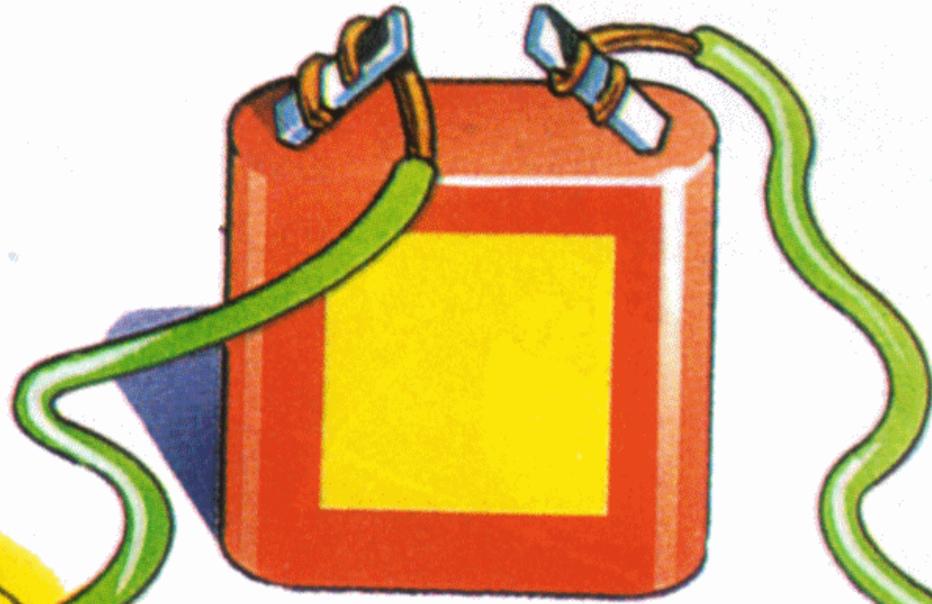


**Circuits • Conductors • Insulators • Relationships**



**Unit Essential Question**

How can dance/movement aid in the comprehension of conductors, insulators and electric circuits?

How can knowledge of the upcycle movement assist in the creation of wearable circuits?

**UNIT DESCRIPTION**

In this arts integrated unit, students will use movement and the creation of human circuits to aid in the comprehension of the direct purposes of conductors, insulators and electric circuits. Students will be able to identify and articulate the two types of simple circuits (parallel & series) and how they work. Students will be actively engaged in the discovery of the upcycling movement. Students will design, sew, and create an outfit that contains a sewn circuit that lights up an LED. The culmination of the project will be a school-wide fashion show in which students will debut their wearable circuitry fashions.

**COMPONENTS**

- Dance Component: Human Circuits
- Visual Arts Component: Wearable Circuits

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Units provide differentiated ideas and activities aligned to a sampling of standards. The units do not necessarily imply mastery of standards, but are intended to inspire and equip educators.

Unit Description	Table of Contents
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### UNIT ESSENTIAL QUESTIONS

- How can dance/movement aid in the comprehension of conductors, insulators and electric circuits?
- How can knowledge of the upcycle movement assist in the creation of wearable circuits?

### CROSS-CUTTING INTERDISCIPLINARY CONCEPT

Relationships  
Simple communication of ideas  
Mutual integration of concepts

### REAL WORLD CONTEXT

The fundamental process that is used on an everyday basis in our daily lives to turn on and off light switches may be basic, however it is the idea of circuitry that we truly depend on. When a computer, television, or any other household electronic device is in use, circuitry is involved. Being able to understand the loop that is created in order for electricity to power such devices is important for students to understand as our world continues to depend on electricity.

### STANDARDS

Curriculum Standards	Arts Standards
<p><b>S5P3.</b> Students will investigate electricity, magnetism, and their relationship.</p> <p><b>a.</b> Investigate static electricity.</p> <p><b>b.</b> Determine the necessary components for completing an electric circuit.</p> <p><b>c.</b> Investigate common materials to determine if they are insulators or conductors of electricity.</p> <p><b>S8P5.</b> Students will recognize characteristics of gravity, electricity, and magnetism as major kinds of forces acting in nature.</p>	<p><b>DMSPCR.1.</b> Demonstrates an understanding of creative and choreographic principles, processes, and structures.</p> <p><b>DMSPCR.2.</b> Demonstrates an understanding of dance as a way to create and communicate meaning.</p> <p><b>VA6MC.1.</b> Engages in the creative process to generate and visualize ideas.</p>

<p><b>b.</b> Demonstrate the advantages and disadvantages of series and parallel circuits and how they transfer energy.</p> <p><u>National Standards:</u>  <b>MS-PS2-3.</b> Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. [Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.]</p>	<p><b>VA6MC.2.</b> Identifies and works to solve visual problems through creative thinking, planning, and/or experimenting with art materials, tools, and techniques.</p> <p><b>VA6CU.2.</b> Investigates and discovers personal relationship to community, culture, and the world through making and studying art.</p> <p><b>VA6PR.2.</b> Creates artwork reflecting a range of concepts, ideas, and subject matter.</p> <p><u>National Standards:</u>  <b>DA:Cr1.1.6.a.</b> Relate similar or contrasting ideas to develop choreography using a variety of stimuli (for example, music, observed dance, literary forms, notation, natural phenomena, personal experience/recall, current news or social events).</p> <p><b>Standard 1:</b> Generate and conceptualize artistic ideas and work.  <b>VA:Cr1.1.6a.</b> Combine concepts collaboratively to generate innovative ideas for creating art.</p> <p><b>Standard 4:</b> Select, analyze, and interpret artistic work for presentation.  <b>VA:Pr4.1.6a.</b> Analyze similarities and differences associated with preserving and presenting two-dimensional, three-dimensional, and digital artwork.</p>
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## ASSESSMENTS

Summative Assessments
<ul style="list-style-type: none"> <li>● <b>Reflection Questions (both components):</b> Students will use these questions to reflect on the important parts of the lessons. (See Downloads)</li> <li>● <b>Parallel Circuit Dance/Movement:</b> Students will show their understanding of elements of a parallel circuit through dance/movement.</li> <li>● <b>Representations of Parallel &amp; Series Circuits:</b> Students will create representations of parallel and series circuits, identifying the parts that make up that circuit. Students could use any medium to demonstrate this knowledge. For example, poster, ThingLink, Google Presentation, etc.</li> <li>● <b>Wearable Circuits Fashion Show:</b> Students will assign roles within the group to produce a student run fashion show for their school community. Roles include: models, students will model the outfits in the “runway;” stylists, students that will get the clothing and models prepared for the “runway;” and an “MC,” a student who will introduce the models and the clothing to the audience.</li> </ul>

**CHARACTER EDUCATION COMPONENTS**

The concept of how electricity moves fluidly via circuits is a perfect example of the concept of being a mindful student/human being. Mindfulness helps us calm down, and thus, in turn, calms the amygdala, which allows the informational flow to the prefrontal cortex. (The part of our brain that helps us make decisions.) When we are mindful our brain uses a type of circuitry. The amygdala tries to protect us, but often mistakes stress for real threats and in turn stops the prefrontal cortex from getting the information it needs to help us make good choices. When the amygdala is calm, it gives the prefrontal cortex what it needs. The prefrontal cortex's role is to help us figure things out in order to make well balanced choices. The prefrontal cortex also sends and retrieves memories to and from the hippocampus. When the amygdala is upset, the prefrontal cortex cannot help us. The hippocampus stores and recalls all of our memories. When the amygdala is upset, the hippocampus is unable to store memories or properly bring them to mind. Learning how to be a more mindful person will be useful in many aspects of our daily lives.

**CHARACTER ATTRIBUTES**

- Personal Responsibility
- Being responsible for tasks that have been assigned.
- Being Mindful
- When we are able to be calm, we can easily make better choices.
- Team Work
- Having an open mind and being a good listener while working in a group situation.

**APPENDIX (see Downloads)**

- Pre/Post Assessment

**ADDITIONAL RESOURCES****Books**

- *Make: Electronics: Learning Through Discovery* by Charles Platt
- *Electronics for Kids: Play with Simple Circuits and Experiment with Electricity!* by Oyvind Nydal Dahl
- *DK Eyewitness Books: Electricity Hardcover* by Steve Parker

**Websites**

- An interactive website all about electricity and circuits:  
<http://interactivesites.weebly.com/electricity-and-energy.html>

**Video Examples of Student Work****Photo Examples of Student Work****CREDITS**

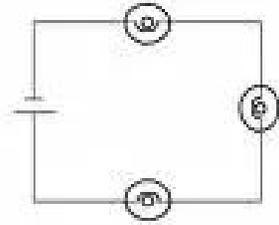
ArtsNow, Inc. and Bear Creek Middle School, Barrow County School System  
Ideas contributed and edited by: Ashley Bailey, Melissa Dittmar Joy, Shannon Green, Michele McClelland

## Circuitry Pre/Post-Assessment

NAME: \_\_\_\_\_

1. What kind of circuit is shown below?

- a. series
- b. parallel

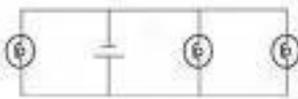


5. Electrical wiring in homes use \_\_\_\_\_ circuits.

- a. series
- b. parallel
- c. overloaded
- d. voltage

2. What kind of circuit is shown below?

- a. series
- b. parallel



6. Which of the following could be used as an insulator?

- a. rubber
- b. wire
- c. metal bolt
- d. metal

3. The pathway for electrical current is called a

- a. highway
- b. electric route
- c. circuit
- d. path

7. A continuous flow of electrons is a

- a. current
- b. conductor
- c. resistance
- d. insulator

4. Objects that allow electrical current to flow are called \_\_\_\_\_.

- a. circuits
- b. nonconductors
- c. batteries
- d. conductors

8. The unit that measures a battery's strength is called \_\_\_\_\_.

- a. volt
- b. conductor
- c. circuit
- d. current