SCIENCE LAB MANUAL

Class-VIII

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Preface

The quality of practical work varies considerably but there is strong evidence, from this country and elsewhere, that: When well-planned and effectively implemented, science education laboratory and simulation experiences situate students' learning in varying levels of inquiry requiring students to be both mentally and physically engaged in ways that are not possible in other science education experiences. (Lunetta et al. 2007, p.405).

The importance and relevance of exercising practical work in science is widely accepted. The qualitative practical work not only promotes the engagement and interest of students but also enriches skills, experiences, knowledge and conceptual understanding of the students. In this book, we have focused on core activities, directly related activities and complementary activities.

Furthermore, to make optimum use of this practical book, Teacher should strive for making students

1. to find problems and their solutions;
2. to develop analytical and critical attitude;
3. to find new facts and arriving at new principles.

This book is designed for to provide practical knowledge as much as possible. Through the development of the project we had a great experience of various strategies that can be applied in the development of the project. This project will prove stepping stone for our carrier.

To provide proper and essential information has been guiding principle for us, As a teacher, we endeavored to achieve this important objective. We are pleased to present this project.

Salient features of this book are: --

1. A special care has been taken to present the subject matter in simple language so that student may understand it with ease.
2. Great efforts have been made to make the book free of mistakes.
3. Original diagrams are used to clarify the experiments.
4. Multiple choice question and viva voice questions have been given in experiments.

We are greatly thankful to Shri RAVI JI (SAH Sangathanmantri, Vidya bharti, Haryana) who inspired us to write this book.

AUTHORS

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INDIAN SCIENTIST

Science is an important part of our everyday life, even more so than we notice. From our fancy gadgets to the technologies we can't live without, from our humble light bulb to the space explorations, it is all gift of science and technology.

I wonder what would we be doing if none of these things were invented? How often do we take out the time to think about those extra ordinary minds who made life easier for us?

C. V. Raman

Chandrasekhara Venkata Raman won the Nobel Prize for Physics in 1930 for his pioneering work on scattering of light. Born in Tiruchirapalli on November 7, 1888, he was the first Asian and first non-White to receive any Nobel Prize in the sciences. Raman also worked on the acoustics of musical instruments. He was the first to investigate the harmonic nature of the sound of the Indian drums such as the tabla and the mridangam.

He discovered that, when light traverses a transparent material, some of the deflected light changes in wavelength. This phenomenon is now called the Raman scattering and is the result of the Raman effect.

In October 1970, he collapsed in his laboratory. He was moved to a hospital and the doctors gave him four hours to live. He survived and after a few days refused to stay in the hospital as he preferred to die in the gardens of his Institute (the Raman Research Institute in Bangalore) surrounded by his flowers. He died of natural causes on 21 November 1970.

Born on October 30, 1909 in Bombay, **Homi Jehangir Bhabha** played an important role in the Quantum Theory.


Homi Jahangir Bhabha

He was the first person to become the Chairman of the Atomic Energy Commission of India. Having started his scientific career in nuclear physics from Great Britain, Bhabha returned to India and played a key role in convincing the Congress Party's senior leaders, most notably Jawaharlal Nehru, to start the ambitious nuclear programme.

Bhabha is generally acknowledged as the father of Indian nuclear power. But few people know that he was absolutely against India manufacturing atomic bombs, even if the country had enough resources to do so. Instead he suggested that the production of an atomic reactor should be used to lessen India's misery and poverty.

He died when Air India Flight 101 crashed near Mont Blanc on 24 January 1966. Many possible theories of the crash came up including a conspiracy theory in which the Central Intelligence Agency (CIA) is involved in order to paralyze India's nuclear program.


Satyendra Nath Bose

Born on January 1, 1894 in Calcutta, **SN Bose** was an Indian physicist specialising in quantum mechanics. He is of course most remembered for his role played in the class of particles 'bosons', which were named after him by Paul Dirac to commemorate his work in the field.

Bose adapted a lecture at the University of Dhaka on the theory of radiation and the ultraviolet catastrophe into a short article called “Planck's Law and the Hypothesis of Light Quanta” and sent it to Albert Einstein. Einstein agreed with him, translated Bose's paper “Planck's Law and Hypothesis of Light Quanta” into German, and had it published in Zeitschrift für Physik under Bose's name, in

1924. This formed the basis of the Bose-Einstein Statistics. In 1937, Rabindranath Tagore dedicated his only book on science, Visva–Parichay, to

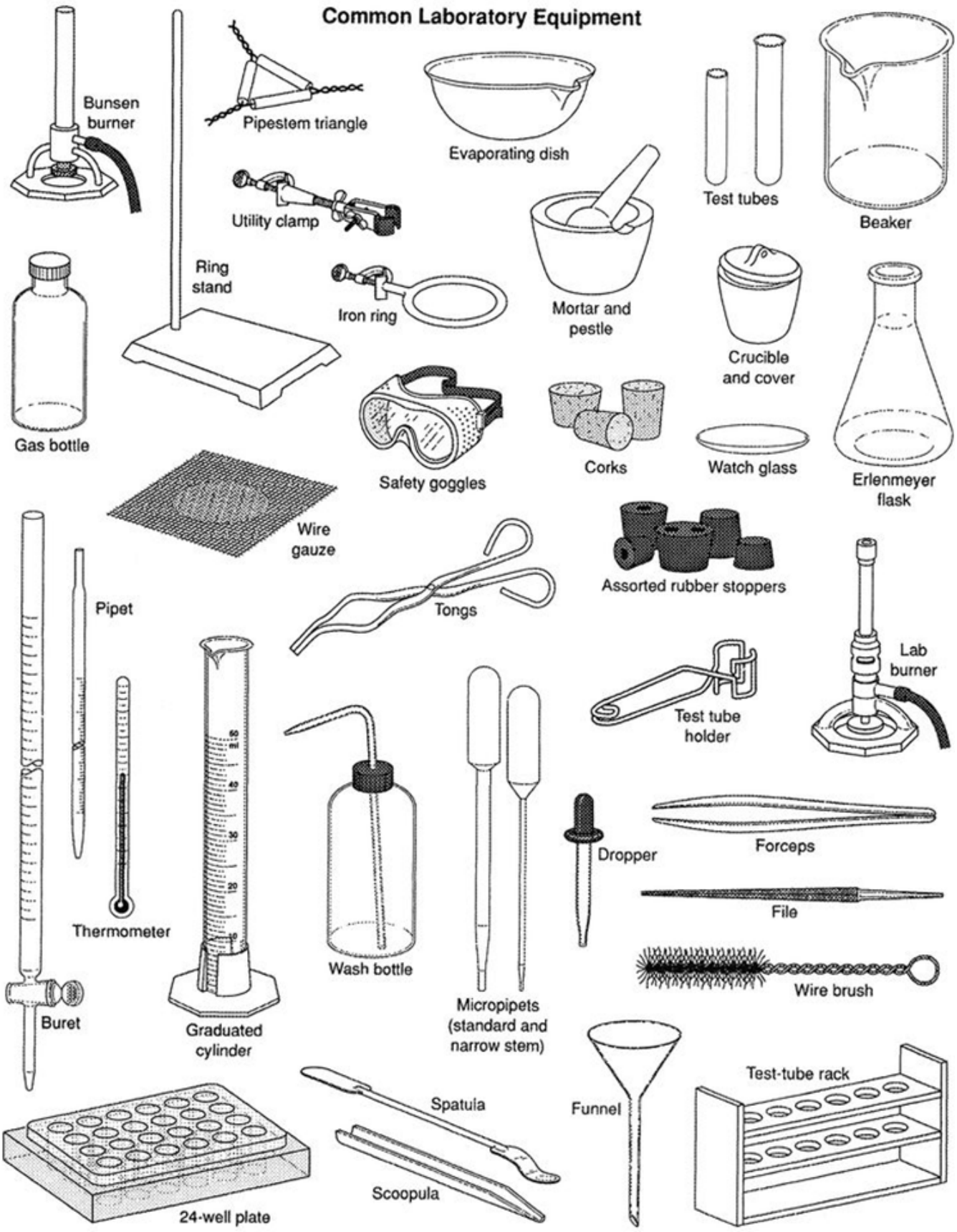
Satyendra Nath Bose. The Government of India awarded him India's second highest civilian award,


Jagdish Chandra Bose

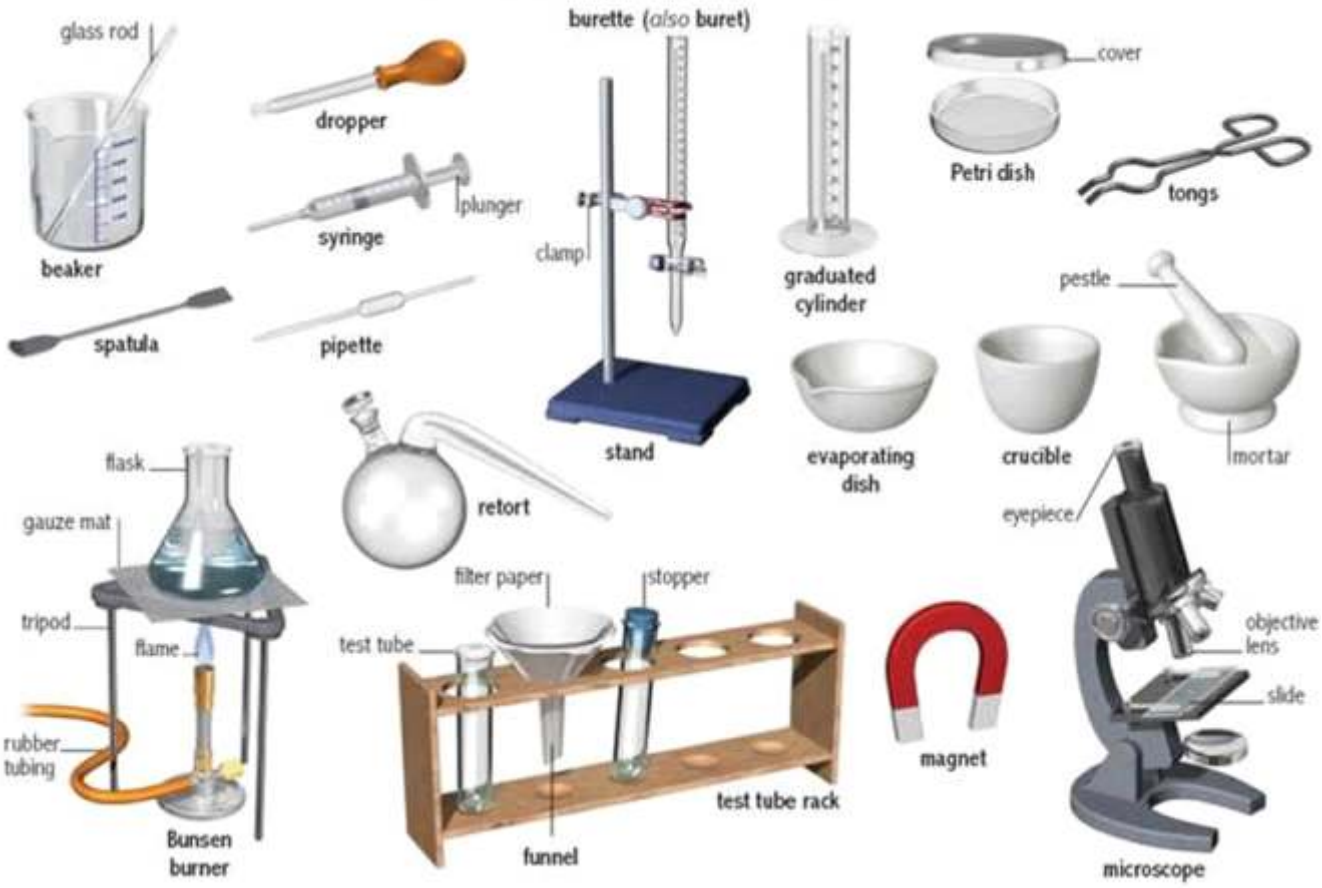
Acharya J.C. Bose was a man of many talents. Born on 30 November, 1858 in Bikrampur, West Bengal, he was a polymath, physicist, biologist, botanist and archaeologist. He pioneered the study of radio and microwave optics, made important contributions to the study of plants and laid the foundation of experimental science in the Indian sub-continent. He was the first person to use semiconductor junctions to detect radio signals, thus demonstrating wireless communication for the first time.
What's more, he is also probably the father of open technology, as he made his inventions and work freely available for others to further develop. His reluctance for patenting his work is legendary.

Another of his well known inventions is the crescograph, through which he measured plant response to various stimuli and hypothesized that plants can feel pain, understand affection etc. While most of us are aware of his scientific prowess, we might not be aware of his talent as an early writer of science fiction! He is in fact considered the father of Bengali science fiction.

Common Laboratory Equipment



laboratory equipment



Experiment 1

AIM

To study various zones of a candle flame.

MATERIALS REQUIRED

(i) Candle

(ii) Matchbox

(iii) Glass rod.

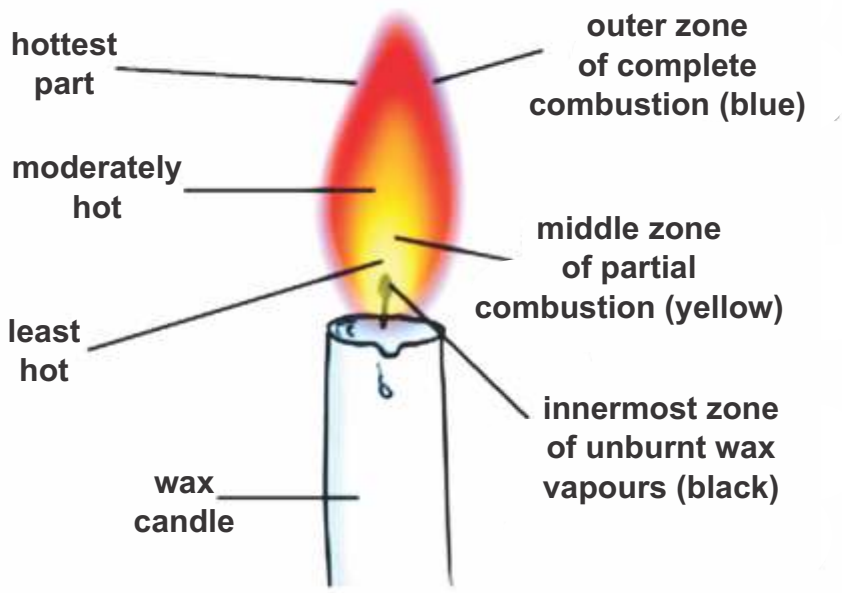
PROCEDURE

1. Take a candle and light it with the help of matchstick.
2. Observe the various zones of candle flame.

OBSERVATION

The flame is a region where the combustion of fuel takes place.

DIAGRAM



STRUCTURE OF A CANDLE FLAME

Figure: Zones of flame.

CONCLUSION

The candle flame can be divided into three zones or parts. It can be easily distinguished by their colours.

Experiment 2

AIM

To prove that like poles repel and unlike poles attract.

MATERIALS REQUIRED

(i) Two bar magnets

(ii) Thread

(iii) Stand

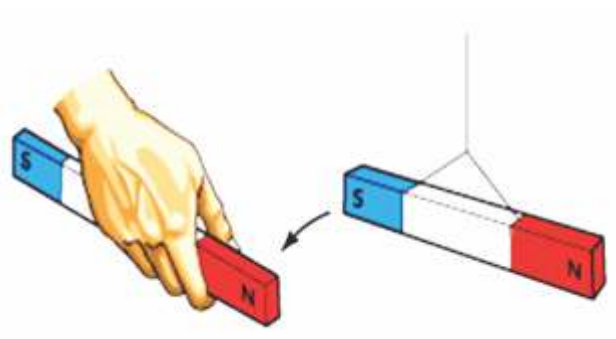
PROCEDURE

1. Suspend one bar magnet with a piece of thread.
2. The magnet will come to rest in north-south direction.
3. Now bring the north pole of the second magnet near the north pole of suspended magnet.
4. These two poles will repel each other.
5. Now bring south pole of magnet near north pole of suspended magnet

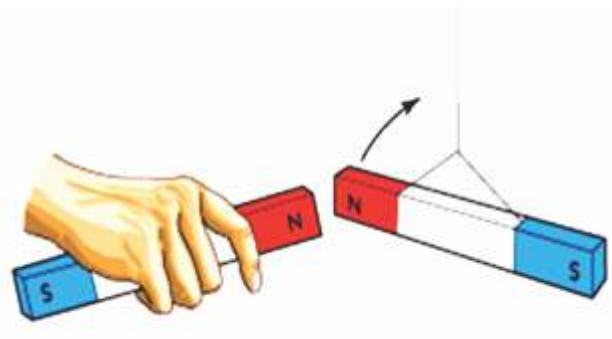
OBSERVATION

It is observed that north pole of magnet and south pole of magnet attract each other.

DIAGRAM



unlike poles attract



like poles repel

CONCLUSION

It confirms that like poles repel each other and unlike poles attract each other.

Experiment 3

AIM

To show the presence of moisture (water) in dry soil.

MATERIALS REQUIRED

(i) Dry soil

(ii) Beaker

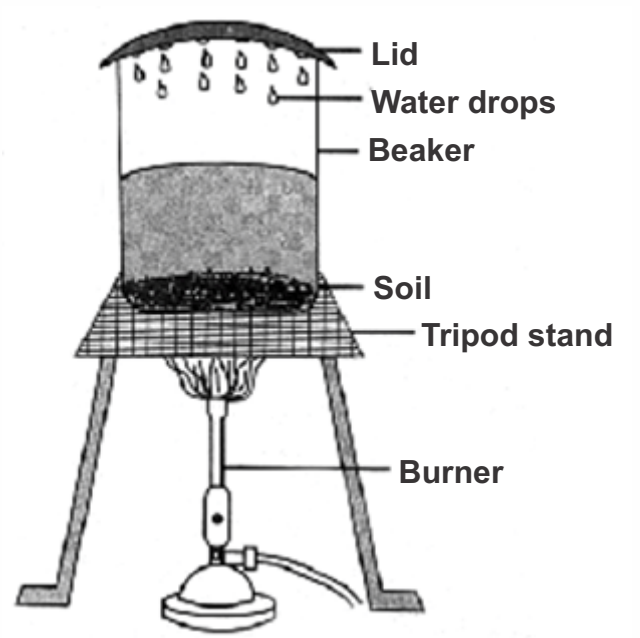
(iii) Burner

(iv) Lid.

PROCEDURE

1. Take a beaker.
2. Put some dry soil in it.
3. Heat the beaker on a flame.
4. Cover it with a lid.

DIAGRAM



OBSERVATION

Drops of water on the inner side of the lid can be seen.

CONCLUSION

The dry soil contains some water, as moisture.

Experiment 4

AIM

To study that air and water are required for rusting of iron.

MATERIALS REQUIRED

(i) Three test tubes, (ii) Iron nail, (iii) oil, (iv) Calcium chloride

PROCEDURE

1. Take three test tubes.
2. Mark these tubes as A, B and C, place iron nails in each of them.
3. Put boiled water in test tube A to remove any dissolved air. Add some oil and cork it.
4. Put some tap water in test tube B and cork it.
5. Put some anhydrous calcium chloride in test tube C and cork it. It absorbs the moisture from the air.
6. Leave these test tubes for a few days and observe it.

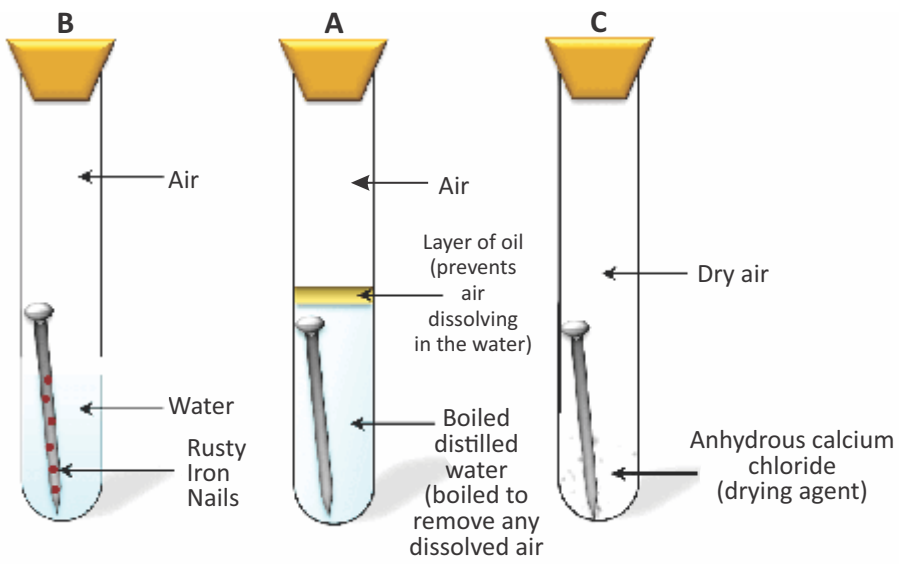
OBSERVATION

In test tube A iron nail does not rust.

In test tube B-iron nail rusts

In test tube C-iron nail does not rust.

DIAGRAM



CONCLUSION

This shows that both air and water are necessary for iron to rust.

Experiment 5

AIM

To study the magnetic effect of electric current.

MATERIALS REQUIRED

(i) Battery (ii) Copper wire (iii) Compass needle (iv) Table.

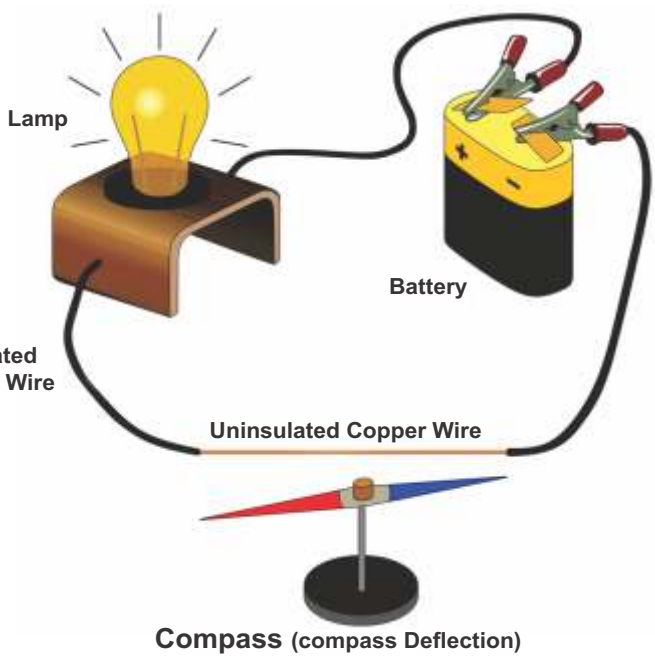
PROCEDURE

1. Fix a copper wire on the table.
2. Connect two ends of wire with a battery.
3. Place a compass needle near the wire.
4. Change the position of compass needle on the table.
5. Needle in compass shows the deflection.

OBSERVATION

When the circuit is disconnected, the needle comes to its original position

DIAGRAM



CONCLUSION

This experiment shows that current carrying wire behaves as magnet