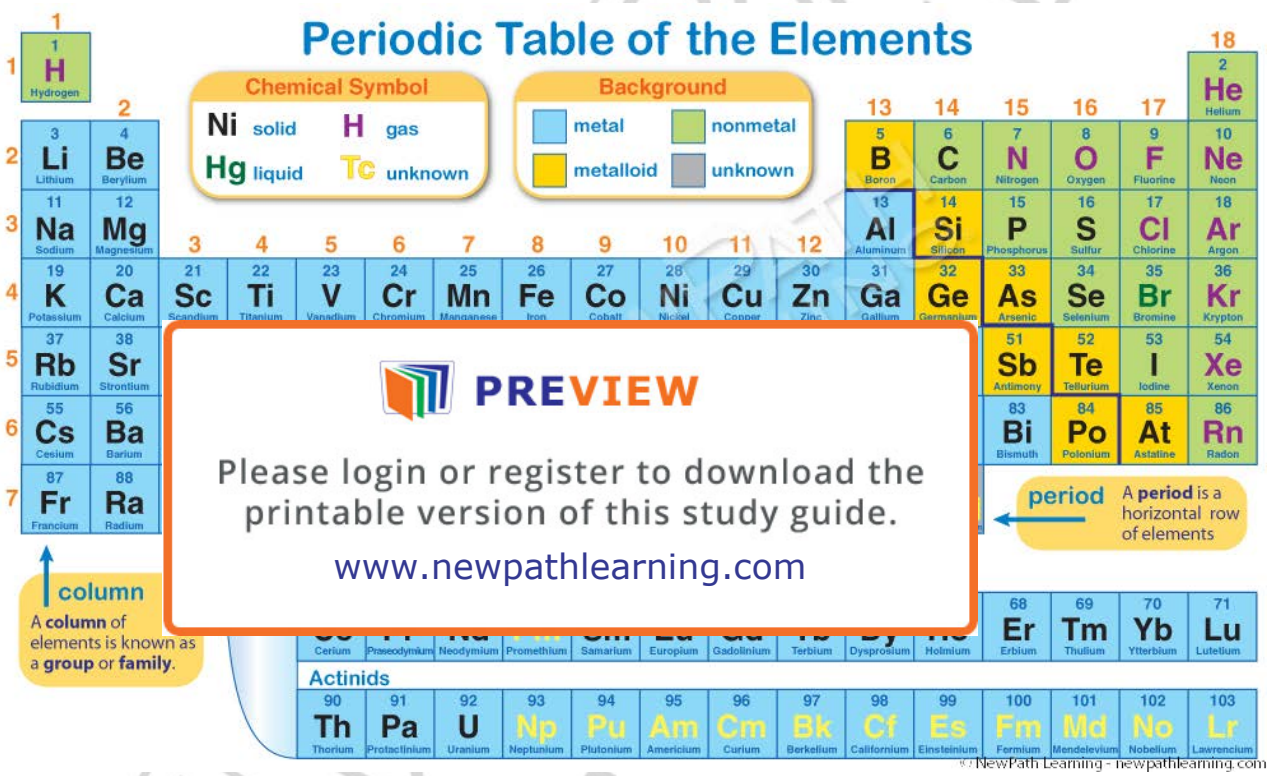
PERIODIC TABLE

Pure Matter

Elements are the purest form of matter and can not be broken down into any other substance by either a physical or chemical change. There are about 114 elements and they are organized on a modern **Periodic Table of the Elements**.

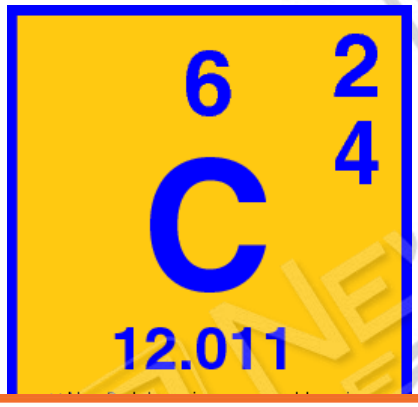


As you look at the table you will notice that the elements are organized by their atomic numbers from top to bottom and left to right. On the table shown above, the first element is H for hydrogen and one atom of H has an atomic number of 1. The element with the highest atomic number is the last one on the bottom right of chart, Uuq.

Lesson Checkpoint:
What is used to organize the elements on the Periodic Table?

Chart Represents an Atom of Each Element

Up toward the top left hand side of the table, the element C or carbon has been taken out and shown separately. To the right of the symbol, labels are given to the various pieces of information that are available for each element. Remember that in each case the information is for one atom of that element.



Notice in t symbol and the **at** mation includes th t atom.

Isotopes

The Period he total number of protons and neutrons in an atom, by subtracting the atom's atomic number from its atomic mass, you can figure out the number of neutrons. Atoms that have the same atomic number but a different atomic mass are called **isotopes** of each other. Carbon with a mass of 12 and Carbon with a mass of 14 are isotopes of each other. The difference is that Carbon 14 has two extra neutrons.

If you count the number of electrons listed on the right hand side of the small box, it will give you the total number of electrons in that atom. Whenever an atom is not bonded to another, the number of protons in the nucleus always equals the number of electrons outside the nucleus.

Lesson Checkpoint:
What can the atomic mass of an atom tell us about particles of the atom?

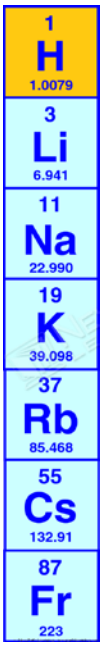
Positions in the Periodic Table

The vertical rows of the table are called **periods**. The elements in a period are not chemically similar. Normally the elements toward the left are **metals**, the ones along the dark line on the right side are **metalloids,** and the ones on the right are **non metals**. Metalloids, such as Silicon (Si), have both metallic and non metallic properties.

Periods towards the bottom of the table contain **radioactive** elements. These atoms disintegrate and, when they do, large amounts of atomic or nuclear energy are released.

For period 4 shown above, K, Ca, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, and Ga are and Se and Br are xplained in the next se

The horiz the elements i . If you look b at each atom has only one electron in its outer orbit. This is what gives these elements similar properties.



Since Li, Na, K, Rb, Cs and Fr have only one electron in their outer orbits, these atoms act as very active metals. If you look over to group 17 you will notice that each atom has seven electrons in its outer orbits. This makes, F, Cl, Br, I and At very active non metals.

Group 18 contains **noble gases**. These atoms all have eight electrons in their outer electron orbit and are almost totally unable to bond to other atoms. These elements are sometimes referred to as **inert** elements.

Lesson Checkpoint:
What are the names of the vertical columns and horizontal rows of the Periodic Table?