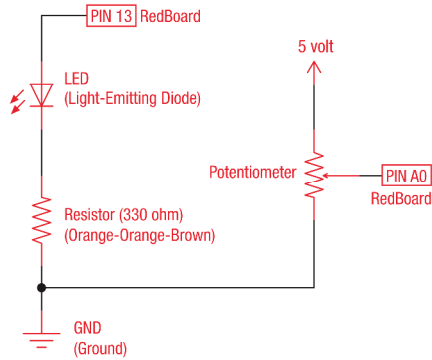



CIRCUIT #2

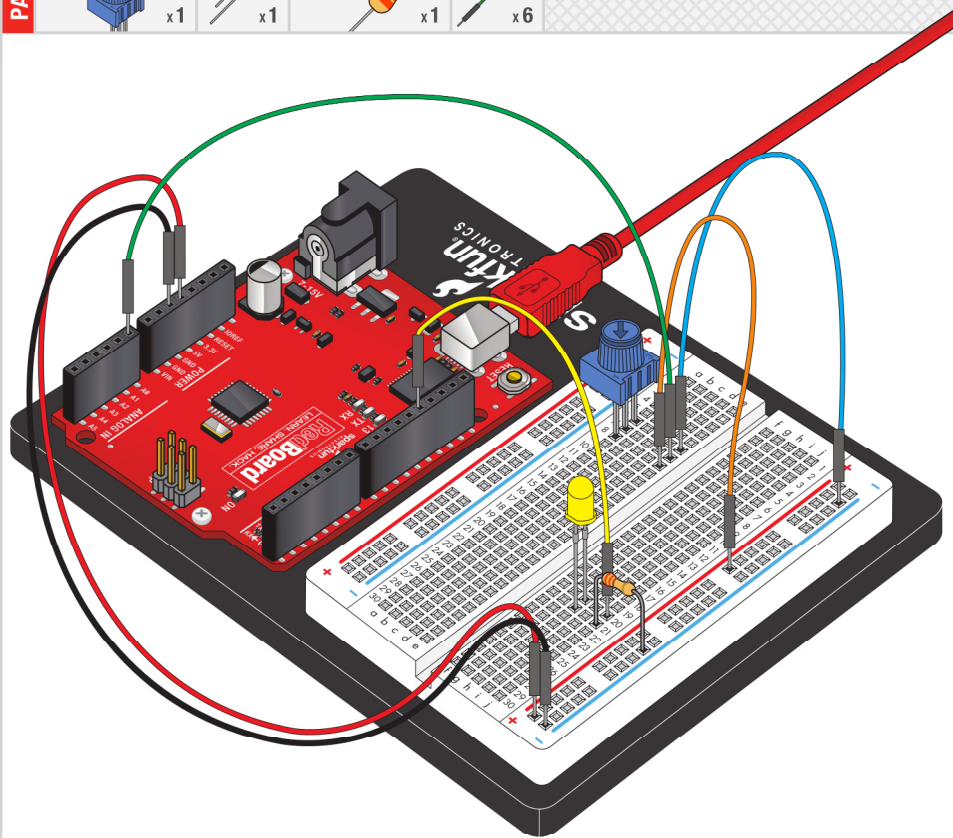
2

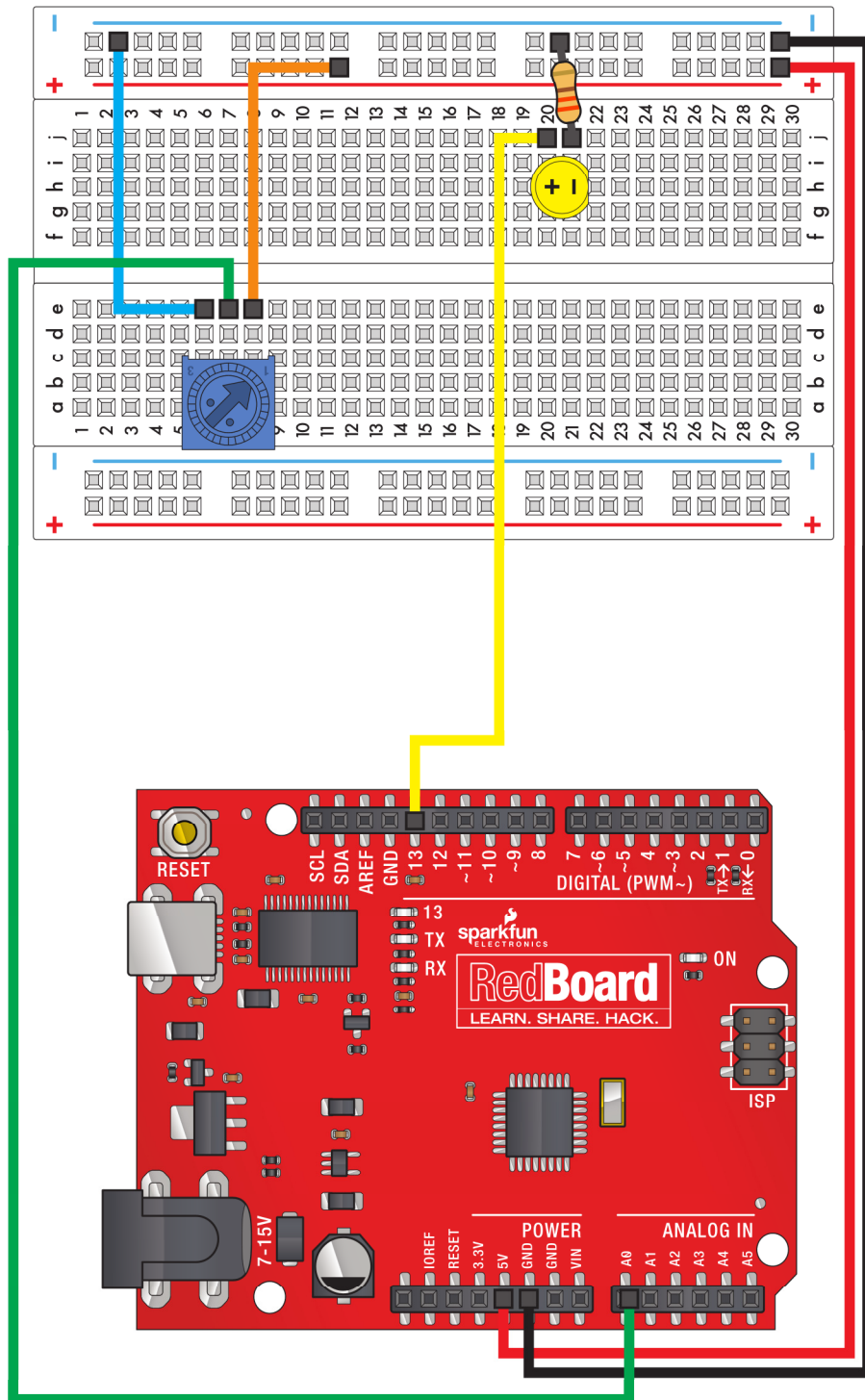
Potentiometer

In this circuit you'll work with a potentiometer. A potentiometer is also known as a variable resistor. When it's connected with 5 volts across its two outer pins, the middle pin outputs a voltage between 0 and 5, depending on the position of the knob on the potentiometer. A potentiometer is a perfect demonstration of a variable voltage divider circuit. The voltage is divided proportionate to the resistance between the middle pin and the ground pin. In this circuit, you'll learn how to use a potentiometer to control the brightness of an LED.






















PARTS:	Potentiometer	LED	330Ω Resistor	Wire
	 x1	 x1	 x1	 x6





Circuit 2: Potentiometer

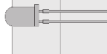
Component:	Image Reference:	
Potentiometer		
LED (5mm)		
330Ω Resistor		
Jumper Wire		
Jumper Wire		
Jumper Wire		
Jumper Wire		
Jumper Wire		
Jumper Wire		

Digital versus Analog:

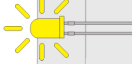
If you look closely at your RedBoard, you'll see some pins labeled "DIGITAL", and some labeled "ANALOG". What's the difference?

Many of the devices you'll interface to, such as LEDs and pushbuttons, have only two possible states: on and off, or as they're known to the RedBoard, "HIGH" (5 volts) and "LOW" (0 volts). The digital pins on an RedBoard are great at getting these signals to and from the outside world, and can even do tricks like simulated dimming (by blinking on and off really fast), and serial communications (transferring data to another device by encoding it as patterns of HIGH and LOW).

DIGITAL


LOW
off
0 volts

or


HIGH
on
5 volts

But there are also a lot of things out there that aren't just "on" or "off". Temperature levels, control knobs, etc. all have a continuous range of values between HIGH and LOW. For these situations, the RedBoard offers six analog inputs that translate an input voltage into a number that ranges from 0 (0 volts) to 1023 (5 volts). The analog pins are perfect for measuring all those "real world" values, and allow you to interface the RedBoard to all kinds of things.

ANALOG

0 volts

to

5 volts

0

1023

2

Arduino Code:



Open Arduino IDE // File > Examples > SIK Guide > **Circuit # 2**

Code to Note:



```
int sensorValue;
```



A "variable" is a stored value you've given a name to. You must introduce, or "declare" variables before you use them; here we're declaring a variable called sensorValue, of type "int" (integer). Don't forget that variable names are case-sensitive!

```
sensorValue = analogRead(sensorPin);
```



We use the analogRead() function to read the value on an analog pin. analogRead() takes one parameter, the analog pin you want to use ("sensorPin"), and returns a number ("sensorValue") between 0 (0 volts) and 1023 (5 volts).

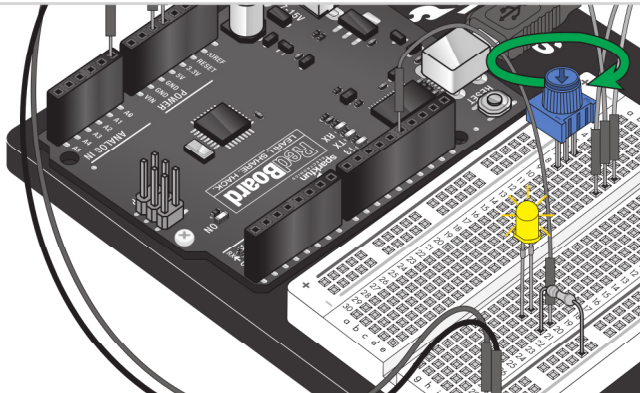
```
delay(sensorValue);
```



The Arduino is very very fast, capable of running thousands of lines of code each second. To slow it down so that we can see what it's doing, we'll often insert delays into the code. delay() counts in milliseconds; there are 1000 ms in one second.

What you Should See:

You should see the LED blink faster or slower in accordance with your potentiometer. If it isn't working, make sure you have assembled the circuit correctly and verified and uploaded the code to your board or see the troubleshooting tips below.



Troubleshooting:

Sporadically Working

This is most likely due to a slightly dodgy connection with the potentiometer's pins. This can usually be conquered by holding the potentiometer down.

Not Working

Make sure you haven't accidentally connected the wiper, the resistive element in the potentiometer, to digital pin 0 rather than analog pin 0. (the row of pins beneath the power pins).

LED Not Lighting Up?

LEDs will only work in one direction. Try taking it out and twisting it 180 degrees (no need to worry, installing it backward does no permanent harm).

Real World Application:

Most traditional volume knobs employ a potentiometer.

