

Technology Idea: Fruit Electricity

Background:

The production of voltage from an electrochemical cell requires two different electrodes and an electrolyte. The electrolyte is often an acidic substance that attacks one or both of the electrodes, resulting in the movement of electrons.

As it turns out, many fruits contain naturally acidic juices that can serve an electrolyte. In this activity, you will use different fruits and a sensitive voltage sensor to investigate the ability of different fruits to produce voltage.

Question:

Can fruit produce voltage? Which fruits are the best at producing voltage?

Materials:

- voltage sensor and alligator clips
- USB link
- a variety of different fruits (lemon, orange, apple, pineapple, mango, etc.)
- 10 cm piece of thick bare copper wire
- ruler
- large paper clip, straightened
- connecting wires
- computer and data recording software (such as DataStudio)

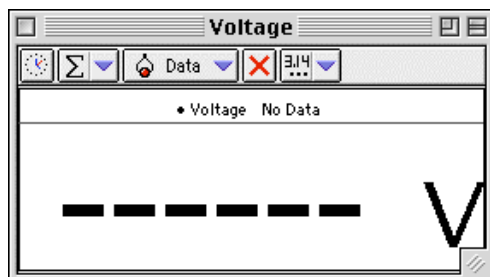
Procedure:

Step 1:

Obtain a voltage sensor, it looks similar to the picture below:



Plug the sensor into the USB link (that is connected to the computer or hand held data collection unit). If you are using a computer, set it up to collect voltage data on a digital display. For example, if you are using DataStudio software, your setup screen and display should look something like this:



Step 2:

Choose a fruit and stick the two straight pieces of metal (copper and paper clip) into the fruit. Stick them in to a depth of 2 cm, and keep the two metal electrodes 2 cm apart. Connect the leads of the voltage sensor to the metal electrodes.

Step 3:

Click "start" to begin recording voltage data in the DataStudio software. Record the maximum voltage produced by the fruit in an appropriate table.

Stop recording data, then repeat steps 2 and 3 for all the different types of fruit that you have available.

Analyze:

1. How much voltage did the different fruits produce? Which fruit produced the most voltage? Why?

Conclude and Apply:

2. Why is a piece of fruit capable of producing voltage?

Extension:

3. Try inserting the electrodes to different depths in the fruits. Record your results and explain your observations.
4. Try inserting the electrodes closer to each other or farther away from each other. Record your results and explain your observations.