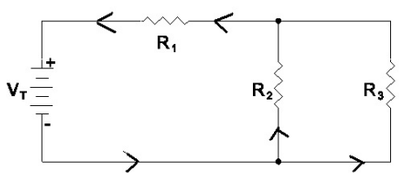
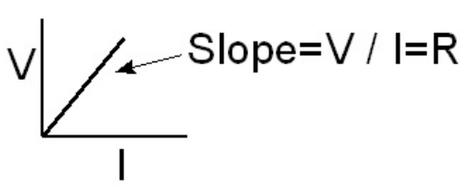
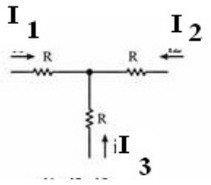
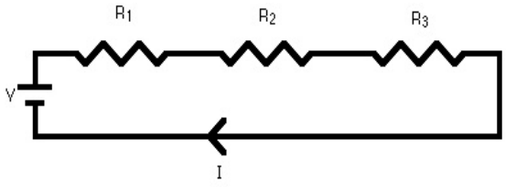
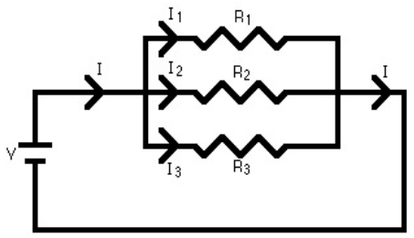
PHYSICS 3204

CURRENT ELECTRICITY

Electron Flow	Electrons flow out of the (-) terminal into the (+) 
CURRENT	$I = \frac{Q}{t}$ I = current (ampere, A) Q = charge (coulombs, C λ = time (s)
AMMETER	Instrument used to measure current. Ammeter is connected in series with the other elements of the circuit.
ELECTRIC POTENTIAL ENERGY OR VOLTAGE	$V = \frac{E_e}{q}$ V= voltage (Volts, V) E_e = Electric Potential Energy (J) q = charge (Coulombs, C)
VOLTMETER	The instrument used to measure voltage.
ELECTRIC ENERGY	E_e = VIt E_e = Electric Potential Energy (J) V= voltage or potential difference across the circuit (Volts, V) I= current flowing through the circuit (Amperes, A) t = time that the circuit is being used (seconds)
OHM'S LAW: measures "resistance" to electron flow.	$R = \frac{V}{I}$ R = resistance (Ohms, Ω) V = Voltage (Volts, V) I = current (ampere, A)
OHMIC CIRCUIT	when V versus I results in a straight line, the resistor has a constant resistance. Such resistors are said to be ohmic because they obey Ohm's law. 

FOUR FACTORS THAT AFFECT RESISTANCE:	1) increases in resistance as its temperature rises 2) longer the wire, larger the resistance $\frac{R_1}{R_2} = \frac{L_1}{L_2}$ 3)Resistance is inversely proportional to the cross-sectional area of the resistor $\frac{R_1}{R_2} = \frac{L_2}{L_1}$ 4)Resistance is affected by the substance that makes up the resistor. (See Resistance of Conductor below)
RESISTANCE OF A CONDUCTOR	$R = \rho\frac{L}{A}$ or $R = \rho\frac{L}{\pi r^2}$ R = resistance (Ohms, Ω) ρ = resistivity (Ωm) L = length (m) A = Area (m^2)
KIRCHOFF'S CURRENT RULE:	current going into a junction point equals the current leaving the junction point. $\mathbf{I_3 = I_1 + I_2}$ 
KIRCHOFF'S VOLTAGE RULE:	- Series (single loop) $V_T = V_1 + V_2$ - Parallel (in every loop) $\Sigma V_{rise} = \Sigma V_{rdrop}$
TOTAL RESISTANCE IN SERIES	$R_{TOTAL} = R_1 + R_2 + R_3 + ...$ 
TOTAL RESISTANCE IN PARALLEL	$\frac{1}{R_{TOTAL}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \ldots$ 
POWER	$P = \frac{W}{t}$ or $P = IV$ P = power (W, watts) W= work (J, Joules) t = time (sec) I= current (amperes, A) V = Voltage (V)
ENERGY	E = P/t To find the cost of your light bill be sure to leave units as kW◦hr