

Unit 6: Electricity

2°ESO



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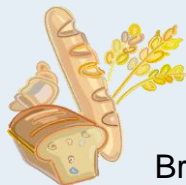
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Computer



Console



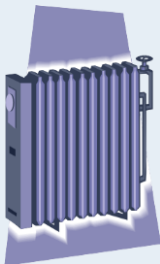
Mp3



DVD player



Television



Heater



Washbasin



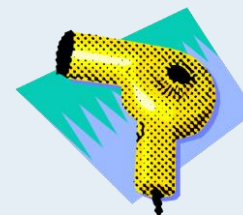
Mobile



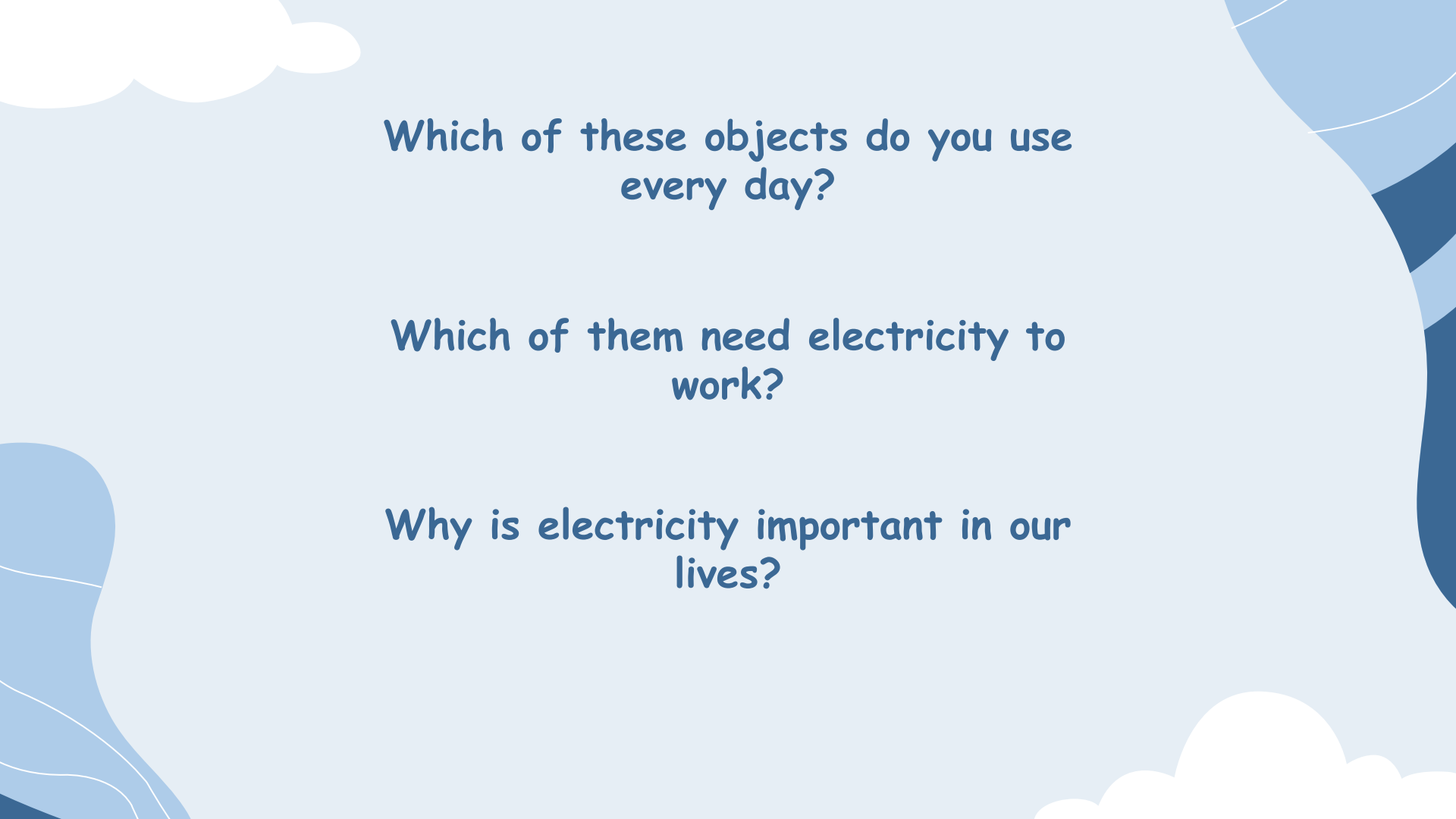
Oven



CD player



Hairdryer

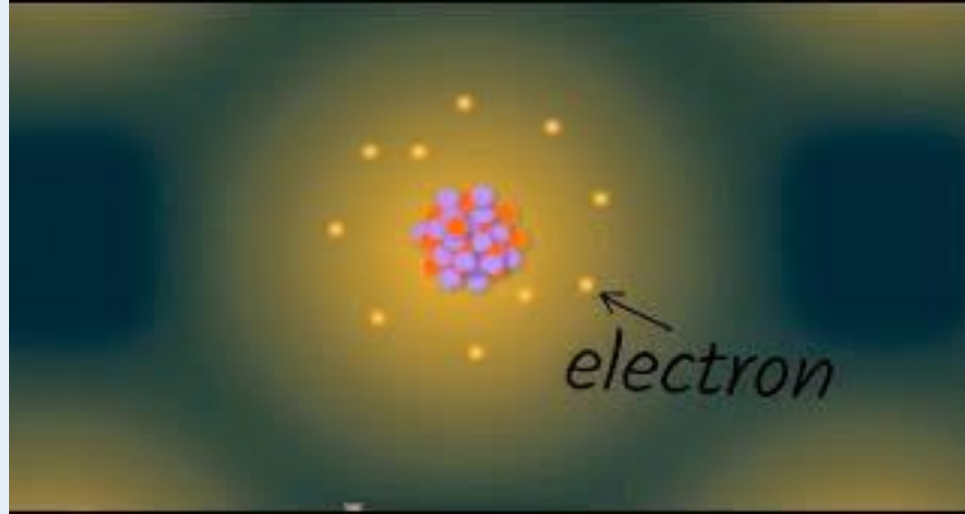


Which of these objects do you use every day?

Which of them need electricity to work?

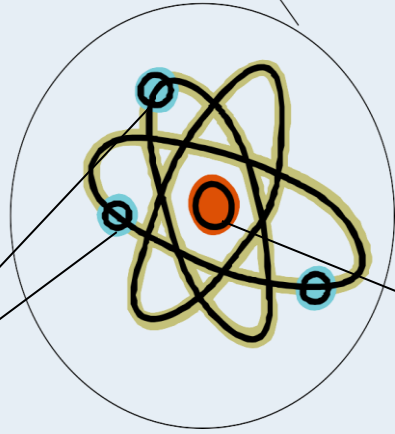
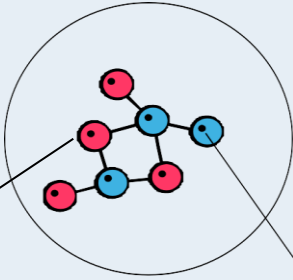
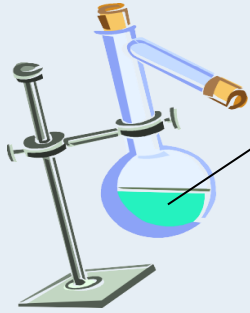
Why is electricity important in our lives?

What is electricity?



<https://www.youtube.com/watch?v=oB1v-wh7EGU>

MOLECULES



ATOM

Nucleus

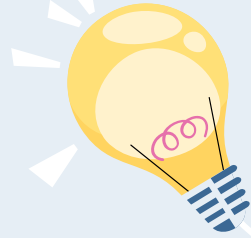
Electrons
Charge -

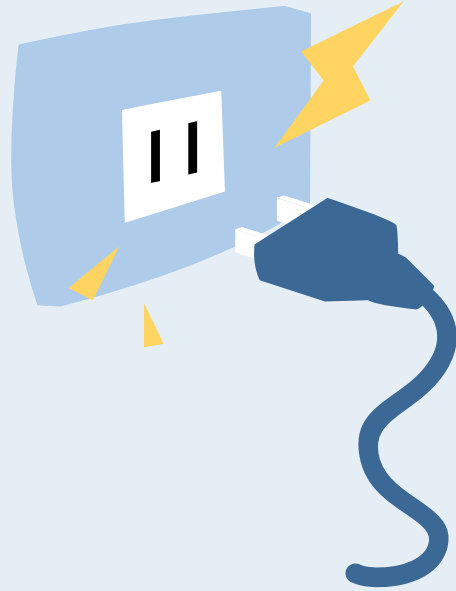
Protons
Charge +

Neutrons
Charge 0

01

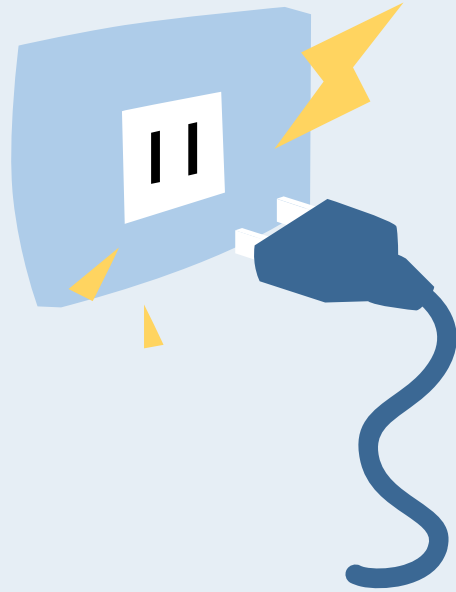
Electric Charge and Current





Electric charge

Property of matter that causes it to experience a force when placed in an electric or magnetic field.



Electric current

The continuous movement of electrons through a material.

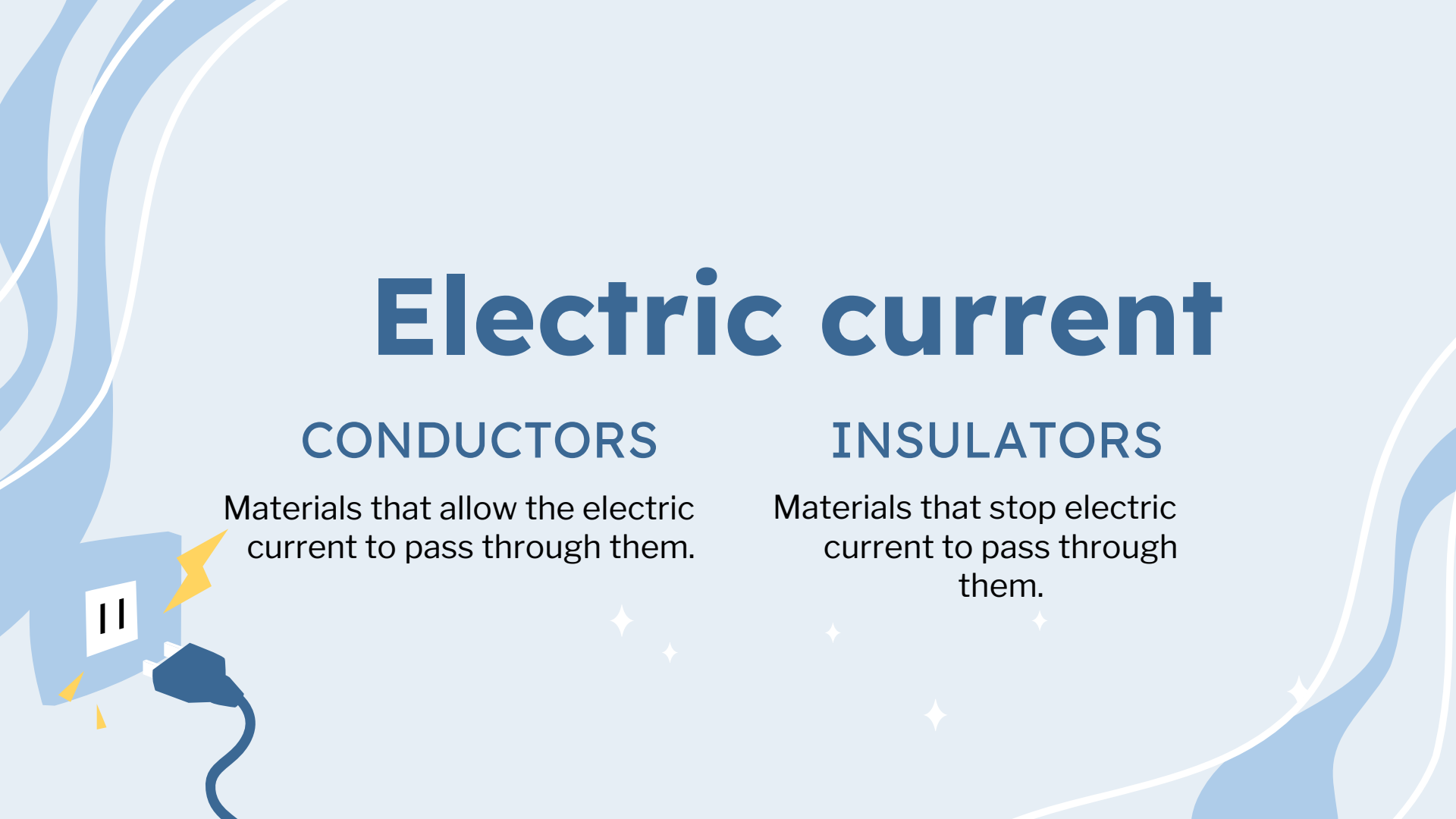
Electric current

CONDUCTORS

Materials that allow the electric current to pass through them.

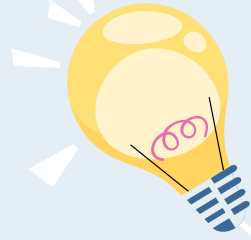
INSULATORS

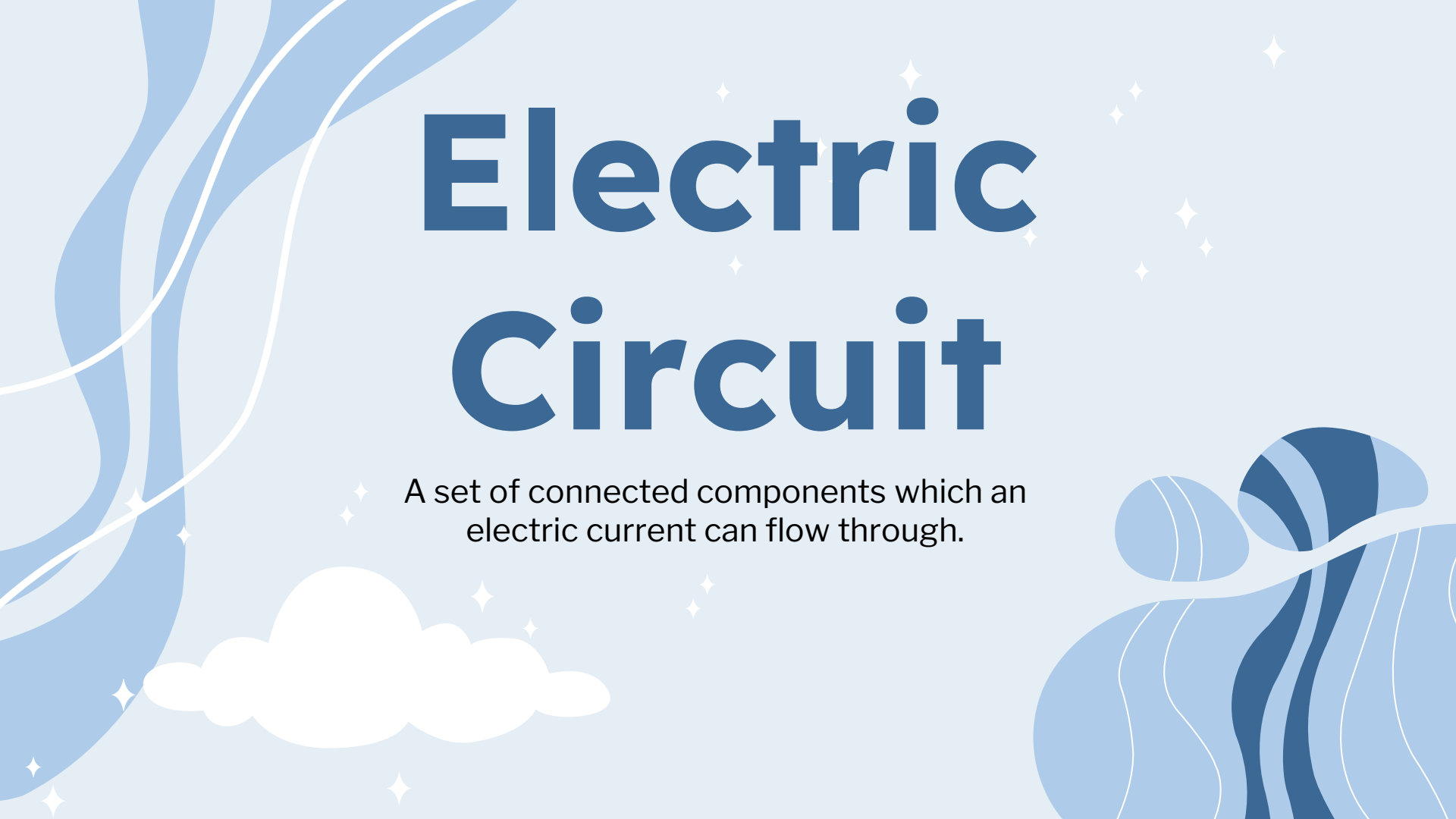
Materials that stop electric current to pass through them.



02

Electric Circuits, Components, and Symbols





Electric Circuit

A set of connected components which an electric current can flow through.

Elements of an Electric Circuit

Generator

Produces energy for the electrons to move



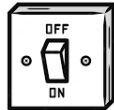
Receptors

Transform the electrical energy they receive into another form



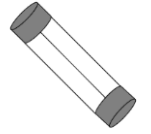
Control Components

Direct or stop the flow of the electric current



Protection

Stop the flow of current when it goes too high, which protects other components from damage.



Symbols

Represent components in electric circuits



Battery



Wire



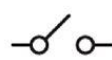
Bulb



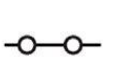
Buzzer



Motor



Switch (off)



Switch (on)

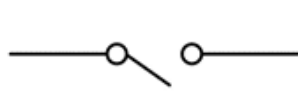
Draw and use the correct symbols to form an electric circuit.

1. 1 Lamp and 1 Battery

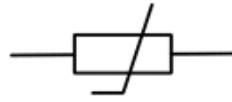
2. 1 Lamp, 1 Battery, 1 Switch

**3. 1 Lamp, 1 Battery, 1 Switch,
1 Fuse**

**4. 1 Motor, 1 Lamp, 1 Battery,
1 Switch, 1 Fuse**



SWITCH (open)



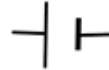
THERMISTOR



LAMP



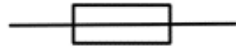
SWITCH (closed)



CELL



AMMETER



FUSE



GROUND



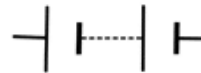
VOLTMETER



DIODE



INDUCTOR



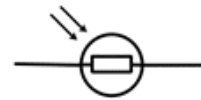
BATTERY



RESISTOR



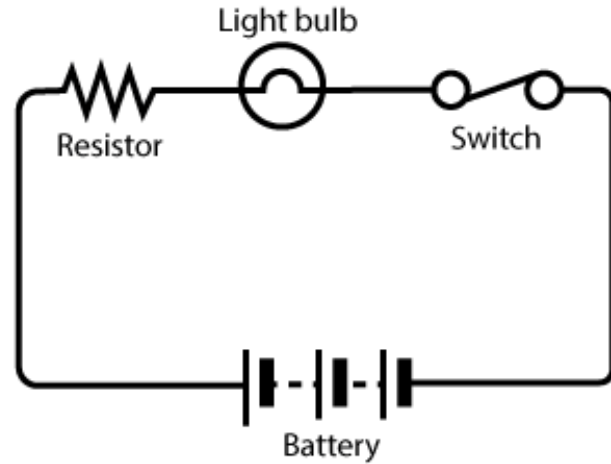
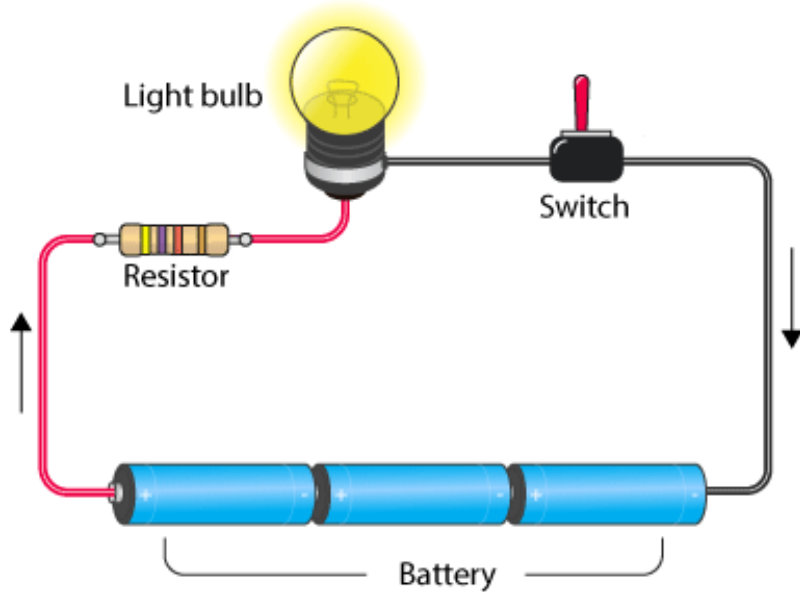
BUZZER



LDR

Simple Electric Circuit

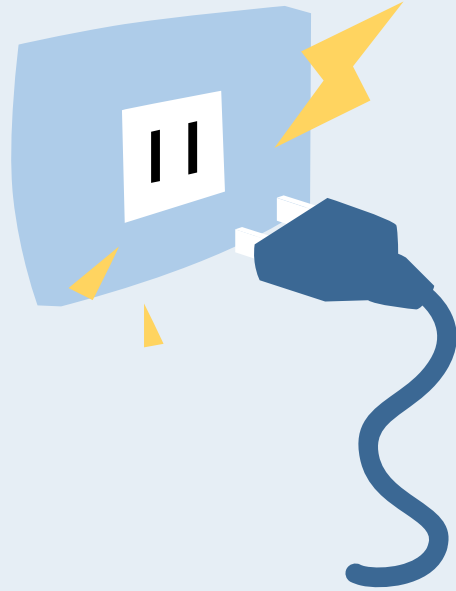
ELECTRIC CIRCUIT



03

Electric Quantities





Charge

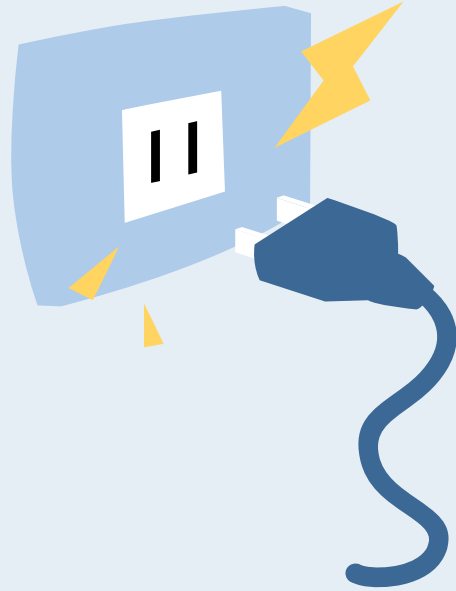
The amount of electricity stored in an object. Its basic components are:

- voltage
- current
- resistance

voltage

Difference between the electrical energy at two points in a circuit. The amount of voltage is indicated by a unit known as the **volt (V)**.





Current

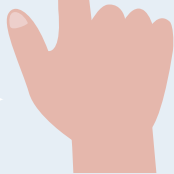
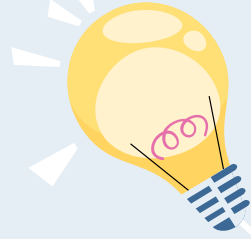
The amount of electric charge passing through a specific point in a circuit in one second (the flow of electrons at that point). Current is expressed in **I**, and we measure current in **amperes** or **amps (A)**.

resistance

Resistance is a force that counteracts the flow of current. Resistance values are expressed in **ohms (Ω)**.

04

Ohm's Law



Ohm's Law state that:

- 1. For a given resistance, the voltage and current are directly proportional.**
- 2. For a given voltage, the current and resistance are inversely proportional.**



$V = I \cdot R$

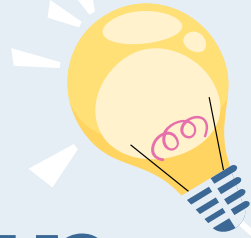
$$V = I \cdot R$$

$$I = \frac{V}{R}$$

$$R = \frac{V}{I}$$

05

Effects of an electric current and using electricity sensibly



Heat

When electrons crash into the atoms of the material they're flowing through, some energy transforms into heat (Joule effect).



Light

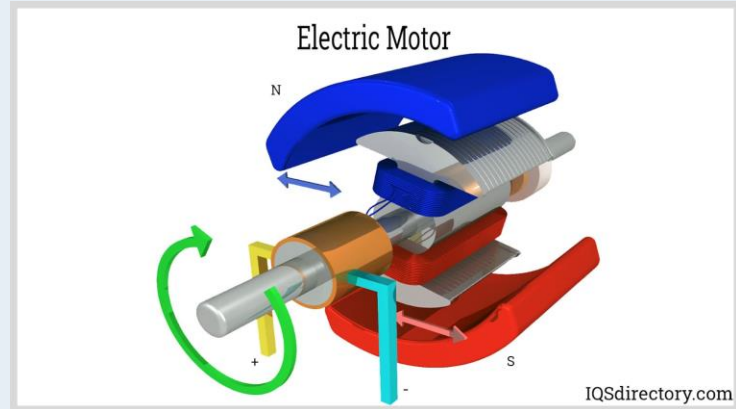
1. Incandescent bulbs produce light when an electric current passes through a metal filament (thin wire).

2. Fluorescent tubes or low-energy bulbs contain gas, which can be toxic.



Motion

3. Motors transform electric energy into motion.



06 LEDs and Resistors



LED

The Light Emitting Diode (LED) emits light very efficiently. It is connected to a resistor in a series circuit.

TIPS TO SAVE ENERGY



<https://www.youtube.com/watch?v=-iZBCKYFqiU>



<https://www.youtube.com/watch?v=h4RmNNve3lc>



<https://www.youtube.com/watch?v=q-zYcUPHpr4>