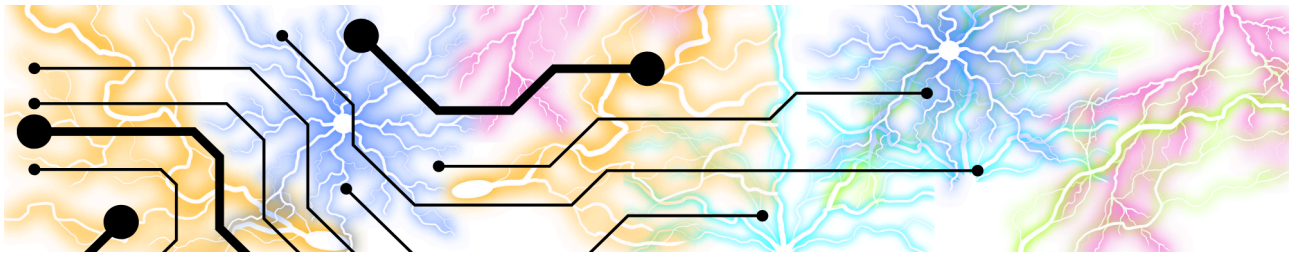
artsNOW
Integrated learning solutions

ELECTRICITY IGNITES! CIRCUITS
Grade Band: 4-5
Content Focus: Theatre & Science



LEARNING DESCRIPTION

Engage all parts of your students' minds and bodies as they play circuit games and develop open and closed circuit pantomimes, making learning about electricity dynamic and fun. Their imaginations will be activated when playing Circuit Freeze. By interacting in Circuit Breaker Tag, they will embody the interconnectedness of electrons, batteries, switches, and lightbulbs. These games will set the stage for sparks of collaboration as they create their circuit pantomimes in small groups with VIvant Circuit making. Finally, students give voice to circuit characters by creating a dialogue with an insulator or conductor.

LEARNING TARGETS

Essential Questions	"I Can" Statements
How does electricity affect my life, family, and school? Does my energy affect others the way energy moves through a closed or open circuit?	I can communicate a story without using my voice. I can exaggerate my body and voice to express scientific ideas and processes. I can work with others to create human circuits.

	I can create a dialogue between two characters using my imagination. I can empathize with a scientific process.

GEORGIA STANDARDS

Curriculum Standards	Arts Standards
Grade 5: 5P2 Obtain, evaluate, and communicate information to investigate electricity. S5P2.b Design a complete, simple electric circuit, and explain all necessary components. S5P2.c Plan and carry out investigations on common materials to determine if they are insulators or conductors of electricity. S5P3 Obtain, evaluate, and communicate information about magnetism and its relationship to electricity.	**Grade 5:** TA5.CR.1 Organize, design, and refine theatrical work. a. Use imagination to create a character with specific physical, vocal, and emotional traits. TA5.PR.1 Act by communicating and sustaining roles in formal and informal environments. b. Use body and movement to communicate thoughts, ideas, and emotions of a character. c. Collaborate and perform with an ensemble to present theatre to an audience. e. Communicate and explore character choices and relationships in a variety of dramatic forms (e.g. narrated story, pantomime, puppetry, dramatic play).

SOUTH CAROLINA STANDARDS

Curriculum Standards	Arts Standards
Grade 4: 4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	**Anchor Standard 1:** I can create scenes and write scripts using story elements and structure. **Anchor Standard 3:** I can act in improvised scenes and written scripts.

KEY VOCABULARY

Content Vocabulary	Arts Vocabulary
• Circuit - A path or a loop that electricity follows to power something • Closed circuit - The electrical path is complete, allowing current to flow • Open circuit - A break in the path preventing current from flowing	• Statues - Frozen pictures made by one person with their body and face to help tell a story without words. • Pantomime - Using gestures, facial expressions, and body movements to convey a story or narrative without speaking. Often includes pretending to

- Series circuit - A circuit that has components (like light bulbs) connected in a single line
- Parallel circuit - A circuit that has multiple paths for electricity to flow
- Resistors - A little gatekeeper that controls how much electricity (or current) can flow through it, preventing too much from flowing and potentially damaging things
- Electron - A tiny, negatively charged particle that moves through wires and carries electricity, like a tiny stream of energy
- Battery - A little power plant, providing the "push" (or electricity) that makes the circuit work, allowing things like lights or motors to turn on
- Wire - A path or road for electricity to travel, connecting the parts of the circuit so the electricity can flow and power something like a light bulb.
- Insulator - A material that electricity cannot flow through easily, like plastic or rubber
- Conductor - A material that electricity can flow through easily, like metal wires
- Electricity - A type of energy that powers things, like lights and appliances; caused by the movement of tiny particles called electrons

hold, touch, or do something one is not holding, touching, or using.

- Body - Actors use their body to become a character through body posture and movement. What your mind thinks, what your emotions feel, all of this is supposed to show up in your body.
- Imagination - Actors use their imagination to envision things that are not real. It is an essential tool in an actor's ability to bring a character, scene, etc. to life.
- Facial Expression - Using your face to show emotion
- Dialogue - A conversation between two or more persons
- Voice - Actors use their voice to be heard by the audience clearly. Actors must also apply vocal choices such as pitch, tempo, and volume to the character they are dramatizing.

MATERIALS

- Circle colored stickers for resistors in circuit breaker tag
- Lanyards for name tags–each lanyard/name tag should have one card in it. Cards should be labeled battery, wires, switch, light bulb/motor); one lanyard/nametag/card per student
- Open/closed cards–each card should have one word on it–either open or closed (one card per group of four students)

- Insulator conductor cards–each card should have a visual of a conductor or insulator on it (one card per group of four students)
- Paper and pencils

INSTRUCTIONAL DESIGN

Opening/Activating Strategy

CIRCUIT FREEZE

- Tell students that statues are frozen poses actors use to tell dramatic stories.
    - A statue is one person freezing.
    - Statues have levels (high, middle, low), interesting shapes, and facial expressions.
- Ask students to use their bodies and faces to create a statue of the word “open”.
    - Ask them to outstretch their arms really wide and freeze as if they can't move.
    - This represents an open circuit.
- Then, ask students to use their body and face to create a statue of the word “closed”.
    - Ask them to hook their hands together in front of their body.
    - Encourage them to pulse their body to represent a closed circuit.
- Tell students they must freeze in the corresponding statue when you call out "1, 2, 3….OPEN FREEZE" or "1, 2, 3….CLOSED FREEZE".
    - Coaching note:
        - Encourage students to use energy in all parts of their body and face, whether frozen or pulsing.
            - Body (gestures, interesting shapes, energy throughout)
            - Face (eyes, mouths, cheeks)
        - Encourage students to have intense freezes like they are being zapped frozen.

CIRCUIT BREAKER TAG

- Choose one student to be the battery.
    - Give that student one color dot.
    - Ask the student to put this dot on their forehead.
    - The battery is “it”.
- Assign three to four students to be switches.
    - Give these students another color dot.
    - Ask students to put the dots on their foreheads.
    - Switches control when circuits are open or closed.
- The rest of the students are electrons.
    - Electrons are runners.
- Explain how the game works.
    - The battery (“it”) will run around tagging electrons.
        - If an electron is tagged, the student will open their arms stretched out wide and freeze in place.
            - They are representing an open circuit.
            - The only way for a frozen electron to move again is if a switch tags them.
                - When a switch tags an electron, the electron can run free again.
                    - They represent "flipping the switch”, which closes the circuit.
- Conclude the game after a set time limit or until most electrons are frozen.
- You can then move on to different modes of the game.
    - Explain each of the three modes:

        - Series Circuit Mode:
            - Have students hold hands to create a chain.
                - This represents a series circuit.
            - If one electron in the chain gets tagged by the battery, everyone in that chain must freeze.
                - This represents a break in the circuit.
            - A switch can tap the frozen players to restore the circuit.
                - This allows the entire chain to move again.
        - Parallel Circuit Mode:
            - Students can run freely throughout the space.
                - This represents separate parallel paths.
            - If an electron is tagged, only that individual electron freezes.
                - All other electrons can keep running.
            - A switch can unfreeze the tagged electron by tapping them.
                - This restores that part of the circuit.
        - Resistor Mode:
            - Assign some students to be resistors.
                - Resistors cannot run. They can only walk and must move very slowly. This simulates resistance in a circuit.
                    - NOTE: You can give resistors colored stickers on their forehead or wristbands.
            - Other electrons (runners) can move freely unless tagged.
            - If a resistor is tagged by the battery, the resistor must freeze like a normal electron.
            - This demonstrates:
                - How resistors slow down the flow of electrons in a circuit.
                - How resistance affects movement (current).
- Once students understand the concept of resistors, you can add levels.
    - Resistance levels:
        - Have some resistors hop in slow motion.
        - Have other resistors turn in slow motion.
        - You can use other slow-motion movements or ask students for suggestions.

Work Session

VIVANT CIRCUIT

- Explain that pantomime is a dramatic way to tell a story without using your voice.
    - Actors exaggerate their body movements, gestures, and facial expressions to mime stories.
- Tell students that the class will tell the story of a human circuit using pantomime.
- Ask the class to make a big movement with their bodies.
    - Tell them that these movements are energy.
- Next, tell them that they will see how energy moves through a circuit.
- Demonstrate one circuit.
    - Ask four volunteers to come to the front of the room.
    - Assign each volunteer a role.
        - 1- Battery–the energy source
        - 2- Wires–the connectors
        - 3- Switch–which can open or close the circuit
        - 4- Light bulb/motor–the load
            - The load reacts when the circuit is complete.
    - Have the actors stand in a circle and hold hands.
    - Explain that they have now formed a circuit chain.

        - Ask the battery to make a big energy movement.
            - This energy movement will pass down the line of the circuit.
        - The battery starts the energy by passing the movement down the line.
            - When the movement reaches the wire, the wire activates.
            - When the movement reaches the light bulb, the light bulb reacts or lights up. The actor jumps or spins.
                - This shows that the circuit is complete.
            - The switch can open/close the circuit.
                - Open–breaking, hands outstretched, and frozen pose
                - Closed–rejoining hands and pulsing
- Explore details about open and closed circuits.
    - Closed circuit: The electrical path is complete, allowing current to flow.
    - Open circuit: There is a break in the path, preventing current from flowing.
- Have students pantomime both types of circuits. Prompt each by asking students in the audience to shout out "OPEN" or "CLOSED".
- Add sound:
    - Explain that you will now stop pantomiming and add sound to the circuit.
    - Encourage students to create a sound for their part of the circuit.
    - Their sound activates when the energy reaches them.
- GROUP CIRCUITS:
    - Hand out lanyards to every student.
    - Tell them that they are now the circuit character listed on their lanyard.
    - Tell them they have two minutes to get into groups of four with each character represented.
    - Allow them time to group themselves without intervening.
    - Once groups are defined, have students create a quick statue of their character.
    - Give each group a closed or open card.
    - Then, tell them they have four minutes to develop a pantomime for their type of circuit.
    - After four minutes, have each group share their pantomime with the rest of the class.
    - Have the audience guess if they were an open or closed circuit.
    - Add sound:
        - After all groups share, have them get back into their circuit groups and create a sound for their character. .
            - Give them two minutes to rehearse bringing their pantomime to life with sounds.
            - When the energy is passed, the character adds their sound.
            - Then call out "1, 2, 3, ACTION" as groups simultaneously add sound and movement to their circuits.
- SERIES VERSUS PARALLEL
    - When the class has mastered open and closed circuits, you can introduce series versus parallel circuits using pantomime and bring them to life with sound.
        - Some light bulbs turn off, others stay on.

EXTENSION: TO CONDUCT OR NOT TO CONDUCT, THAT IS THE QUESTION

- Discuss insulators and conductors and how they affect circuits.
- Get students back into their circuit groups.
- Hand each group a visual of an insulator or conductor.
- Ask them to identify if it is a conductor or insulator and to write it on the visual card.
- Give them five minutes to develop four lines of dialogue between the circuit and the insulator/conductor.
    - Encourage students to create character voices.

- Have students share dialogue with the class.

K-4 GRADE APPLICATIONS:

- *Explore the following electricity-related topics by playing charades or having students create a pantomime to bring to life.*
  - *Kindergarten: Types of motion*
  - *1st: Light and sound*
  - *2nd: Magnets (push and pull)*
  - *3rd: Heat transfer*
  - *4th: Balanced and unbalanced forces*

Closing/Reflection

- Tell students that today they used their bodies to bring electrical circuits to life. Have them show you one thing you learned about circuits without using their voices.
- Now, have them turn and talk. Students should tell their partners three ways that they use electricity every day.
- Ask students the following reflection questions:
  - What did you enjoy about pantomiming and creating dialogue?
  - What do circuits have to do with electricity, and why do we need a complete path/loop for electricity to flow?
  - How do you see circuits or connections in human relationships?

ASSESSMENTS

Formative

- Walk around the room while students create pantomimes and clarify why they chose certain movements through question and answer.
- Assess students' ability to use their voice and body to portray characters. Encourage those who are having difficulty.

Summative

- Have students create a checklist for their pantomime presentation skills that includes use of body, facial expression, and exaggeration.
- Assess whether students understand the content through their pantomime presentation.

DIFFERENTIATION

Accelerated:

- Create monologues from an open or closed circuit point of view, adding the problem or solution of an insulator or conductor.
- Flesh out the four lines of dialogue into a full scene involving three circuit characters.

Remedial:

- Build circuits with groups coming to the front of the class versus getting into small groups.
- Have students improvise the dialogue; the teacher will scribe it on the board.

ADDITIONAL RESOURCES

- Broken Box Theatre Mime Company Video
- History of Mime
- Fun Pantomime Video - "Punchomime, Brushing Teeth"

This integrated lesson provides differentiated ideas and activities for educators that are aligned to a sampling of standards. Standards referenced at the time of publishing may differ based on each state's adoption of new standards.

Ideas contributed by: Susie Spear Purcell