



EXPERIMENTS



Building a Biomass Battery

Questions to ask: What is a battery?
Why are they so important to an energy grid with renewable energy sources?



Before You Build

This activity is great for **fourth through eighth grade students**. It can also make an excellent demo. Students can bring in metal and plastic objects from around the house to see how they do as electrodes then suggest combinations to make the battery produce electricity.



Supplies

- 1 fruit or vegetable with high water content per student (potatoes and lemons work well)
- 1 penny per student
- 1 galvanized screw per student
- Other metal objects (paper clips, pop can tabs, paper clips with plastic coating, etc.)
- 1 or 2 voltmeters or multimeters, so teachers can test the voltage of each student's battery

OBJECTIVE

Students will come away from this lesson with a **curiosity about electricity and batteries**. We will explore the ideas of direct current, as it is the electricity provided by renewable energy sources.



Pre-Questions

- Why does a computer need an adapter to be plugged in? What else needs an adapter? Can you think of something these devices all have in common?
- What makes a battery work? Can anything be a battery?
- What is the difference between electricity from a battery and electricity from the wall?
- Do some things make better batteries than others?

NOTE: If your school has rented a kit from NREL, the produce and pennies ARE NOT provided. Either the school or the students will need to provide these.

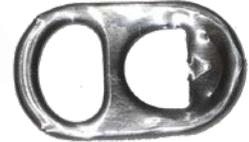
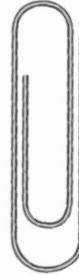


Learn more at: www.nrel.gov/about/energy-education.html



Experimental Procedure

1. Ask students to bring in small objects from around the house. Suggest paper clips, pop tops, plastic bottle caps, bobby pins, pennies, etc.
2. Have the students suggest combinations of electrodes for their batteries from the objects they brought in. (Example: Paper clip and bobby pin; penny and bottle cap).
3. Let the students insert their chosen objects into the potato or other produce.
4. Check the voltage of the battery by touching one electrode from the voltmeter to one object, and the other electrode to the other object. If the number on the voltmeter is negative, switch the electrodes.
5. Have the students record the object that is being touched by the red electrode and the object being touched by the black electrode.
6. Repeat with as many objects as students suggest.



Post-Questions

- Which combination produced the largest voltage?
- Which combination produced the lowest voltage?
- What would happen if we had the same metal for both electrodes?