B-Day: Due Mon., Feb 8
A-Day Due Tues., Feb 9

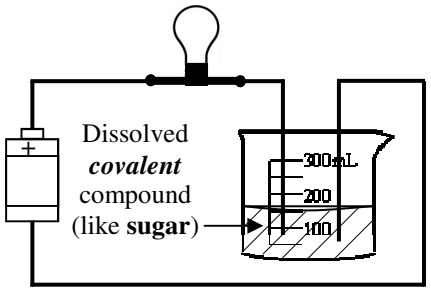
2009-10 PreAP Circuits 1

Just as with heat a conductor allows electricity to flow and insulators resist the flow of electricity.

1. Electrical conductor or insulator?

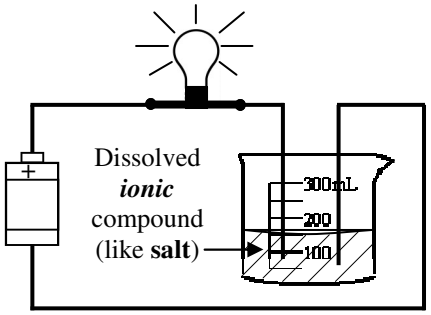
   A. ____ Rubber C. _____Paper
   B. ____ A paperclip D. _____Aluminum

2. 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.

3. A jewel thief has two fish tanks in his house, neither of which have fish in them. Supposedly the thief hide 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 each in you notice electric wires laying in the water, so you quickly pull back. 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 in it. Which tank probably has the jewels in it and why?



4. A 12 volt battery pushes against a 4 Ω resistor. How much current flows thru the circuit?

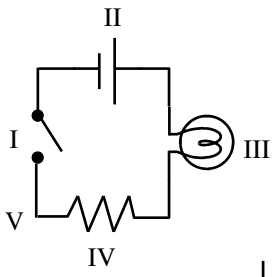
5. How much resistance is in a circuit that has a 6 volt battery and 0.5 amps flowing?

Current (in *amps [A]*) → $I = \frac{V}{R}$ ← Voltage (in *volts [V]*)
Resistance (in *ohms [Ω]*)

Current equals the voltage divided by the resistance.

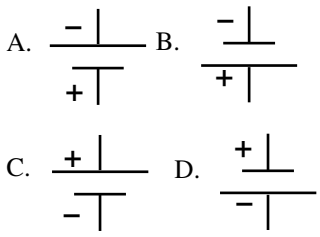
From the "Circuits and Symbols" notes:

6. Electricity flows thru _____ circuits made up of c_____. If there is a break anywhere in the circuit, it is an _____ circuit and electricity will not flow.



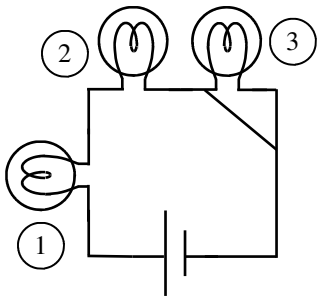
7. Identify the symbols on the diagram at the left (could be more than one).

A. _____ A light bulb	F. _____ Pushes electricity.	K. _____ Like a water pump.
B. _____ A wire.	G. _____ Resists electricity.	L. _____ Is like a pipe.
C. _____ A battery	H. _____ Is a low resistance path.	M. _____ Is like a water faucet
D. _____ A switch	I. _____ Turns electricity on and off	
E. _____ A resistor	J. _____ Like pinching off a hose.	



8. Which side of a battery is the positive side: the long line or the short line?

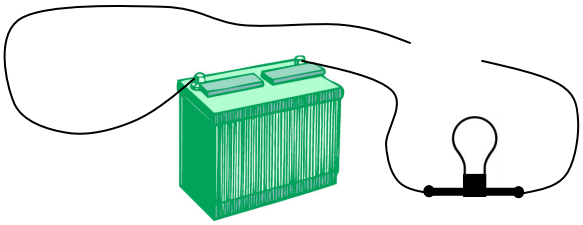
9. Which of the four pictures above are correct?



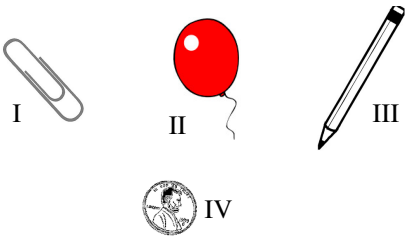
10. What is a short-circuit?

11. Why are short-circuits bad?

12. Use the circuit at the left to answer the following.
    A. Which of the light bulbs will not light?
    B. Why or why not?



Car battery

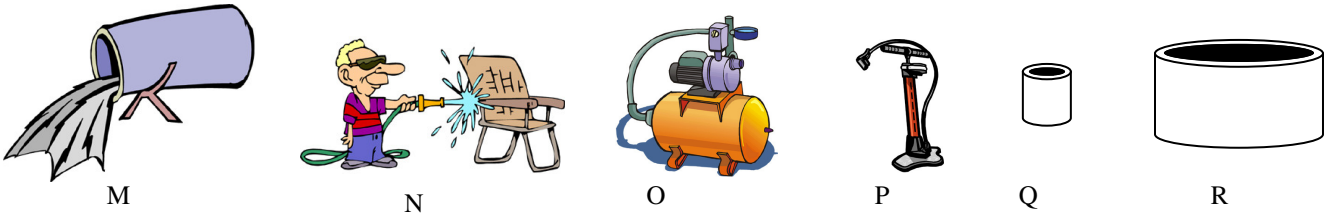


13. A. Will the light bulb light up or not? B. Why or why not?
C. Is it an open or closed circuit? D. Which of the objects would complete the circuit?
E. Will the light come on if you touch the two pieces of wire together?

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. You can't change the current directly, but current can respond to your changing the voltage or the resistance. You can have a lot of voltage and little current: think of a dentist's water pik—it shoots very hard, but would take a long time to fill a cup.

14. Imagine a large flexible bag filled with water that has a hole it in. When would it give more voltage: if you pushed on it with your hands or if you sat on it?

15. 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)?



16. Use the pictures above to answer the following: (See notes: "*Voltage, Current, and Resistance*")

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?

17. Voltage (V), Current (I), or Resistance (R).

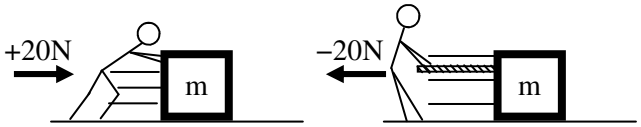
A. ___ Flowing electrons.
B. ____ Pushes electricity in circuits.
C. ____ Like a water pump.
D. ____ Measured in Ω.
E. ____ Measured in A.
F. ____ How much water flows.
G. ____ A battery gives this.
H. ____ Slows down current in a circuit.
I. ____ Measured in V.
J. ____ 12 ohms
K. ____ 36 volts.
L. ____ 5 amps.

18. Voltage (V), Current (I), or Resistance (R)?

A _____ If you increase resistance what decreases?
B._____ If you increases voltage what increases?
C._____ If the current decreased what increased?
D. _____ If current increased what increased?
E. _____ If current increased what decreased?
F. _____ If resistance is decreased, what increases?
G. _____ More batteries will increase these two quantities.
H. _____ More light bulbs will increase this.

Because we didn't have homework last time, we have to catch up on the TAKS stuff. Sorry.

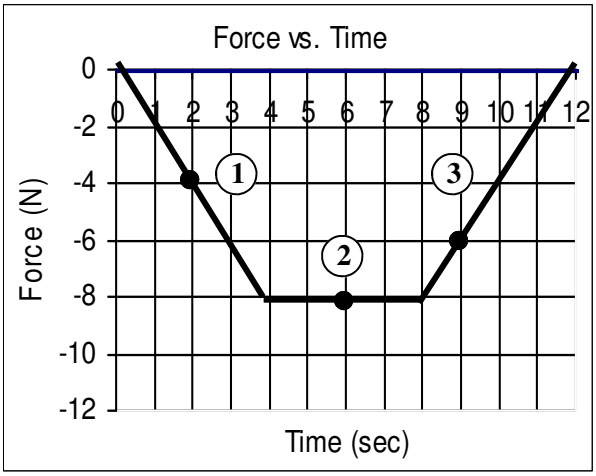
TAKS: Predicting trends and making inferences from data and graphs. Be sure to actually read the data (not just the shape). If a graph is given the answer is actual on the graph.



Positive Force, the object speeds up.

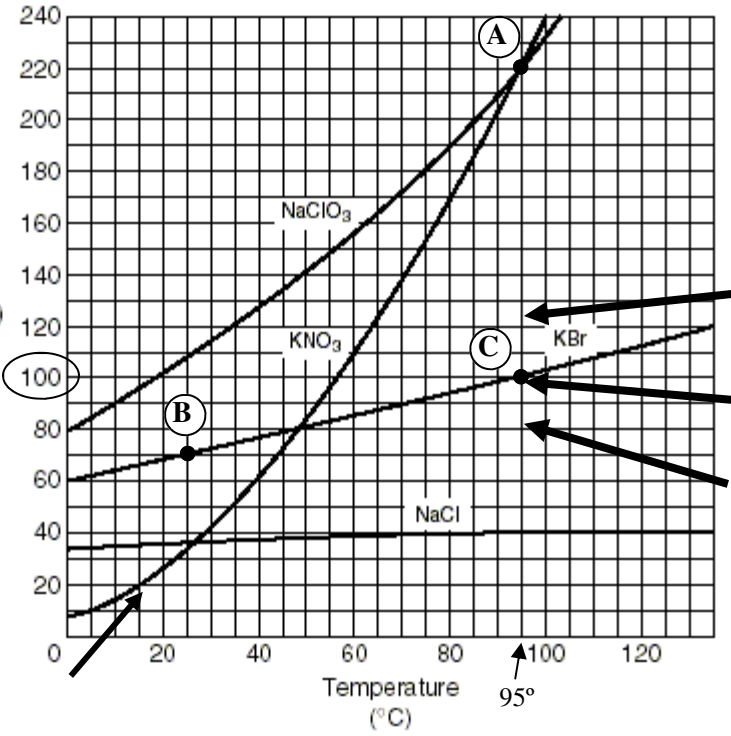
Negative Force, the object slows down.

Notice above the difference between positive and negative forces.



19. Use the graph at the left to answer the following.
    A. Looking at circle 1:
        i. Is circle 1 a positive or negative force?
        ii. How much force is acting?
        iii. Is the object speeding up or slowing down at this point?

    B. Looking at circle 3:
        i. How much force is acting?
        ii. Is it a positive or negative force?
        iii. Is the object speeding up or slowing down at this point?



How much of a substance can be dissolved in water.

Above the line = supersaturated

On the line = saturated

Below the line = unsaturated

At 95°C, 100 g of water can hold 100 g of KBr. 110 g would be super-saturated; 90 g would be unsaturated.

The above solubility graph has been on the TAKS test a couple of times. Don't be confused by all of the lines. There are multiple lines for you to be able to compare the four compounds. Take the time to read the graph and you will notice it is not so hard to read. The following gives the sequence you should use with a new graph.

20. A. What is the x-axis variable?
    B. What is the y-axis variable?
    C. Which compound does not seem to be affect much by temperature?
    D. Which compound is most affected by temperature?
    E. At which temperature does NaCl and KNO_3 have the same solubility?
    F. Which of the following statements can be supported by the graph?
        i. As the temperature increases water can dissolve less table salt.
        ii. If the water is stirred more salt is able to be dissolved.
        iii. Between 0°C and 40°C KNO_3 has the greatest increase in solubility.
        iv. Smaller particles of $NaClO_3$ causes faster dissolution.

Time (sec)	Distance (m)	difference
0	0	
0.5	1.6	
1	3.2	
1.5	4.8	
2	6.4	

When finding trends in data often you must calculate the trend.

21. Use the data table at the left to answer the following.

    A. Next to the graph, calculate the difference between each set of data (between each set of distances).

    B. Does the amount of distance traveled each second increase, decrease, or stay constant?

    C. If the object's motion does not change, how far will it have travelled in 3 seconds? (*To answer this, continue the table by writing your own rows below and following the trend.)*

Continue the table on your own.