**NOTES 8.1: Electric Potential Energy and Voltage**

**Electric Potential Energy**

**Energy:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Potential Energy:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Batteries \_\_\_\_\_\_\_\_\_\_\_\_\_ electric potential energy.

A battery is defined as one or more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells connected together.

An \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cell converts \_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy into

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.

**Electric Potential Difference**

Another name for “Electric Potential Difference” is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is defined as the amount of \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ per \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of charge.

The unit for \_\_\_\_\_\_\_\_\_\_\_\_ is the **volt** (V).

An instrument called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is used to measure voltage.

****Voltage is named after a man named \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ who invented the first modern electric battery (the voltaic pile as shown below).

**ANALOGY #1 – Weights and Pie Plates**

* What does height represent? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What does amount of mass represent? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* What does the amount of sound produced represent? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **DEMO #1 (Same masses, different height)**

**Diagram (draw what you see)**

|  |
| --- |
|  |

* + When the weights are dropped from different heights, which height generates the louder sound? HIGHER / LOWER (circle one)
  + When electrons travel in a circuit, which voltage allows electrons to release the most energy? HIGHER / LOWER (circle one)
* **DEMO #2 (Same height, different masses)**

**Diagram (draw what you see)**

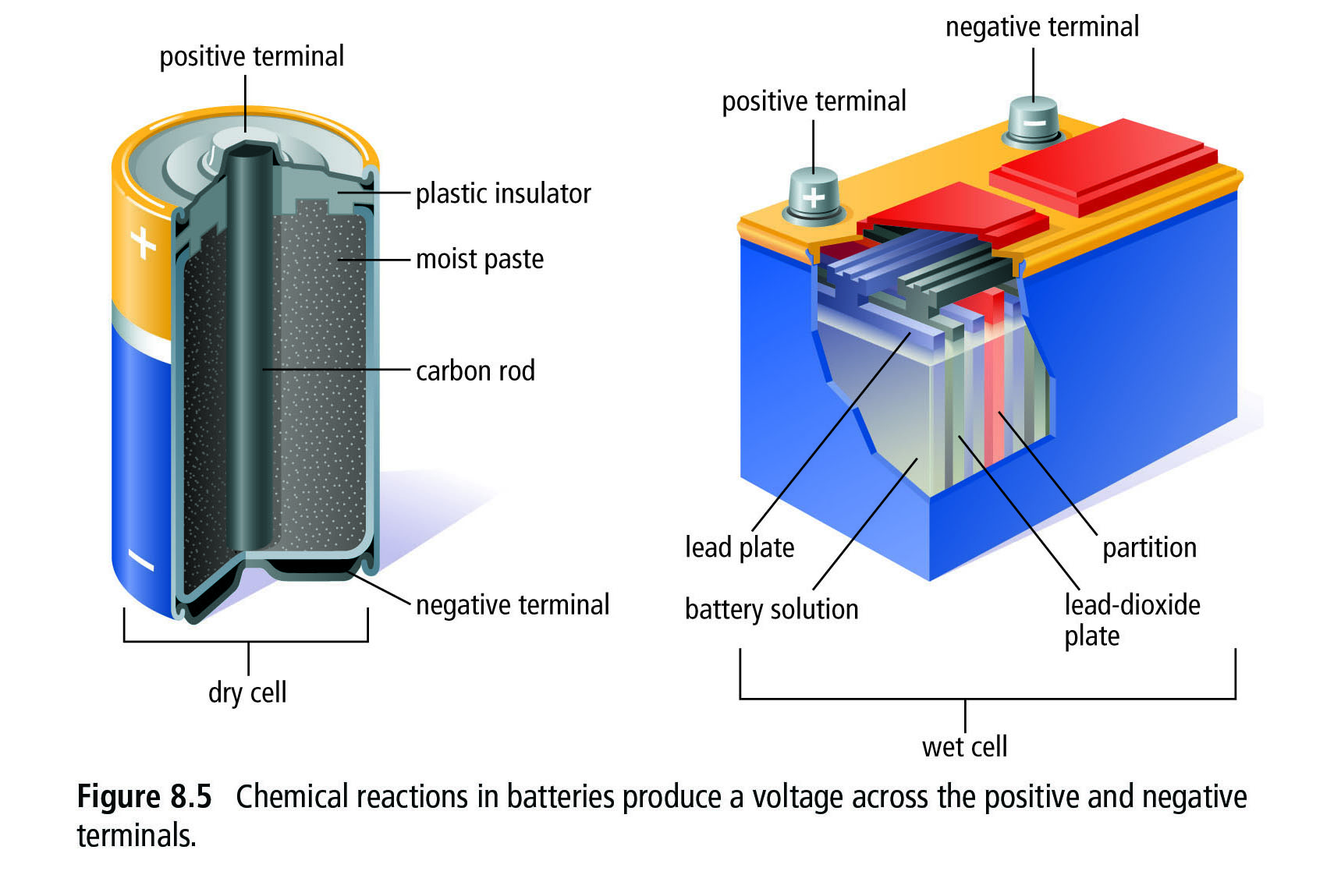
|  |
| --- |
|  |

* + When different weights are dropped from the same height, which weight generates the louder sound? HEAVIER / LIGHTER (circle one)
  + When electrons travel in a circuit, which amount of charge allows the most energy to be transferred? LARGER / SMALLER (circle one)

**ANALOGY #2 – Man on Stairs**

|  |  |
| --- | --- |
|  | * Guy in **A** has built up ***potential energy*** * Guy in **B** has built up **more** potential energy because he has done more work by moving more mass (the backpack) to the same height * Potential difference in battery = \_\_\_\_\_\_\_\_of the stairs (***volts***) * Amount of charge separated in a battery = \_\_\_\_\_\_ of the guy (***coulombs***) |

**Producing Potential Difference**

An ***electrochemical cell*** works by producing a potential energy difference between the +ve and –ve terminals. Because of this, electrons want to flow from the +ve terminal to the –ve terminal.

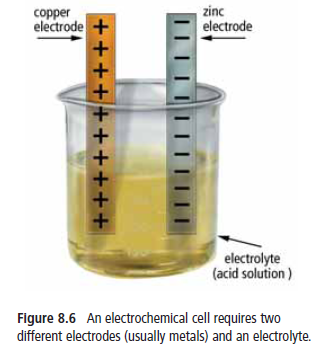
There are 2 types of ***electrochemical cells***: \_\_\_\_\_\_\_ cells and \_\_\_\_\_\_\_.

These cells convert \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy.

**How do electrochemical cells produce voltage?**

Battery terminals- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(usually two different metals) sit in a substance (paste or fluid) called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** that conducts electricity.

* Electrolyte pulls atoms off zinc which leave electrons behind on the zinc electrode – allows \_\_\_\_\_\_\_\_\_\_\_\_ charge to build up
* At same time chemical reactions with copper electrode pull electrons off the copper electrode- allows build-up of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Electrodes become oppositely charged which results in a potential difference (voltage) between the two electrodes.
* Most electrochemical cells produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A 12 V car battery may have eight 1.5 V cells connected together



**Other Sources of Electrical Energy**

What other sources of electrical energy exist other than batteries? Read pg. 274 to find out! Five sources of electrical energy are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
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**Complete Textbook Pg 279 #1-8**