Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_Grade\_\_\_\_\_\_\_\_\_

**Arranging the Elements p. 106**

1. Imagine that you are a scientist from the early 1869’s. At that time, there were only 60 elements discovered and they were not organized in any pattern. How would you organize the elements? Do you think they are organized in any way in the periodic table? What type of organization do they have in the periodic table?
2. Dimitri Mendeleev, a Russian chemist, discovered a pattern to the elements in 1869
3. First, he wrote the names and properties of the elements on cards. Then, he arranged his cards by different properties, such as density, appearance, and melting point. After much thought, he arranged the elements in order of increasing atomic mass.
4. Mendeleev saw that when the elements were arranged in order of increasing atomic mass, those that had similar properties occurred in a repeating pattern (the elements’ properties followed a pattern that repeated every seven elements)
5. The elements in the periodic table are classified as metals, nonmetals, and metalloids, according to their properties.
6. The number of electrons in the outer energy level of an atom is one characteristic that helps determine which category an element belongs in.
7. Metals: found to the left of the zigzag line on the periodic table
   1. Most elements are metals. Atoms of most metals have few electrons in their outer energy level.
   2. Most metals are solid at room temperature (exception: Mercury; which is liquid)
   3. Metals tend to be shiny. You can see a reflection in a mirror because light reflects off the shiny surface of a thin layer of silver behind the glass
   4. All metals are good conductors of electric current and thermal energy
   5. Most metals are malleable which means that they can be flattened with a hammer and will not shatter. Example: aluminum is flattened into sheets to make cans and foil
8. Nonmetals: found to the right of the zigzag line on the periodic table
   1. Atoms of most nonmetals have an almost complete set of electrons in their outer level
   2. More than half of the nonmetals are gases at room temperature
   3. Nonmetals are not malleable, shiny and are poor conductors of thermal energy and electric current.
9. Metalloids: elements that border the zigzag line on the periodic table.
   1. Also called semiconductors
   2. Atoms of metalloids have about half of a complete set of electrons in their outer energy level
   3. Have some properties of metals and some properties of nonmetals
10. Each square on the periodic table includes an element’s name, chemical symbol, atomic number, and atomic mass.
11. The chemical symbols are the same worldwide. For most elements, the chemical symbol has one or two letters. The first letter is always capitalized. Any other letter is always lowercase.
12. Each horizontal row of elements (from left to right) on the periodic table is called a period. The physical and chemical properties of elements in a row follow a repeating, or periodic, pattern as you move across the period. Properties such as conductivity and reactivity change gradually from left to right in each period.

Example: if we look at period 4, the elements on the left are very metallic and the elements on the right are nonmetallic.

1. Each vertical column of elements (from top to bottom) on the periodic table is called a group. Elements in the same group often have similar chemical and physical properties. For this reason, a group is also called a family.

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_Grade\_\_\_\_\_\_\_\_\_

**Arranging the Elements p. 106**

1. Imagine that you are a scientist from the early 1869’s. At that time, there were only 60 elements discovered and they were not organized in any pattern. How would you organize the elements? Do you think they are organized in any way in the periodic table? What type of organization do they have in the periodic table?
2. Dimitri \_\_\_\_\_\_\_\_\_\_\_\_\_, a Russian chemist, discovered a pattern to the elements in \_\_\_\_
3. First, he wrote the names and \_\_\_\_\_\_\_\_\_\_ of the elements on cards. Then, he arranged his cards by different properties, such as density, \_\_\_\_\_\_\_\_\_\_\_, and melting point. After much thought, he arranged the elements in order of increasing \_\_\_\_\_\_\_\_\_\_\_ mass.
4. Mendeleev saw that when the \_\_\_\_\_\_\_\_\_\_ were arranged in order of \_\_\_\_\_\_\_\_\_ atomic mass, those that had \_\_\_\_\_\_\_ properties occurred in a repeating pattern (the elements’ properties followed a pattern that repeated every \_\_\_\_\_\_\_\_\_ elements)
5. The elements in the periodic table are classified as \_\_\_\_\_\_\_, nonmetals, and metalloids, according to their \_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. The number of \_\_\_\_\_\_\_\_\_ in the outer energy level of an atom is one characteristic that helps determine which \_\_\_\_\_\_\_\_\_\_\_ an element belongs in.
7. Metals: found to the \_\_\_\_\_\_\_\_\_\_\_ of the zigzag line on the periodic table
   1. Most elements are metals. Atoms of most metals have \_\_\_\_\_\_ electrons in their outer energy level.
   2. Most metals are solid at room temperature (exception: \_\_\_\_\_\_\_; which is liquid)
   3. Metals tend to be \_\_\_\_\_\_\_\_\_\_. You can see a reflection in a mirror because light reflects off the shiny surface of a thin layer of \_\_\_\_\_\_\_\_\_\_\_ behind the glass
   4. All metals are \_\_\_\_\_\_\_\_\_\_ conductors of electric current and thermal energy
   5. Most metals are malleable which means that they can be \_\_\_\_\_\_\_\_\_\_\_\_ with a hammer and will not shatter. Example: aluminum is flattened into sheets to make cans and \_\_\_\_\_\_\_\_\_\_
8. Nonmetals: found to the \_\_\_\_\_\_\_\_\_\_ of the zigzag line on the periodic table
   1. Atoms of most nonmetals have an almost complete set of electrons in their outer \_\_\_\_\_\_\_\_\_\_
   2. More than half of the nonmetals are \_\_\_\_\_\_\_\_\_\_\_ at room temperature
   3. Nonmetals are not malleable, shiny and are poor \_\_\_\_\_\_\_\_\_\_ of thermal energy and electric current.
9. Metalloids: elements that \_\_\_\_\_\_\_\_\_\_\_\_\_ the zigzag line on the periodic table.
   1. Also called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Atoms of metalloids have about half of a complete set of electrons in their outer energy \_\_\_\_\_\_\_\_\_\_
   3. Have some properties of metals and some properties of \_\_\_\_\_\_\_\_\_\_\_\_
10. Each square on the periodic table includes an element’s name, chemical symbol, \_\_\_\_\_\_ number, and atomic \_\_\_\_\_\_\_\_\_.
11. The chemical symbols are the \_\_\_\_ worldwide. For most elements, the chemical symbol has one or two letters. The first letter is always \_\_\_\_\_\_\_\_\_\_\_. Any other letter is always lowercase.
12. Each \_\_\_\_\_\_\_\_\_\_\_\_\_ row of elements (from left to right) on the periodic table is called a period. The physical and chemical properties of elements in a row follow a repeating, or periodic, pattern as you move \_\_\_\_\_\_\_\_\_the period. Properties such as conductivity and reactivity \_\_\_\_\_\_\_\_\_\_ gradually from left to right in each period.

Example: if we look at period 4, the elements on the left are very \_\_\_\_\_\_\_\_\_\_\_\_ and the elements on the right are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Each \_\_\_\_\_\_\_ column of elements (from top to bottom) on the periodic table is called a group. Elements in the same group often have \_\_\_\_\_\_ chemical and physical properties. For this reason, a group is also called a \_\_\_\_\_\_\_\_\_\_\_

Reading the periodic table:

1. Label the following diagram

6

C

Carbon

12.0

1. In the periodic table provided identify the metals, metalloids and nonmetals
2. In the periodic table provided label the groups and periods
3. Give six examples of metals
4. Give six examples of metalloids
5. Give six examples of nonmetals
6. Which elements are in group 14?
7. Which elements are in group 12?
8. List two metals, two metalloids and two nonmetals from the period 4
9. List two metals, two metalloids and two nonmetals from the period 5
10. List two metals, two metalloids and two nonmetals from the period 6
11. Take a look at period 4. If the elements at the left end are very metallic, what can you expect from the elements germanium and bromine? (Are they going to be as metallic?)
12. An atom that has 117 protons in its nucleus has not yet been made. Once this atom is made, to which group will element 117 belong?
13. An atom that has 118 protons in its nucleus has not yet been made. Once this atom is made, to which group will element 118 belong?
14. Are the properties of sodium more like the properties of lithium or magnesium? Why?
15. Are the properties of fluorine more like the properties of iodine or oxygen? Why?
16. Are the properties of silicon more like the properties of carbon or boron? Why?
17. Which of the following elements should be the best conductor of electric current?: potassium, silicon or neon. Why?
18. Which element should be the worst conductor of electric current?: Helium, boron, mercury or magnesium? Why?
19. Which element should be the shiniest?: Iron, tellurium or oxygen. Why?
20. Which element should be the least shiny?: Calcium, arsenic or sulfur. Why?