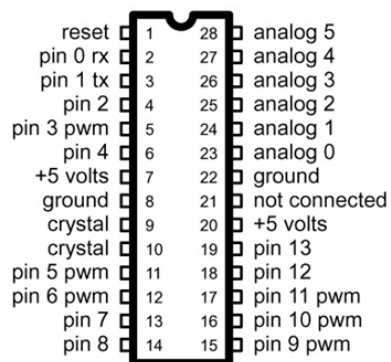# Simple Electric Circuits with the Arduino

The Arduino can provide 5V or 3.3V without any programming involved. The power from the computer USB port or an attached battery is simply routed out and through the Arduino.

The hand-built Shrimp Arduinos use a similar chip. This will provide 5V and a ground return through the +5V and ground pins. Note the half circle that marks the top of the chip.

```
        reset ▢  1      28 ▢ analog 5
     pin 0 rx ▢  2      27 ▢ analog 4
     pin 1 tx ▢  3      26 ▢ analog 3
        pin 2 ▢  4      25 ▢ analog 2
    pin 3 pwm ▢  5      24 ▢ analog 1
        pin 4 ▢  6      23 ▢ analog 0
     +5 volts ▢  7      22 ▢ ground
       ground ▢  8      21 ▢ not connected
      crystal ▢  9      20 ▢ +5 volts
      crystal ▢ 10      19 ▢ pin 13
    pin 5 pwm ▢ 11      18 ▢ pin 12
    pin 6 pwm ▢ 12      17 ▢ pin 11 pwm
        pin 7 ▢ 13      16 ▢ pin 10 pwm
        pin 8 ▢ 14      15 ▢ pin 9 pwm
```

Here the Arduino is shown by the Fritzing program. This allows circuits to be designed although there is no guarantee that the circuit will work.
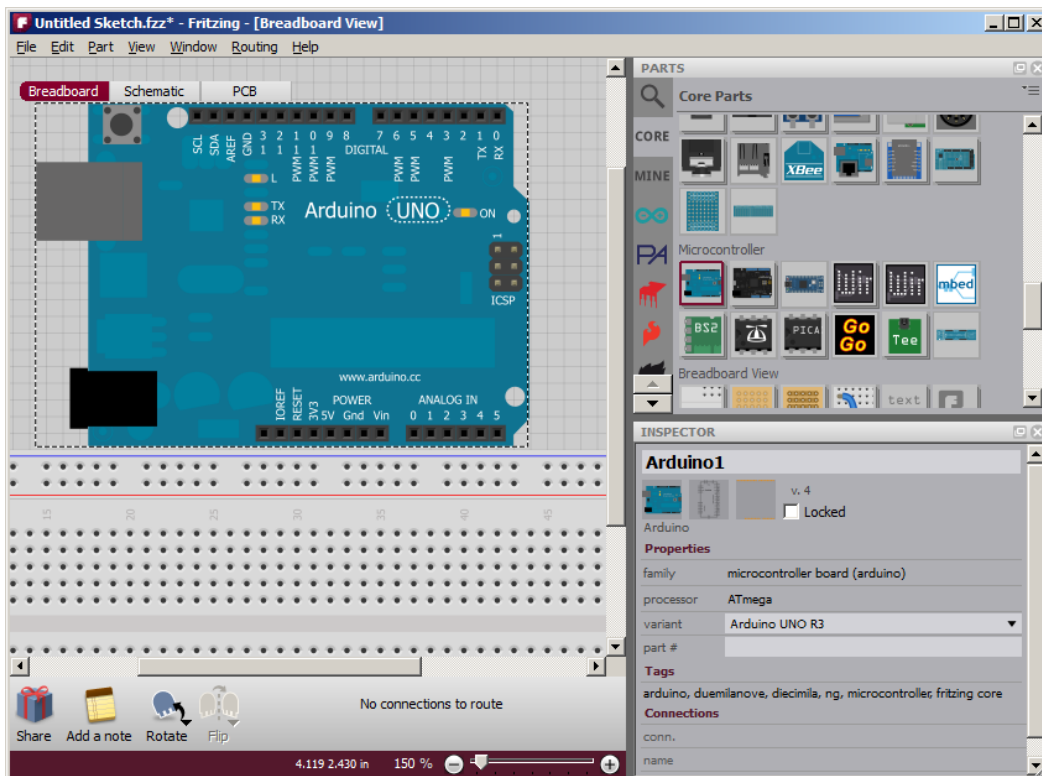
The Arduino has been set up to power a LED, Light Emitting Diode. The LED only allows current through it in 1 direction (that is what diodes do). The long leg of the LED must be closest to the positive connection of the power (the voltage not the ground). Even relatively low currents can burn out a LED so a resistor is used to reduce the current flow through the LED.
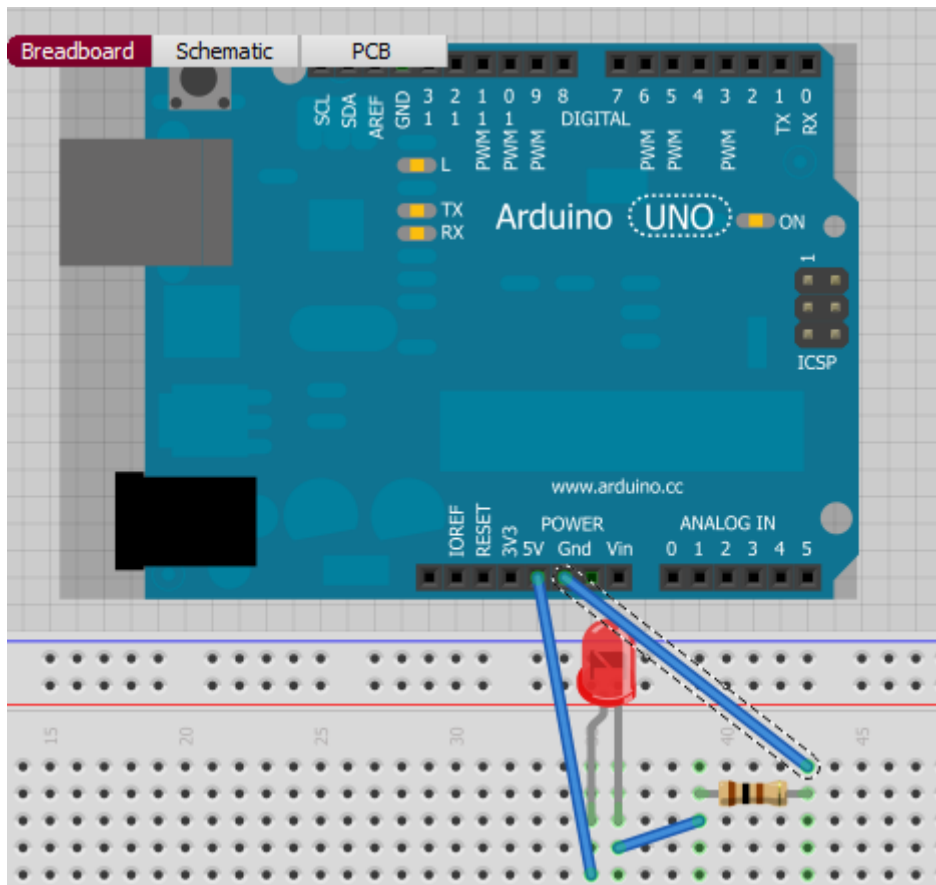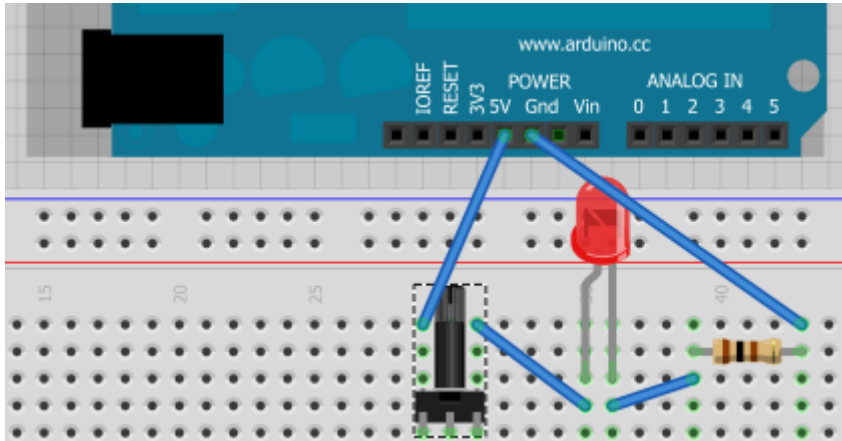

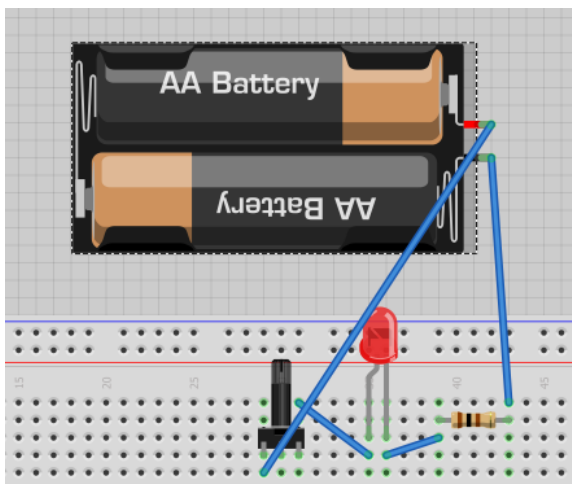The circuit now has a simple switch to turn the light on or off
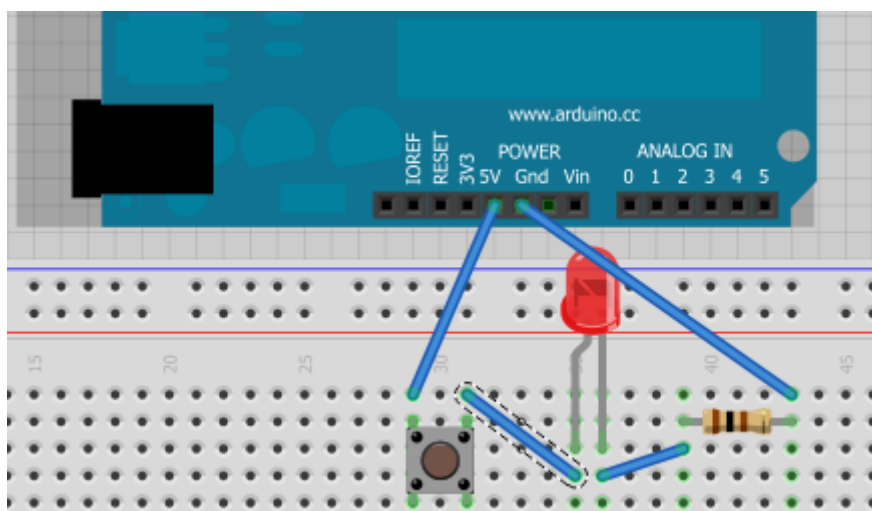
If the switch is replaced by a variable resistor (potentiometer) the light will dim and brighten as the potentiometer is adjusted.

V=IR

The voltage is constant, the resistance varies so the current passing through the LED is affected.

All these circuits could just as well run from a battery pack.

This is the electric circuit diagram for the potentiometer circuit.