6. If we connected a 10 resistor between these two rows - so that it is in a closed loop with the 5V supply from the Rpi, how much current would this circuit attempt to draw across the resistor? **We will get 5A of current.**
   a. The Rpi adaptor provides 5V and up to 2 Amps, is this Current sufficient? **No, this current is not sufficient.**
   b. What do you think might happen? Please don't actually do this. **It will short circuit**

7. Connect a resistor of more than at least 100 ohm (Why might this be enough resistance?) **Because it will limit the current flow so it won't short circuit.**
   a. If you have a multi-meter able to measure current and evaluate the current across the resistor, is it what you expected? NOTE: to measure current, you have to put the meter in series with the rest of the circuit - it cannot measure current like it would voltage (connecting leads to +/- side of a component) - the current has to run through the meter. **We got 0.01 A and this is what we expected.**

LED in a circuit:

1. Add an LED to your circuit
   a. Put it in series with the resistor and move the +/- connectors to the RPi 5V supply as needed
      i. How does the diode need to be oriented? Which wire on the LED goes to the +5V side and which goes to the GND connector? **The longer side of the LED means positive where the long one goes to the +5V side and the shorter wire goes to the GND connector.**
   b. What is the voltage drop across the resistor? Was this what you expected? **It is 1.5 V and this is what we expected.**
   c. What is the voltage drop across the LED? **It is 3.2 V and this is what we expected.**
2. Try removing the resistor from the circuit, keeping the circuit closed - the LED is just in series with the 5V supply.
   a. What do you think will happen to the LED brightness? **It will increase.**
3. Try including resistors of different values - how does LED brightness change vs resistor strength? **The more resistance we have, the dimmer the LED will be**
   a. Do the voltage drops across the resistors and LED change? **Yes they do change.**
4. Using the configuration with the highest LED brightness now move the 5V connection on the RPi to one of the 3.3V pins.
   a. What do you expect to happen to the LED brightness? **It will be dimmer**
5. Add a step-up circuit components to increase your RPi voltage from 5V to 10V but do not close your circuit yet

a.　~~Using the dimmest configuration for the LED explored previously (meaning select the appropriate resistor from those you tried previously) now~~
　　　b.　~~How will the LED brightness change?~~ **The brightness will increase.**
6. ~~How would you quantify the LED brightness changes?~~ **You can quantify it using current.**
7. ~~Do any of these results change with different color LEDs? Specifically do any voltage drop values change, is the relative brightness similar for different color LEDs, etc.~~ **Yes the results vary depending on the different color LEDs.**

Photo-diode:
1. ~~Replace the LED with a photo-diode (remove the step-up component as well if you had one included previously)~~
　　　a.　~~NOTE: photo-diodes operate in reverse bias mode so you will need to orient the diode accordingly~~
2. ~~What is the voltage across the resistor when you simply connect the 5V supply to close this circuit?~~ **5V**
3. ~~What happens if you cover the photo-diode? What happens if you change the +connector to go to the 3.3V pin on the Rpi?~~ **If you cover the photo-diode the voltage decreases. If you change the + connector to go to the 3.3V pin on the Rpi the new voltage is 3.2V.**
　　　a.　~~What is the dark current for this photo-diode? (Use the voltage across the resistor to determine diode current)~~ **0.15 V**
　　　b.　~~Is 5V enough supply voltage to see a signal from this diode? Is 3.3V?~~ **Yes 5V is enough supply to see a signal and also on 3.3 V(even if the signal is very little).**
　　　c.　~~What happens if you attach the step-up circuit component to increase the supply up to 10V?~~ **We found out that the dark current for the photodiode decreased.**
4. ~~What are the dark current and saturation current for the photo-diode?~~ **The dark current is 1.2 V and the saturation current is 5V**