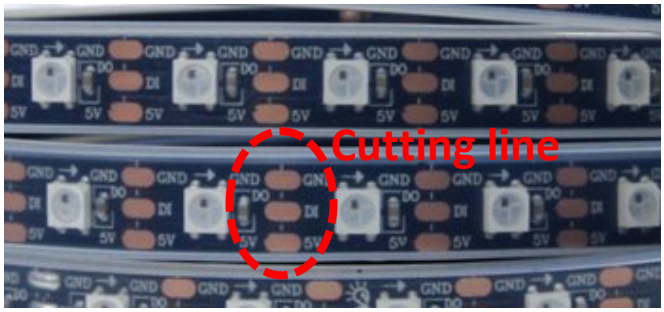
Instruction for Hardware Preparation

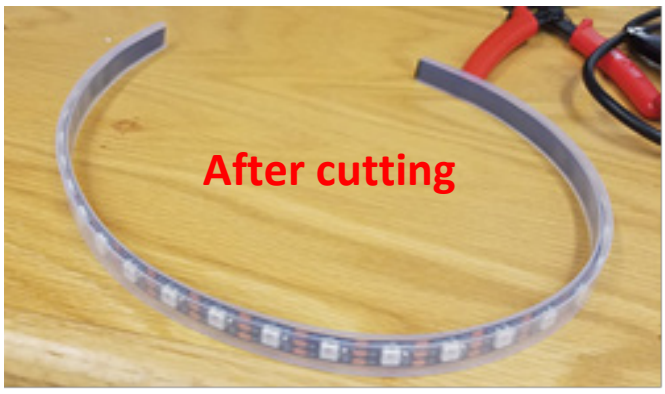
Materials Needed: 1) strip of 300 LEDs, 2) 10 wires of red, green, and black wires (each), 3) silicon glue gun, 4) soldering machine, 5) solder, 6) wire stripper, 7) clipping tool.

Instruction: The lab requires an individually addressable LED strip with a total of 30 LEDs; you can set the number of LED based on your preferences and needs, but 30 LED shall be sufficient for interactive and attractive visualization for non-tech-savvy students.

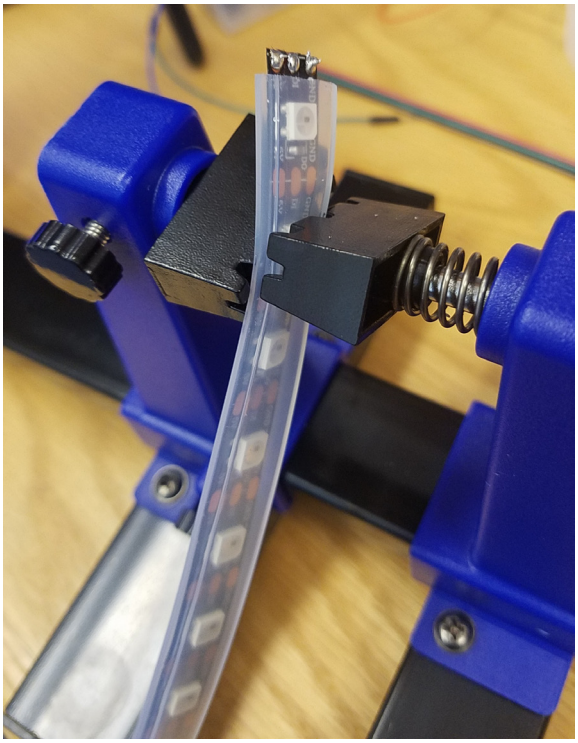
Unfortunately, we could not find any off-the-shelf products that sell strips in 30 LED, so we had to purchase a LED strip with 300 LEDs [link] and make 10 strips of 30 LEDs (to accommodate 8 groups of students with 2 for backup). You can purchase any LED strips with 3 input pins: **5V**, **GND**, and **IN**; make sure you purchase with 3 input pins, not the ones with 4 pins. The long LED strip should look like the following:

Next step is to cut them into 10 strips of 30 LEDs. You can just use a pair of scissors to cut them along the cutting line marked on the strip.

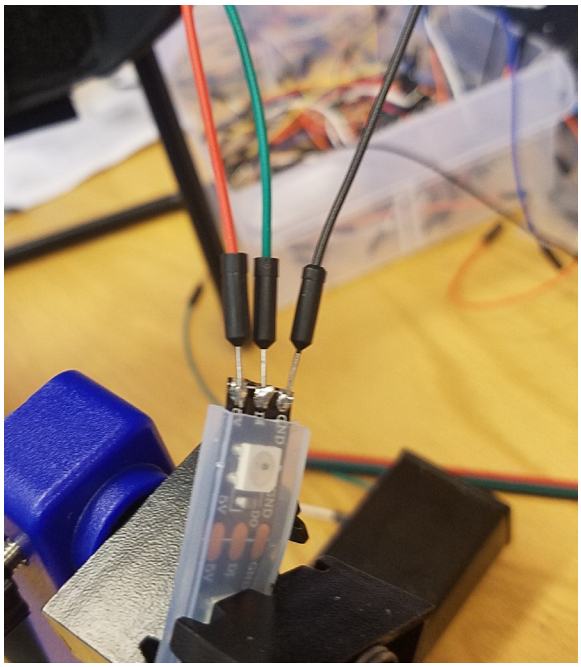




Now, you need to attach three wires to one end (which will be connected to Arduino) of each LED strip – any one of the two ends. Use a clipping tool to hold the strip and place solder on the three input pins as shown in the figure below.



Then, gently heat up the solder that is already on the pins and slide in the wires. We used **RED** for **5V**, **GREEN** for **IN**, and **BLACK** for **GND**.



Then, use a silicon glue gun to seal the two ends of the strip to product from water damage (just in case!). The final product should look like the following.