Formative Assessment - III

(2023-2024)

PHYSICAL SCIENCE

VIII, IX, X Classes

Experiments/Lab activities & Projects

Special Edition

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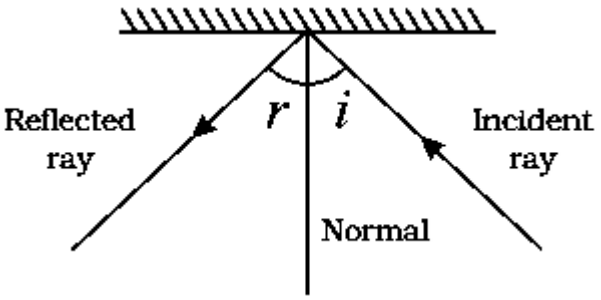
8th CLASS

Experiment -1

Aim: Prove that the laws of reflection of light.

Materials required: White sheet of paper, drawing board, Table, Comb, Torch light, Strip of plane mirror.

Procedure: i) Fix a white sheet of paper on a drawing board or a table.
ii) Take an except one in the middle. You can use a strip of black paper for this purpose.
iii) Hold the comb perpendicular to the sheet of paper.
iv) Throw light from a torch through the opening of the comb from one side.
v) With slight adjustment of the torch and the comb you will see a ray of light along the paper on the other side of the comb.
vi) Keep the comb and the torch steady. Place a strip of plane mirror in the path of the light ray.
vii) After striking the mirror, the ray of light is reflected in another direction.
viii) The light ray, which strikes any surface, is called the incident ray. The ray that comes back from the surface after reflection is known as the reflected ray.
ix) Draw lines showing the position of the plane mirror, the incident ray and the reflected ray on the paper with the help of your friends.
x) Remove the mirror and the comb.



xi) Draw a line making an angle of 90° to the line representing the mirror at the point where the incident ray strikes the mirror. This line is known as the normal to the reflecting surface at that point.
xii) The angle between the normal and incident ray is called the angle of incidence.
xiii) The angle between the normal and the reflected ray is known as the angle of reflection.
xiv) Measure the angle of incidence and the angle of reflection. Repeat the activity several times by changing the angle of incidence.
xv) Enter the data in Table.

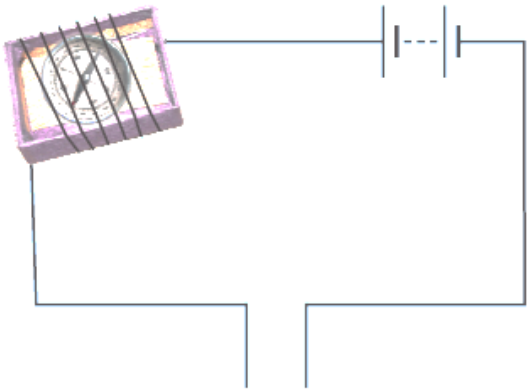
S.No	Angle of incidence(∟i)	Angle of reflection(∟r)
1	25^0	25^0
2	30^0	30^0
3	35^0	35^0
4	40^0	40^0
5	45^0	45^0

Conclusion: Angle of incidence is equal is angle of reflection in each case. i.e ∟i = ∟r

Experiment -2

Aim: To classify the liquids as good or poor conductors of electricity using magnetic compass.

Materials required: Compass needle, Battery, Match box, Electric wire, Lemon juice, Vinegar, Tap water, Vegetable oil, Milk, Honey etc.



Procedure:

1. Take the tray from inside a discarded matchbox. Wrap an electric wire a few times around the tray.
2. Place a small compass needle inside it.
3. Now connect one free end of the wire to the terminal of a battery. Leave the other end free.
4. Take another piece of wire and connect it to the other terminal of the battery.
5. Join the free ends of two wires momentarily.
6. The compass needle should show deflection. Now tester with two free ends of the wire is ready.
7. Take out the ends of the tester from the lemon juice, dip them in water and then wipe them dry.
8. Repeat the activity with other liquids such as tap water, vegetable oil, milk, honey.
9. In each case observe whether the magnetic needle shows deflection or not.
10. Record your observations in Table.

S.No	Liquid	Deflections in compass needle (Yes/No)	Good conductor/ Poor conductor
1	Lemon juice	Yes	Good conductor
2	Vinegar	Yes	Good conductor
3	Tap water	Yes	Good conductor
4	Vegetable oil	No	Poor conductor
5	Milk	Yes	Good conductor
6	Honey	No	Poor conductor

Conclusion: I find that some liquids are good conductors of electricity and some are poor conductors.

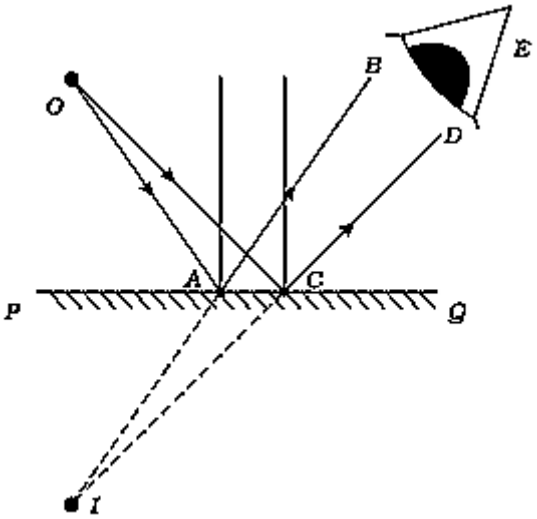
Experiment -3

Aim: To prove that plane mirror forms virtual image.

Materials required: Source of light, Plane mirror, Scale, Pencil

Procedure:

1. A source of light O is placed in front of a plane mirror PQ. Two rays OA and OC are incident on it.
2. Draw normals to the surface of the mirror PQ, at the points A and C.
3. Then draw the reflected rays at the points A and C.
4. Call the reflected rays AB and CD, respectively.
5. Extend them backwards.
6. If they meet, mark this point as I. For a viewer's eye at E, do the reflected rays appear to come from the point I.
7. Since the reflected rays do not actually meet at I, but only appear to do so, we say that a virtual image of the point O is formed at I.
8. This image cannot be obtained on a screen.



Conclusion: A plane mirror always forms a virtual image and cannot be obtained on a screen.

Project – 1

Title of the Project: Process and Applications of electroplating.

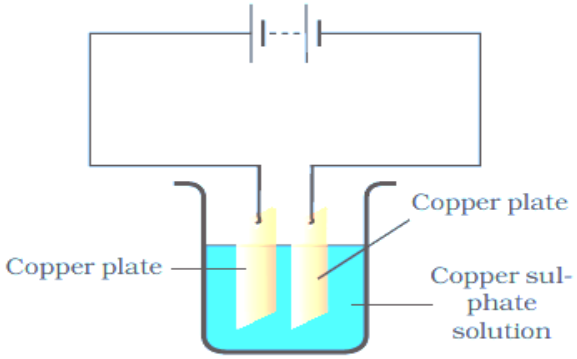
Aim of the project: To study the information of electroplating.

Hypothesis: Electroplating is a process that involves depositing a thin layer of one metal onto the surface of another metal or object using electricity. It's widely used in various industries for functional and decorative purposes.

Introduction:

Process of Electroplating:

1. **Preparation of the Object:** The object to be plated undergoes a thorough cleaning process to remove any dirt, grease, or other contaminants from its surface.
2. **Electrolyte Solution**: An electrolyte solution is prepared, typically containing salts of the metal to be deposited. For example, copper sulfate solution for copper plating or nickel sulfate for nickel plating.
3. **Setup of Electroplating Cell:** The object to be plated is connected to the negative terminal (cathode) of a direct current (DC) power supply. The metal that will be plated onto the object is connected to the positive terminal (anode). Both are immersed in the electrolyte solution.
4. **Electroplating Process:** When the electric current is applied, metal cations from the electrolyte solution are attracted to the object's surface (cathode). They gain electrons, get reduced, and form a thin, even layer on the object's surface.
5. **Controlled Deposition:** The duration and strength of the electric current control the thickness and quality of the deposited metal layer. The process ensures a uniform and adherent coating on the object's surface.
6. **Finishing and Polishing:** After plating, the object may undergo additional processes like polishing or surface treatments to enhance its appearance or functionality.



Applications of Electroplating:

1. Decorative Purposes: Often used in jewelry making, decorative items, and for enhancing the aesthetics of various products.
2. Corrosion Resistance: Provides a protective layer against corrosion on metals like iron and steel, extending the lifespan of products like automotive parts, plumbing fixtures, and machinery.
3. Improved Conductivity: Enhances electrical conductivity in components used in electronics and telecommunications.
4. Wear Resistance: Increases resistance to wear and tear on tools and machine parts, extending their durability.

Environmental Considerations:

1. Waste Management: Electroplating involves handling chemicals and metals that can be environmentally harmful. Proper disposal and treatment of waste are critical to prevent pollution.
2. Regulations: Many countries have strict regulations regarding the disposal of electroplating waste to minimize environmental impact.

Challenges:

1. Health Hazards: Exposure to certain plating chemicals and metals can pose health risks if not handled properly.
2. Costs: Electroplating can be costly due to the energy consumption, chemical usage, and waste management requirements.

Conclusion: Despite these challenges, electroplating remains a widely used process due to its versatility and ability to provide functional and aesthetic benefits to a wide range of products across industries.

PROJECT REPORT

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

Project – 2

Title of the Project: The collect information on the Braille system.

Aim of the project: Brief information on the Braille system.

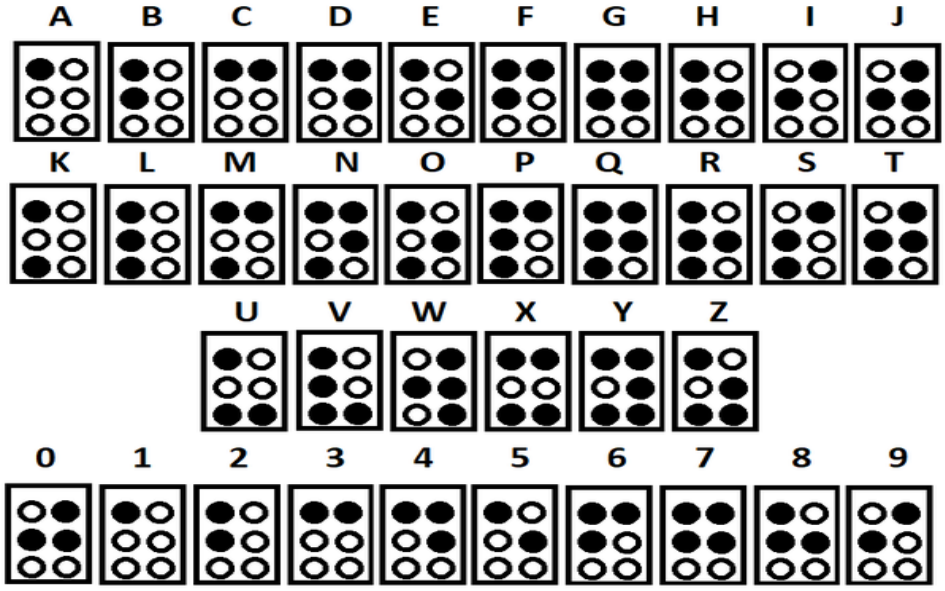
Hypothesis: The Braille system is a tactile writing and reading system primarily used by people who are blind or visually impaired. It was invented by Louis Braille in the early

19th century and has since become a crucial tool for enabling accessibility and literacy among the visually impaired.

Introduction:

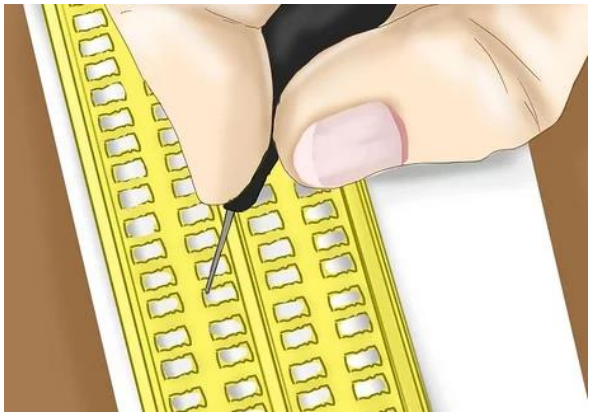
Components of Braille:

1. **Basic Unit:** Braille uses a system of raised dots arranged in cells. Each cell comprises a grid of six dots, arranged in two columns and three rows.
2. **Encoding:** Different combinations of raised dots within these cells represent different letters, numbers, punctuation marks, and even musical notation.
3. **Reading Direction:** Braille is typically read from left to right, with each cell representing a specific character or symbol.



Braille Writing:

1. **Writing Tool:** A stylus is used to create raised dots on a sheet of specialized heavy paper or plastic called Braille paper.
2. **Embossing:** When the stylus is pressed against the paper, it creates a series of raised dots that form the desired Braille characters.

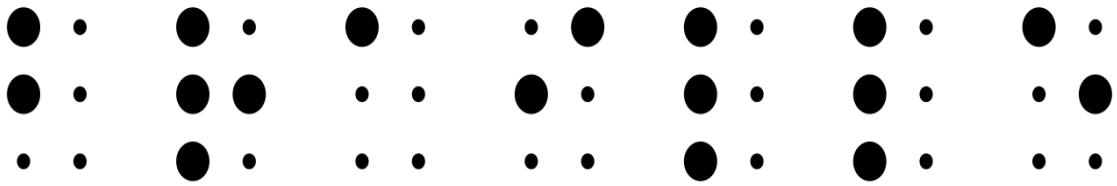


Usage and Importance:

1. **Literacy:** Braille is essential for enabling literacy among people with visual impairments, allowing them to read and write effectively.
2. **Education:** It's taught in schools for the blind as a fundamental skill, enabling students to access textbooks, write assignments, and communicate effectively.
3. **Accessibility:** Braille signage, labels, and instructions provide essential information for blind individuals in public spaces, on elevators, restroom signs, etc.

Variations:

1. **Grade 1 Braille:** Represents the basic alphabet and punctuation.
2. **Grade 2 Braille:** Includes contractions and short forms to make reading more efficient.



Challenges and Advancements:

1. **Learning Curve:** Learning Braille can take time and practice, similar to learning any written language.
2. **Technology Impact:** Advancements in technology have introduced digital tools and devices equipped with screen readers and refreshable Braille displays, enhancing accessibility for the visually impaired.

Conclusion: Braille remains an indispensable tool for enabling communication, education, and independence for individuals with visual impairments. It's a powerful system that continues to evolve alongside technological advancements to enhance accessibility and inclusion.

PROJECT REPORT

Name of the project: The collect information on the Braille system.
Class : 8th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 8thclass physical science book.

Project – 3:

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. Rearview 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 : 8th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 8th class textbook

9th CLASS

Experiment -1

Aim: To understand the meaning of buoyancy and buoyant force by doing an activity.

Materials required:

Procedure:

i) Take an empty plastic bottle.

ii) Take a plastic ball. Put it in a bucket filled with water. You see that the plastic ball floats.

iii) Push the plastic ball into the water. You feel an upward push. Try to push it further down.

iv) I will find it difficult to push deeper and deeper.

v) This indicates that water exerts a force on the plastic ball in the upward direction.

vi) The upward force exerted by the water goes on increasing as the plastic ball is pushed deeper till it is completely immersed.

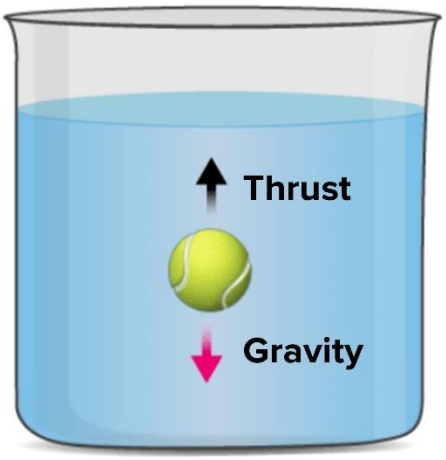
vii) Now, release the plastic ball. It bounces back to the surface.

viii) The force due to the gravitational attraction of the earth acts on the plastic ball in the downward direction. So the plastic ball is pulled downwards.

ix) But the water exerts an upward force on the bottle. Thus, the plastic ball is pushed upwards.

x) When the plastic ball is immersed, the upward force exerted by the water on the plastic ball is greater than its weight. Therefore, it rises up when released.

xi) The upward force exerted by the water on the plastic ball is known as upthrust or buoyant force.



Conclusion: All objects experience a force of buoyancy when they are immersed in a fluid.

Experiment -2

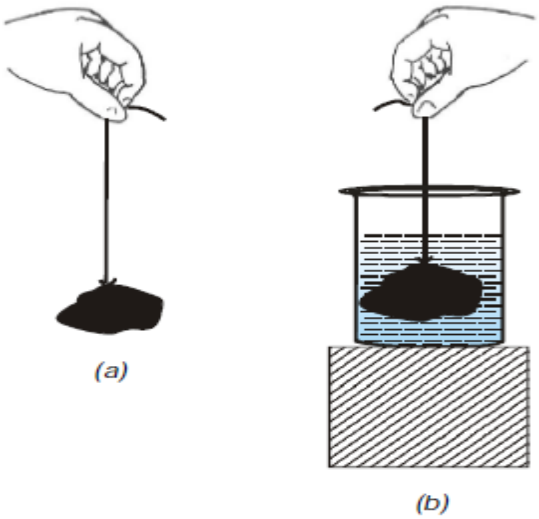
Aim: To prove that Archimedes principle experimentally.

Materials required: A piece of stone, A rubber string/A spring balance, Container, Water.

Procedure:

1) Take a piece of stone and tie it to one end of a rubber string or a spring balance.
2) Suspend the stone by holding the balance or the string as shown in Fig.
3) Note the elongation of the string or the reading on the spring balance due to the weight of the stone.
4) Now, slowly dip the stone in the water in a container as shown in Fig.
5) I will find that the elongation of the string or the reading of the balance decreases as the stone is gradually lowered in the water.

6) However, no further change is observed once the stone gets fully immersed in the water.
7) We know that the elongation produced in the string or the spring balance is due to the weight of the stone. Since the extension decreases once the stone is lowered in water.
8) The apparent loss of weight of the immersed stone is equal to the weight of water displaced by stone.
9) This is equal to the force of buoyancy exerted by the water.

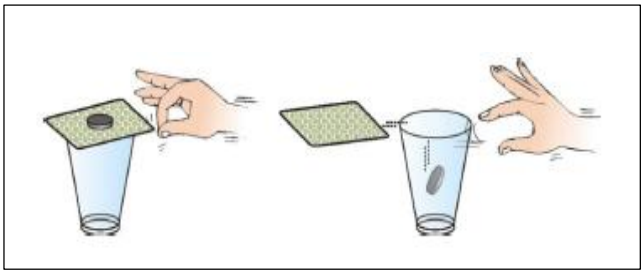


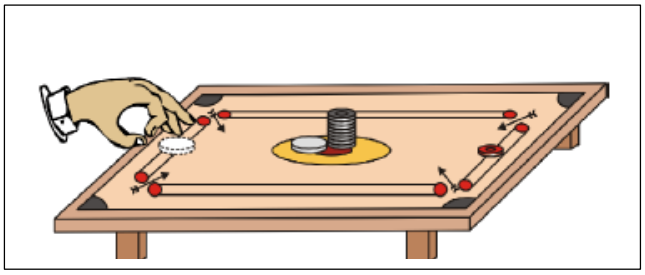
Conclusion: When a body is immersed fully or partially in a fluid, it experiences an upward force that is equal to the weight of the fluid displaced by it.

Experiment -3

Aim: Prove that inertia of rest experimentally in two situations.
Materials required: Glass tumbler, A five-rupee coin, Card board
Procedure:

1) Set a five-rupee coin on a stiff card covering an empty glass tumbler standing on a table as shown in Fig.
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.





Materials required:
Procedure:

1) Make a pile of similar carom coins on a table, as shown in Fig.
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: Inertia is the natural tendency of an object to resist a change in its state of motion or of rest.

Project – 1:

Title of the Project: Applications of Newton's third law of motion in everyday life.

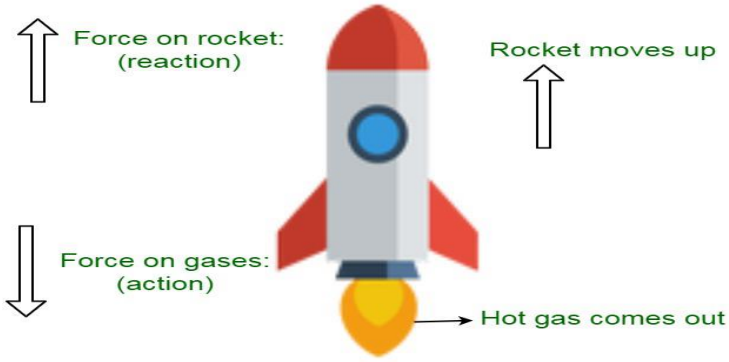
Aim of the Project: Applications of Newton's third law of motion in everyday life.

Hypothesis: To every action, there is an equal and opposite reaction and they act on two different bodies.

Introduction:

Applications of Newton's Third Law:

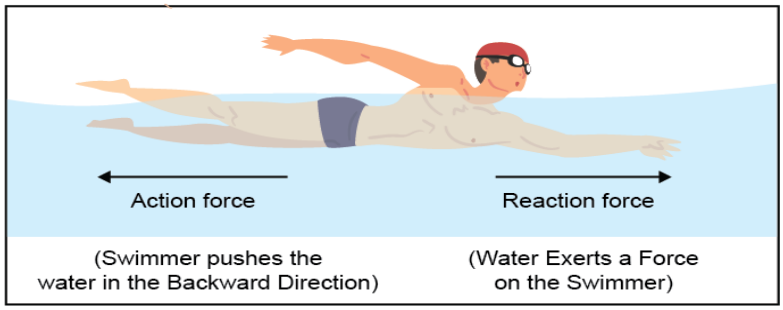
1. **Rocket Propulsion:** Rockets work based on this law. Exhaust gases are expelled downward, exerting a force (action) that propels the rocket upward (reaction).



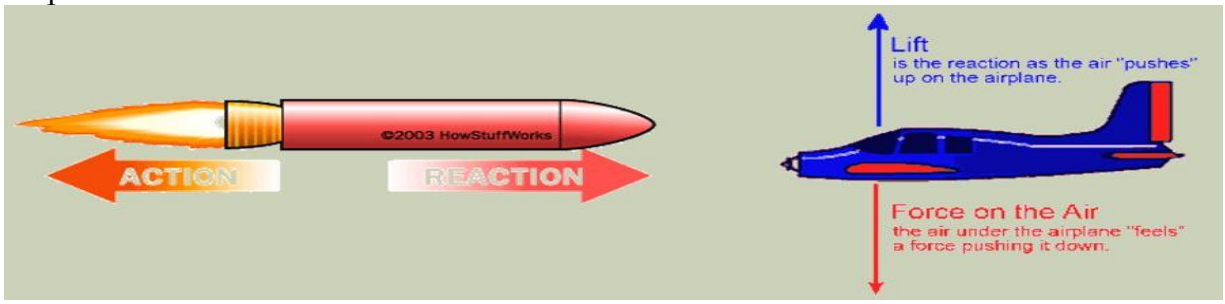
2. **Automobiles:** The movement of a car forward is the reaction to the action of the tires pushing backward against the road.

Action: tire pushes on road Reaction: road pushes on tire

3. **Swimming:** A swimmer pushes water backward (action), and the reaction propels the swimmer forward.

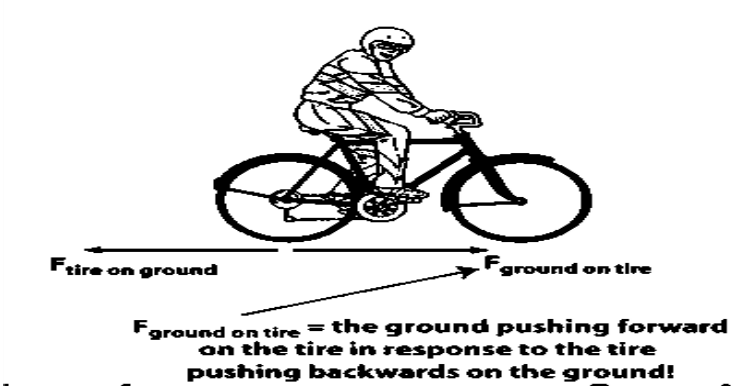


4. **Airplanes:** Thrust generated by engines pushes air backward, causing the airplane to move forward.

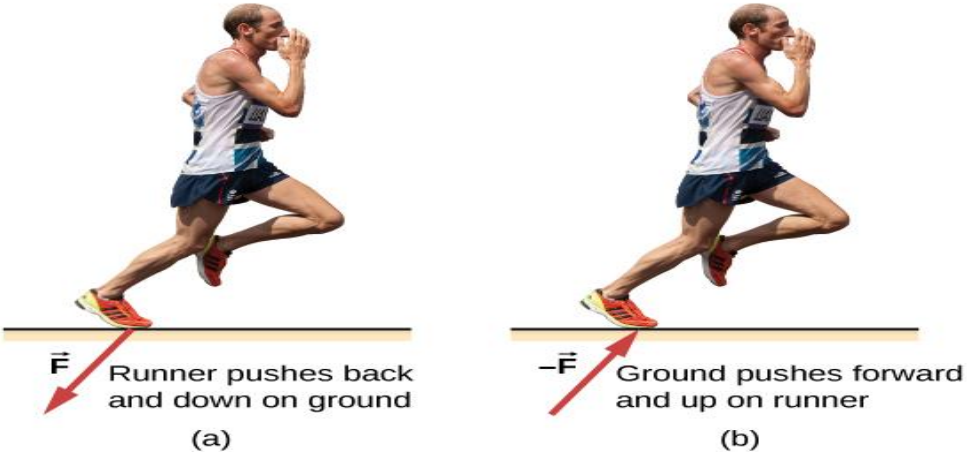


5. **Sports:** The kick of a soccer player against the ball (action) leads to the ball moving in the opposite direction (reaction).

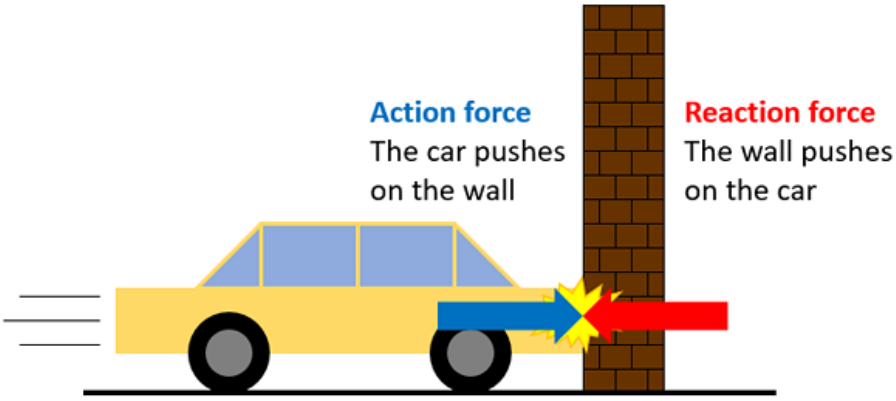
6. **Riding a bicycle:**



7. **Walking and Running:**



8. **Impact in sports or martial arts:** In martial arts, punches and kicks involve actions that generate reaction forces to deliver impact or movement.



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 : Applications 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 class textbook

Project – 2

Title of the Project: "A Universe Without Gravity: The Hypothetical Consequences and Implications"

Aim of the Project: Imagine a universe without Gravity

Hypothesis: Describe a universe where the force of gravity suddenly vanishes.

Introduction:

1. **Overview of Gravity:** Briefly explain the fundamental role of gravity in the universe, its effects on celestial bodies, orbits, and everyday life.
2. **Objective:** Explore and speculate on what the universe might be like if gravity ceased to exist.

Hypothetical Scenario:

1. **Absence of Gravity:** Describe a universe where the force of gravity suddenly vanishes.
2. **Effects on Celestial Bodies:** Discuss the potential consequences on planets, stars, galaxies, and other astronomical bodies. For instance, orbits might become erratic or disintegrate, celestial objects might disperse, etc.
3. **Impact on Planetary Systems:** Explain the fate of planets and their orbits in the absence of gravitational forces. Consider how they might move or drift without gravitational pulls.

Impact on Life and Everyday Scenarios:

1. **Life on Earth:** Speculate on the effects on life if gravity were absent. Discuss potential changes in our environment, structures, and biological systems.
2. **Space Exploration and Travel:** Analyze how space exploration and travel might change in a universe without gravity. Consider the implications for spacecraft, astronauts, and interstellar travel.

Consequences for Physics and Science:

1. **Laws of Physics:** Explore the implications for fundamental laws, such as Newton's laws of motion and their validity in a gravity-less universe.
2. **Fundamental Forces:** Discuss how the absence of gravity might impact other fundamental forces like electromagnetism or the strong and weak nuclear forces.

Speculation and Creativity:

1. **Alternative Scenarios:** Consider imaginative scenarios or possible outcomes in a gravity-free universe, exploring creative possibilities and implications beyond known physics.
2. **Artistic Representation:** Encourage creative interpretations, drawings, or visual representations of a universe without gravity.

Conclusion: Summarize the hypothetical scenario of a universe without gravity and its potential consequences. Emphasize the significance of gravity in the universe and its crucial role in shaping our existence.

PROJECT REPORT

Name of the project : "A Universe Without Gravity: The Hypothetical Consequences and Implications"
Class : 9th class
Subject : Physical Science
Name of the School :
Time Duration :
Material Used : Internet, Newspapers and 9th class textbook

Project – 3

Title of the Project: Significance of Buoyancy.

Aim of the Project: Significance of buoyancy.

Hypothesis: Buoyancy is a fundamental principle in fluid mechanics that describes the upward force exerted on an object submerged or floating in a fluid, such as water or air. Its significance spans various fields, influencing everything from engineering and physics to biology and everyday applications.

Introduction:

Physics and Engineering:

1. Archimedes' Principle: Buoyancy is explained by Archimedes' principle, stating that the buoyant force acting on an object immersed in a fluid is equal to the weight of the fluid displaced by the object. This principle is foundational in fluid dynamics and hydrostatics.
2. Ship Design: Understanding buoyancy is crucial in designing ships and boats. Properly utilizing buoyant forces allows vessels to float and maintain stability while carrying heavy loads.
3. Submarine Operations: Submarines use buoyancy control to rise and descend in water. Adjusting the submarine's density allows it to sink or float as needed.
4. Aircraft Design: Buoyant forces affect the lift and stability of aircraft. Understanding buoyancy helps engineers design planes and airships for optimal flight.

Construction and Architecture:

1. Buoyant Materials: Architects and engineers use buoyant materials in construction for floating platforms, floating houses, and floating bridges, especially in areas prone to flooding or with water-based infrastructures.
2. Buoyancy in Swimming Pools: Designers consider buoyancy in the construction and maintenance of swimming pools, ensuring structural integrity and safety.

Biology and Nature:

1. Buoyancy in Aquatic Life: Marine animals use buoyancy to control their depth in water. Some fish have swim bladders filled with gas to adjust buoyancy, while others use oils or fats.
2. Plant Adaptations: Some plants have adapted to utilize buoyancy in dispersing seeds. Seeds with buoyant structures can float, aiding in their dispersal through water.

Medical and Healthcare:

1. Buoyancy in Hydrotherapy: Buoyancy in water is utilized for hydrotherapy, as it reduces the weight on joints and muscles, facilitating rehabilitation and exercise for injured individuals.
2. Life Jackets and Flotation Devices: Life-saving devices like life jackets and buoys rely on buoyancy to keep individuals afloat in water, preventing drowning.

Everyday Applications:

1. Balloons and Airships: Understanding buoyancy is essential in designing and operating balloons and airships, where buoyant gases provide lift.
2. Hot Air Balloons: Buoyant forces generated by hot air in balloons allow them to float in the air.

Environmental Impact:

1. Buoyancy in Ocean Currents: Buoyant forces contribute to the movement of ocean currents, affecting climate patterns and nutrient distribution.
2. Buoyancy in Marine Ecosystems: Understanding buoyancy helps in studying the behavior and distribution of marine organisms and ecosystems.

Conclusion: Buoyancy's significance is pervasive across various scientific, technological, and practical domains, influencing engineering designs, natural phenomena, medical applications, and our understanding of fluid dynamics. Its principles play a crucial role in everyday life, shaping numerous aspects of our world.

PROJECT REPORT

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

10th CLASS

Experiment -1

Aim: To show that the ratio V/I is a constant for a conductor.

Materials required: 6V battery eliminator, 0 to 1A ammeter, 0-6V volt meter, copper wires, 50cm manganin coil, Rheostat, switch

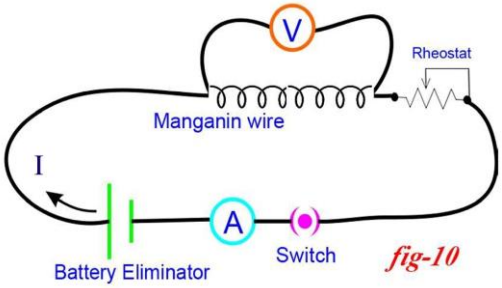


fig-10

Procedure: 1. Complete the circuit as shown in the figure.

2. By using Rheostat adjust the potential difference1V between two ends of manganin wire.
3. Now observe the electric current through ammeter in the circuit.
4. Using Rheostat change the potential difference with different values upto 4.5V and note down at least five values of V and I in the table.
5.

S.No	Potential	Current	V/I
1	1	0.2	5
2	1.5	0.3	5
3	2	0.4	5
4	2.5	0.5	5
5	3	0.6	5

We can conclude that the ratio of V/I is constant.

Conclusion: We can conclude that the ratio of V/I is constant for a conductor

Experiment -2

Aim: To prove that the presence of air and water are essential occurrences of corrosion.

Materials required: Three test tubes, three corks, Distilled water, anhydrous calcium chloride, clean iron nails and oil etc.

Procedure:

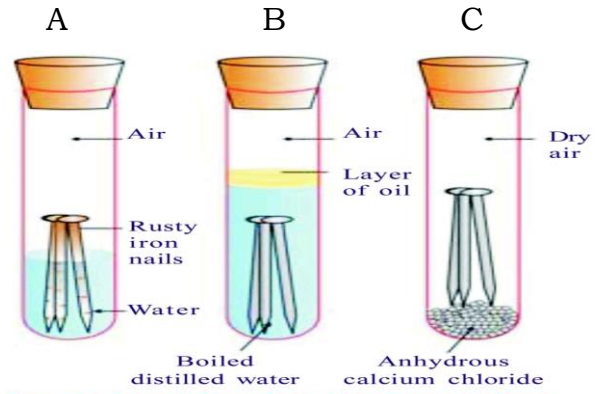


fig-5: Investigating the conditions under which iron rusts

1. Take 3 test tubes and place clean iron nails in each of them.
2. Label the test tubes A, B and C
3. Pour some water in test tube A and cork it.
4. Pour boiled distilled water in test tube B, and about 1ml of oil and cork it.

5. Put some anhydrous calcium chloride in test tube C and cork it.
6. Leave these test tubes for a few days and then observe.
7. After a few days, we will observe that iron nails rust in test tube A, but they do not rust in test tubes B and C.
8. In the test tube A. The nails are exposed to both air and water.
9. In the test tube B, the nails are exposed to only water, and the nails in test tube C are exposed to dry air.

.**Conclusion:** From the above experiment, we can prove that air and water are essential for corrosion.

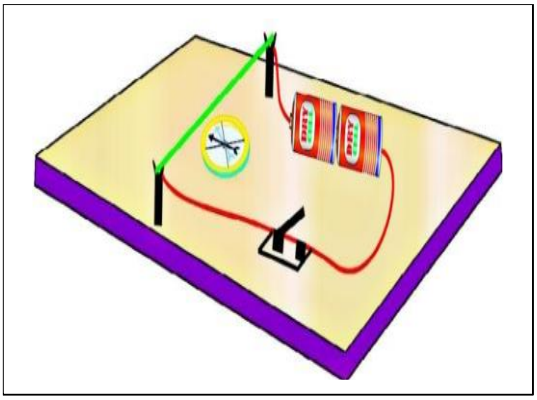
Experiment -3

Aim: To verify that current carrying wire produces magnetic field.

Materials required: Thermocol sheet, battery, key, wooden sticks, compass needle, bar magnetetc.

Procedure:

1. Take a thermocole sheet and fix two thin wooden sticks of height 1cm which have small slit at the topof their ends.
2. Arrange a copper wire of 24 gauge so that it passes through these slits and make a circuit.
3. The circuit consists of a 9 volt battery,key and copper wire which are connected in series as shown in figure.
4. Now, keep a magnetic compass below the wire.
5. Bring a bar magnet close to the compass. The needle get deflected by the bar magnet.
6. Take the bar magnet far away from the circuit and switch on the circuit.
7. The needle get deflected by the bar magnet in opposite direction.
8. This deflection is due to the magnetic field produced by the current carrying wire.



Conclusion: Hence we experimentally proved that current carrying wire produces a magnetic Field.

Project – 1

Title of the Project: Electric shock, its causes and preventions

Aim of the Project: Electric shock causes and preventions.

Hypothesis: Electric shock occurs when a human body comes into contact with an electrical current. It can range from mild to severe, potentially leading to injuries or even death depending on the voltage, duration of exposure, and path the current takes through the body.

Introduction:

a) Causes of Electric Shock:

Direct Contact: Contact with electrical sources such as outlets, appliances, power

lines, or faulty wiring.

Lightning Strikes: A direct strike or through contact with a person or object struck by lightning.

Arc Flash or Blast: High-intensity electrical arcs or blasts that can occur in industrial settings or when working on electrical systems.

b) Effects on the Body:

Mild Shock: Tingling, minor burns, muscle contractions, pain, or discomfort.

Severe Shock: Cardiac arrest, burns, internal organ damage, and neurological complications. It can also cause breathing difficulties and affect the heart's rhythm.

Current in ampere	Effect
0.001	Can be felt
0.005	Is painful
0.010	Causes involuntary muscle contractions (spasms)
0.015	Causes loss of muscle control
0.070	If through the heart, causes serious disruption ; probably fatal if current lasts for more than 1 s

c) Factors Influencing Severity:

Voltage: Higher voltages are more likely to cause severe injuries.

Pathway Through the Body: Current passing through vital organs like the heart or brain can be fatal.

Duration of Exposure: Longer exposure increases the risk of serious injury or death.

d) First Aid and Treatment:

Ensure Safety: Turn off the power source if safe to do so before touching the person.

Call for Help: Dial emergency services immediately.

Do Not Touch: Avoid touching the person until you are sure the power is off to prevent becoming a secondary victim.

CPR if Necessary: If the person isn't breathing or doesn't have a pulse, perform CPR if trained.

Medical Attention: Even for seemingly minor shocks, seek medical attention to check for internal injuries or delayed complications.

e) Prevention:

Electrical Safety Practices: Proper insulation, grounding, and installation of electrical systems.

Education and Training: Training individuals on electrical safety measures, especially in workplaces.

Safety Equipment: Using appropriate personal protective equipment (PPE) when working with electricity.

f) Complications:

Long-Term Effects: Chronic pain, neurological issues, cardiac problems, and psychological trauma.

Secondary Injuries: Falls or injuries resulting from involuntary muscle contractions during a shock.

g) Professional Help:

Electricians: Needed for fixing faulty electrical systems.

Medical Professionals: For assessing and treating injuries resulting from electric shock.

Conclusion: Electric shock is a serious hazard that requires immediate attention and proper handling to prevent further injury or complications. Maintaining awareness of

electrical safety measures and knowing how to respond in an emergency can greatly reduce the risk of injury or fatality.

PROJECT REPORT

Name of the project: Electric shock causes and preventions.
Class : 10th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 10thclass physical science book.

Project – 2

Title of the Project: Collect information on applications of Faraday's law of induction in various fields.

Aim of the Project: Applications of Faraday's law of induction in various fields.

Hypothesis: Faraday's law of electromagnetic induction, formulated by Michael Faraday in the 1830s, describes the generation of electromotive force (EMF) or voltage in a conductor when it experiences a change in magnetic field. This principle has numerous applications across various fields.

Introduction:

Power Generation:

1. **Electric Generators:** Faraday's law is the foundation of electrical power generation. Rotating coils within magnetic fields induce EMF, producing electricity in power plants and generators.
2. **Renewable Energy:** Generators in hydroelectric, wind, and tidal power systems utilize electromagnetic induction to convert mechanical energy into electrical energy.

Transformers:

1. **Voltage Transformation:** Transformers employ Faraday's law to change voltage levels in electrical circuits, facilitating efficient transmission and distribution of electricity.

Induction Heating:

1. **Metal Processing**: Induction heating uses Faraday's law to generate heat in metallic objects, crucial in metalworking, forging, and industrial processes like welding and heat treatment.

Wireless Charging:

1. **Inductive Charging:** Faraday's law is employed in wireless charging systems for devices like smartphones and electric vehicles, using electromagnetic induction to transfer power without physical connectors.

Sensors and Detectors:

1. **Eddy Current Testing:** Faraday's law is utilized in non-destructive testing methods like eddy current testing to detect flaws or inconsistencies in conductive materials.
2. **Magnetic Sensors:** Inductive sensors, like inductive proximity sensors, rely on changes in electromagnetic fields as per Faraday's law to detect the presence or absence of objects.

Medical Applications:

1. **Magnetic Resonance Imaging (MRI):** MRI machines in medical diagnostics use Faraday's law to generate detailed images of internal body structures by manipulating magnetic fields and detecting resulting signals.

Communication and Electronics:

1. **Electromagnetic Compatibility:** Understanding electromagnetic induction is crucial in designing electronic devices to prevent interference and ensure compatibility in communication systems.
2. **Wireless Communication:** Antennas and radiofrequency technology apply electromagnetic induction principles for signal transmission and reception in wireless communication.

Research and Science:

1. **Physics Experiments:** Faraday's law is fundamental in physics experiments involving electromagnetism, helping researchers study magnetic fields, electrical currents, and related phenomena.

Conclusion: Faraday's law of electromagnetic induction is foundational in numerous technologies and industries, enabling advancements in power generation, communications, medical diagnostics, materials testing, and various scientific endeavors. Its applications continue to evolve and expand across diverse fields, contributing significantly to modern technological developments.

PROJECT REPORT

Name of the project: Collect information on applications of Faraday's law of induction in various fields.
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: Construction and working of Reverberatory furnace.

Aim of the Project: **Collect the information on the construction and working of reverberatory furnace.**

Hypothesis: A reverberatory furnace is a type of furnace used for roasting.

Introduction:

Construction:

1. **Structure:** Reverberatory furnaces have a rectangular or cylindrical shape with a refractory-lined hearth (bottom) and walls.
2. **Fuel and Air Entry:** They typically have multiple ports for fuel and air entry, allowing for controlled combustion.
3. **Roof and Flue:** A sloped roof helps reflect heat downwards, and a flue or chimney allows gases and fumes to exit.

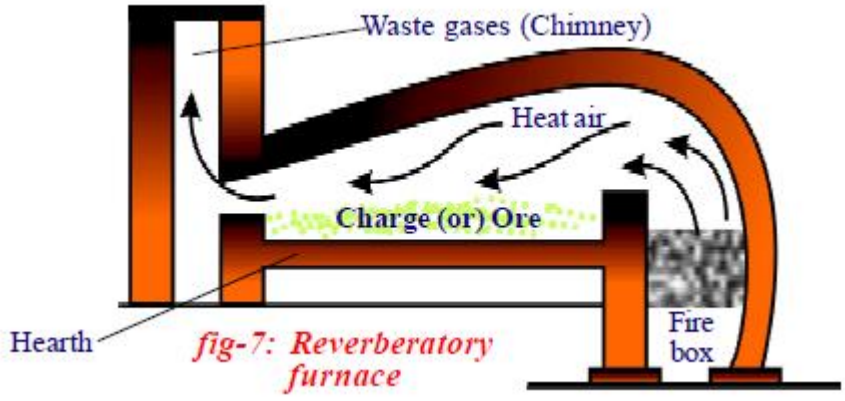


fig-7: Reverberatory furnace

Working Principle:

1. **Heat Source:** Combustion of fuel (coal, gas, oil, etc.) in the furnace generates heat.

2. **Reflected Heat:** The roof's design allows heat to reflect downward onto the materials being processed in the hearth.
3. **Heating Process:** Materials (such as ores, metals, or other substances) are placed on the hearth. Heat from the combustion chamber heats these materials indirectly through the reflected heat from the roof.
4. **Melting or Processing:** The high temperatures attained in the furnace allow for processes like smelting ores to extract metals, refining metals, or heating substances for various purposes.

Operation:

1. **Charging and Discharging:** Materials are loaded and unloaded manually or using machinery through openings in the furnace.
2. **Controlled Combustion:** Air and fuel flow rates are regulated to control temperature and ensure efficient combustion.
3. **Skimming and Tapping:** Depending on the process, impurities or slag may float on the molten metal surface and are periodically skimmed off. The molten metal is tapped and collected for further processing.

Applications:

1. **Metallurgical Processes:** Reverberatory furnaces are used for smelting and refining non-ferrous metals like copper, lead, and zinc.
2. **Glass Production:** They're employed in glassmaking for melting and refining glass compositions.

Advantages and Disadvantages:

1. **Advantages:** Versatility in processing various materials, relatively simple design, and ability to achieve high temperatures.
2. **Disadvantages:** Slower heating rates compared to other furnaces, potential inefficiency due to heat loss, and emissions of pollutants.

Conclusion: Reverberatory furnaces have been used historically and continue to be employed in specific industrial applications for their suitability in certain processes, despite advancements in other heating technologies.

PROJECT REPORT

Name of the project: Construction and working of Reverberatory furnace.
Class : 10th
Subject : Physical Science
Name of the School:
Time Duration :
Material used : Internet, Newspapers and 10thclass physical science book.

Formative Assessment - III

(2023-2024)

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