

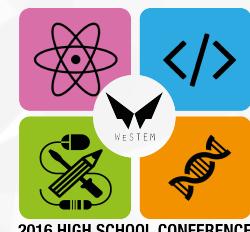
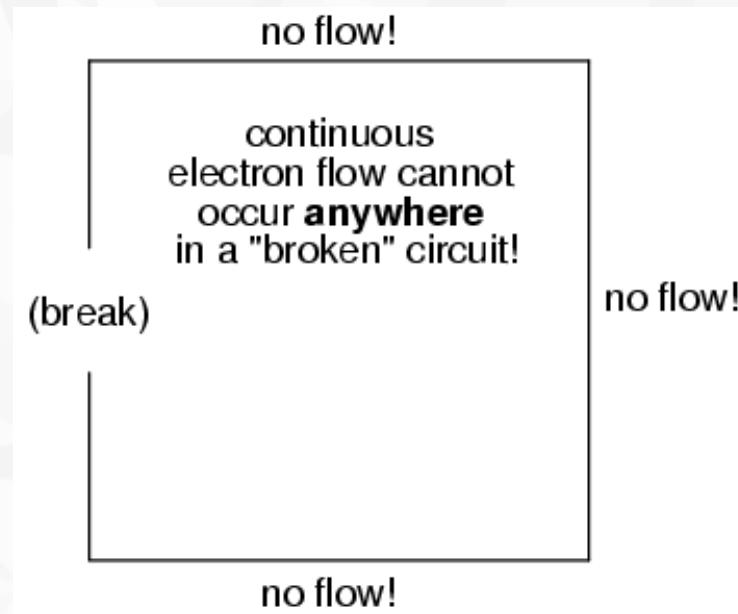
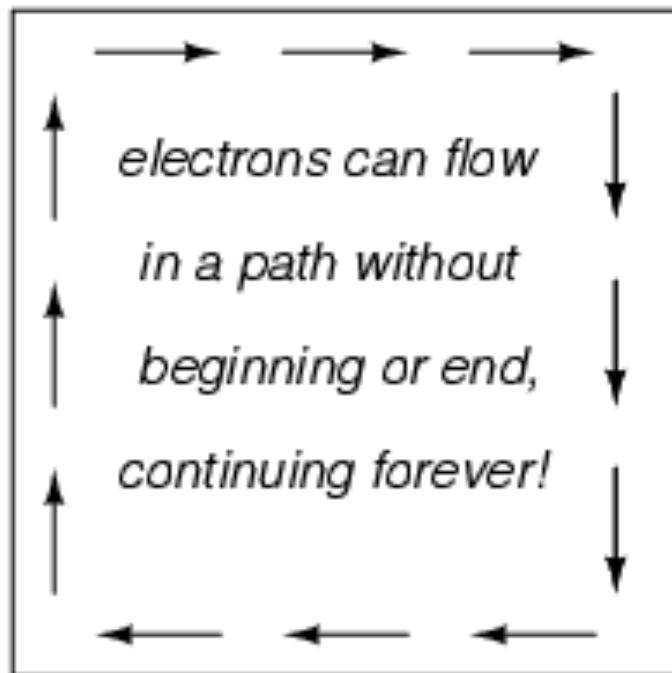
2016 HIGH SCHOOL CONFERENCE

ARDUINO WORKSHOP

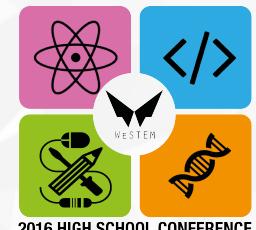
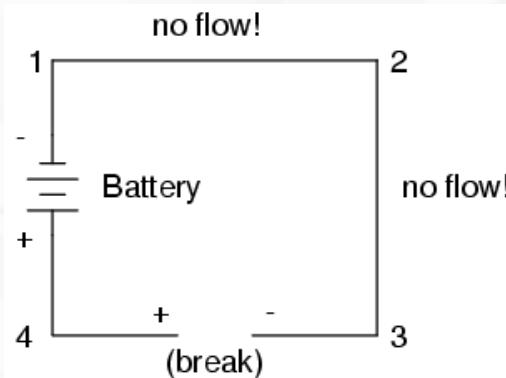
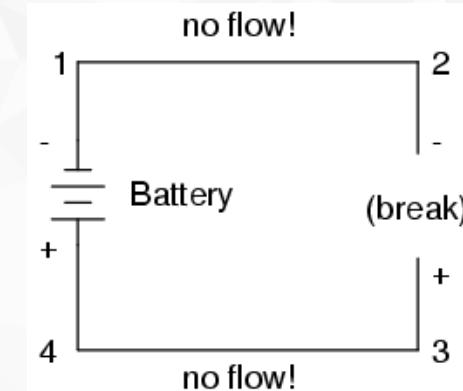
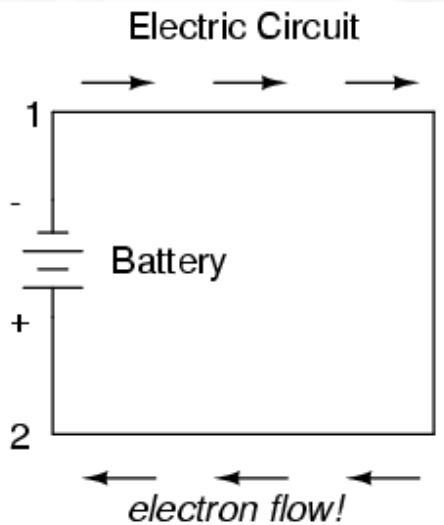
BEATRICE IONASCU

Understanding circuits: Electronics World

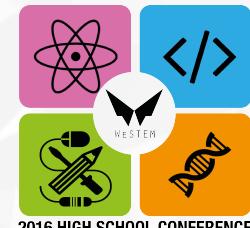
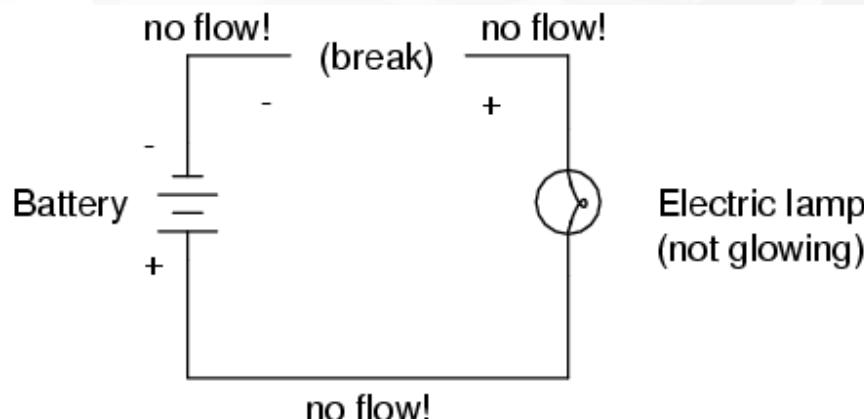
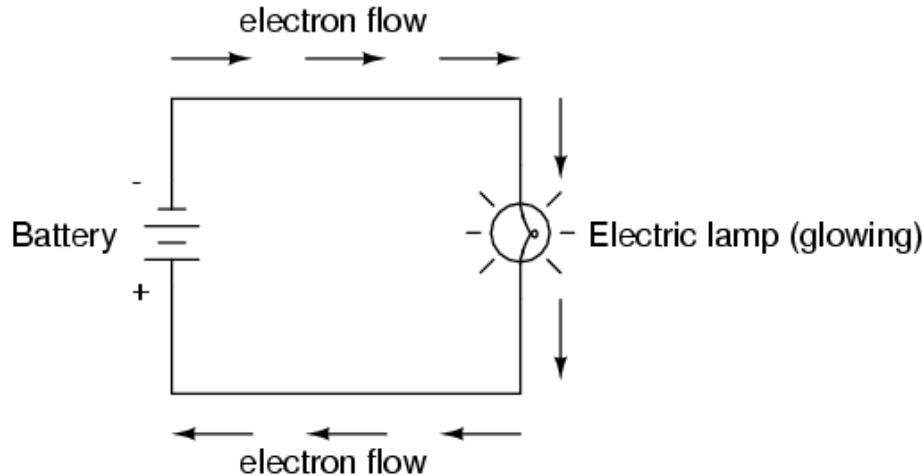
Definition: an **electric circuit** is an electrical device that provides a closed path for electrical current to flow



Understanding circuits: Electronics World



Understanding circuits: Electronics World



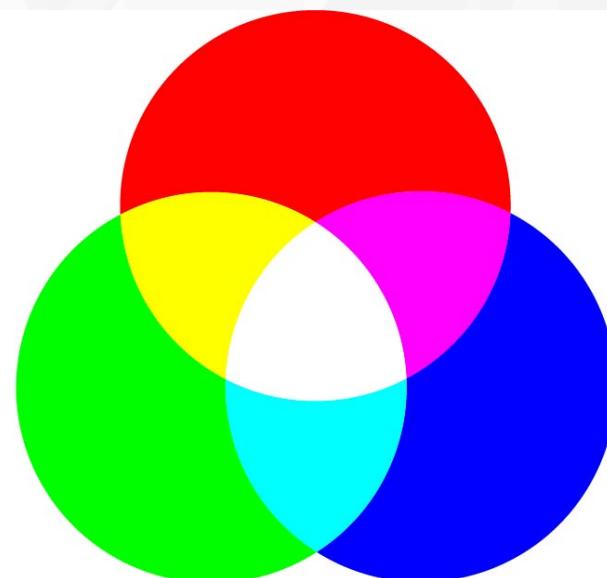
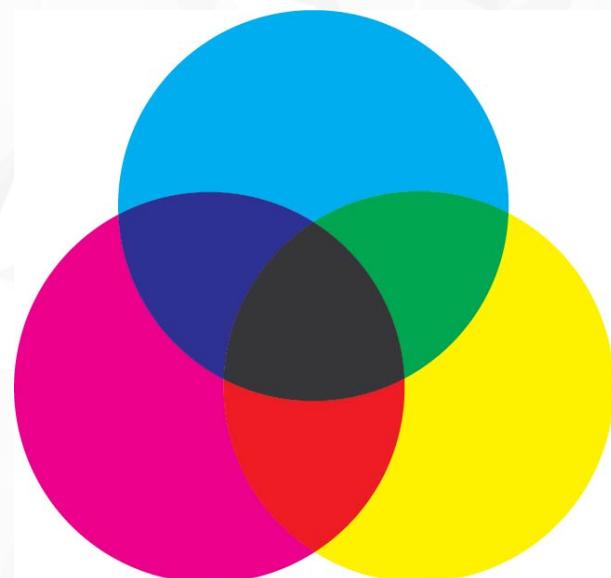
Understanding circuits: Electronics World

- **Current (I):** is the rate at which charge is flowing
- **Voltage (V):** Voltage is the difference in charge between two points
- **Resistance (R):** is a material's tendency to resist the flow of charge (current)

$$V = I \times R$$



Understanding color: RGB World



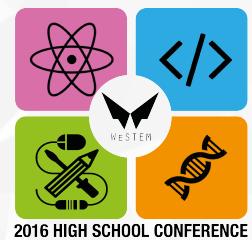
Understanding color: RGB World

RGB (255, 0, 0)
RGB (255, 127, 0)
RGB (255, 255, 0)
RGB (0, 255, 0)
RGB (0, 0, 255)
RGB (75, 0, 130)
RGB (143, 0, 255)

RGB system

- Colors to be used on a computer display
- R, G, B – combined in various proportions to obtain any color that is visible to us
- Levels of R, G, B range from 0 to 100% intensity
- Levels represented by numbers from **0** to **255**
- **256** levels for each color

Total: $256 \times 256 \times 256 =$
16,777,216 possible colors



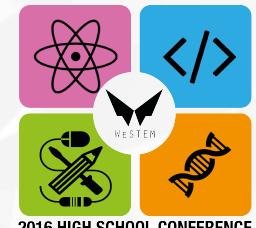
But this workshop is called the *Arduino Workshop*

WHY ARE WE NOT TALKING ABOUT ARDUINO?

Understanding Arduino: Prototyping World



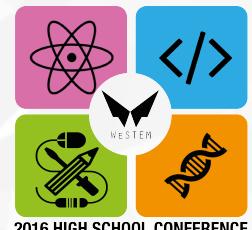
This is an Arduino Uno



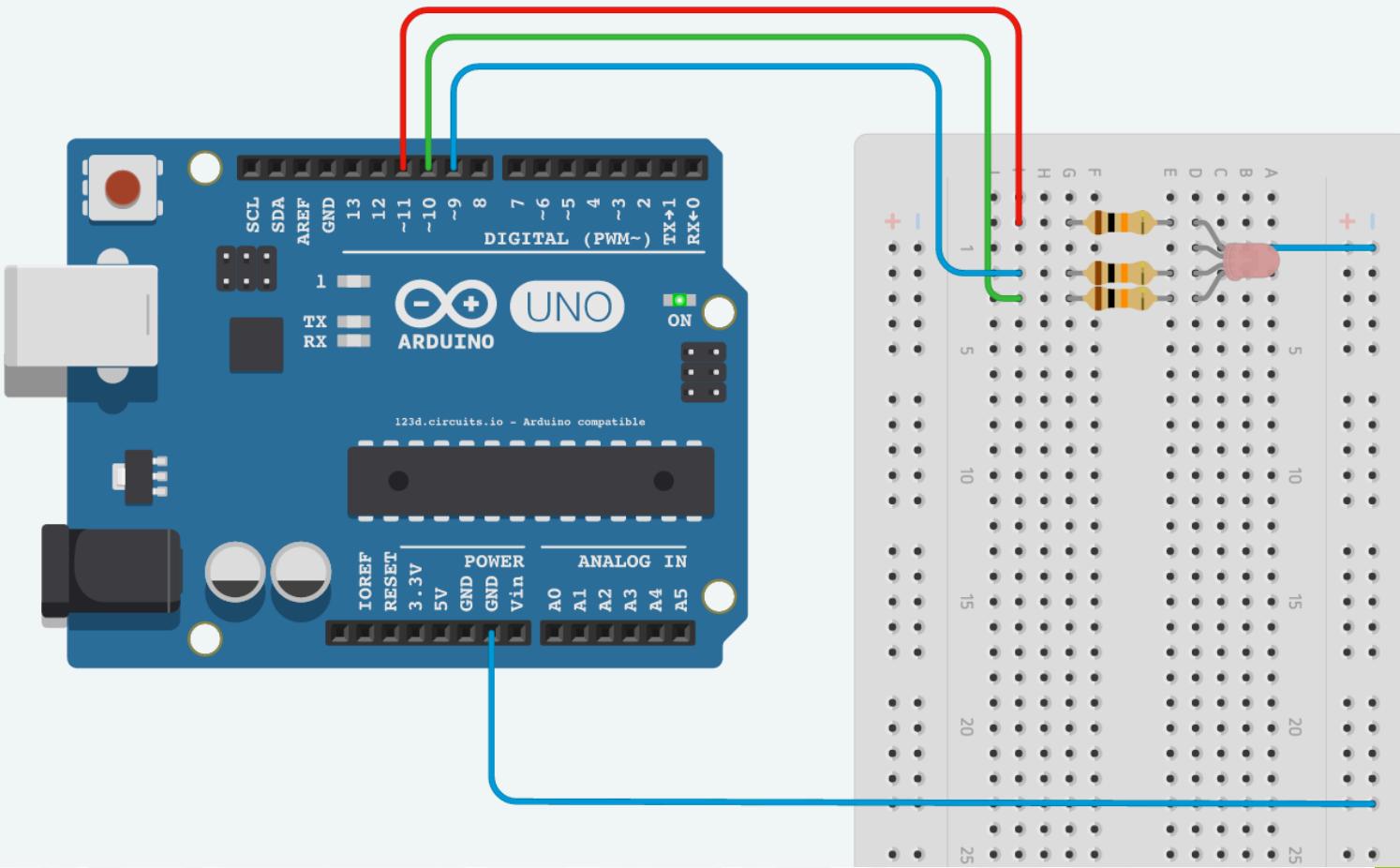
Understanding Arduino: Prototyping World



This is the Arduino Software (IDE)

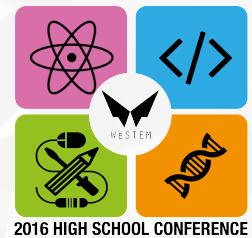


Arduino + RGB = cool circuit



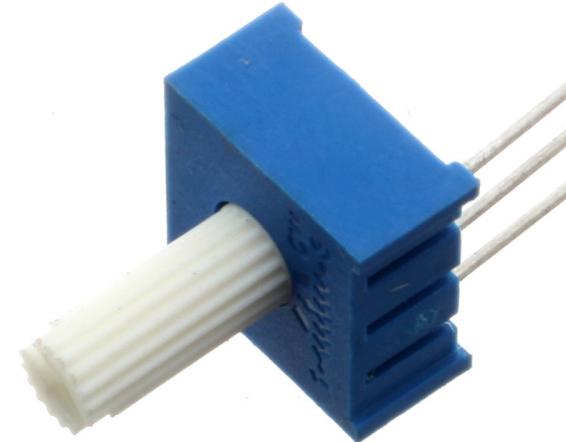
Inputs and Outputs

- Output: RGB LED
- Input
 - Code?
 - Physical input – Analog input – read as a voltage
 - Potentiometer
 - Slider (Potentiometer)
 - Proximity Sensor



Potentiometer

- Based on the concept of Resistance (2 Resistors)
- As you turn the shaft, the resistance on either side of the center pin changes
- This causes the voltage to change
- Voltage value (between 0 and 1023) is read as analog input

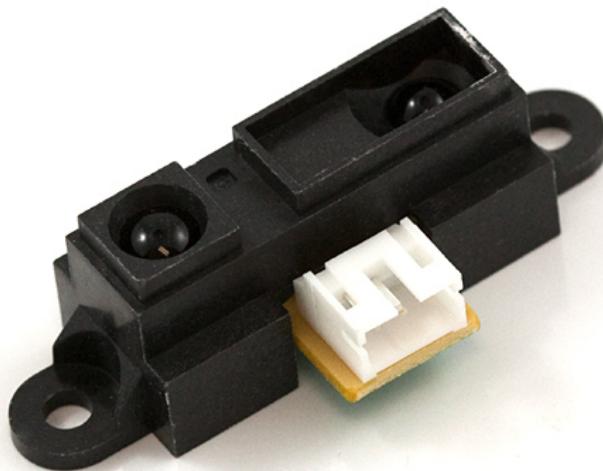


Slide(r) Potentiometer

- Based on the concept of Resistance (2 Resistors)
- As you turn the shaft, the resistance on either side of the center pin changes
- This causes the voltage to change
- Voltage value (between 0 and 1023) is read as analog input



Proximity Sensor



- Also based on the concept of Resistance (2 Resistors)

Cheatsheet

RGB (255, 0, 0)

RGB (255, 127, 0)

RGB (255, 255, 0)

RGB (0, 255, 0)

RGB (0, 0, 255)

RGB (75, 0, 130)

RGB (143, 0, 255)

