Light Box: Instructor Guide

Week Before

1) Introduce project to the class and that they need to be collect shoe boxes or a box similar in shape. Assign an area of the classroom for donated materials.

Day/ Night Before

1) If the classroom set is on a checkout system or a classroom cart be sure to get this into your possession.
2) Check each kit to be sure all components, Galileos and power supplies are accounted for. Here is a wish list of what each kit should include: http://sfe.io/w91575
3) If a kit is missing parts, take note of which parts are missing for reorder and resupply.
4) Double check the MicroSD card in each Galileo.
    a) Power each Galileo and make sure it broadcasts a wifi network. (This is roughly 2 minutes per Galileo.)
5) Download and Print a placemat and reference card set for each kit specific to this project
6) Double check presentation materials for the workshop
7) Collect all required extension cords, power strips and extra parts. (LEDs, standoffs, screws, extra antennas and jumper wires are recommended to have on hand at all times.)
8) Check all craft knives for broken or missing blades. Replace as needed.
9) Collect Materials

1 Hour Before

1. Setup
    a. Each station will be occupied by 2 students. Make sure that each station has 2 chairs.
    b. Each station should be set according to this photograph.
    [image]
    c. Run required power to all stations. Each station will require at least one outlet, more if you plan on using laptops.
        i. Be sure to tape down any wires that pose a tripping hazard to the floor and secure them on the table tops.
    d. Setup your instructor station with projector, laptop and instructor Galileo
        i. Make sure that your Galileo is up and running and you can connect with CAT
2. Have all craft tools and supplies ready in a designated area.
    a. Plug hot glue guns in so they are ready to be used.

Lesson Timing Guide

Day 1

Introductions (5 Minutes)

- Take role during a warm-up activity
- Warm-up Question: (Think, pair, share)
    - What does the terms Output and Input mean to you? Can you give real world examples?

Recap Connect AnyThing (5 Minutes)

- How do you add an output and input?
    - Demonstrate how to Add an input to pin 9
- Controller Mode differences
    - What is the difference between 9 and 13?
    - Add an LED to pin 9 and use Controller Mode, what happens to the LED?
- Add a second output
    - Wire a second LED to pin 10, you now have multiple output

Hooking up the Light Sensor and Reading it in CAT (5 Minutes)

- We can hook up a bunch of different inputs and outputs to the Galileo using the protoCAT Shield and jumper wires
    - Recap wiring concepts with students.
        - 5V power is RED
        - GND (Ground) is Black
        - Signal is a different color (Yellow, Green, etc.
    - Hook up the light sensor and demonstrate the concept of power, ground and signal hook up.
    - Cover making a connection from inputs to outputs
        - Can you hook an input to multiple outputs?
            - Try it out!

Set the Stage for the Project (5 Minutes)

- They have created a system to create “mood lighting”. All it needs now is to look cool.
    - Go over materials and tools available to the students
    - Show examples of figure ground relationships in the slide deck.
        - What is figure and what is ground, how does light have to do with it?
        - The concept of figure/ground in layers.
- By cutting holes in layers you let light through
- The light box should do the following
    - create a simple figure ground relationship
    - disperse the light of at least 3 LEDs
    - Wow me!

Safety for Craft Knives (5 minutes)

- If you choose use craft knives you need to go over some safety rule for your students
- Safety slides are included in the slide deck
- Rules to cover:
    - Always pull your knife to cut
    - If a tip is broken, do not use a knife
    - Keep fingers out of line with your cut
    - always use steel ruler for a straight edge, never wood or plastic
    - Walk while carrying the knife pointed down
    - Make a cut using multiple passes, do not put too much pressure on the knife.
    - Lastly, never try to catch a knife that is falling off of a table. Let it fall and then pick it up off of the floor.

Project work Time (15 Minutes)

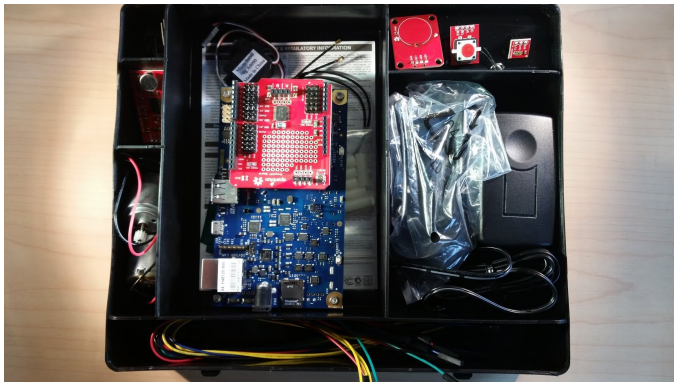
- This part of work time is allocated to exploration and design. Leave it up to students to define their process. The number of class periods you spend on this project is up to you. ***It should take about a full class period of work time for students to complete this project***.
- Release students to work in partners
    - Do not push them right away, the project needs time to settle in and creative juices need time.
        - Walk around and answer questions
        - Be looking for students who do not have the hook up correct or are not finished yet and help them along.
        - Be sure to give a time countdown every 5 minutes.
    - Sketch first, cut later.
        - Students only get so many pieces of card stock, have them sketch their concept and maybe cut out concepts from scrap paper.
    - Be sure to point out students who figure things out on their own…
        - Multiple LEDs
        - Different inputs
        - Creative design
        - Good Craft
- Be sure to leave time for class debrief and show and tell!
    - Sometimes the work time naturally comes to an end early, if it does go with it!
        - Don't allow for wasted non-goal oriented time or you will lose the class.

Cleanup and debrief(10 Minutes)

- When it is time to clean up
    - Students return all tools to specified area
    - Have host teacher walk around with recycling bin while you lead debrief

Day 2

- Warm-up: Planning and strategy meetings
    - Have partners talk about what needs to get done that day
    - Each students should build a to do list for themselves, have students share out.
    - Plug in hot glue guns!
- Work time
    - Open work time
        - Remind students of their deadline
        - last 10 minutes of class will be a gallery walk, so plan accordingly
        - Remind them of safety rules
- Debrief
    - Turn off lights...All night lights should turn on
    - Have the entire class stand up and have a gallery walk around the room
        - You should take photos of outstanding projects
    - Once the class has viewed the projects have them return to their seats
        - What did you like about what you saw?
        - What would you have changed now that you saw others work?
        - What other project could you apply this circuit to?
        - Look at the other sensor reference cards, which one would you try next?
- The hardware stays with the kits!!!
    - Ask students to put the wires, LEDs and sensors away in the kit
    - They can take the night light if they want, otherwise recycle it

Follow-up and Post Workshop

- Unplug all of the Galileos
    - pull up and dispose of tape.
- repack kits, take note that all sensors and actuators are in tact
    - If something is missing, take note of it for restocking
    - Replace all parts in the kit so it reflects this image…