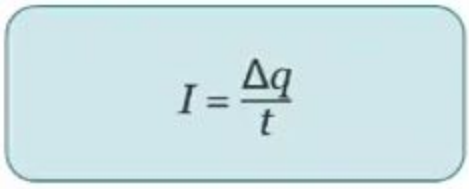
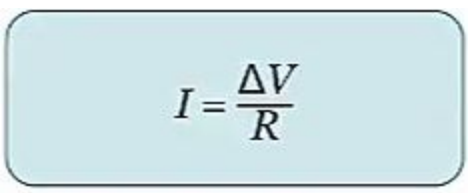
Ohm's Law Notes

- Electrons flow from places with higher electric potential energy to places with lower electric potential energy
    - Why? Electricity is like a falling object.
        - Things fall from higher gravitational potential energy to places with lower gravitational energy
            - i.e. Things fall from high to low
- Current - the continuous flow of electric charge
    - Also known as the rate at which a charge moves through a conductor
    - Equation: 
        - I = current
            - Unit: ampere (A)
        - Δq = change in electric charge
            - Unit: C
        - t = time
            - Unit: s
- Question: It takes 10.0 seconds for 15 coulombs of charge to flow through a wire. How much current is flowing through it?
    - Given: t = 10.0 s
      Δq = 15 C
    - Unknown: I = ?
    - Equation: I = $\frac{\Delta q}{t}$
    - Substitute: I = $\frac{15\ C}{10.0\ s}$
    - Solve: I = 1.5 A
- Electric circuit - a path through which electric charges or current can travel
- Voltage - the difference in electric potential between two spots
    - Unit: Volt (V)
    - Current flows from higher electric potential to lower electric potential
    - The bigger the voltage the more current
- Resistance - the tendency of a material to oppose the flow of charges
    - Unit: ohm (Ω)
    - The bigger the resistance the less current
    - You can change a wire's resistance by changing the wire's
        - Thickness
        - Length
        - Temperature
    - Any device that uses electricity has resistance

- Question: A thick wire has _____ resistance than a thin wire.
  - Less
- Question: A long wire has _____ resistance than a short wire.
  - More
- Question: A cool wire has _____ resistance than a warm wire.
  - Less

- Ohm's Law - current is equal to voltage divided by resistance
  - Formula: 
    - I = current
      - Unit: A
    - ΔV = change in voltage
      - Unit: V
    - R = resistance
      - Unit: Ω
  - Question: What is the current in a circuit with a 9.0 V battery and a 1.5 Ω resistor?
    - Given: $\Delta V = 9.0$ V
      R = 1.5 Ω
    - Unknown: I = ?
    - Equation: I = $\frac{\Delta V}{R}$
    - Substitute: I = $\frac{9.0\ V}{1.5\ \Omega}$
    - Solve: I = 6 A
  - Question: How does the current in a circuit change if the resistance is tripled?
    - The current is ⅓ what it used to be.
      - Plug in 3 for R and see what happens to I