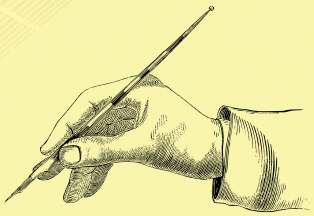
PHYSICAL SCIENCE

FORMATIVE ASSESSMENT - 2

(2026 - 2027)



Experiments/ Lab activities/ Activities and Projects

8th Class

9th Class

10th Class

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Visit: srini science mind

8th Class

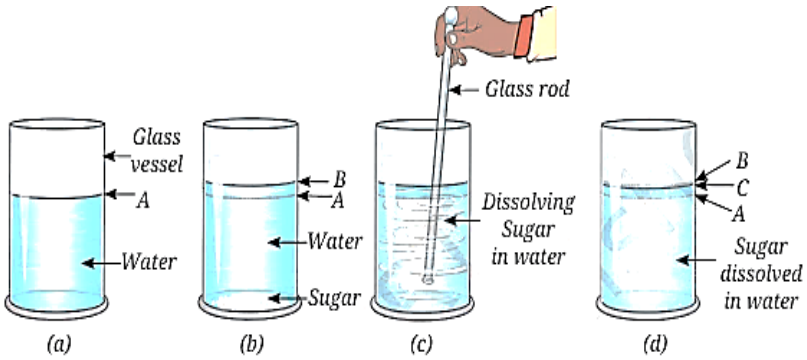
Lab Activities

Lab Activity - 1

Aim: To observe that particles of matter occupy spaces between them

Materials required: Glass vessel, water, sugar, glass rod/spoon.

Procedure:



a) Take water in a glass and mark its level.
b) Add sugar to the water.
c) Stir well until the sugar dissolves completely.
d) Observe the water level again.

Observation: The sugar dissolves in water. The water level increases very little or remains almost the same.

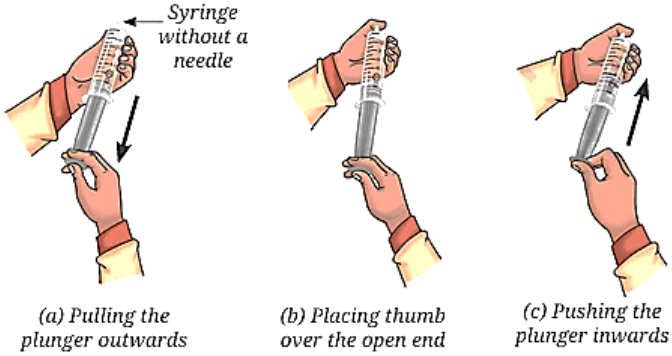
Conclusion: Sugar particles occupy the spaces between water particles.
This shows that there are spaces between particles of matter.

Lab Activity - 2

Aim: To show that gases can be compressed (or) To understand the compressibility of gases and compare it with the incompressibility of liquids using a syringe.

Materials required: Syringe (without needle).

Procedure:



a) Take a syringe and pull the plunger outward.
b) Close the open end of the syringe with your thumb.
c) Push the plunger inward slowly.
d) Observe what happens.
e) Release the plunger and observe again.

Observation: The plunger can be pushed inward, reducing the space of air. When released, the plunger moves back.

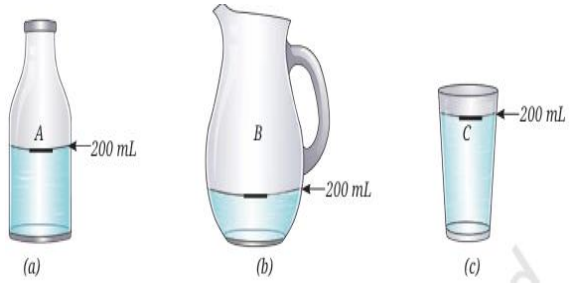
Conclusion: Gases can be compressed because their particles have space between them.

Lab Activity - 3

Aim: To show that liquids have no fixed shape but have a definite volume (or) To observe that liquids acquire the shape of their container while maintaining a fixed volume.

Materials required: Three containers of different shapes, water, marker.

Procedure:



a) Take three containers of different shapes and label them A, B, and C.
b) Mark the same level (Example: 200 mL) on each container.
c) Pour water into container A up to the marked level.
d) Transfer the water from A to B and observe its shape and level.
e) Now transfer the water from B to C and observe again.

Observation: Water takes the shape of each container. The level (volume) of water remains the same in all containers.

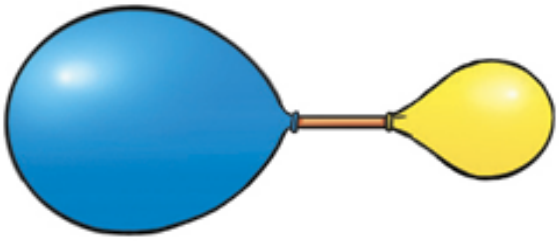
Conclusion: Liquids do not have a fixed shape but have a definite volume.

Lab Activity - 4

Aim: To show that air moves from a region of high pressure to a region of low pressure.

Materials required: Two balloons, a straw, and rubber bands.

Procedure:



a) Blow air into one balloon and tie it.
b) Attach the straw to the mouth of the inflated balloon.
c) Fix the other balloon (empty) to the other end of the straw.
d) Release the air from the first balloon into the second balloon.
e) Observe what happens.

Observation: Air moves from the inflated balloon to the empty balloon.
The first balloon becomes smaller and the second balloon becomes bigger.

Conclusion: Air moves from high pressure (inflated balloon) to low pressure (empty balloon).
This shows the movement of air due to pressure difference.

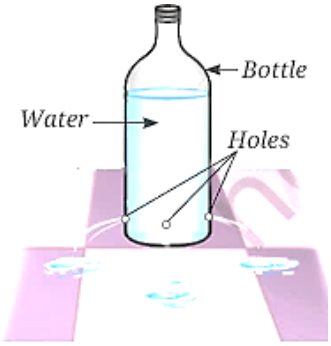
Lab Activity - 5

Aim: To show that liquids exert pressure on the sides of a container.

Materials required: Plastic bottle, needle or pin, tape, and water.

Procedure:

a) Take a plastic bottle and make small holes around its sides near the bottom.
b) Close all the holes with tape.
c) Fill the bottle with water.
d) Remove the tape from all holes at the same time.
e) Observe the flow of water.



Observation: Water comes out from the holes on the sides of the bottle.
Conclusion: Liquids exert pressure not only at the bottom but also on the sides of a container.

Lab Activity - 6

Aim: To show that atmospheric pressure can hold objects together.
Materials required: Rubber sucker (suction cup) and a smooth flat surface (glass/table).
Procedure:

a) Press the rubber sucker firmly on a smooth surface.
b) Observe whether it sticks to the surface.
c) Now try to pull it off.
d) Notice the effort needed to remove it.

Observation: The rubber sucker sticks tightly to the surface. It is difficult to pull it off.
Conclusion: Air (atmospheric) pressure acts on objects. It presses the sucker against the surface and holds it firmly.

Project – 1

Title of the Project: **Collect Information on the Applications of Diffusion of Gases in Daily Life**.
Aim of the project: To understand diffusion of gases and learn about its uses in our daily life.
Hypothesis: Gases move from a region of higher concentration to lower concentration and mix with each other.
Introduction: Diffusion is the natural movement of gas particles from a region of higher concentration to a region of lower concentration. Gas particles move freely and spread in all directions.
Project: **Applications of Diffusion of Gases in Daily Life**

1. **Smell of Perfume:** Perfume spreads through a room by diffusion.
2. **Cooking Smell:** The smell of food spreads through the house.
3. **Breathing:** Oxygen enters the blood and carbon dioxide leaves the blood by diffusion.
4. **Plants:** Carbon dioxide enters leaves through tiny openings for photosynthesis.
5. **Air Fresheners:** Their smell spreads throughout a room.
6. **Burning of Fuels:** Oxygen mixes with fuel vapour and helps it burn.

7. **Smell of Flowers:** The fragrance of flowers spreads through the air.
8. **LPG Gas:** LPG spreads in the air when it leaks, allowing us to detect its smell.
9. **Smoke:** Smoke spreads through the air by diffusion.
10. **Medical Oxygen:** Oxygen moves from the lungs into the blood by diffusion.
11. **Respiration in Animals:** Oxygen and carbon dioxide move between the lungs and blood.
12. **Industrial Gases:** Gases mix with other gases during various industrial processes.

Conclusion: Diffusion of gases is an important process that we observe in many daily activities. It helps in breathing, spreading smells, photosynthesis and burning of fuels.

PROJECT REPORT

Name of the project: Collect Information on the Applications of Diffusion of Gases in Daily Life**.**
Class : 8th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 8th class science book.

Project – 2

Title of the Project: Collect Information on the Formation of Lightning, Its Disadvantages and Precautions.

Aim of the project: To understand how lightning is formed, its dangers and the safety precautions to be followed.

Hypothesis: Lightning is a large electric discharge that occurs between clouds or between a cloud and the ground.

Introduction: Lightning is a bright flash of electricity seen during thunderstorms. It is produced due to the build-up of electric charges in clouds.

Project:

Formation of Lightning

1. During a thunderstorm, water droplets and ice particles move inside clouds.
2. This movement causes **positive and negative charges** to separate.
3. When the charge becomes very large, electricity suddenly flows between clouds or between a cloud and the ground.
4. This produces a bright flash called **lightning**.

Disadvantages of Lightning

1. It can cause **electric shocks and death**.
2. It may start **fires** in buildings and forests.
3. It can damage **electrical appliances and power lines**.
4. It may damage trees, houses and other structures.

Precautions During Lightning

1. Stay **inside a building** during a thunderstorm.
2. Do not stand under **trees or near electric poles**.
3. Avoid using **electrical appliances** during severe thunderstorms.
4. Stay away from **open fields and water bodies**.
5. If outside, move to a **safe enclosed place** as quickly as possible.

Conclusion: Lightning is a natural electrical phenomenon. It can be dangerous, but by following proper safety precautions, we can protect ourselves and reduce damage.

PROJECT REPORT

Name of the project: Collect Information on the Formation of Lightning, Its Disadvantages and Precautions
Class : 8th
Subject : Physical Science
Name of the School:
Time Duration :

Material used : Internet, Newspapers and 8th class science book.

Project – 3

Title of the Project: **Collect Information about Cyclones and Their Effects in India.**

Aim of the project: To understand how cyclones are formed and learn about their effects and safety measures.

Hypothesis: Cyclones are powerful storms formed over warm sea water. They can cause strong winds, heavy rain and floods.

Introduction: A cyclone is a large rotating storm that forms over warm ocean water. India is affected by cyclones mainly along its eastern and western coasts. Andhra Pradesh is also vulnerable to cyclones from the Bay of Bengal.

Project:

Formation of Cyclones

1. Warm ocean water heats the air above it.
2. Warm, moist air rises and creates a **low-pressure area**.
3. More air moves towards the low-pressure area and starts rotating.
4. The storm becomes stronger and forms a **cyclone**.

Effects of Cyclones in India

1. Cause **heavy rainfall and floods**.
2. Damage houses, roads, crops and electric lines.
3. Strong winds can uproot **trees and poles**.
4. Affect fishing, transport and communication.
5. May cause **loss of life and property**.

Precautions

1. Follow warnings from the **weather department**.
2. Stay indoors during the cyclone.
3. Keep emergency items such as **water, food, torch and medicines** ready.
4. Stay away from the sea and flooded areas.
5. Move to a **safe shelter** when advised.

Conclusion: Cyclones are natural disasters that can cause serious damage. Proper warnings, preparation and safety measures can reduce the loss of life and property.

PROJECT REPORT

Name of the project: Collect Information about Cyclones and Their Effects in India.
Class : 8th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 8th class science book.

Project – 4

Title of the Project: **Collect Information about the Working of Weather Monitoring Satellites and their Applications**

Aim of the project: To understand how weather satellites work and learn about their uses in weather forecasting.

Hypothesis: Weather satellites observe the Earth from space and provide information about clouds, rainfall, storms and temperature.

Introduction: Weather monitoring satellites are satellites that collect information about the Earth's atmosphere and weather. They help scientists observe weather conditions from space.

Project:

Working of Weather Satellites

1. The satellite moves around the Earth and observes the atmosphere.
2. Its instruments take pictures and collect weather data.
3. The data is sent to ground stations on Earth.

4. Scientists study the data to prepare weather forecasts and warnings.

Applications

1. Weather forecasting: Helps predict rain, temperature and storms.
2. Cyclone tracking: Helps track the movement and strength of cyclones.
3. Rainfall monitoring: Provides information about rainfall and clouds.
4. Disaster warnings: Helps give early warnings about severe weather.
5. Agriculture: Helps farmers plan farming activities using weather information.
6. Climate study: Helps scientists study changes in Earth's climate.

Conclusion: Weather monitoring satellites are very useful for weather forecasting, cyclone tracking and disaster warnings. They help protect people and support agriculture and other activities.

PROJECT REPORT

Name of the project: Collect Information about the Working of Weather Monitoring Satellites and their Applications

Class : 8th

Subject : Physical Science

Name of the School:

Time Duration :

Material used : Internet, Newspapers and 8th class science book.

Project – 5

Title of the Project: Collect Information about the Role of Heat Energy in the Movement of Particles.

Aim of the project: To understand how heat energy affects the movement of particles in matter.

Hypothesis: When heat is supplied to a substance, its particles move faster. When heat is removed, the particles move slower.

Introduction: All matter is made up of tiny particles. These particles are always moving. Heat energy increases the movement of particles, while cooling decreases their movement.

Project:

Effect of Heat on Particles

1. **Solids:** Heating makes particles vibrate faster and move slightly apart.
2. **Liquids:** Heating makes particles move faster and spread apart.
3. **Gases:** Heating makes particles move very fast and spread farther apart.
4. **Melting:** Heat changes a solid into a liquid, such as ice changing into water.
5. **Evaporation:** Heat changes a liquid into a gas, such as water changing into water vapour.
6. **Boiling:** When a liquid gets enough heat, it changes into gas throughout the liquid.
7. **Diffusion:** Heat increases the movement of particles, so substances mix faster.
8. **Expansion:** Heating makes most substances expand because their particles move farther apart.

Daily Life Examples

1. **Ice melts** when heat is supplied.
2. **Water boils** when heated.
3. **Wet clothes dry** faster in sunlight.
4. **Food cooks** when heat is supplied.
5. **Perfume spreads** faster in warm air.
6. **Hot air rises** because its particles move faster and spread apart.
7. **Metal expands** when heated, so gaps are provided in railway tracks and bridges.

Conclusion: Heat energy increases the movement of particles. This movement causes changes such as melting, boiling, evaporation and diffusion. Thus, heat plays an important role in our daily life.

PROJECT REPORT

Name of the project: Collect Information about the Role of Heat Energy in the Movement of Particles.

Class : 8th

Subject : Physical Science

Name of the School:

Time Duration :

Material used : Internet, Newspapers and 8th class science book.

Project – 6

Title of the Project: **Collect Information about the Particulate Nature of Matter Around Us**.

Aim of the project: To understand that matter is made up of very small particles and observe their properties.

Hypothesis: All matter is made up of tiny particles that are always moving and have spaces between them.

Introduction: Everything around us, such as air, water, food and objects, is made up of matter. Matter consists of very small particles that cannot be seen with our eyes.

Project:

Properties of Particles of Matter

1. **Particles are very small:** A small amount of matter contains many particles.
2. **Particles have spaces:** There are spaces between particles.
3. **Particles are always moving:** Heating makes them move faster.
4. **Particles attract each other:** They have a force of attraction between them.

Daily Life Examples

1. **Sugar dissolves in water** because sugar particles enter the spaces between water particles.
2. **Perfume spreads** through a room because its particles move through the air.
3. **Salt dissolves in water** and spreads throughout the water.
4. **Ice melts on heating** because its particles gain heat and move faster.
5. **Smell of food spreads** through the air due to moving particles.

Conclusion: Matter is made up of tiny particles. These particles have spaces between them, are always moving and attract each other. These properties can be seen in many daily life activities.

PROJECT REPORT

Name of the project: Collect Information about the Particulate Nature of Matter Around Us**.**
Class : 8th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 8th class science book.

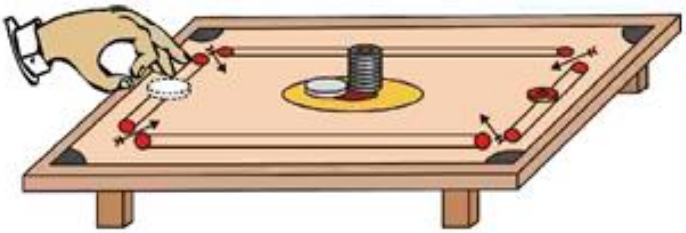
9th Class

Lab Activities

Lab Activity - 1

Aim: A body will remain at rest unless acted upon by an unbalanced force. (Inertia of rest)
Materials required: Carom board, Carom coins.
Procedure:

1. Make a pile of similar carom coins on a table, as shown in Figure.
2. Attempt a sharp horizontal hit at the bottom of the pile using another carom coin or the striker.
3. If the hit is strong enough, the bottom coin moves out quickly.
4. Once the lowest coin is removed, the inertia of the other coins makes them 'fall' vertically on the table.

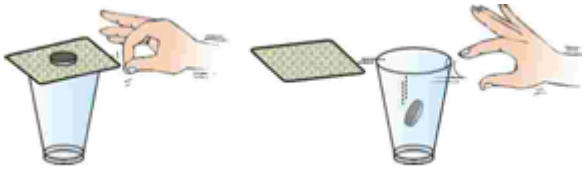


Conclusion: A body will remain at rest unless acted upon by an unbalanced force.

Lab Activity - 2

Aim: A body will remain at rest unless acted upon by an unbalanced force. (Inertia of rest)
Materials required: Five-rupee coin, Glass tumbler, Stiff card.
Procedure:

1. Set a five-rupee coin on a stiff card covering an empty glass tumbler standing on a table as shown in Figure.
2. Give the card a sharp horizontal flick with a finger.
3. If we do it fast then the card shoots away, allowing the coin to fall vertically into the glass tumbler due to its inertia.
4. The inertia of the coin tries to maintain its state of rest even when the card flows off



Conclusion: A body will remain at rest unless acted upon by an unbalanced force.

Lab Activity - 3

Aim: To prove that the Newton's third law of motion.
Materials required: Two Stands, Two children's, Sand bag.
Procedure:

1. Request two children to stand on two separate carts as shown in Figure.
2. Give them a bag full of sand or some other heavy object.
3. Ask them to play a game of catch with the bag.

Conclusion:

1. As result of throwing and catching the sand bag, each child receives a reaction.
2. The acceleration of two carts will be nearly equal because of almost equal masses of the two carts.
3. When two children stand on one cart and one on another cart, the forces of reaction are still equal.
4. But the acceleration of the cart with two children will be smaller than the other.

Lab Activity - 4

Aim: Identification of homogeneous and heterogeneous mixtures.

Materials required: Beakers, Water, Spatula, Copper sulphate powder, Potassium permanganate/ Common salt

Procedure:

1. Let us divide the class into groups A, B, C and D.
2. Group A takes a beaker containing 50 mL of water and one spatula full of copper sulphate powder. Group B takes 50 mL of water and two spatula full of copper sulphate powder in a beaker.
3. Groups C and D can take different amounts of copper sulphate and potassium permanganate or common salt (sodium chloride) and mix the given components to form a mixture.
4. Report the observations on the uniformity in colour and texture.
5. Groups A and B have obtained a mixture which has a uniform composition throughout. Compare the colour of the solutions of the two groups. Though both the groups have obtained copper sulphate solution but the intensity of colour of the solutions is different. This shows that a homogeneous mixture can have a variable composition.
6. Groups C and D have obtained mixtures, which contain physically distinct parts and have non-uniform compositions. Such mixtures are called heterogeneous mixtures.

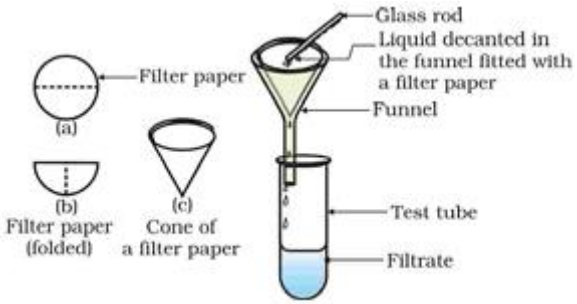
Conclusion: Identification of homogeneous and heterogeneous mixtures.

Lab Activity - 5

Aim: Preparation of solution, suspension and colloidal solution.

Materials required: Crystal of copper sulphate, Chalk powder/Wheat flour, Milk/Ink, Test tubes, Torch light, Filter paper, Funnel,

Procedure:



1. Let us again divide the class into four groups— A, B, C and D.
2. Distribute the following samples to each group:
   - Few crystals of copper sulphate to group A.
   - One spatula full of copper sulphate to group B.
   - Chalk powder or wheat flour to group C.
   - Few drops of milk or ink to group D.
3. Each group should add the given sample in water and stir properly using a glass rod.
4. Particles of mixture are visible only in case of group C.
5. Direct a beam of light from a torch through the beaker containing the mixture and observe from the front.
6. The path of beam of light was visible in the case of group C and D.

7. Leave the mixtures undisturbed for a few minutes (and set up the filtration apparatus in the meantime).
8. The Particles settle down after sometime in the case of group C.
9. Filter the mixture. Residue will be left in case of group C.
10. Groups A and B have got a solution. Group C has got a suspension. Group D has got a colloidal solution.

Conclusion: Identification and preparation of solution, suspension and colloidal solution.

Project – 1

Title of the Project: **Collect information on the applications of Newton's First Law of Motion in Various Fields.**

Aim of the Project: To study and explore the applications of Newton's First Law of Motion (Law of Inertia)

Hypothesis: Newton's First Law of Motion, which states that an object at rest stays at rest and an object in motion continues in motion with the same speed and direction unless acted upon by an external unbalanced force.

Introduction: Newton's First Law of Motion, also known as the Law of Inertia, is one of the foundational principles of physics.

Applications of Newton's First Law in Various Fields

1. Transportation:
- Seatbelts in Cars: When a car suddenly stops, passengers tend to move forward due to inertia. Seatbelts provide an external force to stop this motion, preventing injuries.
- Airbags: Airbags deploy during a sudden stop or collision to counteract the forward motion of passengers caused by inertia.

2. Space Exploration:
- Motion of Satellites: Satellites in orbit continue to move at a constant speed and direction unless acted upon by external forces like gravity or thrust.
- Spacecraft Propulsion: Spacecraft use thrust to change their motion, overcoming inertia to move in a desired direction.

3. Sports:
- Cricket: A batsman continues to run after hitting the ball due to inertia.
- Soccer: The ball keeps rolling on the ground until friction or an external force stops it.

4. Household Activities:
- Shaking a Ketchup Bottle: Shaking the bottle causes the ketchup to move downward due to inertia, allowing it to pour out.
- Dusting a Carpet: When a carpet is shaken, dust particles remain in their state of rest due to inertia, while the carpet moves.

5. Engineering and Technology:
- Flywheels: Flywheels store energy by maintaining rotational motion due to inertia.
- Elevators: Passengers feel a slight force when an elevator starts or stops, as their bodies resist changes in motion.

Conclusion: Newton's First Law of Motion (Law of Inertia) has widespread applications in various fields, including transportation, sports, space exploration, and everyday activities. It explains phenomena such as the movement of vehicles, the behavior of objects in sports, and the operation of machinery.

PROJECT REPORT

Name of the project : Collect information on the applications of Newton's First Law of Motion in various fields.

Class : 9th class

Subject : Physical Science

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

Project – 2

Title of the Project: **Collect information of Newton's third law of motion in everyday life.**
Aim of the Project: Applications of Newton's third law of motion in everyday life.
Hypothesis: To every action, there is an equal and opposite reaction and they act on two different bodies.
Introduction: Newton's Third Law of Motion, formulated by Sir Isaac Newton.
Applications of Newton's Third Law:

S.No	Item	Action	Reaction
1	Walking and Running	Foot pushes backward against the ground with friction force	Ground pushes forward on the foot (normal force)
2	Swimming	Hands and feet push water backward	Water pushes swimmer forward
3	Jumping	Leg muscles exert downward force on ground	Ground provides upward normal force
4	Automobile Motion	Tires push road backward via friction	Road pushes car forward
5	Rocket Propulsion	Rocket expels high-speed exhaust gases downward	Gases push rocket upward
6	Airplane Flight	Wings push air downward	Air provides lift upward
7	Archery	Bowstring pushes arrow forward	Arrow pushes back on bow (felt as recoil)
8	Sitting on Furniture	Body weight pushes down on chair	Chair pushes up with normal force
9	Hammering a Nail	Hammer head exerts force on nail	Nail exerts equal force on hammer
10	Balloon Rocket	Air escapes backward from balloon	Balloon propelled forward
11	Bird Flight	Wings push air downward	Air provides lift
12	Jet Engines	Expels high-velocity exhaust gases	Thrust propels aircraft forward
13	Hydraulic Systems	Fluid pushed through narrow opening	Creates pressure for mechanical work

Conclusion: Newton's third law of motion is fundamental to understanding interactions between objects and is applicable in various activities we encounter in our everyday lives, from simple movements to complex mechanical systems.

PROJECT REPORT

Name of the project : Collect information of Newton's third law of motion in everyday life.
Class : 9th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 9th Science textbook

Project – 3

Title of the Project: **Collect information of Tyndall effect, its examples and Affected factors.**
Aim of the Project: To study Tyndall effects, its examples and affected factors.
Hypothesis: The Tyndall Effect is a phenomenon in physics that refers to the scattering of light as it passes through a colloid or a fine suspension of particles.

Introduction: In 19th-century Irish scientist John Tyndall, who studied the scattering of light by small particles in gases and liquids, this effect helps explain several natural phenomena.

- Only occurs in **heterogeneous mixtures** (Example: colloids like milk, fog).
- Does **not** occur in **true solutions** (Example:saltwater) because particles are too small to scatter light.

Examples of the Tyndall Effect

1. Sunlight Through Fog or Mist
   Observation: Beams of sunlight become visible in foggy weather.
   Reason: Water droplets scatter sunlight, creating visible rays.
2. Headlights in Foggy or Dusty Air
   Observation: Car headlights appear brighter and more scattered in fog.
   Reason: Water droplets/dust particles reflect and scatter light.
3. Laser Pointer in Smoke or Chalk Dust
   Observation: A laser beam becomes visible when passed through smoke.
   Reason: Smoke particles scatter the laser light.
4. Milk in Water
   Observation: When milk is mixed in water, a light beam passing through it becomes visible.
   Reason: Fat and protein particles scatter light.
5. Blue Color of the Sky (Related Concept: Rayleigh Scattering)
   Observation: The sky appears blue due to sunlight scattering by air molecules.

Applications of the Tyndall Effect

1. Identifying Colloids: Helps distinguish colloids from true solutions by light scattering.
2. Particle Size: Helps determine the size and distribution of colloidal particles.
3. Medical Research: Used to study particles in blood plasma and other biological colloids.
4. Purity Testing: Detects colloidal impurities in liquids through light scattering.

Factors Affecting the Tyndall Effect

1. Wavelength of Incident Light
2. Size and Concentration of Particles
3. Nature of the Medium

Conclusion: The effect can be observed in everyday life, such as in fog, dusty air, or when shining a light through a colloidal solution.

PROJECT REPORT

Name of the project : Collect information of Tyndall effect, its examples and Affected factors.
Class : 9th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 9th Science textbook

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Project – 4

Title of the Project: **Collect information of "Solutions, Suspensions and Colloids: Understanding Mixtures in Everyday Life"**

Aim of the Project: To study and compare different types of mixtures (solutions, suspensions, and colloids) and identify their examples and applications in daily life.

Hypothesis: **Solutions** are homogeneous mixtures where particles are completely dissolved.
Suspensions are heterogeneous mixtures where particles settle over time.
Colloidal solutions are intermediate mixtures where particles remain dispersed.
Each type of mixture has unique properties and practical uses in daily life.

Introduction: Mixtures are combinations of two or more substances that are physically mixed but not chemically bonded. They can be classified into three main types based on particle size and behavior

1. Solutions (homogeneous, particles <1 nm)
2. Suspensions (heterogeneous, particles >1000 nm)
3. Colloidal solutions (intermediate, particles 1–1000 nm)

A. Solutions (Homogeneous Mixtures)

Definition: Uniform mixture where solute dissolves completely in solvent.
Examples in Daily Life: i) **Saltwater** (Salt + Water) – Cooking, medical saline.

ii) **Sugar in Tea** – Sweetened beverages.

Properties: Transparent, Particles invisible under microscope, Do not scatter light (Tyndall effect absent).

B. Suspensions (Heterogeneous Mixtures)

Definition: Particles are large, visible, and settle when undisturbed.

Examples in Daily Life: i) **Muddy Water** (Soil + Water) – Settles after standing.

ii) **Orange Juice with Pulp** – Particles sink to the bottom.

Properties: Opaque or cloudy, Particles can be filtered out, Show Tyndall effect when stirred.

C. Colloidal Solutions (Intermediate Mixtures)

Definition: Particles are small but remain dispersed without settling.

Examples in Daily Life: i) **Milk** (Fat droplets in water) – Nutrient-rich drink.

ii) **Fog** (Water droplets in air) – Weather phenomenon.

iii) **Blood** (Cells in plasma) – Biological fluid.

Properties: Particles scatter light (Tyndall effect present), Stable and do not settle. Cannot be filtered easily.

Property	Solution	Suspension	Colloid
Particle Size	<1 nm	>1000 nm	1–1000 nm
Appearance	Transparent	Cloudy/Opaque	Translucent
Tyndall Effect	No	Yes (if stirred)	Yes
Stability	Stable	Unstable (settles)	Stable
Filtration	Cannot be filtered	Can be filtered	Cannot be filtered

Conclusion: Solutions, suspensions, and colloids are integral to daily life, from cooking to healthcare. Their differences in particle size, stability, and light interaction determine their applications.

PROJECT REPORT

Name of the project : Collect information of "Solutions, Suspensions and Colloids: Understanding Mixtures in Everyday Life"

Class : 9th class

Subject : Physical Science

Name of the School :

Time Duration :

Material Used : Internet, Newspapers and 9th Science textbook

Project – 5

Title of the Project: Collect information of mass and Inertia in daily life applications.

Aim of the Project: To understand the relationship between mass and inertia and observe its applications in our daily life.

Hypothesis: Greater the mass of an object, greater is its inertia. Therefore, heavier objects are more difficult to start or stop than lighter objects.

Introduction: Inertia is the tendency of an object to resist any change in its state of rest or motion. Mass is a measure of inertia. An object with greater mass has greater inertia.

Project – Daily Life Applications:

S.No.	Daily Life Example	Role of Mass and Inertia
1	**Bus starting suddenly**	Passengers tend to move backward due to inertia of rest.
2	**Bus stopping suddenly**	Passengers move forward due to inertia of motion.
3	**Moving a loaded trolley**	A heavily loaded trolley is harder to move because it has greater inertia.
4	**Football and cricket ball**	A heavier ball requires more force to change its motion.
5	**Hammering a nail**	The mass of the hammer helps it overcome the resistance of the nail.
6	**Seat belts in cars**	Seat belts protect passengers when the vehicle stops suddenly.

Conclusion: Mass and inertia are closely related. **A heavier object has greater inertia and needs more force to change its state of motion.** We can observe this principle in many activities in our daily life.

PROJECT REPORT

Name of the project : Collect information of mass and Inertia in daily life applications.

Class : 9th class

Subject : Physical Science

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

Project – 6

Title of the Project: Collect Information on Solutions, Dilute Solutions and Concentrated Solutions and Their Applications in Daily Life

Aim of the Project: To understand solutions, dilute solutions and concentrated solutions and their uses in daily life.

Hypothesis: The amount of solute in a solution determines whether it is dilute or concentrated.

Introduction: A solution is a uniform mixture of a solute and a solvent. For example, sugar mixed with water forms a sugar solution.

- **Dilute Solution:** Contains a small amount of solute.
- **Concentrated Solution:** Contains a large amount of solute.

Project: Applications in Daily Life

Solutions

1. **Salt water:** Used in cooking and food preparation.
2. **Sugar solution:** Used in juices and drinks.
3. **ORS:** Used to replace water and salts lost from the body.
4. **Medicines:** Many medicines are prepared as solutions.

Dilute Solutions

1. **Diluted juice:** Water is added to make the drink less concentrated.
2. **Mild salt water:** Used for cleaning and gargling.
3. **Diluted cleaning liquids:** Used for household cleaning.
4. **Diluted fertilizers:** Used for supplying nutrients to plants.

Concentrated Solutions

1. **Sugar syrup:** Contains a large amount of sugar and is used in sweets.
2. **Salt solution:** Concentrated salt solutions are used in food preservation.
3. **Concentrated cleaning liquids:** Used for cleaning after proper dilution.
4. **Fruit syrups:** Concentrated fruit mixtures are diluted with water before drinking.

Conclusion: Solutions are useful in many daily activities. Dilute solutions contain less solute, while concentrated solutions contain more solute. The concentration of a solution can be changed by adding more solute or solvent.

PROJECT REPORT

Name of the project : Collect Information on Solutions, Dilute Solutions and Concentrated Solutions and Their Applications in Daily Life.
Class : 9th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 9th Science textbook

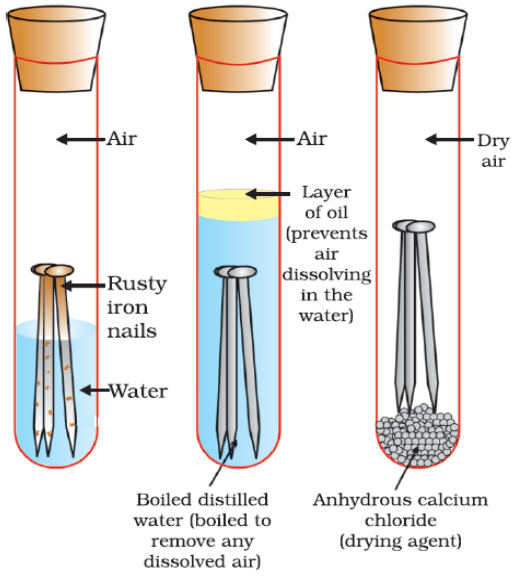
10th Class

Lab Activities

Lab Activity - 1

Aim: Investigate the conditions under which iron rusts.

Materials required: Test tubes, Iron nails, Water, Boiled distilled water, Anhydrous calcium chloride.



Procedure: i) Take three test tubes and place clean iron nails in each of them.

ii) Label these test tubes A, B and C. Pour some water in test tube A and cork it.

iii) Pour boiled distilled water in test tube B, add about 1 mL of oil and cork it. The oil will float on water and prevent the air from dissolving in the water.

iv) Put some anhydrous calcium chloride in test tube C and cork it. Anhydrous calcium chloride will absorb the moisture, if any, from the air. Leave these test tubes for a few days and then observe figure.

Conclusion:

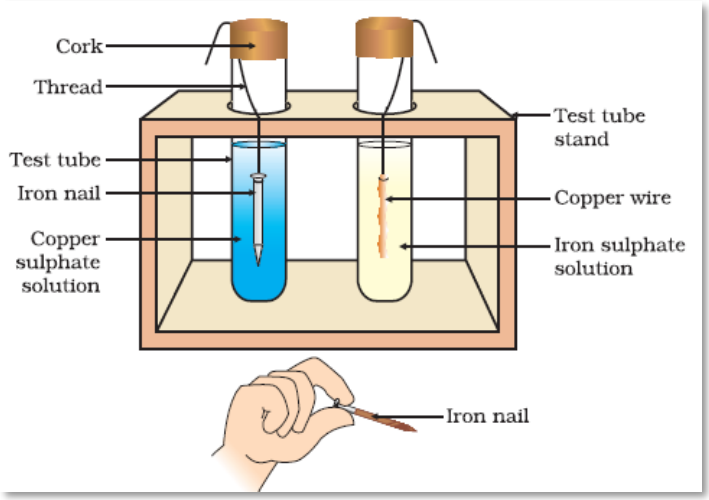
i) We observe that iron nails rust in test tube A, but they do not rust in test tubes B and C.

ii) In the test tube A, the nails are exposed to both air and water. In the test tube B, the nails are exposed to only water, and the nails in test tube C are exposed to dry air.

Lab Activity - 2

Aim: Observe the reactive metals can displace less reactive metals from their compounds in solution.

Materials required: Copper wire, Iron nail, Iron sulphate solution, Copper sulphate solution, Test tubes



Procedure:

i) Take a clean wire of copper and an iron nail.
ii) Put the copper wire in a solution of iron sulphate and the iron nail in a solution of copper sulphate taken in test tubes figure.
iii) Record your observations after 20 minutes.
iv) The reaction occurs in the test in which iron nail is placed in a solution of copper sulphate.
v) The blue colour of copper sulpahte solution starts fading.
vi) This is a displacement reaction.

Conclusion:

i) Reactive metals can displace less reactive metals from their compounds in solution.
ii) Iron metal displaces copper metal from its solution, iron is more reactive than copper.

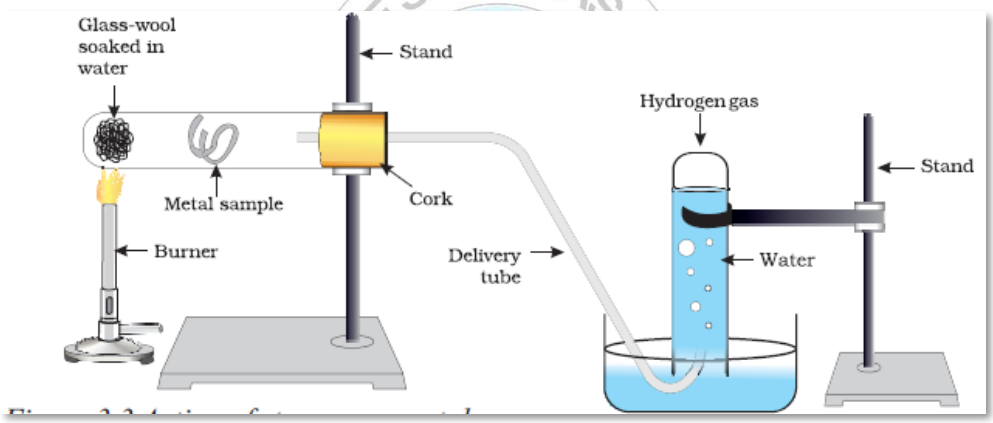
Lab Activity - 3

Aim: Observe the reactions of different metals with water.

Materials required: Different metals, Stands, Burner, Test tube, Delivery tube, Glass jar.

Procedure:

i) Collect the samples of some metals
ii) Put small pieces of the samples separately in beakers half-filled with cold water.
iii) The reactivity of metals with cold water increasing in order is Mg < Ca < Na < K
iv) Sodium and Potassium catch fire on water
v) Calcium starts floating after some time.
vi) Put the metals that did not react with cold water in beakers half - filled with hot water.
vii) Copper, Silver and Gold metals did not react even with steam.



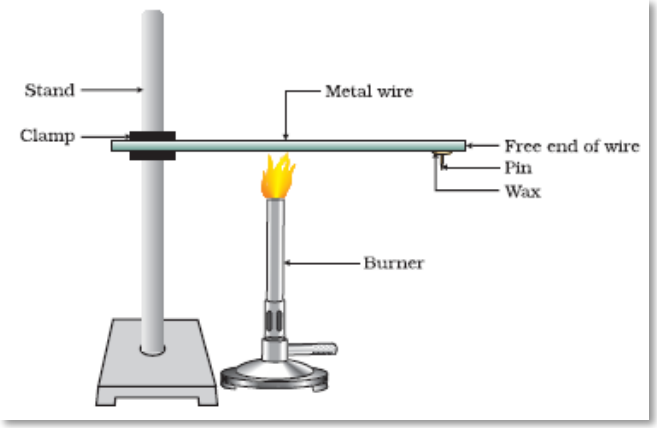
Conclusion: Lead, Copper, Silver and Gold metals do not react with water at all.

Lab Activity - 4

Aim: To show that metals are good conductors of heat.

Materials required: Copper/Aluminium wire, Stand, Clamp, Burner

Procedure:



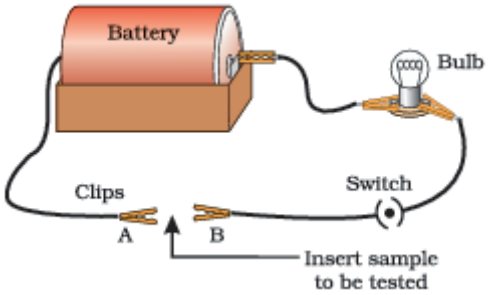
i) Take an aluminium or copper wire.
ii) Clamp this wire on a stand, as shown in Fig.
iii) Fix a pin to the free end of the wire using wax.
iv) Heat the wire with a spirit lamp, candle or a burner near the place where it is clamped.

Conclusion:

i) When aluminium or copper wire is heated at one end, heat reaches the other end, melting the wax, and the pin gets detached.
ii) Metals are good conductors of heat.

Lab Activity - 5

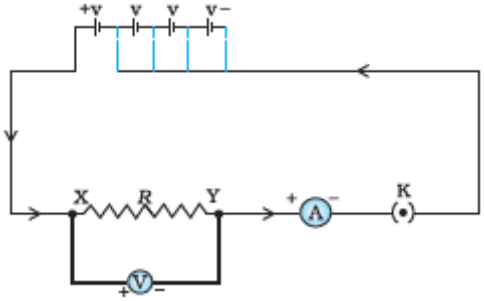
Aim: To show that metals are good conductors of electricity.
Materials required: Battery, bulb, connecting wires, switch, clips and metal sample.
Procedure: i) Set up an electric circuit using a battery, bulb, switch and connecting wires as shown in the figure.
ii) Place the metal sample between clips A and B.
iii) Close the switch and observe the bulb.
iv) Repeat the activity with different metal samples.



Observation: The bulb glows when a metal sample is placed between A and B. Metals are good conductors of electricity.

Lab Activity - 6

Aim: To verify the Ohm's law and V/I is constant for metals.
Materials required: Nichrome wire, Ammeter, Voltmeter, Cells, Key
Procedure:



1. Set up a circuit as shown in Figure, consisting of a nichrome wire XY of length, say 0.5 m, an ammeter, a voltmeter and four cells of 1.5 V each.
2. First use only one cell as the source in the circuit. Note the reading in the ammeter I, for the current and reading of the voltmeter V for the potential difference across the nichrome wire XY in the circuit. Tabulate them in the Table given.
3. Next connect two cells in the circuit and note the respective readings of the ammeter and voltmeter for the values of current through the nichrome wire and potential difference across the nichrome wire.
4. Repeat the above steps using three cells and then four cells in the circuit separately.
5. Calculate the ratio of V to I for each pair of potential difference V and current I.

S.No	No.of Cells used in the circuit	Current through the nichrome wire (ampere)	Potential difference across the nichrome (volt)	V/I (volt/ampere)
1	1	1	1.5	1.5

2	2	2	3	1.5
3	3	3	4.5	1.5
4	4	4	6	1.5

Conclusion: 1. From the above table, the column of table V/I is constant in four cases.
2. Ohm's law is verified

Project – 1

Title of the Project: **Collect information of rainbow**

Aim of the Project: Formation rainbow and significance.

Hypothesis: A rainbow is formed when sunlight passes through water droplets and undergoes refraction, reflection and dispersion**.**

Introduction: A rainbow is a beautiful natural optical phenomenon. It is usually seen after rain when sunlight interacts with water droplets.

Formation:

1. **Refraction:** Light bends when it enters a water droplet.
2. **Reflection:** Light reflects inside the droplet.
3. **Dispersion:** White light separates into seven colours.

Colours: VIBGYOR – Violet, Indigo, Blue, Green, Yellow, Orange and Red.

Types of Rainbows

1. **Primary Rainbow:** The most common and brightest rainbow, formed when light is refracted and reflected once inside the droplet. In a primary rainbow, red is on the outer edge and violet on the inner edge.
2. **Secondary Rainbow:** Sometimes, a second, fainter rainbow appears outside the primary one. This is formed by two internal reflections inside the droplet, reversing the color order (red on the inside, violet on the outside).
3. **Supernumerary Rainbow:** Faint, extra rainbow arcs can occasionally be seen inside the primary rainbow. These are caused by interference patterns of light waves, usually due to smaller water droplets.
4. **Full Circle Rainbow:** A complete circular rainbow that may be seen from high places such as an aeroplane.

Conditions for Seeing a Rainbow

- Sunlight must be present.
- Water droplets must be present in the air.
- The observer should have the Sun behind them.

Conclusion: Rainbows are a striking example of natural beauty and a reminder of the complexity of light and optics. Their vibrant colors and arc-shaped appearance have made them symbols of hope, beauty, and wonder throughout human history.

PROJECT REPORT

Name of the project: Collect information of rainbow
Class : 10th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 10^{th} class physical science book.

Project – 2

Title of the Project: **Collect information on Atmospheric refraction.**

Aim of the Project: Atmospheric refraction and factors

Hypothesis: Atmospheric refraction refers to the bending of light (or any electromagnetic wave) as it passes through the Earth's atmosphere. This bending occurs because light travels at different speeds through different layers of the atmosphere, which vary in temperature and density.

Introduction:

1. Basic Principle
   - **Light Bending:** Light bends when it passes through layers of air with different densities.
   - **Refractive Index:** The bending depends on air density, temperature, pressure and humidity. Cooler, denser air has a higher refractive index.
2. Effects of Atmospheric Refraction
   - **Astronomical Refraction:** Stars appear slightly higher than their actual position.
   - **Twilight Extension:** The Sun is visible slightly before sunrise and after sunset.
   - **Mirages:** Bending of light can produce false or distorted images.
   - **Terrestrial Refraction:** Distant objects may appear displaced from their actual position.
3. Types of Refraction
   - **Standard Refraction:** Normal bending of light through different air layers.
   - **Super-refraction:** Light bends more than usual, increasing the visibility of distant objects.
   - **Sub-refraction:** Light bends less than usual.
   - **Ducting:** In extreme conditions, light or radio waves can travel unusually long distances by following the Earth's curvature.

Factors Influencing Atmospheric Refraction

- Temperature: Warmer air has a lower refractive index, while cooler air has a higher refractive index, leading to variations in the bending of light.
- Pressure: Higher pressure increases air density, which in turn increases the refractive index.
- Humidity: Water vapor in the air also affects the refractive index. Humid air has a slightly lower refractive index than dry air, though this effect is generally small.

Conclusion: Atmospheric refraction is a crucial aspect of both everyday optical experiences and specialized fields like astronomy and meteorology, significantly affecting how we perceive light from the environment and space.

PROJECT REPORT

Name of the project: Collect information on Atmospheric refraction.
Class : 10th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 10thclass physical science book.

Project – 3

Title of the Project: Collect information of advantages and disadvantages of Series and Parallel Connections of Household Appliances

Aim of the Project: Advantages and Disadvantages of Series and Parallel Connections of Household Appliances

Hypothesis: This project explores the benefits and limitations of both configurations in the context of household appliances.

Introduction: Electric circuits play a crucial role in powering household appliances. These circuits can be connected in two fundamental ways: **series connection** and **parallel connection**.

Series Connection

In a **series connection**, appliances are connected one after another in a single path. The same current flows through all the appliances.

Advantages

1. **Simple:** Easy to make.
2. **Low Cost:** Needs less wire.
3. **Useful:** Used in some simple circuits and decorative lights.

Disadvantages

1. If one appliance stops working, **all appliances stop**.

2. Appliances may not get enough voltage.
3. Adding or removing one appliance affects the whole circuit.

Parallel Connection

In a **parallel connection**, each appliance has its own path for current. Each appliance gets the full voltage from the supply.

Advantages

1. **Independent:** If one appliance fails, others continue to work.
2. **Full Voltage:** Each appliance gets the required voltage.
3. **Easy to Add:** More appliances can be connected easily.
4. **Used in Homes:** Household appliances are connected in parallel.

Disadvantages

1. Needs **more wires**.
2. Uses more electricity when more appliances are used.
3. Too many appliances may cause **overloading**.
4. It can be more difficult to repair.

Conclusion: Both series and parallel connections have their unique advantages and disadvantages. For most household applications in **parallel connections** and **series connections** can be suitable for specific low-power or decorative uses.

PROJECT REPORT

Name of the project: Collect information of advantages and disadvantages of Series and Parallel Connections of Household Appliances

Class : 10th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 10th class physical science book.

Project – 4

Title of the Project: **Collect information of the common eye defects and their corrections.**

Aim of the Project: To study common eye defects and their corrections.

Hypothesis: Sometimes, the eye may gradually lose its power of accommodation. In such conditions, the person cannot see the objects distinctly and comfortably.

Introduction: There are mainly three common refractive defects of vision. These are (i) myopia or near sightedness, (ii) Hypermetropia or far sightedness, and (iii) Presbyopia.

Myopia

Definition: Myopia is also known as near sightedness. A person with myopia can see nearby objects clearly but cannot see distant objects distinctly.

Explanation: A person with this defect has the far point nearer than infinity. Such a person may see clearly upto a distance of a few metres.

Causes: Excessive curvature of the eye lens, Elongation of the eyeball.

Correction: It is corrected using a concave lens of suitable power.

Hypermetropia

Definition: Hypermetropia is also known as far sightedness. A person with hypermetropia can see distant objects clearly but cannot see nearby objects distinctly.

Explanation: The near point, for the person, is farther away from the normal near point (25 cm). Such a person has to keep a reading material much beyond 25 cm from the eye for comfortable reading.

Cause: The focal length of the eye lens is too long, or the eyeball has become too small.

Correction: It is corrected using a convex lens of suitable power.

Presbyopia

Definition: The power of accommodation of the eye usually decreases with ageing. For most people, the near point gradually recedes away. They find it difficult to see nearby objects comfortably and distinctly without corrective eye-glasses. This defect is called Presbyopia.

Cause: The gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens.

Correction: It is corrected using bi-focal lenses of suitable power.

Eye Defect	Cause	Image Formation	Correction
Myopia	Eyeball too long or lens too curved	In front of retina	Concave lens
Hypermetropia	Eyeball too short or lens too flat	Behind retina	Convex lens
Presbyopia	Loss of elasticity of lens, weak ciliary muscles	Cannot focus near/far well	Bifocal lenses
Cataract	Clouding of lens	Image blocked/scattered	Surgery with artificial lens

Conclusion: Eye defects are common but most can be effectively corrected. Regular eye check-ups are essential for early detection. Modern technology offers various solutions from spectacles to laser surgery Maintaining eye health through proper nutrition and care can prevent some defects.

PROJECT REPORT

Name of the project: Collect information of the common eye defects and their corrections.
Class : 10th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 10th class physical science book.

Project – 5

Title of the Project: Collect information of the applications of metals and non-metals in daily life.

Aim of the Project: To study common metals and non-metals we use daily
- To understand their properties and applications
- To compare how metals and non-metals serve different purposes

Hypothesis: "Both metals and non-metals play vital but different roles in our daily lives, with metals being crucial for structures and conductivity while non-metals are essential for insulation and life processes."

Introduction: Our world is made up of metals and non-metals. They have different properties and are used in our homes, industries and environment. They are very important in our daily life.

A. Applications of Metals in Daily Life:

Metal	Applications	Why Used
Iron	Construction, vehicles, tools	Strong and durable
Aluminum	Foil, cans, aircraft	Lightweight and corrosion-resistant
Copper	Electrical wires, pipes	Excellent conductor
Gold/Silver	Jewelry, electronics	Non-reactive and conductive
Zinc	Galvanization, batteries	Prevents rusting

B. Applications of Non-Metals in Daily Life:

Non-Metal	Applications	Why Used
Oxygen	Breathing, combustion	Supports life and burning
Carbon	Pencils, fuels, plastics	Forms many compounds
Nitrogen	Fertilizers, food packaging	Inert and abundant
Sulfur	Matches, medicines, vulcanization	Reactive and useful
Chlorine	Water purification, PVC	Strong disinfectant

C. Innovative Uses: Smartphone metals (rare earth elements), Graphene (carbon form) in future tech, Titanium in medical implants, Silicon in computer chips

Conclusion: Metals and non-metals form the foundation of our material world. While metals dominate in construction and technology, non-metals are equally vital for life processes and modern applications.

PROJECT REPORT

Name of the project: Collect information of the applications of metals and non-metals in daily life.
Class : 10th
Subject : Physical Science

Name of the School:
Time Duration :
Material used : Internet, Newspapers and 10th class physical science book.

Project – 6

Title of the Project: Collect information about Methods of Saving Electricity at Home and School

Aim of the Project: To learn the importance of saving electricity and identify simple ways to reduce electricity consumption at home and school.

Hypothesis: If we use electricity carefully and avoid wastage, we can save electrical energy, reduce electricity bills, and protect the environment.

Introduction: Electricity is very important in our daily life. Electricity should not be wasted because saving energy helps to conserve natural resources and reduce pollution.

Project:

Methods of Saving Electricity at Home

1. **Switch off lights and fans** when they are not needed.
2. Use **LED bulbs** instead of ordinary bulbs.
3. Use **natural sunlight** during the daytime.
4. Switch off electrical appliances when not in use.
5. Do not leave **mobile chargers** plugged in unnecessarily.
6. Use **energy-efficient appliances**.
7. Keep refrigerators properly closed and avoid opening them frequently.
8. Use washing machines and other appliances with full loads.
9. Avoid unnecessary use of air conditioners.
10. Regularly check electrical appliances and wiring.

Methods of Saving Electricity at School

1. Switch off **lights and fans** after each class.
2. Use natural light and ventilation whenever possible.
3. Switch off computers, projectors and smart boards after use.
4. Use **LED lights** in classrooms and offices.
5. Avoid keeping electrical appliances in standby mode.
6. Check for damaged wires and electrical faults.
7. Put **"Save Electricity"** notices near switches.
8. Encourage students and teachers to use electricity carefully.
9. Use energy-efficient equipment in laboratories and offices.
10. Conduct **electricity-saving awareness programmes** in the school.

Benefits of Saving Electricity

1. Reduces electricity bills.
2. Conserves natural resources.
3. Reduces pollution and greenhouse gas emissions.
4. Helps prevent unnecessary energy wastage.
5. Protects the environment for future generations.

Conclusion: Saving electricity is everyone's responsibility. By switching off unused appliances, using LED lights and making proper use of natural light, we can save electricity at home and school. Small savings by everyone can make a big difference.

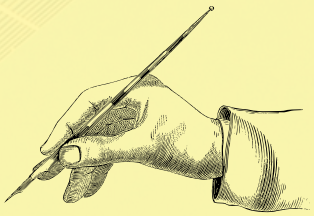
PROJECT REPORT

Name of the project: Collect information about Methods of Saving Electricity at Home and School.
Class : 10th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 10th class physical science book.

PHYSICAL SCIENCE

FORMATIVE ASSESSMENT - 2

(2026 - 2027)



Experiments/ Lab activities/ Activities and Projects

8th Class

9th Class

10th Class

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