Name: _____ Period: _____ Date: _____ Lab: **The Physical Basis of Life**

**** Safety Precautions must be adhered to.**

Pre lab. Read the lab.

1. Write the purpose of each activity.
2. Write a hypothesis for all 3 experiments.
3. Write the reasoning for the hypothesis.

The ionic nature of matter

Experiment A: The conductivity of solutions (Teacher Demo).

1. A conductivity apparatus will be used to test dilute solutions (use distilled water) of the following substances: sodium chloride, sulfuric acid, acetic acid, sodium hydroxide, sucrose, alcohol. Also test tap and distilled water, sports drink, cola, orange juice, apple juice.
2. Make a table for the substances and record the relative conductivities as indicated by the brightness of the electric bulb. (-, +, ++)
3. Answer these question after the demo: 1. What do the results suggest about the number of ions in each solution? 2. What is the role of water in each solution? 3. What types of bonds were present in the solutions that did not light the bulb? What types of bonds were present in the solutions that did light the bulb? 4. Which of these solutions can be considered to contain electrolytes? 5. What is the role of electrolytes in the human body?

Purpose: _____

Hypothesis: _____

Reasoning: _____

Solutions				
Conductivity				

Solutions				
Conductivity				

Experiment B: The role of water in ionization.

1. Hold a piece of dry litmus paper over the mouth of a bottle of aqueous ammonia. Record observations
2. Repeat the procedure but this time moisten the litmus paper with distilled water. Record observations.
3. Answer this question: Explain the changes that took place in terms of the role of water.

Purpose: _____

Hypothesis: _____

Reasoning: _____

_____

Dry Litmus	Moist Litmus

_____

Experiment C: Identifying ions in living cells.

1. Clean a loop of platinum wire by dipping it in 95% ethyl alcohol.
2. Use the matches to light the alcohol burner. Heat it over an alcohol burner until it glows red. Let it cool until it no longer glows red. Place the wire on a clean piece of paper toweling.
3. Obtain a small amount of ground liver from the supply table. Place a small amount of the tissue on the wire and hold it in the flame (Be careful of spattering). If sodium ions are present the color of the flame will be yellow.
4. Repeat the procedure and observe the flame through a cobalt glass plate. This will screen the yellow color and if potassium ions are present the flame will appear violet. Barium ions will give a light green color to the flame.
5. Put the cap on the alcohol burner to dampen the flame.
6. Describe the results of your experiment.
7. Next mix some of the ground tissue with about 15 ml of distilled water in a small cup. Filter the mixture through a piece of cheese cloth into another small cup. Measure 5 ml of the filtrate from the cup and place into a test tube.
8. Add dilute silver nitrate solution DROP BY DROP. If chloride ions are present, a white precipitate will appear. Record your results.
9. Next to 5 ml of the filtrate, add dilute hydrochloric acid. If a gas is liberated without heating, it is probably carbon dioxide from the carbonate radical. Record your results.

Purpose: _____

Hypothesis: _____

Reasoning: _____
_____

	Beef Liver	Chicken Liver		
plain				
Cobalt glass				
Silver nitrate rxn				
Dilute HCL				

10. Answer this question post lab: What conclusions can you draw concerning the ions in this tissue?

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