

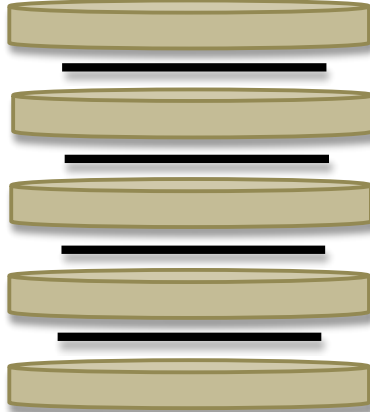


A “Centsible” Battery

What materials can a battery be made out of?

1. Cut four squares, each approximately 1 cm x 1 cm.
2. Dampen the squares in the salt-vinegar solution.
3. Select four sanded pennies and one unsanded penny.
4. Stack the pennies and dampened cardboard pieces as shown:

unsanded penny
cardboard
sanded penny
cardboard
sanded penny
cardboard
sanded penny
cardboard
sanded penny



- Make sure
- The sanded sides of the pennies are all face up.
 - Pennies do not touch
 - An unsanded penny is on the top of the stack.

5. Connect the bulb by touching one of the leads to the top of stack and one to the bottom. [Hint: If the bulb doesn't light, try reversing its leads. Also make sure the leads don't touch any other layer and that the solution isn't dripping off the cardboard.]

Other things to investigate:

- Can you make the battery work with fewer pennies? What happens if you use more pennies?
- How does changing the number of pennies in the stack change the way the battery works?
- Compare different combinations to see which ones work and which ones do not (penny-nickel, penny-dime, nickel-dime, nickel-quarter, penny-quarter)
- Why is it important that the battery be made with alternating layers? See what happens if the layers are arranged differently.
- How long will this battery work? How could you recharge it?

What's going on?

How does a voltaic pile make electricity? The key to electricity is the movement of electrons. In the penny battery, electrons move from one metal to another through the salt-vinegar solution (an electrolyte). This happens because when two different metals are connected by an electrolyte, a chemical reaction occurs at each of the metal surfaces. This reaction either produces or uses electrons. When the two surfaces are connected by a wire, the electrons will move from surface to surface, creating the pathway for an electric current.

Please turn card back over when finished