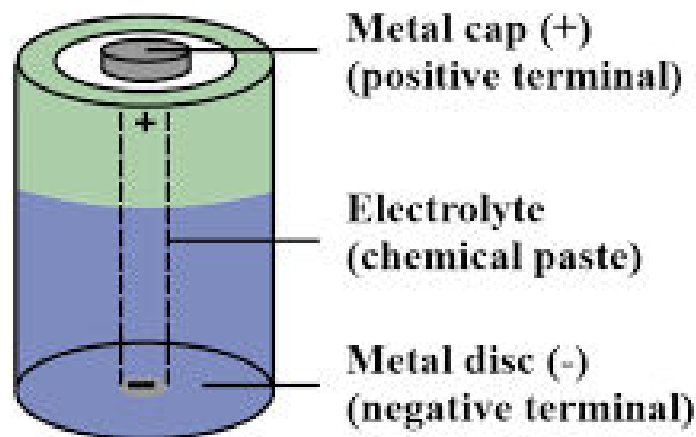




## ELECTRICITY AND CIRCUITS

### ELECTRIC CELL

- x An electric cell is a device which produces electricity from the chemicals stored inside it. When the chemical inside the electric cell are used up, the electric cell stops producing electricity. Then the electric cell has to be replaced with a new one.
- x *STRUCTURE*: An electric cell consists of a metal cap and a metal disc at the end of the cell. Metal cap is the positive terminal of the cell and metal disc is the negative terminal of the cell.



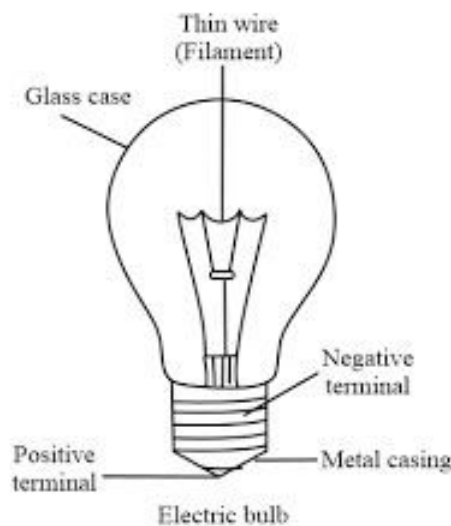
**Electric cell (dry cell)**

- x *USES*: The devices of alarm clocks, wrist watches, transistor radios, cameras and many other devices use electric cells. Electricity to the bulb in a torch is provided by the electric cell.

# A BULB CONNECTED TO A ELECTRIC CELL

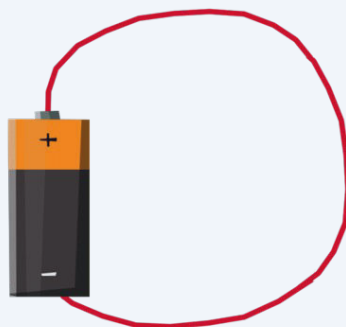
## Parts of a bulb:

- **Glass case**: It is the outer covering of the glass in a bulb which prevents oxygen in the air from reaching the hot filament.
- **Filament**: The filament of a bulb is made up of metallic thin wire (tungsten filament) that gives off light.
- **Terminal**: Every bulb has two terminals one is connected with the negative terminal of the cell and another is connected with the positive terminal of the cell.

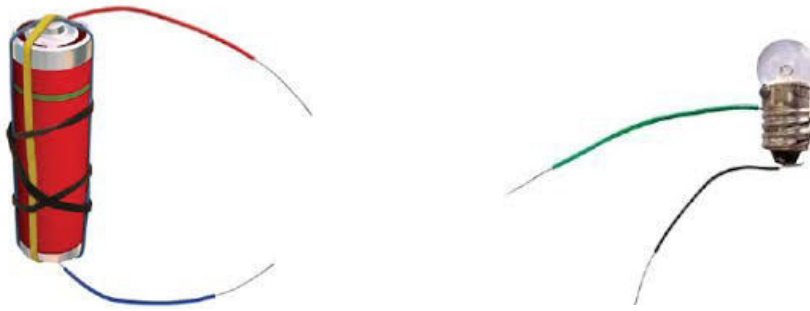


### ➤ TIP:

Never join the two terminals of the electric cell without connecting them through a switch and a device like a bulb. If you do so, then the maximum possible current flows through the circuit and chemicals in the electric cell get used up very fast and the cell stops working.



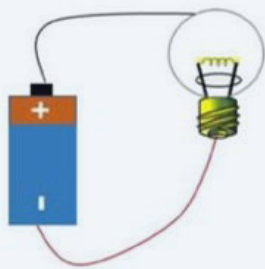
- How to connect electric cell and bulb with wires....



Given above are the correct arrangement for connecting wires with electric cell and bulb. To stick the wires to the bulb, you can use the tape used by electrician and rubber bands or tape to fix the wires to the cell.

**Question:**

Does the bulb glow in the given figure?



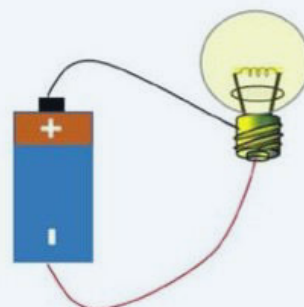
**Answer:**

No, The bulb will not glow in this case.

*For a bulb to glow, the positive terminal of the battery is to be connected with the one terminal of the bulb and the negative terminal of the battery with other terminal of the bulb.*

In the given image, one end of the battery is connected to one end terminal of the bulb, but the other terminal of the battery is connected to the glass case of the bulb. Due to this the circuit is not complete and the bulb does not glow.

For the bulb to glow, the correct circuit is as shown in the adjacent figure.



➔ Different arrangements of electric cell and bulb to check whether the bulb will glow or not.



Electric cell & Electric bulb  
with two wires attached to the terminals



ARRANGEMENT 1

Wires from cell  
are **CONNECTED** to the bulb



ARRANGEMENT 2

One of the connections  
is **BROKEN**



ARRANGEMENT 3

One of the connections  
is **BROKEN**



ARRANGEMENT 4

One of the connections  
is **BROKEN**



ARRANGEMENT 5

One of the connections  
is **BROKEN**

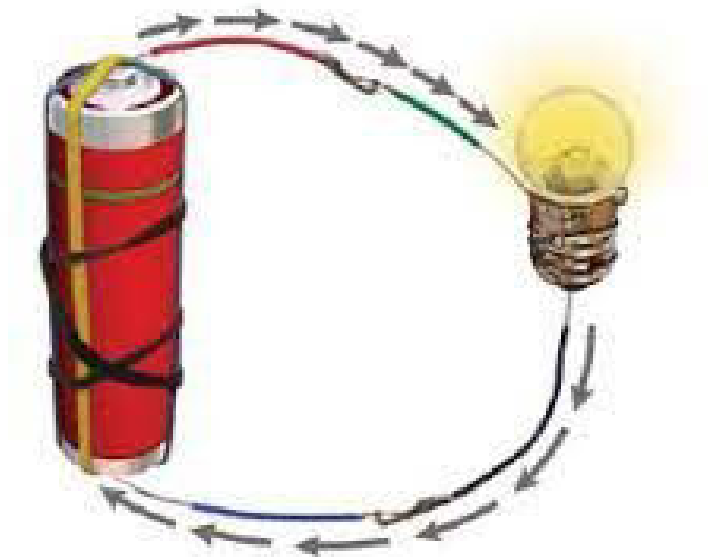


ARRANGEMENT 6

Wires from cell  
are **CONNECTED** to the bulb

## ELECTRIC CIRCUIT

- ✗ When electric components like bulb, cell, wires etc. Are connected with each other, the setup is called an electric circuit.
- ✗ The electric circuit provides a complete path for electricity to pass (current to flow) between the two terminals of the electric cell. The bulb will glow only when current flows through the circuit.
- ✗ In an electric circuit, the direction of current is taken from the positive to negative terminal of the electric cell.
- ✗ When the terminals of the bulb are connected with that of the electric cell by wires, the current passes through the filament of the bulb. This makes the bulb glow.



### FUSED:

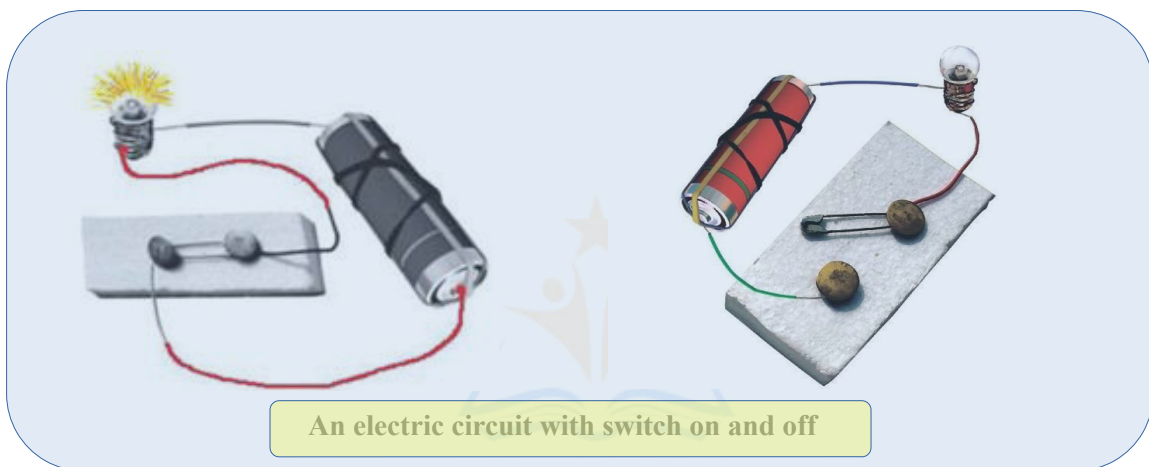
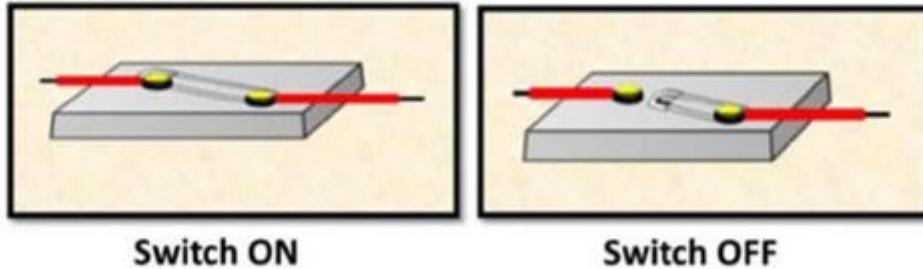
An electric bulb is said to be fused when it is connected to a cell in the circuit but does not glow. An electric bulb may fuse due to many reasons like if the filament of the bulb is broken the bulb does not glow.



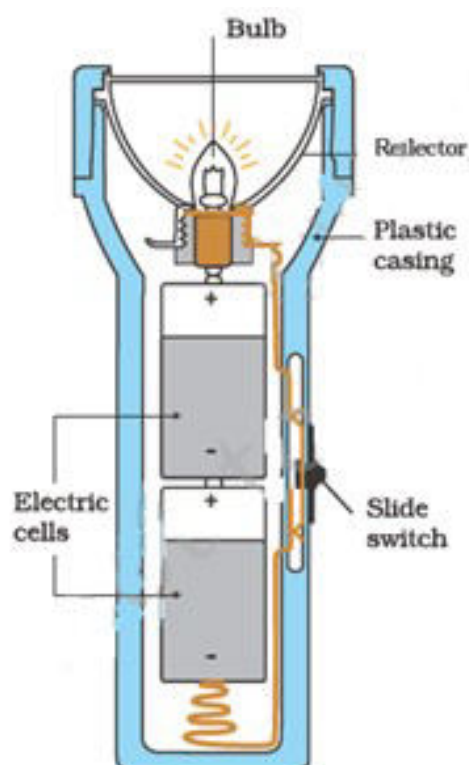
Bulb fused due to broken filament

# ELECTRIC SWITCH

A Switch is a simple device that either break the circuit or completes it.



- The switches used in lighting of electric bulbs and other devices in home work on the same principle although their designs are more complex.



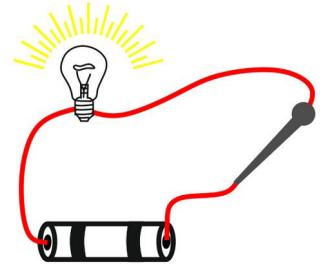


# ELECTRIC CONDUCTORS AND INSULATORS

## CONDUCTORS

The materials which allow the electric current to pass through them are conductors of electricity.

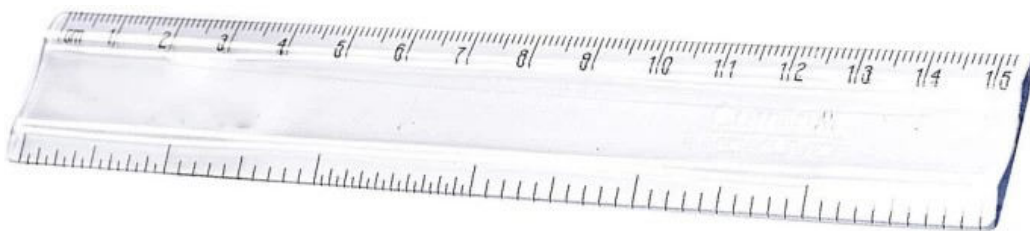
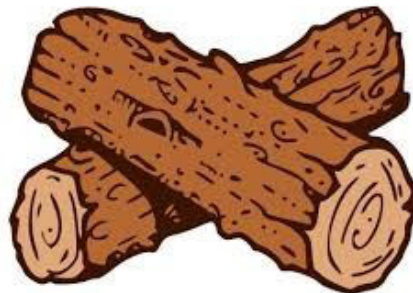
Example – Coins, metal wires, a sewing needle and an iron nail.



## INSULATORS

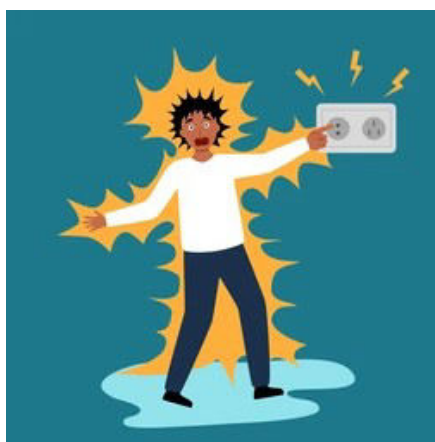
The materials which do not allow electric current to pass through them are called insulators.

Example – Thermocol, wood and plastic scale.



- Conductors and insulators are equally important for us. Switches, electrical plugs and sockets are made of conductors. On the other hand, rubber and plastics are used for covering electrical wires, plug tops, switches and other parts of electrical appliances, which people might touch.

***HUMAN BODY IS A CONDUCTOR OF ELECTRIC CURRENT SO, WE HAVE TO BE CAREFUL WHILE HANDLING ELECTRIC APPLIANCES.***



**Question:**

Why do the handle of the screwdrivers used by electricians usually have plastic or rubber cover on them?

**Answer:**

Rubber and plastic are bad conductors of electricity. It does not allow current to flow through it. Hence, handles of tools such as screwdrivers which are used by electricians usually have plastic or rubber cover on them. This protects them from any electric shock.

