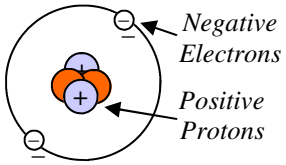
PreAP Circuits 1

Electricity

Electricity is moving electrons; Protons can't move.

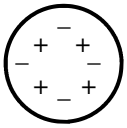
Electrons can move, but protons are held together in the nucleus by the strong nuclear force, the strongest force in nature.



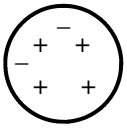
Electricity comes from electrons moving between atoms.

Charge

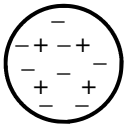
Objects can be positive, negative, or neutral. The unit of charge is the ***coulomb*** (C).



A neutral object has an **equal amount** of protons and electrons.



A positive object has **lost electrons**, so it has more protons than electrons.



A negative object has **gained electrons**, so it has more electrons than protons.

1. Obviously batteries cause electricity, but when you hook up a battery to a light bulb what is actually moving in an electrical circuit?

2. Why can't protons move?

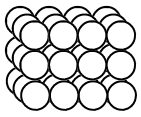
Conductors are materials that allow electrons to flow thru them because the outer most valence electrons are free to move. Insulators are materials that do not allow electrons to flow easily. Electrons can still flow thru an insulator, it is just harder and would require more force.

3. Electrical conductor or insulator?

A. ____ Rubber B. ____ A paperclip C. ____ Paper D. ____ Aluminum

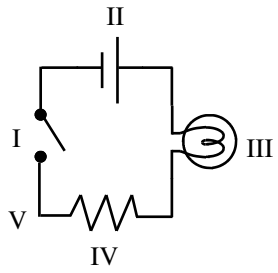
4. An object that is a good insulator is a poor c_____. An object that is a good conductor is a poor i _____.

The picture at the left shows a lattice, which is a reoccurring structure. The picture at the right shows molecules in the solid phase of matter. In a solid the molecules are locked in a repeated pattern known as a crystal lattice. "Crystal" means it has a repeated, regular pattern.



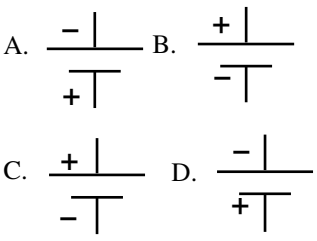
5. In a insulator the v_____ electrons are easy or hard to remove?
6. In a conductor the electrons are _____ to move thru the crystal lattice.

Look at the symbols in the table at the right.



7. Identify the symbols on the diagram at the left.
Object I is a:
Object II is a:
Object III is a:
Object IV is a:
Object V is a:

Electrical Device	Symbol
wire	
battery	
light bulb	
switch	
resistor	
capacitor	



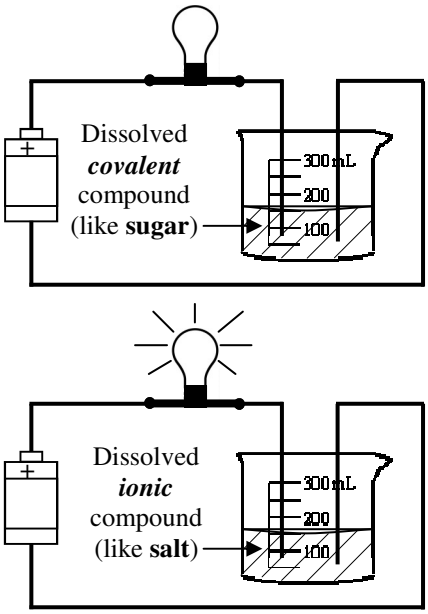
8. Which side of a battery is the positive side: the long line or the short line?
9. Which of the four pictures at the left are correct?
10. What is the difference between the symbols for a capacitor and a battery?

More on back

11. As seen in the diagrams at the right, sugar and salt are dumped into water and disappear (called d_____).

    A. Can the salt or sugar be filtered out of the solution (can a filter be used to get them out)?
    B. Which type of compound is due to atoms sharing electrons: ionic or covalent?
    C. Which of two solutions is an electrical conductor?
    D. How do you know?
    E. If magnesium oxide where dissolved, would it be a conductor or insulator?

    Turns out that pure water is not a good conductor and salt water is.



12. A jewel thief has two fish tanks in his house, neither of which have fish in them. Supposedly, the thief hides his jewels in one of the tanks. As you look, you notice that both of the tanks have little treasure chests at the bottom. Just before you reach in to the first tank, you notice electric wires lying in the water, so you quickly pull your hand out. Upon closer inspection, you see that the right tank has residue on the sides, which turns out to be salt. The left tank has no salt residue on the sides. Which tank probably has the jewels in it and why?