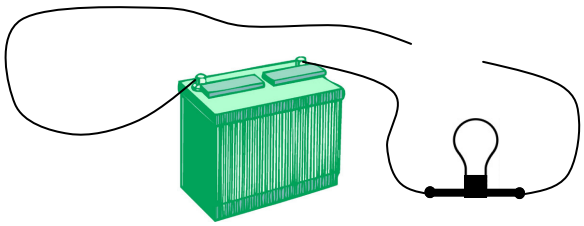
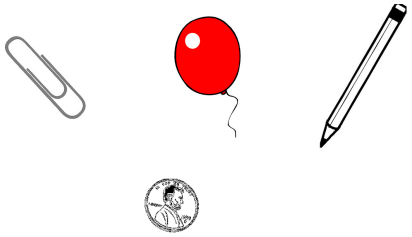
Due: Fri., Dec 16

2011-12 PreAP Circuits 2

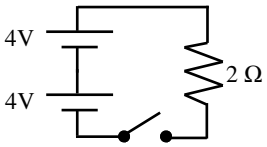


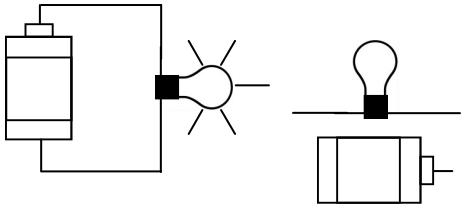
Car battery



1. A. Will the light bulb light up or not (*as it is right now*)?
   B. Why or why not?
   C. Is it an open or closed circuit?
   D. Which of the objects would complete the circuit?
   E. Will the light come on if you touch the two pieces of wire together?

2. Use the circuit at the right to answer the following questions.
   A. As drawn right now, is it an open or closed circuit?
   B. With the switch is closed, what is the current in the circuit?





From the Lab:

3. Given only the equipment shown at the left, what would you add to...

   A. increase resistance?
   B. increase brightness?
   C. increase voltage?
   D. decrease current?
   E. increase current?
   F. decrease brightness?

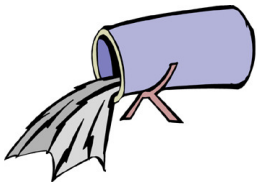
So, from what you saw in the lab: Electricity is like water. Voltage is the push from a pump. Current is how much water flows. Resistance is a restriction in the pipe (like kinking a water hose) or like a dam holding back water.

4. Imagine a large flexible bag filled with water. When would it give more voltage if you pushed on it with your hands or if you sat on it?

5. Which has more voltage: a water hose with a nozzle on it, or without?

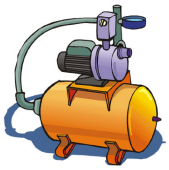
6. Compare the slow moving Mississippi river and a fire hose.
   A. Which one has more voltage (push)?
   B. Which one has more current (water flowing)?

7. Which would have more resistance for water: a large water hose (big opening) or a small water hose?



M

N



O

P

Q

R

8. Use the pictures above to answer the following:

   A. ___ Which has more voltage, the water from the large bucket (M) or the hose (N)?
   B. ___ Which would fill a container first: M or N?
   C. ___ Which has more current: M or N?
   D. ___ Which would have more voltage: the air compressor (O) or the bike pump (P)?
   E. ___ If they were both hooked up to the same size hose, which would give more current: O or P?
   F. ___ Which has more resistance: Q or R?
   G. How could you get the same current thru Q as thru R?

In the lab you should have noticed that doubling the number of batteries (doubling the voltage) doubles the brightess (which is current thru the light bulb). So, the current (I) is proportional to the voltage (V). Also, you noticed that doubling the resistance (R, which is number of light bulbs) decreases the brightness (I). So, current is inversely proportional to the resistance. Which gives us the following equation, known as Ohm's Law:

9. 4 volts pushes thru a 2 ohm resistor. How much current flows?

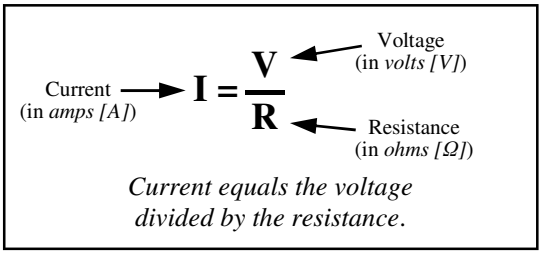
10. 8 volts pushes thru the same 2 ohm resistor. How much current flows?

    (See: *Current is proportional to Voltage. If one doubles, the other doubles*.)

11. 4 volts pushes thru a 4 ohm resistor. How much current flows?

    (*Comparing Q9 and Q11: Current is inversely proportional to Resistance. If R doubles, I halves*.)

12. 0.73 amps flow thru a 15Ω resistor. How much voltage does the resistor use?



Current equals the voltage divided by the resistance.