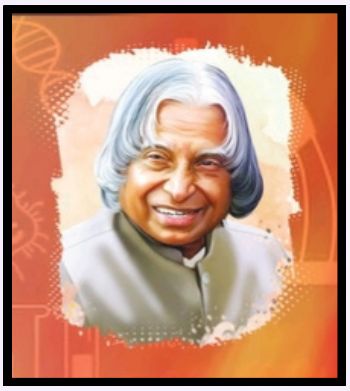
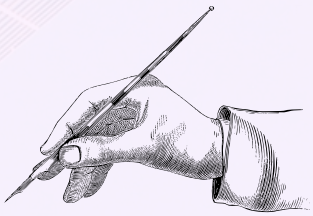
PHYSICAL SCIENCE

FORMATIVE ASSESSMENT - 1

(2026 - 2027)





Experiments/ Lab activities/ Activities and Projects

- 8th Class
- 9th Class
- 10th Class

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8th Class

Experiments

Experiment -1

Aim: To study the effects of force on objects(or)
To understand the different actions of force and their effects.

Materials required: Ball, inflated balloon, toy car or bicycle (optional), and a notebook.

Procedure:

a) Hit a moving ball and observe what happens.
b) Press an inflated balloon gently.
c) Push or pull a toy car or any object.
d) Observe the changes in motion, direction, or shape.
e) Write observations.

S.No	Action	Push/Pull	Effect
1	Your friend holding your moving bicycle from behind to stop it	Pull	Stopping or decreasing the speed of the bicycle
2	Hitting a moving ball with a bat	Push	Changing te direction of a moving ball
3	Pressing an inflated balloon	Push	Change in shape of the balloon

Observation: The ball changes its direction when hit.
The balloon changes its shape when pressed.
Objects start moving, stop, or change speed when pushed or pulled.

Conclusion: Force can change the speed, direction, and shape of an object.
It can also start or stop the motion of an object.

Experiment -2

Aim: To find the smallest value (least count) measured by a spring balance (or)
To identify the smallest weight the spring balance can measure.

Materials required: A spring balance.

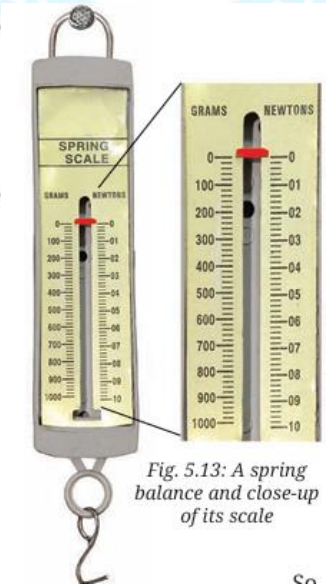


Fig. 5.13: A spring balance and close-up of its scale

Procedure:

a) Observe the scale of the spring balance carefully.
b) Note the values of two consecutive big marks (Example: 0 N and 1 N).
c) Count the number of small divisions between these big marks.
d) Divide the value difference by the number of small divisions.

Observation: The difference between two big marks is 1 N.

There are 5 small divisions between them.
Each small division represents 0.2 N.

Conclusion: The least count of the spring balance is 0.2 N. It can measure weight in steps of 0.2 N.

Experiment -3

Aim: To observe that different weights cause different stretching in a spring (or)
To measure the weight of different objects using a spring.

Required materials: A spring, a nail, and objects of different masses (pencil box, tiffin box, stone, etc.).

Procedure:

a) Hang the spring from a nail or support.
b) Attach one object to the spring and observe how much it stretches.
c) Remove it and hang another object.
d) Repeat with different objects one by one.
e) Compare the stretching each time.

Observation: The spring stretches when an object is hung.
Heavier objects cause more stretching than lighter objects.
Different objects cause different amounts of stretch.

Conclusion: The stretch of a spring depends on the weight (force) of the object.
Heavier objects apply more force and stretch the spring more.

Experiment -4

Aim: To show that like charges repel and unlike charges attract (or)
To understand the different types of charges.

Required materials: Two balloons, thread, woollen cloth.

Procedure:

a) Inflate two balloons and hang them using threads so they do not touch each other.
b) Rub both balloons with a woollen cloth.
c) Release them and observe their movement.
d) Now bring the woollen cloth near one rubbed balloon and observe again.

Observation: The two balloons move away from each other (repel).
When the woollen cloth is brought near a balloon, they move towards each other (attract).

Conclusion: Like charges repel each other and unlike charges attract each other.
This shows the nature of electrostatic force.

Experiment -5

Aim: To show that magnets can exert force without touching (non-contact force) (or)
To understand the nature of magnetic force.

Required materials: Two ring magnets and a wooden stick.

Procedure:

a) Insert one ring magnet into the wooden stick.
b) Place the second ring magnet above it with like poles facing each other.
c) Observe whether the upper magnet floats.
d) Gently push the upper magnet down and feel the force.
e) Release it and observe again.

Observation: The upper magnet floats above the lower magnet.
When pushed down, it moves back up without touching.

Conclusion: Magnets can exert force without contact.
This force is called magnetic force and it is a non-contact force.

Experiment - 6

Aim: To observe the upward force (buoyant force) exerted by water (or)
To understand the concept of upthrust.

Materials required: An empty plastic bottle (with lid closed) and a bucket of water.

Procedure:

a) Take a bucket filled with water.
b) Push the empty plastic bottle into the water.
c) Feel the force acting on the bottle.
d) Release the bottle and observe what happens.

Observation: An upward force is felt when pushing the bottle into water.
When released, the bottle comes back up and floats.

Conclusion: Water exerts an upward force called buoyant force (upthrust). This force makes objects float in water.

Project – 1

Title of the Project: Exploring the Applications of Force and Pressure in Daily Life.

Aim of the Project: To investigate and demonstrate how the principles of force and pressure are applied in various real-life situations.

Hypothesis: The concepts of force and pressure are widely used in everyday objects and activities to improve efficiency, safety, and functionality.

Introduction: Force is a push or pull applied to an object, while pressure is the force exerted per unit area. These concepts are essential in understanding how many tools, machines, and systems work. From sharp knives to hydraulic lifts, force and pressure are applied in numerous ways to make tasks easier and safer. This project explores some common applications of force and pressure in daily life and demonstrates their practical significance.

Project:

Materials Needed: A sharp knife, A blunt knife, A nail and a hammer, A syringe or hydraulic jack (if available) A balloon, A piece of clay or foam, A ruler or measuring tape

Procedure and Applications:

1. Sharp vs. Blunt Knife:
   a) Use a sharp knife and a blunt knife to cut a piece of clay or foam.
   b) Observe which knife cuts more easily and explain why (smaller surface area of a sharp knife increases pressure).
2. Hammer and Nail:
   a) Hammer a nail into a piece of wood.
   b) Observe how the small area of the nail's tip increases pressure, making it easier to penetrate the wood.
3. Hydraulic Lift (Using a Syringe):
   a) Use a syringe to demonstrate how pressure is transmitted through a fluid to lift a small object.
   b) Explain the principle of Pascal's law and its application in hydraulic systems.
4. Balloon Pressure:
   a) Blow up a balloon and observe how the air pressure inside the balloon increases as it expands.
   b) Poke the balloon with a pin to demonstrate how pressure is released suddenly.

Observations:

1. A sharp knife cuts more easily than a blunt knife due to higher pressure.
2. A nail's small tip exerts high pressure, allowing it to penetrate wood.
3. A syringe demonstrates how pressure can be transmitted to lift objects.
4. A balloon bursts when the pressure inside exceeds its limit.

Conclusion: This project highlights the practical applications of force and pressure in daily life. By understanding these concepts, we can explain the working of tools like knives and nails, systems like hydraulic lifts, and even simple objects like balloons. These principles are essential for designing efficient and safe tools and machines, making our lives easier and more convenient.

PROJECT REPORT

Name of the project:
Class : 8th
Subject : Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 8th class physical science book.

Project – 2

Title of the Project: Imagine a scenario where the gravity disappears.

Aim of the project: To understand the importance of gravitational force by imagining a world where gravity suddenly disappears.

Hypothesis: If gravity disappears, all objects, living beings, water, and air will float freely, making life on Earth impossible.

Introduction: Gravity is the force with which the Earth attracts all objects towards its centre. It keeps us firmly on the ground, holds the atmosphere around the Earth, causes rain to fall, and keeps the Moon and artificial satellites in their orbits. Every object on Earth has weight because of gravity.

Project Work (Imagine the Situation):

It was a bright Monday morning. At exactly **8:00 a.m.**, something unbelievable happened—**gravity disappeared!**

1. At first, nobody understood what was happening. People who were walking to school suddenly began floating into the air. Cars, buses, bicycles, and trains lifted off the roads. School bags, books, pencils, desks, and chairs floated around classrooms.
2. Rivers and lakes could no longer stay on the ground. Water floated upward as giant droplets. Rain stopped falling because clouds could no longer release water onto the Earth. Oceans began breaking into enormous floating water bubbles.
3. The Earth's atmosphere also started drifting away into space because gravity was no longer holding it. Soon, there was very little air left to breathe. Birds could not fly properly because there was no force pulling them downward. Trees were uprooted and floated away with the soil.
4. Buildings became unsafe because objects inside them floated freely. Food, utensils, furniture, and electronic devices drifted through the air. Hospitals, airports, factories, and schools stopped functioning.
5. The Moon slowly moved away from the Earth because gravity no longer kept it in orbit. Artificial satellites also drifted into space, causing communication systems, television, GPS, and internet services to stop working.

Conclusion: This imaginary situation shows that **gravity is essential for life on Earth**. It keeps everything in its proper place, provides weight to objects, holds the atmosphere around the Earth, controls the movement of planets and satellites, and makes everyday activities possible. Without gravity, Earth would become an uninhabitable planet.

PROJECT REPORT

Name of the project:
Class : 8th
Subject : Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 8th class physical science book.

Project – 3

Title of the Project: Floating and Sinking of Objects

Aim of the Project: To investigate why some objects float while others sink in water and to understand the role of gravitational force and buoyant force (upthrust) in floating and sinking.

Hypothesis: Objects with lower density than water float, while denser objects sink.

Introduction: Objects in water experience two forces—gravity and buoyant force. Whether an object floats or sinks depends on these forces.

Project Work:

Materials Required: Bucket or tub filled with clean water, Stone, Coin, Plastic bottle (empty and tightly closed), Cork, Sponge, Wooden block.

Testing the Objects

1. Take one object at a time.
2. Gently place it on the surface of the water.
3. Observe whether it floats or sinks.
4. If it sinks, note how quickly it reaches the bottom.
5. If it floats, observe whether it floats completely or partially above the water.
6. Repeat the same procedure for all the objects.
7. Record your observations carefully.

S.No.	Object	Float/Sink	Reason
1	Stone	Sink	Denser than water; weight is greater than buoyant force.
2	Coin	Sink	High density; gravitational force is greater than upthrust.
3	Plastic Bottle (Empty)	Float	Contains air; overall density is less than water.
4	Cork	Float	Very low density; buoyant force balances its weight.
5	Sponge (Dry)	Float	Contains tiny air spaces, making it less dense than water.
6	Wooden Block	Float	Wood is less dense than water.

Conclusion: The experiment confirms that floating and sinking depend on the relationship between gravitational force and buoyant force.

1. Objects float when the buoyant force is equal to or greater than their weight.

2. Objects sink when their weight is greater than the buoyant force.
3. The density of the object relative to the density of water is the main factor determining whether it floats or sinks.

PROJECT REPORT

Name of the project :
Class : 8th class
Subject : Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 8th class textbook

Project – 4

Title of the Project: Exploring the Relationship Between Force and Pressure.

Aim of the Project: To investigate how the amount of force applied and the area over which it is applied affect the pressure exerted on a surface.

Hypothesis: If the force applied increases while the area of contact remains constant, the pressure will increase. Similarly, if the area of contact increases while the force remains constant, the pressure will decrease.

Introduction: Force is a push or pull applied to an object, and pressure is the force exerted per unit area. The relationship between force and pressure can be described by the formula:

Pressure = Force/Area

Project Work:

Materials Needed: A brick or wooden block, A spring balance or force meter, A soft surface (Ex: clay, foam, or sand), A ruler or measuring tape

Procedure:

1. Effect of Force on Pressure:
   - Place the brick on its largest surface area (lying flat) on the soft surface.
   - Use a spring balance to apply a small 5 N force vertically downward on the brick.
   - Measure the depth of the impression made on the soft surface.
   - Repeat the experiment by increasing the force of 10 N, 15 N and record the depth of the impression each time.
2. Effect of Area on Pressure:
   - Place the brick in two different orientations:
   - Orientation 1: Largest surface area (lying flat).
   - Orientation 2: Smallest surface area (standing on edge).
   - Apply the same 10 N force in both orientations.
   - Measure and compare the depth of the impressions made on the soft surface.

Observations:

- As the force increases, the depth of the impression increases, indicating higher pressure.
- When the area of contact is smaller, the depth of the impression is greater, indicating higher pressure.

Conclusion: Increasing force or decreasing the area of contact will result in higher pressure. This principle explains the design of sharp knives, pointed nails, and wide tires for heavy vehicles. Understanding this relationship helps us make informed decisions in designing tools and equipment for everyday use.

PROJECT REPORT

Name of the project :
Class : 8th class
Subject : Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 8th class textbook

Project – 5

Title of the Project: Investigating Friction on Different Surfaces

Aim of the Project: To investigate the effect of friction on the movement of an object over different surfaces and understand how the nature of the surface affects frictional force.

Hypothesis: If an object moves on different surfaces, the force of friction will vary. Rough surfaces will produce more friction and slow down the object quickly, while smooth surfaces will produce less friction and allow the object to move a longer distance.

Introduction: Friction is a **contact force** that acts between two surfaces in contact. It always acts in the direction opposite to the motion of an object. Friction is present everywhere in our daily life. It helps us walk without slipping, write with a pencil, hold objects firmly, and apply brakes to vehicles. Without friction, it would be impossible to perform many everyday activities safely.

Project Work:

Materials Required: Toy car or empty matchbox, Wooden board, Glass sheet or ceramic tile, Cotton cloth, Sandpaper, Measuring tape or ruler, Marker. Notebook, Pen.

Procedure: 1. Arrange four different surfaces such as a glass sheet, wooden board, cloth, and sandpaper.

2. Place the toy car at the same starting point on each surface.
3. Push the toy car with nearly the same force each time.
4. Measure the distance travelled before the toy car stops.
5. Repeat the activity three times for each surface.
6. Calculate the average distance travelled.
7. Record all observations carefully in the table.

Observation table

S.No.	Surface	Distance Travelled	Friction
1	Glass	Longest distance	Very Low
2	Ceramic Tile	Long distance	Low
3	Wooden Board	Medium distance	Moderate
4	Cotton Cloth	Short distance	High
5	Sandpaper	Shortest distance	Very High

Conclusion: The experiment proves that friction depends on the nature of the surfaces in contact. Rough surfaces oppose motion more strongly because they have more surface irregularities. Smooth surfaces offer less resistance, allowing objects to move farther. Friction is a useful force because it helps us walk, write, and control vehicles, but excessive friction can reduce efficiency and damage moving parts.

PROJECT REPORT

Name of the project :
Class : 8th class
Subject : Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 8th class textbook

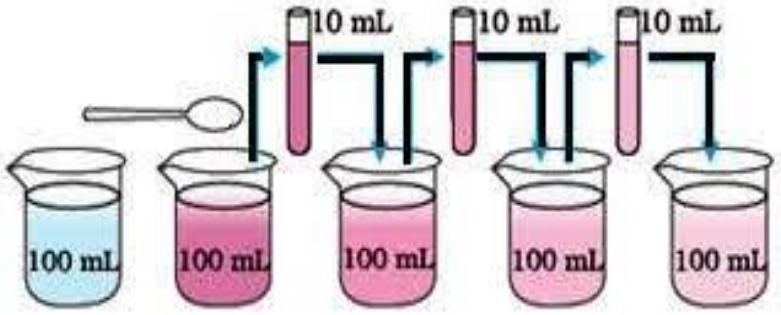
9th Class

Experiments

Experiment - 1

Aim: Testing that the particles of matter are very small.
Materials required: Transparent measuring beakers, Potassium permanganate crystals,Water, Spoon, Test tubes
Procedure:

1) Take 2–3 crystals of potassium permanganate and dissolve them in 100 mL of water.
2) Take out approximately 10 mL of this solution and put it into 90 mL of clear water.
3) Take out 10 mL of this solution and put it into another 90 mL of clear water.
4) Keep diluting the solution like this 5 to 8 times.
5) The water remains coloured till the last dilution.
6) This experiment shows that just a few crystals of potassium permanganate can colour a large volume of water (about 1000L).



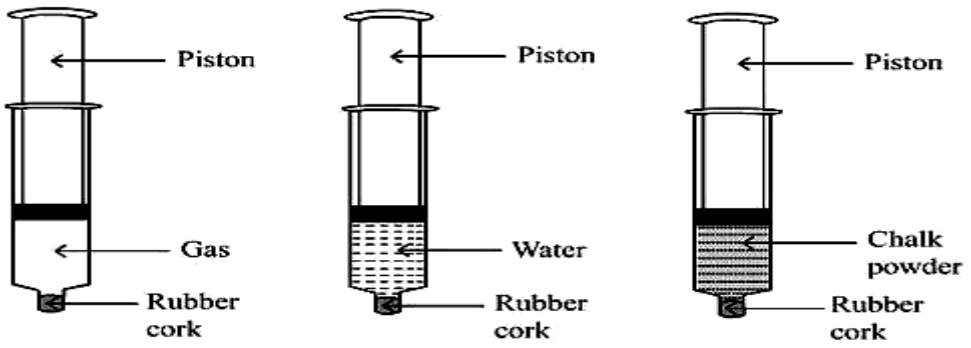
7) So we conclude that there must be millions of tiny particles in just one crystal of potassium permanganate, which keep on dividing themselves into smaller and smaller particles.
8) The same activity can be done using 2 ml of Dettol instead of potassium permanganate.
9) The smell can be detected even on repeated dilution.

Conclusion: The particles of matter are very small. They are small beyond our imagination.

Experiment - 2

Aim: The gases are highly compressible as compared to solids and liquids.
Materials required:
Procedure:

1) Take three 100 mL syringes and close their nozzles by rubber corks, as shown in Figure



2) Remove the pistons from all the syringes.
3) Leaving one syringe untouched, fill water in the second and pieces of chalk in the third.
4) Insert the pistons back into the syringes. You may apply some vaseline on the pistons before inserting them into the syringes for their smooth movement.
5) Now, try to compress the content by pushing the piston in each syringe.

6) The piston was pushed in easily in the syringe in which nothing except air was filled.
7) Gases can be compressed easily.

Conclusion: We have observed that gases are highly compressible as compared to solids and liquids.

Experiment - 3

Aim: Shows that particles of matter are continuously moving

Required materials: Two glasses/ beakers, Blue or Red ink, Honey

Procedure:

1. Take two glasses/beakers filled with water.
2. Put a drop of blue or red ink slowly and carefully along the sides of the first beaker and honey in the same way in the second beaker.
3. Leave them undisturbed in your house or in a corner of the class.
4. Record your observations.
5. The colour of ink starts spreading soon.
6. The honey drops slowly disappear.
7. The colour of ink spreads evenly throughout the water within a few minutes.

Observation: Particles of matter are continuously moving.

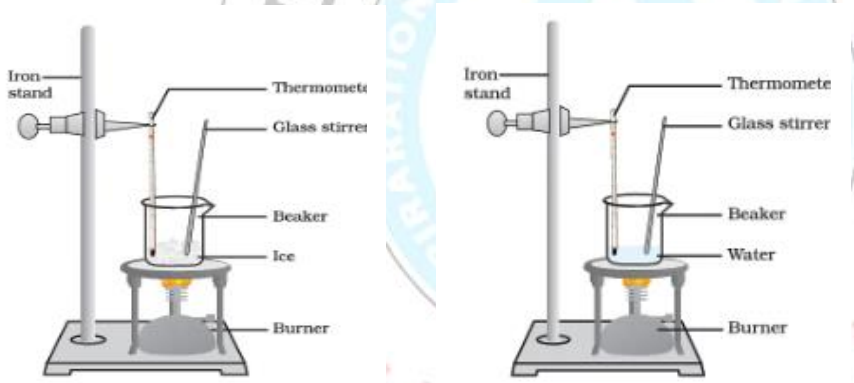
Experiment - 4

Aim: The state of matter is affected by changing temperature.

Materials required: Beaker, Laboratory thermometer, Ice, Burner, Glass rod

Procedure:

1) Take about 150 g of ice in a beaker and suspend a laboratory thermometer so that its bulb is in contact with the ice, as in Figure.



2) Start heating the beaker on a low flame.
3) Note the temperature when the ice starts melting.
4) Note the temperature when all the ice has converted into water.
5) The ice melts at 0^0C. All the ice gets conversion from solid to liquid state.
6) Now, put a glass rod in the beaker and heat while stirring till the water starts boiling.
7) Keep a careful eye on the thermometer reading till most of the water has vaporised.
8) The water starts boiling at 100^0C and gets converted into vapours at the same temperature.

Conclusion: On increasing the temperature of solids, the kinetic energy of the particles increases. Due to the increase in kinetic energy, the particles start vibrating with greater speed. The energy supplied by heat overcomes the forces of attraction between the particles. The particles leave their fixed positions and start moving more freely. The state of matter is affected by changing temperature.

Experiment - 5

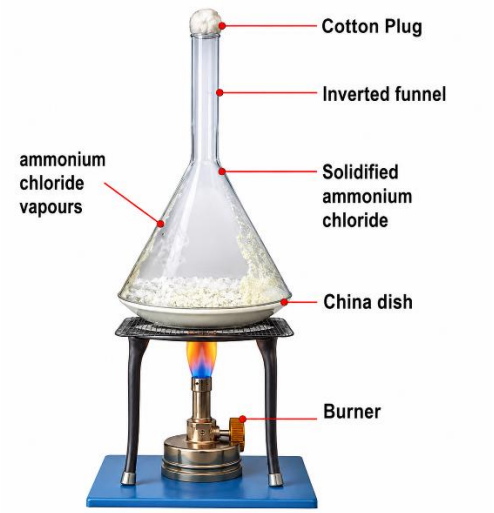
Aim: To study the changes in state of Sublimate solids on heating.

Required materials: Camphor/Ammonium chloride, China dish, Funnel.

Procedure:

1. Take some camphor or ammonium chloride. Crush it and put it in a china dish.
2. Put an inverted funnel over the china dish.
3. Put a cotton plug on the stem of the funnel, as shown in figure.

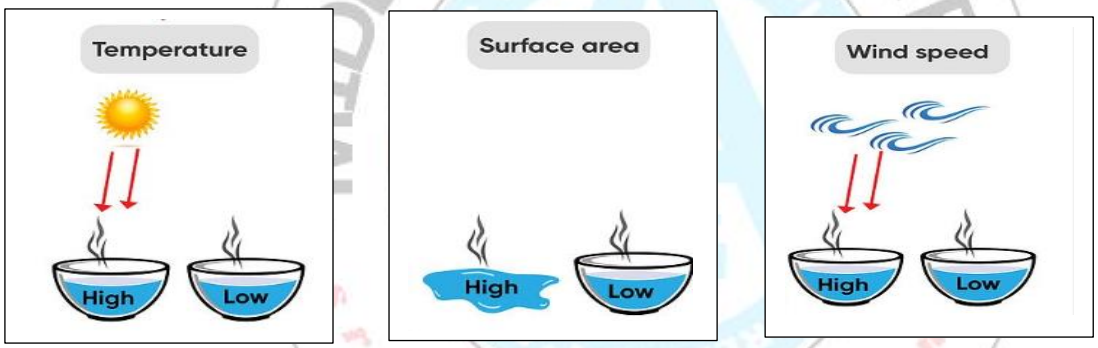
4. Now, heat slowly and observe.
5. Vapour of ammonium chloride get deposited on the inner stem of funnel.



Observation: Solid ammonium chloride gets converted into vapours directly.

Experiment - 6

Aim: Evaporation depends on temperature, surface area and speed of wind.
Materials required: Test tube, China dish, Fan, Thermometer
Procedure:



1) Take 5 mL of water in a test tube and keep it near a window or under a fan.
2) Take 5 mL of water in an open china dish and keep it near a window or under a fan.
3) Take 5 mL of water in an open china dish and keep it inside a cupboard or on a shelf in your class.
4) Record the room temperature.
5) Record the time or days taken for the evaporation process in the above cases.
6) Repeat the above three steps of activity on a rainy day and record your observations.
7) Evaporation will be fastest from the china dish kept near window.
8) The evaporation increases with temperature, surface area of the container and speed of wind.

Conclusion: Evaporation depends on temperature, surface area and speed of wind.

Project – 1

Title of the Project: Graphical Representation of Motion: Applications in Daily Life.

Aim of the Project: To explore and demonstrate how graphical representation of motion (distance-time and velocity-time graphs) helps in understanding and analyzing real-life motion scenarios.

Hypothesis: Graphical representation of motion can provide a clear and visual understanding of the nature of motion, including speed, direction, and acceleration, which can be applied to analyze everyday movement.

Introduction: Motion is a fundamental concept in physics, and it can be represented graphically using distance-time and velocity-time graphs. These graphs help us visualize and analyze the motion of objects in terms of speed, direction, and acceleration. In daily life, understanding motion graphically is essential in fields like transportation, sports, and even pedestrian safety. This project explores real-life examples where motion graphs are applied and demonstrates their significance.

Project:

Materials Needed: A stopwatch or timer, A measuring tape, A small toy car or ball, Graph paper or graphing software, A ruler or pen

Procedure:

1. Distance-Time Graph:
   a) Measure a distance of 10 meters on a flat surface.
   b) Roll a toy car or ball along the measured distance.
   c) Record the distance traveled at regular intervals (Example: every 2 seconds).
   d) Plot a distance-time graph using the collected data.
   e) Analyze the graph to determine the speed of the object.

2. Velocity-Time Graph:
   a) Push a toy car or ball on a flat surface to accelerate it.
   b) Measure its velocity at regular intervals (Example: every 2 seconds) using the distance covered.
   c) Plot a velocity-time graph using the data.
   d) Analyze the graph to determine acceleration and deceleration.

3. Real-Life Applications:
   - Explain how distance-time graphs are used in GPS systems to calculate travel time.
   - Discuss how velocity-time graphs help in analyzing vehicle speed and braking distance for road safety.
   - Demonstrate how motion graphs are used in sports to analyze an athlete's performance.

Observations:

- The distance-time graph shows a straight line for constant speed and a curve for changing speed.
- The velocity-time graph indicates acceleration when the line slopes upward and deceleration when it slopes downward.
- Motion graphs help in understanding and predicting real-life motion scenarios.

Conclusion: Distance-time and velocity-time graphs help us understand speed, direction, and acceleration, which are essential for applications in transportation, safety, and sports.

PROJECT REPORT

Name of the project :
Class : 9th class
Subject : Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 9th class textbook

Project – 2

Title of the Project: Understanding the Importance of Equations of Motion in Real Life

Aim of the Project: To study the use and significance of equations of motion in understanding and solving problems related to moving objects.
Hypothesis: Equations of motion help us to predict the position, velocity, and time of moving objects and are useful in many real-life applications like driving, sports, and space science.
Introduction: Equations of motion describe the relationship between displacement, velocity, acceleration, and time for an object moving with uniform acceleration. These equations are widely used in physics to analyze the motion of vehicles, athletes, projectiles, and more.
There are three equations of motion:

1. $v = u + at$ 2. $s = ut + \frac{1}{2}at^2$ 3. $v^2 = u^2 + 2as$

Where u = initial velocity v = final velocity a = acceleration
s = displacement t = time

Project:
1. Driving Vehicles:
Drivers use these principles unconsciously. For example, how long it takes to stop a car when brakes are applied depends on initial speed and deceleration.
2. Sports and Athletics:
Coaches analyze athletes' motion using these equations to improve performance (Example: sprinter's acceleration).
3. Projectile Motion (Cricket/Football):
Calculating how far or high a ball will travel can be done using the equations of motion.
4. Space and Rocket Launches:
Scientists use these equations to calculate the speed, time, and distance of rockets and satellites.
5. Accident Investigation:
Police use motion equations to estimate speed and time of impact in accidents.
Conclusion: Equations of motion are essential tools in physics. They help us to accurately describe and predict how objects move. Their applications in transport, sports, engineering, and space science prove their practical importance in our daily lives.

PROJECT REPORT

Name of the project :
Class : 9th class
Subject : Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 9th class textbook

Project – 3

Title of the Project: The effect of evaporation on daily Life situations.
Aim of the Project: To study the effect of evaporation on daily life situations.
Hypothesis: Evaporation is a cooling process and surface phenomena.
Evaporation: Evaporation is a surface phenomenon. Particles from the surface gain enough energy to overcome the forces of attraction present in the liquid and change into the vapour state.

The rate of evaporation depends upon the surface area exposed to the atmosphere, the temperature, the humidity and the wind speed.

The effect of evaporation on daily life situations: -

1. **Drying Clothes under The Sun:**
When the wet clothes are put under the sun, they get heated up resulting in the evaporation of water particles present in wet clothes; making the clothes dry.
2. **Ironing of Clothes:**
The hot iron evaporates the water vapors present in the fabric of clothes, which help to iron the clothes well.
3. **Cooling Down of Hot Tea and Other Hot Liquids:**
Heat loss happens as the water evaporates resulting in the cooling down of the tea and other such beverages.
4. **Wet Floors:**
The simple answer is that the water is evaporated because of the heat and making the floor completely dry.
5. **Preparation of Common Salt:**
Preparation of common salt is also a widespread example of the evaporation. The seawater goes under the

evaporation, which results in the formation of salt crystals.

6. Evaporation of Nail Paint Remover:

The acetone present in the nail paint remover takes the heat of our bodies and evaporates.

7. Drying of Wet Hair:

The only possible immediate solution is drying up of hair with the hairdryer. The water vapor of wet hair evaporates due to the heat of the sun or heat of the hairdryer.

8. Drying up of Different Water Bodies:

The water from different water bodies mostly get dried up during the hot summers and gets refilled only after rain.

9. Evaporation of Sweat from Body:

On a hot summer day, the sweat from the skin evaporates due to the high temperature of the environment, taking a little bit of body heat. Thus, it results in the cooling effect.

10. Distillation Process:

Distillation is a process in which the different components of the liquid is separated by the boiling and the condensation. Thus, in this process too, the evaporation performs the main role.

11. Working of a Pressure Cooker:

During cooking, a lot of heat is produced inside a pressure cooker, and with its whistle, the steam comes out by evaporation; making a perfect dish for us.

12. Brings Rain:

The initial stage under the water cycle process is evaporation. The other process like condensation, sublimation, precipitation, transpiration, runoff, and infiltration comes after the evaporation process. So, if evaporation is not there then this water cycle would remain incomplete.

Conclusion: Evaporation is a natural phenomenon that occurs in liquids. Evaporation is a part of human life.

PROJECT REPORT

Name of the project :
Class : 9th class
Subject : Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 9th class textbook

Project – 4

Title of the Project: Evaporation and Factors Affecting Evaporation

Aim of the Project: To study the process of evaporation and factors affecting evaporation.

Hypothesis: Evaporation is a cooling process and surface phenomena.

Evaporation: Evaporation is a surface phenomenon. Particles from the surface gain enough energy to overcome the forces of attraction present in the liquid and change into the vapour state.

The rate of evaporation depends upon the surface area exposed to the atmosphere, the temperature, the humidity and the wind speed.

Each of these factors affecting evaporation have been explained in detail below.

1) Temperature

When the temperature of the liquid (water, in this case) is increased, it results in an increase in the kinetic energy of the individual molecules that constitute the liquid. This increase in energy makes it easier for the liquid molecules to overcome the intermolecular forces of attraction (that holds the liquid together) and escape into the atmosphere as a gas. It can be noted that the temperature of the surrounding can also contribute towards faster evaporation since hot environments can transfer their heat to the liquid.

2) Surface Area Occupied by the Liquid

Evaporation is a surface phenomenon, which implies that the process only occurs at the surface of the liquid. During evaporation, the molecules of the liquid that are present at its surface overcome the intermolecular forces of attraction to break away from the liquid and escape into the atmosphere as a gas (or vapour).

Liquids are known to not have any definite shape – they assume the shape of their container. Therefore, the greater the surface area of the container (or the greater the surface occupied by the liquid), the greater the number of liquid molecules present at the surface. The larger the number of liquid molecules are at the surface, the larger the number of molecules that will break away from the liquid and become a gas at a given point of time, which contributes to an increase in the rate of evaporation.

3) Humidity of the Surrounding

There is a limit to how much water vapour the atmosphere can hold. This limit is proportional to the temperature (which implies that hot air can hold more water vapour than cold air). Evaporation can be viewed as an equilibrium process through which the amount of water vapour in the atmosphere reaches an equilibrium with the amount of water in the surface of the liquid. Therefore, the greater the amount of water vapour in the atmosphere over the liquid, the slower the rate of evaporation.

4) Air Circulation or Wind Speed

Evaporation increases the humidity of the atmosphere that immediately surrounds the liquid. This humid air takes some time to dissipate into the rest of the atmosphere. The presence of a breeze, a powerful wind, or some other form of air circulation can speed up this process and make the environment of the liquid less humid. Therefore, by decreasing the humidity of the liquid's surrounding, a powerful breeze or wind can increase the rate at which the liquid evaporates.

Conclusion: we collect the data about the factors which depend on evaporation in our daily life.

PROJECT REPORT

Name of the project :
Class : 9^{th} class
Subject : Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 9^{th} class textbook

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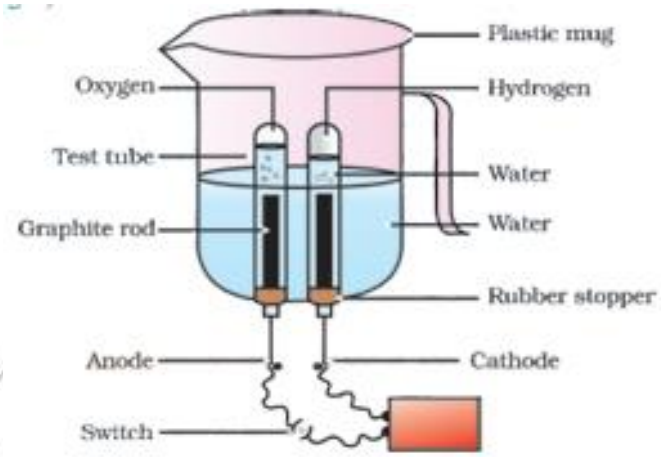
10th Class

Experiments

Experiment -1

Aim: Electrolysis of water.

Apparatus: Plastic mug, Water, Test tubes, Graphite rods, Rubber stoppers, 6V Battery, Switch, Sulphuric acid.



Procedure: 1.Take a plastic mug. Drill two holes at it base and fit rubber stoppers in these holes. Insert carbon electrodes in these rubber stoppers.

2. Connect these electrodes to 6 volt battery. Fill the mug with water such that the electrodes are immersed.
3. Add a few drops of dilute sulphate acid to the water. Take two test tubes filled with water and invert them over the two carbon electrodes.
4. Switch on the current and leave the apparatus undisturbed for some time.
5. Once these test tubes are filled with the gases, carefully remove them from the mug.
6. Take a glowing candle near the mouth of the test tubes.
7. The candle fire and burns with a pop sound, showing the presence of hydrogen gas in the test tube.
8. The candle starts to burn brightly, showing the presence of oxygen gas in the test tube.

$$2H_2O \xrightarrow{\text{Electricity}} 2H_2 + O_2$$

Observation: 1. Hydrogen gas is liberated at the cathode while Oxygen gas is liberated at the anode.

2. The hydrogen gas volume is twice the oxygen gas volume contained in the other test tube.

Experiment -2

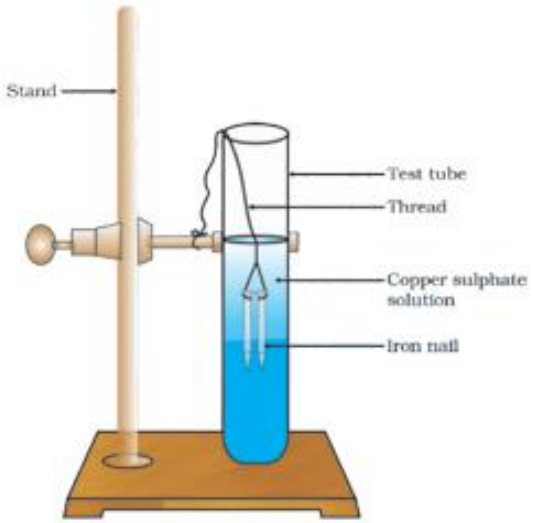
Aim: To Demonstrate the iron has displaced copper from copper sulphate solution.

Apparatus: Test tubes, Iron nails, Copper sulphate solution, Sandpaper.

Procedure: 1. Take 3 iron nails and clean them by rubbing with sandpaper.

2. Take 2 test tubes marked as A and B.
3. In each test tube, take about 10 ml copper sulphate solution.
4. Tie 2 iron nails with a thread and immerse them carefully in the copper sulphate solution in the tube B for about 20 minutes.
5. Keep one iron nail aside for comparison.
6. After 20 minutes, take out the iron nails from the copper sulphate solution.
7. Compare the intensity of the blue colour of copper sulphate solutions in test tubes A and B.
8. Compare the colour of the iron nails dipped in the copper sulphate solution with the one kept aside.

$$\underset{\text{(Iron)}}{Fe\,(s)} + \underset{\text{(Copper sulphate)}}{CuSO_4\,(aq)} \rightarrow \underset{\text{(Iron sulphate)}}{FeSO_4\,(aq)} + \underset{\text{(Copper)}}{Cu\,(s)}$$



Observation: 1. The iron nail become brownish in colour and the blue colour of copper sulphate solution fades.
2. Iron has displaced another copper element from copper sulphate solution.

Experiment -3

Aim: To demonstrate double displacement reaction.
Apparatus: Sodium sulphate solution, Barium chloride solution, Test tubes
Procedure: 1.Take about 3 ml of Sodium sulphate solution in test tube.
2. In another test tube, take about 3 ml of Barium chloride solution.
3. Mix the solutions properly.

Na_2SO_4 (aq) + $BaCl_2$ (aq) → $BaSO_4$ (s) + 2NaCl (aq)
(Sodium sulphate) (Barium chloride) (Barium sulphate) (Sodium chloride)

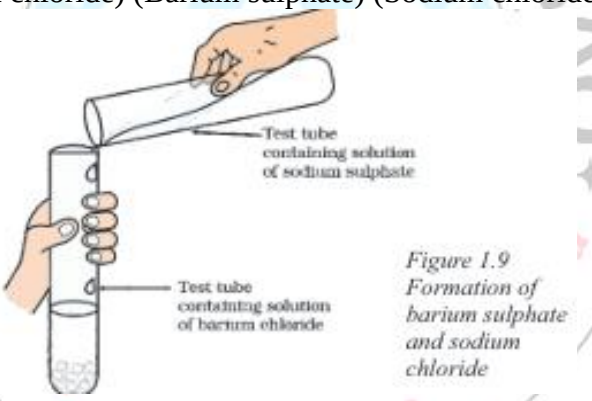


Figure 1.9 Formation of barium sulphate and sodium chloride

Observation: 1. Insoluble white precipitate Barium sulphate is formed by the reaction of SO_4 and Ba^{2+}.
2. Exchange of ions between the reactants.

Experiment -4

Aim: Formation of hydrogen gas by the action of dilute Sulphuric acid on zinc granules.
Apparatus: Conical flask/Test tube, Cork, Glass tube, Zinc granules, dilute sulphuric acid/hydrochloric acid.
Procedure:

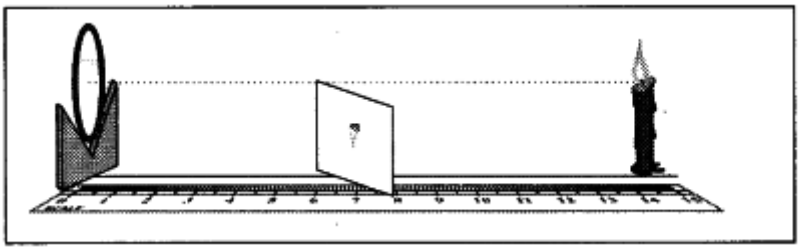
Figure 1.2 Formation of hydrogen gas by the action of dilute sulphuric acid on zinc

1. Take a few Zinc granules in a conical flask or a test tube.
2. Add dilute hydrochloric acid or sulphuric acid to this.

Observation: We observe that, hydrogen gas is evolved.

Experiment -5

Aim: To study the formation of images by concave mirror by an object at different positions on its principal axis.
Apparatus: Conacave mirror, Metre scale, Chalk piece, Burning candle, Paper screen.



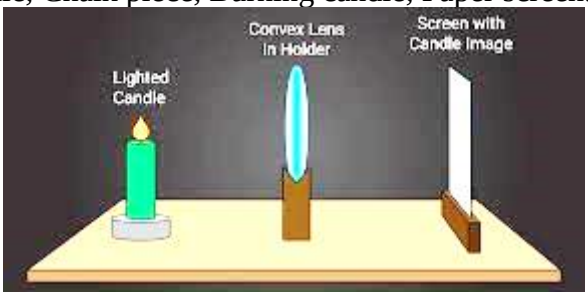
Procedure:1. Take a concave mirror of known focal length.
2. Mark a line on a Table with a chalk. Place the concave mirror on a stand. Place the stand over the line such that its pole lies over the line.
3. Draw with a chalk two more lines parallel to the previous line such that the distance between any two successive lines is equal to the focal length of the mirror. These lines will now correspond to the positions of the points P, F and C respectively.
4. Keep a bright object, say a burning candle, at a position far beyond C. Place a paper screen and move it in front of the mirror till you obtain a sharp bright image of the candle flame on it.
5. Observe the image carefully. Note down its nature, position and relative size with respect to the object size.
6. Repeat the activity by placing the candle – (a) beyond C , (b) at C, (c) between F and C, (d) at F, and (e) between P and F.
7. In one of the cases, you may not get the image on the screen. Identify the position of the object in such a case. Then, look for its virtual image in the mirror itself.
8. Note down and tabulate your observations.

Position of the object	Position of the image	Size of the image	Nature of the image
At infinity	At the focus F	Highly diminished point-sized	Real and inverted
Beyond C	Between F and C	Diminished	Real and inverted
At C	At C	Same size	Real and inverted
Between C and F	Beyond C	Enlarged	Real and inverted
At F	At infinity	Highly enlarged	Real and inverted
Between P and F	Behind the mirror	Enlarged	Virtual and erect

Observation: We observe that the nature, position and size of the image formed by a concave mirror depends on the position of the object in relation to points.

Experiment -6

Aim: To study the formation of images by convex lens by an object at different positions on its principal axis.
Apparatus: Convex lens, Metre scale, Chalk piece, Burning candle, Paper screen.



Procedure: 1. Take a convex lens of known focal length.
2. Mark a line on a Table with a chalk. Place the convex lens on a stand. Place the stand over the line such that its pole lies over the line.
3. Draw with a chalk two more lines parallel to the previous line such that the distance between any two successive lines is equal to the focal length of the lens. These lines will now correspond to the positions of the points O, F

and C respectively.

4. Keep a bright object, say a burning candle, at a position far beyond C. Place a paper screen and move it other side of the lens till you obtain a sharp bright image of the candle flame on it.
5. Observe the image carefully. Note down its nature, position and relative size with respect to the object size.
6. Repeat the activity by placing the candle – (a) beyond C, (b) at C, (c) between F and C, (d) at F, and (e) between O and F.
7. In one of the cases, you may not get the image on the screen. Identify the position of the object in such a case. Then, look for its virtual image in the lens itself.
8. Note down and tabulate your observations.

Position of the object	Position of the image	Size of the image	Nature of the image
At infinity	At the focus F	Highly diminished point-sized	Real and inverted
Beyond $2F_1$	Between F and C	Diminished	Real and inverted
At $2F_1$	At C	Same size	Real and inverted
Between F_1 and $2F_1$	Beyond C	Enlarged	Real and inverted
At Focus F_1	At infinity	Highly enlarged	Real and inverted
Between P and O	Behind the lens	Enlarged	Virtual and erect

Observation: We observe that the nature, position and size of the image formed by a convex lens depends on the position of the object in relation to points.

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Class room based Projects

Project – 1

Title of the Project: **Understanding the Importance of Chemical Reactions in Daily Life**
Aim of the Project: To explore how chemical reactions play a crucial role in everyday life and the natural world.
Hypothesis: Chemical reactions are essential for basic life processes, industrial development, and environmental changes.
Introduction: Chemical reactions are changes that transform substances into new products with different properties. These reactions are not limited to laboratories—they occur around us all the time. From digestion in our body to rusting of iron, from cooking food to producing electricity in batteries, all involve chemical reactions.
Project:

1. **Photosynthesis:**
   Green plants use sunlight to convert carbon dioxide and water into glucose and oxygen.
   $(6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2)$
   → Essential for food production and oxygen.
2. **Digestion of Food:**
   Our stomach uses acids and enzymes to break down food into simpler substances.
   → Provides energy for the body.
3. **Combustion of Fuels:**
   Burning petrol, diesel, or LPG is a chemical reaction that releases energy.
   → Used in vehicles, cooking, and power generation.
4. **Rusting of Iron:**
   A slow chemical reaction between iron, water, and oxygen.
   $(Fe + O_2 + H_2O \rightarrow Fe_2O_3 \cdot xH_2O)$
   → Important to understand and prevent in construction.
5. **Formation of Medicines:**
   Pharmaceutical industries use chemical reactions to create life-saving drugs.
   → Critical for healthcare and treatment.
6. Neutralization Reaction:
   - Mix baking soda with vinegar in a test tube.
   - Observe the fizzing reaction, which produces carbon dioxide gas.
   - Neutralization reactions are used in antacids to relieve acidity.

7. **Cleaning Action of Soap:**
   - Add a few drops of oil to water and observe how it does not mix.
   - Add soap or detergent and stir, observing how the oil mixes with water.
   - Soap molecules chemically react with oil and water to clean surfaces.

Conclusion: Chemical reactions are the foundation of life and technology. They help us understand natural phenomena, produce useful materials, generate energy, and improve human life. Recognizing their importance encourages us to study them deeply and use them responsibly.

PROJECT REPORT

Name of the project :
Class : 10th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 10th class textbook

Project – 2

Title of the Project: **Applications of reflection of light in various fields**
Aim of the Project: **Application of reflection of light in various fields.**
Hypothesis: The reflection of light finds numerous applications across various fields, enabling diverse functionalities and technologies.
Introduction:

Optics and Imaging:

1. **Mirrors in Optics:** Mirrors, both concave and convex, are extensively used in telescopes, microscopes, and cameras to reflect and focus light for magnification, imaging, and visual observation.
2. **Reflective Telescopes:** Reflecting telescopes use mirrors to gather and focus light, enabling astronomers to observe distant celestial objects.
3. **Rear view and Side Mirrors:** In vehicles, mirrors are crucial for providing drivers with a clear view of their surroundings, aiding in safe navigation.

Lighting and Illumination:

1. **Fiber Optic Technology:** Mirrors and reflective surfaces play a role in guiding and redirecting light in fiber optic cables, allowing for high-speed transmission of data in telecommunications.
2. **Reflectors in Lighting:** Reflectors are employed in lamps and lighting fixtures to redirect light, ensuring better illumination in specific areas or to enhance efficiency by directing light where needed.

Architecture and Design:

1. **Skylights and Light Wells:** Architectural designs incorporate reflective surfaces to redirect natural light into buildings, reducing the need for artificial lighting during the day.
2. **Reflective Coatings:** Reflective materials and coatings on buildings or surfaces help manage heat absorption, keeping structures cooler in sunny climates.

Solar Energy:

1. **Solar Reflectors:** Mirrors and reflective surfaces are used in solar power plants to concentrate sunlight onto solar panels or collectors, maximizing energy production.

Scientific Applications:

1. **Spectroscopy:** Reflection and dispersion of light are essential in spectrometers, enabling the analysis of materials' composition by separating light into its component wavelengths.
2. **Optical Experiments:** Reflection is utilized in various optical experiments to understand the behavior of light, such as in mirrors, lenses, and prisms.

Art and Display:

1. **Art Installations:** Artists use mirrors and reflective surfaces creatively in installations and artworks to manipulate light and create visual effects.
2. **Display Technologies:** Reflective displays, such as electronic ink or e-paper, use ambient light reflection for low-power, easy-to-read digital screens.

Conclusion: The applications of light reflection span across scientific, technological, artistic, and everyday contexts, showcasing its versatility and significance in enabling various functionalities and innovations in different fields.

PROJECT REPORT

Name of the project :
Class : 10th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 10th class textbook

Project – 3

Title of the Project: How to reducing of corrosion and protection of articles

Aim of the Project: Reducing of corrosion and protection of articles.

Hypothesis: Reducing corrosion and protecting articles from its damaging effects is crucial in maintaining the integrity and longevity of metal objects and structures.

Introduction: When a metal is attacked by substances around it such as moisture, acids etc. it is said to corrode and this process is called corrosion.

Reducing of corrosion:

1. Protective Coatings and Paints

Applying protective coatings and paints is one of the most common methods to prevent corrosion. These coatings act as a barrier between the metal surface and the corrosive elements.

Paints: Various paints can be applied, including epoxy, polyurethane, and zinc-rich paints, which provide a durable and long-lasting protective layer.

Varnishes and Lacquers: Clear coatings that provide a protective layer without altering the appearance of

the metal.

Powder Coating: A dry finishing process that uses a powder applied electrostatically and then cured under heat, forming a tough, protective layer.

2. Galvanization

Galvanization involves coating steel or iron with a layer of zinc, which acts as a protective barrier. Zinc corrodes more slowly than steel and iron, providing sacrificial protection.

Hot-Dip Galvanization: The metal is dipped into molten zinc, forming a thick, durable coating.

Electrogalvanization: Zinc is electroplated onto the metal surface, providing a thinner but uniformly distributed layer.

3. Using Corrosion-Resistant Materials

Using materials that are inherently resistant to corrosion can be very effective.

Stainless Steel: Contains chromium, which forms a passive layer of chromium oxide that protects against further corrosion.

Aluminum: Forms a protective oxide layer that shields the underlying metal.

Plastic and Composites: Non-metallic materials that do not corrode and can be used in corrosive environments.

4. Regular Maintenance and Cleaning

Regular maintenance and cleaning help remove corrosive substances like salt, dirt, and moisture that can accelerate the corrosion process.

Cleaning: Periodically washing metal surfaces with water and mild detergents to remove contaminants.

Inspection: Regularly inspecting for signs of corrosion and addressing them promptly.

5. Environmental Control

Reducing exposure to corrosive environments can significantly reduce the rate of corrosion.

Dehumidification: Using dehumidifiers in humid environments to reduce moisture.

Climate Control: Storing metal objects in controlled environments where temperature and humidity are regulated.

Avoiding Salt Exposure: Keeping metals away from saltwater or de-icing salts, or washing off salt residues promptly.

6. Design Improvements

Designing structures and components to minimize corrosion can be highly effective.

Drainage: Ensuring proper drainage to avoid water accumulation.

Ventilation: Allowing air circulation to keep surfaces dry.

7. Electroplating

Electroplating involves depositing a layer of metal onto the surface of another metal using an electric current, providing protection and aesthetic appeal.

Chromium Plating: Provides a shiny, corrosion-resistant surface.

Nickel Plating: Adds a layer of nickel, which is resistant to corrosion and wear.

8. Passivation

Passivation is a process that removes surface contaminants and enhances the formation of a protective oxide layer.

Chemical Passivation: Using acids or other chemicals to clean the metal surface and promote the formation of a protective oxide layer.

Conclusion: Implementing these strategies can significantly reduce corrosion and protect metal articles in various environments. Combining multiple methods, such as using corrosion-resistant materials, applying protective coatings, and regular maintenance, often provides the best protection against corrosion.

PROJECT REPORT

Name of the project :
Class : 10th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 10th class textbook

Project – 4

Title of the Project: **Applications of refraction of light in various fields**

Aim of the Project: **Application of refraction of light in various fields.**

Hypothesis: The refraction of light finds numerous applications across various fields, enabling diverse functionalities and technologies.

Introduction:

1. Optics and Vision:

- *Eyeglasses and Contact Lenses:* Corrective lenses use refraction to adjust the focal point of light entering the eyes, thereby correcting vision impairments like myopia, hyperopia, and astigmatism.
- *Cameras:* Lenses in cameras refract light to focus images onto the film or sensor, allowing for clear photographs.
- *Microscopes and Telescopes:* These devices use multiple lenses to refract light and magnify small or distant objects for better viewing.

2. Medical Field:

- *Endoscopy:* Endoscopes use fiber optics, which rely on total internal reflection and refraction to transmit light through flexible tubes, allowing doctors to view internal organs without invasive surgery.
- *Ophthalmology:* Various diagnostic instruments, such as slit lamps and retinoscopy's, use refraction principles to examine the eye and diagnose conditions.

3. Astronomy:

- *Astronomical Telescopes:* Refracting telescopes use lenses to bend and focus light from distant stars and planets, aiding in celestial observations.
- *Atmospheric Refraction:* Understanding how light bends as it passes through Earth's atmosphere helps astronomers correct for atmospheric distortion when observing stars and other celestial bodies.

4. Communications:

- *Fiber Optic Cables:* These cables transmit data as light pulses, using refraction and total internal reflection to guide light through glass or plastic fibers with minimal loss over long distances.

5. Engineering and Construction:

- *Surveying Instruments:* Theodolites and other surveying instruments use lenses and prisms to accurately measure angles and distances by refracting light.
- *Building Design:* Architects use knowledge of light refraction to design buildings with optimal natural lighting, enhancing energy efficiency and comfort.

6. Entertainment:

- *Projectors:* Movie and slide projectors use lenses to refract and focus light, projecting images onto screens for viewing.

7. Scientific Research:

- *Spectroscopy:* This technique analyzes the refraction of light to study the composition of substances. It is widely used in chemistry, physics, and astronomy.

8. Everyday Applications:

- *Rainbows:* The refraction and dispersion of light in water droplets create rainbows, demonstrating the natural beauty of light phenomena.
- *Mirages:* Atmospheric refraction causes mirages, where light bends due to temperature gradients, creating illusions of water or displaced objects on the horizon.

Conclusion: The applications of light refraction span across scientific, technological, artistic, and everyday contexts, showcasing its versatility and significance in enabling various functionalities and innovations in different fields.

PROJECT REPORT

Name of the project :
Class : 10th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 10th class textbook

Project – 5

Title of the Project: Comparing the Images Formed by Concave and Convex Mirrors

Aim of the Project: **To compare the images formed by concave and convex mirrors.**

Hypothesis: A concave mirror can produce real or virtual images depending on the position of the object with respect to its principal focus (F) and centre of curvature (C). A convex mirror always produces a virtual, erect, and diminished image irrespective of the object's position.

Introduction: Mirrors are smooth, highly polished surfaces that reflect light according to the laws of reflection. Mirrors are broadly classified into plane mirrors, concave mirrors, and convex mirrors. Curved mirrors, also called spherical mirrors, are widely used in our daily life because they can produce different types of images.
A concave mirror is a converging mirror. A convex mirror is a diverging mirror.

Project Work:

Materials Required: Concave mirror, Convex mirror, Candle, Screen, Mirror stand, Measuring scale

Procedure:

1. Fix the concave mirror vertically on the mirror stand.
2. Light the candle and place it beyond the centre of curvature (C).
3. Move the white screen until a sharp image is obtained.
4. Record the nature, size, and position of the image.
5. Now place the candle at different positions:
    - Beyond C
    - At C
    - Between C and F
    - At F
    - Between F and the Pole (P)
6. Observe the image each time and record your observations carefully.
7. Replace the concave mirror with the convex mirror.

Observation:

Mirror	**Nature of Image**
Concave Mirror	Real/Virtual depending on object position
Convex Mirror	Always virtual, erect, and diminished

Conclusion: The experiment shows that a concave mirror can form different types of images depending on the object's position, while a convex mirror always forms a virtual, erect, and diminished image. These properties make concave mirrors suitable for focusing light and convex mirrors ideal for vehicle rear-view mirrors.

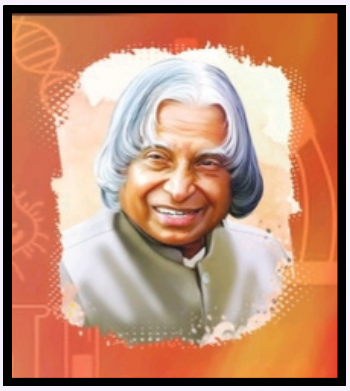
PROJECT REPORT

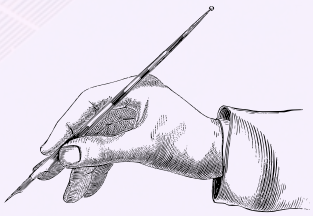
Name of the project :
Class : 10th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 10th class textbook

PHYSICAL SCIENCE

FORMATIVE ASSESSMENT - 1

(2026 - 2027)





Experiments/ Lab activities/ Activities and Projects

- 8th Class
- 9th Class
- 10th Class

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