EXPERIMENT TIPS

Keep Your Ion the Ball

In this experiment students test the conductivity of a variety of beverages to see which ones contain a higher concentration of electrolytes, or salts. This experiment appears in the section *The Body Electric*.

Materials

- 6-volt battery
- two 8-inch pieces of coated wire (18-22 gauge) with ends stripped
- wire cutters
- electrical tape
- 1 jumbo super-bright LED (light-emitting diode) available from Radio Shack
- at least three beverages to test
- paper cups, one for each beverage

Safety First

- Students should be supervised by an adult while doing this experiment.
- Explain to students that electricity can be dangerous if it is not handled correctly, and emphasize that they should never experiment with the electricity that comes from a wall outlet. It is much more powerful than the electricity made by small batteries and could seriously injure or even kill someone.

Experiment Tips

Make sure students strip enough insulation from the ends of the wires to allow for good contact with the battery and the beverages. Remind them to wipe off the tips of the wires between each test.

Objective

Students will observe that drinks with a higher electrolyte concentration create better conductivity than those with a lower concentration. This will convey that keeping the body hydrated with electrolytes enhances the transmission of nerve impulses.

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EXPERIMENT TIPS

Getting It Across

Have students read the background and follow the steps listed. Make sure students understand that the drinks that make the bulb shine brighter do so because they contain more electrolytes (salts) like sodium and potassium. They should be able to make the connection between the bulb shining brightly and their own nerve impulses firing rapidly in their bodies when they are well hydrated with electrolytes.

Questions and Answers

Ask students to share their predictions and results. Were the results the same? If not, why not? *(Answers will vary. Be sure the experimental setup was not at fault.)*

1. Predict which beverage has the most electrolytes, and which has the least. Why do you think so?

Students' answers to the questions will vary depending on the beverages they choose to test.

2. Which beverages have a higher concentration of electrolytes? How do you know?

3. Which beverages have a lower concentration? How do you know?

Students may think that only salty tasting beverages will contain enough salts to make the bulb shine brightly, but this is not the case. Any beverage with sodium, potassium, magnesium, and/or calcium will make the bulb light up. Beverages with a higher concentration of these substances (such as orange juice and sports drinks) will conduct electricity better and should make the bulb shine more brightly than those with a lower concentration (such as water or tea).

This may be a good opportunity to teach students the concept of concentration, which is a measure of the amount of dissolved substance contained per unit of volume.

4. How were the results different from your prediction?

Students' answers will vary.