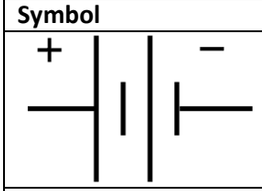
# Electricity – Summary Sheet

| Electricity Equations: | | | |
|---|---|---|---|
| **Equations:**<br>1) $P = VI$<br>2) $R = \frac{V}{I}$<br>3) $I = \frac{Q}{t}$<br>4) $Q = ne$<br>5) $V = \frac{\Delta E}{Q}$<br>6) $E = Pt$<br>7) $Cost = (E)(rate)$ | **Concept** | **Symbol** | **Units** |
| | Power | P | Watts (W) |
| | Current | I | Amps (A) |
| | Voltage (potential difference) | V | Volts (V) |
| | Charge | Q | Coulomb (c) |
| | Time | t | Seconds (s) – (Equation #3)<br>Hours (h) – (Equation #6) |
| | Energy | E | Joules (J) – (Equation #5)<br>Kilowatt-hours (kWh) – (Equation #6 & 7) |
| | Rate | R | Dollars per kWh ($/kWh) |
| | Cost | C | Dollars ($) |

| Shopping Analogy | | |
|---|---|---|
| **Symbol** | **Meaning** | **Analogy** |
|  | *Power source* | *The bank.*<br>This symbol gives out the money to all the people in the circuit |
| | *Resistor*<br>(represents conversion of electricity to any "load," such as a light, a speaker or any other conversion | *The store*<br>This symbol represents the place where people spend their money |
| V | *Voltage (potential difference)* | *The money* |
| I | *Current* | *The people running around the store* |
| R | *Resistance* | (I don't have a good analogy in this case |

# Solving Circuits – Cheat Sheet

**Kirchoff's Laws:**

| | Series Circuit | Parallel Circuit |
|---|---|---|
| **Voltage (V)** | $V_T = V_1 + V_2 + V_3 + \ldots$ | $V_T = V_1 = V_2 = V_3 = \ldots$ |
| **Current (A)** | $I_T = I_1 = I_2 = I_3 = \ldots$ | $I_T = I_1 + I_2 + I_3 + \ldots$ |
| **Resistance (Ω)** | $R_T = R_1 + R_2 + R_3 + \ldots$ | $\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \cdots$ |

Or…more simply…

| | Series | Parallel |
|---|---|---|
| **(V)** | **+** | **=** |
| **(I)** | **=** | **+** |
| **(R)** | **Add up values** | **Add up reciprocal values** |

**Four Rules for solving circuits:**

1. Simplify the part of the circuit you recognize
2. If given two values, find the third
3. Transfer information that is the same
4. Redraw every time you change information