

Electric Current

PH11-11, PH11-6

ORIENTATION

Lesson goal: define current as rate of charge flow and distinguish conventional current from electron flow.

The critical language repair is that current flows; voltage does not.

CORE CONTENT

Current is the rate at which charge passes a point:

$$I = \frac{Q}{t}$$

Conventional current is defined as the direction positive charge would move in the external circuit. Electron flow is opposite to conventional current in a metal wire.

QUANTITY	SYMBOL	UNIT	MEANING
current	I	A	charge per second
charge	Q	C	amount of electric charge
time	t	s	duration of flow

CONCEPT CHECK

1. Current is measured in:

- A. volts
- B. amps

- C. ohms
- D. joules

Answer: B.

2. Conventional current in an external circuit is from:

- A. negative to positive
- B. positive to negative
- C. north to south
- D. high resistance to low resistance only

Answer: B.

3. If 20 C passes a point in 8 s, current is:

- A. 2.5 A
- B. 12 A
- C. 160 A
- D. 0.40 A

Answer: A.

APPLIED PRACTICE

A current of 2.5 A flows for 8.0 s. Calculate the charge that passes a point.

$$Q = It = 2.5 \times 8.0 = 20 \text{ C}$$

Final answer: 20 C.

DEEP PRACTICE AND WRITING

Prompt: explain why current is not "used up" by a resistor in a simple series circuit.

MAINTENANCE LOOP

Retrieve $I = Q/t$, conventional current direction, and electron-flow direction.

STUDENT WORKING
