

Lesson #2: Current

Orally: Remind students that we use electric current instead of conventional current.

Current is measured with an ammeter. Schematic symbol for an ammeter is _____.
Ammeters are placed in series in the circuit you are measuring current for. (Show students an ammeter in a circuit to demo)

The unit of Current is the Ampere (A). (We can also measure mA)

Q: How is current measured?

A: **$I = Q/t$** (Option: Show students triangle calculation)

“I” is current in amperes.

“Q” is charge measured in Coulombs (i.e., 1.0C = the charge on 6.25×10^{18} electrons).

“t” is time in seconds.

e.g., When 1.0 Coulomb of charge (Q) passes through an ammeter in 1.0s (t), the ammeter will read 1.0A.

$$1.0A = 1.0C/1.0s$$

Exercises:

1. If 34.0C of charge pass through an ammeter in 14.0s, what is the current in amperes?

$$I = 34.0C/14.0s$$

$$I = 2.43A \text{ or } 2\,430mA$$

2. If an ammeter reads 2.0A in a circuit over the course of 10s, how many Coulombs of charge have passed through the ammeter?

$$2.0A = Q/10s$$

$$Q = 20.0C$$

How many electrons are represented by 20.0C of charge?

6.25×10^{18} electrons/1C, therefore there will be 20 times this number of electrons
($20.0C \times 6.25 \times 10^{18} = 1.25 \times 10^{20}$ electrons)

3. If an ammeter reads 5.0A in a circuit and the charge over a period of time is 4.0C, then calculate the amount of time elapsed in seconds.

$$I = Q/t$$

$$5.0A = 4.0C/t$$

$$\text{Therefore } t = 0.80s$$

There are two basic kinds of current:

Direct Current (DC) – current flows in one direction

e.g., batteries and battery eliminators

Alternating Current (AC) – current flows back and forth

e.g., all outlets (i.e., “house electricity”)

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