



# Computer Engineering

Introduction to Electronics

For more info see [HERE](#)






Be prepared for success, take**TECH.**



# Electronics ... Electricity?

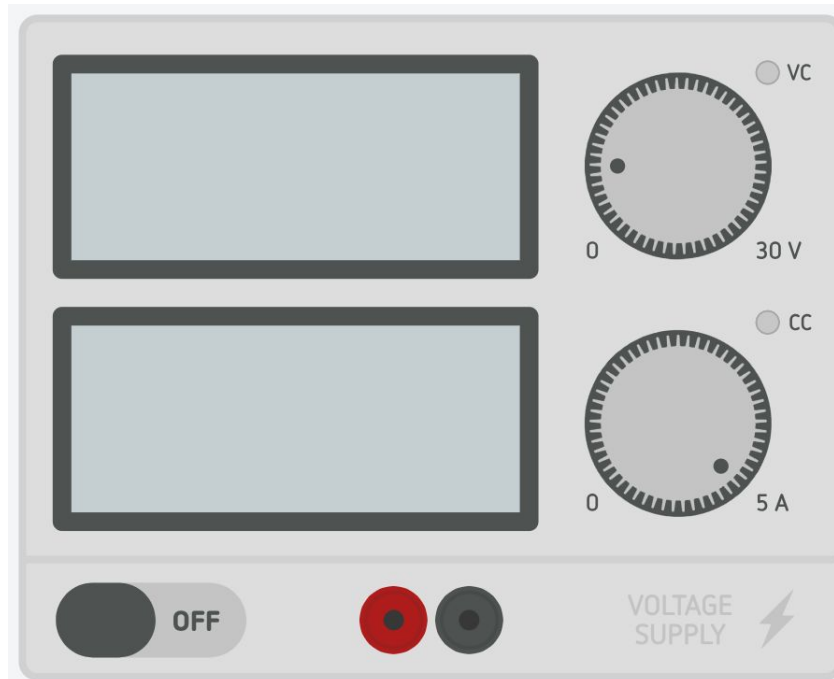
- Electronics are based on the controlled flow of electricity, and electricity follows Ohm's Law
- Ohm's Law follow the "viral" equation
- $V=I \cdot R$ ,  $I=V/R$ ,  $R=V/I$
- With this one equation you can pretty much do all the [Ohm's Law Student Assignment](#)
  - [Ohm's Law Assignment Solution](#)
- For more detail see [Ohm's Law PowerPoint](#)
- When you feel ready try the [Ohm's Law Assessment \(quiz\)](#)
  - [Ohm's Law Assessment Solution](#)

$\frac{V}{I R}$ <p>“viral”</p>	 $\frac{V}{I R}$ $V=IR$
 $\frac{V}{I} R$ $I = \frac{V}{R}$	$\frac{V}{I R}$  $R = \frac{V}{I}$



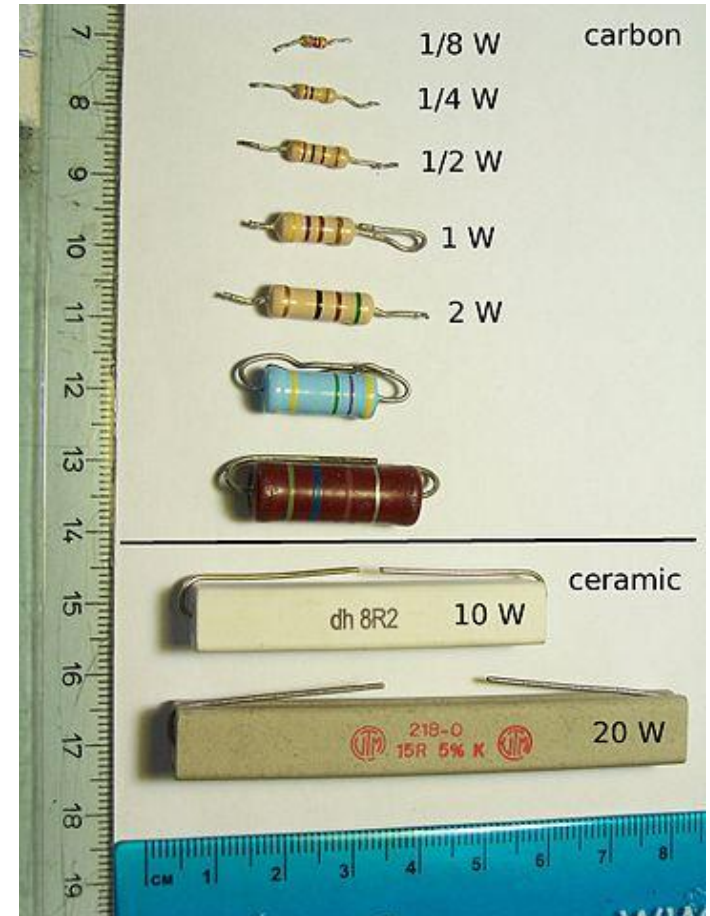
# Power Source

- Electronics require a power source to provide the required energy to work, and typically provided by battery (mobile), or a wall adaptor (fixed location)



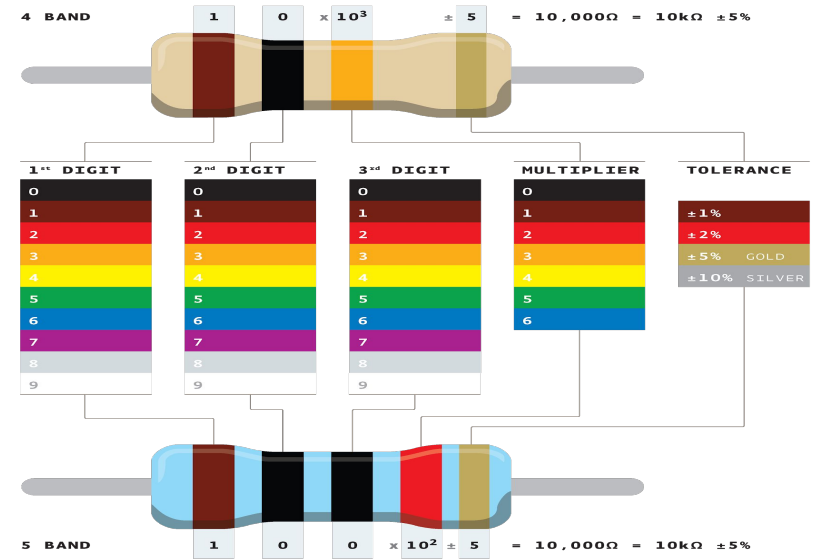
# Resistors

- "With great power comes great responsibility"... Stan Lee
- Electronics often require resistors to slow down the flow of electricity
- The power rating of the resistor tells us how powerful the voltage and amperage coming into the resistor can handle safely
- Let's try using the Resistor!
- [Lab 1 The Resistor Teacher Solution and Read Me](#)
- [Lab 1 The Resistor \(Student Handout\)](#)



# Resistors Colour Code

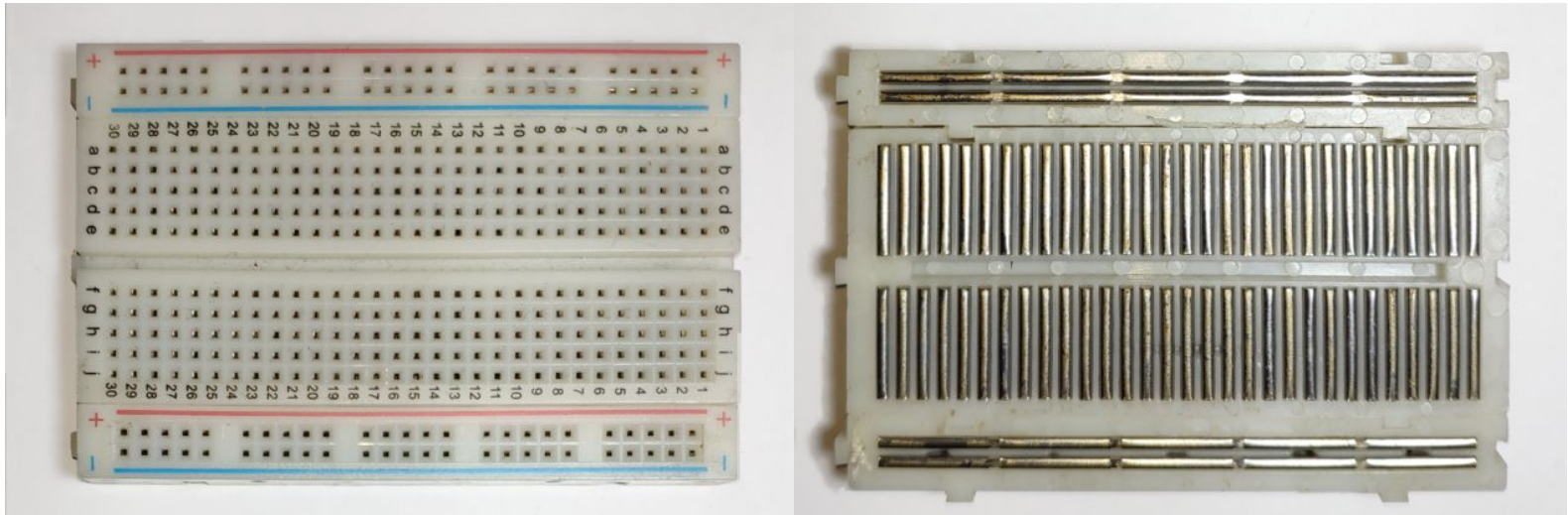
- The strength of a resistor is measured in  $\Omega$  (pronounced ohms)
- The colour code of the resistors tell the value of the resistor
- For example, what is the value of a resistor with: blue, green, orange, gold?
- blue = 6, green = 5, orange = 3, so 000 zero's is what I need to put on the end of 65... 65 000  $\Omega$
- Gold is +/- 5%
- 65000 +/- 5% is the answer



- When you feel confident, try the [Resistor Worksheet 1](#), [Resistor Worksheet 2](#), [Resistor Quiz](#)
- [Resistor Quiz Solutions](#)

# Breadboard

- A breadboard is a construction base used to build semi-permanent prototypes of electronic circuits, the connections are shown in the picture
- The main benefit of using readboards to connect circuit components is that it does not require soldering and is reusable



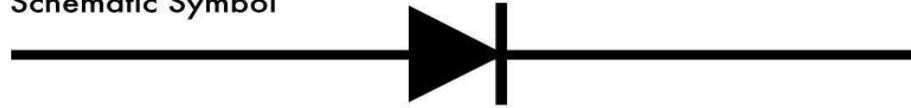
# Diodes

- Electricity flow can sometimes reverse, due to static electricity discharge or other reasons, and damage sensitive electronics
- Diodes are like one way valves for electricity to eliminate backflow
- Let's try using the Diode!
- [Lab 2 The Diode Teacher Solution and Read Me](#)
- [Lab 2 The Diode \(Student Handout\)](#)

Appearance



Schematic Symbol

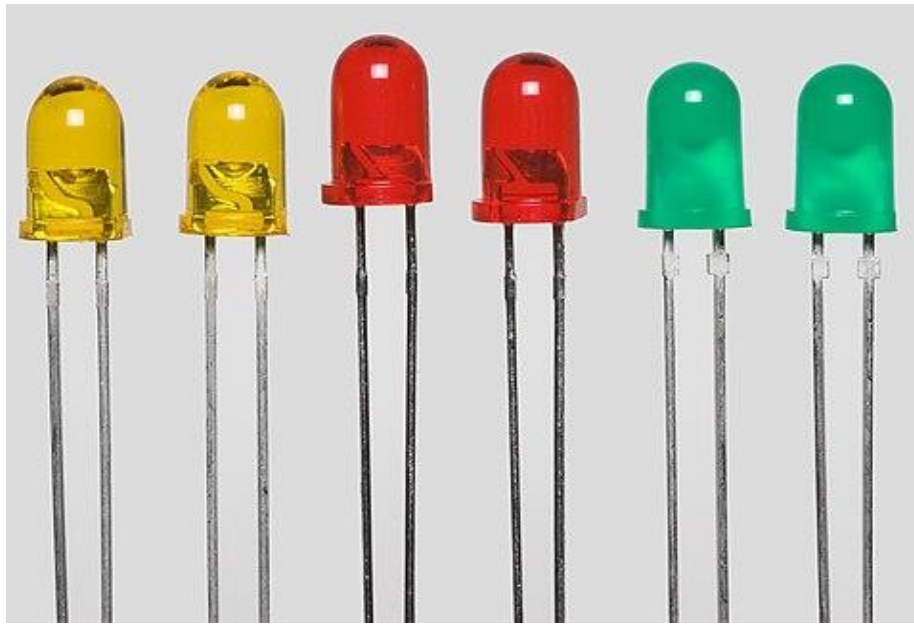
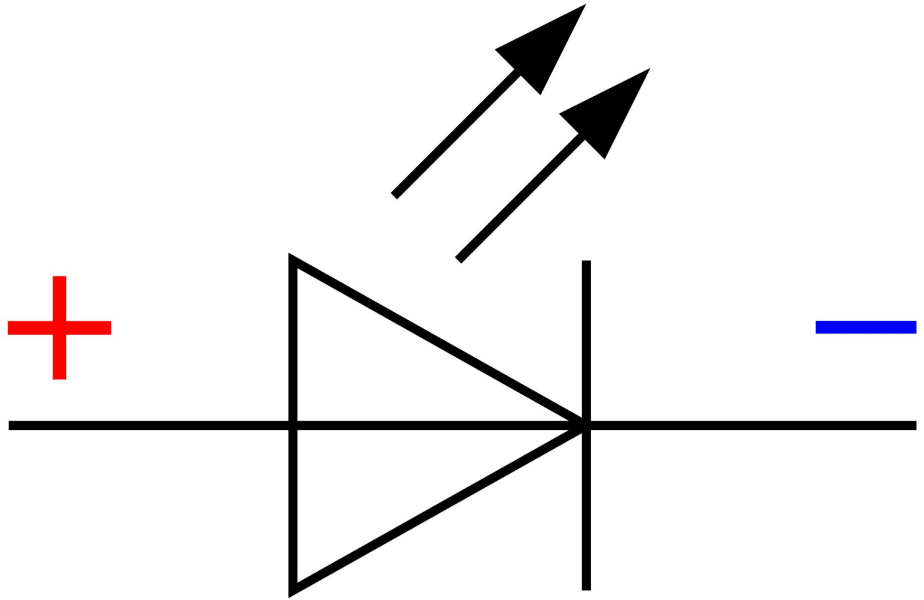


Direction of "normal"  
diode current flow



# LED (Light Emitting Diodes)

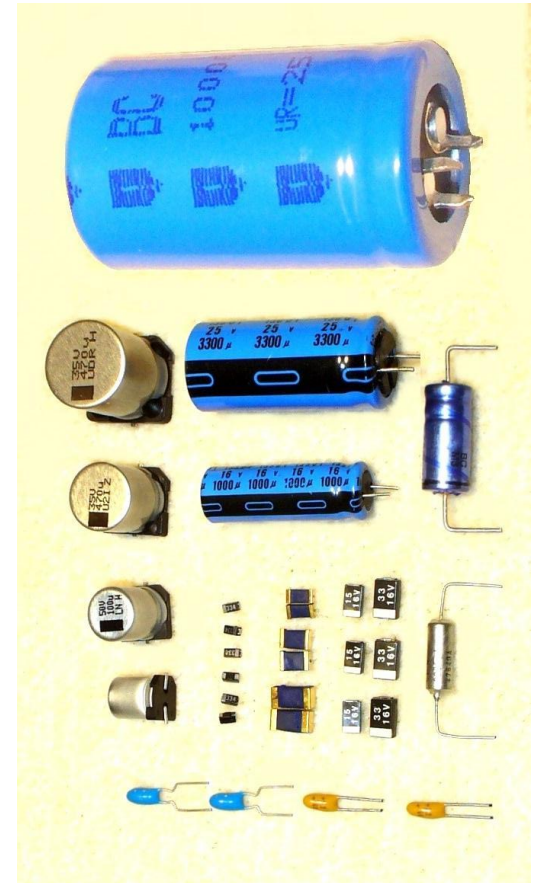
- Light Emitting Diodes are special Diodes, they only allows flow in one direction and also gives off light when electric current passes through them





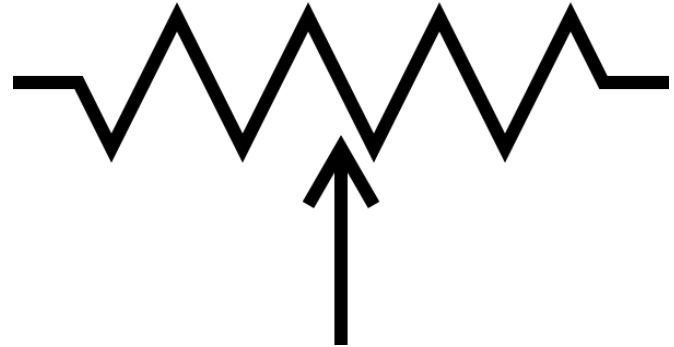
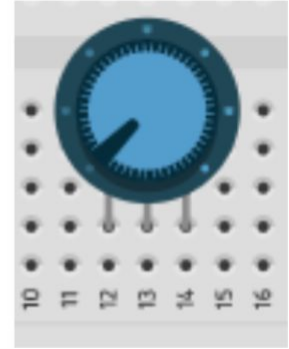
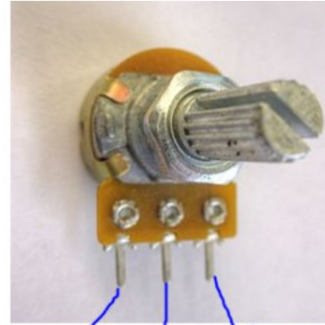
# Capacitors

- Sensitive electronics require a stable voltage or else they will glitch
- Capacitors are like mini batteries, they keep the voltage locally stable (they act to slow down the change in voltage)
- Let's try using the Capacitor!
- [Lab 3 The Capacitor Teacher Solution and Read Me](#)
- [Lab 3 The Capacitor \(Student Handout\)](#)



# Potentiometer (Variable Resistor)

- What if you need to change the brightness of the LED?
- What if you need to change the loudness of the speakers?
- Potentiometers to the rescue!
- Let's try using the Potentiometer!
- [Lab 4 The Potentiometer Teacher Solution and Read Me](#)
- [Lab 4 The Potentiometer \(Student Handout\)](#)



# Putting It together

- Use your electronics know how to light up
  - an Easter egg [Easter Egg Electronics Project](#)
  - an Easter Bunny [Easter Bunny Electronics Project](#)
  - a plastic brain [Halloween Electronics Project](#)

