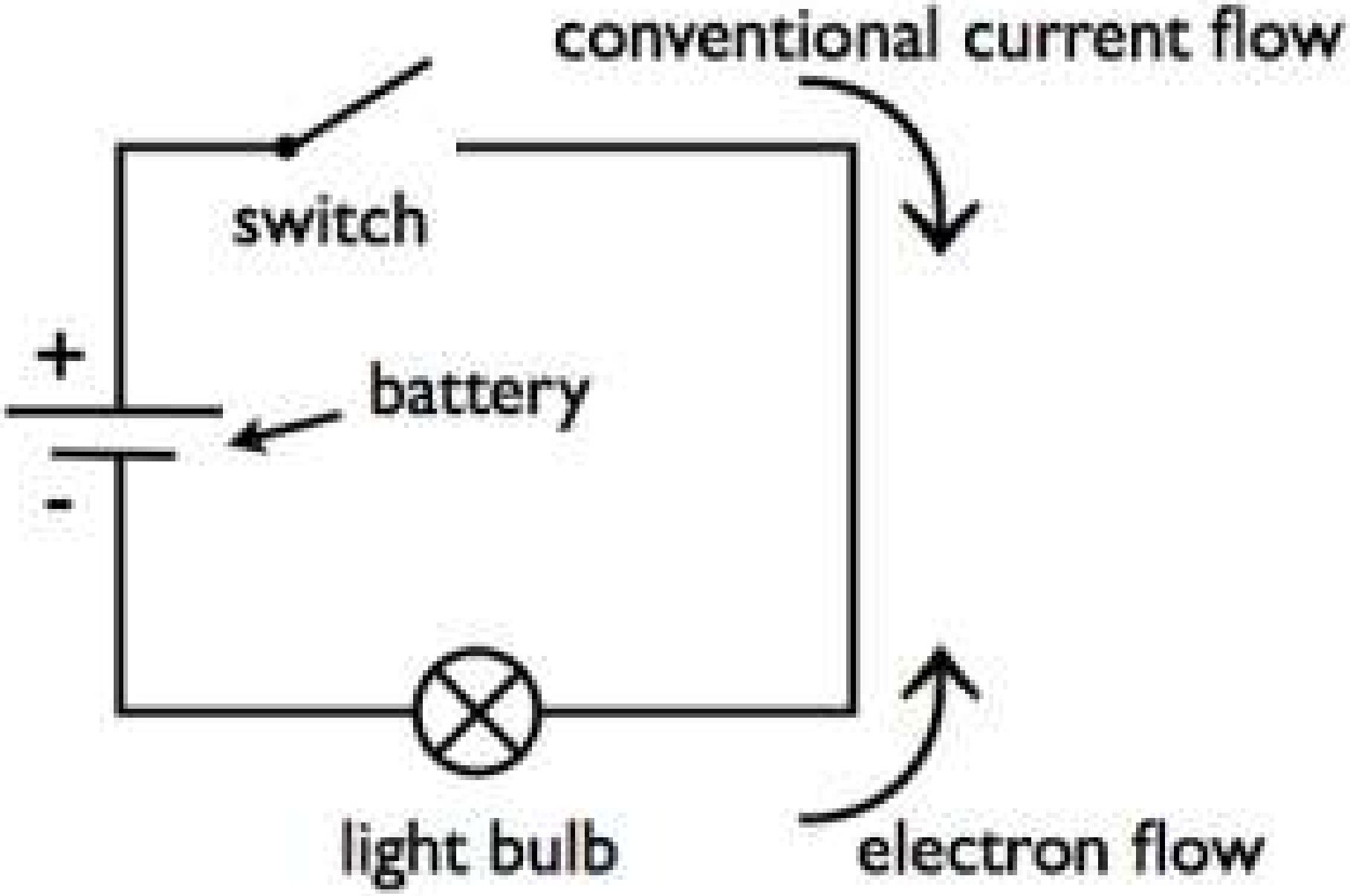
Chapter 17

- Circuits

Schematic Diagram

- A diagram that depicts the construction of an electrical apparatus is called a schematic diagram.
- Diagrams use symbols to represent bulbs, batteries, and wires.


conventional current flow
switch
+
battery
-
light bulb
electron flow

Electric Circuit

- Together, the bulb, battery, switch, and wire form the electric circuit.
- This is a path through which charges can flow.

Short Circuits

- In a short circuit, the current can increase and become unsafe.
- The wires can’t withstand the increased current, and begin to overheat.

Short Circuit Demo

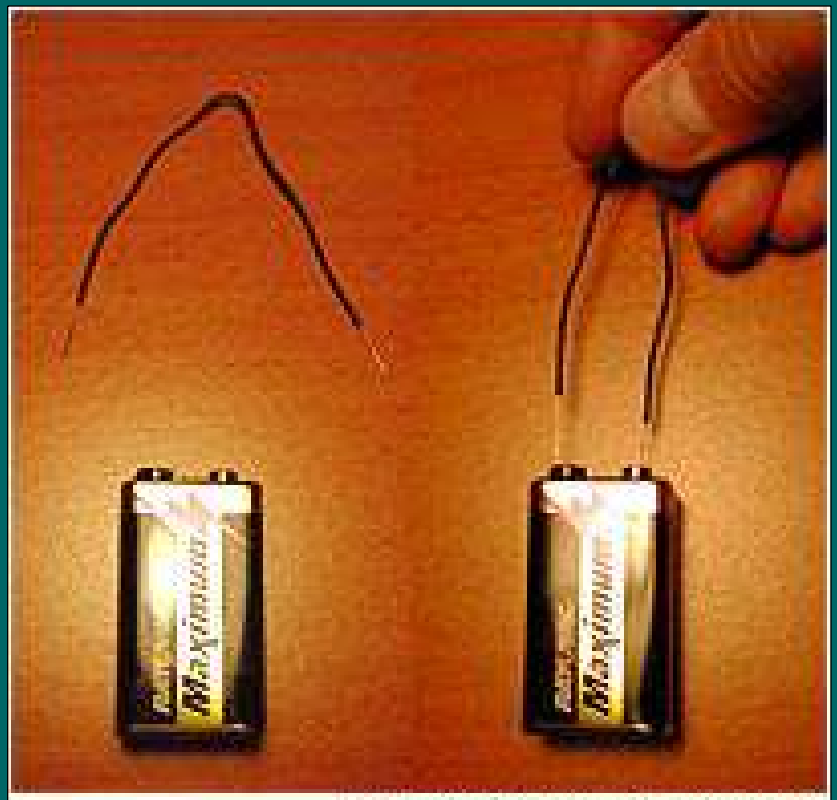
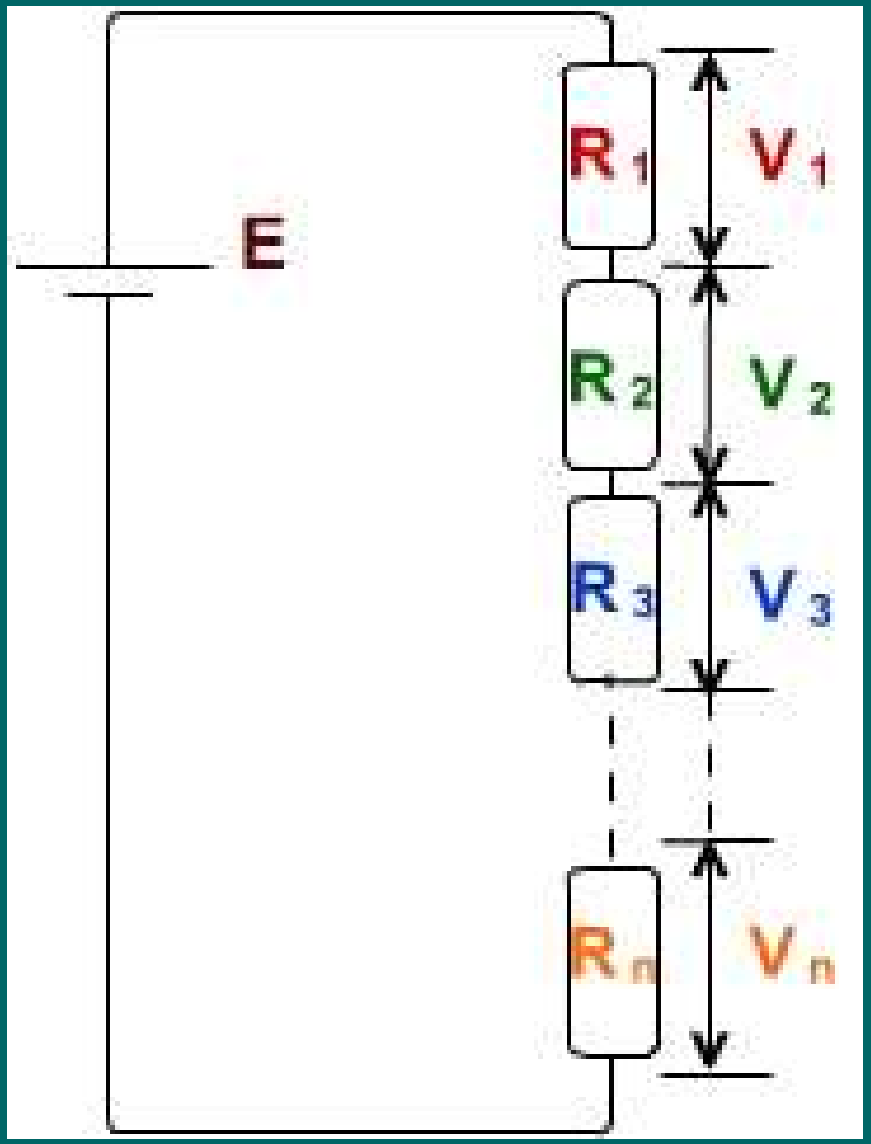


Image: The simplest example of a 'Short Circuit'. All you need is a battery and a piece of wire. If you do this in dark you may notice faint sparking when you connect + to - of the battery.

Resistors in Series

- In series, there is only one path for the current to flow.
- When many resistors are connected in series, the current in each resistor is the same.
- $R_1 + R_2 \ldots\ldots = R_{total}$

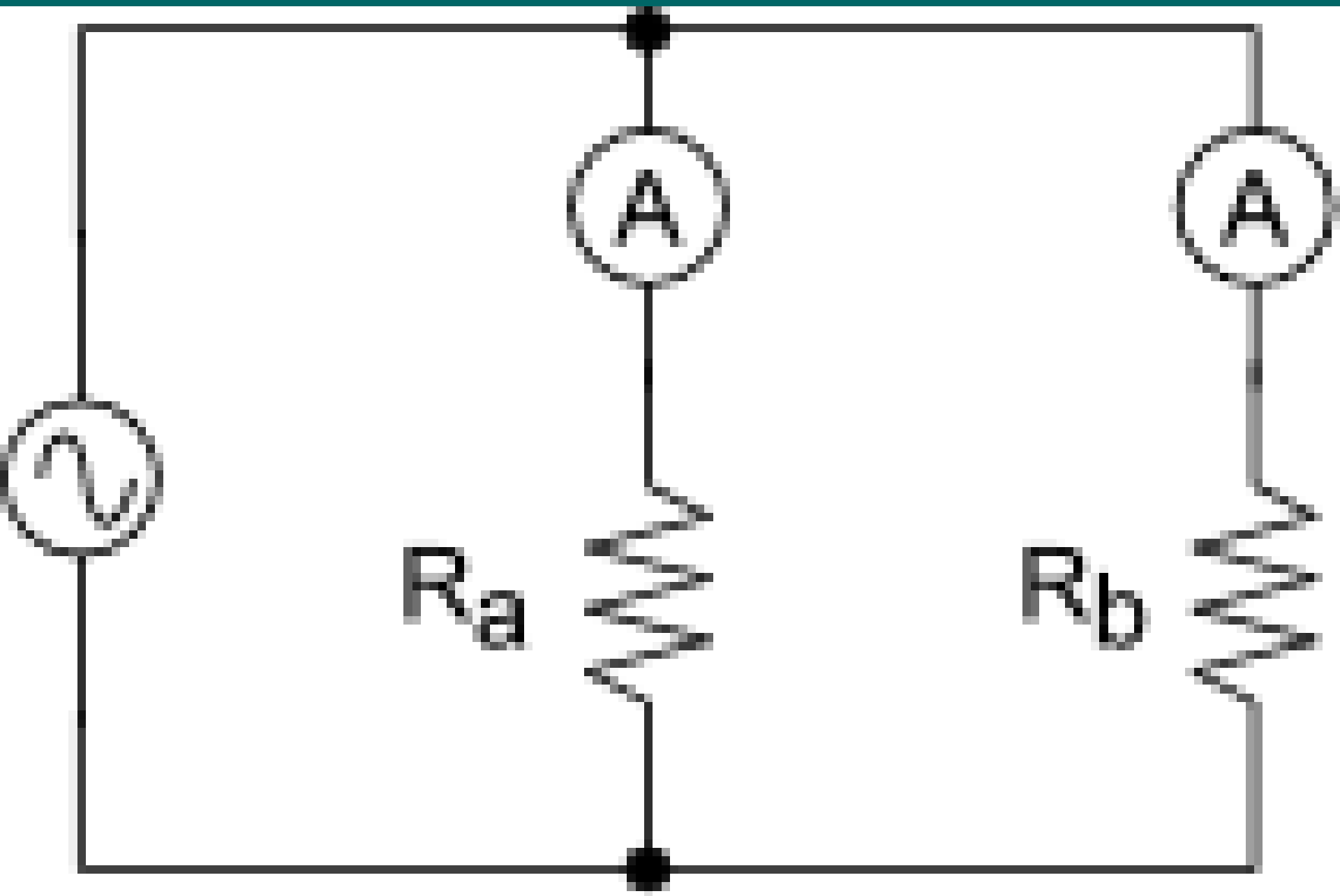

E
R 1
V 1
R 2
V 2
R 3
V 3
R n
V n

A 9 V battery is connect to 4 bulbs with resistance of 2, 4, 5, and 7. What is the current of the circuit?

- Current = V / R_{Total}

Resistance in Parallel

- Parallel means there are more than 1 path for a current to flow.
- $1/R_{total} = 1/R_1 + 1/R_2 .....$


A
A
Ra
Rb

A 9 V battery is connected to 4 resistors connected in parallel. The resistors are 2, 4, 5, and 7. What is the current?

- Current = V / R