**Lesson Overview:**

Students will leave with a basic understanding of how circuits work and be able to apply them in paper circuits

They will be able to….

**Kindergarten- 3rd Grade**

* Define electricity and how it moves in a circuit

**4th-5th Grade**

* explain energy transfer involving electricity

**Middle**

* Explain the Law of Conservation of Energy and how it applies to this circuit

**Procedure Thesis:**

In this workshop we will teach you about electricity. Next, we will explain how electricity is used in paper circuits. Finally, you will be making your own paper circuits that you can take home.

**Slide Outline:**

* Introduction (EX: Story about electricity)
* Background Info (Teaching about electricity, edit based on age group)
* Workshop Overview (Materials & Procedure)
  + Materials: (not sure exactly what we have or measurements)
    - Paper (size depending on how much copper tape because we don’t want the paper to be too large and them having a ton of blank space)
    - Copper tape
    - Led
    - Coin cell battery
  + Workshop steps (I assume we’re having them fold the paper to complete the circuit, change as needed)
    - <https://www.exploratorium.edu/tinkering/projects/paper-circuits> <—where i’m taking the steps from

1. Notice the positive and negative side of the battery
2. Notice the longer positive (anode) lead and shorter negative (cathode) lead
   1. (terminology dependent on age group and background info they get)
3. Fold one corner of the paper and trace the battery on either side of the fold
4. Tape two strips of copper tape so that one strip connects the positive lead of LED to positive side of battery and do the same for the other strip
5. Fold the corner and see the LED light up

* (Optional) Conclusion (What we learned, what we did, etc.)

**Information**

3rd graders:

* explain electricity?

Middle Schoolers:

* Law of conservation of energy
* Electrical energy transforms to light energy, but some turns to thermal energy
* actually explain how battery works
  + Contain chemicals (chemical form of energy)
    - Most common lithium, lithium ion battery
  + Batteries have two terminals called cathode and anode, separate by a material called an electrolyte
    - Cathode is positive
    - Anode is negative
      * \*for galvanic cells, like batteries
    - The electrolyte prevents the cathode and anode from direct contact with each other but allows a charge to flow
    - That is why only when there is a path connecting anode and cathode do electrons flow, and that flow of electrons is what powers the LED