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Chapter 4: Organization of the Periodic Table: *Why Are Elements Put Into Families?*

Purpose: To experiment with salts of the alkali metals and the alkaline earth metals. To test two of the families on the periodic table to see how they react with ammonium compounds. To understand why scientists put elements into families.

Materials:

Safety Materials
Safety goggles
Apron

Chemicals (0.5M solutions)
Ammonium carbonate
Ammonium phosphate
Barium chloride
Calcium chloride
Lithium chloride
Potassium chloride
Sodium chloride
Strontium chloride

Laboratory Equipment
Six test tubes
Test tube rack
Eight Barnes bottles
(Any bottles with eyedroppers will do)
Distilled water

Procedures

1. Put on the safety goggles and the aprons.
2. Label the test tubes A, B, C, D, E, and F. Place them in order in the test tube rack.
3. Notice that each Barnes bottle is labeled with the letters A-F. Place each Barnes bottle in front of the corresponding test tube. (The two extra bottles hold the ammonium carbonate and phosphate.)
4. Add five drops from each Barnes bottle to the corresponding test tube, so five drops of chemical A are in test tube A, five drops of chemical B are in test tube B, and so on to F.
5. Add three drops of ammonium carbonate to each test tube.
6. Observe the test tubes for a couple of minutes. If a milky substance appears in the test tube, then a precipitate has formed. Indicate with a P on Table 1 for the chemicals that formed a precipitate. If a milky substance did not form, then a precipitate did not form. Indicate with an NP on Table 1 for the chemicals that did not form a precipitate.
7. Empty, rinse, and clean the substances from the test tubes with distilled water.
8. Repeat the experiment, but instead of adding ammonium carbonate, add ammonium phosphate this time.

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Observations:

Table 1

Letter	Chemicals	Reaction With Ammonium Carbonate (P or NP)	Reaction With Ammonium Phosphate (P or NP)
A	Barium Chloride		
B	Calcium Chloride		
C	Lithium Chloride		
D	Potassium Chloride		
E	Sodium Chloride		
F	Strontium Chloride		

Conclusions:

1. What conclusions can you draw from this experiment based on the way the elements are put into the periodic table?

_____

_____

_____

_____

2. List two examples from the element families represented in this experiment.

_____

_____

_____

3. How did the alkali metal compounds react to the ammonium compounds?

_____

_____

_____

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4. How did the alkaline earth metals react to the ammonium compounds?

_____

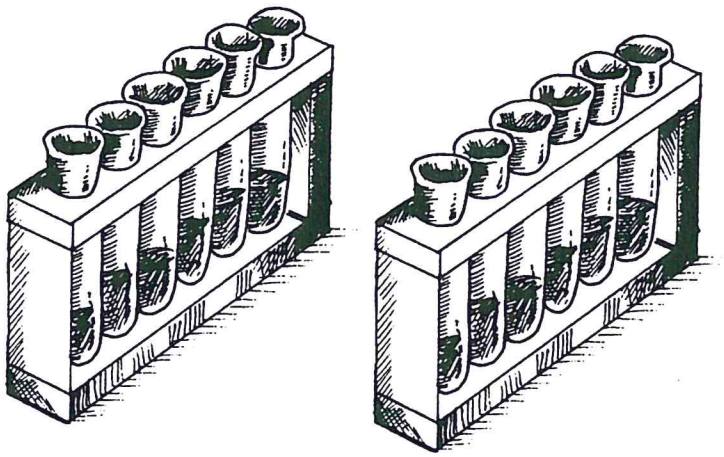
_____

_____

5. Fill in Table 2 by predicting how the elements in the table would react to the ammonium compounds.

Table 2

Element	Reaction with Ammonium Carbonate (P or NP)	Reaction with Ammonium Phosphate (P or NP)
Beryllium		
Cesium		
Francium		
Magnesium		
Radium		
Rubidium		



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Chapter 4: Organization of the Periodic Table: *The Scientific Method—Why Are Elements Put Into Families?*

Laboratory Quiz

Directions: Use your lab sheet and your periodic table to answer the following questions about the experiment you performed. Write clearly written, complete answers for each of the following questions.

1. Write a problem that would fit this experiment.

_____

_____

_____

2. Write a hypothesis that would fit this experiment.

_____

_____

_____

3. List the materials and chemicals that you used to perform this experiment.

_____

_____

_____

4. Summarize the procedures that you used in this experiment so another person could repeat the experiment and get the same results.

_____

_____

_____

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5. What observations did you make about how different families react to ammonium compounds?

_____

_____

_____

6. What can you conclude from this experiment?

_____

_____

_____

7. What predictions can you make about how other elements in the alkali metal family will react to ammonium compounds?

_____

_____

_____

8. What predictions can you make about how other elements in the alkaline earth metal family will react to ammonium compounds?

_____

_____

_____

9. What was the variable (the thing that changed) in this experiment?

_____

_____

10. Name one thing that was controlled in this experiment.

_____

_____