Squishy Circuits

Grade Level: 1st-Adult

Time Required: 30-60 minutes

Group Size: Individual-full class

Summary

Learners use playdough to create imaginative electrical circuits.

Learning Objectives

After this lesson, learners should be able to:

- Create electrical circuits and identify the parts of the circuit
- To find similarities and differences between the structure of different circuits

Materials List

- Playdough (Note: Most brands will work, but dough should be tested ahead of time. Educators may choose to create their own.)
- Small LEDs (>5 per learner)
- Variety of batteries- AA to D
- Various circuitry parts- Small fans with blades, Small motors, tiny buzzers, etc
- Battery Packs with alligator clips
- Paper and pencil
- Tablet (optional)

Procedure

1. Decide which playdough (conducting or conducting and resistor) will be used. If the educator prefers to make his/her own playdough, this can be done either before the lesson or with the learners.
2. On a shared table, put out a collection of items to be used to build circuits. Small LEDs, small fans, low-voltage motors, small buzzers, batteries, and battery packs. Encourage learners to pull items from the shared table and replace them when finished, so others may use the items. Each learner or pair of learners gets a chunk of playdough to begin.
3. Learners shape the dough to create conductors, connect the batteries for a power source, and add any loads they wish to create an electrical circuit.
4. Learners can experiment with adding different parts of the circuit and creating different types of circuits. The educator can assign specific goals for the kinds of circuits created, if appropriate.

Some goals or challenges might include the longest wire of playdough that works, the most lights/loads, or the most parallel circuits created in one design.

5. Be creative! Circuits can be made into shapes of letters, animals, buildings, and much more.
6. Each time a successful circuit is completed, learners can record their results by drawing or writing their designs on paper.

Assessment

Learners should review the progress of their designs (recorded on paper or by video) and find examples of the targeted goals. The parts of the circuit can be labeled and explained. Learners can present their designs to others in the group and are encouraged to find similarities and differences between the designs.

Extensions

- A resistor dough can be made and added to the experiment to restrict the flow of the electricity and increase the complexity of the circuit. The same playdough recipe is used for the resistor dough, except sugar replaces the salt.
- Learners can record their procedure by making a stop-motion video of their circuit building by using a tablet application.

Explanation

In this activity learners are creating an electrical circuit, a closed loop through which electricity flows. Parts of a circuit include a power source, conductors, load(s), and a switch(es). The salt in the playdough acts as a conductor, similar to wires, for electricity to travel from the batteries. The dough can be molded in many ways to create shapes. In the case of the resistor playdough, salt is swapped out for sugar. This does not allow the electrons to move through the circuit, and instead limits or regulates the current.

Acknowledgements

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