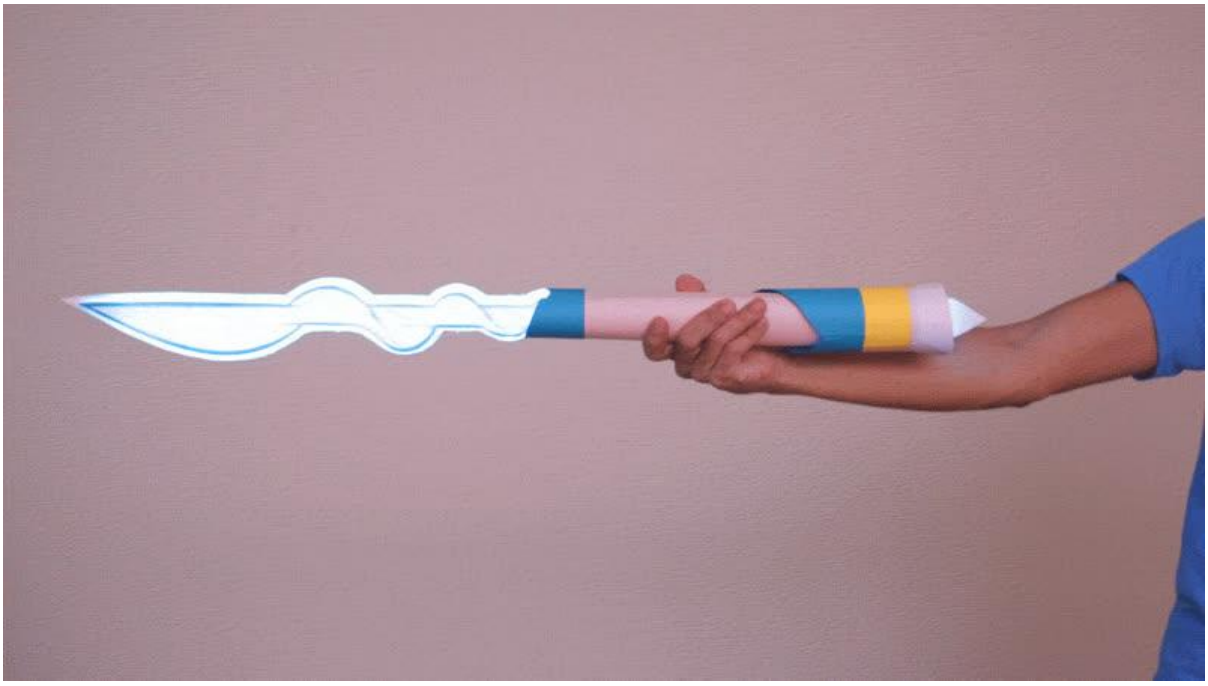
Pearl's Gem Weapon – Steven Universe

Created by Ruiz Brothers



https://learn.adafruit.com/pearl-s-spear-steven-universe

Last updated on 2022-12-01 03:28:13 PM EST

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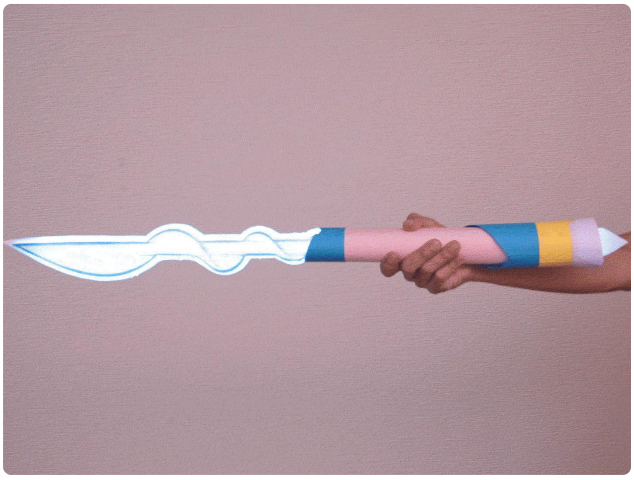
Overview

In this project we're building Pearl's Spear: LED Wand from Steven Universe!!

We made Pearl's gem wand so it lights up and makes sound effects when you swing it around! You too can build your own with a couple parts and craft supplies.

Use microsoft MakeCode and Adafruit Circuit Playground Express and learn how to program. Drag and drop code blocks to develop interactive LED animations.

Lights and Sounds and more!



The Circuit Playground Express powers the NeoPixel LED strip and can activated animations and sounds with its build in sensors!

Tigger with motions, sound or even temperature!

Parts easily connect with Alligator clips, so no need to solder!

Craft Parts/ Tools

To build this project, all you need are some foam poster boards and art supplies.

Prerequisite Guides

There's resources in these guides that go beyond what's covered in this tutorial. MakeCode guide is all about setting up your Circuit Playground Express board.

TheCircuit Playground Express introduction guide walks you through all of the pinouts, sensors and everything you need to know.

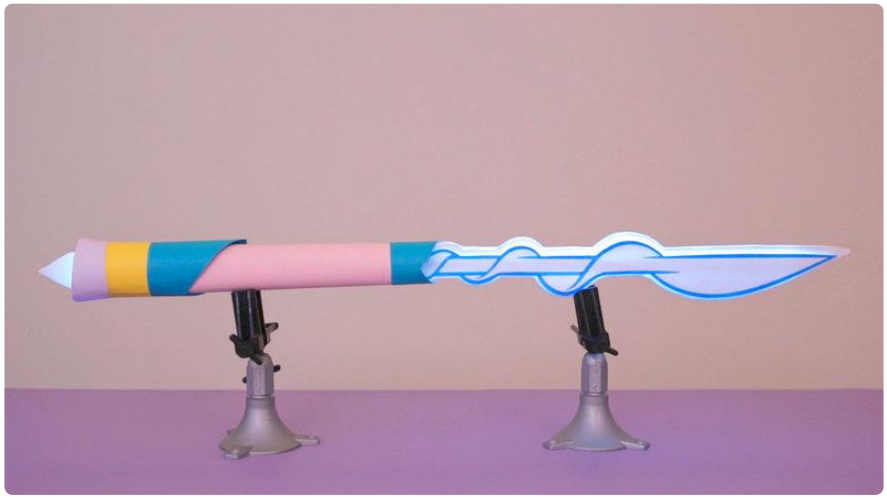
MakeCode for Circuit Playground Express ()
Introducing Circuit Playground Express ()
Using Vinyl Cutters for Projects ()

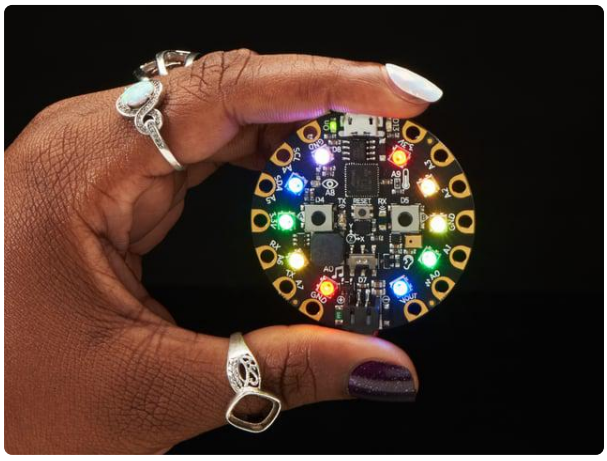
Parts List

This is an easy to copy + paste list of parts linked to their individual product pages.

- Adafruit Circuit Playground Express ()
- Adafruit NeoPixel LED Strip w/ Alligator Clips ()
- Short Wire Alligator Clips ()
- 3x AAA Battery Pack w/ JST connector ()
- .7mm thick Chipboard ()
- Hobby Knife
- colored Cardstock
- glue stick
- colored markers
- Foam poster board ()

- Cricut Vinyl Cutter ()





Circuit Playground Express

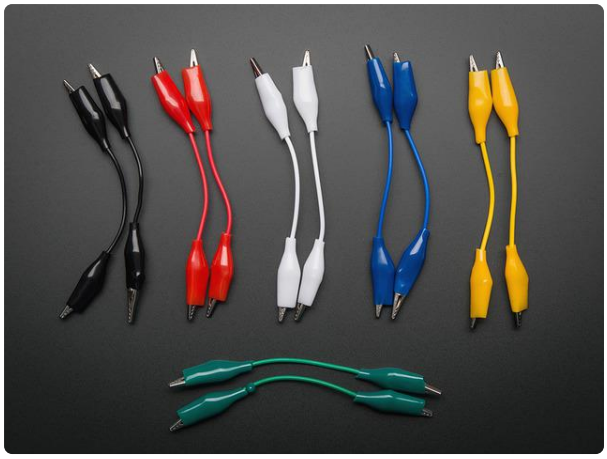
Circuit Playground Express is the next step towards a perfect introduction to electronics and programming. We've taken the original Circuit Playground Classic and...

https://www.adafruit.com/product/3333

Adafruit NeoPixel LED Strip w/ Alligator Clips - 60 LED/m

Adding glowy color to your projects has never been easier: no more soldering or stripping wires, clip 'em on and glow! This Adafruit NeoPixel LED Strip with Alligator...

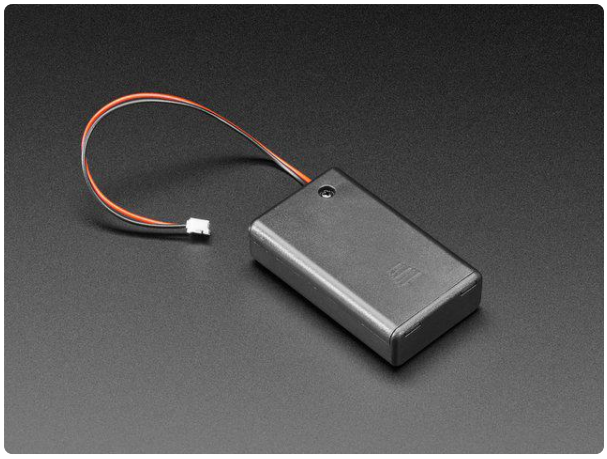
https://www.adafruit.com/product/3811



Short Wire Alligator Clip Test Lead (set of 12)

Connect this to that without soldering using these handy mini alligator clip test leads. Approximately 4.5" overall cables with alligator clip on each end, color coded. You get 12...

https://www.adafruit.com/product/1592

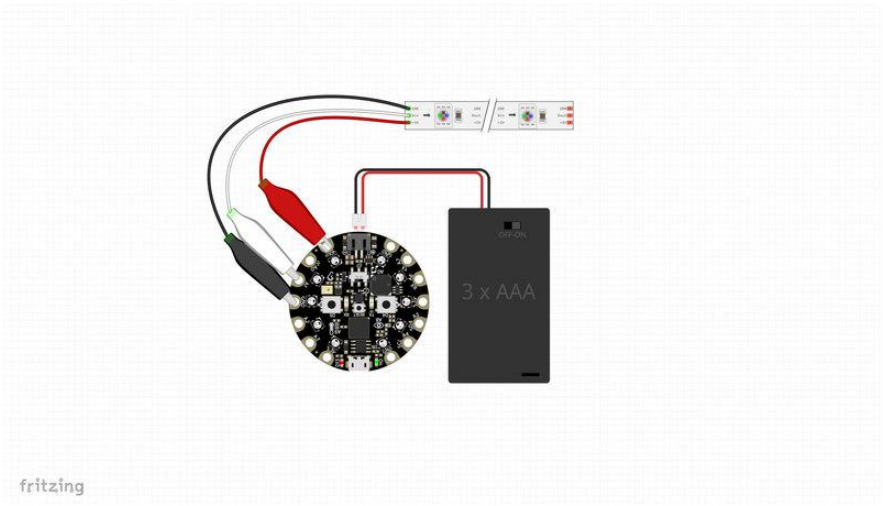


3 x AAA Battery Holder with On/Off Switch and 2-Pin JST

This battery holder connects 3 AAA batteries together in series for powering all kinds of projects. We spec'd these out because the box is slim, and 3 AAA's add up to about...

https://www.adafruit.com/product/727

Circuit Diagram

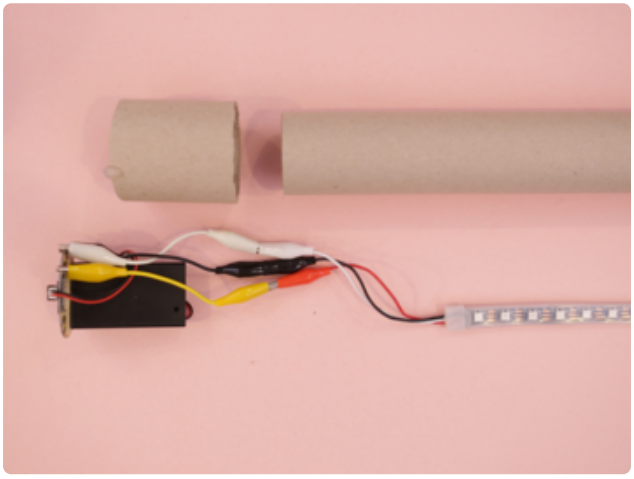


Circuit Diagram

This provides a visual reference for wiring of the components. They aren't true to scale, just meant to be used as reference.

Power Pack

The 3xAAA battery pack can supply ~4.5V which is suffice to power the Circuit Playground Express. The battery plugs directs into the JST connector.



NeoPixel Strip + Extension Alligator Clips

The Alligator clip Neopixel strips connects to the pads on Circuit Playground Express. The wires on the Strip will need a small extension to reach the blade. We used short Alligator clips to join the strip to the Circuit Playground.

Red connects to Vout

White connects to A1

Black connects to GND

Code

MakeCode for Circuit Playground Express

MakeCode is this programming editor that runs in the Google Chrome web browser. It's has an intuitive interface that's both block based and text editor.

It works with Adafruit's Circuit Playground Express so you can make interactive projects with the on-board sensors and components. You can drag & drop blocks to make interactive programs using lights and sounds without having to solder or learning a new syntax.

You can alternatively upload code directly to the Circuit Playground Express with WebUSB, see the steps to do so here ().

Setup Circuit Playground Express for MakeCode

To get started, we'll need to head over to the Adafruit MakeCode () website and follow the steps below.

1. Plug in your Circuit Playground Express with a USB Cable
2. Press the RESET button. Green light means you're ready to MakeCode
3. Download the UF2 file and drop it onto CPLAYBOOT.

Edit Makecode

Upload and Test Code

Once you have your CPX setup with the MakeCode UF2, try testing it out by uploading the code to the board.

Click the link below to open up the program in MakeCode. Click on the pink edit icon near the top of the title to open the code.

This will create a project in MakeCode and allow you to edit, modify and upload the code to the board.

Makecode Blocks

on start block

when the CPX is turned on do the following

set accelerometer rage

set motion to a medium setting

set strip

setup an external neopixel strip on the A1 pad of the circuit playground express

strip set all pixels

setup a color for all the LEDs in the strip

set all pixels to

setup a color for all the LEDs on board the Circuit Playground Express

set brightness

adjust the brightness of the LEDs on board the Circuit Playground

on tilt right

triggers animation when circuit playground express board is tilted

play sound

setup audio sound effect to play

strip show animation

set animation on LED strip and duration (in milliseconds)

strip show animation

set strip animation and how long to play

show animation

set animation on CPX LEDs and duration (in milliseconds)

strip stop all animation

stop animations and resets

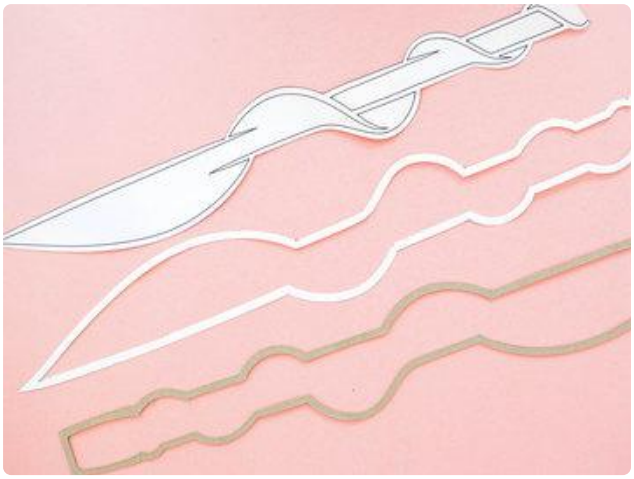
strip set all pixels to

set color back to blue color on LED strip

set all pixels to

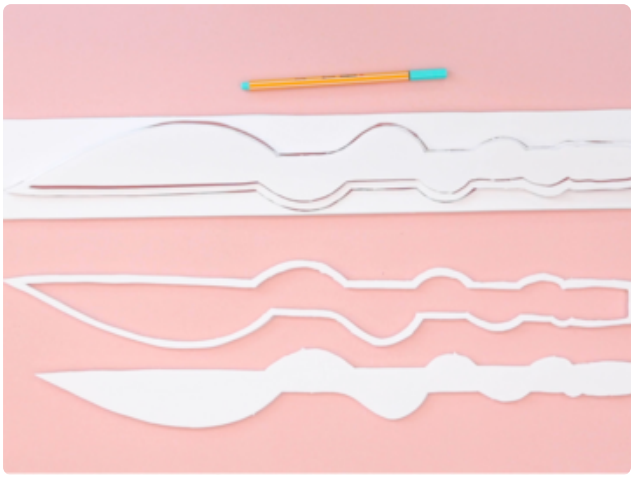
set color back to blue color on the CPX LEDs

Assembly



Print and Cut Outlines

To start off we'll go ahead and download, print and then trace the paper outlines onto foam board. We used banner paper to print the length of the blade, but you could tape two pieces of paper to print the full size.

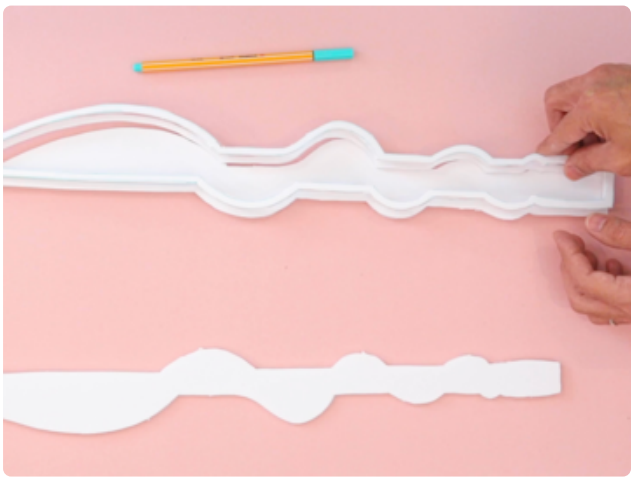


The files include outlines to use on vinyl cutters to get precise edges and make printing easier.

Cut out two copies. We'll use the outline to form the sides of the blade and then use the center pieces as the backing and lid.

Pearl_Spear_Cuts.zip

Stack Layers



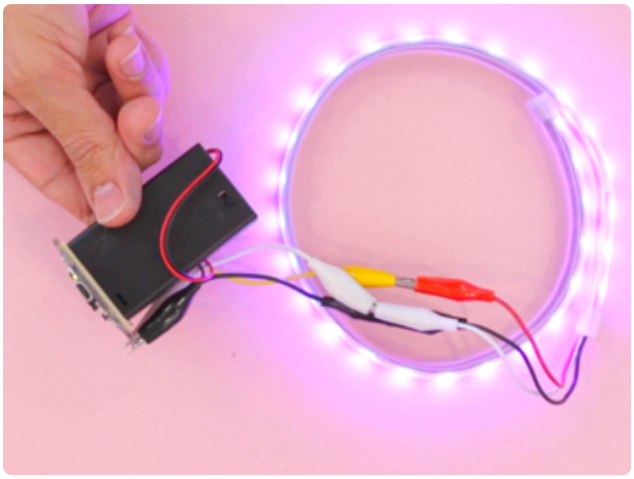
Now we can stack the layers on top of each other to form the blade body to mount the NeoPixel Strip.

Glue Layers

We applied hot glue to the inner edges of the backing and the two frame pieces. Glue the backing to the first outline piece.

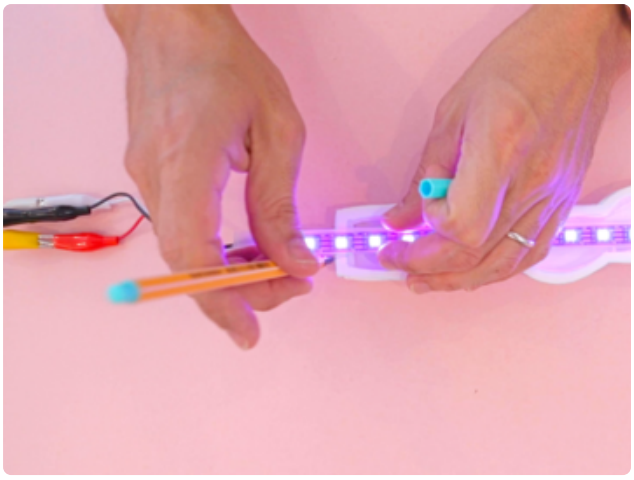
Do NOT glue the other center piece, will use this as our removable lid.

We'll want to make sure the backing isn't inserted in the outline, stack it on top then glue the inner edges.



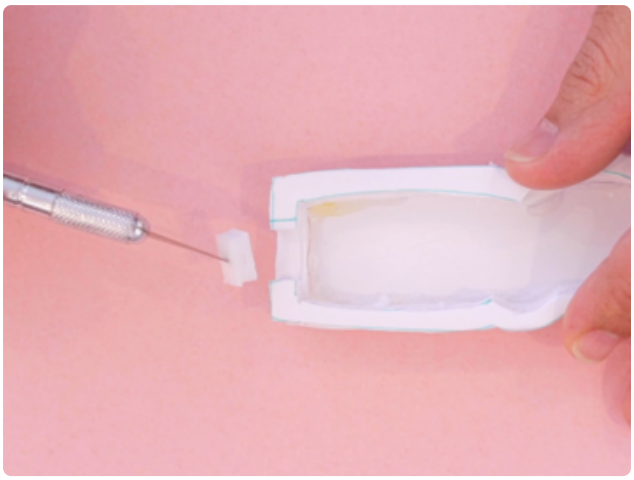
CPX and Battery Assemble

The Circuit Playground Express and battery pack are attach with a strip of double stick foam tape. Apply the foam tape to the center backing of the Circuit Playground. Position the battery pack with its wire to the opposite side of board as shown.



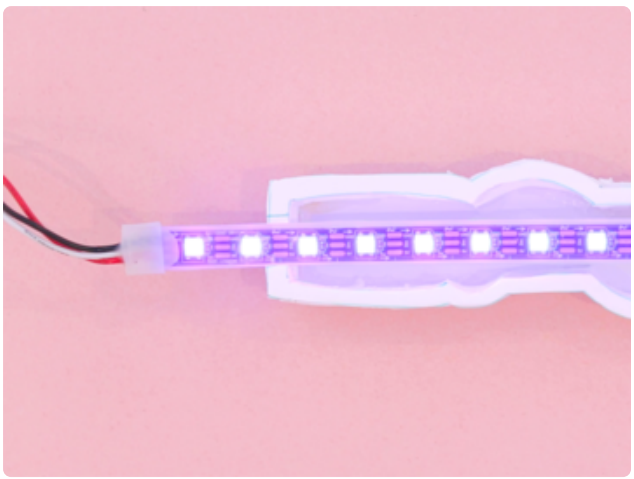
Alligator Cip Extensions

We'll need to add short extensions for the NeoPixel strip. This will allow it to reach from the CPX, through the handle end and into the spear.

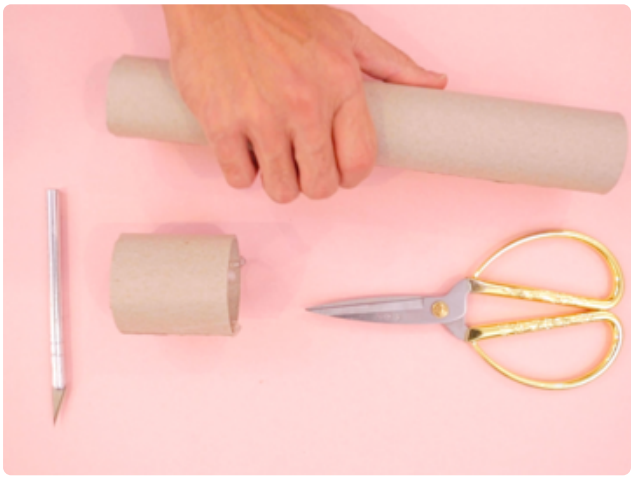


Mark Strip

Next we'll place the NeoPixel strip on the end of the blade and add a cut out to allow the strip to sit inside the blade cavity.

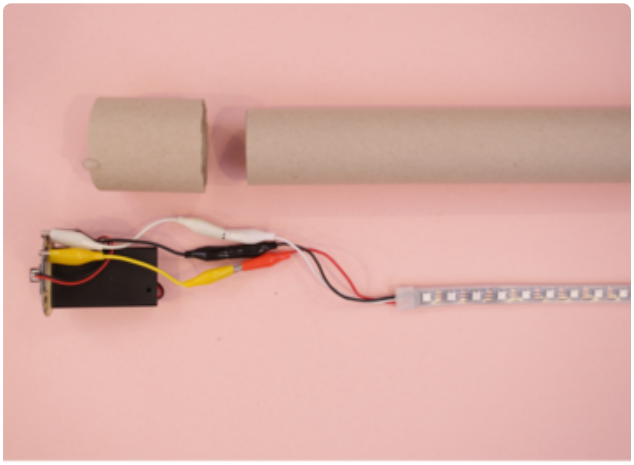


Handle Build



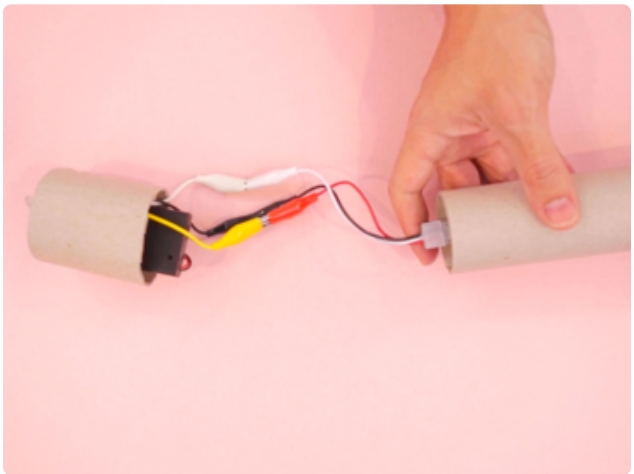
The handle can be made with a paper towel rolls or make your own with cereal boxes or chipboard. We can make a beefy handle with .7mm thick chipboard (). We simple rolled the chipboard over the battery pack to get our fit and then hot glued the chipboard into it's shape.

Pommel



The pommel will need to be constructed with chipboard (). Roll the chipboard around the Circuit Playground Express to get a tight fitting and then glue the chipboard to keep its shape.

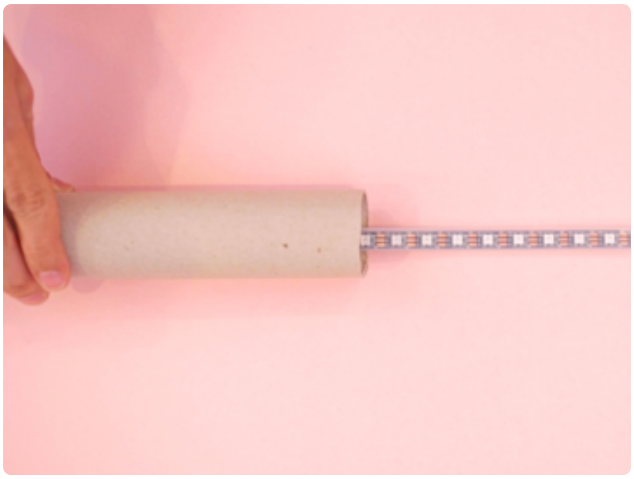
Allow the handle and pommel to fully dry before inserting the CPX and battery pack.

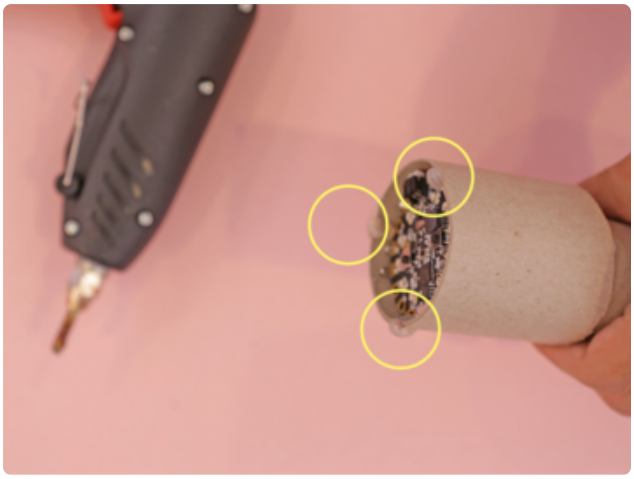


Mount CPX + Battery pack

The Circuit Playground Express press fits in to the pommel. Now we can pass the NeoPixel Strip through the handle.

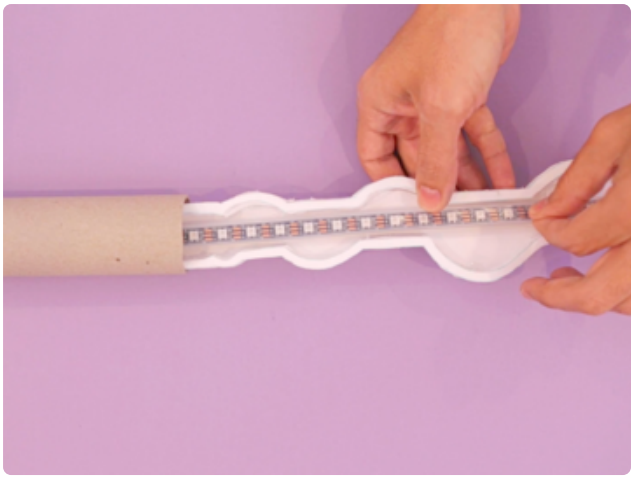
Now we can join the pommel and handle together. The battery pack will press fit into the handle.





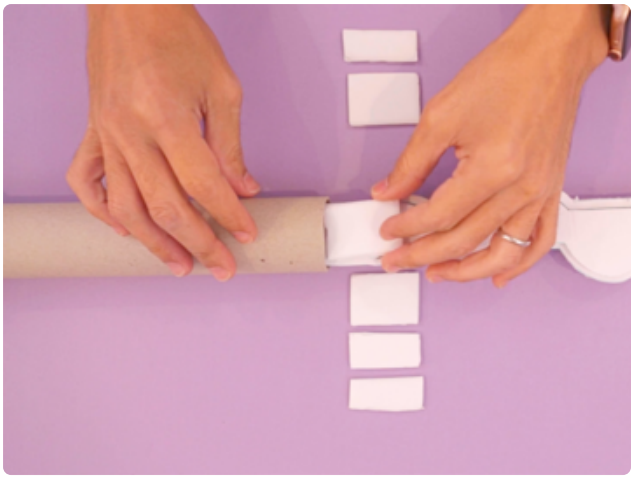
Pommel Stopper

We added small drops of hot glue to the end on the pommel. This will prevent the Circuit Playground Express from pushing through the pommel and will allow the Gem at the end to mount in place.



Assemble Blade Shims

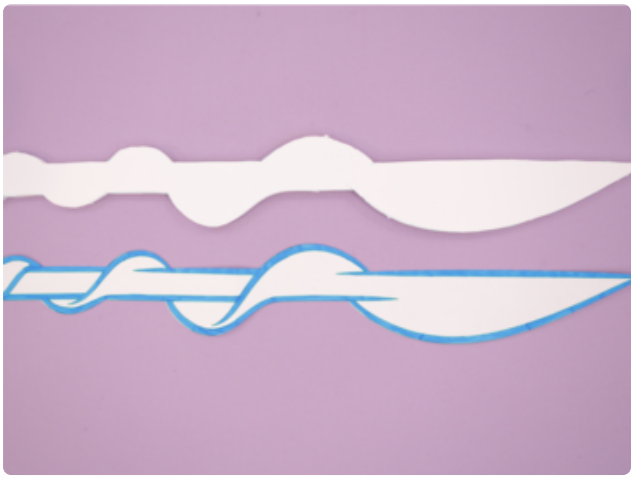
Next up is adding padding to the side of the handle to press fit the blade into place. We'll use small pieces of scrap foam.



Cut (3) 33mmx45 and (3) 22x47mm long. Place the blade inside of the handle and arrange the shims close to the edge of the handle.

Once all of the shims are in place we'll carefully apply glue to just the top parts of the shims.

Be careful NOT to glue the blade parts to the shim!



Glue Blade Decals

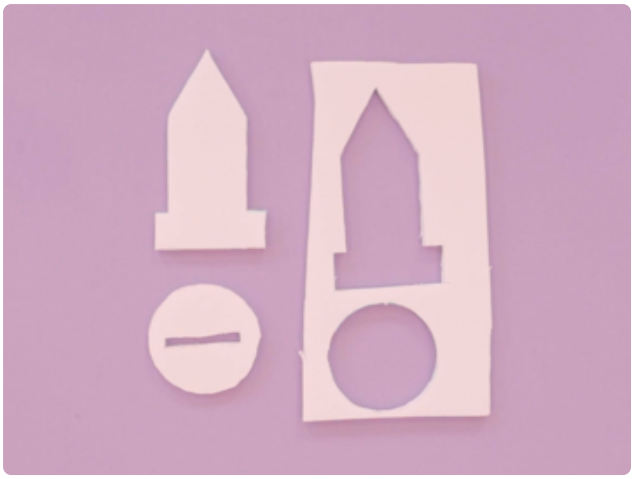
After the glue dries on the shims, we can remove the blades and glue our deals.

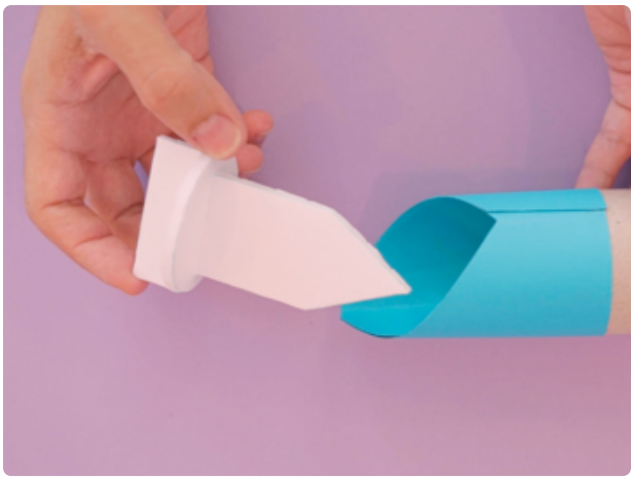
Pommel Details

Print and cut the pattern for the pommel details. We used colored card stock and tape to hold the rolled shapes.

Place each cut out around the pommel to get its shape and then use tape to secure the roll.

We can add hot glue inside the pommel, were each part meets, to secure the rolls in place.





Pommel Gem Assemble

Last up is the Gem on the end of the pommel. Print, cut and assemble the gem out of scrapes of foam. Once assembled, pass it through the pommel to the end as shown.

With our gem attach and details glued on we can finish up by press fitting the assembled pommel into the handle!

Add all the additional details you want and share your creations with the universe!

We hope you have fun building, crafting, and making your own props. You can make cool stuff to sharpen your skills, just don't give up!