

Key

Color Coding the Periodic Table

Student Information Sheet

The Periodic Table is a list of all the known elements. It is organized by increasing atomic number. There are two main groups on the periodic table: metals and nonmetals. The left side of the table contains elements with the greatest metallic properties. As you move from the left to the right, the elements become less metallic with the far right side of the table consisting of nonmetals. The elements in the middle of the table are called "transition" elements because they are changed from metallic properties to nonmetallic properties. A small group whose members touch the zigzag line are called metalloids because they have both metallic and nonmetallic properties.

The table is also arranged in vertical columns called "groups" or "families" and horizontal rows called "periods." Each arrangement is significant. The elements in each vertical column or group have similar properties. Group 1 elements all have the electron in their outer shells. This gives them similar properties. Group 2 elements all have 2 electrons in their outer shells. This also gives them similar properties. Not all of the groups, however, hold true for this pattern. The elements in the first period or row all have one shell. The elements in period 2 all have 2 shells. The elements in period 3 have 3 shells and so on.

There are a number of major groups with similar properties. They are as follows:

Hydrogen: This element does not match the properties of any other group so it stands alone. It is placed above group 1 but it is not part of that group. It is a very reactive, colorless, odorless gas at room temperature. (1 outer level electron)

Group 1: Alkali Metals – These metals are extremely reactive and are never found in nature in their pure form. They are silver colored and shiny. Their density is extremely low so that they are soft enough to be cut with a knife. (1 outer level electron)

Group 2: Alkaline-earth Metals – Slightly less reactive than alkali metals. They are silver colored and more dense than alkali metals. (2 outer level electrons)

Groups 3 – 12: Transition Metals – These metals have a moderate range of reactivity and a wide range of properties. In general, they are shiny and good conductors of heat and electricity. They also have higher densities and melting points than groups 1 & 2. (1 or 2 outer level electrons)

Lanthanides and Actinides: These are also transition metals that were taken out and placed at the bottom of the table so the table wouldn't be so wide. The elements in each of these two periods share many properties. The lanthanides are shiny and reactive. The actinides are *all* radioactive and are therefore unstable.

Elements 95 through 103 do not exist in nature but have been manufactured in the lab.

Group 13: Boron Group – Contains one metalloid and 4 metals. Reactive. Aluminum is in this group. It is also the most abundant metal in the earth's crust. (3 outer level electrons)

Group 14: Carbon Group – Contains one nonmetal, two metalloids, and two metals. Varied reactivity. (4 outer level electrons)

Group 15: Nitrogen Group – Contains two nonmetals, two metalloids, and one metal. Varied reactivity. (5 outer level electrons)

Group 16: Oxygen Group – Contains three nonmetals, one metalloid, and one metal. Reactive group. (6 outer level electrons)

Groups 17: Halogens – All nonmetals. Very reactive. Poor conductors of heat and electricity. Tend to form salts with metals. Ex. NaCl: sodium chloride also known as "table salt". (7 outer level electrons)

Groups 18: Noble Gases – Unreactive nonmetals. All are colorless, odorless gases at room temperature. All found in earth's atmosphere in small amounts. (8 outer level electrons)

Color-Coded Periodic Table Activity

Name _____

Directions: Be sure to follow all instructions carefully and completely! Use your textbook and any other resources to help you complete the periodic table.

1. Draw a **RED** diagonal line through the elements that exist as a **gas** at room temperature.
2. Draw a **BLUE** diagonal line through the elements that exist as a **liquid** at room temperature.
3. Draw **HEAVY BLACK LINE** down the staircase that separates the metals from the nonmetals.
4. Draw a **DIAGONAL BLACK LINE** from the upper left to the lower right through Astatine (85).
5. Lightly shade all the metalloids orange, including the **lower** portion of Astatine (85).
6. Use the following colors(or pick your own) to identify the various sections of the periodic table.
 - a. Alkali Metals = green
 - b. Alkaline Earth Metals = brown
 - c. Halogens = pink
 - d. Noble Gases = yellow
 - e. Transition Metals = purple
 - f. Lanthanide Series = red do in the lower right corner
 - g. Actinide Series = blue dot in the lower right corner

7. Make a color key in the large open region showing all the colored groups assigned in #6.

8. Answer the following question below (these should be review):

- a. Define the following vocabulary words: period, group, atomic number, atomic mass, and isotope.

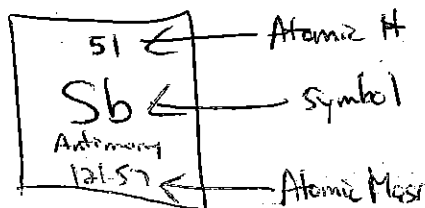
period - row in periodic table - all elements have outer electron in same level
 group - column in periodic / also known as "family" - all elements in family have similar electron configurations,

Atomic # - # of protons Atomic Mass - # of protons + neutrons

- b. What are the characteristics of a metal, nonmetal, and metalloid?

<u>metals</u>	<u>non-metals</u>	<u>Metalloids</u>
- good conductors of heat + elect.	- Dull	have prop. of both
- Malleable	- Soft + Brittle	
- Ductile	- Low MP.	
- High M.P.	- Poor Conductors of heat	
- Shiny		

- c. List all of the information that can be found in every box on the periodic table. Draw the box of the element of your choice and label everything found in the box.



Family Ties

Student Worksheet

Follow the instructions below to label the major groups and divisions of the periodic table.

1. The vertical columns on the periodic table are called groups.
2. The horizontal rows on the periodic table are called Periods.
3. Most of the elements in the periodic table are classified as Metals.
4. The elements that touch the zigzag line are classified as Metalloids.
5. The elements in the far upper right corner are classified as non-metals.
6. Elements in the first group have one outer shell electron and are extremely reactive. They are called alkali metals.
7. Elements in the second group have 2 outer shell electrons and are also very reactive. They are called alkaline earth metals.
8. Elements in groups 3 through 12 have many useful properties and are called transition metals.
9. Elements in group 17 are known as "salt formers". They are called Halogens.
10. Elements in group 18 are very unreactive. They are said to be "inert". We call these the noble gases.
11. The elements at the bottom of the table were pulled out to keep the table from becoming too long. The first period at the bottom called the Lanthanides.
12. The second period at the bottom of the table is called the Actinides.