Project Description	Learning Targets
In this arts integrated unit, students will use movement and the creation of human circuits to aid in the comprehension of conductors, insulators and electric circuits.	"I Can…" ● Classify materials as conductors or insulators of electricity when placed within a circuit ● Construct series and parallel circuits to demonstrate the flow of energy within a closed system

ESSENTIAL QUESTION(S)

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

STANDARDS

Curriculum Standards	Arts Standards
S5P3. Students will investigate electricity, magnetism, and their relationship. **a.** Investigate static electricity. **b.** Determine the necessary components for completing an electric circuit. **c.** Investigate common materials to determine if they are insulators or conductors of electricity. **S8P5.** Students will recognize characteristics of gravity, electricity, and magnetism as major kinds of forces acting in nature. **b.** Demonstrate the advantages and disadvantages of series and parallel circuits and how they transfer energy. <u>National Standards</u> **MS-PS2-3.** 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.]	**DMSPCR.1.** Demonstrates an understanding of creative and choreographic principles, processes, and structures. **DMSPCR.2.** Demonstrates an understanding of dance as a way to create and communicate meaning. <u>National Standards</u> **DA:Cr1.1.6.** **a.** 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).

KEY VOCABULARY

Content Vocabulary
● Resistor ● Conductor ● Insulator ● Wire ● Energy source ● Closed circuit ● Open circuit ● Series circuit ● Parallel circuit ● Current ● Ohm's Law (extension)
Arts Vocabulary
● Levels: This is one of the aspects of the movement element space. In dance there are 3 basic levels: high, middle and low.

TECHNOLOGY INTEGRATION

- Green Screen
- Video Camera
- iMovie or other video editing software with green screen capabilities

ASSESSMENTS

Formative	**Summative**
● Observe students correctly "building" circuit types. ● Observe students correctly identifying circuit types and components.	● Students show their understanding of elements of a parallel circuit through dance/movement. ● **Reflection Questions** (see Downloads)

MATERIALS

Music, music player, camera, green screen, video editing software, **Elements of Circuits Index Cards** (see Downloads)

Activating Strategy (5-10 min)
● Set up parameters for acceptable movement choices. ● Discuss audience behavior/etiquette. ● Students will participate in The Name Game. ● Have the group form a circle. ● Pick a person to go first and have them say their name while making a movement or gesture to accompany their name. (Examples: using your hands and figures to create a heart, using jazz hands, doing a curtsy…) ● The circle then collectively repeats the person's name and gesture. ● Continue with the next person stating their name and making a gesture.

- The circle repeats the new person's name and gesture.
- Then, starting with the person of origin, repeat all the names and gestures shared to that point.
- Continue until everyone in the circle is included.

Main Activity

PART 1

- As a large group, play "Pass the Movement:"
  1) Gather students in a circle. Students will choose a movement that transfers energy, they gather the energy and send it out to another person, sending the energy…Throwing a ball and the person next to them catches the ball. Or kicking a ball, or a person using their arms in a volleyball hitting gesture, etc.)
  2) Begin with the student to your right. About halfway through the circle go ahead and allow the movement to be passed either to the left or the right. Their movement energizes the next person after they get the feeling of what is being passed.
  3) Lastly, the students choose a movement and pass their energy to anyone in the circle. As an extension, have students add examples insulators and conductors to Pass the Movement as a valuable review.
- Discuss different types of circuits and the parts needed to build the circuit.
- Explore building human electrical circuits.
- Break students into groups.
- Assign roles for each element of a circuit by passing out the **Elements of Circuits Index Cards** (see Downloads)
- In groups, students will create a dancing circuit utilizing all the necessary components.
- Students will perform for the whole group.
- Audience will identify circuit type and which dancer(s) were representing each component.

PART 2

- Students will receive feedback of group performance from the audience using the **Glow & Grow Feedback Form**. (see Downloads)
- The teacher will compile the feedback for the groups from the Glow & Grow Feedback Forms.
- Each group will look at the feedback forms and polish their dance to make it more clear for the audience.
- Each group will select music to dance to (instrumental music is encouraged).
- Each group will film the dance in front of the green screen.
- Groups will upload their video to iMovie and select a background image to represent their idea for their parallel circuit dance.
- Videos will be presented to an audience (online, in person, etc.) (See Additional Resources for video examples of student work.)

REFLECTION

Reflection Questions

- *Identify the elements of a circuit that appeared in your dance. How did the movement relate to the element of the circuit?*
- *What happens to the flow of electricity if the circuit is not complete? How do you know? Does it matter where the break in the circuit is?*

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

APPENDIX (See Downloads)

- **Elements of Circuits Index Cards**
- **Glow & Grow Feedback Form**
- **Reflection Questions**

CREDITS

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