Name _____ period _____
Date _____

Write your notes about what you are reading in this space.

Science Shorts -8

Atoms in the Periodic Table

The periodic table is a system used worldwide for organizing elements into categories based on how they react. An element's atomic number is the number of protons in the nucleus of any atom of that element. Look at any periodic table and you will see that elements are arranged from left to right and top to bottom in order of increasing atomic number.

A row across the periodic table is called a period. The atomic number increases one at a time from left to right across the table. The number of valence electrons also increases from left to right.

Elements in the same column of the periodic table are called a group, or family. The groups are numbered 1 through 18 across the tops of the columns. Each family in the periodic table has its own characteristic properties based on the number of valence electrons.

The elements in Group 18 at the far right side of the table are known as the noble gases. Except for helium, atoms of these elements have eight valence electrons. The group 18 elements are also known as the inert gases. Inert means "inactive." The inert gases don't react very easily with other atoms. Helium only has two valence electrons, but it has the same unreactive properties as the other noble gases.

Elements in Group 17 are known as the halogen family. These elements are very reactive. Each halogen atom has seven valence electrons. A gain of just one electron leads to the more stable number of eight. As a result, these electrons react easily with other elements whose atoms can give up electrons.

On the far left side of the table is Group 1, known as the alkali metal family. Atoms of these elements have only one valence electron. They are very reactive because the easily lose one electron.

Recall that atoms of halogens easily gain electrons. Atoms of alkali metals easily lose electrons. When these two types of electrons come in contact with each other, they react violently. For example, the elements sodium and bromine react with an explosion when they form the compound sodium bromide. Hydrogen is located above Group 1 on the periodic table. Like the alkali metals, it atoms have only one valence electron. Hydrogen is also extremely reactive.

1 **Elements from Group 1 on the periodic table react violently when they come into contact with —**

A the noble gases
B Group 2 elements
C Group 17 elements
D helium

2 **The ability of an element to form a compound with another element is determined largely by —**

F the element's atomic number
G the number of valence electrons
H the atomic mass
J the number of neutrons in the nucleus of each atom

3 **What does inert mean?**

A object has a lot of inertia
B inactive
C very active
D elemental

Look at the Periodic Table to the right to answer the following questions.

6 **How many valence electrons do the elements in Group 1 have?**

F 4
G 3
H 2
J 1

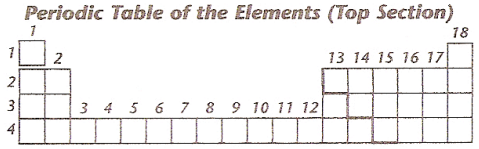
4 A certain element has eight valence electrons and does not react easily with other elements. **What might you conclude about this element?**

A It is probably an alkali metal.
B It is probably helium.
C It is probably a noble gas.
D It is probably a halogen.

5 **How are elements arranged on the periodic table?**

F From right to left in order of increasing atomic number
G Alphabetically from left to right and top to bottom
H From left to right in order of increasing atomic number
J From top to bottom in order of decreasing atomic number

Periodic Table of the Elements (Top Section)



7 **Which group of elements has atoms with two valence electrons?**

A Group 1
B Group 2
C Group 3
D Group 4

8 **Which group of elements has atoms with 7 valence electrons?**

A Group 18
B Group 17
C Group 16
D Group 15