It's Electric

Objective
Students will understand the concepts of conductors and insulators.

Curriculum Focus
Science
Technology

Materials
(per team)

- Copy of "Student Sheet: It's Electric"
- Ruler
- Voltage meter
- Sandpaper
- 2 steel nails for electrodes
- 2 zinc nails for electrodes
- 2 pieces of copper wire with plastic removed for electrodes
- Fruits and vegetables: banana, apple, lemon, lime, orange, cucumber, carrot, potato and tomato

Key Vocabulary
Conductor
Insulator

Next Generation Science Correlations
MS-PS1 - 6
MS-PS2 - 3, 5
MS-PS3 - 1-5
HS-PS2 - 3, 5
HS-PS3 - 1-5
HS-PS3.A-D

Introduction

The following experiment illustrates the concepts of conductors and insulators. Students will discover which fruits and vegetables conduct the most electricity and learn about the properties of conductors and insulators.

Procedure

1. Explain to students that a conductor is a material that allows electricity to pass through easily. Examples include aluminum foil, wire and people. An insulator does not let electricity flow through easily. Examples are paper, plastic and rubber.
2. Divide the class into groups of students to work through the experiment.
3. Hand out the materials listed to each team.
4. Allow the students time to do the activity and answer the questions.
5. Discuss the students' findings as a class and what conclusions can be made from this information.

Conclusions

- The fruits and vegetables in this activity can conduct electricity.
- The electrodes react with the juice inside the fruits and vegetables to conduct electricity.
- The best electrodes are zinc and copper.
- The best fruit as a conductor is an apple.
- The best vegetable as a conductor is a carrot.
- The farther apart the electrodes, the more efficiently electricity is conducted.
- Zinc and copper on opposite sides of an apple yielded the best results

Student Sheet: It's Electric

Discover which fruits and vegetables conduct the most electricity and learn about the properties of conductors and insulators.

Materials

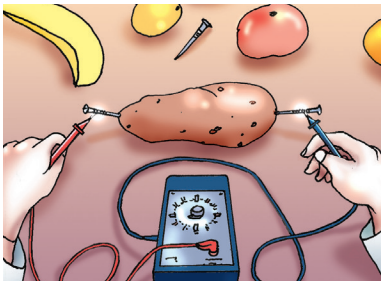
Ruler, voltage meter, sandpaper, two steel nails, two zinc nails, two pieces of copper wire, fruits and vegetables

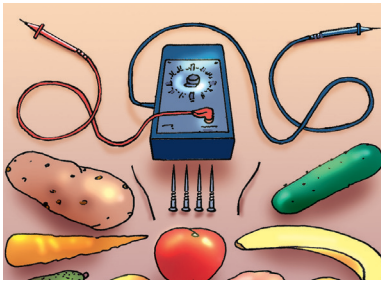
Procedure

1. Use sandpaper to file the tip of each nail and copper wire before the experiment begins.
2. Place one copper and one zinc electrode into a banana one inch apart.
3. Using the voltage meter, touch each electrode to measure the electricity and record the data in a table below.
4. Next use the copper/steel combination.
5. Repeat with the zinc/steel combination.
6. Repeat steps 2 to 5 with each fruit and vegetable.
7. Record all the data in the chart below.

Volts Measured from Fruits and Vegetables

		Electrodes		
		Copper/Zinc	Copper/Steel	Zinc/Steel
Fruits and Vegetables	Apple			
	Orange			
	Carrot			
	Banana			
	Lime			
	Tomato			
	Lemon			
	Potato			
	Cucumber			





Questions

1. Which fruit was the best conductor?
2. Which vegetable was the best conductor?
3. Why do you think certain items were better conductors than others?
4. What did you learn from the electrodes?