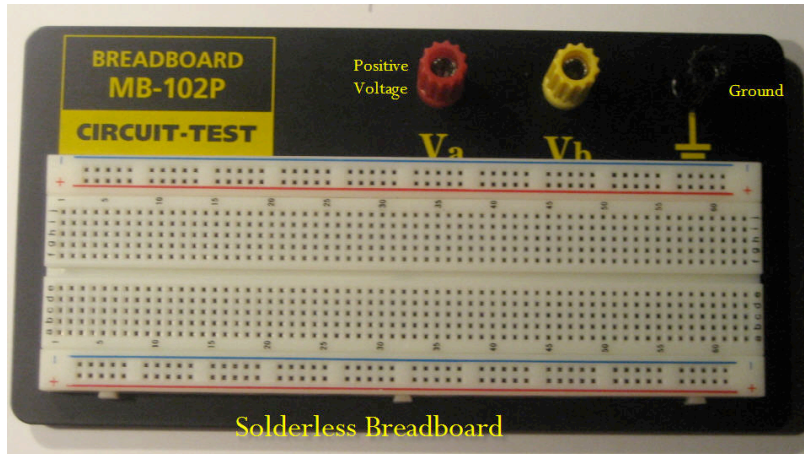


Week 2 Workshop Activity

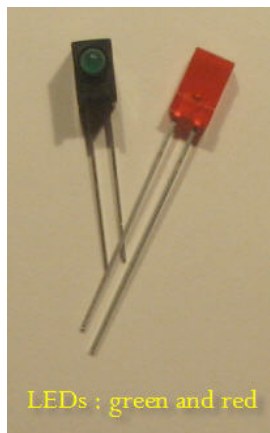
Getting started with building some simple circuits

1. Parts and circuit components that we are going to use in the workshop:



Solderless breadboards are the quickest tools for prototyping a new circuit.

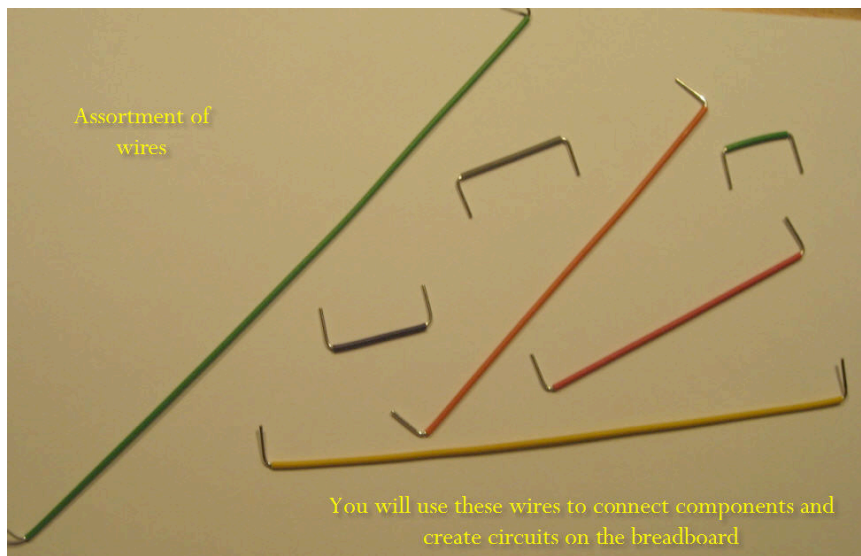
!!! When you start to put components on your breadboard, avoid adding, removing, or changing components on a breadboard whenever the board is powered. You risk shocking yourself and damaging your components.



LEDs, or Light Emitting Diodes, are diodes that emit light when given the correct voltage. Like all diodes, they are **polarized**, meaning that they only operate when oriented correctly in the circuit. The **anode** of the LED connects to voltage, and the **cathode** connects to ground. The anode in the LEDs in this photo is the longer leg on each LED.

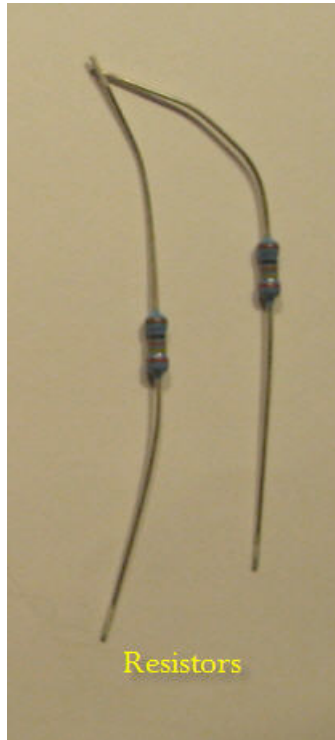
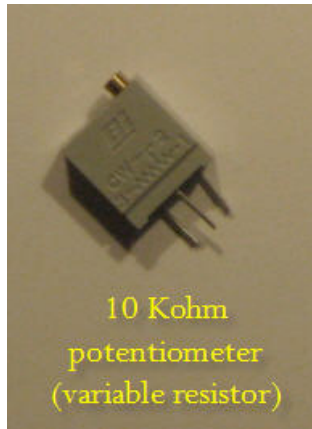
LEDs come in many different packages.

LEDs : green and red



Assortment of wires

You will use these wires to connect components and create circuits on the breadboard



A potentiometer is a resistor that can change its resistance. A potentiometer (or pot) has three connections. The outer leads are the ends of a fixed value resistor. The center lead connects to a wiper which slides along the fixed resistor. The resistance between the center lead and either of the outside leads changes as the pot's knob is moved.

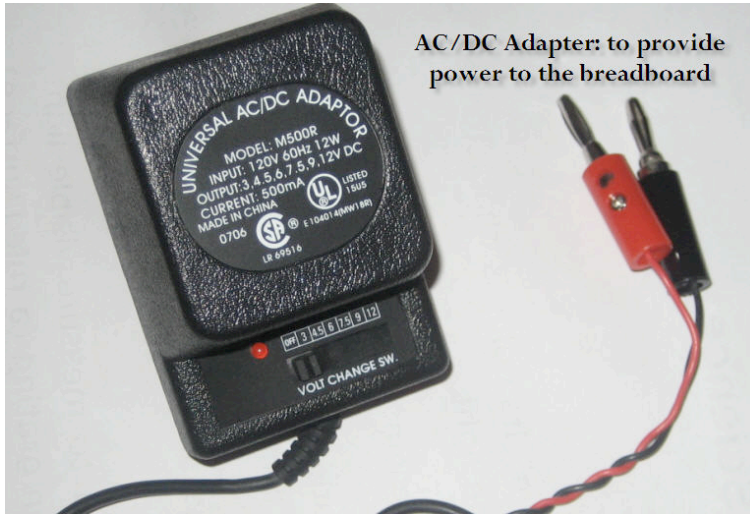
Resistors: these limit the current in the circuit (the potentiometer is also a resistor, therefore it will also limit the current).

Switch: has two states: on/off, and will control the flow of current through a portion of a circuit.



Voltage regulators take a range of DC voltage and convert it to a constant voltage.

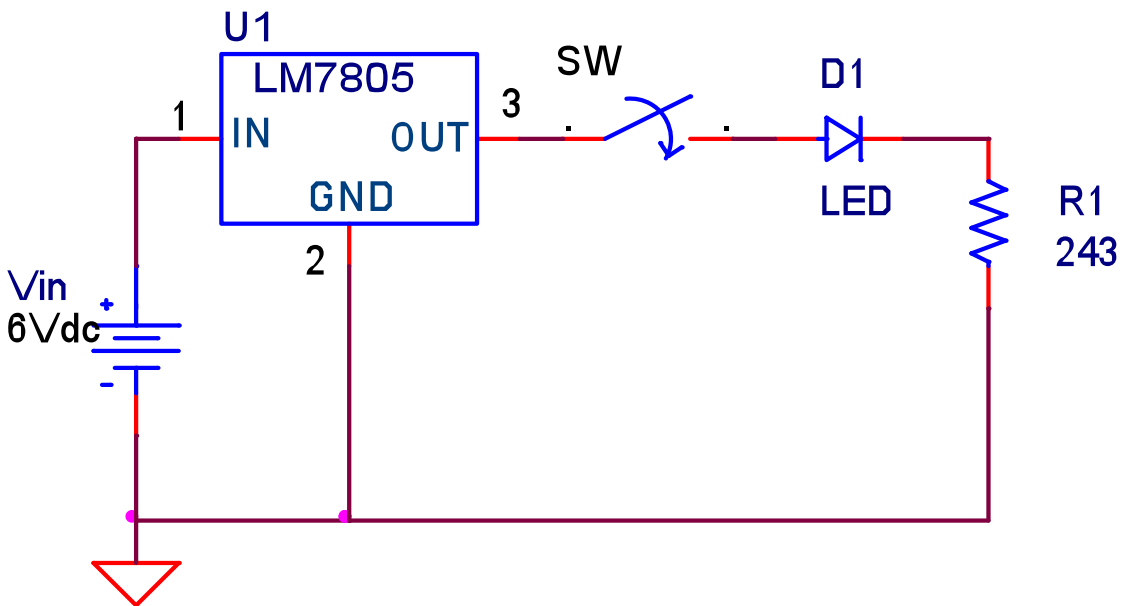
For example, this regulator, a 7805 regulator, takes a range of 8 - 15 volts DC input and converts it to a constant 5-volt output.



2. Simple circuits

2.1 Now you're going to build your first working circuit.

Disconnect the board from power and add an LED, a switch, and a resistor in series.

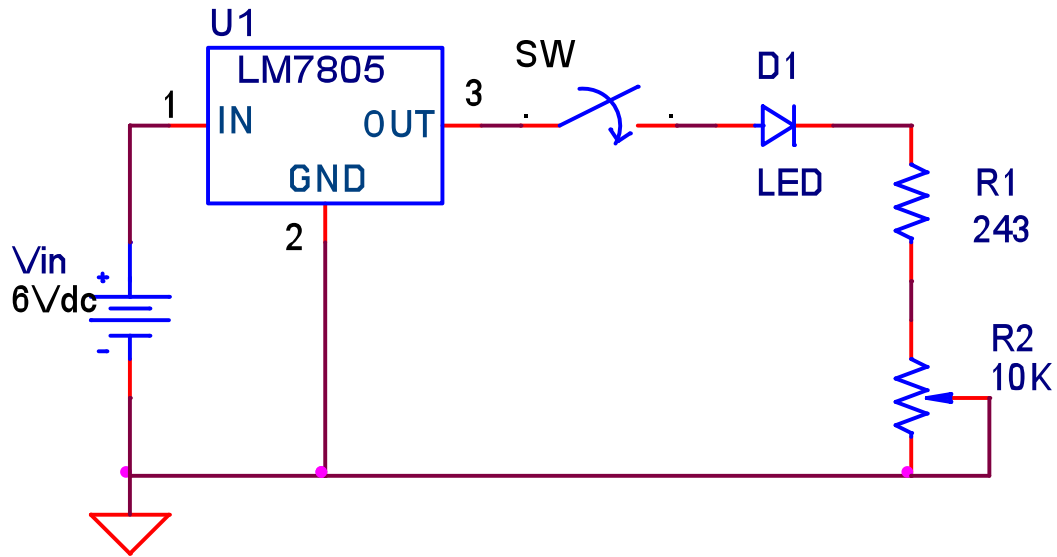


Note: R1 can be of a different value in the same range (eg, 270 Ohm or 300Ohm). Remember, the purpose of this resistor is to limit the current flowing through the LED, so any value in the 200 – 300 Ohms range will work.

2.2

Circuit with potentiometer – potentiometer in series with LED and another resistor.

Observe the variation of the intensity of the LED as you increase / decrease the total resistance in the circuit by varying the potentiometer.



2.3 (if time remaining)

If you have finished with both circuits, build a circuit with two LEDs (yellow, red) and a switch to control each LED.