Blinking LED

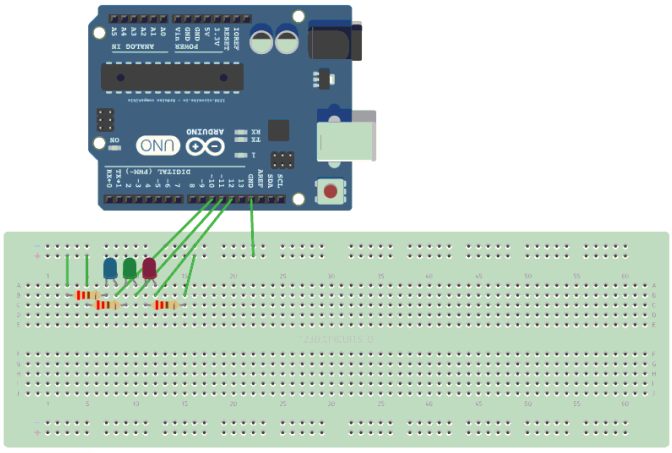
Physical Science and Technology

This lesson was adapted from original work by Limor Fried that is posted on http://www.ladyada.net/learn/arduino.

The goal of this lesson is to use an Arduino along with three different colors of LED lights to create new colors (by mixing the LED colors together). You will use the simulated Arduino and breadboard at http://123d.circuits.io (log in with your Corvallis School District Google ID).

1. Start by adding an Arduino Uno (from the Arduino Basic Kit after you've clicked "+ Components") to a new Electronics Lab. You'll also need three resistors – 220 ohm will work well. Finally, add a red, green, and blue LED.

2. Wire your LEDs to the Arduino and breadboard as shown below. To make a wire in 123d Circuits, just click on the breadboard and drag the mouse. To get the components to fit on the breadboard, you might have to rotate them (click on the two triangles with the curved arrow on the upper left-hand side of the window). Try to have the LEDs as close together as possible so you will be able to see how the colors mix together when two or more are both lit.

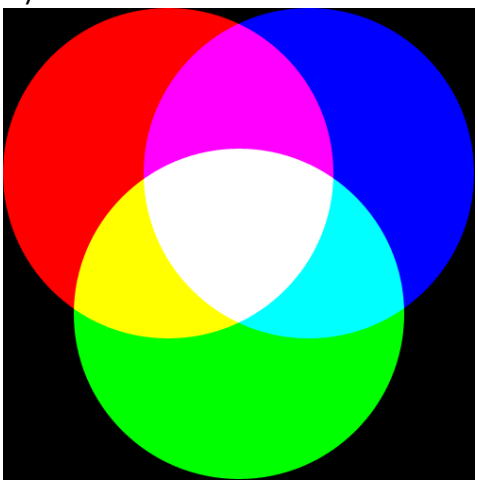


Screenshot showing Arduino and wiring

3. Using the code editor (which should automatically load the "Blink" sketch), program your Arduino to turn on each light separately for 1 second. This sketch should be very similar to the sketch you used for your Derby Racer blinking LED lights. It will be helpful if you give the pins variable names that correspond to the color of the LEDs (for example, I used blueLED = 10, greenLED = 11, and redLED = 12).

4. Now that you have red, green and blue light, try *color mixing*. Color mixing is the ability that our eyes have to combine different light colors and create a new color. Modify your

code to create the following colored light: Violet (red & blue), Turquoise (blue & green) and yellow (green & red).



An additive (light) color mixing diagram

5. Modify the sketch so that the emitted light follows this cycle: red, yellow, green, turquoise, blue violet and back to red. It should pause about half a second between each color change. On your computer screen, the light from the LEDs isn't bright enough and doesn't spread out enough to actually mix. But with a real Arduino, when two or more LEDs are lit, your eyes would be tricked into seeing the mixed color rather than two separate lights!

When you are done with the assignment, do the following to earn credit for your work:

A) Show your blinking Arduino simulation to an instructor (and get feedback if necessary)

B) Print your sketch – make sure your name is on it! – and turn it in