Chemistry: Matter and Change

Activity 6.1 Predicting Elemental Properties

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Purpose: To understand how the periodic table is organized into distinct sections of similar characteristics.

Background Information: Dmitri Mendeleev arranged the elements in his periodic table by increasing atomic mass and began to see a pattern. Elements with similar properties fell in groups on the table. He also recognized that not all elements were discovered. He left gaps in the table for these elements. He was also bold enough to predict the properties of unknown elements. When the missing elements were discovered, Mendeleev was proven correct in his predictions of the elements. This gave his Periodic Table credibility and acceptance by other scientists.

Materials: Periodic Table

Procedure:

1. Fill out the information of each element based on your knowledge of the Periodic Table. Make a hypothesis of the elements' properties and fill in the blanks.

Results:

1. Element number 40 2. Element 14 3. Element 7

Name Name Name

Color Color Color

Type Type Type

Malleable Malleable Malleable

Ductile Ductile Ductile

Conductor Conductor Conductor

State of matter State State

4. Element 56 5. Element 80 6. Element 65

Name Name Name

Color Color Color

Type Type Type

Malleable Malleable Malleable

Ductile Ductile Ductile

Conductor Conductor Conductor

State of matter State State

7. Predict the number of valence electrons for the following elements.

Thallium\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Antimony\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Germanium\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Oxygen\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Beryllium\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Iodine\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cesium\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Helium\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. List two exceptions to the pattern on the periodic table. Example: Hydrogen is listed with the metals but is a nonmetal.

a.

b.

9. Mendeleev's periodic table was arranged by atomic mass. How was Henry Moseley's periodic table arranged?

10. What are Groups?

11. What do elements in the same group have in common?

12. What is another name for a Group?

13. What are Periods?

14. What do elements of the same Period have in common?

15. What are elements left of the zigzag line called? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

16. What are elements right of the zigzag line called? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

17. What are elements on the zigzag line called? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

18. Give the group name for the following elements.

Krypton \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Magnesium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tin \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Astatine \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Selenium\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Sodium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Indium \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Phosphorus \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

19. What are the inner transition elements?

20. What are some characteristics of the actinide series?

21. Explain why the Actinoids are all radioactive.

22. What 2 groups are highly reactive elements? (Hint: One consists of all metals and the other is all nonmetals.)

23. Why are the Lanthanide and Actinide series located at the bottom of the Periodic Table?