson: keywords/key concepts/symbols/ formulae etc,
3. Conceptual understanding through pedagogical strategies.
4. Recapitulation/summary
5. Homework



Sir C.V. Raman



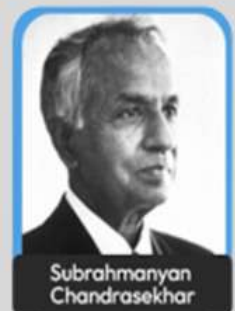
Satyendranath Bose



Meghnad Saha



Homi J. Bhabha



Subrahmanyan
Chandrasekhar



Vikram Sarabhai



G.N Ramachandran



Jayant Narlikar



Harish Chandra



Sandip Chakrabarti