

Help Eulim inventing
great things to help
the Steammmians
live on planet earth!



Here is all you need to build Eulim!



1x Photoresistor



2x RGB LEDs



6x Resistor 220 ohm



1x Potentiometer



1x Resistor 10K ohm



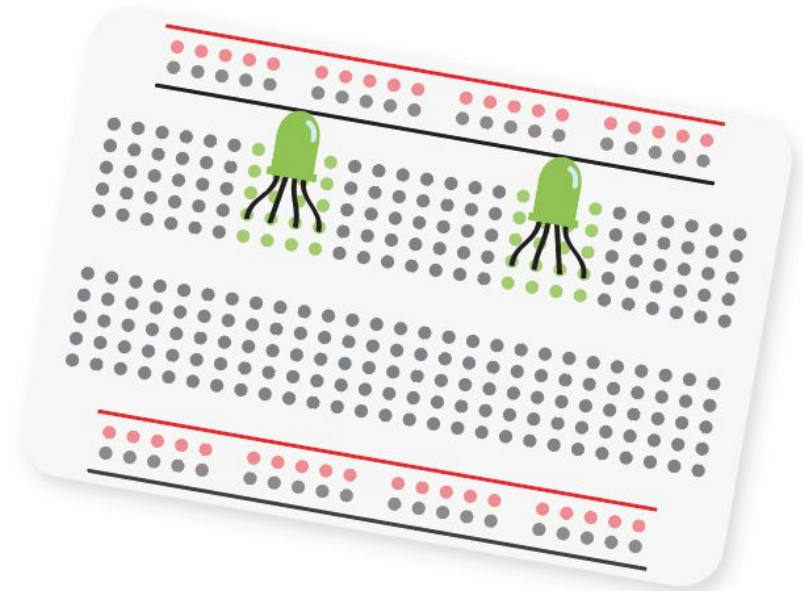
Level 1
Special view



STEP 1/4

Place the LEDs on the breadboard.

NOTE: Remember where you place the longer lead!



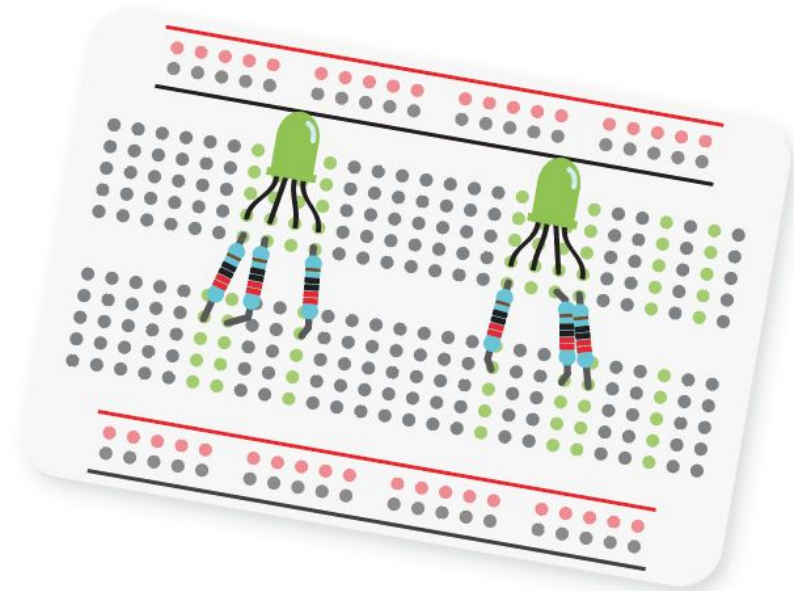
Electricity flows from the positive pole to the negative pole. Inside an RGB LED there are 3 LEDs: one red, one green and one blue; this is why RGB LEDs can produce 3 different colors and a mix of them! The RGB LED has a longer lead than the other leads. In the common cathode case, it will be connected to **GND** and in the common anode case; it will be connected to **5V**.





STEP 2/4

Now put the 220 ohm in correspondence of the shorter leads.



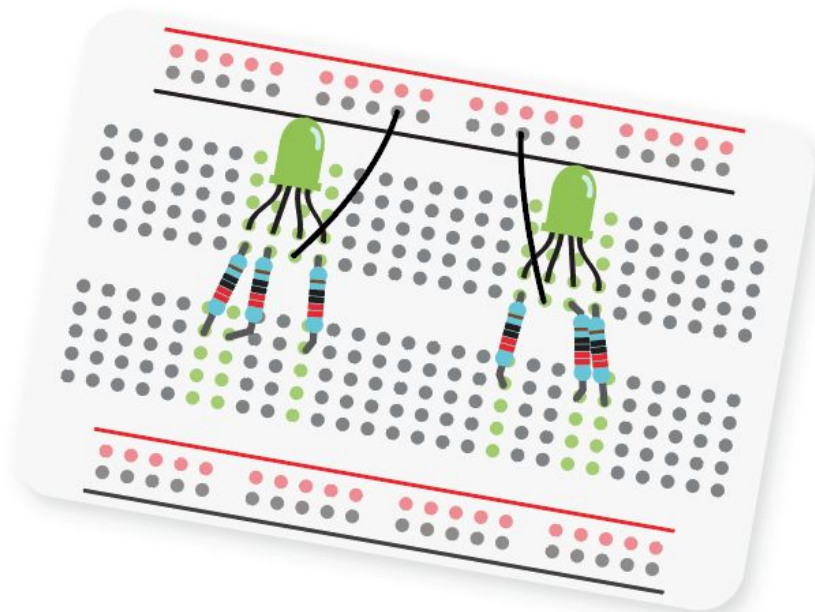
LEARN MORE: HOW TO RESIST ELECTRICITY?

Resistors allow changing the intensity of the electricity inside a circuit. If you don't use them the eyes will explode!!! The intensity of electricity is measured in Ohm and you can recognize the different intensities by looking at the colored stripes.



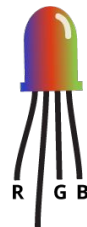
STEP 3/4

Connect the longer lead to the ground line on the breadboard using two jumpers.



LEARN MORE: HOW TO MAKE CONNECTIONS?

Jumper wires are used for making connections between items on your breadboard and your Arduino's header pins. Use them to wire up all your circuits!

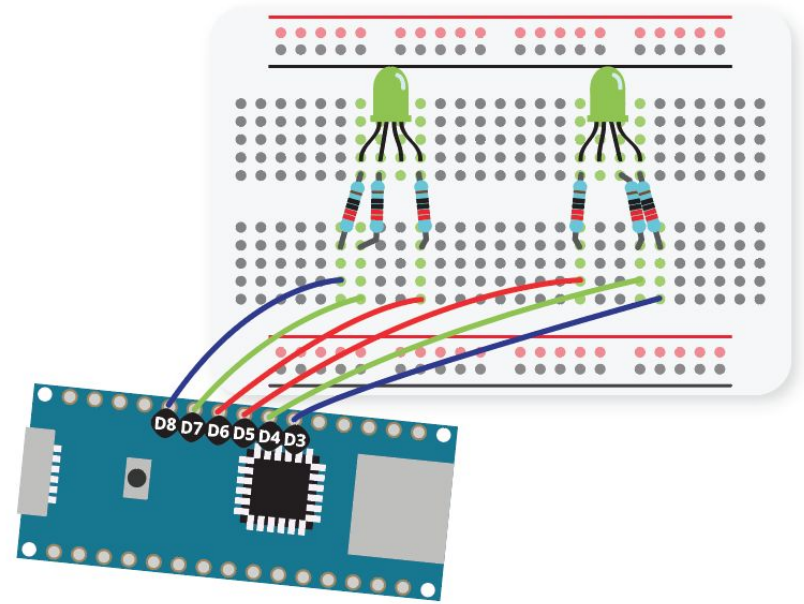


Remember what you read about the anode and cathode!!



STEP 4/4

Lastly, connect the LEDs and resistor to the Arduino following the instruction in the image.



LEARN MORE: ARDUINO IS THE BRAIN!

The Arduino is a fundamental part of the circuit because it's what tells the other components how to behave. It's the brain of the Steammians! The Arduino is composed of different parts, one of them are the pins.



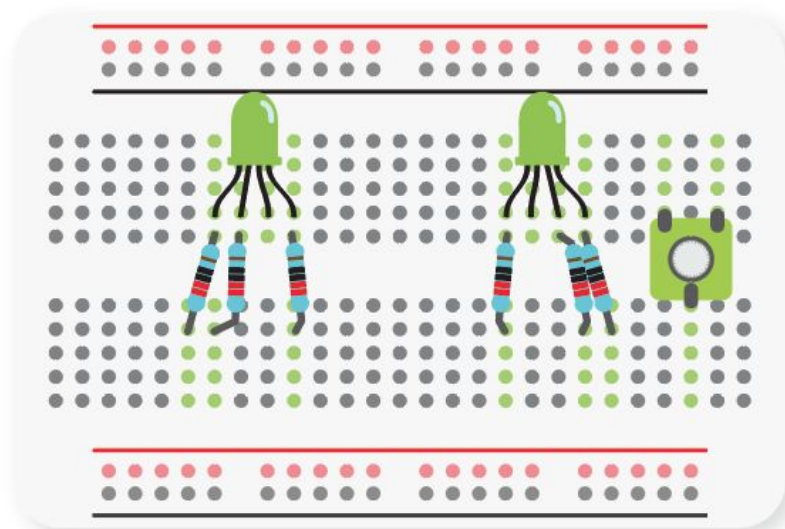
Level 2

Idea boots



STEP 1/3

Place the potentiometer in the middle of the breadboard. Keep the two leads at the top.



LEARN MORE: WHAT IS A POT?

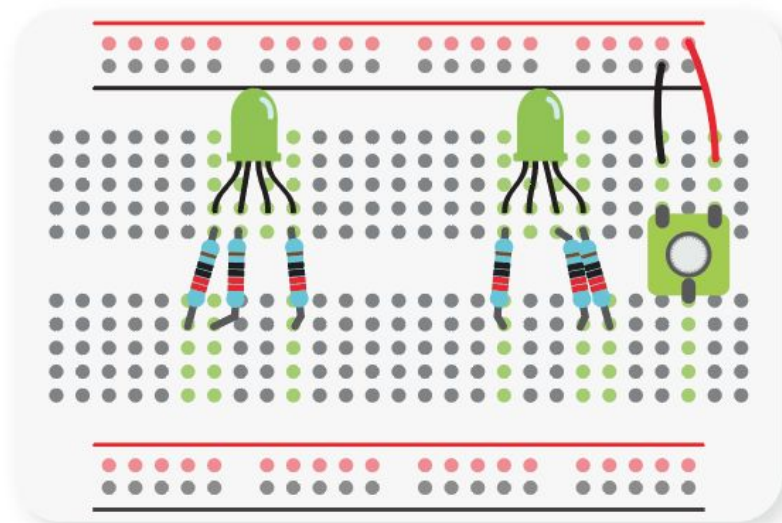
Potentiometer or pot is a variable resistor. The pot enables to change the blink rate or in this case, the color of the LED without changing any components in your circuit.



STEP 2/3

Connect the two terminals at the top. One to the **ground** and the other one to the **positive line**.

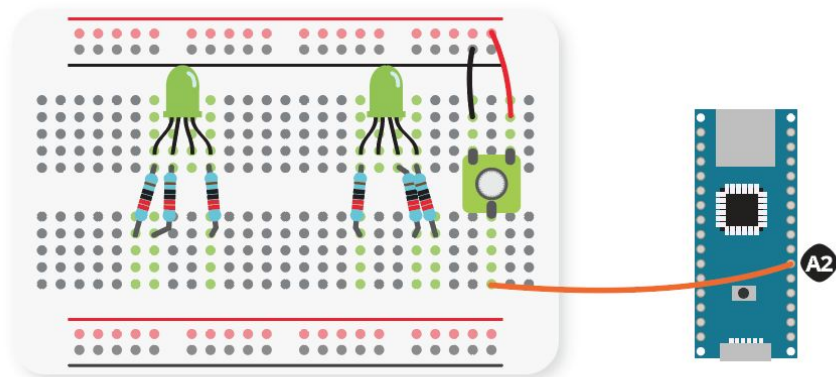
I will soon be able to start inventing!!
Thank you for your help!





STEP 3/3

Lastly, connect the remaining terminal to the pin A2 of the Arduino.



LEARN MORE: WHAT IS THE “A” PIN?

The Arduino has several different kinds of pins, each of which is labeled on the board and used for different functions. The “A” stands for analog. Those pins can read the signal from an analog sensor (like a temperature sensor) and convert it into a digital value from 0 to 1023 that we can read. The analog pin can measure physical phenomena around the Steammians.



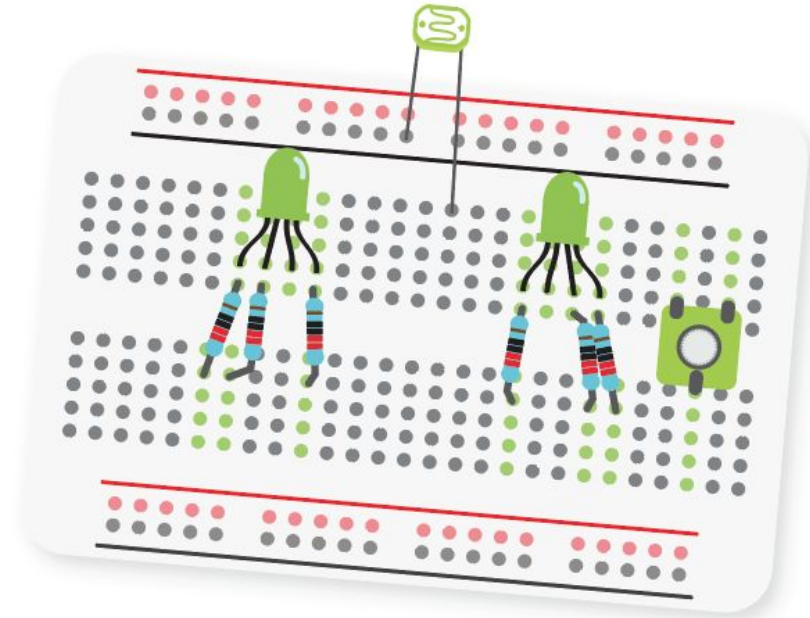
Level 3

Light tracker



STEP 1/3

Place the photoresistor by insert one terminal in the **ground line** of the breadboard and the other one in the **neutral area**.



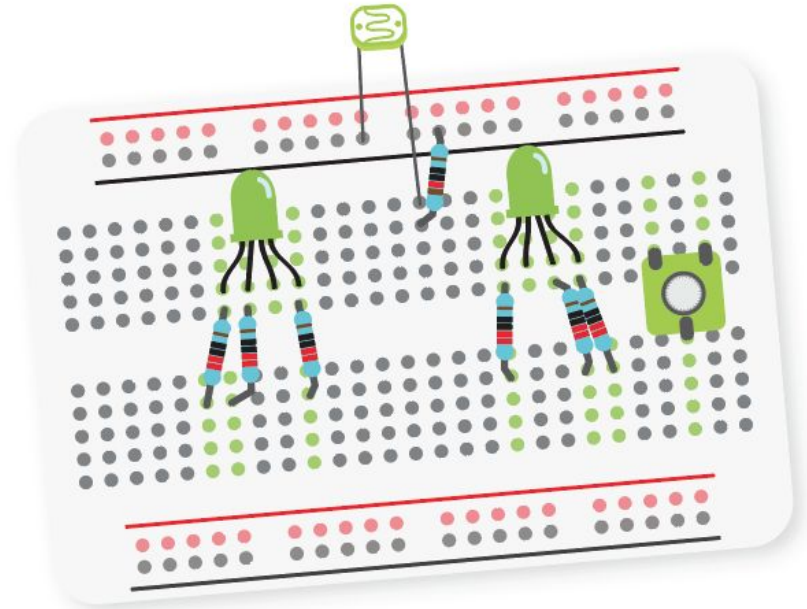
LEARN MORE: WHAT IS A PHOTORESISTOR?

The photoresistor reads the amount of light in the ambient. It's a conductor whose resistance decreases with the increasing incident light intensity. This means that the more light hits the photoresistor, the more electricity it can conduct!



STEP 2/3

Now put the 10K resistance in correspondence of the terminal in the **neutral area** of the breadboard.



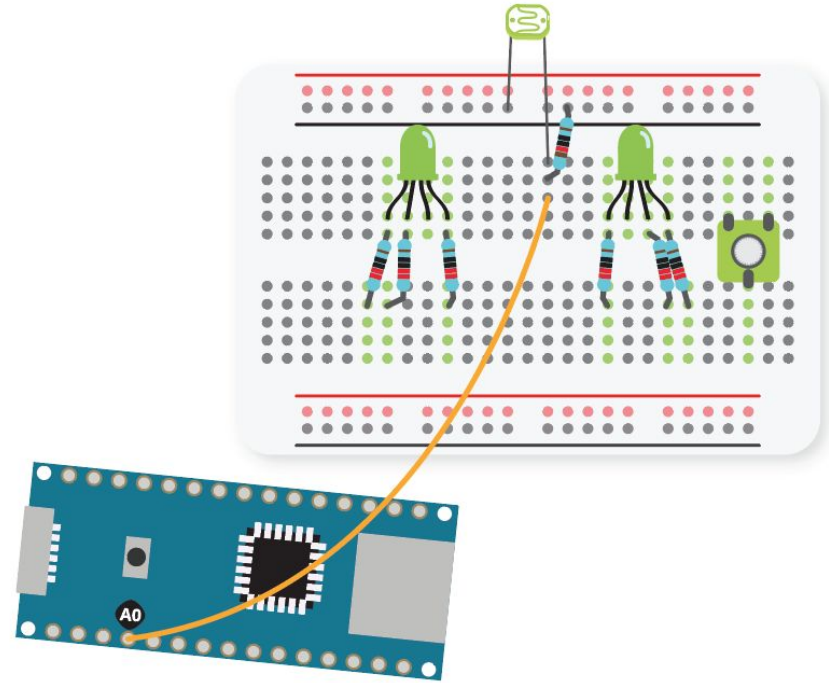
LEARN MORE: WHAT THE 10K STANDS FOR?

The resistor's resistance limits the flow of electrons through a circuit. The higher the value of the resistor the fewer electrons will pass through it. This means that if we want to pass more electricity through a circuit, we must use a resistor with a lower value.



STEP 3/3

Connect the photoresistor terminal placed in the **neutral area** of the breadboard to the analog pin **A0** of the Arduino.



LEARN MORE: WHAT ARE THE DIGITAL PINS?

There are 13 digital pin in the Arduino (D1, D2...D13). These kind of pins can be used for both digital input (like telling if a button is pushed) and digital output (like powering an LED).



Level 4
Level up
energy



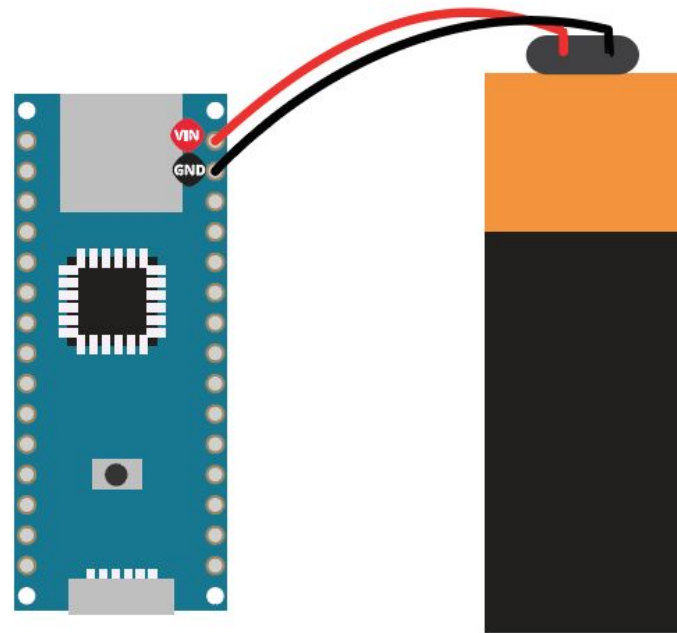
STEP 1/2

To make your circuit work you have to power it using a **9V** battery!

Connect the **black wire** to pin **GND** of the Arduino and the **red one** to the pin **5V**!

LEARN MORE: WHAT V STANDS FOR?

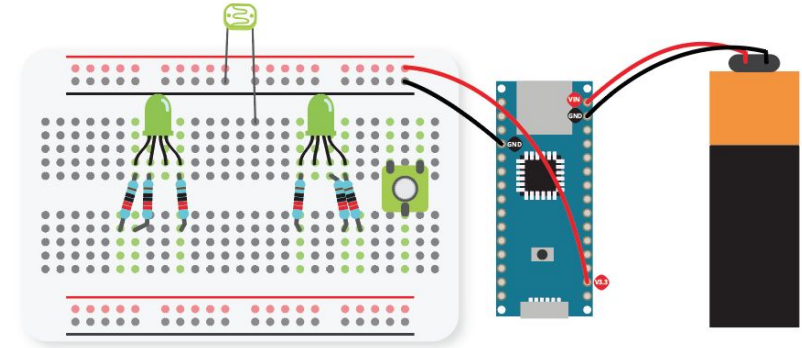
The volt (symbol: V) is the unit that express the force that pushes electrons through a circuit to produce electricity. At the beginning of the circuit, electricity has a certain amount of force. It also has a certain amount of force at the end of the circuit. The difference between these two amounts is the voltage, measured in volts.





STEP 2/2

Finally, you need to power the breadboard! Connect the **positive line** to pin **v3.3** and the **ground line** to the remaining **GND** pin.



LEARN MORE: VIN vs. 3.3V

The Arduino has 4 pins that are related to **power**: **2 GND** that are the same and have to be connected to the **ground**; then there are the **3.3** and **VIN** pins that have a **positive polarity**.

The difference among these two is that the VIN is the pin that powers the Arduino (input) and can handle up to 20V, the 3.3V instead is an output and as suggested provides power up to 3.3V.