

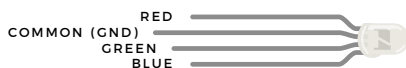
Circuit 1D: RGB Night-Light

In this circuit, you'll take the night-light concept to the next level by adding an RGB LED, which is three differently colored Light-Emitting Diodes (LEDs) built into one component. RGB stands for Red, Green and Blue, and these three colors can be combined to create any color of the rainbow!



NEW COMPONENTS

RGB LED: An RGB LED is actually three small LEDs — one red, one green and one blue — inside a normal LED housing. This RGB LED has all the internal LEDs share the same ground wire, so there are four legs in total. To turn on one color, ensure ground is connected, then power one of the legs just as you would a regular LED. Don't forget the current-limiting resistors. If you turn on more than one color at a time, you will see the colors start to blend together to form a new color.

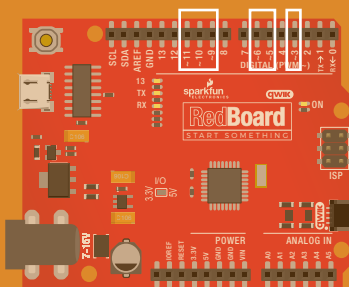


NEW CONCEPTS

ANALOG OUTPUT (PULSE-WIDTH MODULATION): The `digitalWrite()` command can turn pins on (5V) or off (0V), but what if you want to output 2.5V? The `analogWrite()` command can output 2.5 volts by quickly switching a pin on and

NEW IDEAS

PWM PINS: Only a few of the pins on the RedBoard have the circuitry needed to turn on and off fast enough for PWM. These are pins 3, 5, 6, 9, 10 and 11. Each PWM pin is marked with a ~ on the board. Remember, you can only use `analogWrite()` on these pins.



off so that it is only on 50 percent of the time (50% of 5V is 2.5V). By doing this, any voltage between 0 and 5V can be produced. This is what is known as Pulse-Width Modulation (PWM). It can create many different colors on the RGB LED.