

Current Electricity

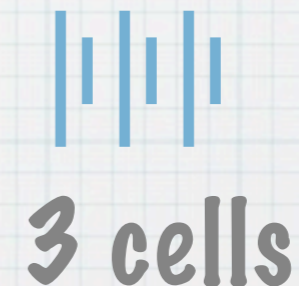
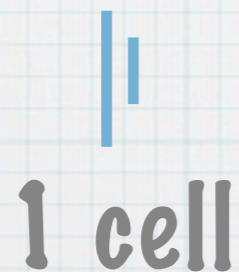
An Introduction to Simple Circuits

Static Electricity vs Current Electricity

Electricity	Definition	Characteristic
Static	Stationary buildup of electric charge on a substance	Electrons do not move along a path
Current	Electric charge that moves from a source of electrical energy along a controlled path in an electric current	Electrons move along a path

Circuits

- * **Current Electricity:** the controlled flow of electrons through a conductor.
- * **Dry cell:** A source of energy



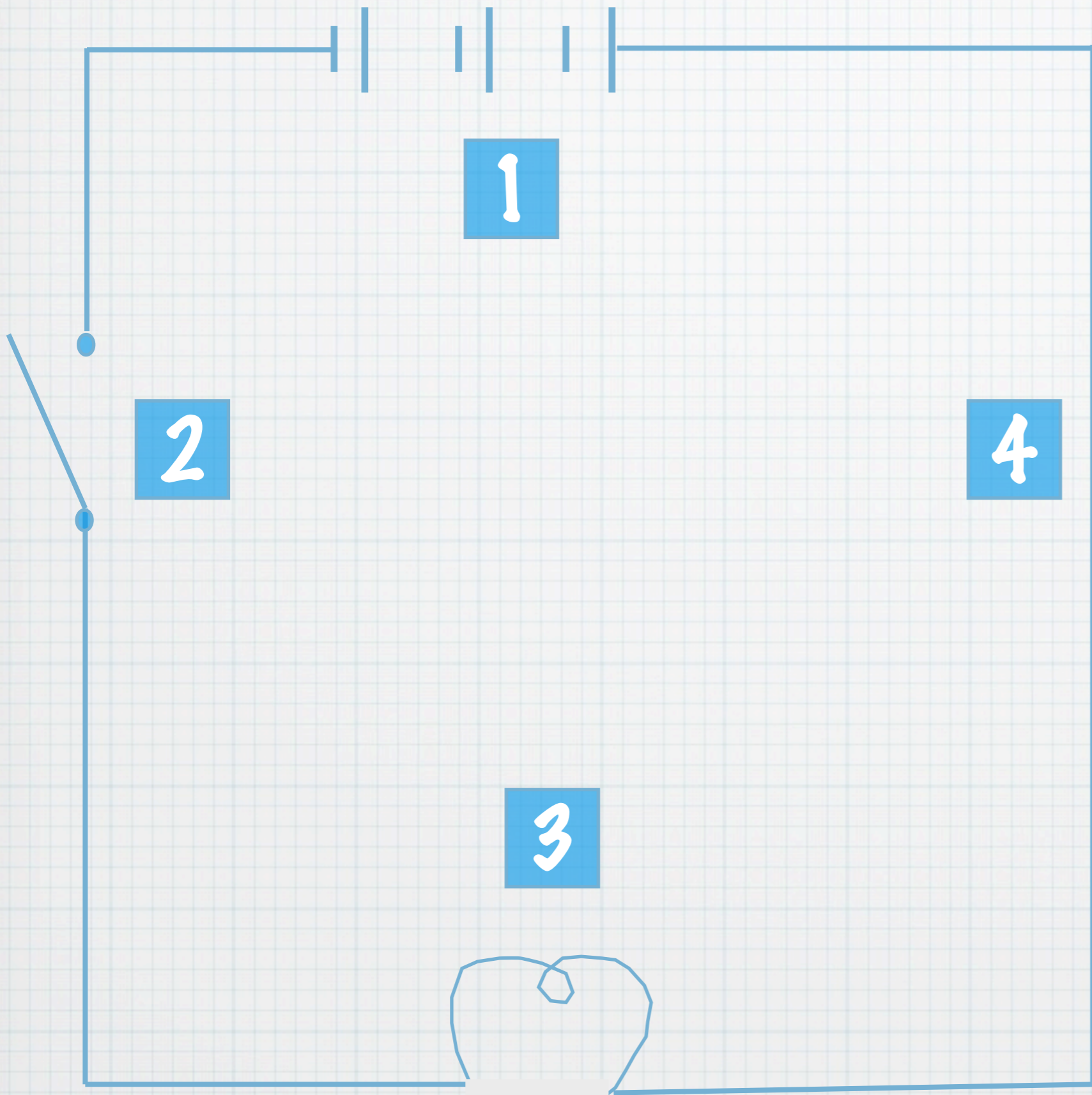
- * **Battery:** 2 or more conductors

Circuits

*** Circuits: A closed path for electrons**

Parts of a simple circuit

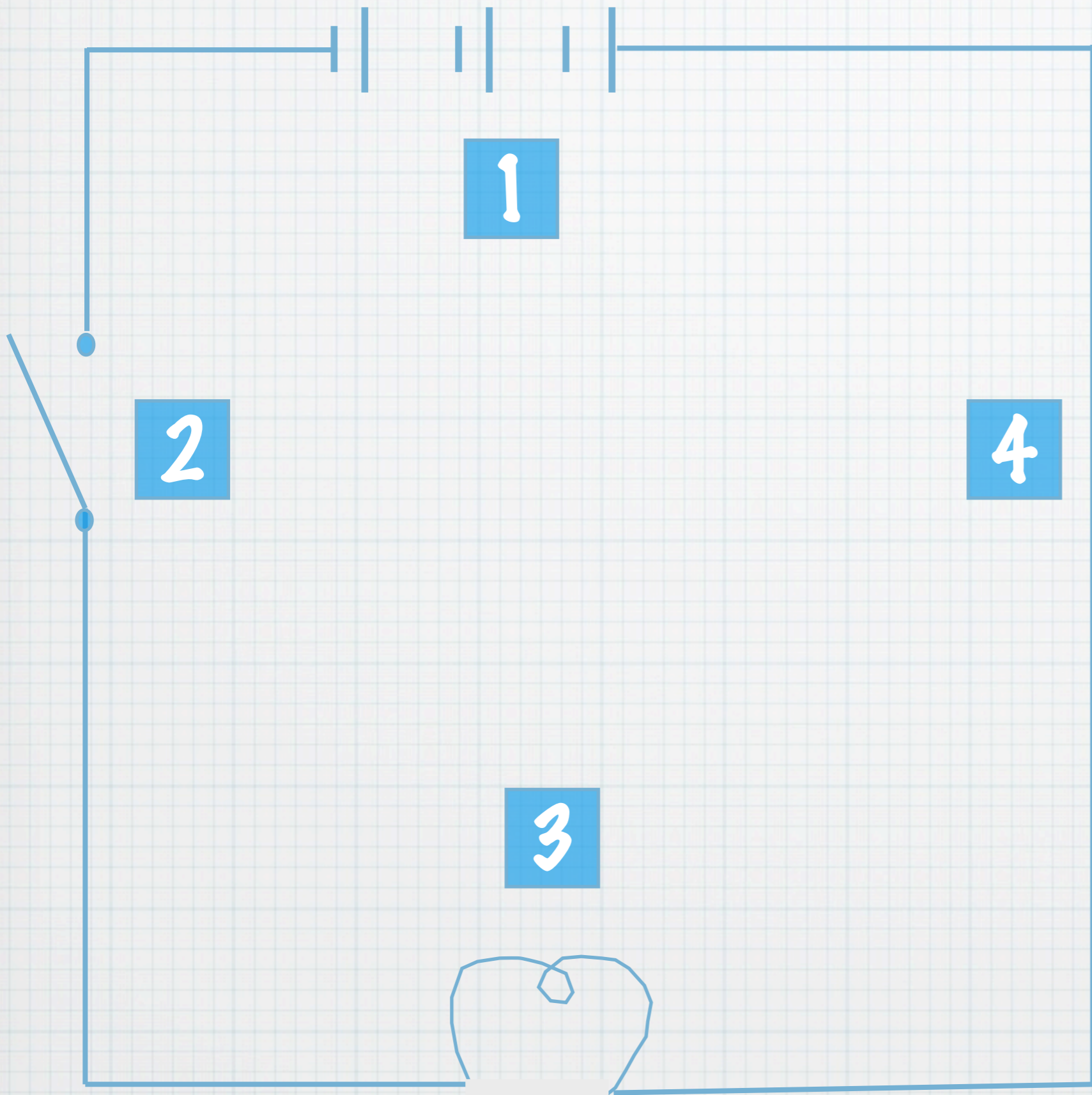
- * **Parts of a simple circuit**
 - * **1) Source: provides power (ie battery)**
 - * **2) Control: opens and closes the circuit (ie switch)**
 - * **3) Load: converts one type of energy (electrical) into another (sound, light, heat)**
 - * **4) Conductor: allows electrical energy to pass through it (ie. copper wire)**



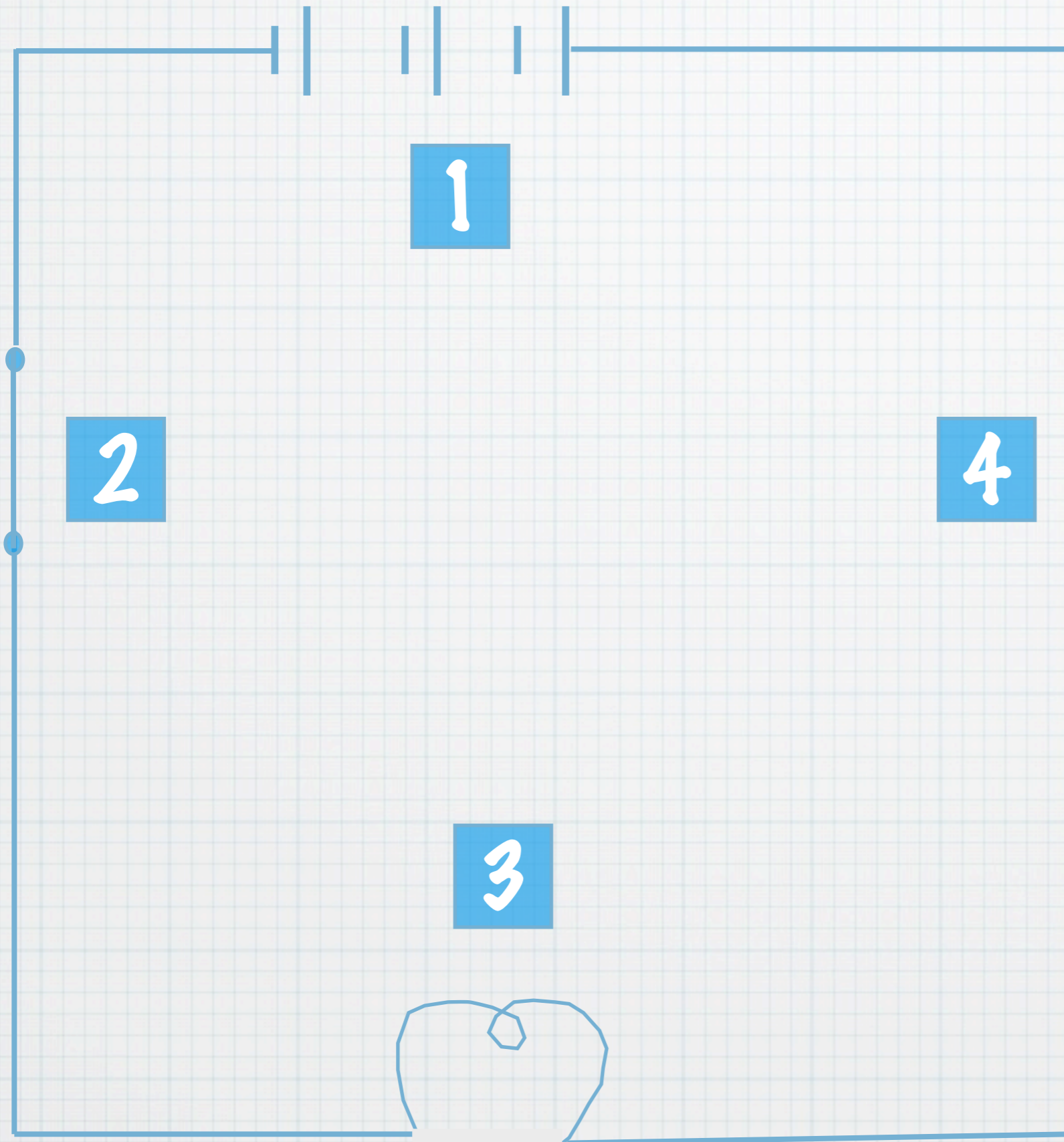
- 1) Source
- 2) Control
- 3) Load
- 4) Conductor

Operation of an Electric Circuit

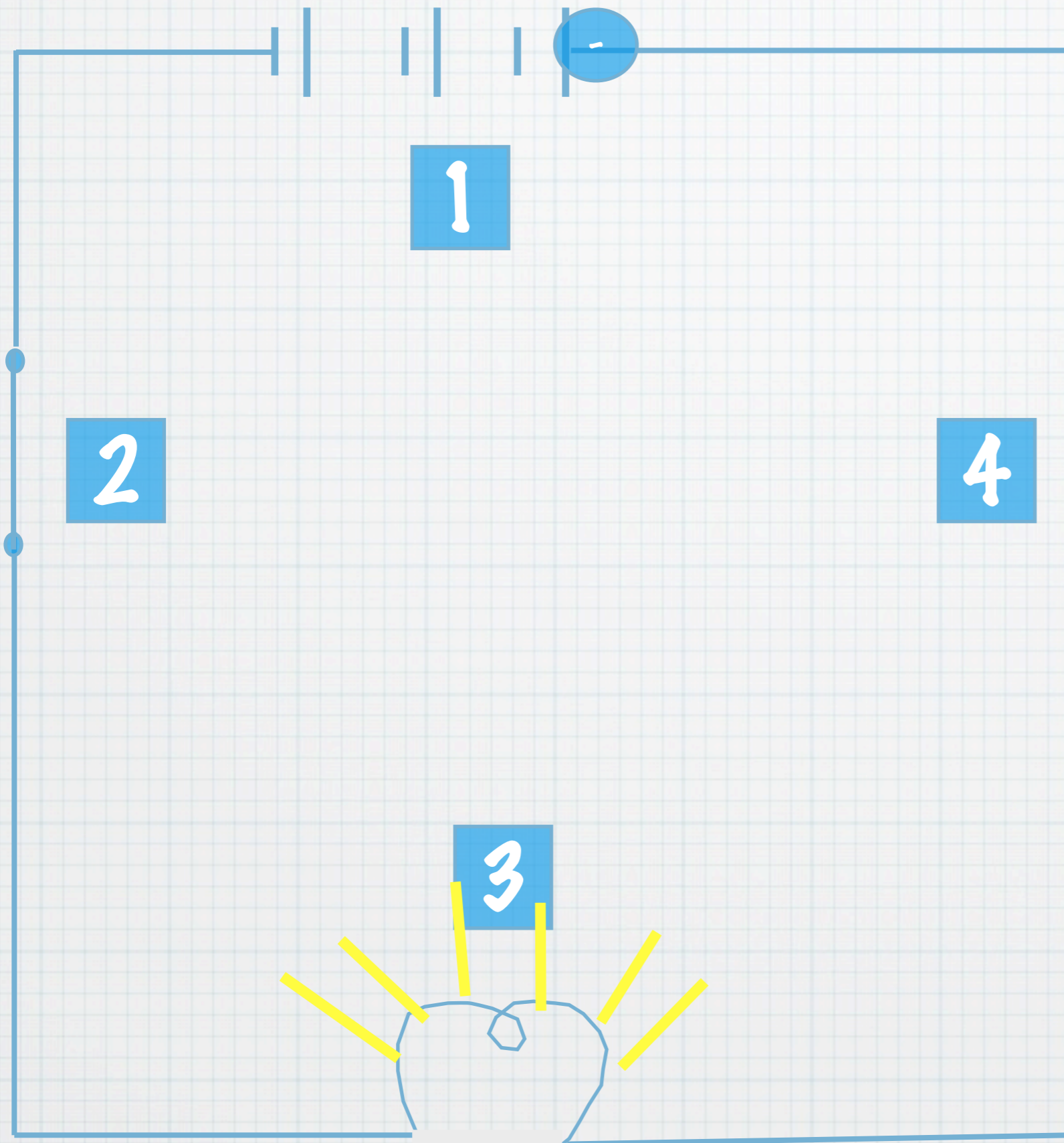
- * **Closed circuit:** circuit is operating and current is flowing and the switch is ON
- * **Open circuit:** Circuit is not operating and the current is not flowing. Switch is OFF



- 1) Source
- 2) Control
- 3) Load
- 4) Conductor



- 1) Source
- 2) Control
- 3) Load
- 4) Conductor



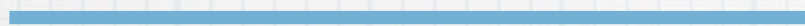
- 1) Source
- 2) Control
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Operation of an Electric Circuit

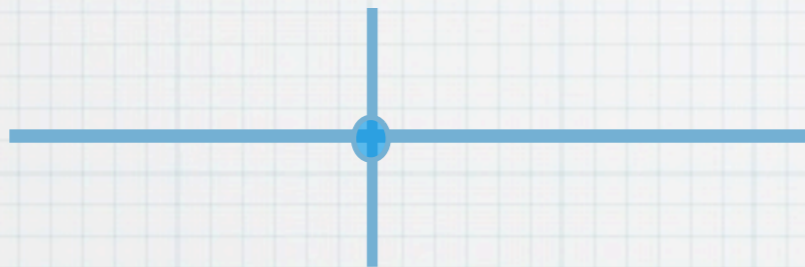
- * The electric current flows in a continuous loop from the negative terminal of the cell, through the wires, the switch and the light bulb and returns to the positive terminal.

Circuit Diagram Symbols

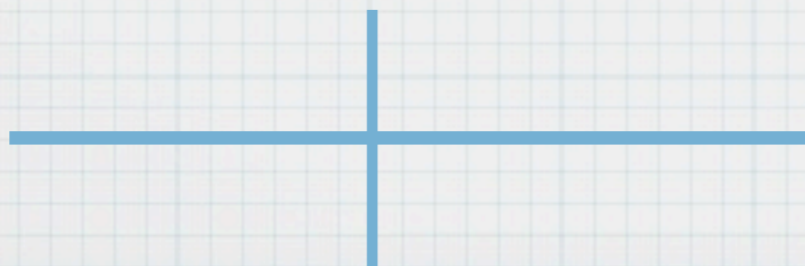
Conducting wire



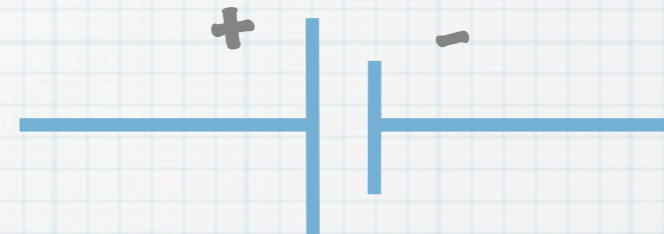
Wires joined



Wires not joined



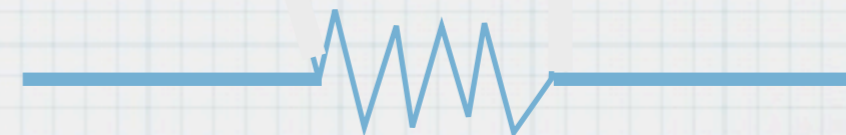
Cell



Lamp



Resistor



Circuit Diagram Symbols

Switch



Ammeter



Voltmeter



Electrical Current

- * The amount of charge that passes a point in a conducting wire every second
- * Represented by I
- * Measured in amperes (coulomb/second)
- * Measured using an ammeter

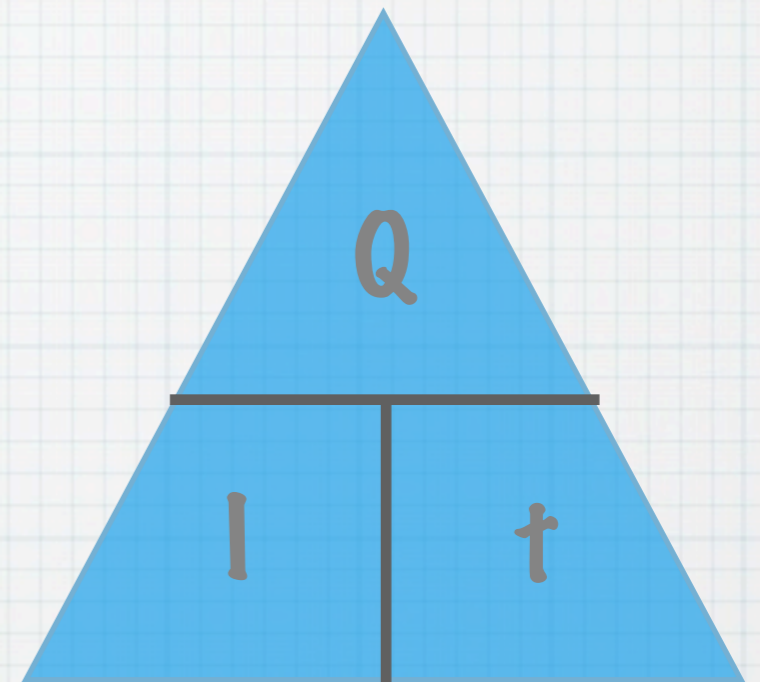
Electric Current

* $I = Q / t$

* I =current (measured in amperes)

* Q = charge moving past a point (measured in coulombs)

* t =time (measured in seconds)



Sample Calculation

- * If 240 coulombs of charge pass a point in a wire in five minutes, what is the current through that point in the wire?
- * Given
 - * $Q=240\text{ C}$ (Charge)
 - * $t=5\text{ min}$ (time)

Sample Calculation

- * First, time must always be in seconds
- * $t=5\text{min}$
- * $t=5 \text{ min} \times 60 \text{ seconds} = 300 \text{ seconds}$

Sample Calculation

- * Required: I (current)
- * $I = Q / t$
- * $I = 240 \text{ C} / 300 \text{ sec}$
- * $= 0.80 \text{ A}$
- * Therefore 0.80A will move through that point in the conductor.