# Rainbow LEDs

LED stands for **L**ight-**E**mitting **D**iode. Today we will be playing with a multicolor LED and figuring out how to control its color. This special LED is called an RGB LED, which stands for Red-Green-Blue, because it is composed of 3 different color LEDs. Turning on multiple of the different colored LEDs at once allows us to create different colors. By adjusting the current supplied to an LED, we can control the brightness of one of the color LEDs, which allows to make even more colors. This is how your TV display creates all the different colors. As always, do not be afraid to ask questions—that is how we learn!

STEP 1: Parts Needed   Open your lab kit and find the following parts.

RGB LED

3 220Ω resistors

OR

9V battery
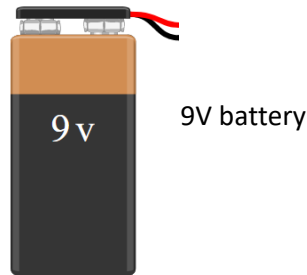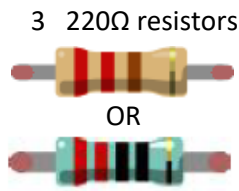
Potentiometer
(variable resistor)

1 2 3

Breadboard
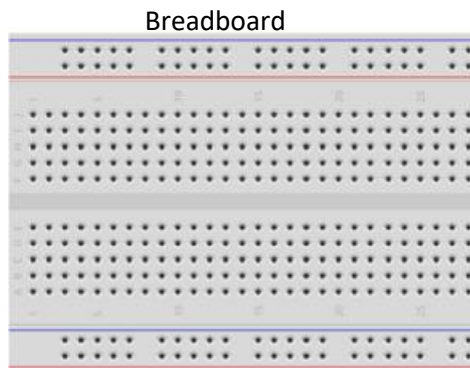
Battery Connector

Several Jumper Wires

STEP 2: Get Colors Working Individually

1. Use the 5V (red wire) and Gnd (black wire) as a power supply from the Arduino.
2. The longest pin on the LED is the ground pin. This pin should be connected to the black wire from the battery.
3. LEDs need a current limiting resistor, so each other leg of the LED should connect to a resistor.
4. Once the first color is working, move the short red wire to the other resistors one-by-one (see dotted arrows)
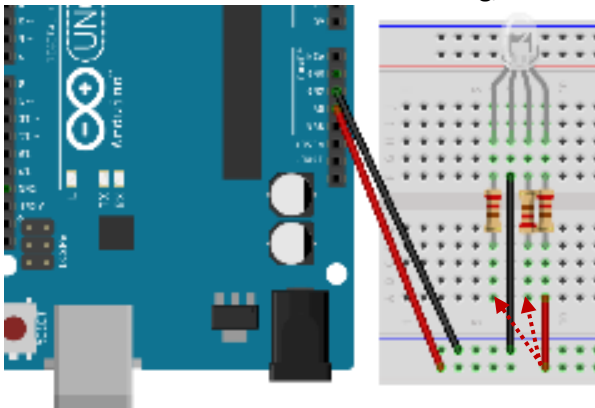
Label each other leg of the LED with its proper color.
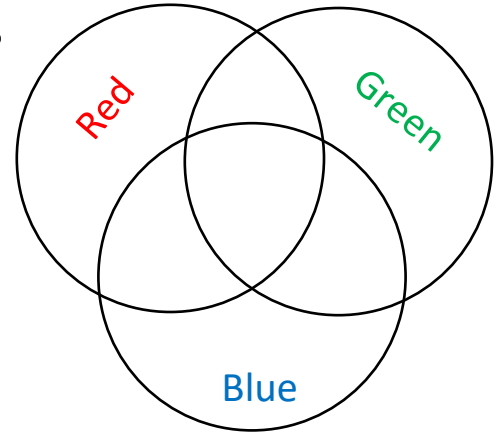
_____

_____

Ground

_____
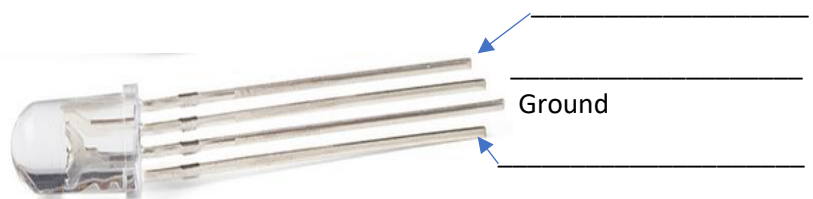
STEP 3: Start Mixing Colors

What happens when we provide power to two different colors at the same time?

Mixing colors of light doesn't work the same as mixing colors of paint.

What colors do you get when you mix the following two colors?

|	
Red + Green	
Green + Blue	
Blue + Red	
All Three	

STEP 4: Adjust Brightness

To change the brightness of each LED, we can change the resistance of the current-limiting resistor. The more resistance we include, the dimmer the LED will be. To create a variable resistance we use a potentiometer, which changes resistance when we turn the knob on top.   Put leg 1 or 3 in the same row as the resistor and then connect the power to leg 2. You should see the LED dim as you turn the knob.

Connect other LEDs to power and see what hues you can create.

What other colors did you make?
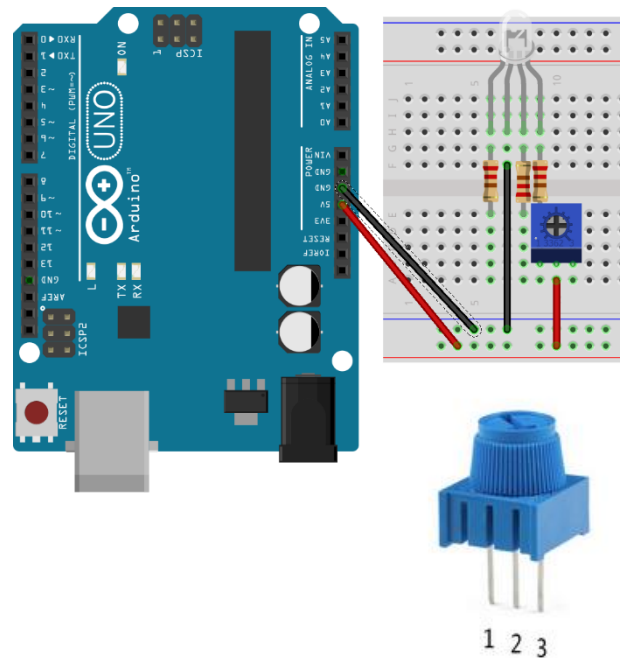
Bonus STEP: Challenge Activity

Use buttons to be able to turn each color LED on and off when desired.

Current flows from the positive terminal of the battery (red wires), through the current-limiting resistor, through the LED, and then back to the negative terminal of the battery through the black wires. By breaking this path and including the button in the path, we can turn an LED on and off with a push of the button.

These two wires are connected when the button is pushed.

Did you enjoy the activity today?

We used the SunFounder Arduino Uno R3 Starter Kit today.
This is just one of dozens of fun activities that comes with this kit.
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kit here!

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