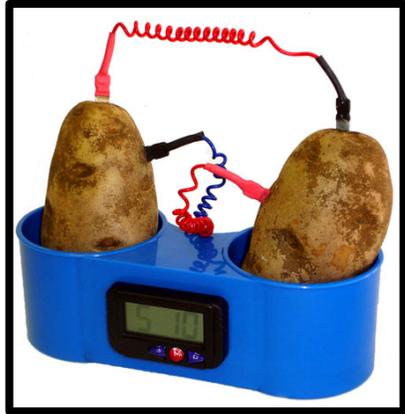
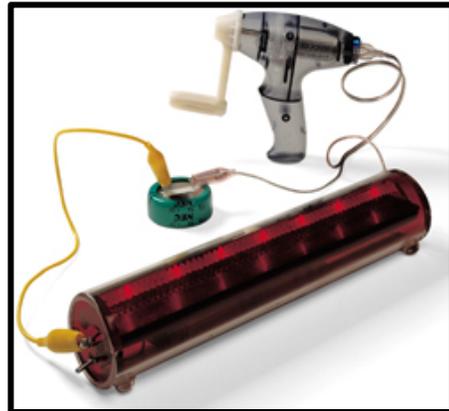


Fun with Electricity at

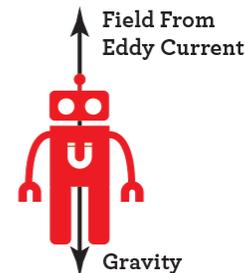
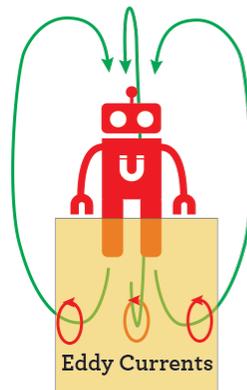
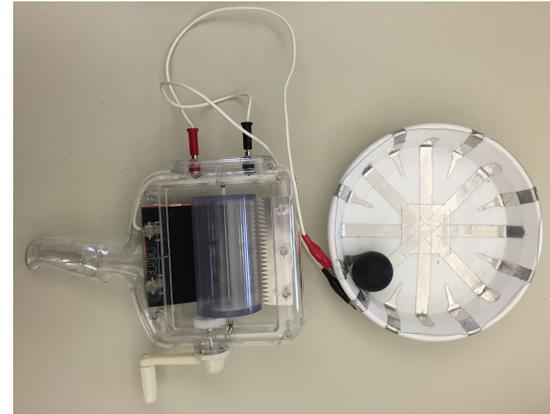


Generate electricity from potato and friction

Polarity of electric current

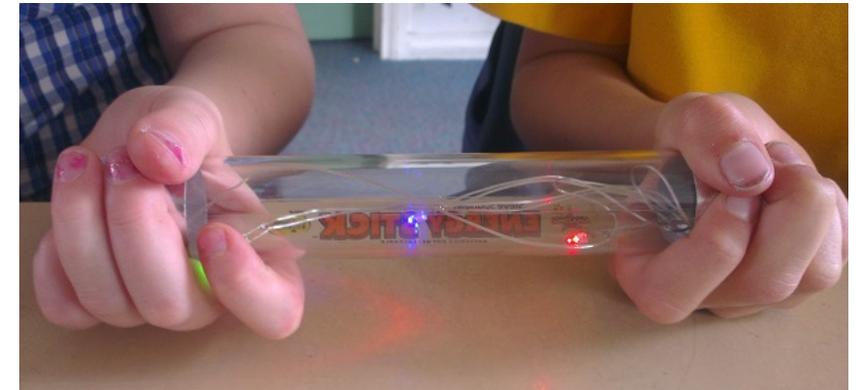


Accelerating a *big* particle

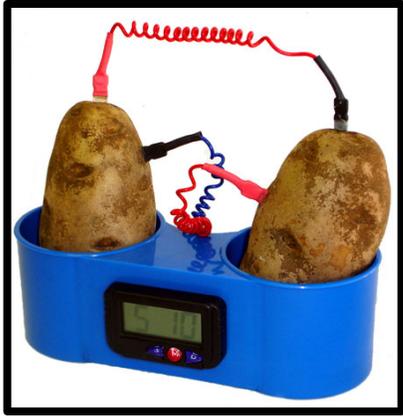


Eddy current

Human body as an electric conductor



Visit Fermilab Lederman Science Center to have fun with science



Setup

- 1) Place two potatoes in the container, one in each box as shown.
- 2) Identify the two wires which are attached to the clock, stick the metal strip at the end of wires into potatoes, one in each potato, as deep as possible but not to penetrate.
- 3) Connect the two potatoes with the loose BLACK wire by sticking the metal strip into potatoes.

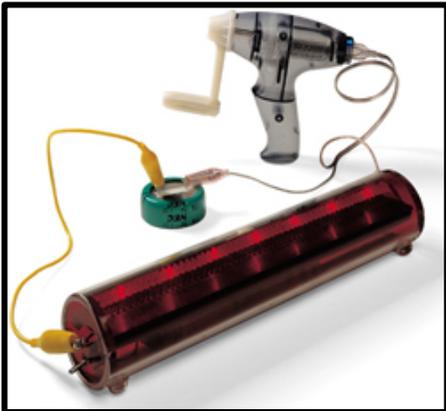
Important: on each potato, the two metal stripes should be copper-zinc (or yellow-silver color) combination, and stay away from each other even inside the potatoes.

Congratulations! “Potato” clock should start run

Science fact behind the potato clock (from about.com)

A potato battery is a type of [electrochemical cell](#). An electrochemical cell converts chemical energy into electrical energy. In the potato battery, there is a transfer of electrons between the zinc coating the galvanized nail that will be inserted into the potato and the copper wire that will be inserted another part of the potato. The potato conducts electricity, yet keeps the zinc ions and copper ions separate, so that the electrons in the copper wire are forced to move (generate current).

Static electricity is generated by rubbing two non-conductive materials (by contacting)



Setup and demonstration

- 1) Connect a light bulb, the current demonstrator (red tube), and a hand generator into a closed circuit as shown.
- 2) Switch on the tube. Red LED lights in the tube is to show charged particles exist in the wire even when there is no current flow. **Important: switch off the tube if it is not in demonstration.**
- 3) Invite a student to roll the handle to light the bulb. Notice that the simultaneous and directional flow of current (polarity).

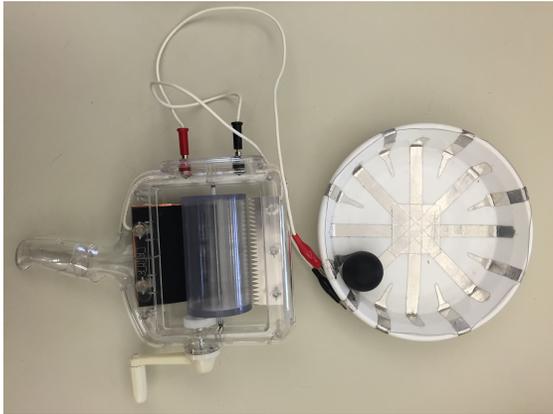
Questions: can we reverse the polarity of the current in the circuit?



Safety on static genecon

- 1) **NO touch the output terminals or the clips of the output cables when in operation**
- 2) Do not turn the handle at high speed forcedly
- 3) Not to spill water on the felt surface

Static electricity is generated by rubbing two non-conductive materials (by contacting)



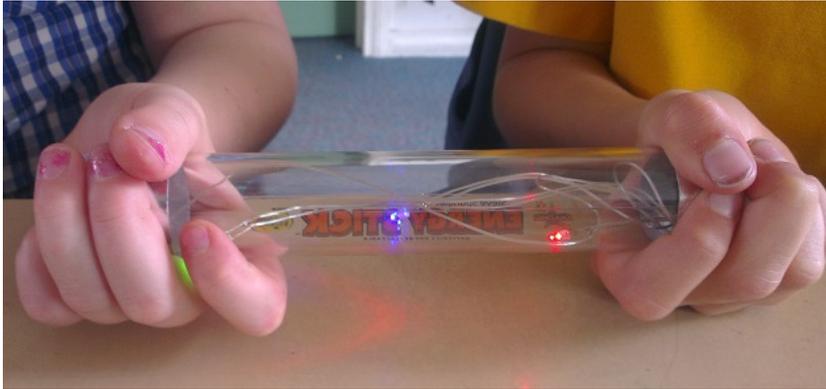
Setup and demonstration

- 1) Connect hand generator with the plate as shown.
- 2) Invite a student to roll the handle continuously and you can observe that the “particle” will start rotating.

Explanation:

Static charges from hand generator are applied on the alternating metal strips on the plate: one set is connected together in the center and another set is connected by a metal wire on the edge. One set of the strips carries positive charges and another set carries negative charges. When the “particle” (ball) touches a strip with negative charges, it becomes negatively charged and is pulled toward the next strip, which has positive charges. When the “particle” is pulled to touch the positively charged strip, it becomes positively charged and is pulled further towards the next strip, which has negative charges. By doing so, the “particle” will make circular rotation.

Additional demo: can we reverse the rotating direction of the “particle”?



Setup and demonstration

- 1) Invite two or more students to participate.
- 2) Ask everyone to join hands and form a circle.
- 3) Break the circle at one point and have the two to grab either end of the “energy stick”. **See what happens? Energy stick should flash and buzz**
- 4) Break the circle at a different point, energy stick should be off.
- 5) Try to invite more people to join the circle.

Explanation:

The energy stick is a sensing circuit and can detect small amount of electricity travel across your skin. Human body is a conductor. When we close the circle with the energy stick, we have a complete circuit and a small and absolute safe current flows through everyone’s body. The energy stick is on. When we break the circle at any point, the circuit is open and energy stick is off. We are making a human switch!