

SPACE JUNKYARD **BLOWUP**

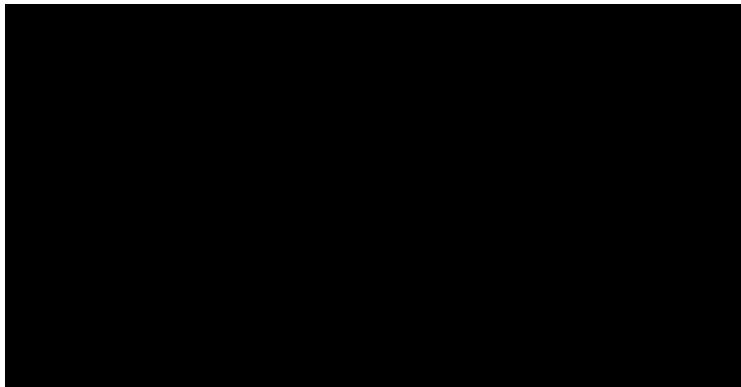


Shannen Guntoro & Leanna Barwick

Space Junkyard Blow-up

Life as a space junkyard hauler is a sweet job, with many perks like being your own boss and access to all the Space garbage that you could want! But there are also risks that come with the territory.

Space Junkyard Blowup is a two-player puzzle game that explores what happens when a friend blows up into pieces on the job, and the only thing that can help them is the junkyard scraps and a communication channel between the players.



Junkyard A

[Link to interactive webpage](#)



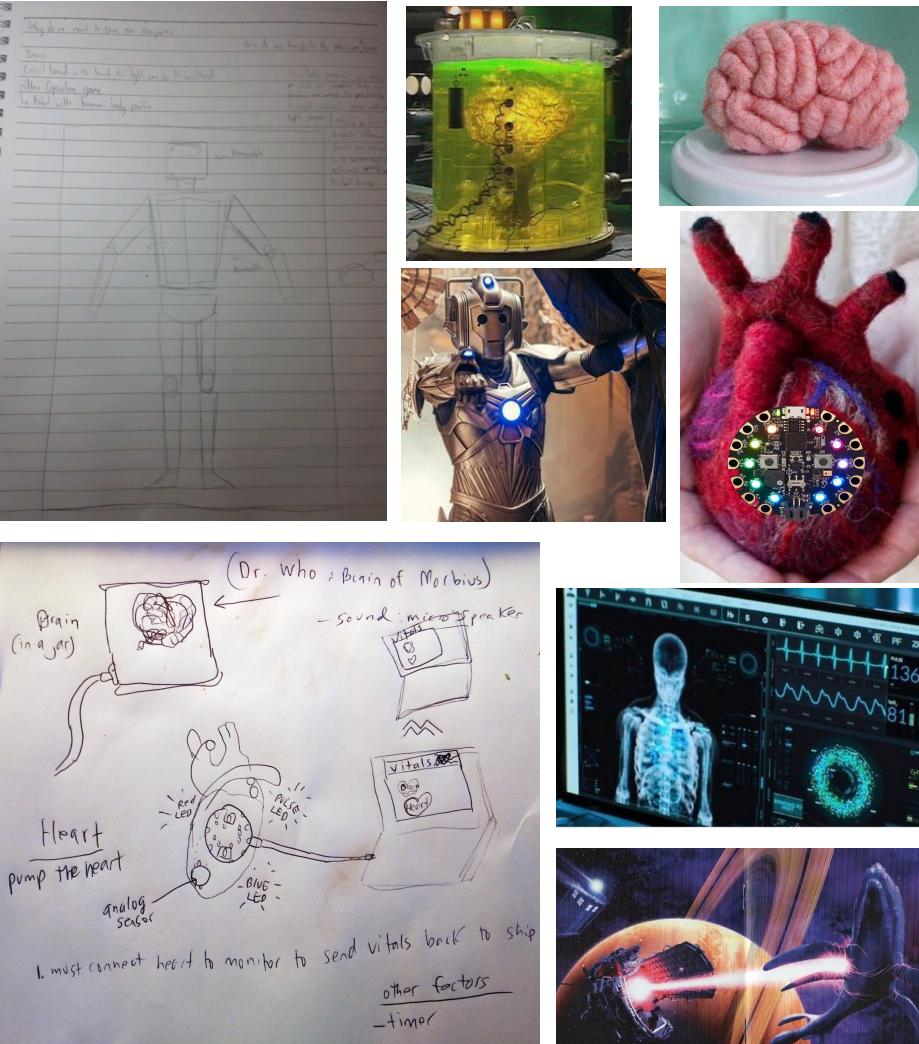
Junkyard B

[Link to Interactive webpage](#)

Game Jam Day 1 & 2 Notes

Jam Day 1

- What happened?
 - We came to the jam with an idea in mind, and throughout the course of the day refined our idea.
- What decisions did you make?
 - To divide the tasks (both during the game jam and in the game play) so that it was balanced between the makers/players to be done in a remote setting
 - To forgo external sensors (eg. light sensors, pressure sensors) and utilize what is unique to the circuit playground board and textiles (eg. analog sensor, digital switch with conductive textiles)
- What new insights or ideas came up?
 - We became aware of some limitations related to working as a team remotely
- How did the remote game jam process help (or hinder)?
 - A better grasp of the technology, its limitations and what we can do with it



Jam Day 2 - To do

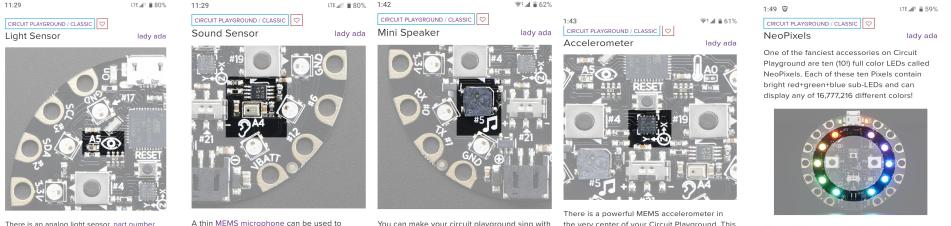
- Webpages
 - Shannen
 - Needs to do backdrop
 - Needs Leanna drawings
 - Need Shannen drawings
 - Hints
 - Description
- Shannen puzzle
 - Sew into textile thing make pretty
 - Code maybe, neopixel respond to game being won
- Leanna puzzle
 - Send Shannen pics
 - Load the code kate sent onto the controller
 - Make my brain
 - Code neopixels
 - Video (will do on wed/thurs)

Ideation

Softparts and Hardware

We came into this game Jam with an idea and narrative we wanted to explore; soft materials mimicking human body parts sensinsing and impacted by external inputs and responding with various outputs, using the Circuit Playground Classic controller.

My creative process is both driven by narrative concepts and inspired by the physical materials. I spend time on initial ideation to understand what I am working with as far as I can reach. I researched each sensor and aspect of the controller. I found tutorials that could be adapted to fit with our concept. While learning about the functions and interactions for the sensors and components, I also think about how this is similar to a body's needs or ways of being.



This is an analog light sensor, the ALS-PT100 is the top left part of the board. This can be used to detect ambient light, with similar spectral response to the human eye. There is a 10K balancing resistor to convert the current drive to voltage.

At this MEMS microphone can be used to detect audio levels and even perform basic FFT functions. You can read the analog voltage corresponding to the audio on analog pin #A4. Note that this is raw analog audio waveform! When it's silent there will be a reading of ~330 and when loud the audio will read between 0 and 800 or so. Averaging and

You can make your circuit playground sing with the mini in buzzer. This is a miniature magnetic speaker connected to digital pin #5 with a transistor driver. It is quite small but it can beep with conviction! It's not good for playing detailed audio, more for beeping and buzzing and simple bleepy tunes.

There is a powerful MEMS accelerometer in the very center of the board, the LIS3DH. It has the LIS3DH, a 3-axis (X, Y and Z) sensing accelerometer. Accelerometers are the sensors in your WiIMoto, phone, and other motion control hardware. These sensors used to cost \$20 each but now are as common we can include them for free!

One of the fanciest accessories on Circuit Playground are ten (10!) full color LEDs called Neopixels. Each of these ten pixels contain bright red/green/blue sub-LEDs and can display any of 16,777,216 different colors!

These pixels are controlled by a single data pin, #17. Unlike non-smart RGB LEDs, you can set the color of a little chip inside the LED will handle the PWM for you.

Since they are controlled in a chain, you will need to tell the Circuit Playground which pixel

- Heart Beat Puzzle
 - Accelerometer recognizes taps
 - Could be used to “tap” start the heart
 - Neopixels could mimic pulse (in red/blue vein blood like colors)
- Make the “patient” more comfortable Puzzle
 - Sound sensor listens for determined volume threshold and when the amount is surpassed a noise plays
 - What does comfort or non-comfort sound like in terms of what noises the mini speaker can produce?
 - Light sensor set to responds to indoor room lighting and when the body part is covered
 - “Patient” needs to be covered by a blanket because ‘they are cold’
 - Eyes need to be covered because the light in the room is too bright

1:47 LTE 60% CIRCUIT PLAYGROUND | CLASSIC lady ada

Don't feel like you have to understand this part? Skim it for now, and come back to it when you want to take a deeper dive into understanding the hardware!

There are 14 total Alligator Pads on the outside of the Circuit Playground. These are for you when you want to add more sensors or circuitry without the need for soldering. Use

2:19 LTE 50% learn.adafruit.com/sc lady ada

Soil Moisture Sensor with Circuit Playground Express and MakeCode

Allows your plants to let you know when they need a drink.

Overview Build Code Going Further

2:41 LTE 57% Capacitive Touch

All 8 non-power pads (e.g. not the GND/3.3V/VBATT) around the Circuit Playground have the ability to act as capacitive touch pads. Each pad has a 1 MΩ resistor between it and ground. You can toggle this pin in your sketch to control whether the resistor is a pullup or pulldown or floating. Note that this means that all the pads have a 2 MΩ resistance between them, not important for 99% of uses but may be confusing for some cases where you are trying to detect very high resistance values

CIRCUIT PLAYGROUND | CLASSIC lady ada

NeoPixels

One of the fanciest accessories on Circuit Playgrounds are ten (10!) full color NeoPixels. Each of these ten pixels contain bright red+green+blue sub-LEDs and can display any of 16,777,216 different colors!

These pixels are controlled by a single data pin, #17. Unlike non-smart RGB LEDs, you can set the color and a little chip inside the LED will handle the PWM for you.

These are controlled in a chain, you will need to tell the Circuit Playground's NeoPixel

For this project we are creating a fiber optic rainbow archway using glue sticks and a Neopixel LED dot strand. The Neopixels hidden beneath the glue sticks will change colors as the user moves their hand under the archway. Each glue stick connects two different Neopixels, they are able to mix colors to create many different colors and effects that are not otherwise achieved.

You can make neat sculptures with light effects!

Ideation - Brain in Jar Puzzle



Because brains need to be wet

- <https://www.technologyreview.com/2018/04/25/240742/researchers-are-keeping-pig-brains-alive-outside-the-body/>
- <https://www.learning-mind.com/is-it-possible-to-keep-the-brain-alive-outside-the-body/>

<https://learn.adafruit.com/soil-moisture-sensor-with-circuit-playground-express>

Could use the same concept of conductive material sensing moisture from soil; but applied to our narrative

- “Brain” (constructed from a soft spongy foam material) needs to be put into water and gives an output (eg. sound/alarm) when the conditions are too dry

- There could be other parts that are found, and the player needs to figure out how to use them together; the brain would go into the jar.

- Maybe the jar base is where the circuit playground is positioned, and the “brain stem” (alligator clips) need to be connected to the hydro station
- Other parts could connect this way

<https://learn.adafruit.com/glue-stick-archway>

- Neopixels could add effect when brain is in water
 - <Note: Glue stick effect did not work well. Too opaque?>

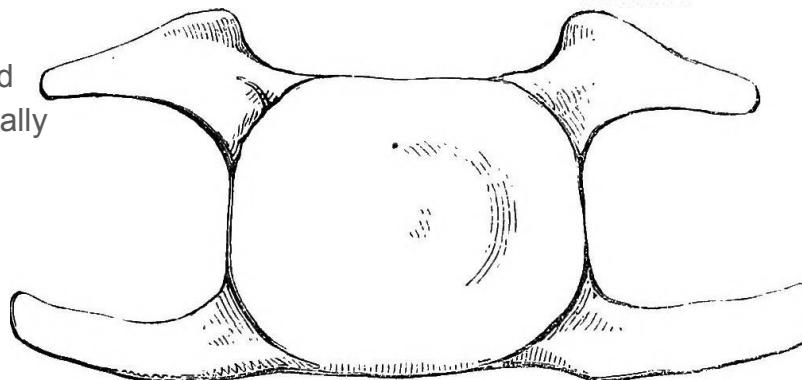
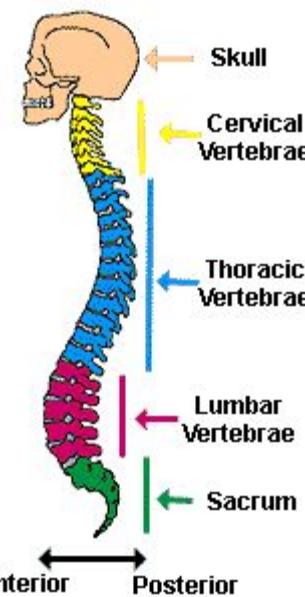
Spinal Cord/ Vertebrae

[Link](#)

-The Spinal Cord essentially acts as an information Superhighway. It relays signals to and from the brain

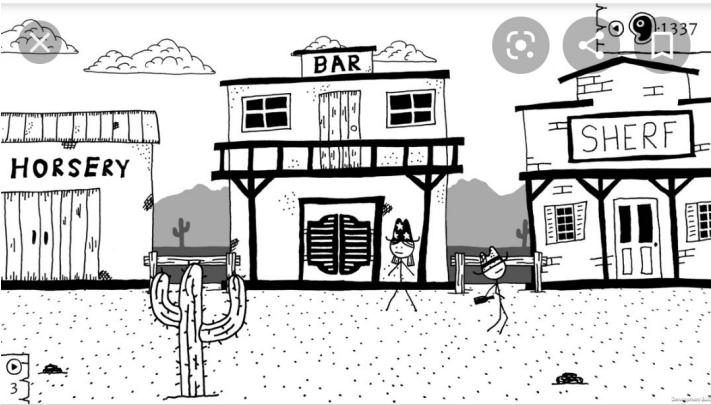
[Link](#)

- Spinal Vertebrae aren't hollow and are filled with marrow, which is usually red (in younger whales)



Collaborative Aspect of game

- In the game narrative, a team of space garbage collectors have gone off looking for trash to haul, and tragically one of the crew blows up in an accident, causing their body parts and organs to spread in different areas of the junkyard.
- Each player will have the other player's clues, and they will have to communicate with each other remotely
 - Make 2 separate "clue" website pages
- Each page will display an image of a space junkyard
- "clues" will be a clickable png that will link to a page with the individual clue specifics
- Each puzzle will have 2 clues
- The COVID-19 lockdown and working in remote isolation from each other worked its way into the game universe and we designed around that by using the 2 separate websites so players are encouraged to communicate to accomplish their shared goal.



Polygon

West of Loathing review - Polygon

Visit

Backdrop style inspiration (stickman simple)

Brain in jar clues

- Dr Who vhs video tape
- Medical textbook page about

Spinal Diagnostic tool clues

- Pages from the "instruction manual"

Process

Clue Webpages

Collaborative Clue Webpages

Two web pages were created with p5.js which serve as a virtual area players explore to get hints

For the player with the Brain in Jar puzzle:

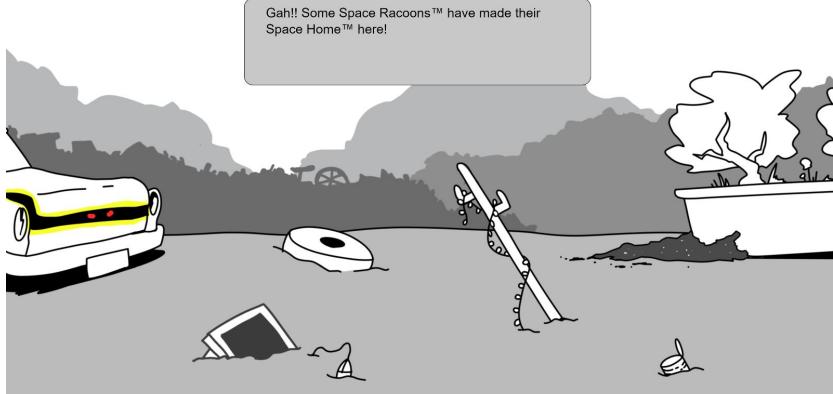
https://editor.p5js.org/mcshanneng/present/HCcbWnu_5

For the player with the Spinal Cord Calibrator puzzle:

https://editor.p5js.org/mcshanneng/present/HCcbWnu_5

Google Doc of Hints:

https://docs.google.com/document/d/1u196m9Yw9owQbJ_fM3CSUDUUvCCGuk9sf_9eXdgjwpc/edit?usp=sharing

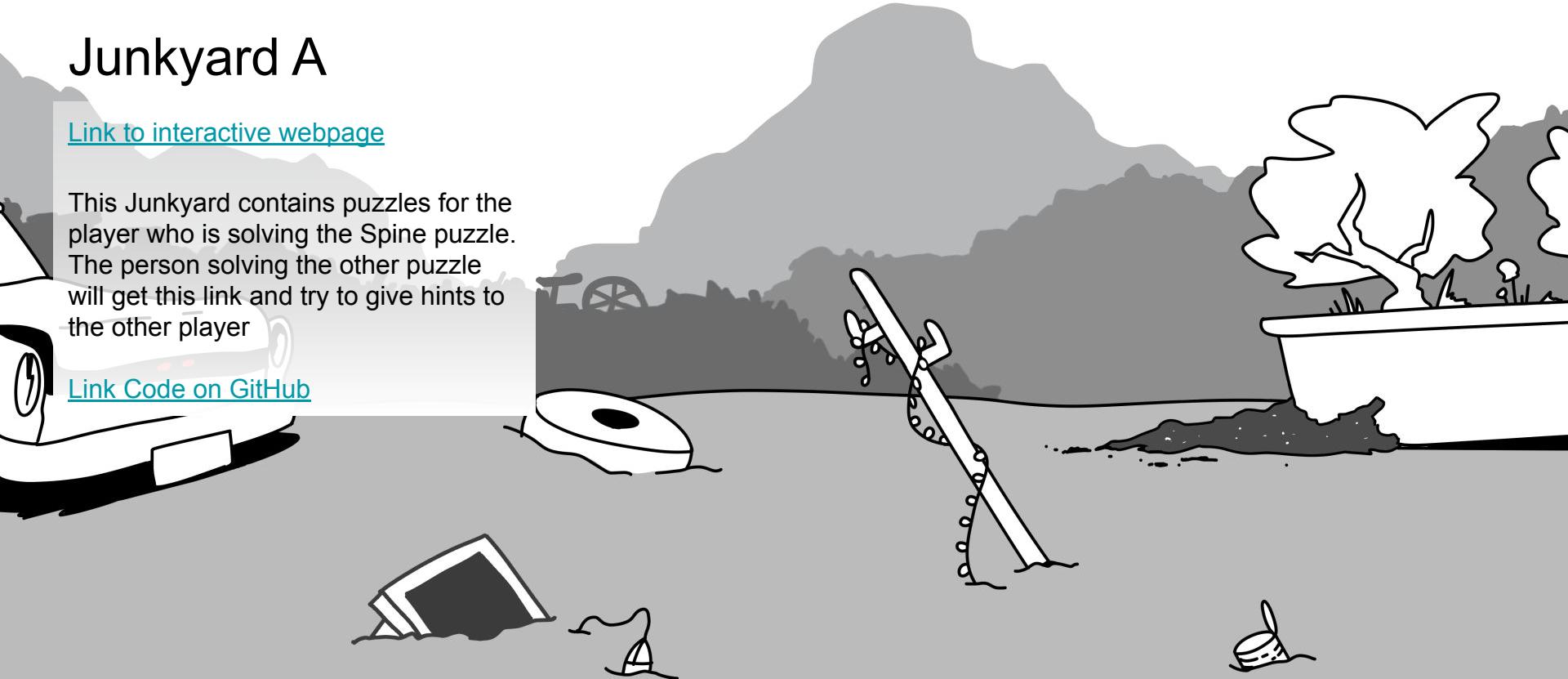


Junkyard A

[Link to interactive webpage](#)

This Junkyard contains puzzles for the player who is solving the Spine puzzle. The person solving the other puzzle will get this link and try to give hints to the other player

[Link Code on GitHub](#)



Junkyard B

[Link to Interactive Page](#)

This Junkyard contains puzzles for the player who is solving the brain puzzle. The person solving the other puzzle will get this link and try to give hints to the other player

[Link to Code on GitHub](#)



Brain in Jar Puzzle



Brain in Jar puzzle - How it works

The brain needs to be hydrated.

The Circuit Playground Classic can detect the capacitance (the ability to store an electric charge) on an analog pin (in this case, pin #12). As the moisture around the conductive material increases, the value increases (we're creating a bigger capacitor). Most dry materials don't work as well for electricity (except metals and conductive textiles) so the value read by the Circuit Playground Classic will be lower.

Electronic components

- Circuit playground classic
- Alligator clips
- Conductive soft material
- USB micro-mini data cable

References

- <https://learn.adafruit.com/soil-moisture-sensor-with-circuit-playground-express>
- <https://www.brainfacts.org/3d-brain#intro=false&focus=Brain>



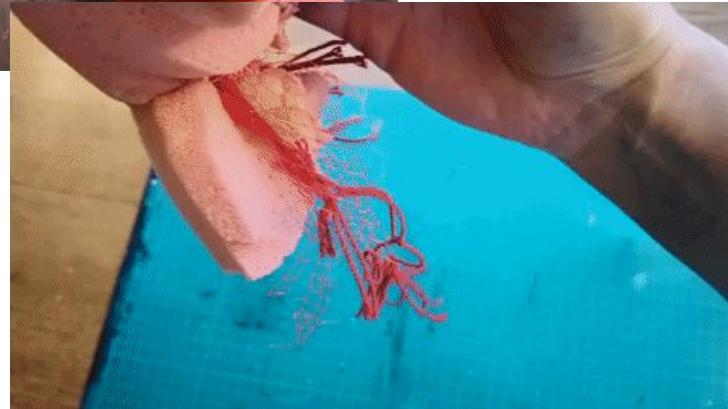
- Soft memory foam (for brain)
- Glass jar
- Plastic container (enclosure for controller and base for jar)
- Bottle of water
- Acrylic paint (pink)
- glue sticks and glue gun

Brain in Jar - Physical Build



Jar: Cut a hole in a plastic take-out container lid and fastened to the jar base with hot glue, so the jar is stable and raised above the container base which encloses the controller.

Brain: Cut foam into rounded edged strips and coiled onto fabric ball, mimicking brain folds, fastening with hot glue. Painted with diluted pink acrylic paint. For brain-spinal stem detailing repurposed onion bag netting, strands of red thread knotted in various places to give an organic fibery fleshy texture. A small piece of conductive fabric was stitched into a small tab that was sewn between the brain stem (medulla oblongata).



Brain in Jar - Electronics Build

The alligator clips onto the Circuit Playground Classic capacitive pin, pad#12. The other end clips onto the conductive material, attached to the foam brain. The USB cable provides the Circuit Playground power.

For the Code portion of this build, the Circuit Playground Classic was connected via a USB cable to a computer running Arduino IDE. The tutorial this project used was for the Circuit Playground Express and the Social Body Lab helped translate the code to use with the Classic.

In the final piece, the code takes a moisture value (read as dry) and gives a flashing pink neopixel reading if the reading falls below this dry amount. When the conductive fabric is wet the neopixels will read as neon green. The value read by the Circuit Playground Classic is set to a level that might be a good dry soil value 20. This number can be adjusted to give a better accuracy.

Circuit image need



Link to code:

https://github.com/Leanna-B/Textile-game-jam/tree/master/brain_in_jar_cap



Testing two different conductive materials (a nail and a conductive piece of fabric) in a jar of water



Brain in Jar Puzzle - Final

Brain is attached to electronic components with alligator clips, which signals an oscillating ring of pink lights below the jar. Brain is put into jar, and when water is added to hydrate it, the lights beneath jar turn lime green.



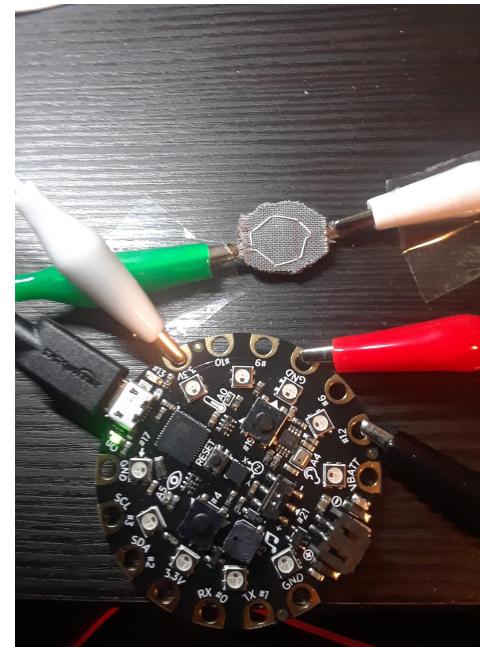
Spinal Diagnostic Puzzle

Initial Prototypes of Analog Inputs



I started out by trying to create the analog sensors with the conductive fabric and velostat.

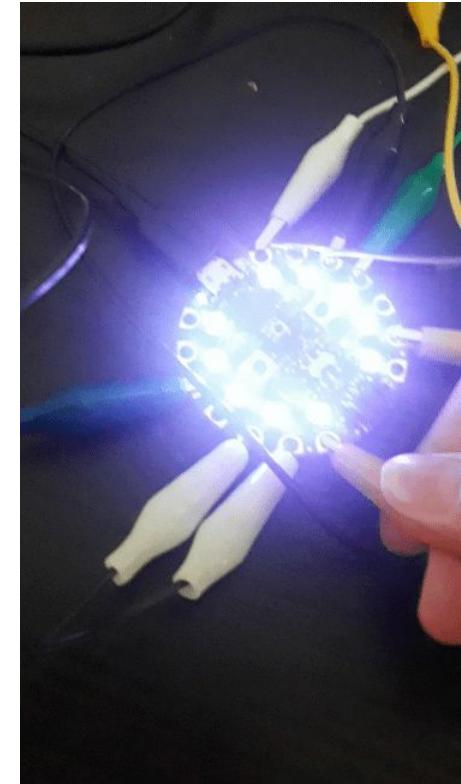
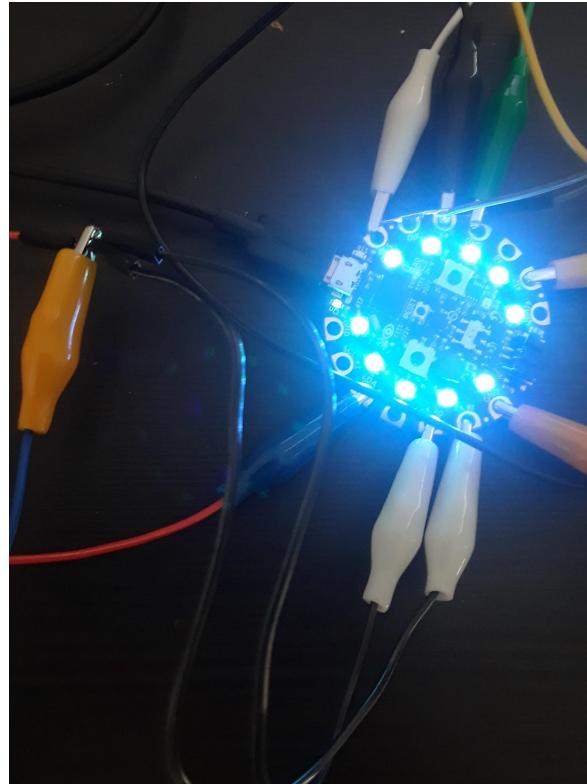
For the prototype I just connected everything with crocodile clips and used the base code provided by DMG



Initial Prototypes for Digital Switch input

The switch prototypes only used crocodile clips. I wanted to test the code so that 3 switches had to be connected before the lights could turn on.

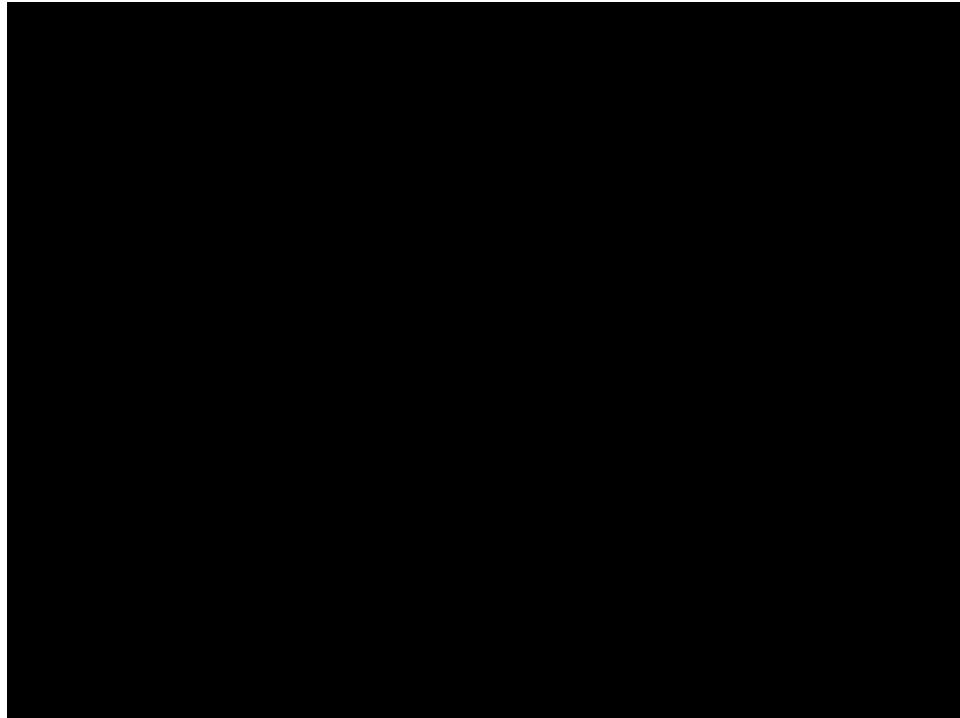
[Link to Prototype Code](#)



Merging the prototypes

After trying both methods, I decided to combine them and changed it up a bit. Instead of the number of neopixels that lit up, I changed their colour based on how hard the analog sensor was pushed. For the lights to turn on, all the switches have to be connected.

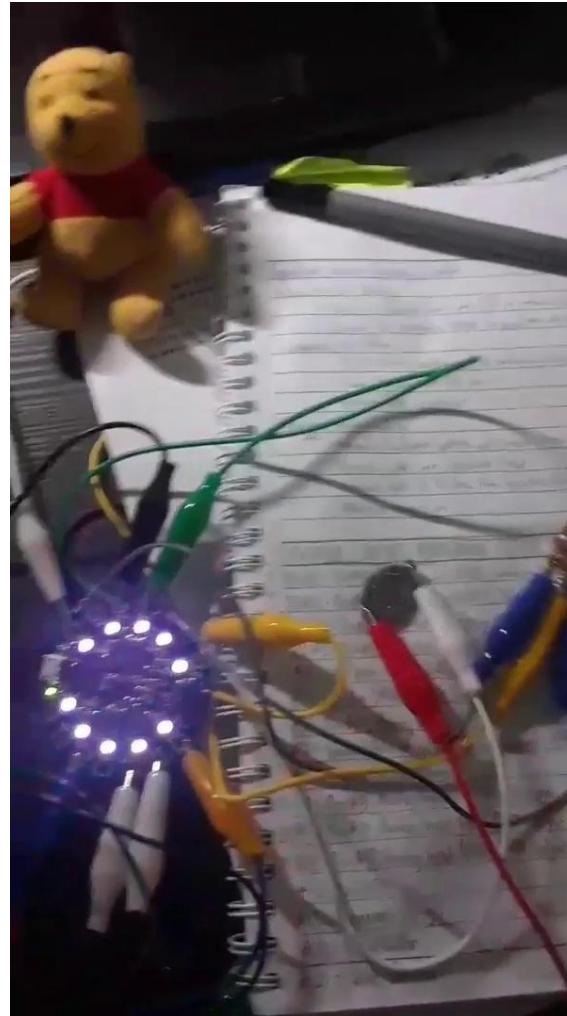
I also made it so the puzzle was responsive to right and wrong answers, if the puzzle was solved and a button was pressed it would light up green. Otherwise it would only light up red



Final Prototype

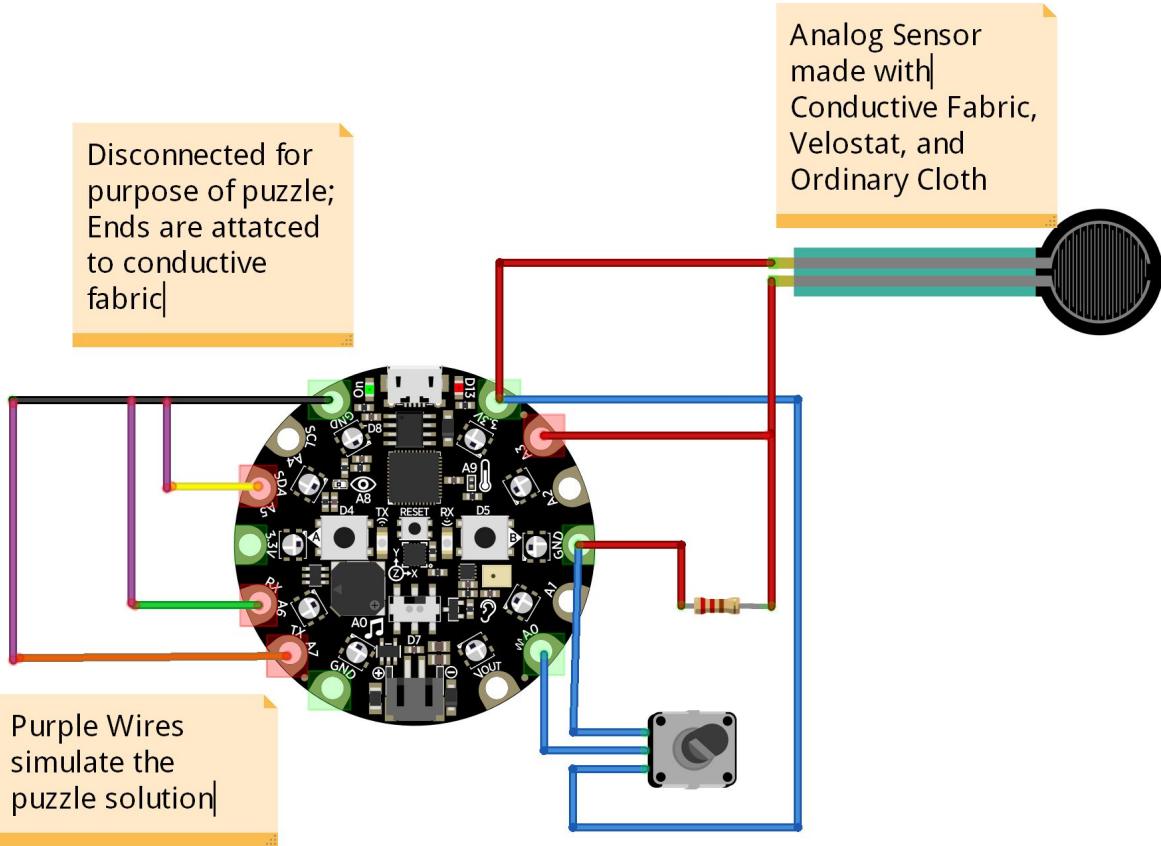
After everything was figured out I changed the green light to indicate the puzzle was done to a Rainbow chaser that was more permanent. So the player wouldn't have to keep holding down the button for affirmation

[Code for final](#)



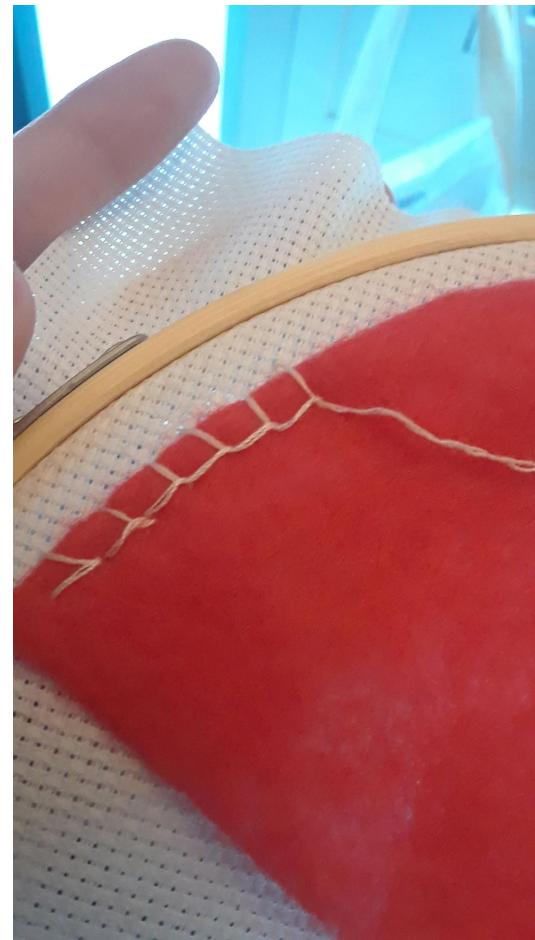
Construction

Circuit diagram displaying the connections in the circuit

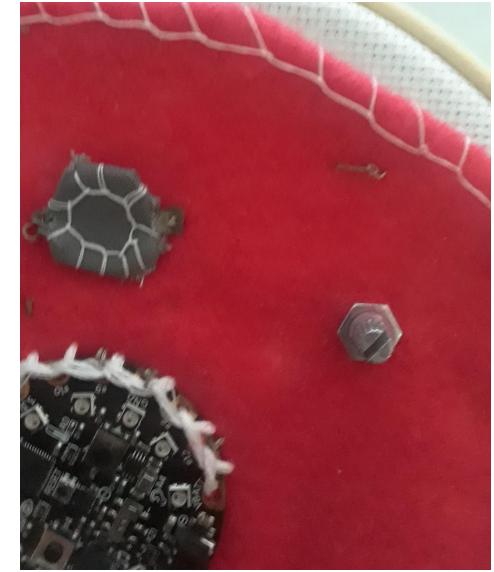
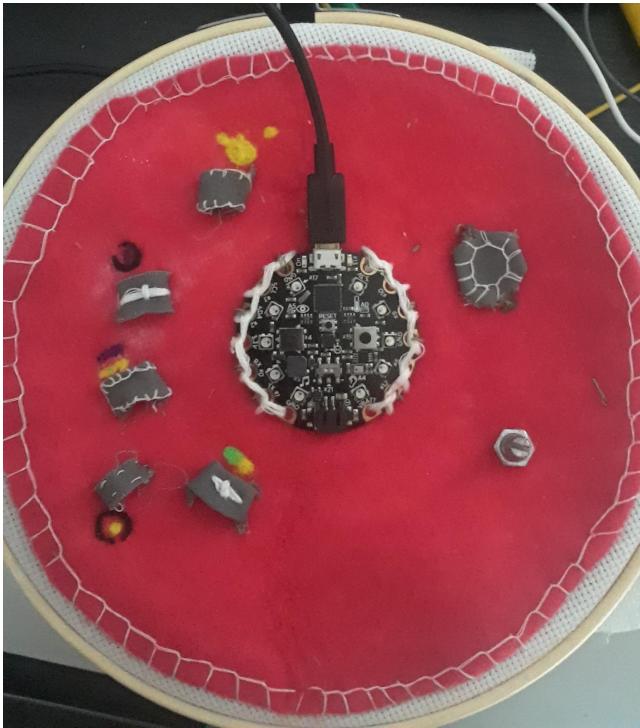
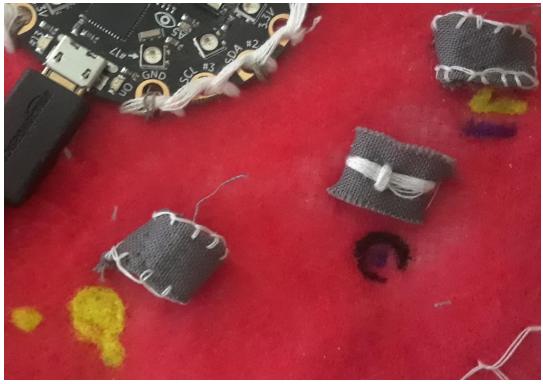


Construction

Sewing, felting, and assembling



Final Results



Constructed final piece.