



Steven Universe Wearable, Fusable Gem

Created by Erin St Blaine



<https://learn.adafruit.com/steven-universe-wearable-fusable-gem>

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Overview

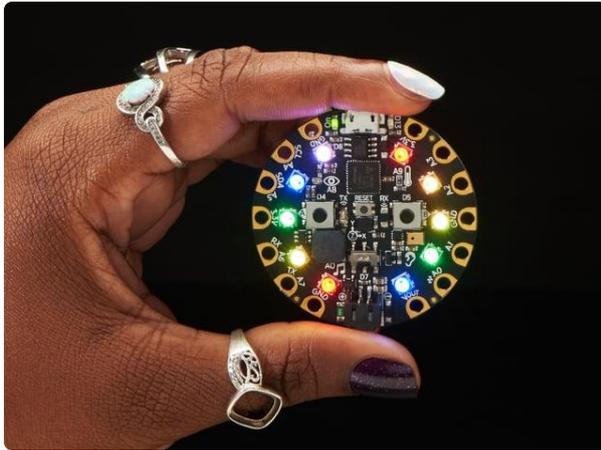
Get crafty and create a wearable glowing Gem that expresses your style and matches your favorite Steven Universe character. This is a fun and easy project that's great for kids or beginners, or anyone who wants to add some easy bling to their cosplay.

Use MakeCode's drag-and-drop code editor to customize the colors to match your favorite characters. Tilt the gem left or right to switch colors, and shake it to fuse the two gems and create a Fusion character gem. All Right!



Materials Needed

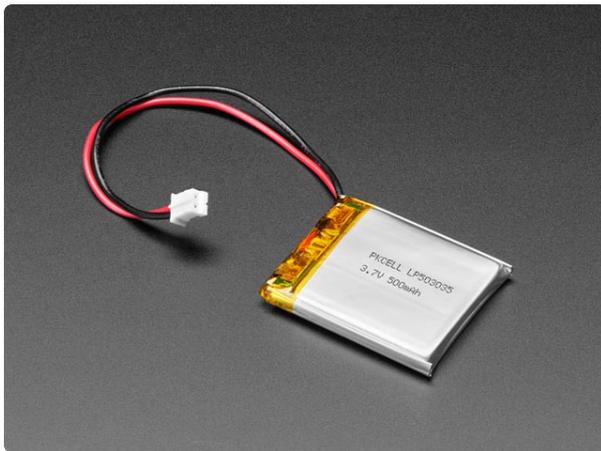
- A Circuit Playground Express
- A battery and battery charger
- An empty plastic water bottle
- Hot glue gun & lots of glue sticks
- Cardboard and tape for the backing
- Rubber bands
- A string to hang it around your neck



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>



Lithium Ion Polymer Battery - 3.7v 500mAh

Lithium-ion polymer (also known as 'lipo' or 'lipoly') batteries are thin, light, and powerful. The output ranges from 4.2V when completely charged to 3.7V. This...

<https://www.adafruit.com/product/1578>



Adafruit Micro Lipo - USB Lipo/LiPoly charger

Oh so adorable, this is the tiniest little lipo charger, so handy you can keep it any project box! Its also easy to use. Simply plug in the gold plated contacts into any USB port and a...

<https://www.adafruit.com/product/1304>



USB cable - USB A to Micro-B

This here is your standard A to micro-B USB cable, for USB 1.1 or 2.0. Perfect for connecting a PC to your Metro, Feather, Raspberry Pi or other dev-board or...

<https://www.adafruit.com/product/592>

Code with MakeCode

MakeCode is Microsoft's drag-and-drop code editor. It makes it easy for beginners and/or kids to get up and running with the Circuit Playground Express. So many options are accessible and easy with MakeCode, and it's really fun to customize and play around with making blinky lights and sounds.

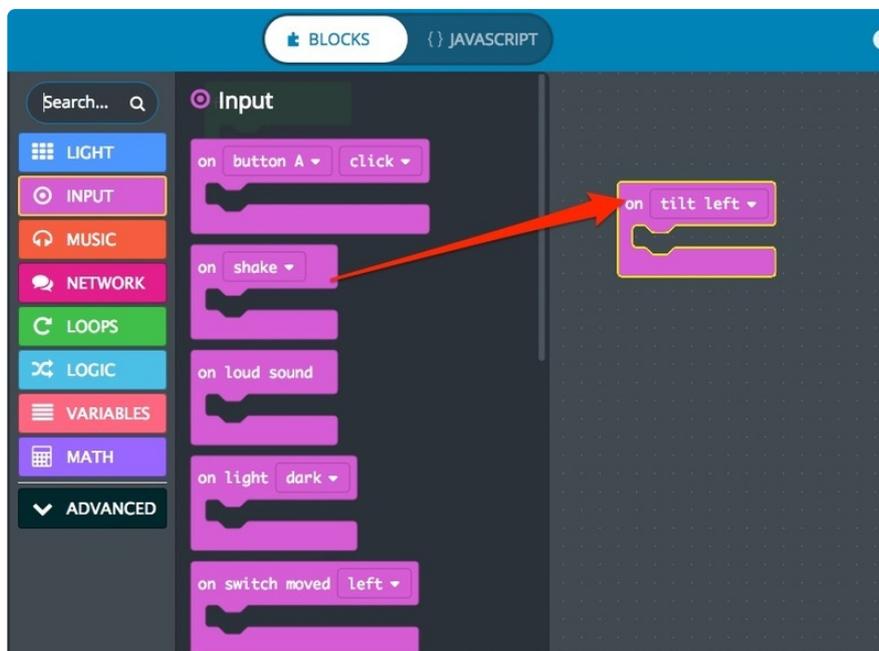
Here's the completed project. Click the Download link at the bottom, plug your Circuit Playground Express into your computer and drag the file onto the resulting **CPLAYBOOT** drive.

Or, follow along below to create your own project from scratch.

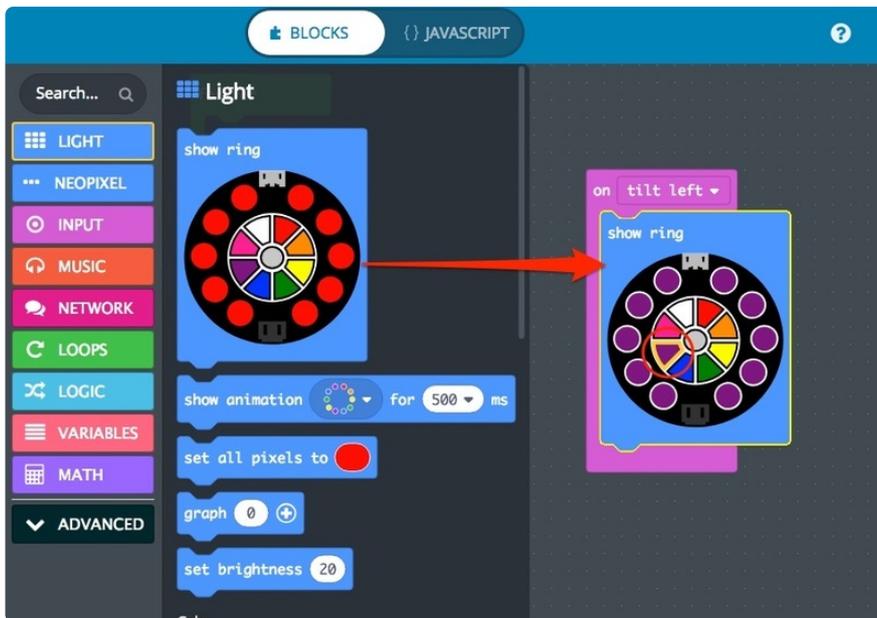
Code It Yourself

Head to <https://www.makecode.com> (<https://adafru.it/DL1>) and choose the Circuit Playground Express. Select "New Project" and give it a name. I called mine "Steven Universe Gem."

Click the **INPUT** tab and find the **on shake** block. Drag it out into your workspace and change the dropdown so it reads **on tilt left**.

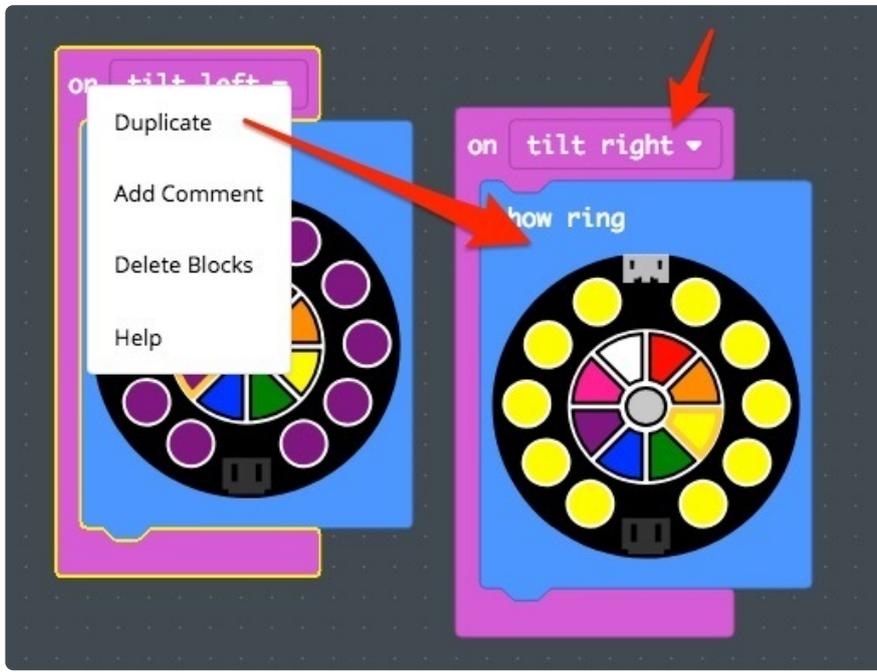


Click the **LIGHT** tab and look for the ring of lights. Drag this into your workspace and place it inside the **on tilt left** block you just made. Select one of the colors from the inner ring, and click each of the lights to change it to that color. I'm using purple, for Amethyst.

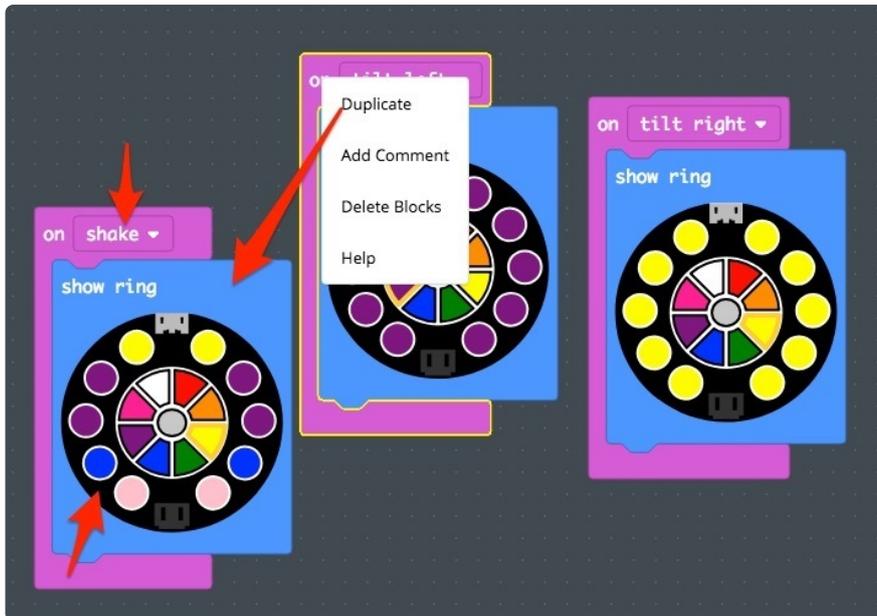


Now, once you've downloaded the code, your lights will turn purple when you tilt the Circuit Playground to the left! Let's make them turn yellow, like Pearl's gem, when we tilt right.

Right-click on the pink `on tilt left` block and choose "Duplicate." Another block will appear, identical to the first one. Change the dropdown to `tilt right` and change all the colors to yellow.



Let's duplicate one more time. This time we'll set the dropdown to `on shake`. Change the colors to a pretty assortment that reminds you of Opal's fusion gem.



Plug your Circuit Playground Express into your computer using a USB cable. You will see a rainbow animation appear the first time it boots up. Click the tiny **Reset** button in the middle of the board and the lights will all turn red, then green. When the lights turn green, a new drive will appear on your computer called **CPLAYBOOT**.

In MakeCode, click the Download button to download your code to a file. Drag this file onto the **CPLAYBOOT** drive. The Circuit Playground Express will reboot and eject itself.

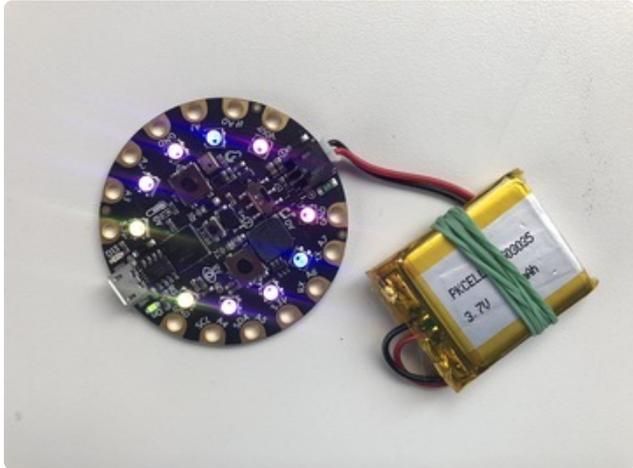
Tilt left and right to see the colors change. Shake the Circuit Playground and watch the gems fuse!

You can go back and change the colors to anything you want! Try adding sounds too. Once you're happy with how it works, let's make the outside of the gem.

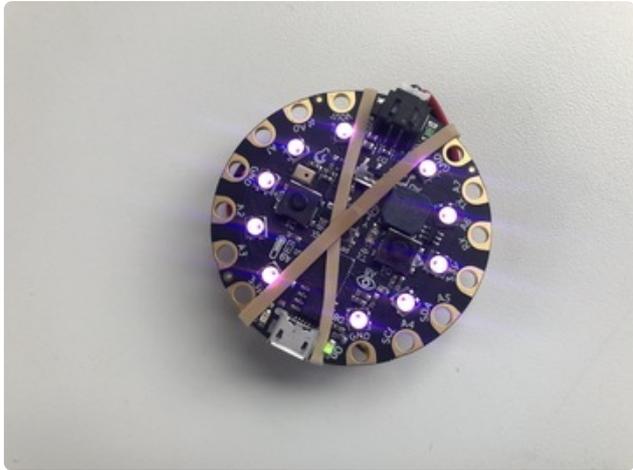
Troubleshooting

If you're having trouble, head over to the [Circuit Playground Express tutorial \(https://adafruit.it/BeF\)](https://adafruit.it/BeF) for some troubleshooting ideas.

Build the Gem



Wrap a rubber band around your battery, holding the leads gently against the battery pack. These leads are delicate, and this will keep them from breaking off. Plug the battery into your Circuit Playground Express. If it's all working, secure the battery to the back of the Circuit Playground with another rubber band.



Use a pair of scissors to cut the bottom inch or so off your water bottle. It's better to cut it a little too big rather than too small - you can trim it down later if you need to.



Fill the bottom of the bottle with hot glue. Get it into all the divots and fill to a level where even the center has some hot glue on it. Let the hot glue cool completely until it's hard.



Please be careful with hot glue, the molten glue and the gun can cause burns.



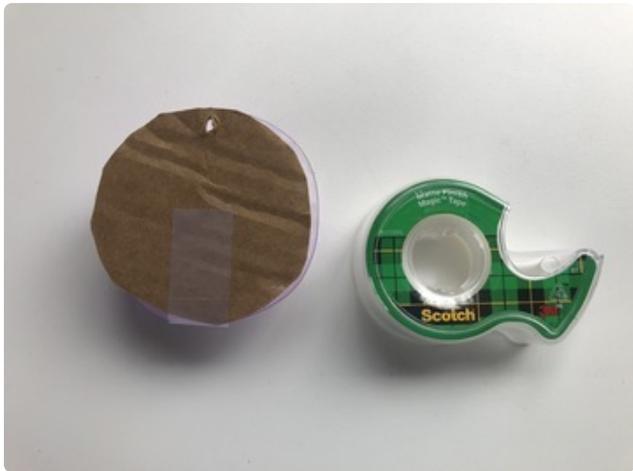
Place your Circuit Playground Express inside and see how it looks! If it's not diffused enough, add more hot glue.



Cut a circle of cardboard the same size as the gem. You can trace around the gem with a pen, then cut on the line you made. Make a small hole at the top of the cardboard circle so you can add a necklace cord. Make another hole in the side of the plastic gem -- the cord will go through both holes and help hold the back on.



Place the Circuit Playground into the gem and place the back on. Use some scotch tape on the opposite side from the hole to hold it in place. Thread a necklace cord or string through the holes in the cardboard and the plastic. Now you have a wearable gem!



Tilt your gem left and right. It's easy to open it up and adjust the position of the Circuit Playground Express inside, if the tilt seems off. It works best if the Circuit Playground's USB port is pointing upwards inside the gem.

