Circuit Playground Express Laser Tag

Created by John Park
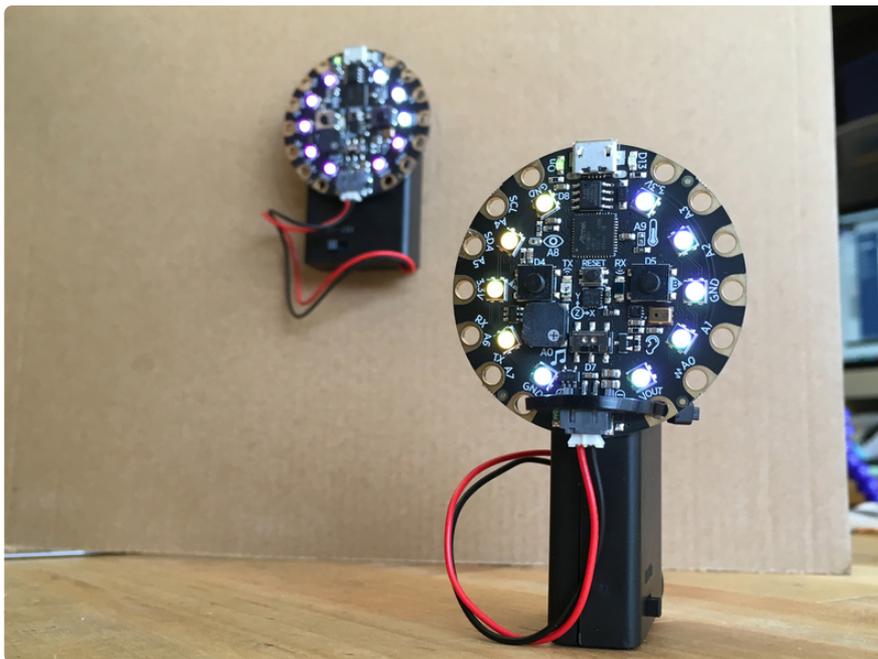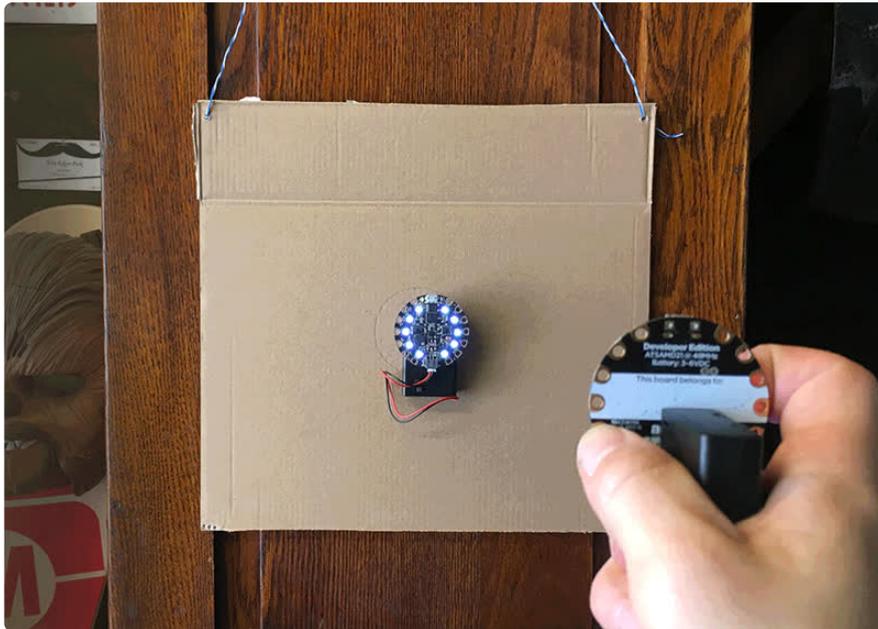

https://learn.adafruit.com/circuit-playground-express-laser-tag

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Build a Laser Tag Game

The Circuit Playground Express has a built in infrared (IR) transmitter and receiver. With a pair of Circuit Playground Express boards, you can send and receive messages that will cause the boards to run prepared operations. In this case, being "hit" with an IR blast causes the NeoPixels to count up from one to ten shots, and then score the final hit with an all red light fill and sound effect!

Play laser tag with a friend, or use it for target shooting. Too easy? You can also make it more of a challenge by adding a straw or empty pen barrel to cover the transmitter (TX) IR LED, thus narrowing it's cone of light.

Here's all you'll need:

2 x Circuit Playground Express   https://www.adafruit.com/product/3333
Super amazing microcontroller board stuffed full of
sensors, inputs, and outputs!

2 x 3 x AAA Battery Holder   https://www.adafruit.com/product/727
battery holder with On/Off Switch and 2-Pin JST

2 x USB cable   https://www.adafruit.com/product/592
A/Micro B 3 ft.

3 x AAA Alkaline batteries   https://www.adafruit.com/product/617
Three packs of two, for a total of 6 AAA batteries

Code the Laser Tag Game

MakeCode

Before you start, be sure you're familiar with the basics of coding the Circuit
Playground Express using MakeCode by going through this tutorial (https://adafru.it/
wB5).

> This is what the final program will look like. Have a look, but don't worry if it looks
> like a lot of stuff is going on, we'll break it down step by step!

You're now ready to begin coding your own program with the MakeCode interface
with the Circuit Playground Express

Click the **Projects** button so you can start a new project, then click the **New
Project...** button to create a fresh, clean project.

When the program begins, turn the entire ring of NeoPixels white. To do so, you'll
initialize your code with an **on start** loop from the **Loops** category.

Then, drag into the **start** loop a **set all pixels to red** block from the **Light...More**
category. Then change the **red** dropdown to **white.**

> The MakeCode interface graphics have changed a bit since this was created,
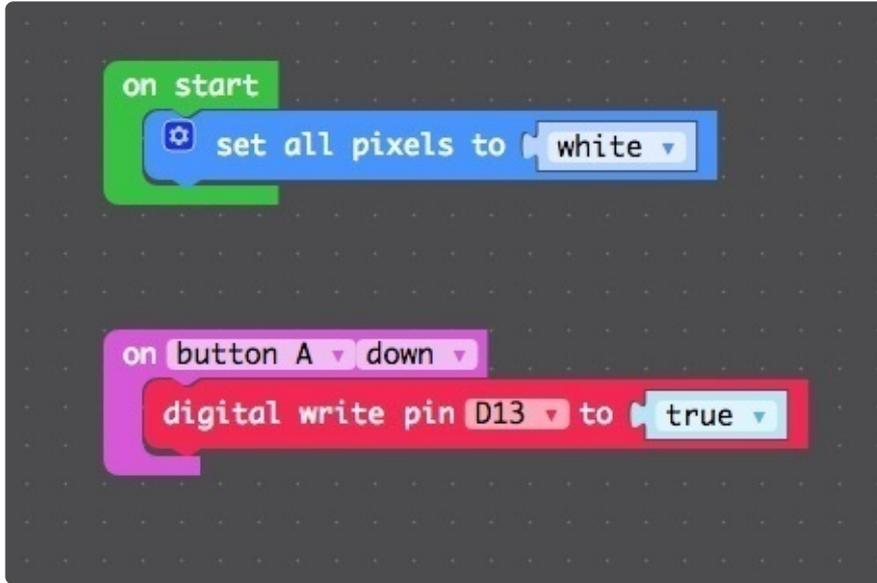> however the program still works as expected.
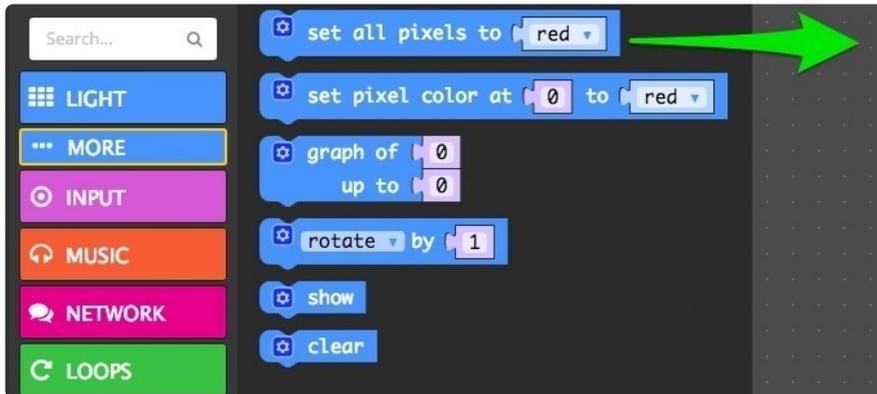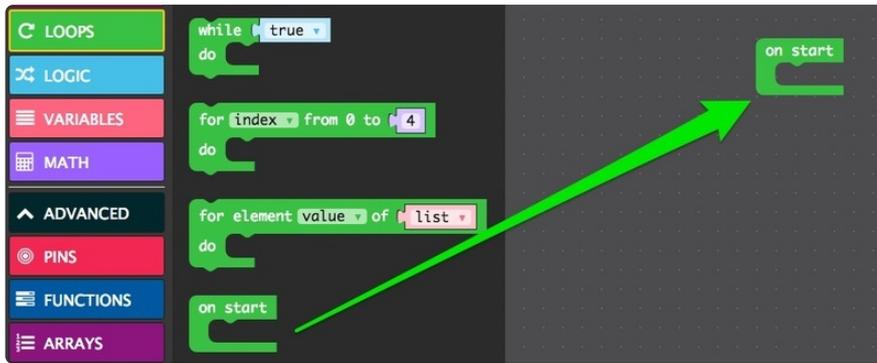
To use the button as a trigger, add the **on button A click** loop from the **Input** category.
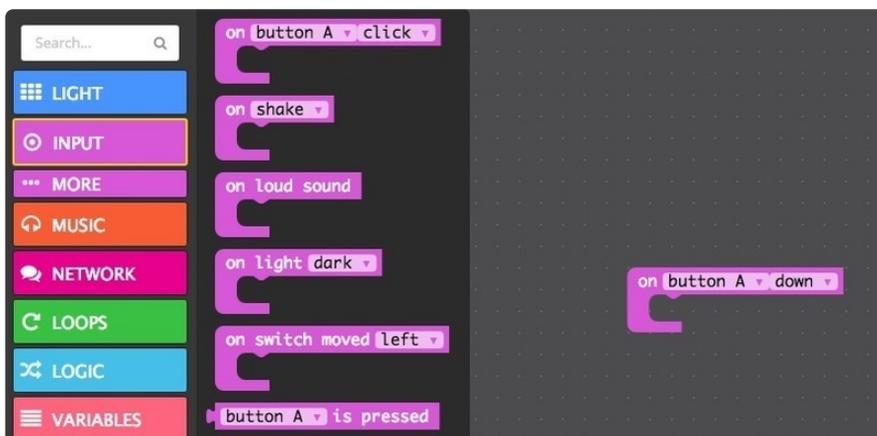
NOTE: The name 'D13' has been changed to 'LED'

So that the input registers the moment you push the button, instead of a down/up motion of the **click** method, change it to **down.**

Since IR light isn't visible, you may want an indicator that your button has been pressed. Add in the **digital write pin A0 to false** block from the **Pins** category found in the **Advanced** section. Then, change the pin to **D13** and the dropdown to **true.** This will set the onboard red LED at pin 13 to high, which is lit.

Transmitting IR Messages

IR message transmission is very easy to set up in MakeCode. There are only two block to use, **infrared send number** and **on infrared received.**

Drag one of the **infrared send numbed** blocks into the **on button A down** loop.
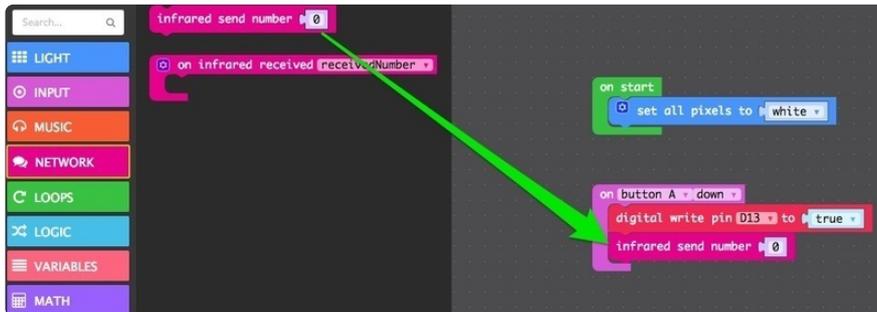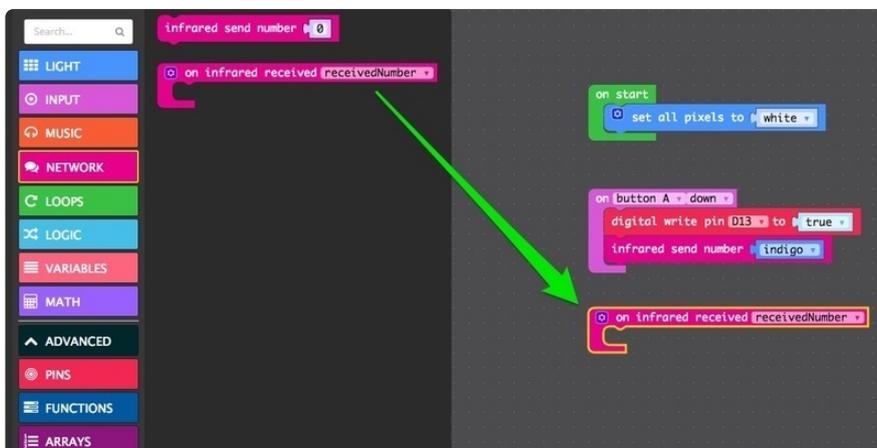

The message we'll send when triggered is the color choice we want to use on the LEDs when the target is hit. From the **Light... More** category, drag in the color **red**, onto the current **0** send message, then change it to **indigo.**
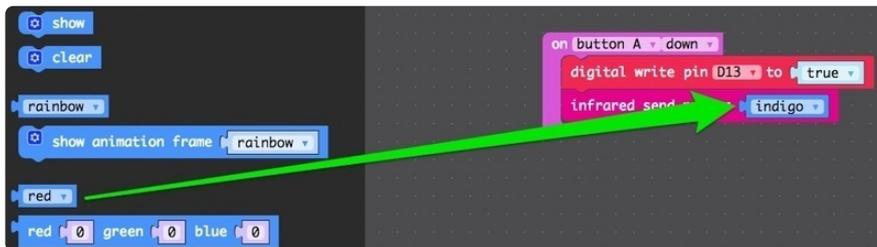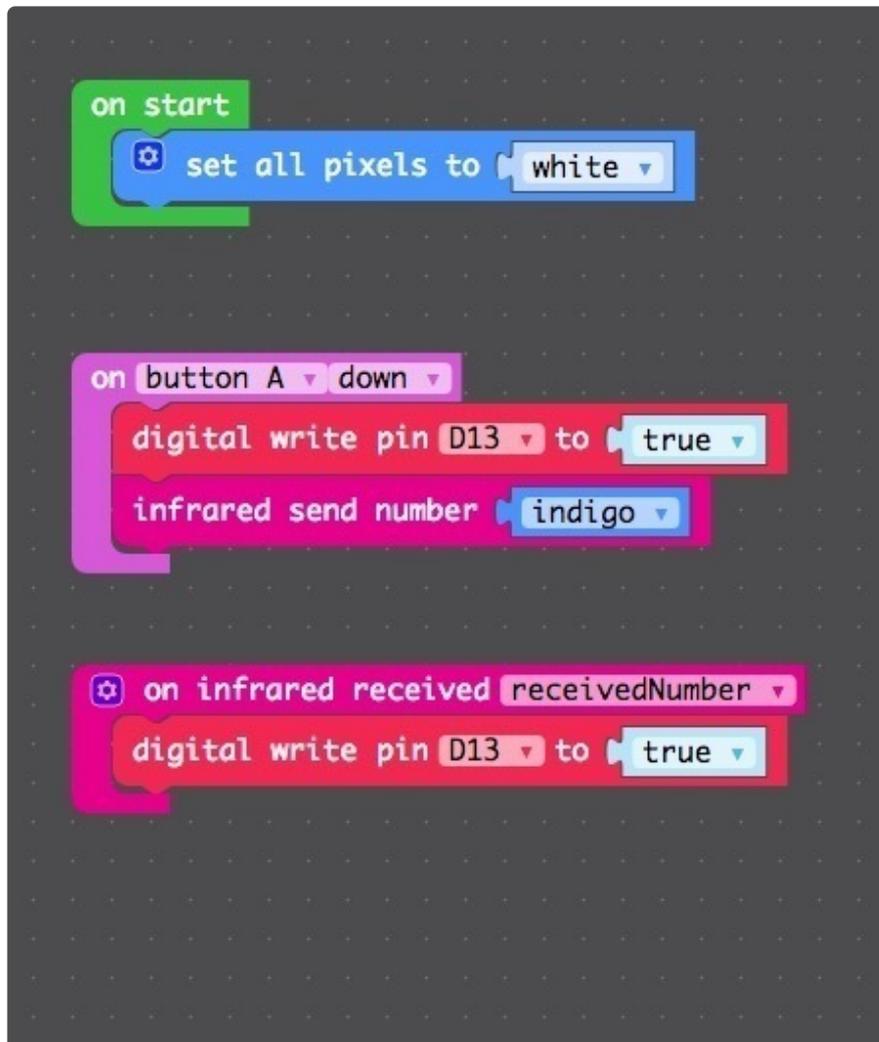

Now, add the **on infrared received** block.

NOTE: The variable 'recievedNumber' is now called 'num'

So we can tell that the message has been received easily, duplicate the pin 13 LED block and place it here.

Variables

We'll make some variables that can be used as counters for the number of hits, and the health of a target. Hits will start at 0, and health will start at 1. So, create the variables by clicking **Make a Variable** in the **variables** category, and add their declarations and value assignments to the **on start** loop.
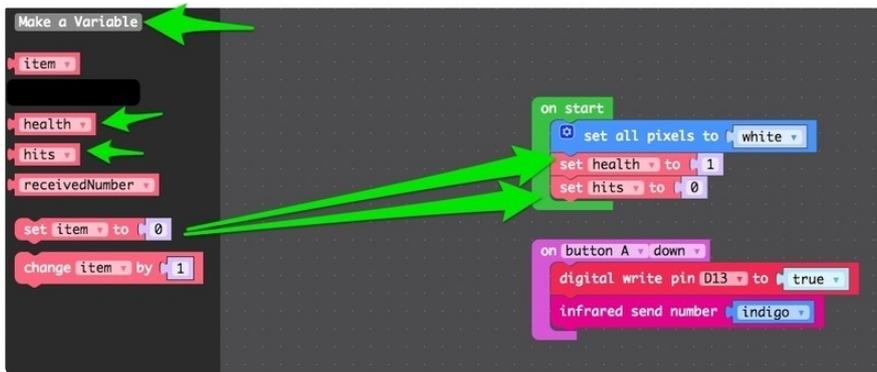
Conditions

The first condition we need to check is on the health of a target. When it is at 1, things are healthy and the target can perform as its own blaster as normal. When it is unhealthy, or 0, it can't do anything until being reset.

Add an **if...then** block from the **Logic** category to the **button A** block, and place the previous contents inside the loop.

Also get a **0 = 0** block from the same place, and us it as the conditional test, instead of the word **true** that's there by default.

Change the first **0** to test the **health** variable, by dragging one into that position, and set the second number to **1** as seen here.
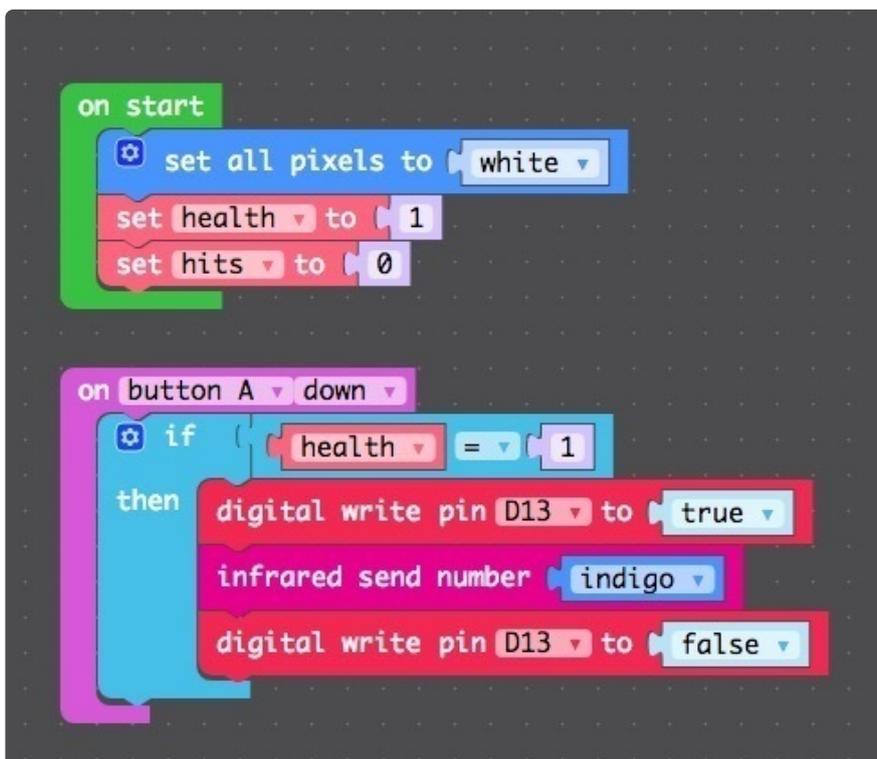
Also, it's good to turn off the red led, so duplicate the **digital write** block as seen above, and change the **true** to **false.**

Next, it's time to make the receiver do something interesting upon each hit. We want it to do the following:

- record how many times it has been hit
- light up in a color an incrementing number of pixels
- set the health to 0 upon the final hit

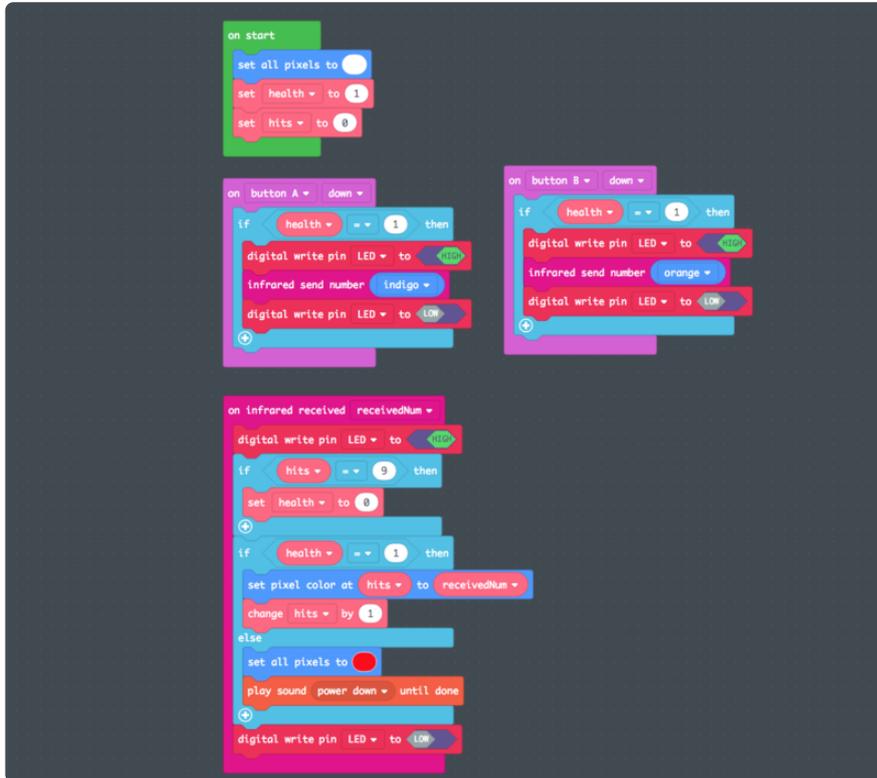Build this collection of blocks to do those things.

Use the **else** section of the conditional to light up all the LEDs to red when the final blast has been received.

It's fun to also play a sound effect when the target has been obliterated, so add in a **play sound power down until done** to the **else** section.

Also, you can make use of both buttons by duplicating the **on button** input and changing one to **button B** and send a different color message.

Upload the code to both of your Circuit Playground Express boards, and try shooting at them!

Build Blasters and Targets
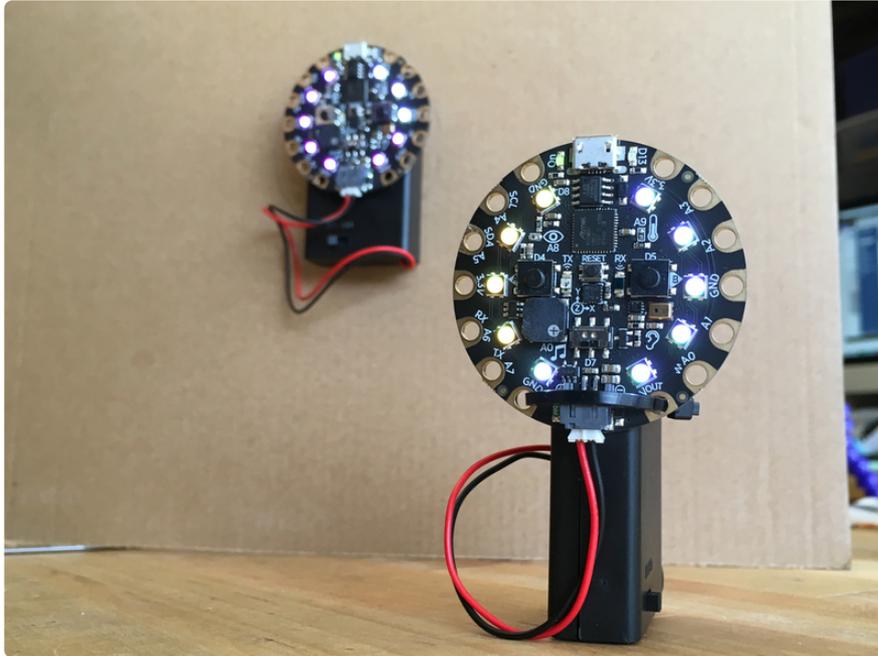
To build your blaster and target, place the AAA batteries in each pack, then plug them in, and turn on the packs.

Use zip ties or double stick foam tape to connect the boards to the battery packs.
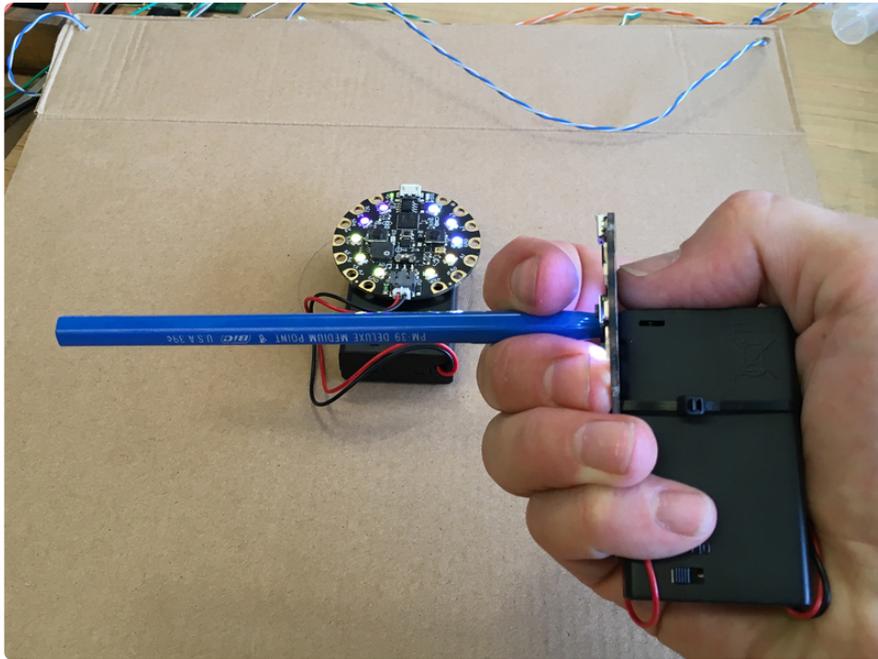
Modification

You can add a barrel to your blaster to narrow the IR beam spread. This will actually make aiming at your target much more challenging -- and fun! You can use a straw, a pen barrel, even a rolled up tube of paper.
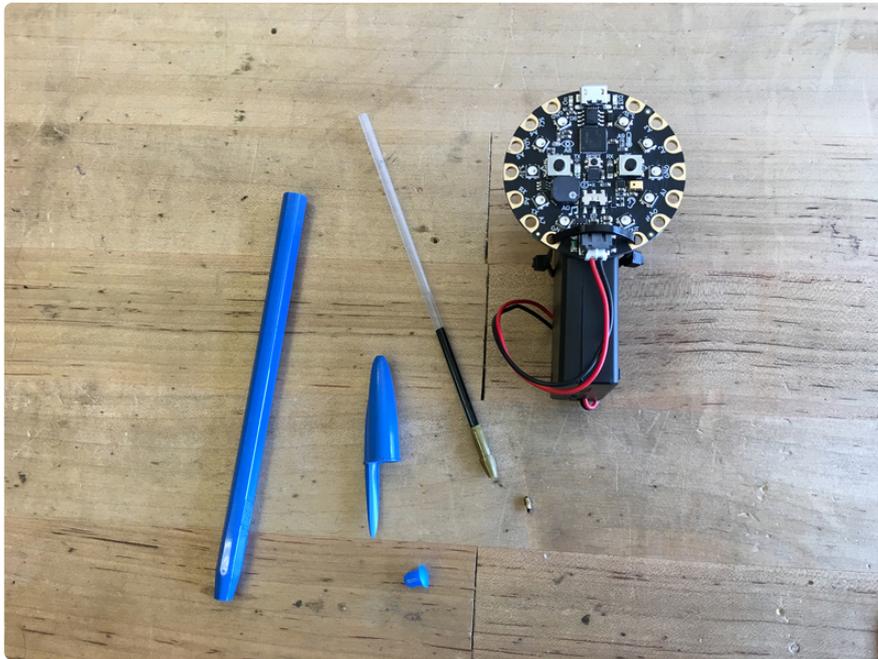
Simply place the barrel over the TX LED on the Circuit Playground Express. You can hold it in place while playing, or stick it on with some poster putty.

Have fun, and remember, when a target is full you can just reset it and start all over again! You'll be an IR sharpshooter in no time!!