

LEDs Merit Badge Assessment

Derived from the adafruit learning system

Instructions: do each of the following and submit to your instructor.

- 1.) Identify and describe the principles by which an LED produces light.
- 2.) Identify and describe 5 devices in your home that contains LEDs.
- 3.) Describe the benefits and limitations of using LED technology versus conventional lighting (i.e. incandescent and fluorescent)
- 4.) Identify and describe the primary components that make up the common LED. Be sure to include the means of determining anode from cathode.
- 5.) Determine the electrical requirements for lighting the red LED supplied by your instructor. Make sure to reference the datasheet provided. You will need to identify the forward voltage and forward current.
- 6.) Determine the electrical requirements for lighting the green LED supplied by your instructor. Make sure to reference the datasheet provided. You will need to identify the forward voltage and forward current.
- 7.) Why are the values between 5 and 6 different?
- 8.) Use the LED dropping resistor calculation to determine the value of a dropping resistor for your red and green LEDs if your input voltage is 3.3V, 5V, and 12V.
- 9.) Use the LED dropping resistor calculation to determine the value of a dropping resistor for powering both red and green LEDs if they are connected in series.
- 10.) Use the LED dropping resistor calculation to determine the value of a dropping resistor for powering both red and green LEDs if they are connected in parallel.
- 11.) Prototype out using an Arduino or Raspberry Pi a circuit that will alternately blink a red and green LED.