GRADE LEVELS: 4th

Time Allotment: 60-90 Minutes

LED Bracelets

Project Description:

In this hands-on STEAM activity, students will learn about basic circuitry and conductivity as they design and create their own wearable LED bracelets. They will combine science, technology, engineering, art, and math skills to imagine, plan, and construct eye-catching light-up accessories.

Learning Objectives:

- Describe how a simple circuit works to light an LED.
- Identify conductive materials that allow electricity to flow.
- Design a wearable circuit using craft materials.
- Construct a working LED bracelet following their plan.
- Apply measurement and geometry concepts.
- Express creativity through decorating their bracelets.

Materials:

- KIDS N TECH STEAM KIT

Procedure:

Introduction (10-15 minutes):

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- Engage students by showing examples of wearable technology.
- Explain that they will make light-up LED bracelets powered by a simple circuit.
- Discuss how a basic circuit works (path for electricity flow, conductive materials)

Techer Notes:

A basic circuit provides a closed loop or path for electricity to flow from the power source, through the components (like a light), and back to the power source. It requires three main elements: A power source (e.g. battery); A conductive path for the electricity to travel; A load/component that utilizes the electricity (e.g. light bulb or LED).

The conductive materials allow the flow of electricity by providing a path with little resistance. Common conductive materials used in circuits include metals like copper wire or copper tape.

An example of a simple circuit is using a battery to power an LED light:

The positive (+) side of the battery is connected to the positive leg of the LED using a conductive material like copper tape or wire. The negative (-) side of the battery is connected to the negative leg of the LED,

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Instruction (20 mins):

- Demonstrate steps to construct the LED bracelet circuit. (See instruction sheet)
- Review materials available for decorating to make it their own creation.

Hands-On Activity (40 mins):

- Distribute the kits for students to begin constructing bracelets based on instruction sheet.
- Circulate to assist with troubleshooting issues like battery not connected correctly.
- Remind students to test battery connection once circuit is assembled.

Wrap-Up (10-20 mins):

- Allow students to show off their illuminated bracelets.
- Reflect on what worked well and challenges they overcame.
- Discuss how they integrated art components through their creative designs.

Observation Assessment:

- Completed functional LED bracelet demonstrating understanding of circuitry.
- Creativity/Decoration:
  - Unique design elements incorporated.
  - Colors, patterns, textures add artistic flair.
  - Thoughtful use of provided embellishments.

Class Discussion Evaluation:

- Participate consistently with relevant comments.
- Participate occasionally with some relevant comments.
- Participates minimally and/or comments often off-topic.
- Does not participate in class discussions.

Science/Engineering Concepts:

- How a basic circuit works/closed loop.
- Role of conductive materials
- Purpose/function of components (LED, battery)
- Troubleshooting issues (loose connections, short circuits)

Assess students' understanding of:

1) Integrating all circuit components correctly

2) Applying creativity and decoration skills

LED BRACELET DESIGN INSTRUCTIONS

Examine your kit to make sure you have all the materials to make your bracelet. Next, follow the steps outlined below to make your bracelet. Explore STEAM with circuitry, engineering design, and creativity! Complete the final touch by adding a splash of color or a burst of flashing patterns to make your bracelet a unique expression of yourself.

1. INVENTORY PARTS

- 1 8.5-in. long piece of foam paper
- 1 2.5-in. short piece of foam paper
- 3 Pairs Velcro dots
- Embellishments
- 1 3v battery
- 1 Step-by-step instructions
- 1 Small piece of copper tape

2. APPLY VELCRO DOTS

a. Stick the soft Velcro dot firmly to one end of the bracelet.

b. Flip the bracelet over so the opposite side is facing up.

c. Stick the scratchy Velcro dot securely to the other end of the bracelet. Make sure it aligns with the soft dot on the opposite side.

3. CHECK THE FIT

a. Close the bracelet around your wrist by pressing the soft and scratchy dots together.

b. Make sure it fastens securely and feels comfortable. If necessary, adjust the placement of the dots before moving on to the next step.

4. PLACE THE LED

a. Press the LED light wires all the way through the center of the foam paper, so the LED light is touching the paper.

b. Flip the bracelet and fold the LED prongs flat against it.

5. CREATE THE CIRCUIT

Use the copper tape to cover one wire of the LED.

6. SECURE THE BATTERY

a.

b.

c.

a. Place the battery on top of the d wire, then press the other wire on top of the battery. The light should light up. If not, flip the battery, the LEDs must match the battery's positive and negative sides.

b. Use the Velcro dots to secure the battery in place by attaching them on both sides of the battery.

c. Stick the final Velco dot pairs to the smaller piece of foam paper, placing one dot on each side. This will cover the battery.

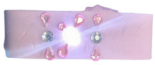
7. EMBELLISH

Once the bracelet lights up, decorate the outer side with your chosen embellishments.

8. FINAL TOUCHES

Ensure the circuit is complete and the LED lights up.

9. TESTING & DECORATING



Check if the LED stays lit. If not, ensure the battery and the lead on the top is touching; also flip the battery as it should match the LED's positive and negative sides.

That's it — your paper circuit bracelet is ready to wear!