Current - amount of charge flowing through a specific point in a certain period
Voltage - electrical potential energy, must across two points, GND = 0V

Components of circuits:
- resistor - measures how well a material conducts electrons
- capacitor/inductor - measures material's ability to store charge and energy
- transistor - basic amplification or switching technology

Kirchhoff's Laws:
- KCL - current in = current out, sum of current at any location = 0
- KVL - sum of voltages around a loop = 0, define consistent polarity

KVL and KCL are general and apply to any device

Electrical node: the junction of two or more devices connected by wires
- same voltage at any point of the node

Resistance and Ohms Law:
- Measure how hard it is for current to flow through the substance
- Resistance = Voltage / Current
- Measured in Ohms
- Ohms Law: I = V/R or V = IR (only applies to resistors or devices modeled as resistors)

Series vs Parallel resistance:
- Series resistors = same current must pass through both (R_eff = R1 + R2 + …)
- Parallel resistors = each connects to the same two nodes (R_eff = 1/R1 + 1/R2 + …) ^-1
- Series and parallel resistors can be combined to an equivalent resistor

When two resistors are **in series**, we can deduce an expression for the voltage across one of them.
(1) I = Vtot / (R1+R2) (2) V1 = I*R1 (3) V2 = i*R2
V1 = Vtot [R1/(R1+R2)], V2 = Vtot[R2/(R1+R2)]

LED:
- glows when current flows through it (voltage difference)
- LEDs are polarized, work in one direction (longer leg must be at higher voltage)
- Use a series of resistors to limit current
    - Amount of current will determine brightness of LED
    - R increases -> I decreases -> brightness down
    - usually R1 is 200-500 ohms