

# **Electrical Energy**

9/22/14

# **Exam 1**

78.5 % average

23 A's!!!

Top score: 103

# Energy Flow Worksheet



# Lion Eats the Sun



What do you notice about batteries?



# Contacts have opposite charges

Caused by a chemical reaction inside. Once the reactions are complete, the battery is dead.





# Contacts have opposite charges



Which end are electrons attracted to?

- A. +
- B. -
- C. Both
- D. Not enough info

# Contacts have opposite charges



Electrons are attracted to +



Electrons are repelled by -



# PhET - CCK

Circuit Construction Kit (AC+DC) (3.20)

File Options Help

Grab Bag

Wire

Resistor

Battery

Light Bulb

Switch

AC Voltage

Capacitor

Inductor

**Circuit**

Save Load

**Visual**

Lifelike  Schematic

Show Values

**Tools**

Voltmeter

Ammeter(s) 0.00 Amps

Non-Contact Ammeter

Stopwatch

Current Chart

Voltage Chart

**Size**

Large

Medium

Small

**Advanced**

Show >>

Reset Dynamics

Reset All

Help!

Play/Pause

# Bottom line

- **Current** is *flow of electrons* caused by opposite charges attracting and repelling.
- **Resistance** is *friction* acting on the electrons.

That's it!

# Intermission

## Gravitational Potential Energy $U_g$

$$mgy$$

$m$  = mass (in kilograms)

$g$  = acceleration due to gravity (9.8 m/s<sup>2</sup>)

$y$  = height

Joe has a mass of 75kg and climbs up on a desk 1 m off the floor. What is his gravitational potential energy with respect to the floor?

$$U_g = 75 \text{ kg} \cdot 9.8 \text{ m/s}^2 \cdot 1 \text{ m} = \mathbf{735 \text{ J}}$$

# Intermission

## Power

$$P = \text{energy/unit time}$$

Let's say it took Joe 1.5 seconds to get up on that desk.  
How much power did he exert?

$$P = 735 \text{ J} / 1.5\text{s} = \mathbf{490 \text{ W}}$$