ELECTRICAL ENGINEERING

ELECTRICAL ACTIVITY

Electrical Liquids

Materials

- cups
- 9V battery *(new for best results)*
- 9V battery snap with wires
- safety goggles *(1 for each student)*
- alligator clip wires
- 0.15A screw in mini lightbulbs
- plastic spoon, fabric, key
- salt and sugar (1 tablespoon)
- 2 large paper clips
- aluminium foil
- light bulb holder
- beaker
- 5 cent coins
- water, orange juice, Gatorade

Original Source: Discover Engineering

Instructions

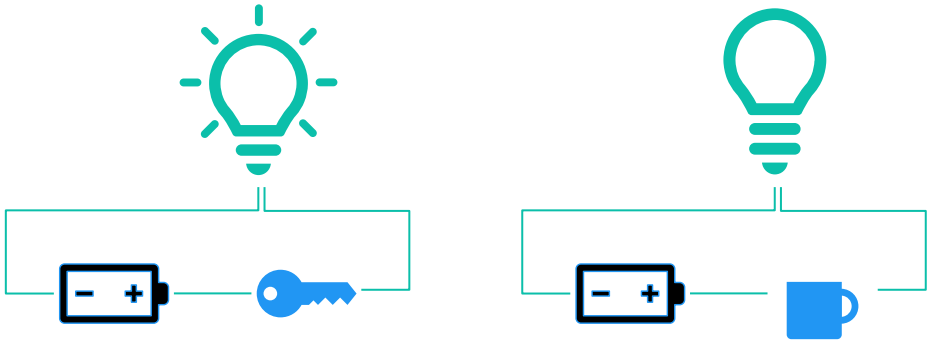
Students build an electrical circuit to test which liquids are conductive.

To set up this activity fill five (5) cups with the following liquids:

- 3 x water
- 1 x Gatorade
- 1 x orange juice

1. Add one (1) tablespoon of salt to one cup of water and one (1) tablespoon of sugar to the other.
2. Arrange students in groups and give each group a bulb, bulb holder, 9-volt battery, battery snap, and two wires.
3. Students need to create a circuit that will make the bulb light up. Work with groups to help as needed.
4. When students have their circuits working, give then a third wire and invite them to try adding other objects to their circuit: a coin, paper clip, a plastic spoon or other objects.

Explain to students the difference between conductors and insulators.



ACTIVITY

Electrical Liquids

ELECTRICAL ENGINEERING

Class discussion: Can a liquid be a conductor?

Explain that students will test liquids to see if they can conduct electricity. In order to do so, students will need to modify their circuit to create a conductivity tester.

1. Give each group two large paper clips and two small pieces of aluminum foil.
2. Wrap the foil around each paper clip so that it is completely covered (except for an end to attach a wire). These will be the testing "paddles" that can go in liquid so that the clips and wires don't get wet.

Safety - Keep all clips and wires dry. Never put electrical appliances or wires in water.

3. Attach the paddles to the end of the wires or use alligator clips. The paddles will serve as conductivity testers.
4. To confirm that the testers are working, touch the paddles together, the bulb should light up.
5. Write down a predication for each of the six testing liquids.
6. Place the tips of the paddle testers into each liquid and observe what happens to the bulb. Comparing the results with their predictions.

Testing guidelines:

- Demonstrate how to wipe off the testers between liquids.
- Ensure the paddles are not touching in the liquid. If they paddles touch the current will flow from paddle to paddle and is not testing the conductivity of the liquid.

Students should discover that the saltwater and Gatorade conduct electricity the best. Ask students to read the Gatorade product label. What does Gatorade contain that allows it to conduct electricity?