

Batteries

Name _____

Phenomenon:



Lithium-ion
battery



Lead-acid
battery



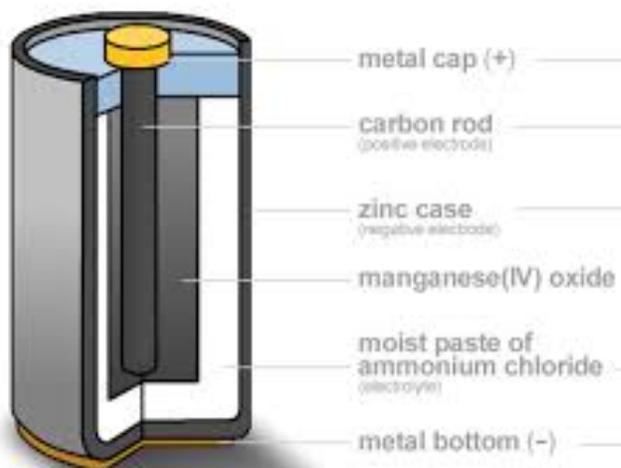
Nickel-metal
hydride
battery



Lithium



Alkaline
battery



What do you notice?

What questions do you have?

Guiding question: Which substances inside a battery produce the most electricity?

Materials: [Metal strips](#), 2 leads (wires with clips on end), a beaker, a voltmeter, a light bulb, a variety of liquids (salt water, weak acid (lemon juice), baking soda, and water solution).

Procedures:

1.
2.
3.
4.
5.

Drawing of your experimental design:

Data:

Which internet resources did you lookup? (Use the name of the page)

Model:

Draw your experiment again and describe what you think is happening at the atomic level.

Choose a battery type to research from the list below.

Each student should choose a different battery type. Claim your battery and support it with three evidence statements from your research. Remember that our question was, "Which substances inside a battery produce the most electricity?" Explain your reasoning in the next paragraph. Remember that several characteristics define a good battery.

CER Paragraph:

Claim:

Evidence:

Reasoning:

Review your paragraph based on comments from your group. Rewrite if necessary.

Battery Types:

Primary Cells or Non-Rechargeable	Secondary Cells or Rechargeable
<ul style="list-style-type: none"> ● Alkaline battery (zinc manganese oxide, carbon) ● Aluminum–air battery ● Atomic battery ● Bunsen cell ● Chromic acid cell (Poggendorff cell) ● Clark cell ● Daniell cell ● Dry cell ● Earth battery ● Frog battery ● Galvanic cell ● Grove cell ● Leclanché cell ● Lemon/potato battery ● Lithium battery ● Lithium-air battery ● Magnesium battery ● Mercury battery ● Molten salt battery ● Nickel oxyhydroxide battery <ul style="list-style-type: none"> ○ Oxyride battery ● Organic radical battery ● Paper battery ● Pulvermacher's chain ● Silver-oxide battery ● Solid-state battery ● Sugar battery ● Voltaic pile <ul style="list-style-type: none"> ○ Penny battery ○ Trough battery ● Water-activated battery ● Weston cell ● Zinc-air battery ● Zinc–carbon battery ● Zinc chloride battery 	<ul style="list-style-type: none"> ● Aluminum-ion battery ● Carbon Battery ● Flow battery <ul style="list-style-type: none"> ○ Vanadium redox battery ○ Zinc–bromine battery ○ Zinc–cerium battery ● Lead-acid battery <ul style="list-style-type: none"> ○ Deep cycle battery ○ VRLA battery ○ AGM battery ○ Gel battery ● Glass battery ● Lithium-ion battery <ul style="list-style-type: none"> ○ Lithium-ion lithium cobalt oxide battery (ICR) ○ Lithium-ion manganese oxide battery (IMR) ○ Lithium-ion polymer battery ○ Lithium iron phosphate battery ○ Lithium-sulfur battery ○ Lithium–titanate battery ○ Thin-film lithium-ion battery ○ Lithium ceramic battery ^[5] ^[6] ● Magnesium-ion battery ● Metal–air electrochemical cells <ul style="list-style-type: none"> ○ Lithium-air battery ○ Aluminum–air battery ○ Germanium air battery ○ Calcium air battery ○ Iron air battery ○ Potassium-ion battery ○ Silicon–air battery ○ Zinc-air battery ○ Tin air battery ○ Sodium-air battery ○ Beryllium air battery ● Molten salt battery ● Nickel-cadmium battery ● Nickel hydrogen battery ● Nickel–iron battery ● Nickel metal hydride battery <ul style="list-style-type: none"> ○ Low self-discharge NiMH battery ● Nickel–zinc battery ● Organic radical battery

- | | |
|--|---|
| | <ul style="list-style-type: none">● Polymer-based battery● Polysulfide bromide battery● Potassium-ion battery● Rechargeable alkaline battery● Rechargeable fuel battery● Sand battery● Silicon air battery● Silver-zinc battery● Silver calcium battery● Silver-cadmium battery● Sodium-ion battery● Sodium–sulfur battery● Solid-state battery ^[7]● Super iron battery● UltraBattery● Zinc ion battery |
|--|---|