Subject - Science

Term - 02

Unit - 07 - Measurement associated with electricity

Learning outcomes -

Student -

- ✓ Explain electric potential with suitable examples
- ✓ State the unit of voltage as ‘volt ‘(V)
- ✓ Measure the voltage between two given points in a circuit correctly.
- ✓ Describe that flow of current is from higher potential to the lower potential'
- ✓ State that the direction of current is from the positive terminal to the negative terminal
- ✓ State the unit of electric current as the ‘ampere’ (A)
- ✓ Explain resistance as a property which opposes the passage of an electric current through a conductor'
- ✓ Explain the unit of resistance as ‘ohm (Ω)
- ✓ Accept of the importance of measuring electrical quantities correctly.

Grade 8 - 07th lesson

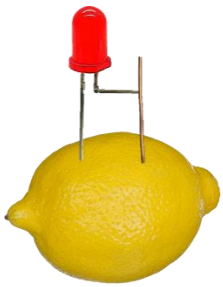
Measurements associated electricity

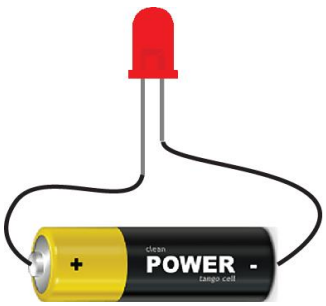
Come, Let's do a little experiment

Materials - Lime/lemon, 2 dry cells, a small motor, connecting wires (a piece of flexible wire/a piece of housing wire), a graphite rod of 3 inches from a pencil, a torch bulb, LED, A cardboard circle of 5 inches in diameter (colour it as shown in the diagram)

Activity 01(-

- Cut 8cm long wire from a housing wire and take out the copper rod in it.
- Crush the lime and insert the copper rod to it.
- Take the LED and insert the shorter terminal of it to the lime fruit and connect the free end to the copper rod.
- Observe the illumination of the LED.
- Now, connect the LED to a dry cell using connecting wires and observe the illumination of the LED.





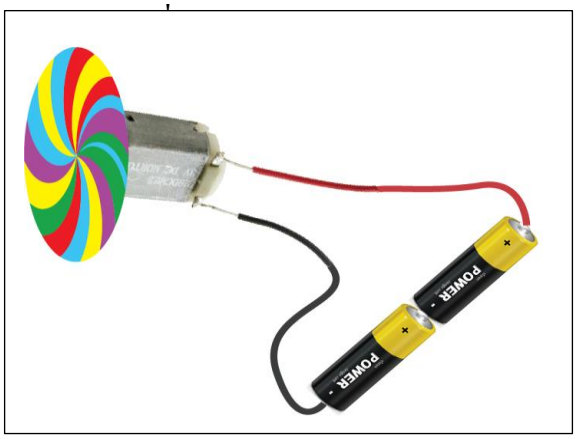
01' What is the reason for the difference in illumination?

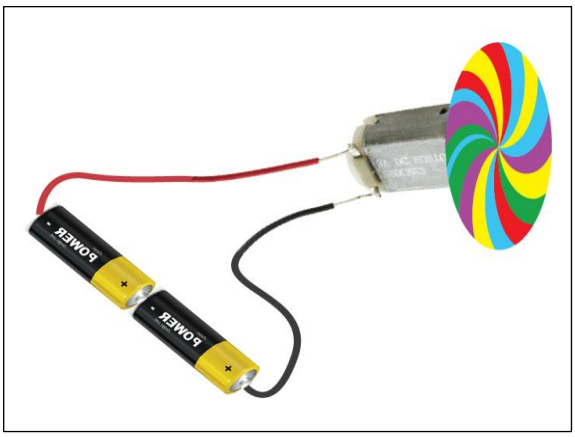
- Amount of electric charges produced in the dry cell is higher than the amount of electric charges produced in the lime fruit due to chemical reaction taking place in it.
- Therefore, the amount of electric charges pass through the conductor is different.
- There's a high voltage in the source which produces the electric charges.
- An electric current is generated when one end of the source is connected to the other end of the same source.

Activity 02 -

Materials : Two dry cells, motor, the coloured cardboard circle as shown in the figure, connecting wires

- Connect the carboard circle to the shaft of the motor. Connect two wires to the two terminals of the motor as shown in the diagram. Connect the two dry cells in series.

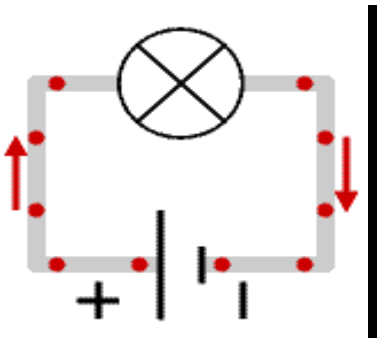




- Observe the direction of the motion of the coloured circle.
- Now, change the terminals of the motor and supply the current to it.
- Again, observe the direction of motion.
- You will understand that when the terminals are changed, the direction of rotation of the motor also changes.
- And also, you will understand that when the direction of current changes, the direction of rotation of the motor also changes.

02' Mention the direction of flow of current?

Current flows from positive terminal to the negative terminal.



Galvanometer is used in the laboratory to identify the direction of current flow.

Here, you have to make a circuit as shown in the figure 7.5 of your textbook. Now, you will be able to see that direction of motion of galvanometer-indicator changes with the change of terminals of the cells.

Equipment used to measure electric current - Ammeter

Symbol for electric current - I

Symbol

International unit for electric current is Ampere (A)

Sub units are used to measure small currents

- Milliampere - mA
- Microampere - μA

Symbol of the unit - A

Milliammeter is used to measure the current generated in the lime fruit.

During this process, the electric charges are generated by a chemical reaction in the lime fruit and dry cells and those charges flow between the terminals connected to them. That is, charges flow rapidly from higher end to the lower end.

The difference of electric potential energy between the two terminals of the cells is called voltage or potential difference.

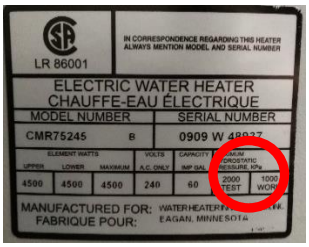
Equipment used to measure the voltage - Voltmeter

Standard international unit to measure potential difference – Volt (V)

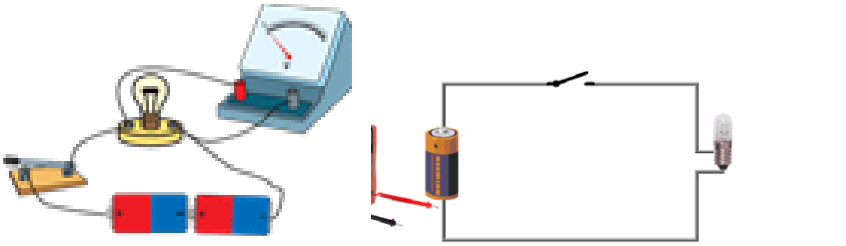
Symbol

Symbol of the unit - V

Potential difference is marked on each and every equipment that you use at home.

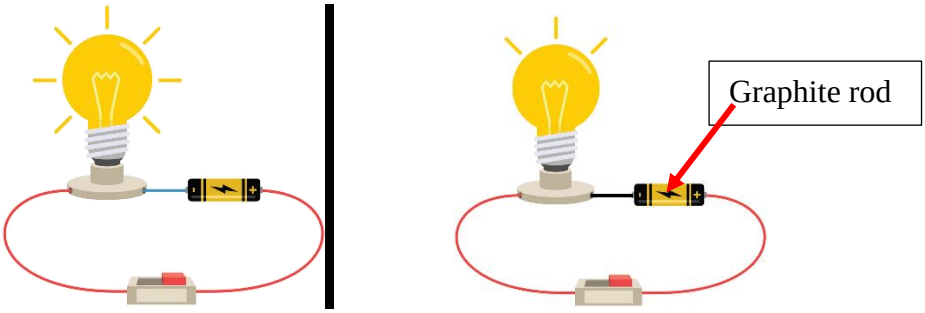


Voltmeter is used in the laboratory to measure the potential difference in a circuit. It should be connected parallelly to the device to measure the potential difference. That is, positive terminal to the positive terminal and negative terminal to negative terminal.



Activity 03 - Cut two pieces about 10cm long from the connecting wires. Connect the torch bulb using that. Now, keep the two batteries in series and connect the bulb. Then, observe the illumination of the bulb.

Now, keep the graphite rod to one end of battery and observe the illumination of the bulb. Remove the graphite rod and again connect the bulb to battery and observe. Repeat this for few times.



03. What is the reason for the change in illumination?

- Barrier for the flow of electric current through the circuit
- The obstacle caused by a conductor to the flowing of current through it is called the resistance of that conductor.
- When the resistance increases the flow of current through the circuit decreases.
- Devices that act as a barrier to the flow of current have been developed.

- They are known as resistors.
- There are fixed resistors as well as variable resistors which can change the resistance as required.
- The resistance of conductors are different from each other.

The equipment used to measure resistance - Multimeter

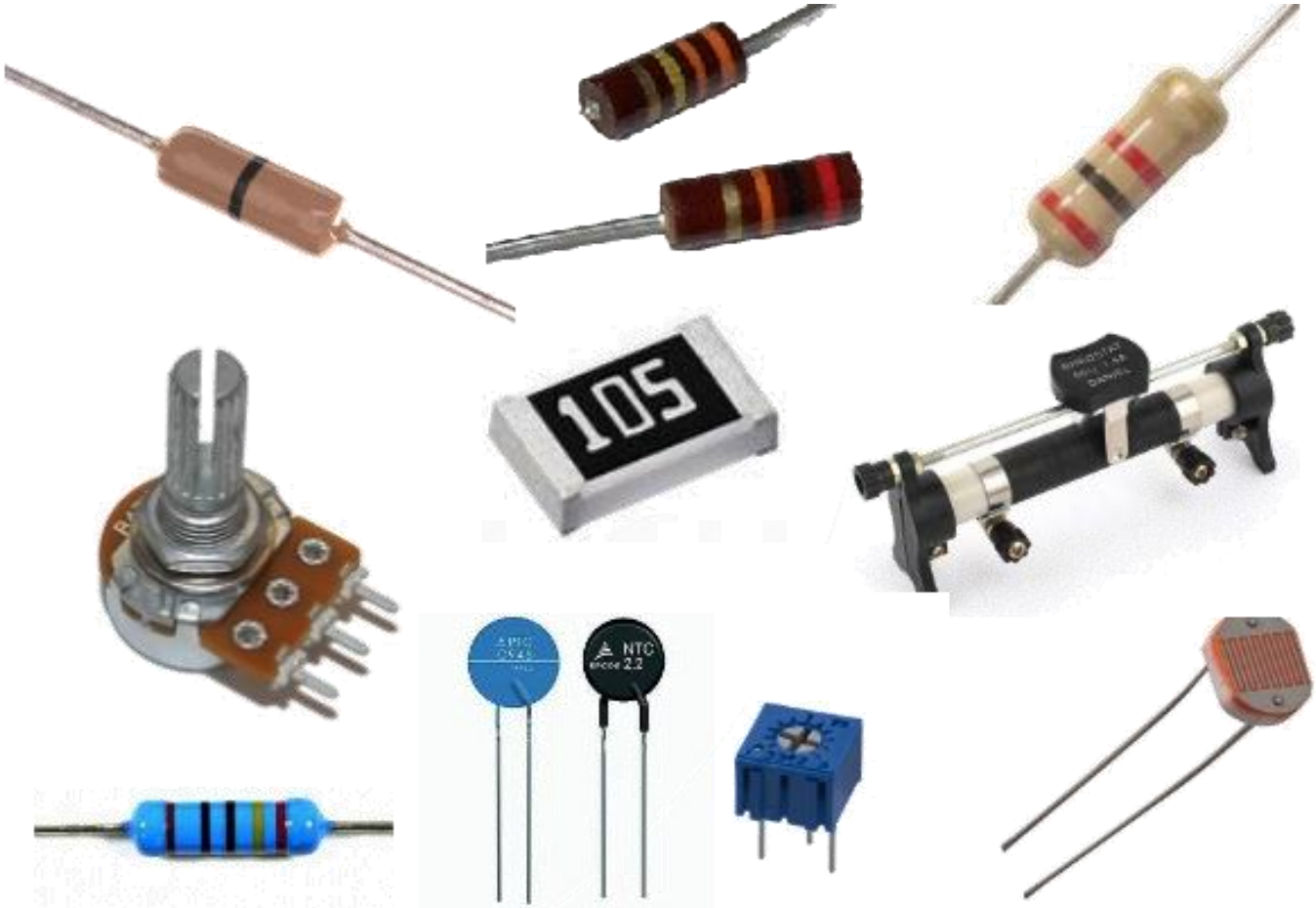
Unit used to measure the resistance - ohm

Symbol of the resistor

Symbol used to denote resistance - R

Symbol of the unit - Ω

Type of resistors



- Resistance is an important factor in controlling the flow of current through a circuit.
- Flow of current can be controlled by changing the resistance of the conductor.
- Devices have been developed to control the flow of current through a circuit and they are known as resistors.
- Resistance of fixed resistors are often marked with a colour code system.

	Current	Potential difference	Resistance
Symbol	I	V	R
Standard international unit	Ampere	Volt	Ohm
Symbol of the unit	A / mA	V	Ω / kΩ
Equipment used to measure	Ammeter	Voltmeter	Resistor
Circuit symbols			

Select the correct answer.

01. Flow of electric charges through a conductor is known as '\…… (electric current/ electric charges)

02. The unit used to measure the current is ……. (Voltage/ Ampere)

03. The instrument used to measure the current is…….. (Multimeter/ Ammeter)

04. Ammeter should be connected ……. to a circuit. (series/parallel)

05. The flow of current between two points of a circuit is known as its…….(Potential difference/ resistance)

06. The unit used to measure the potential difference is …….(Ohm/volt)

07. ……is used to measure the potential difference. (Voltmeter/ Ammeter)

08. Voltmeter is connected……. to measure the potential difference across a device. (parallelly/ series)

09. The obstacle to flow of current through a conductor is known as ……(current/ resistance)

10. The unit used to measure the resistance is ……. (ohm/volt)

Translated by : Nayomi Wijesooriya

Answers

01. Electric current	02. Ampere	03. Ammeter
04. in series	05. Potential difference	06. volt
07. voltmeter	08. parallel	09. resistance
10. ohm		