



Outreach Playbook

Code LED Lights

Metrics:

Grade Level: High School (9th-12th)	# of Student Participants: 15	Duration (hrs): 1	# of SWE Volunteers: 3	Partner orgs (if any):
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Overview of Activity

This activity's objective is to learn about RGB lights and rudimentary electrical engineering and computer science principles. To do so, we will start by learning how basic circuits are constructed and then construct our own using an Arduino and our LED light strip. Once the hardware is figured out, students can begin coding their lights using RGB knowledge and basic codings principles - variables, loops, if-else statements. RGB lights have become popular decor tools, so this project allows each student to be creative in creating their own light show! This activity could be left open-ended and be just a fun, creative activity, or you could add a challenge to it, like creating a light show that goes to a Tik Tok sound or a favorite song.

Outline and Script



For this activity I distributed this document: <https://docs.google.com/document/d/1pf7edNZ54B1Z9ALowJrF3HyBYjvD8j08LbwgY8uPlaw/edit?usp=sharing>

The document has all the instructions and learning materials for this activity. The only instructions not included are the set up instructions that I would recommend supervisors prepare in advance.

Prep instructions:

1. Cut LED light roll into strips with 15 lights on each strip by cutting on the copper lines (the amount of lights on each strip can vary depending on what you want to do)
2. Cut the long wire that came with the connectors so that each person will have one section
3. You can separate the wires fully, but I would recommend only separating a portion of each side so they are easier to distribute to participants
4. Use wire strippers to strip about 1cm of wire on one side
5. Insert the LED strip in one end of the connector and the wires in the other end (it should be the unstripped end of the wire). This can be tricky so I'd recommend putting them in as far as possible before using something to clamp the sides down. Additionally, make sure the wire colors are in the same order for each light strip just to make things less complicated when teaching.

Lessons Learned



Students had a hard time getting the wires in the Arduino pins, so I suggest having them twist the wire ends so it is easier to insert into the Arduino pins. Also, make sure to have scissors for the electrical tape. The wires slip out very easily so electrical tape will be needed. Some students also had a hard time differentiating between the pin places on the Arduino, so emphasize double checking the wire placements with the provided diagram. The wire colors in the diagram are likely different than the wire color you will have so make sure they aren't relying on the colors when following the diagram.

Accessibility Adaptations

When we did this activity, we did not have access to computers that could download the Arduino IDE that would allow each student to upload their code to their Arduino. Instead, we had each student code on a google doc that they emailed to or shared with a supervisor, who would then upload the code onto each student's Arduino individually.



Materials and Costs

Item	Quantity	Where to Buy (link if applicable)	Total Cost
Elegoo Uno Board (Arduino dupe)	1 per person	Elegoo Uno Board	\$18.99 per board
Wire Connectors	1 per person (10 come in one order)	Wire Connectors	\$12.49 for 10
LED Strip Roll	Depends on how many lights each student is being given. One roll does have 300 LED lights so we only needed 1.	LED Lights	\$31.99 for one 300 LED roll
Electrical Tape	1 roll for 2 students	Electrical Tape	\$2 per roll
Scissors	1 per student		



Wire Stripper	1	https:// www.amazon.com/ DOWELL-Stripper- Multi-Function-Tool, Professional- Craftsmanship/dp/ B06X9875Z7/ ref=sr_1_11? crid=3J5VLNW7WTL MB&keywords=wire+ stripper&qid=165344 5628&s=hi&srefix=w ire+strippe%2Ctools %2C188&sr=1-11	\$6.99 for 1
<p>Describe any additional funding sources outside of section budget (if applicable): We were able to get Arduinos donated from students who have used them in the past in labs.</p>			