CHAPTER 14 : ELECTRIC CURRENT AND ITS EFFECTS
MODULE : 2 /2

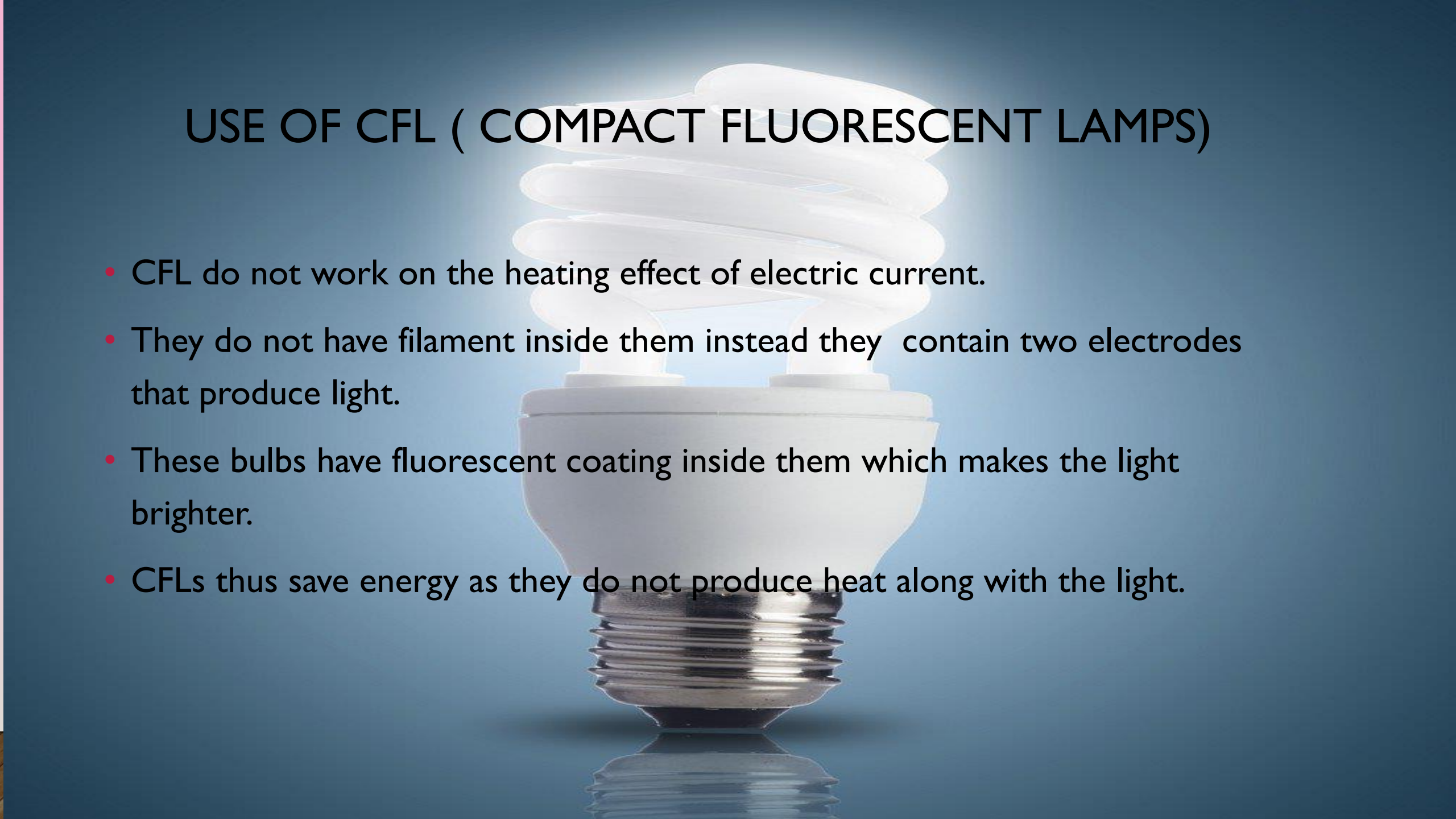
AECS , NARORA

MISS SWARNMARY HEMBROM

PRODUCTION OF LIGHT IN BULB DUE TO HEATING EFFECT OF ELECTRIC CURRENT

- The filament of a bulb is a coiled wire that gets hot when electricity is passed through it. This makes the filament glow and as a result , light is produced.
- The filament present in the bulb glow due to the passage of electricity, thus when a larger amount of electricity passes through the wire, the wire may get so hot that the filament could melt and break.
- It is also a waste of electricity as the heat produced during lighting is not desirable .

USE OF CFL (COMPACT FLUORESCENT LAMPS)



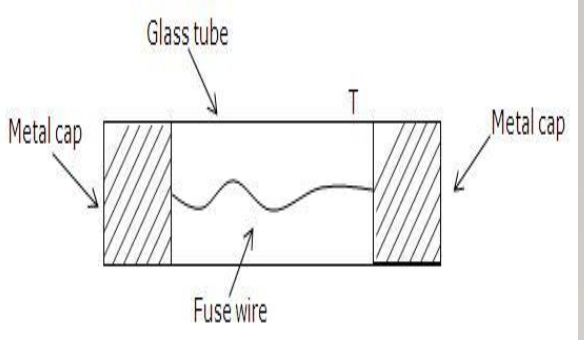
- CFL do not work on the heating effect of electric current.
- They do not have filament inside them instead they contain two electrodes that produce light.
- These bulbs have fluorescent coating inside them which makes the light brighter.
- CFLs thus save energy as they do not produce heat along with the light.

WHAT IF EXCESSIVE AMOUNT OF CURRENT PASS THROUGH A CIRCUIT ?

- Sometimes different devices are connected to the same socket which result in drawing of more current from that socket. As a result the load on the circuit increases and it can lead to a short circuit or fire.
- When the insulation of wires get torn away, the wires can come in contact with each other which causes spark or may lead to fire.
- A fuse is thus used as a safety device which prevents damage to electrical circuits and possible fires.

ELECTRIC FUSE :

An electric fuse is a device that is used to prevent damage from excessive flow of current. According to the heating effect of the electric current , a wire becomes hot whenever current is passed through it. However , if an excess current is passed through a wire it can break.



- The electric fuse consists of a wire which is made of a metal or an alloy which has a low melting point. As a result the wire breaks down easily when high current pass through it.
- This can prevent a short circuit or fire due to high electric current.
- Different types of electric fuse are used in houses and different electric appliances.

ISI MARKING :

ISI stands for ***Indian Standards Institute*** which standardizes all electrical appliances.

Hence if any electric appliances does not have an ISI mark on it , it means that appliance does not confirm to the standard guidelines of ISI and hence it is not safe to use.

ON THE OTHER HAND , IF ANY APPLIANCE HOLDS ISI MARK , IT MEANS THAT IT IS SAFE TO USE, IT WILL NOT LEAD TO WASTAGE OF ELECTRICITY.

MINIATURE CIRCUIT BREAKER(MCB) :

- A miniature circuit breaker or MCB is generally used instead fuses.
- A fuse breaks due to excessive current so that the circuit opens up and further damage can be prevented. However, once the fuse breaks down it cannot be used again.
- MCB, on other hand is a switch which turns OFF on its own when a circuit overloads. Once the problem in the circuit is rectified, MCB can be used again.

MAGNETIC EFFECTS OF ELECTRIC CURRENT

- A conducting wire behaves like a magnet when electricity is passed through it and hence the needle in the magnetic compass get deflected. This is called the magnetic effect of electric current.

FACTORS ON WHICH MAGNETIC EFFECT OF ELECTRIC CURRENT DEPENDS :-

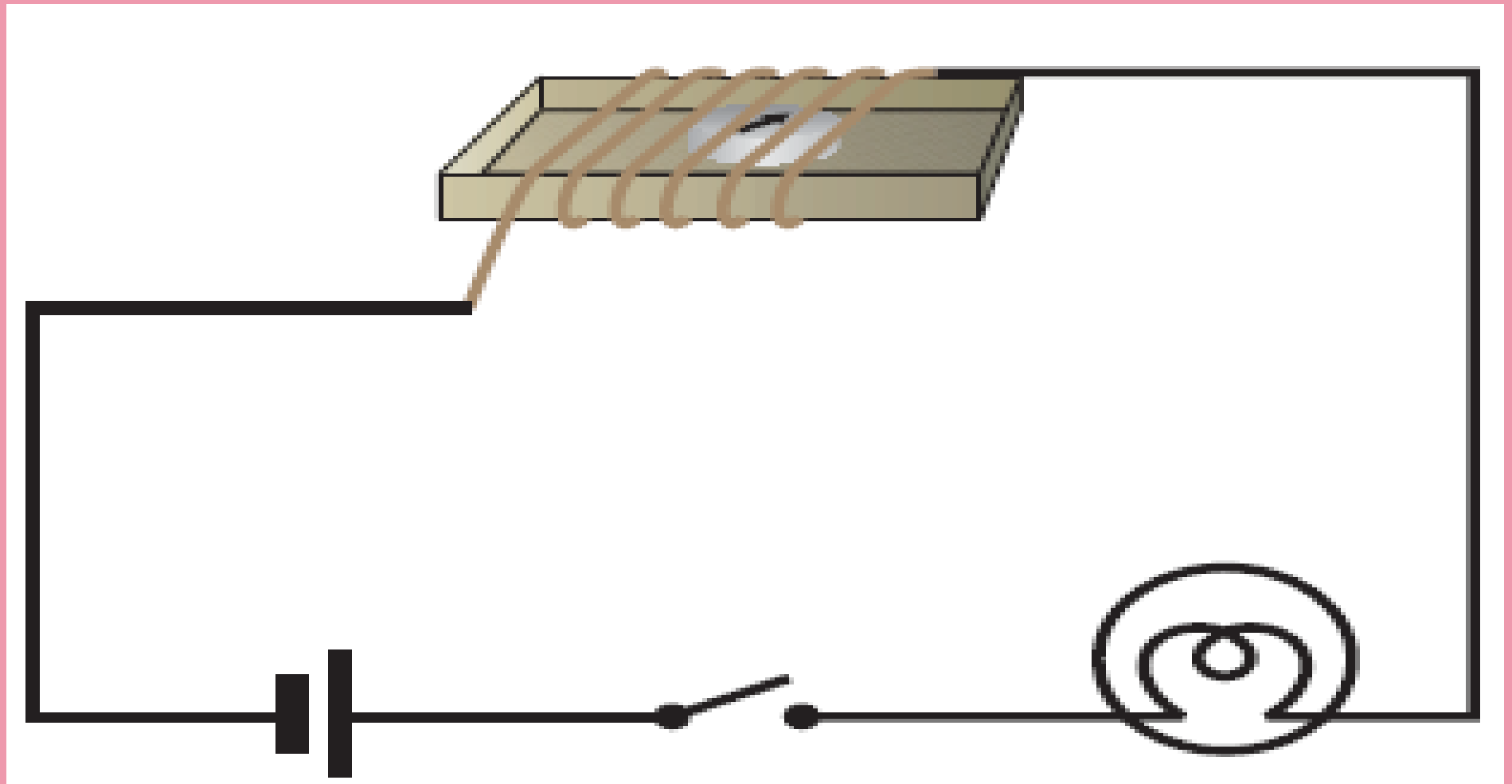
I. *It is directly proportional to the number of turns in the coil.*

II. *It is directly proportional to the amount of current.*

ACTIVITY :

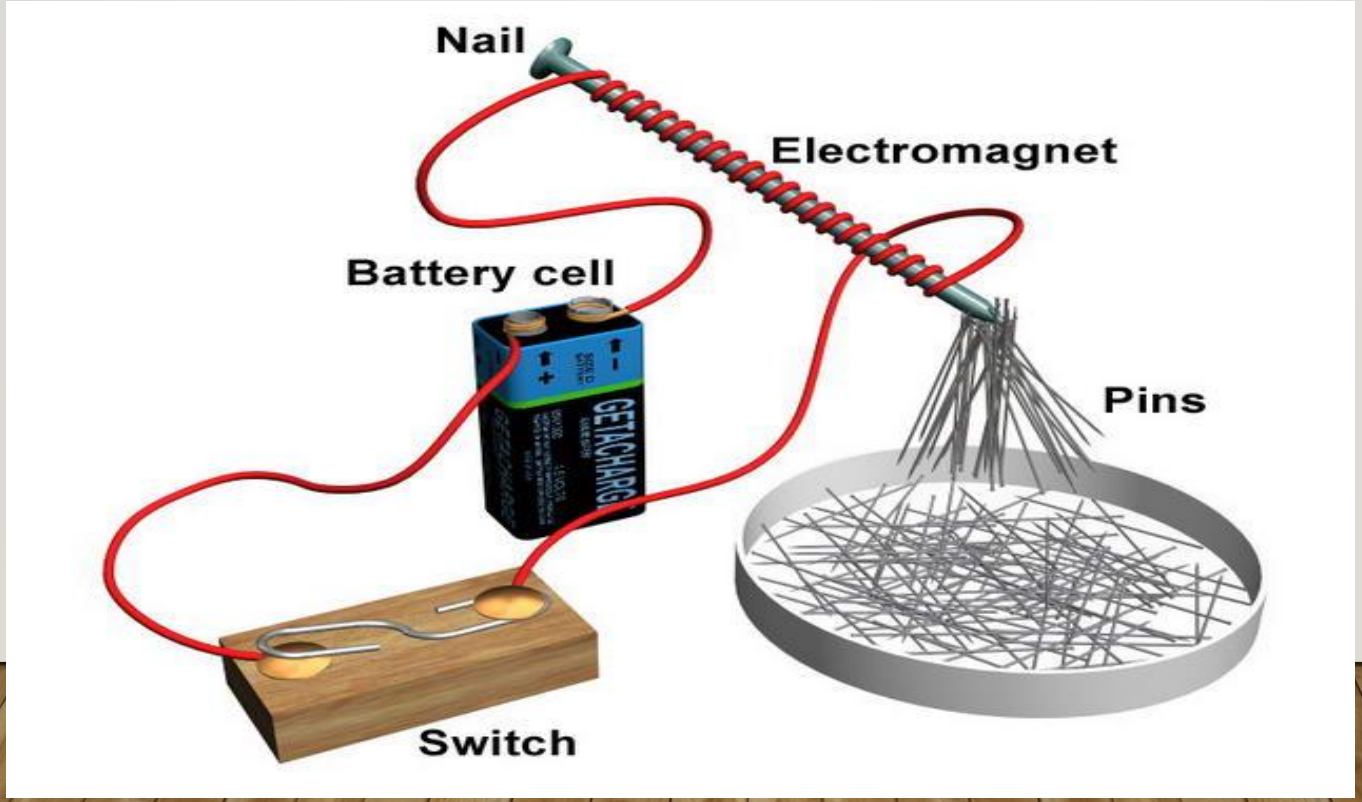
A cardboard tray is taken from a matchbox. Electric wire is winded around the cardboard a few times. A small compass is placed inside it. The ends of the wire are connected to an electric cell through a switch. When the switch is ON, the compass needle deflects. When the switch is OFF, the compass needle comes back to its original position. This shows that when electric current flows through a wire, it behaves like a magnet. The deflection in the needle of compass was first observed by a scientist called **Hans Christian Oersted.**

MAGNETIC EFFECT OF AN ELECTRIC CURRENT



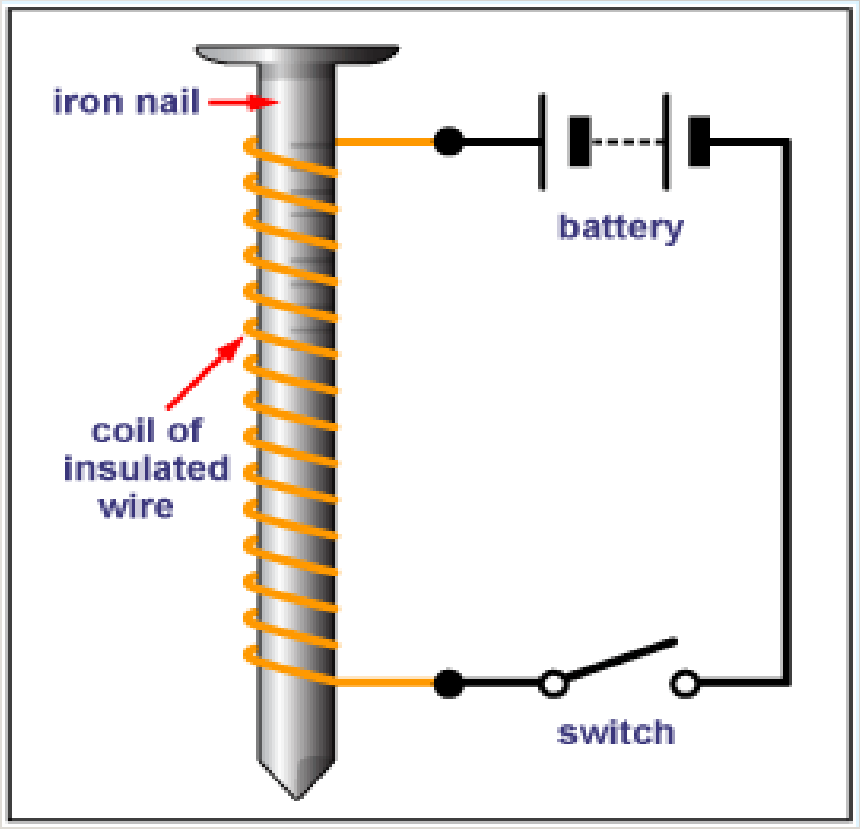
ELECTROMAGNET :

- Electromagnet is the temporary magnet in which a current carrying wire behaves like a magnet.



ACTIVITY:

A piece of insulated wire is winded around an iron nail in the form of a coil. The free ends of the wire are connected to an electric cell through a switch. Some pins are placed near the nail. When electric current is passed, the iron nails becomes a magnet and attracts the pins. When electric current is switched OFF, the nail loses its magnetism.

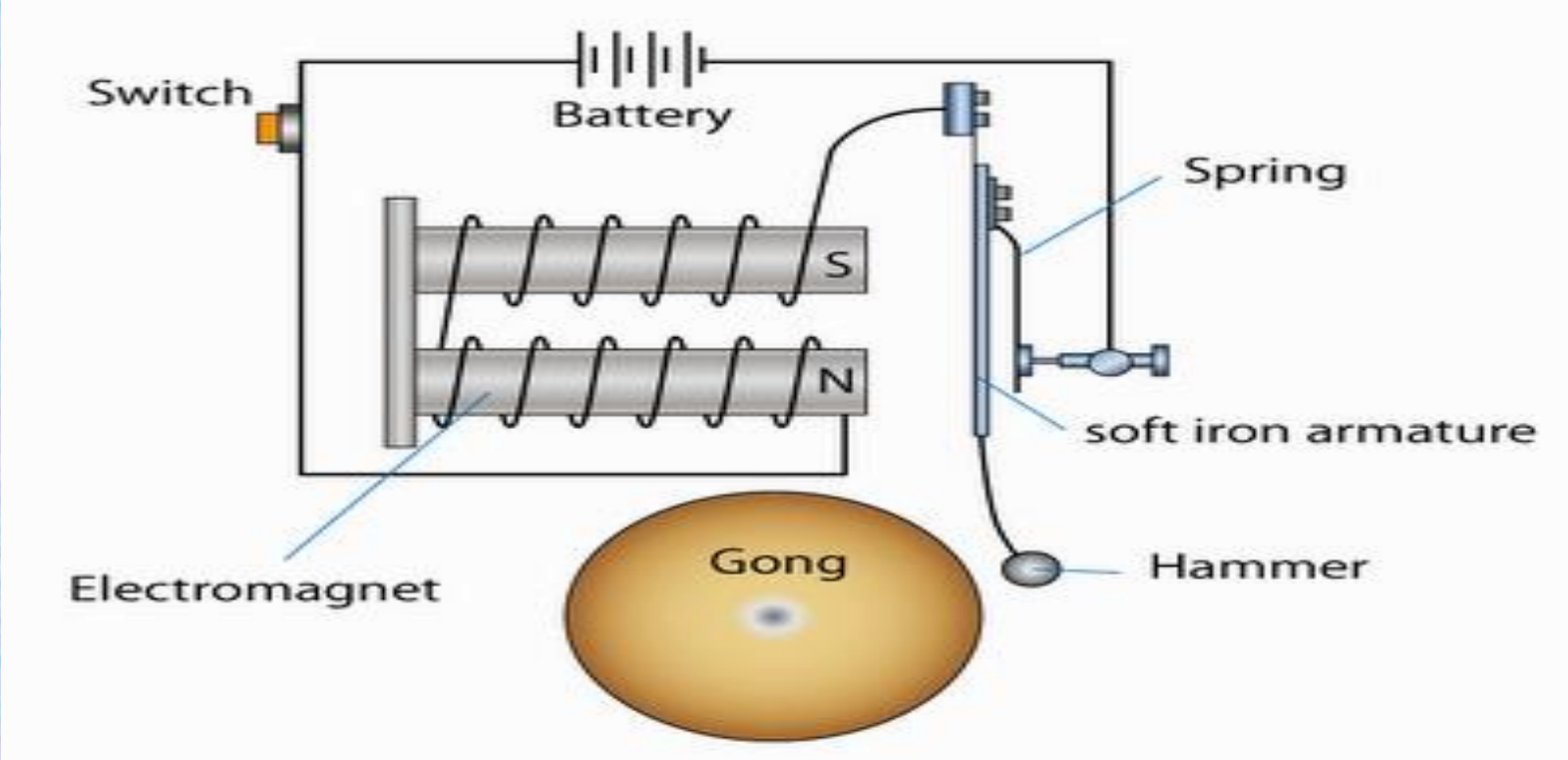


USES OF ELECTROMAGNET

1. They are used in devices and appliances like motors, generators, loudspeakers , MRI machines etc.
2. They are used in magnetic levitation by which an object remains suspended with no support other than magnetic fields.
3. They are used for separating iron materials from junk. They are also used in separating iron from ore.
4. They are used to magnetise and make permanent magnets.

ELECTRIC BELL :

- An electric bell is based on the principle of electromagnetic effect of current.



MECHANISM OF MAGNETIC BELL

I. When the switch is pressed on, the current flows through the wire and the iron rod becomes an electromagnet.

II. The electromagnet attracts the armature, and as the armature moves towards the gong, it strickes the gong to produce sound.

III. Meanwhile, the connection between the armature and the contact screw breaks, resulting in a break in the circuit.

IV. Because of this the iron rod ceases to be an electromagnet and armature returns to its previous position.

V. This process is repeated till the time, the switch is kept in the ON position.


Electric Current
THANK YOU