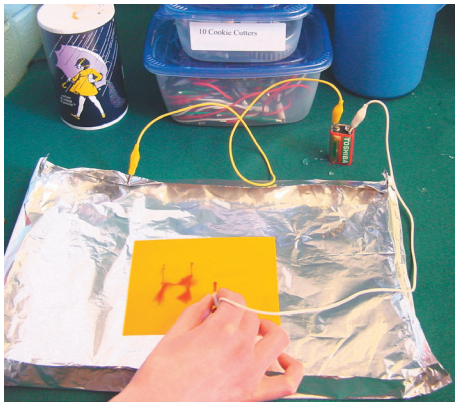
Writing With Electricity

Students will be able to brand designs and write on goldenrod paper while exploring electrochemistry.



Grade Level

- 4th - 8th

Science Focus

- circuit
- electrode
- electrolyte

Time Required

- 15 minutes

Supplies

There are enough supplies to run ten cooperative groups.

Per Cooperative Group

1 9V Battery
2 alligator clips
1 sheet of aluminum foil or 1 aluminum baking dish
1 uncoated metal cookie cutter
several sheets of goldenrod paper soaked in salt water

Doing the Activity

- Hook one end of the first alligator clip to the positive terminal of the 9V battery and then hook the other end to the aluminum foil or the aluminum baking dish
- Place a sheet of the salt water soaked goldenrod paper on the foil of in the bottom of the baking dish
- Take the second alligator clip and hook it to the negative terminal of the 9V battery
- Touch the other end of the second alligator clip to the goldenrod paper and write or draw on it. What happens? (The goldenrod paper turns red wherever the negative electrode touches it.)
- Attach the cookie cutter to the loose end of the second alligator clip and use it to press designs on the paper like a brand.
- Try switching how the alligator clips are attached to the 9V battery so you're reversing the polarity. What happens now? (The red marks move to the bottom side of the paper.)

Active Questioning, Explanation, and Discussion

1. What is going on? (Goldenrod paper has a chemical from the goldenrod plant used in the dye. Since the yellow part of this molecule is positive and is attracted to the negative electrode, it leaves the red part of the molecule in the paper. When you hook the up the alligator clips so you are writing with the positive electrode instead, the yellow part of

the molecule is repelled from the positive electrode and collects under the paper at the aluminum foil which is now the negative side, leaving the red part of the molecule in the underside of the paper.)

2. Will this work with dry goldenrod paper or goldenrod paper soaked only in water? (No. Dry paper or paper soaked in plain water are not good conductors, so the circuit is not completed or closed. Salt water is an electrolyte solution that allows the circuit to be completed and electricity to flow.)