

## Paper Circuits Illuminated Letter

### **PREREQUISITES**

Students should have already completed the simple and parallel circuit activities, have made a battery holder (press switch), and be comfortable designing circuits without a template.

### **DESCRIPTION**

In this lesson, students will design an illuminated letter of their first or last initial and then add paper circuits to light up the artwork.

### **LEARNING OBJECTIVES**

Students will:

- Learn about the history of illuminated letters.
- Design and create an illuminated letter.
- Design and create a circuit without a template.

### **STANDARDS USED**

This will be specific to the grade you are teaching. Please check the list at the end of this lesson.

### **MATERIALS AND SUPPLIES**

- White paper
- Drawing and coloring tools
- Sharpie
- Copper tape
- 3v coin batteries
- Card stock
- Foam tape
- LED lights
- Construction paper
- Glue sticks

### **ACTIVITY**

1. Introduce students to the history of illuminated letters. This is a great resource: <https://www.wccusd.net/cms/lib/CA01001466/Centricity/Domain/412/Illuminations1.pdf>
2. Explain to students that most illuminated letters used gold leaf but we are going to use copper tape to make our letters shine AND light them up! Show an example of a completed project so students can see how the tape will be used, as this is different from the way they have been putting the circuit behind their artwork in previous lessons.

3. Have students research images of illuminated letters of their initial as well as patterns and designs often seen in illuminated letters (for example- flowers, vines, leaves, animals, Celtic knots, swirls, mythical creatures like dragons, and geometric patterns). Suggest students sketch some possible ideas for designs to add to their artwork while they research. Remind students that they may decorate inside their letter, around their letter, or both (show examples of the different forms).



Inside letter

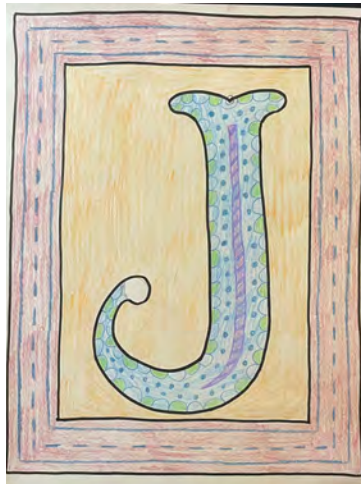


Around letter

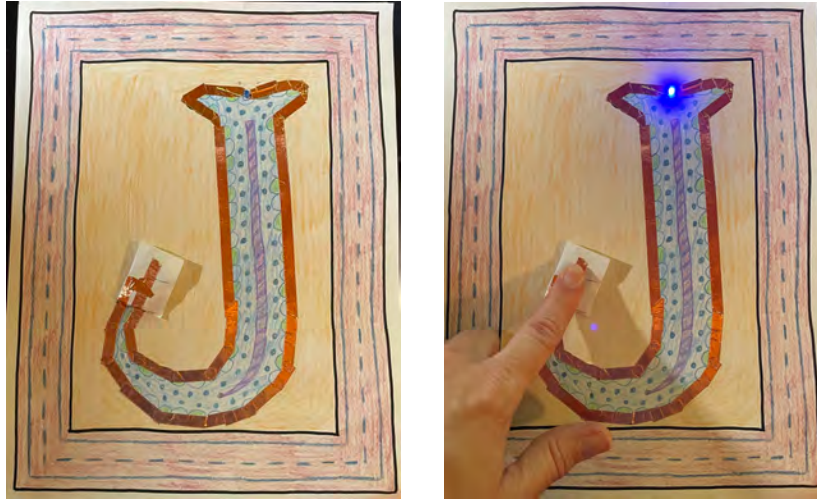


Both

4. After students have completed their research, have students sketch out their letter on their drawing paper, making sure to fill a large portion of the paper with the letter.
5. Once the letter is sketched, have students decide on items to decorate their letter. Remind students that the outline of their letter will have the copper tape on it so anything they draw that goes across the outline of the letter will be covered. Encourage students to think of items they might want to add using construction paper after the letter is taped. Students may also choose to draw a border around their paper.
6. Have students use a sharpie to outline their design and color in.



7. Have students determine the battery holder location for their letter.
8. Have students use the copper tape to outline their letter and add the battery (in a holder) and LEDs to make the circuit and test it to ensure it works. Remind students to use no more than 3 lights and stick to the colors that work best on a single circuit (blue + white OR red + yellow OR red + green).



9. Have students collage on additional decorations, especially a design to cover the battery.



10. Have the students share their artwork with the whole class.

#### **ACCOMMODATIONS FOR INCLUDING ALL CHILDREN**

- BE CAUTIOUS ABOUT THE COIN BATTERIES IF YOU HAVE STUDENTS THAT EAT NON-FOOD ITEMS. If you have students that may have issues with the batteries, please provide them in a battery holder and have the teacher or para attach them to the artwork.

- For students who may have a difficult time designing their letter- the teacher can use illuminated letter coloring pages and mark the light locations and location of where the battery should go.
- Use adapted coloring tools or tools with adaptive grips as needed.
- Consider having students work with a partner/buddy if they are unable to physically do the coloring or create the circuit.
- Use LED stickers instead of bulbs for students with fine motor issues.
- Consider fabric or copper tape based on student's needs (scissors vs ripping).
- Have paras assist with cutting tape as needed.

## Possible Standards

### Art Standards

#### Grade 4:

VA.4.C.1.1

Integrate ideas during the art-making process to convey meaning in personal works of art.

VA.4.C.2.2

Use various resources to generate ideas for growth in personal works.

VA.4.S.1.1

Manipulate tools and materials to achieve diverse effects in personal works of art.

VA.4.S.1.2

Explore and use media, technology, and other art resources to express ideas visually.

VA.4.S.1.3

Create artworks that integrate ideas from culture or history.

VA.4.S.3.1

Experiment with various materials, tools, techniques, and processes to achieve a variety of results in two- and/or three-dimensional artworks.

VA.4.H.1.1

Identify historical and cultural influences that have inspired artists to produce works of art.

VA.4.F.1.1

Combine art media with innovative ideas and techniques to create two- and/or three-dimensional works of art.

VA.4.F.1.2

Examine and apply creative solutions to solve an artistic problem.

#### Grade 5:

VA.5.C.2.1

Revise artwork as a necessary part of the creative process to achieve an artistic goal.

VA.5.S.1.2

Use media, technology, and other resources to inspire personal art-making decisions.

VA.5.S.2.3

Visualize the end product to justify artistic choices of tools, techniques, and processes.

VA.5.S.3.1

Use materials, tools, techniques, and processes to achieve expected results in two- and/or three-dimensional artworks.

VA.5.H.1.1

Examine historical and cultural influences that inspire artists and their work.

VA.5.F.1.1

Examine and experiment with traditional or non-traditional uses of media to apply imaginative techniques in two- and/or three-dimensional artworks.

**Grades 6-8:**

VA.68.S.1.3

Use ideas from cultural, historical, and artistic references to create personal responses in personal artwork.

VA.68.S.2.1

Organize the structural elements of art to achieve artistic goals when producing personal works of art.

VA.68.S.2.2

Create artwork requiring sequentially ordered procedures and specified media to achieve intended results.

VA.68.O.1.3

Combine creative and technical knowledge to produce visually strong works of art.

VA.68.F.1.1

Use non-traditional thinking and various techniques to create two-, three-, and/or four-dimensional artworks.

VA.68.F.1.3

Investigate and describe how technology inspires and affects new applications and adaptations in art.

**Grades 9-12:**

VA.912.S.1.2

Investigate the use of technology and other resources to inspire art-making decisions.

VA.912.S.3.1

Manipulate materials, techniques, and processes through practice and perseverance to create a desired result in two- and/or three-dimensional artworks.

VA.912.O.1.3

Research and use the techniques and processes of various artists to create personal works.

VA.912.F.1.4

Use technological tools to create art with varying effects and outcomes.

## **Science Standards**

### **Grades 3-5 (Computer Science):**

SC.35.CS-PC.3.2

Gather, organize, and analyze information from digital resources.

SC.35.CS-CS.1.4

Create a simple model of a system (e.g., flower or solar system) and explain what the model shows and does not show.

SC.35.CS-CS.2.4

Solve real-world problems in science and engineering using computational thinking skills.

SC.35.CS-CP.3.1

Write, communicate and publish activities using technology tools.

### **Grade 5:**

SC.5.P.10.4

Investigate and explain that electrical energy can be transformed into heat, light, and sound energy, as well as the energy of motion.

SC.5.P.11.1

Investigate and illustrate the fact that the flow of electricity requires a closed circuit (a complete loop).

### **Grades 6-8 (Computer Science):**

SC.68.CS-PC.3.1

Answer research questions using digital information resources.

**Grade 7:**

SC.7.P.11.2

Investigate and describe the transformation of energy from one form to another.