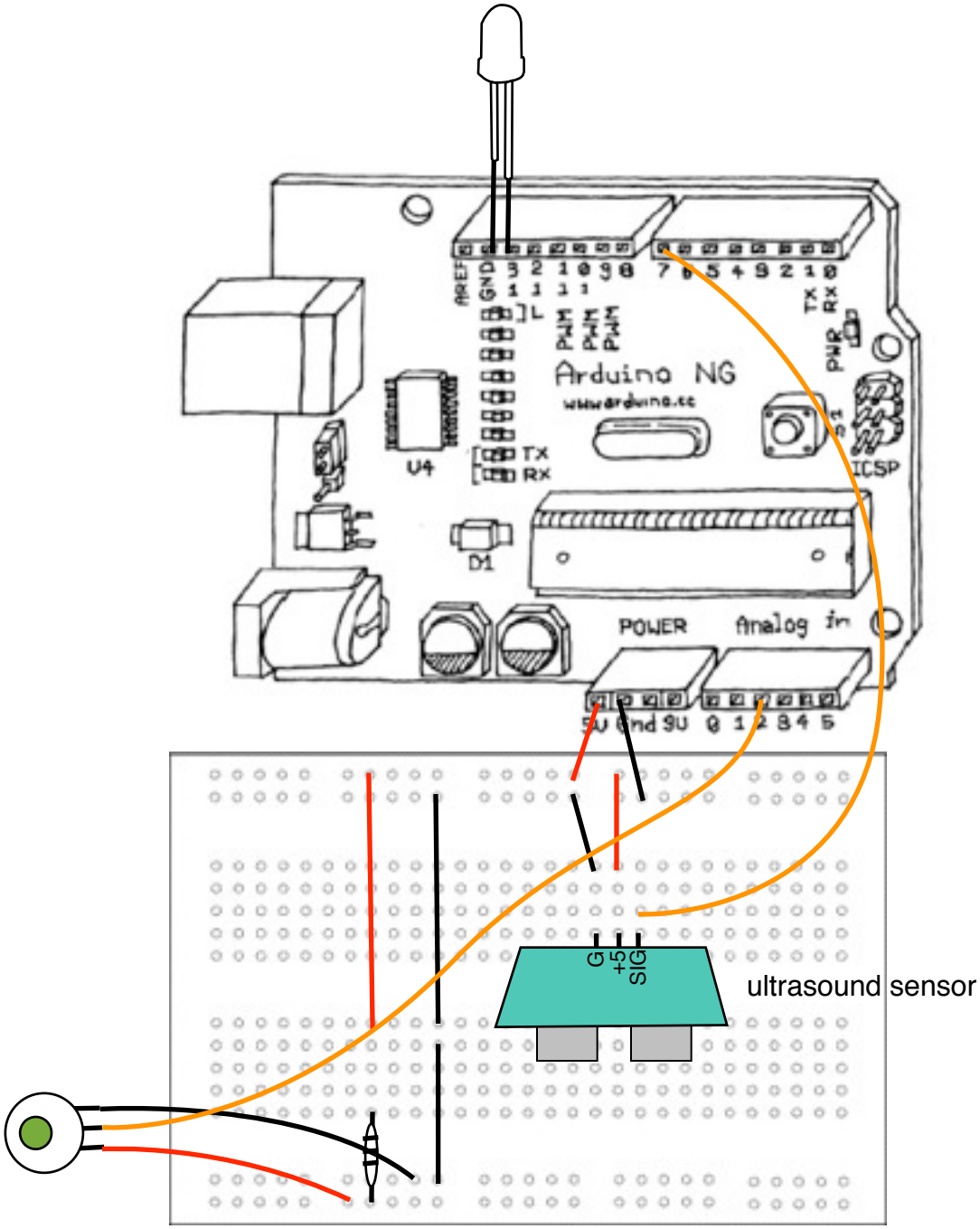
## Ultrasound sensor, led, potentiometer

Program an ultrasound sensor to send out an ultrasound wave and then listen for it to bounce back while counting time. *This is the same technique that bats use to locate their prey.* Program an LED to turn on at particular distance or range from the sensor. Instead of using your body or an object to turn your LED to turn on, use a potentiometer to locate this distance at a certain point in its rotation. The potentiometer has a range of 0 to 1023. This range can be narrow (making bigger steps) by dividing it by an integer.



```
// Send a wave out with an ultrasound sensor; Use a potentiometer to turn on an LED at a par-
ticular distance from the sensor.

int ultraSoundpin = 7;
int ledPin = 13;
unsigned long ultrasoundDuration;

int potPin = 2;    // select the input pin for the potentiometer
int val = 0;       // variable to store the value coming from the potentiometer


void setup() {
 beginSerial(9600);
}

void loop() {
 // switch pin to output
 // sensor sends an ultrasound wave out and then waits for the wave to bounce back
 // same tech as dolphins and bats

 pinMode(ultraSoundpin, OUTPUT); // usually set in void loop
  pinMode(ledPin, OUTPUT);

 // send a low, wait 2 microseconds, send a high then wait 10 microseconds
 // switches ultrasound sensor pin from output to input; sensor waits to receive ultrasound
wave; counts how long the ultrasound wave has been gone (time) before bouncing back

 digitalWrite(ultraSoundpin, LOW);
 delayMicroseconds(2);
 digitalWrite(ultraSoundpin, HIGH);
 delayMicroseconds(10); // length of wave
 digitalWrite(ultraSoundpin, LOW);

  // switch pin to input
 pinMode(ultraSoundpin, INPUT);

 // wait for a pulse to come in as high
 ultrasoundDuration = pulseIn(ultraSoundpin, HIGH);

 // output
 Serial.print(ultrasoundDuration); //
 //Serial.print("\t");
 Serial.print(ultrasoundDuration/58, DEC);
 //Serial.print(" cm");
 Serial.println();
 val = analogRead(potPin);    // read the value from the sensor, fine-tune sensor
 //val = val / 3; // to get a narrower range with bigger steps in between "uncomment" this line
of code to divide your analog value by 3 or any number
```

```
 if(ultrasoundDuration < val){
 digitalWrite(ledPin, HIGH);
}
 else
{
 digitalWrite(ledPin, LOW);
}
 delay(100);
}
```