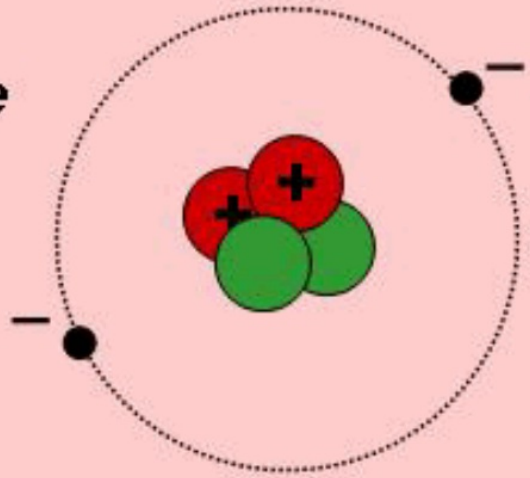
Electricity

ELECTRICITY comes from the electrons in an atom.

Electrons

Negative Charge



Electricity

Forms when electrons are transferred between objects.

Types of Electricity

Static Electricity

- Build-up of electrical charge
- Electrons move in non-specific directions

Current Electricity

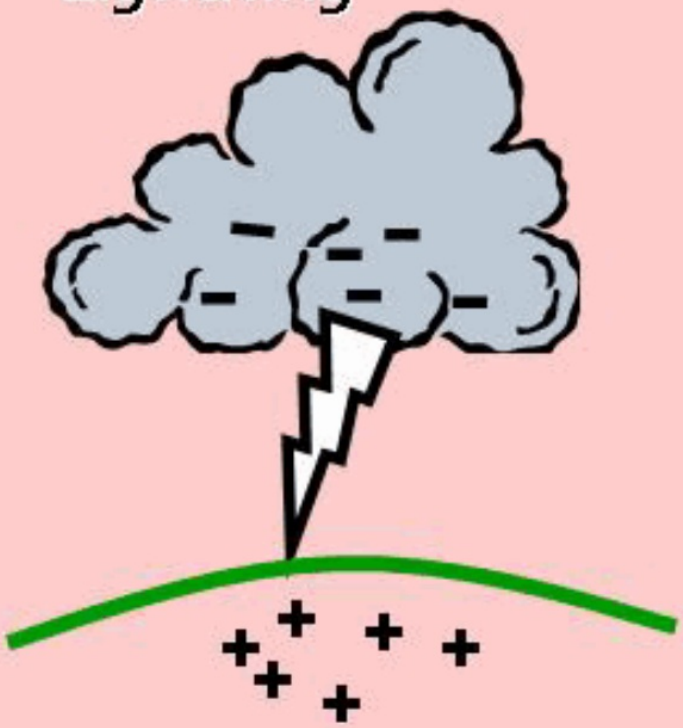
- Flow of electricity through wires
- Electrons move in definite paths

Electricity exists naturally in nature…

Static Electricity

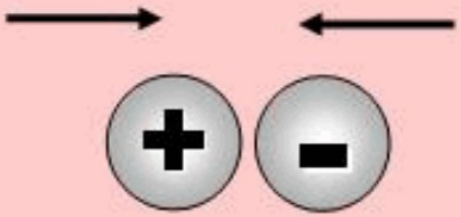
For example:

Lightning



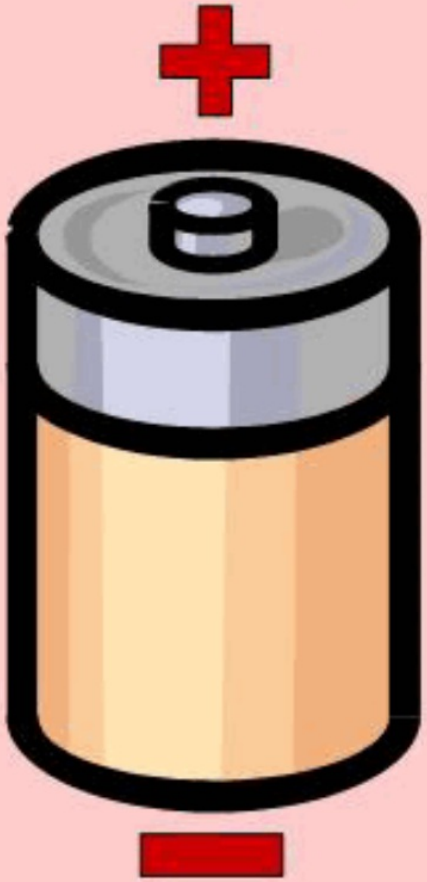
Law of Electrical Charges

Opposite Charges Attract



Same Charges Repel

Battery



Batteries use chemical energy to move electrical charges

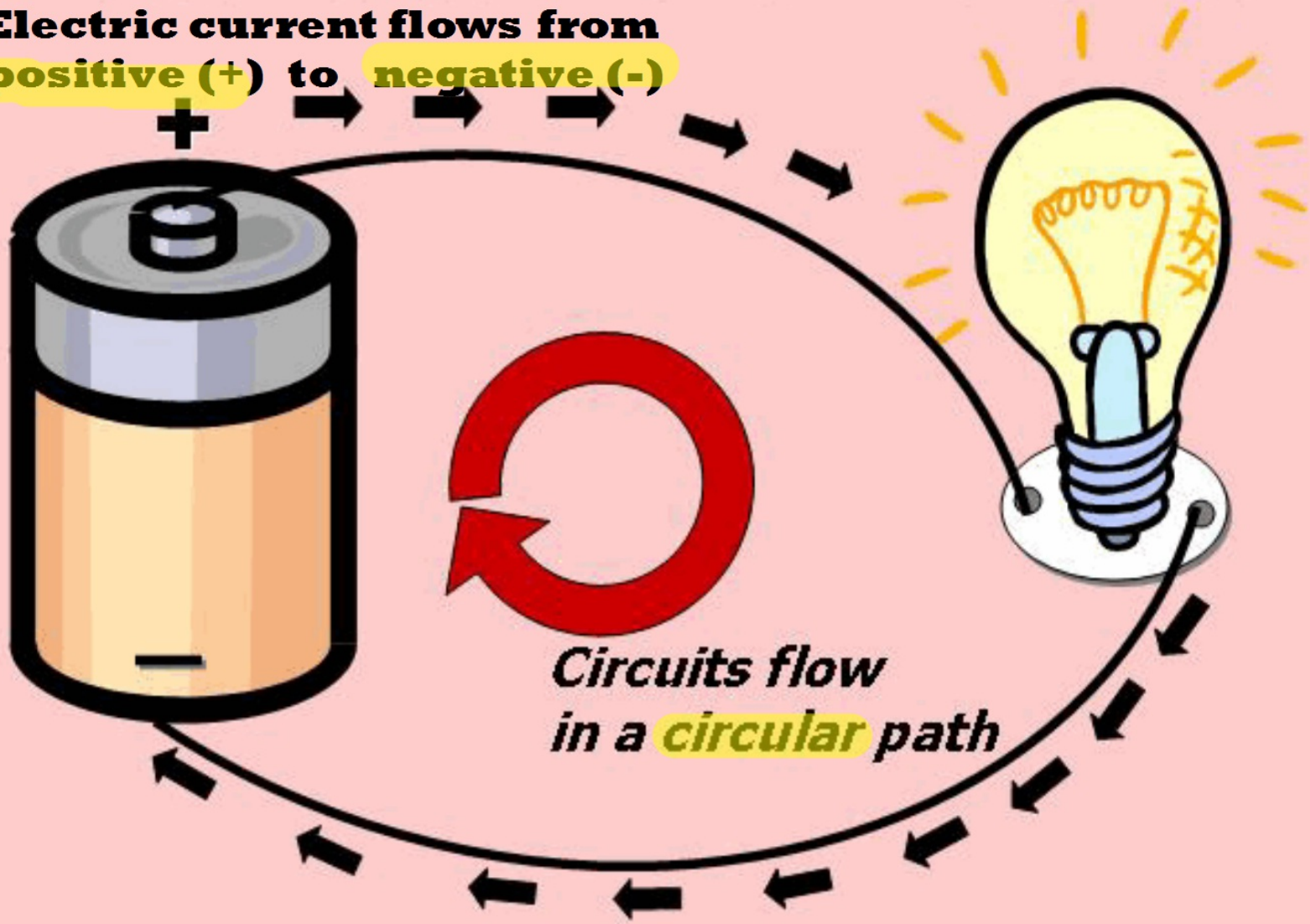
Types:

Dry cell-chemical inside are a paste and do not spill easily (example: AA or AAA bateries)

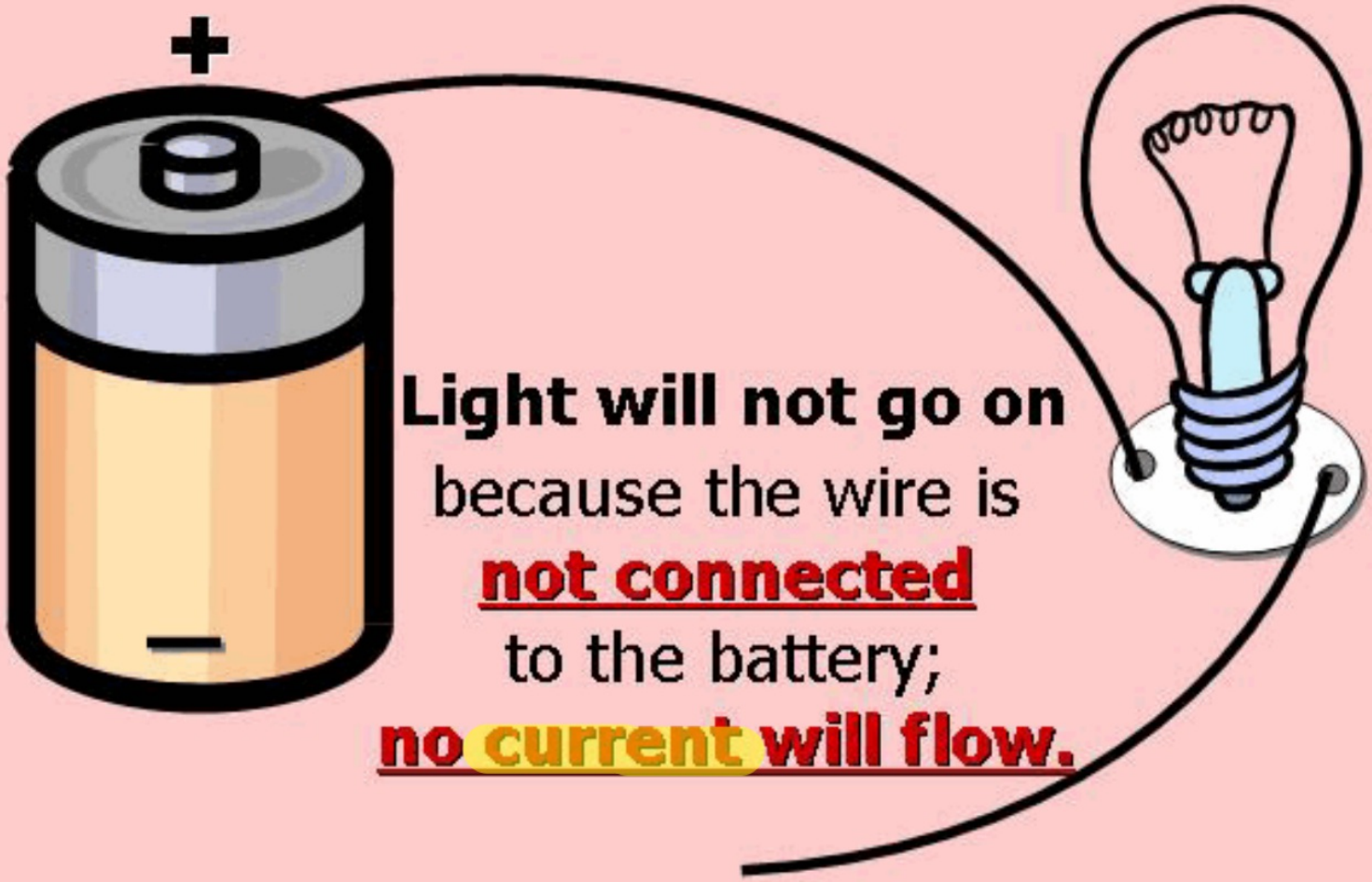
Wet cell-chemicals inside are free flowing and could spill if turned upside down (example: car battery)

Electric current in a circuit

Electric current flows from positive (+) to negative (-)

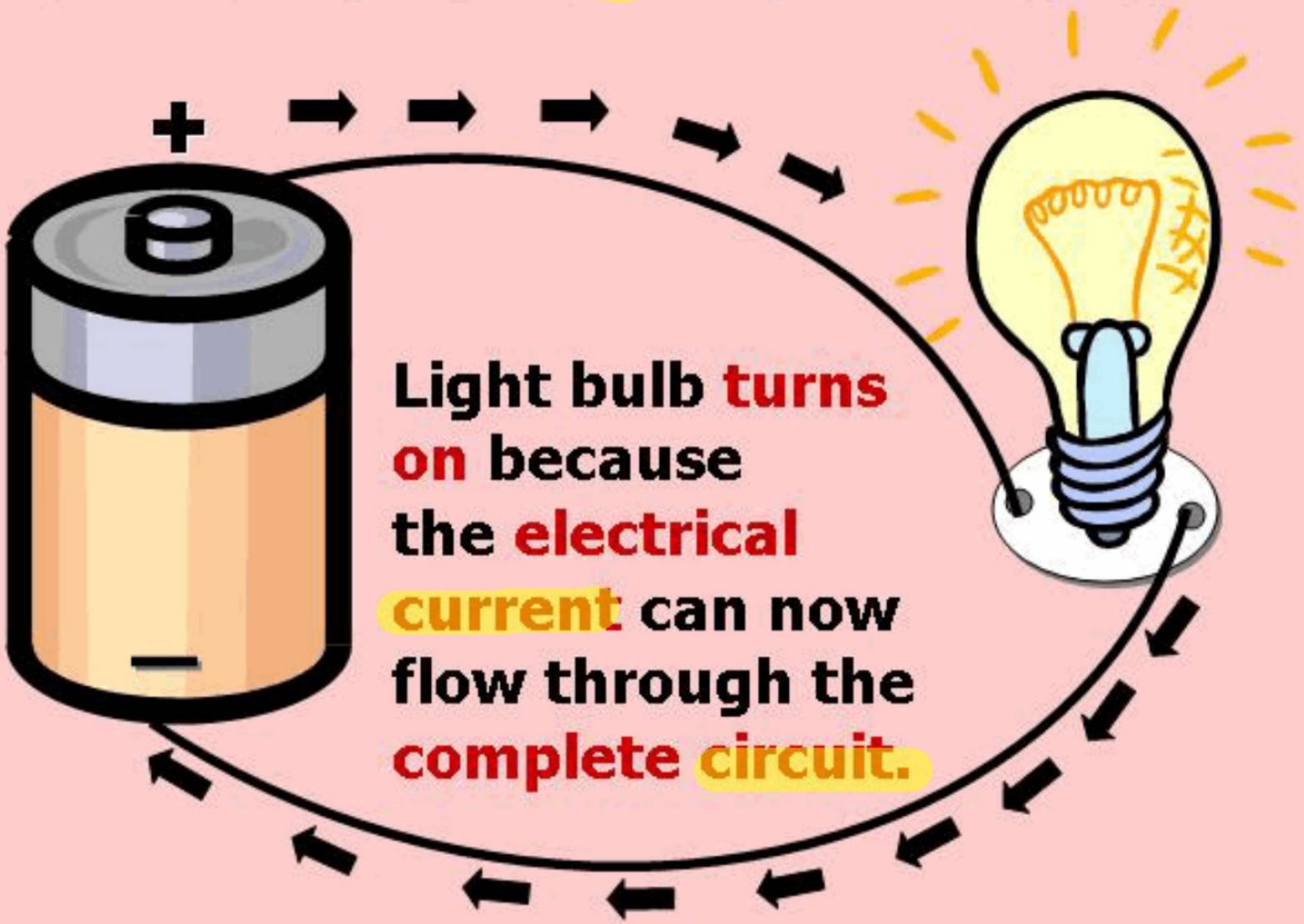


Open Circuit



Light will not go on
because the wire is
not connected
to the battery;
no current will flow.

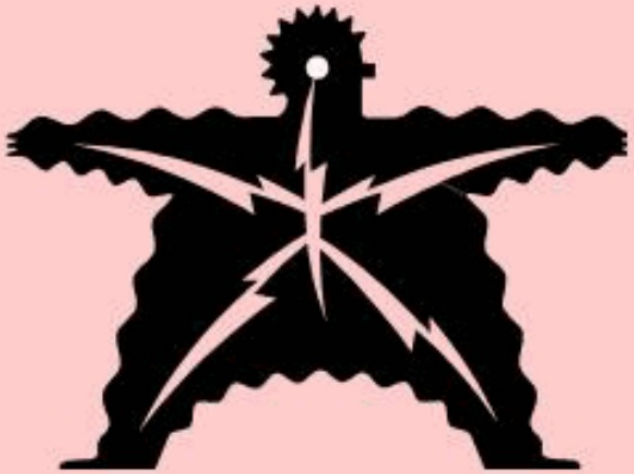
Closed Circuit



Light bulb turns on because the electrical current can now flow through the complete circuit.

Short Circuits

- an accidental path for current to flow
- often causing risk of shock or fire
- a branch with zero or very low resistance



(MORE ON NEXT SLIDE)

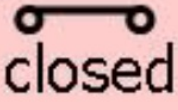
Circuit Diagrams

- Wire

- Power Source (1.5 V)

- Bulb

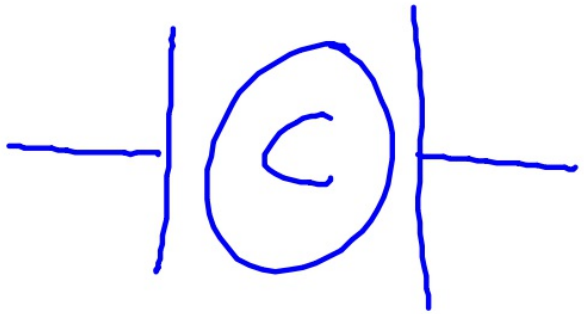
- Resistance



- Switch

Varrible Risistor
ex: Dimmer Switch

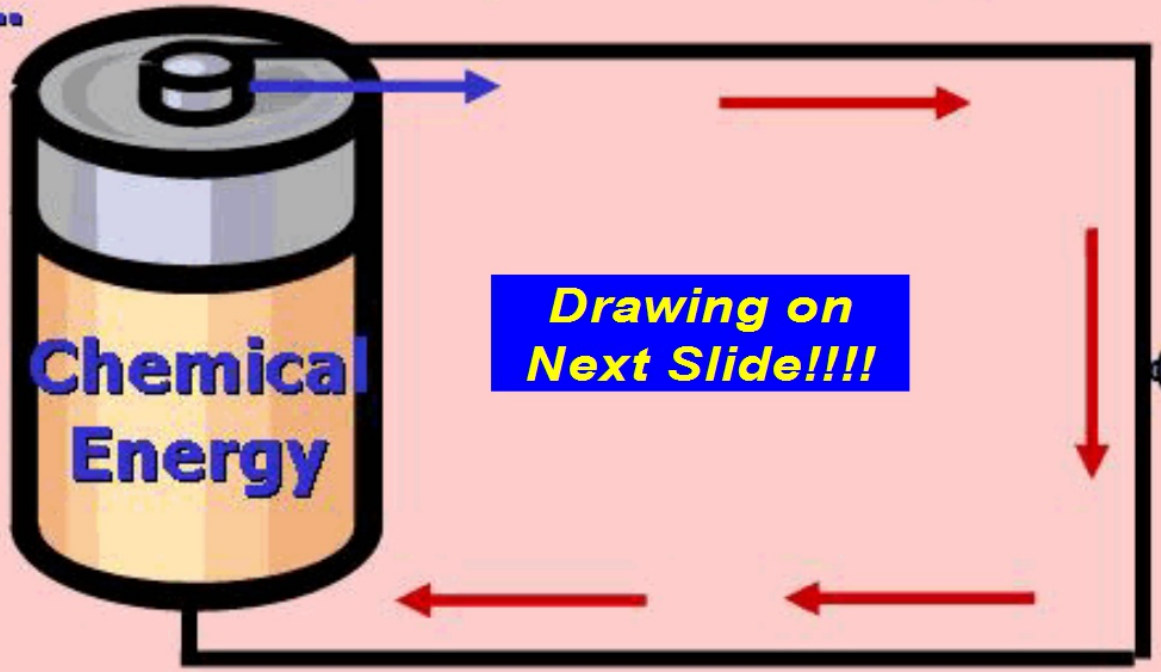
Motor



Cappacitor
ex: Flash on a disposible camera

Energy Conversions in a Simple Circuit

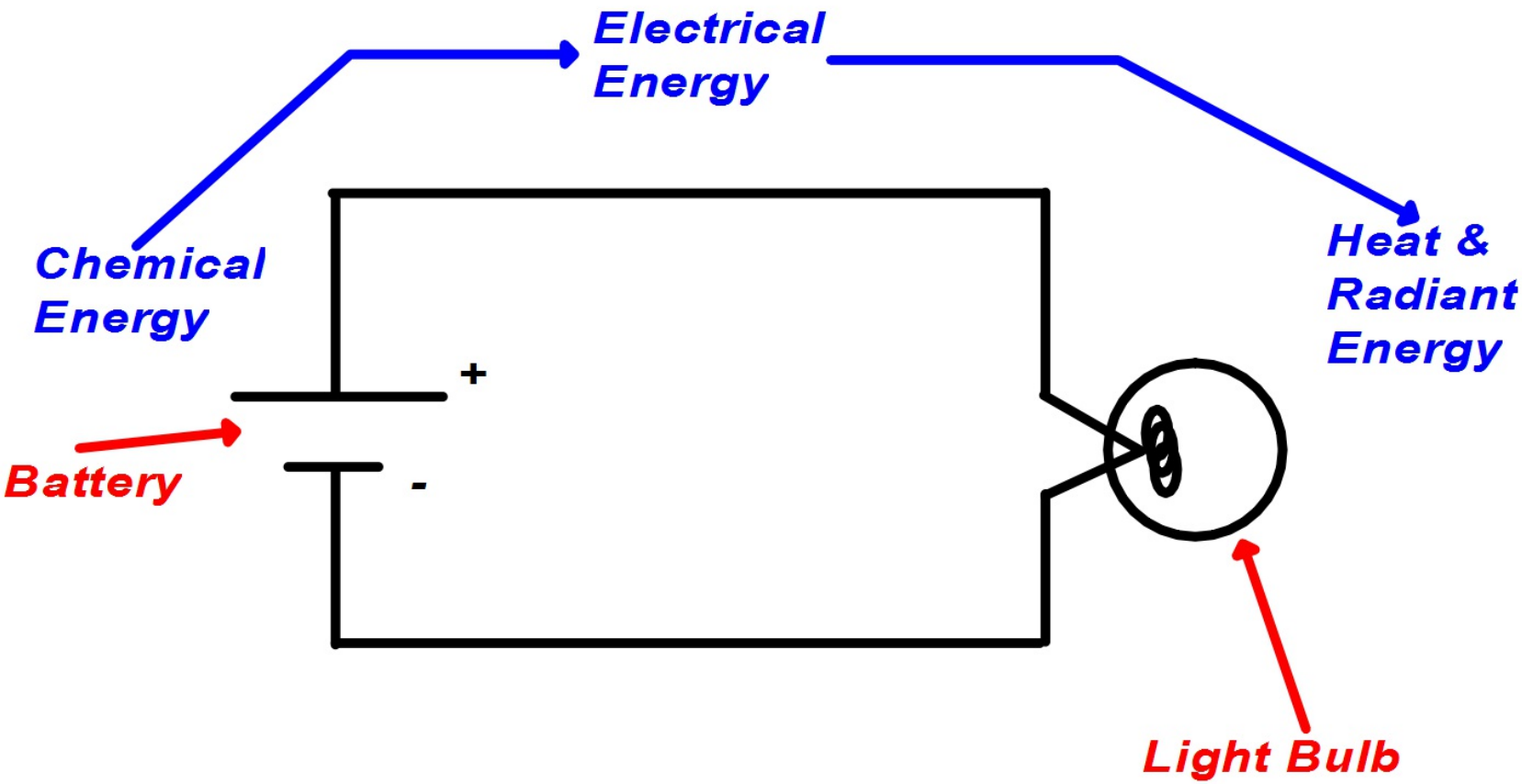
Battery converts
Chemical Energy **Electrical Energy**
into...



If you add a light bulb in the circuit, electrical energy is converted into...

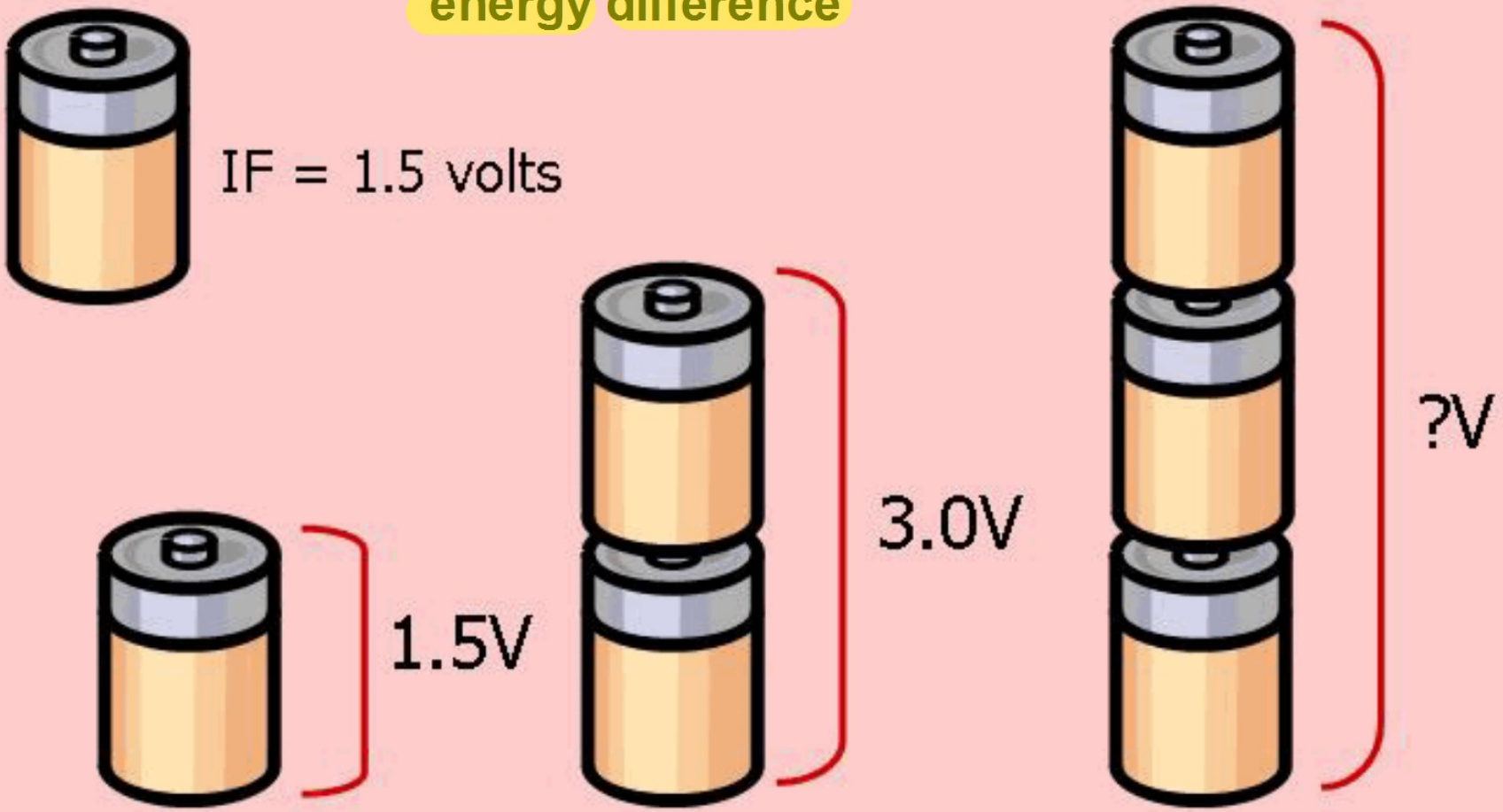
Drawing on Next Slide!!!!

Light Energy and Thermal Energy


Electrical Energy
Chemical Energy
Heat & Radiant Energy
+
-
Battery
Light Bulb

Volts

Measurement of the potential energy difference



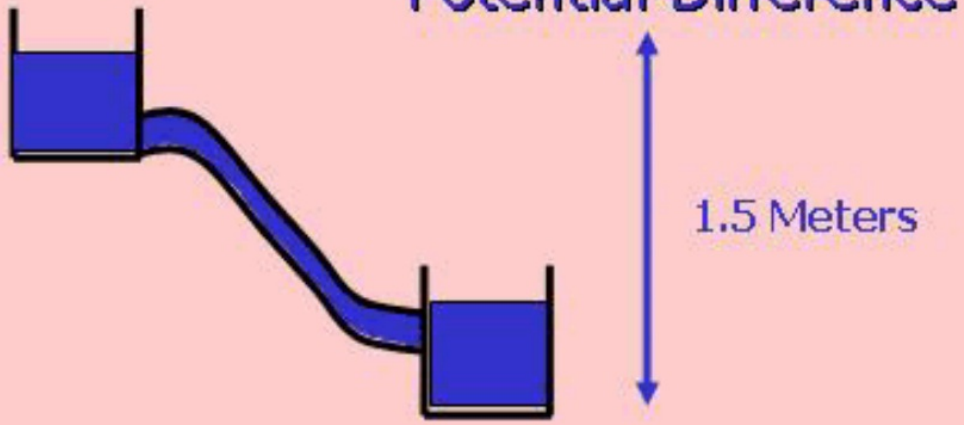
Voltage

is a measure of "potential difference."

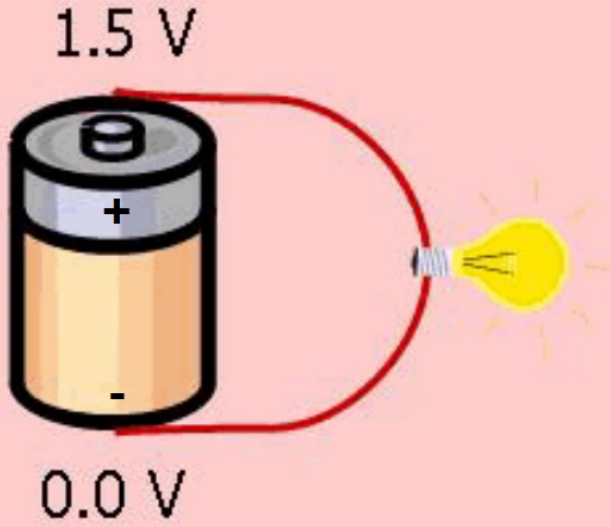
The unit for voltage is volts (V)

from Higher Energy

Potential Energy (height)



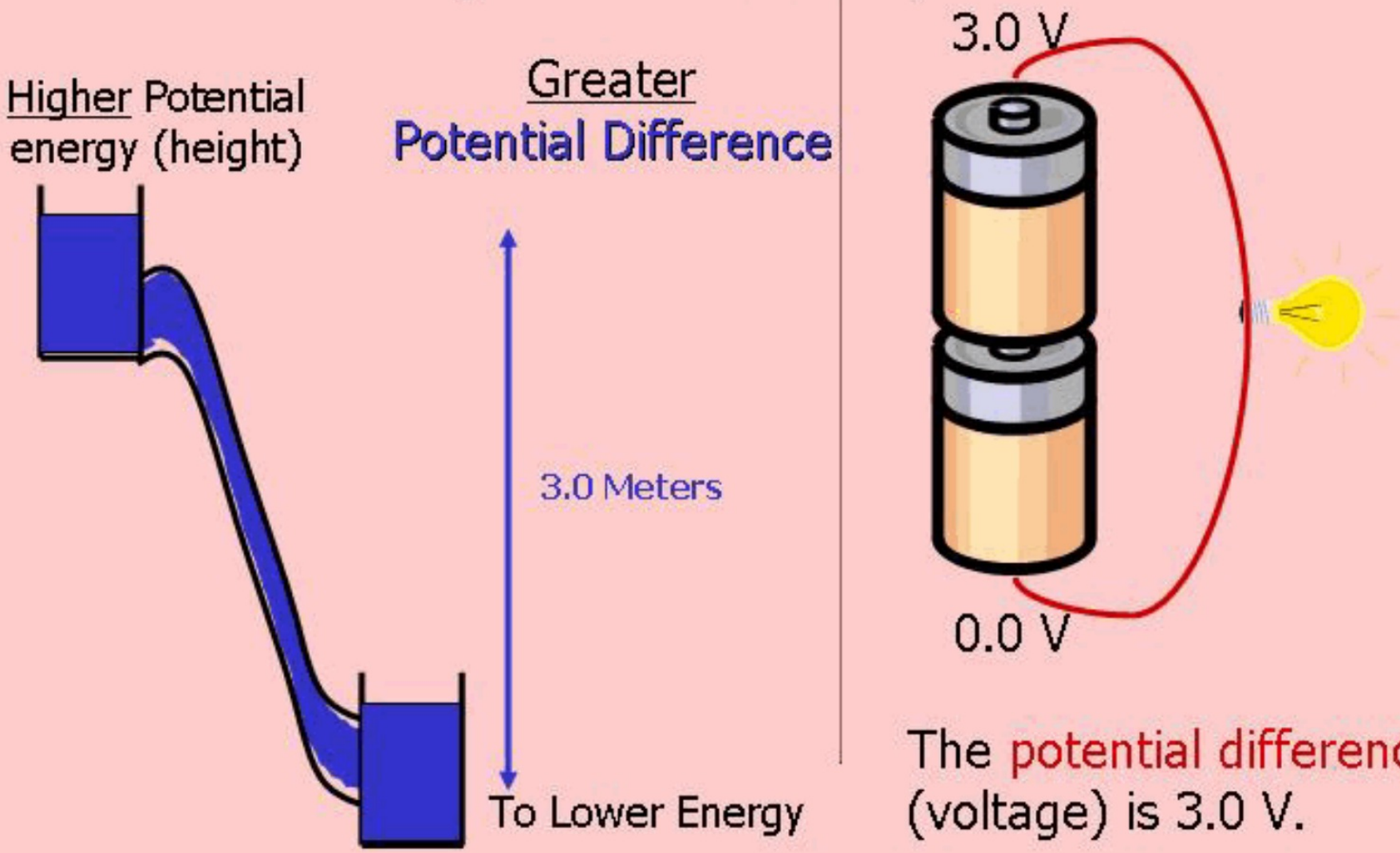
To Lower Energy



The potential difference (voltage) is 1.5 V.

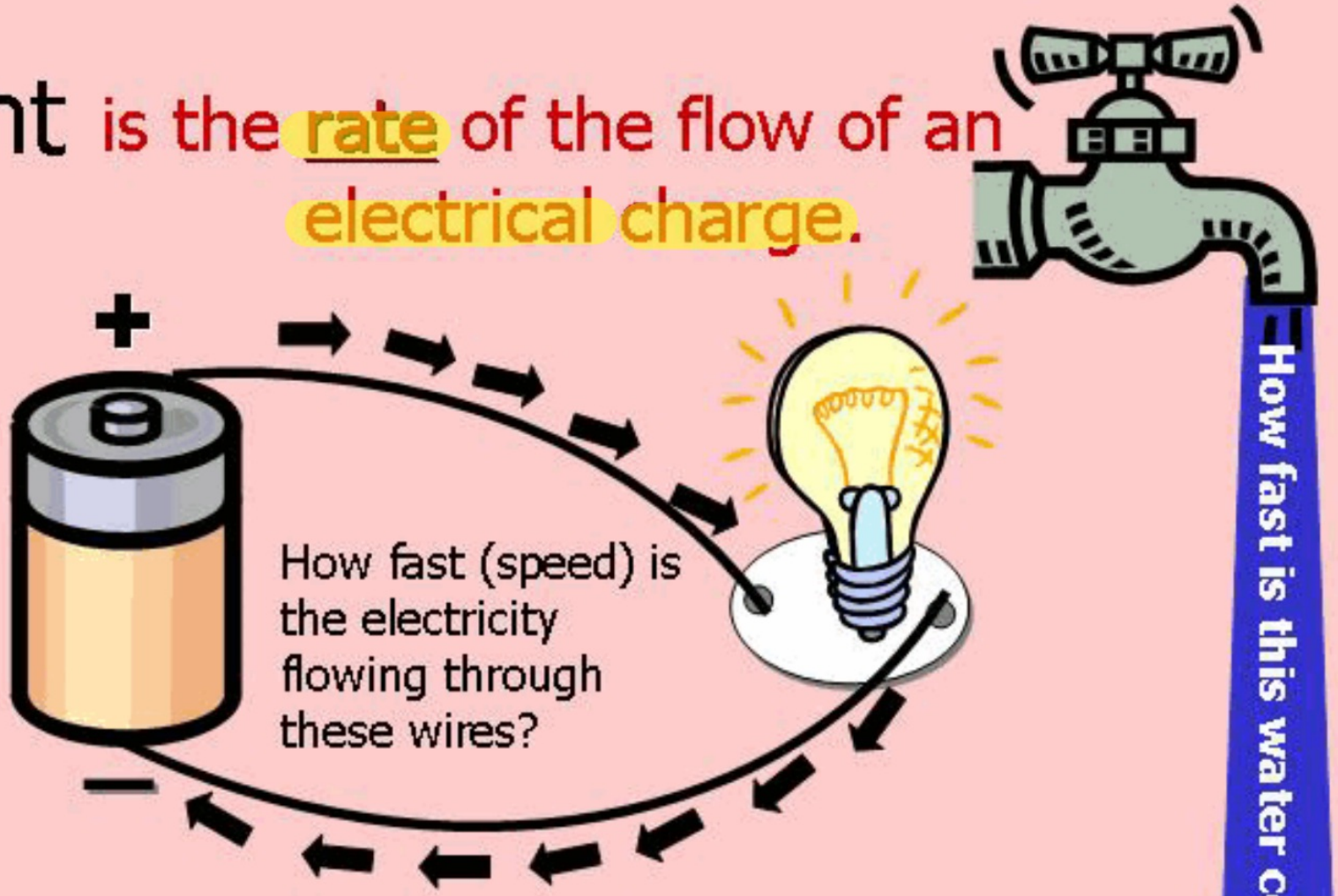
Voltage

The higher the energy, the greater the voltage (potential difference).



The potential difference (voltage) is 3.0 V.

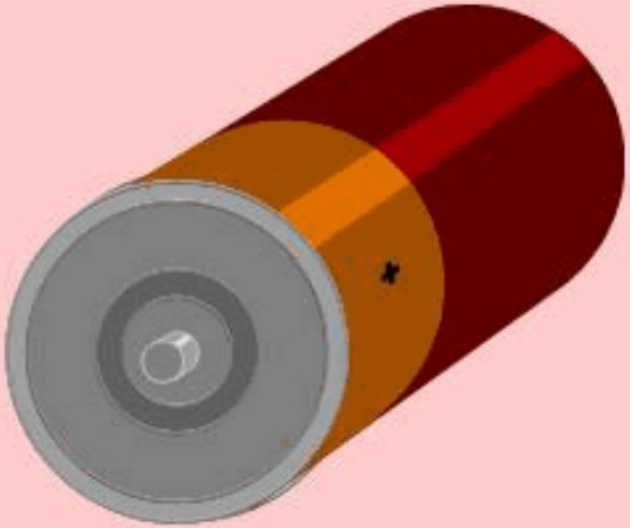
Current is the rate of the flow of an electrical charge.

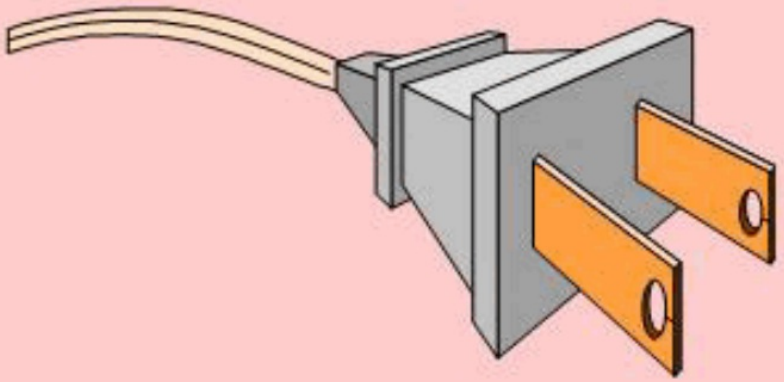


The **rate** that the electricity flows is called **CURRENT**

CURRENT (I) is measured in Amperes (Amps).

TYPES of CURRENT





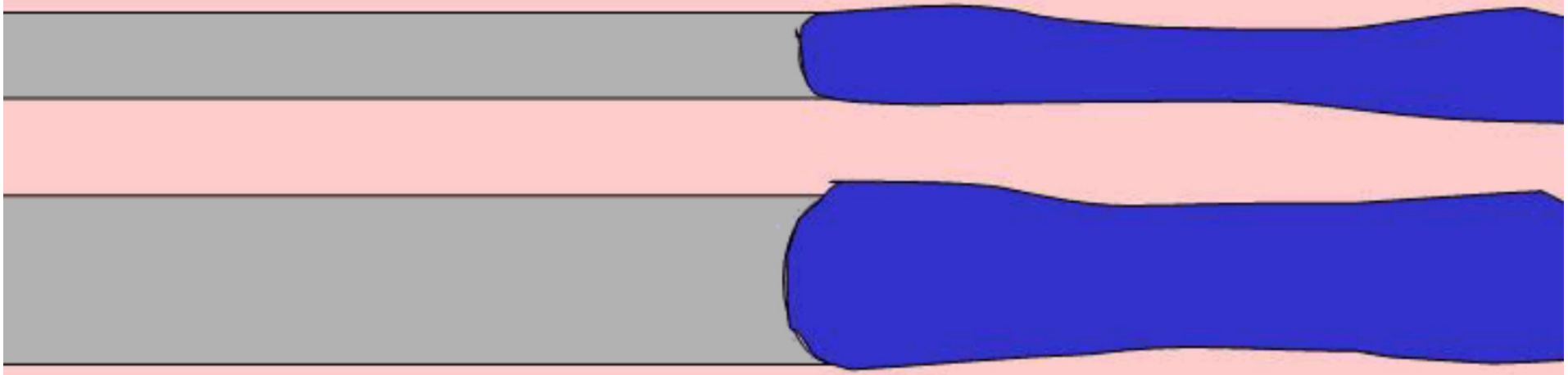
Direct Current (DC)
flows in one direction.

Alternating Current (AC)
flows back and forth.

RESISTANCE

the tendency of a material to oppose electron flow

Which of the pipes below would allow water out faster?



The smaller pipe would have more resistance to the flow.

Resistance (R) is measured in ohms.

Ω

to Electrical Current

Which of the following do you think would be most resistant to electrical current?

Plastic

Glass

Rubber

Resistance

These materials allow electrical charge (current) to move easily through them. They have little resistance to the flow of electrical current. They are

Conductors.

Resistance


Glass


Plastic


Rubber

These materials do not allow electrical charges (current) to move easily through them. They have a strong resistance to the flow of electrical current. They are

Insulators.

Conductors and Insulators:

- Conductors allow charges to flow easily.
  - Examples include copper, silver, and aluminum.

- Insulators do not allow charges to flow easily
  - Examples include glass, plastic, and rubber