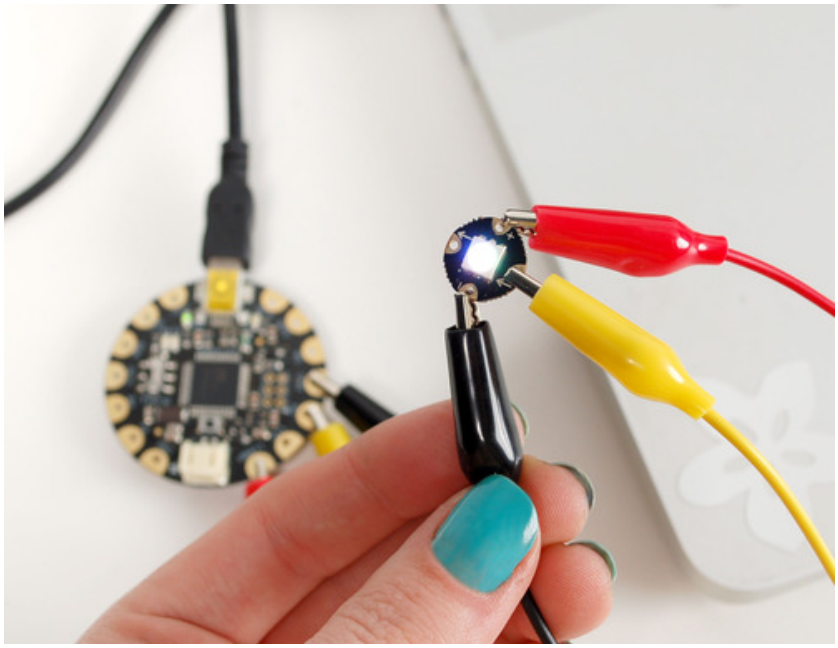
adafruit learning system

Flora RGB Smart NeoPixels

Created by Becky Stern



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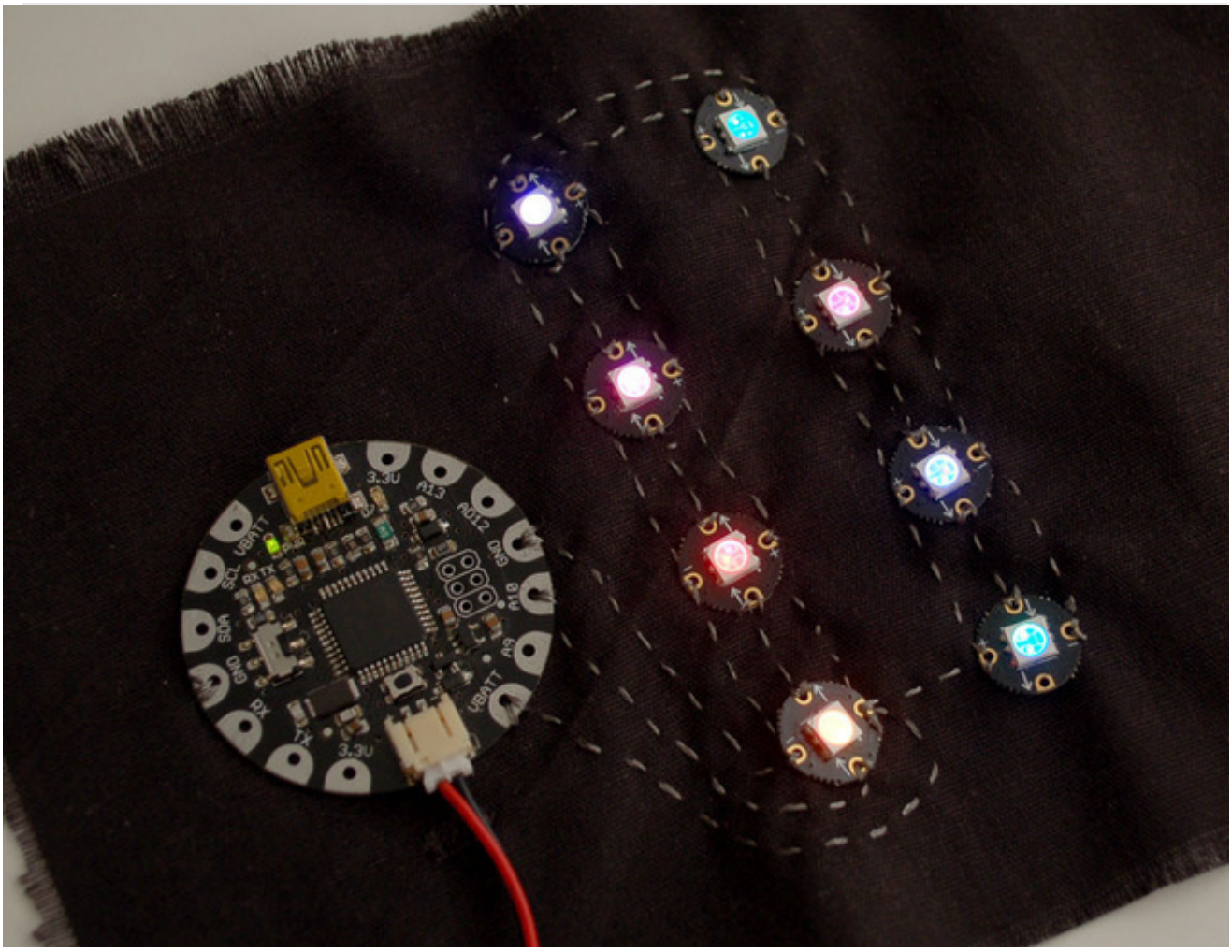
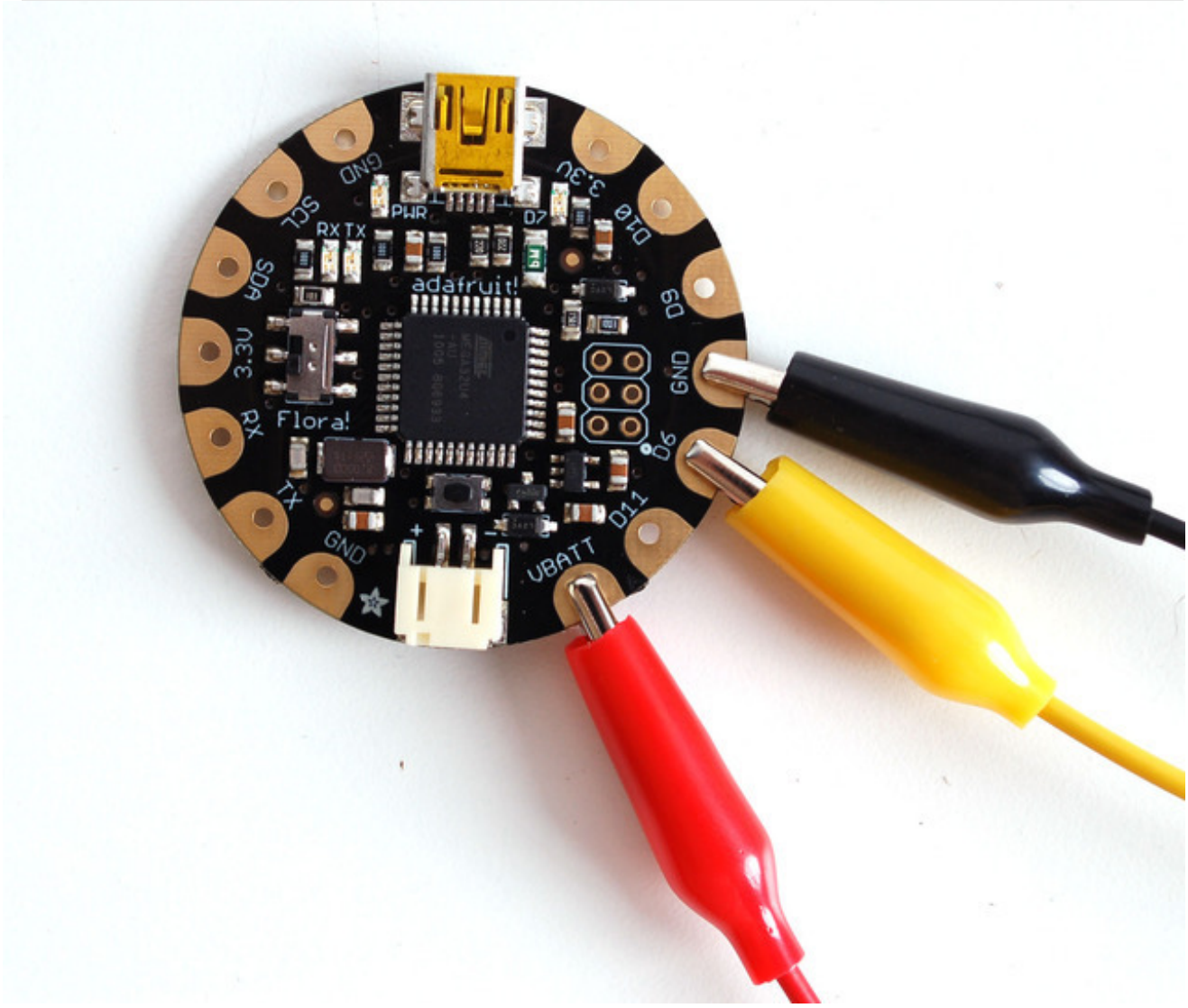
Overview



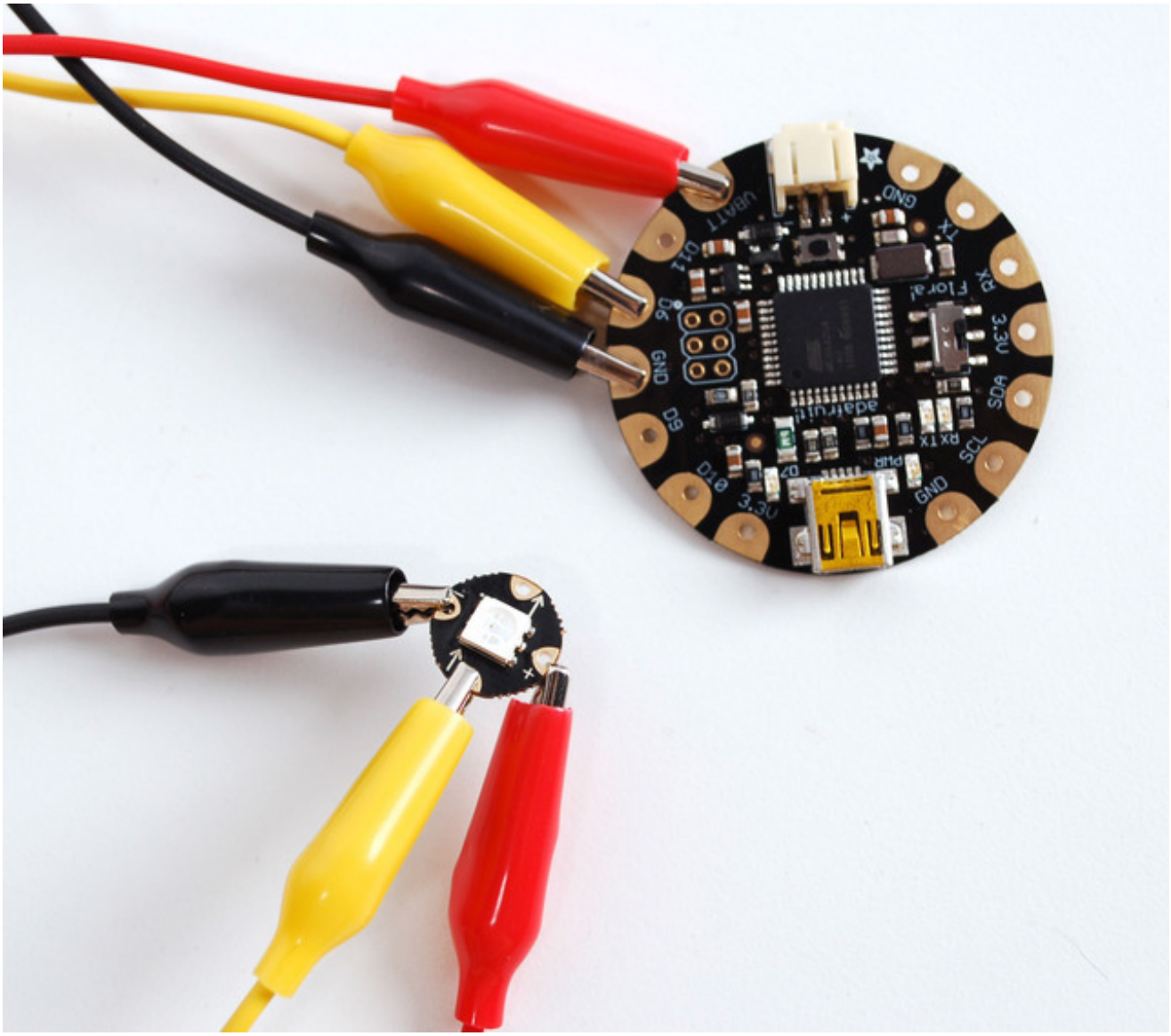
What's a wearable project without LEDs? Our favorite part of the Flora platform is these tiny smart pixels. Designed specifically for wearables, we found the brightest RGB LEDs available (an eye-blistering ~3800mcd) (http://adafru.it/619) and paired them with a constant-current driver chip. The contacts are easily sewn with conductive thread. Use this guide to test your first pixel and start on a blinding wearables project with FLORA or GEMMA!

We now have both the older v1 pixels (http://adafru.it/1060) and the newer v2 pixels (http://adafru.it/1260). This tutorial will cover both - the sewing part is the same for both versions but the library code is different as the controlling chipset has been upgraded in v2

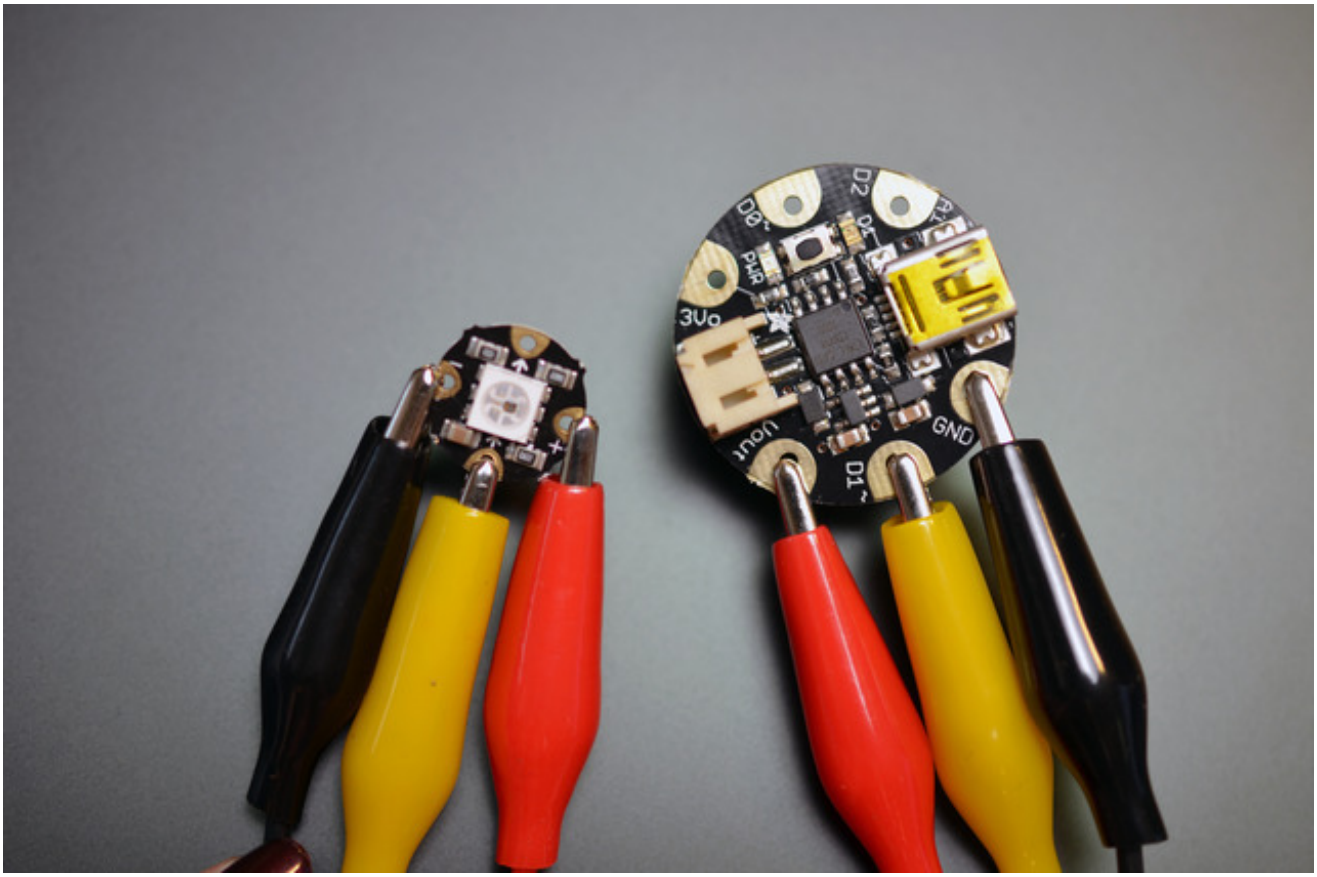
Hook up alligator clips



Hook up three alligator clips as shown: one to VBATT, one to D6, and one to GND. I used a red wire for power and a black wire for ground for clarity, but it doesn't matter what color you use.

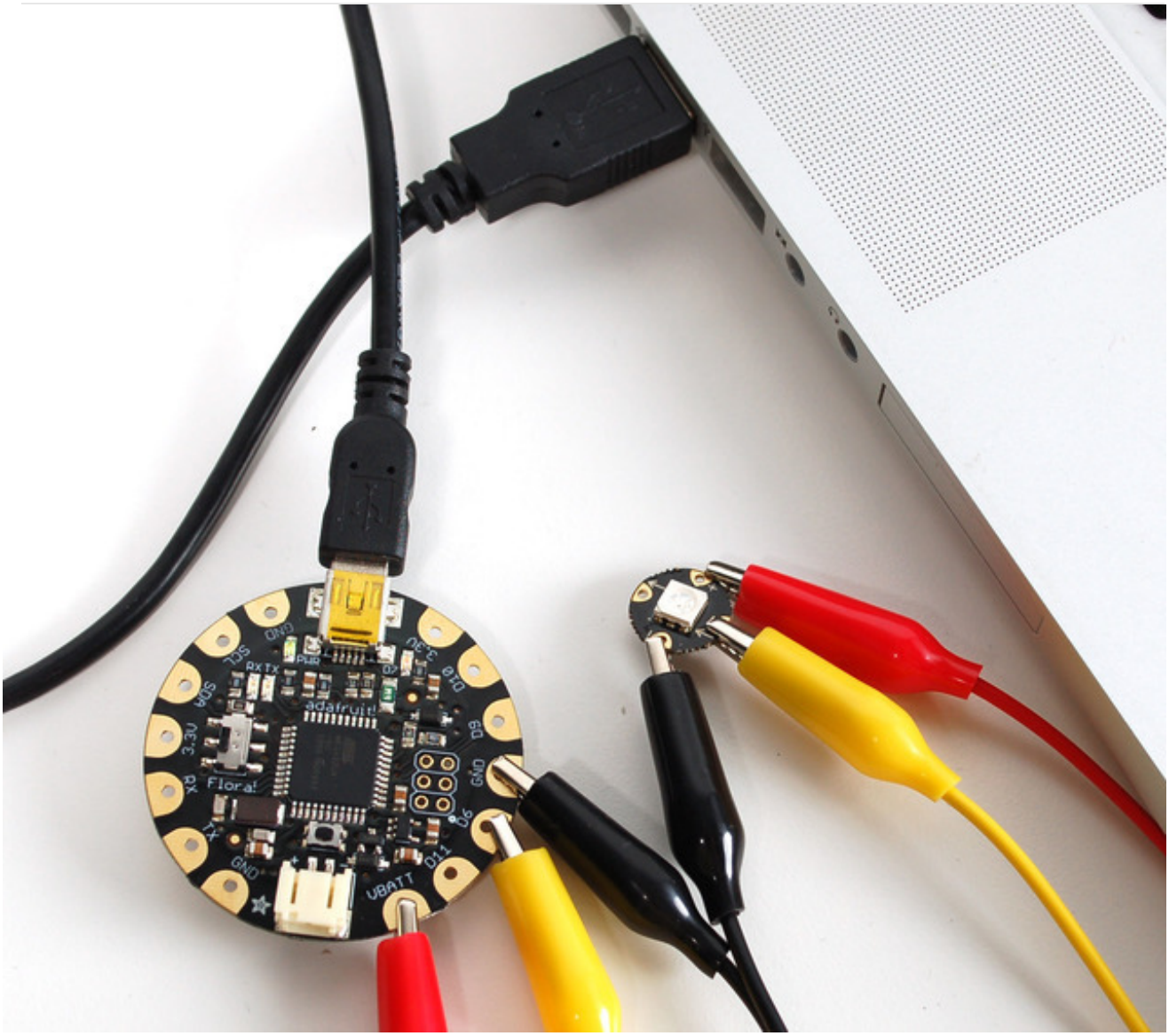


Hook up the other ends of your alligator clips to a single pixel. VBATT (red) connects to the + on the pixel, GND (black) to the -, and D6 (yellow) to the pad marked with an arrow pointing towards the LED on the tiny board (not away from it).



On GEMMA, the wiring is very similar. Hook up Vout (red in the picture above) to +, GND to - (black above), and D1 to the inward facing arrow (yellow above).

Run pixel test code



Connect your FLORA and computer with a USB cable.

Install the NeoPixel Arduino library

Installation of the library is as follows:

1. Visit the Adafruit_NeoPixel library page (http://adafru.it/aZU) at Github.com.
2. Select the “Download ZIP” button, or simply click this link (http://adafru.it/cDj) to download directly.
3. Uncompress the ZIP file after it’s finished downloading.
4. The resulting folder should contain the files “Adafruit_NeoPixel.cpp”, “Adafruit_NeoPixel.h” and an “examples” sub-folder. Sometimes in Windows you’ll get an intermediate-level folder and need to move things around.
5. Rename the folder (containing the .cpp and .h files) to “Adafruit_NeoPixel” (with the

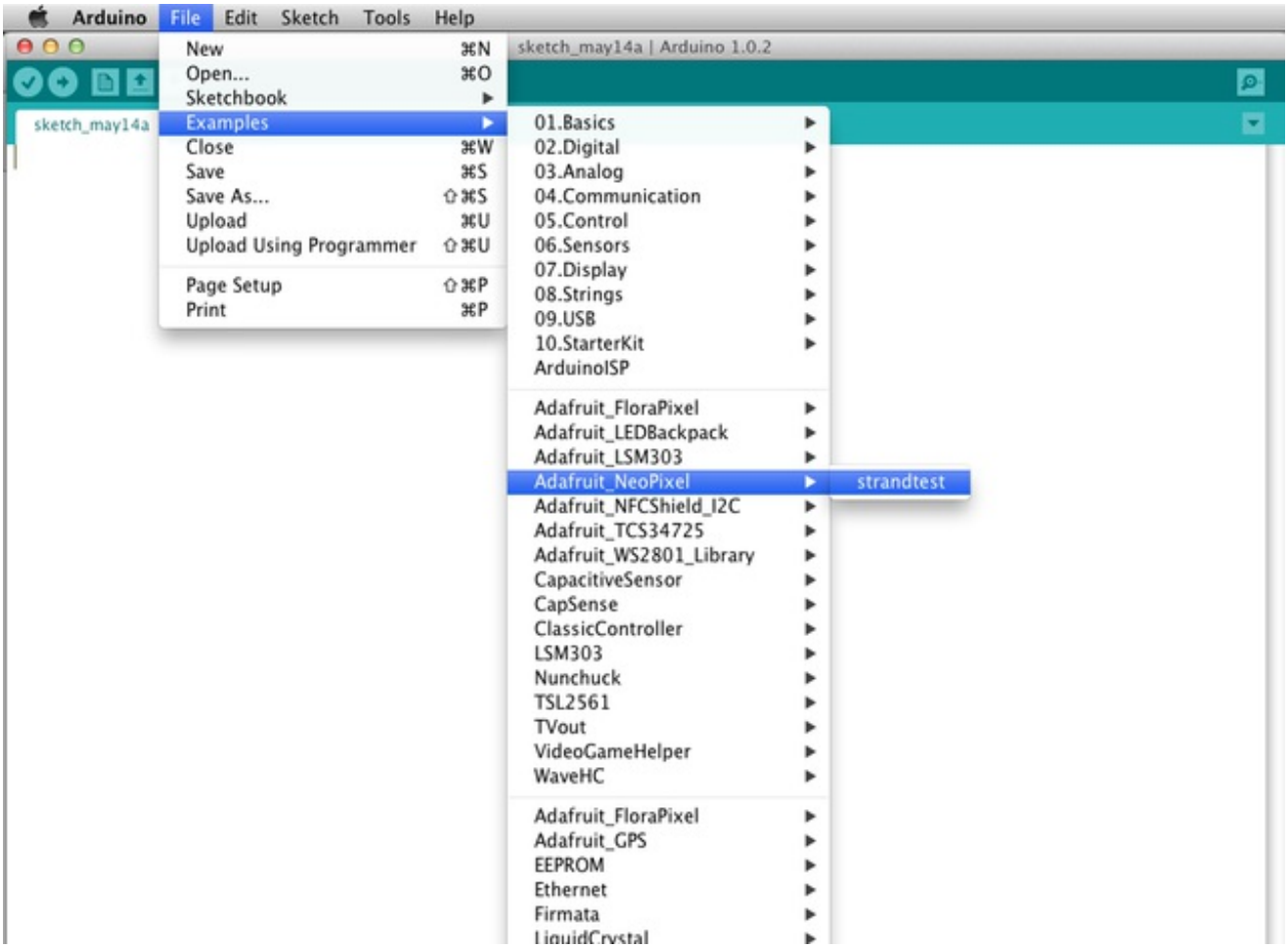
underscore and everything), and place it alongside your other Arduino libraries, typically in your (home folder)/Documents/Arduino/Libraries folder. Libraries should not be installed alongside the Arduino application itself.

6. Re-start the Arduino IDE if it's currently running.

Here's a tutorial (http://adafru.it/aYM) that walks through the process of correctly installing Arduino libraries.

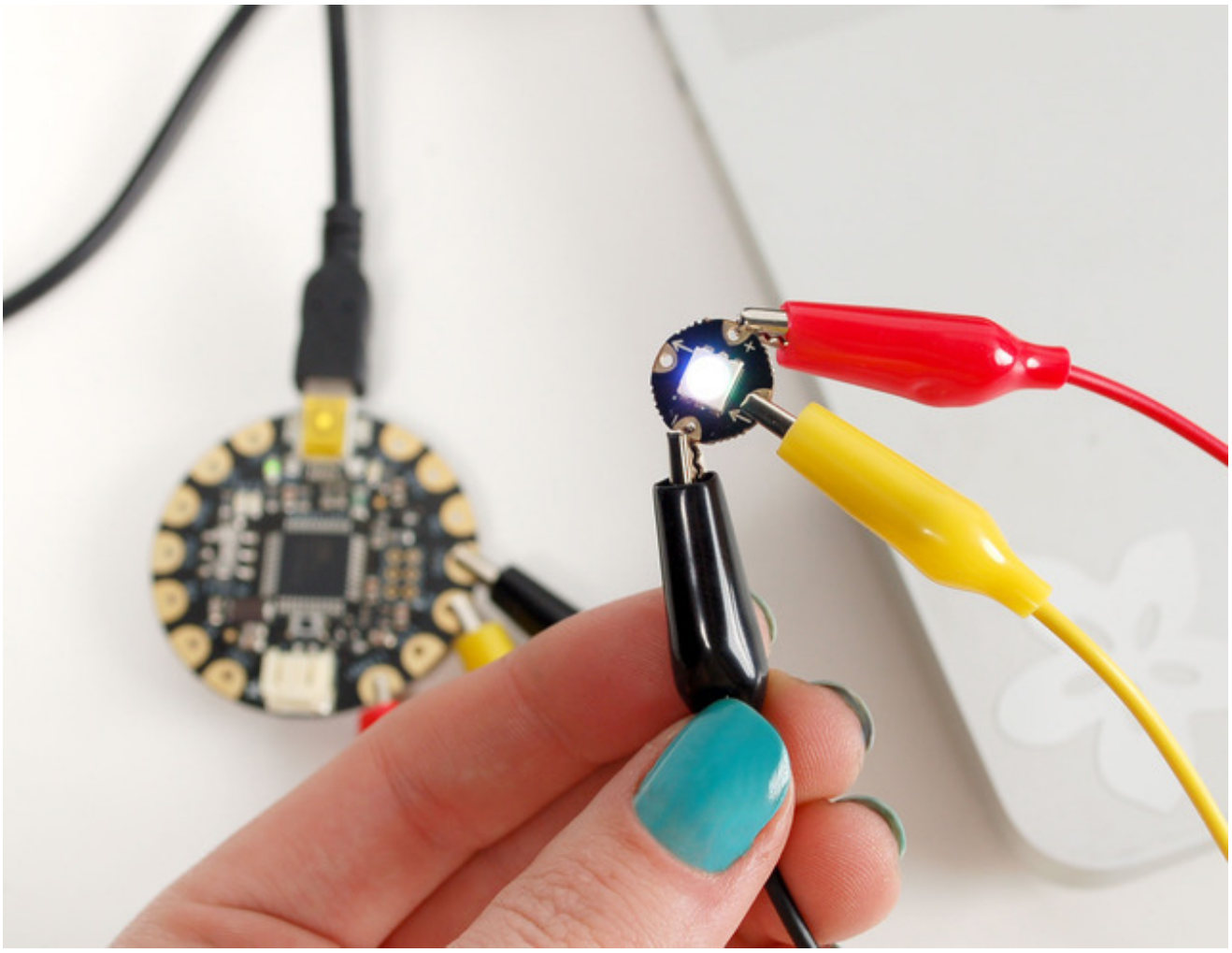
Now upload!

Install the NeoPixel library (http://adafru.it/aZU) and go to **File-->Examples-->Adafruit_NeoPixel-->strandtest.**



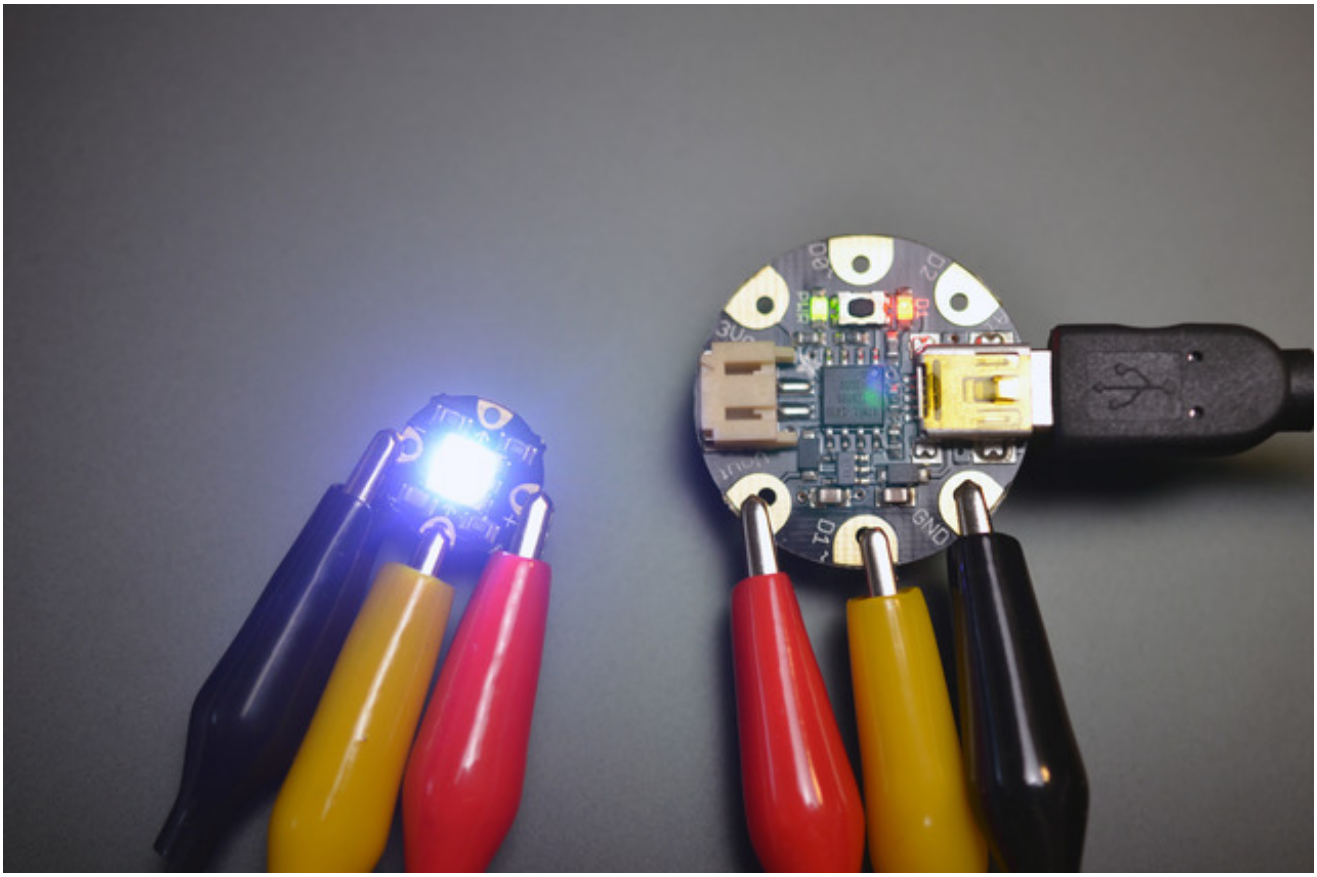
If you cannot find that file in the dropdown menu go back up and reinstall the library.

This will launch a window containing the sample sketch. Upload it to your FLORA with the Upload button.

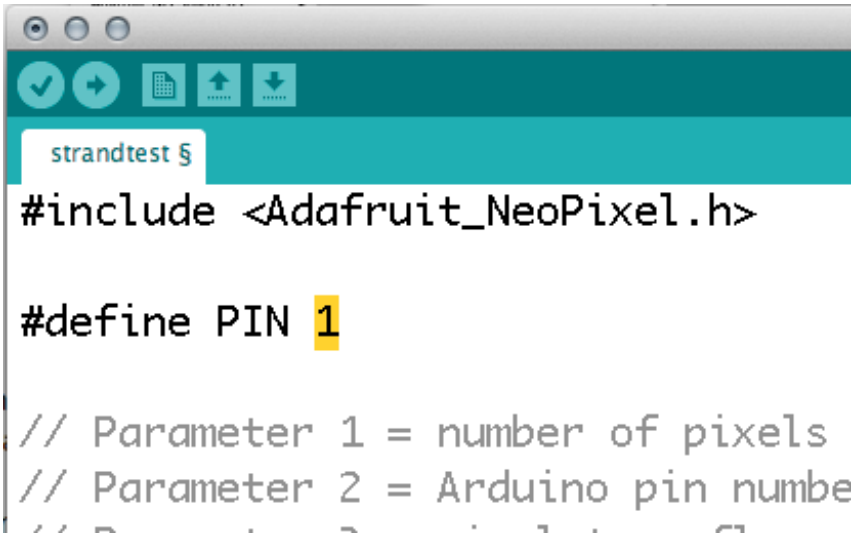


Once successfully uploaded to your FLORA, the pixel will flash and fade different colors. Congrats, you've tested your pixel!

We do test each pixel in the factory, but you should use this method to test that all three colors (red, green, blue) work on each of your pixels before sewing them into your project!

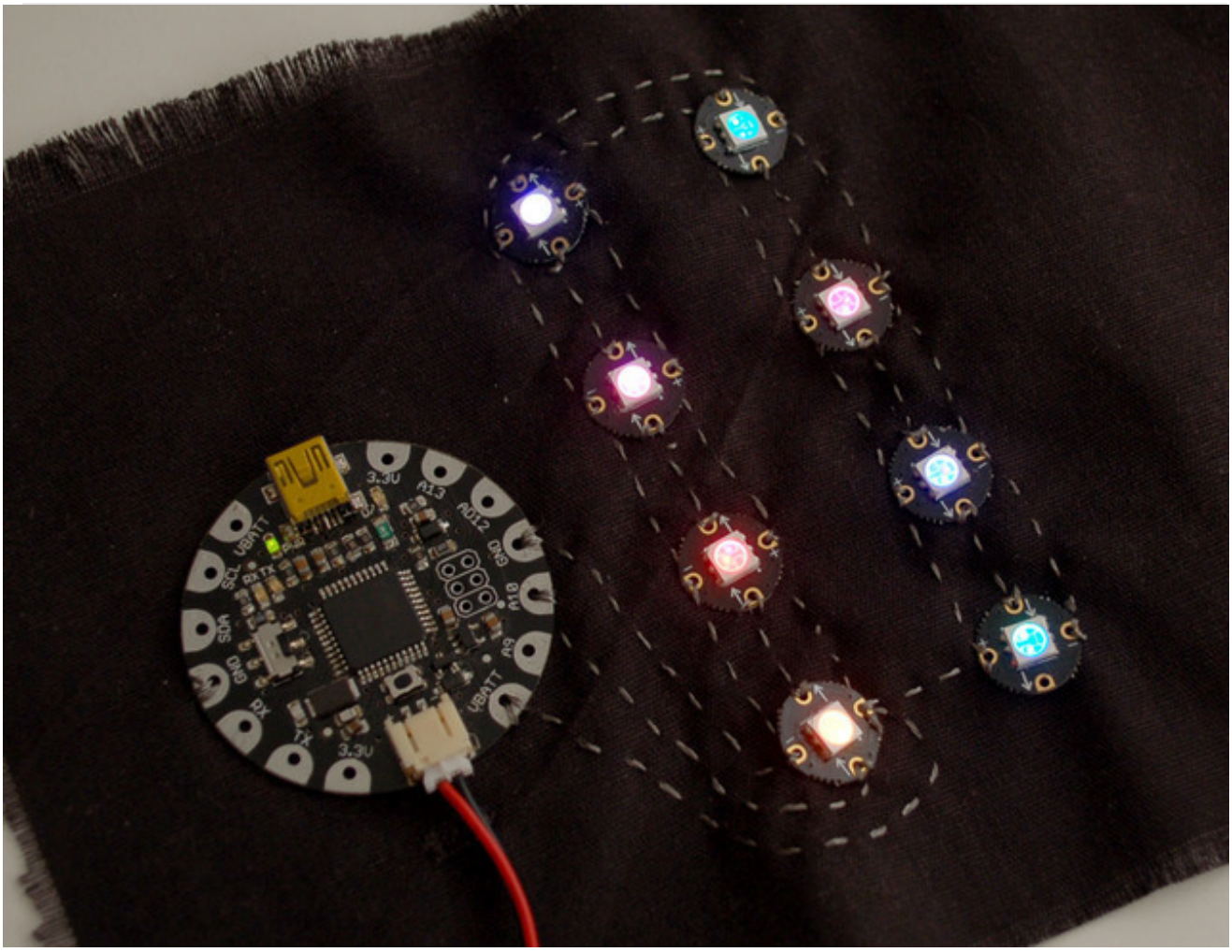


For GEMMA, you'll need to change the pin number in the Arduino sketch before uploading. Change "6" to "1":



Then upload the sample code to GEMMA by pressing the reset button (the red LED should start pulsing) and clicking the "upload" button in the Arduino software.

Add more pixels



The pixels are chainable - so you only need 1 pin/wire to control as many LEDs as you like. They're easy to sew, and the chainable design means no crossed conductive threads (http://adafru.it/641). The output of one pixel connects directly to the input of the next.

Just make sure that each arrow points away from the Flora in a line. All the +'s and -'s connect together, as you can see above, I sewed the +'s of the two rows together at the bottom, not the top.

Lots of Pixels?

Each pixel draws as much as 60mA (all three RGB LEDs on for full brightness white). In theory, the Flora can drive up to 500 pixels at 30 FPS (it will run out of RAM after that). However, after about 10 pixels (or if the distance between pixels is more than an inch or two) the resistance of the thread can affect the power supply. For large quantities of pixels over 10, you may want to consider using stranded core wire or copper braid to provide a

"power bus" for the pixels - the current draw will add up fast!

The library for these pixels is very similar to our Adafruit_WS2801 (http://adafru.it/aRL) library for other types of RGB pixels (http://adafru.it/aRL).