# Electric Palette: Artistic Designs with Spin Art Circuits

**Grade Level:** 3rd to 5th Grade

**Objective:**

- Understand how switches control the flow of electricity in a circuit.
- Explore the conversion of electrical energy into mechanical energy and its application in creating kinetic art.
- Encourage creativity in applying scientific principles to produce unique artworks.

**Standards:**

- **NGSS 3-PS2-2:** Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.
- **NGSS 4-PS3-4:** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
- **NGSS 3-5-ETS1-1:** Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

**Materials:**

- Small electric motors
- Battery packs with built-in switches and wires (or separate switches to be wired into the circuit)
- Wires (if needed)
- Corks
- Tape
- Cardboard pieces (various shapes and sizes)
- Markers in various colors
- Large popsicle stick to secure the motor (optional)

**Procedure:**

1. **Introduction to Circuits and Energy Conversion (15 minutes):**
    - Discuss the components of a basic circuit and introduce the concept of energy transformation from electrical to mechanical forms.
2. **Building the Spin Art Machine (25 minutes):**
    - Demonstrate how to connect the motor, battery, and switch.

    - Assist students in attaching the motor to a stable base(Large Popsicle Stick) and fixing the cork and cardboard to create the spin art platform.
3. **Art Creation and Energy Observation (30 minutes):**
    - Students activate their machines to see the cardboard spin. They will use markers to create designs while observing how the switch controls the flow and stoppage of energy.
    - Encourage experimentation with different speeds(pressing the marker down with more force could slow it down) and marker placements to see how the energy transfer affects the art patterns.
4. **Conclusion and Cleanup (10 minutes):**
    - Review the principles of circuit functionality and energy conversion. Discuss how these principles can be creatively applied in other contexts.
    - Discuss how the students' artwork turned out and let them talk about what they did to get specific designs.

**Guiding Questions:**

- How does the speed of the motor affect the art you create?
- How does the switch control the transformation of electrical energy into mechanical motion?
- What was done to produce different patterns within your art piece?

**Assessment:**

- Evaluate students on their ability to construct a functioning circuit and apply modifications to enhance their art.
- Assess understanding through a quiz or discussion on energy conversion and circuit components.

**Extensions:**

- Introduce alternative energy sources such as solar panels to power their machines.
- Challenge students to incorporate multiple colors and synchronization in their designs based on motor speed and switch timing.