A-Day: Due Fri., Jan 22
B-Day: Due Mon., Jan 25

2010 Electricity 2

Name: _____

1. Find the number of electrons gained or lost by a –7.3 coulomb object.

2. How much charge do 6.5 x 10^8 electrons have?

3. A. A 4.5μC charge and a 6.2μC charge are 4.2 mm away from each other.
   Find the electric force between them.

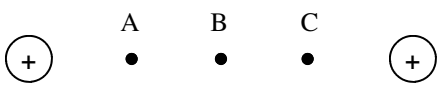
   B. Is the above force attractive or repulsive?

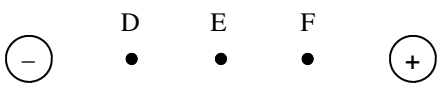
4. Electric force will increase or decrease?
   A. _____If the distance between two charges decreases.
   B. _____If both of the charges decreases.
   C. _____If the distance increases.
   D. _____If q_1 increases.

5. Let's understand how charge and force affect the electric force between two charges. In the following table calculate the electric force for each of the situations. Leave kc in your answer. This is for comparison, so you don't need to fully calculate your answer.

Situation	q_1 =	q_2 =	r =	F = (keep k_c in the equation)
1. control	1	1	1	$F_e = k_c \frac{q_1 q_2}{r^2} = k_c \frac{1(1)}{1^2} = k_c \frac{1}{1} = 1k_c$
2. double the charge	2	1	1	
3. half the charge	1	0.5	1	
4. double the distance	1	1	2	
5. half the distance	1	1	.5	

6. Use the information you just collected to answer the following.
   A. If the distance between two charges doubles, by how much does the force change?
   B. If the charge doubles, by how much does the force change?
   C. If the distance between two charges is halved, by how much does the force change?
   Now, continue the logic:
   D. If one of the charges is tripled, by how much does the force change?
   E. If the distance is tripled, by how much does the force change?
   F. If the distance is 1/3 the original, by how much does the force change?





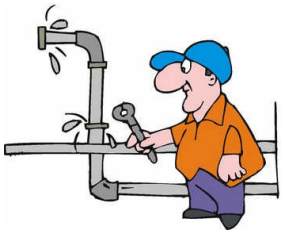
7. Will it move to the left, right, or stay stationary?
   A. A +6 C charge placed at C.
   B. An object that has gained electrons is placed at A.

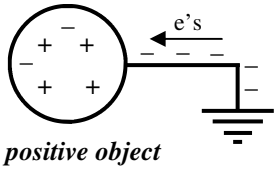
8. Will it move to the left, right, or stay stationary?
   A. A +6 C charge is placed at F.
   B. A negative charge is placed at E.

Ground

Ground (the earth) can take or give an infinite number of electrons. Ground is electrically neutral. Both positive and negative charges will neutralize when grounded.

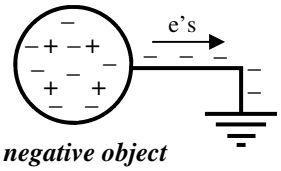
To ground something you can often touch it to a pipe. Metal pipes are good electrical conductors and usually connected to ground somewhere in the building.





Symbol for ground

A positive object **will take electrons** from ground and become neutral.



A negative object **will give electrons** to ground and become neutral.

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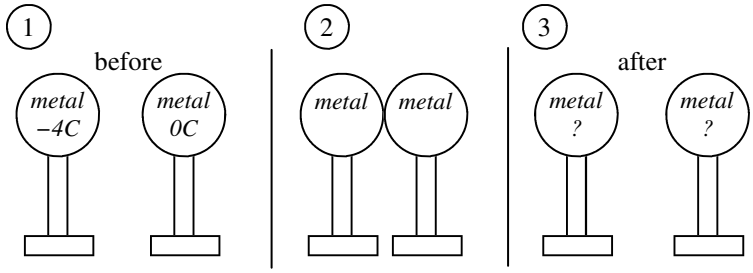
9. An object has a charge of 4.5 C.
   A) ____Is the object positive or negative?
   B) ____Did it gain or lose electrons?
   C) ____If you touch it to ground, will it lose electrons to ground or gain electrons from ground?
   D) _____What will its charge be after it is grounded?

– 8C

10. A) ____ Did the object at the left gain or lose electrons?
    B) ____ When grounded, will it gain or lose electrons from ground?
    C) Draw a wire grounding it (be accurate—use the right symbol from above).
    D) ____ What will its charge be after grounding?

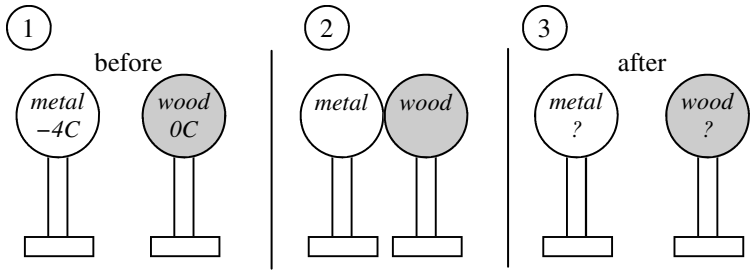
Since electrons repel each other. Electrons will try to get away from each other as far as possible. Given an electrical conductor to travel thru, electrons will spread out. Use this concept to answer the following SIMPLE questions.

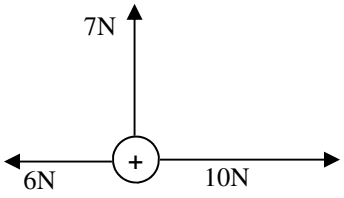
11. A metal sphere has a charge of –4C. It is touched to another metal sphere that is neutral to begin with.
    A. Are the spheres conductors or insulators?
    B. Will they allow electrons to flow?
    C. Will the electrons attract or repel each other?
    D. Will the electrons want to stay together or spread apart as far as possible?
    E. What will be the charge of the right sphere afterwards?



12. This time the metal sphere is touched to a neutral wood sphere.
    A. What is the final charge of the metal sphere?

    B. What is the final charge of the wood sphere?

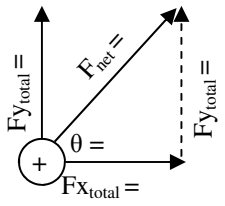




13. A. To cause the 7N force upward, is the bottom charge a + or −?
    B. What is the net horizontal force on the object (Fx_{total})?

    C. Transfer Fx_{total} and Fy_{total} to the diagram at the right and calculate F_{net}.

    D. Calculate the direction (θ), too.



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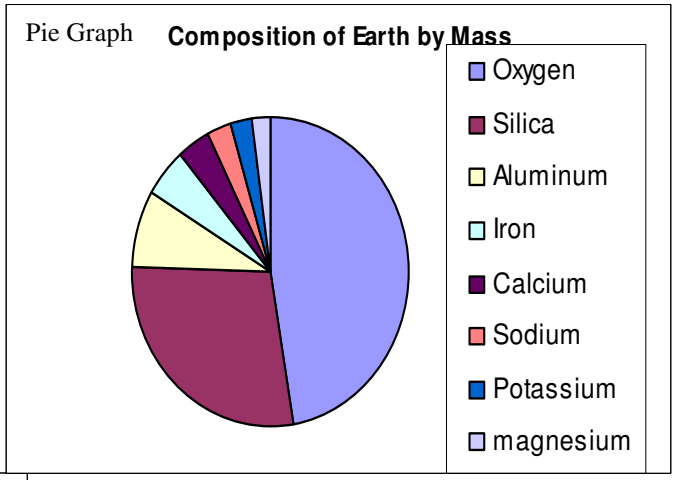
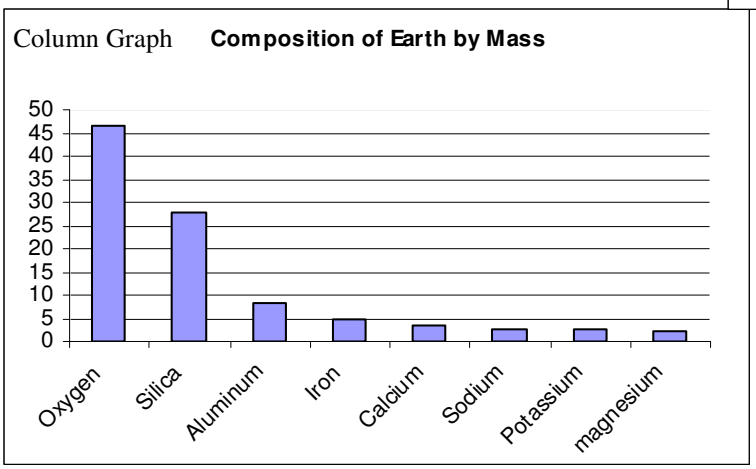
Types of Graphs:

14. Which type of graph makes it easy to see that Oxygen is roughly one-half the total?
15. Which type of graph makes it easy to see that Oxygen is almost twice the amount of Silica?
16. Which type of graph allows you to easily see how the different elements compare to one another (*how big they are to each other*)?
17. Which type of graph allows you to easily see how each element compares to the total mass (*what percentage they are of the whole*)?
18. Which graph makes no sense for this data?

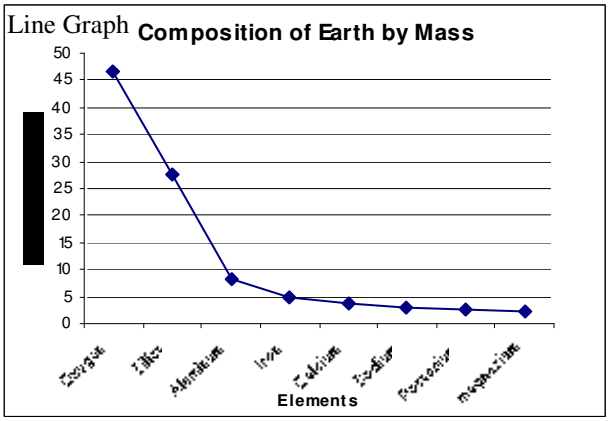
Pie Graph



Column Graph



Line Graph



19. Which kind of graph would you use: bar graph (B); pie chart (C); line graph (L)?
    A. _____You want to know how where an object is after 3 seconds.
    B._____You want to know how the population of migratory birds differs between multiple wetland locations.
    C._____You want to know what percentage of your income is spent on entertainment.
    D. _____You want to predict the population of insects at a certain time after collecting data for several days.

20. (*For lines graphs*) - X or Y axis?
    A. _____Is the dependent variable.
    B._____Is the responsive variable.
    C._____Records what you are measuring.
    D. _____Records one of the control variable.
    E._____Records what you are changing in the experiment (experimental variable).
    F._____Is the manipulated variable.
    G. _____Is the independent variable.