

Illuminating *The Starry Night* with Paper Circuits

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1. Teaching Materials Checklist

- **Art Supplies:**
 - Draft or white paper for sketching *The Starry Night*.
 - Colored pencils, oil pastels, or watercolors (various shades of blue and yellow are recommended).
 - Thick cardboard (to serve as a sturdy base for the circuit).
- **Electronic Components:**
 - LED diodes (Yellow is recommended to simulate stars).
 - Copper foil tape (for creating conductive paths).
 - 3V Coin cell batteries (CR2032).
 - Conductive glue or standard clear tape.
- **Tools:**
 - Hole puncher or awl (to poke holes for the LED bulbs).
 - Scissors.

2. Preparation Guide

- **Circuit-First Strategy:** Based on the author's experience, it is highly recommended to plan and install the paper circuit *before* finishing the final artwork. Since circuits often require multiple adjustments, completing the electrical components first prevents accidental damage to the final drawing.
- **Component Testing:** Pre-test all batteries and LEDs to ensure they work. Verify that the copper tape's adhesive is strong enough to maintain a consistent connection.
- **Environment Setup:** Prepare a dim or dark area in the classroom to effectively showcase the "glowing" results of the finished projects.

3. Teaching Plan

Phase	Activity	Learning Objective

Phase 1: Appreciation & Sketching	Students observe the color composition of <i>The Starry Night</i> and use art tools to recreate the texture and motion of the sky.	Enhance visual observation skills and understand Van Gogh's artistic style.
Phase 2: Circuit Design & Layout	Mark the star positions on the back of the art, plan positive/negative paths, and apply copper tape.	Learn basic physical concepts of closed-loop circuitry.
Phase 3: Assembly & Debugging	Insert LEDs into the star positions, connect the battery, and debug the touch or fixed switches.	Develop problem-solving skills and hands-on technical abilities.
Phase 4: Interactive Gallery	Display works in the classroom to create an "Interactive Illuminated Gallery" where students view and light up each other's stars.	Build a collaborative learning community and reflect on the intersection of Art and Physics.

4. Teaching Case Study

Project Name: Interactive *The Starry Night* Paper Circuit

Background: A student found it difficult to achieve the heavy texture of oil paint using only colored pencils while recreating the masterpiece.

Implementation Process:

1. **Color Challenge:** The student used layering techniques to simulate the swirling motion of the sky, realizing the depth of the night sky comes from a mix of blues and yellow accents.
2. **Circuit Integration:** During LED installation, the student faced connectivity issues. After several attempts at folding the copper tape to ensure a better connection, they successfully lit three "main stars" simultaneously.
3. **Reflection:** Through this process, the student reflected on the difference between how light is observed in reality versus how it is represented in art.



Core Educational Philosophy:

This plan embodies the principle of **"Low Floor and Wide Walls."** It lowers the barrier to entry for learning electronics (via paper circuits) while providing a vast creative space for artistic expression, allowing students of all levels to find success within the same project.