Chapter Twelve: Atoms and the Periodic Table

- 12.1 The Structure of the Atom
- 12.2 Electrons
- 12.3 The Periodic Table of Elements
- 12.4 Properties of the Elements

Chapter 12.3 Learning Goals

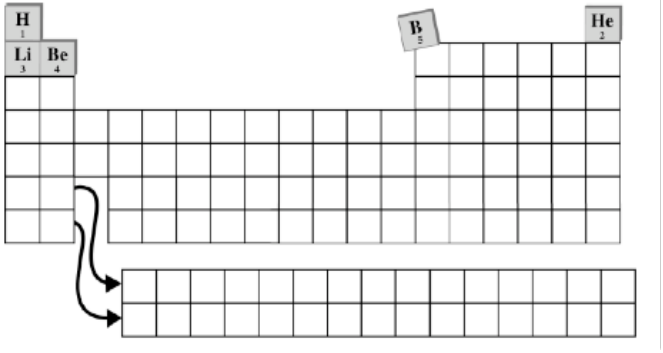
- Explain how the periodic table is organized.
- Use the periodic table to become familiar with groups of elements and their properties.
- Identify metals, semimetals, and nonmetals on the periodic table.

Investigation 12B

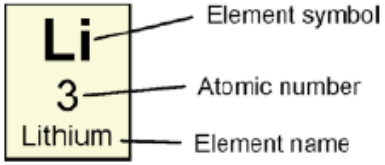
The Periodic Table

- **Key Question:**

  How is the periodic table organized?

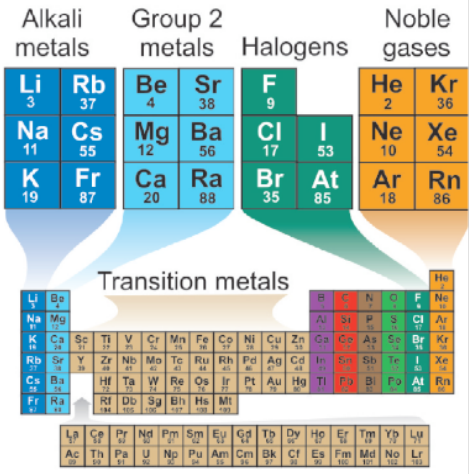


12.3 The Periodic Table



- The periodic table organizes the elements according to how they combine with other elements (chemical properties).
- The periodic table is organized in order of increasing atomic number.

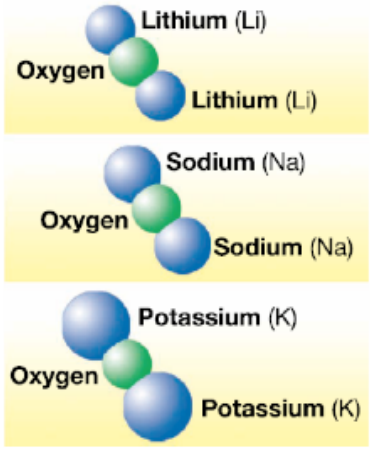
12.3 The Periodic Table



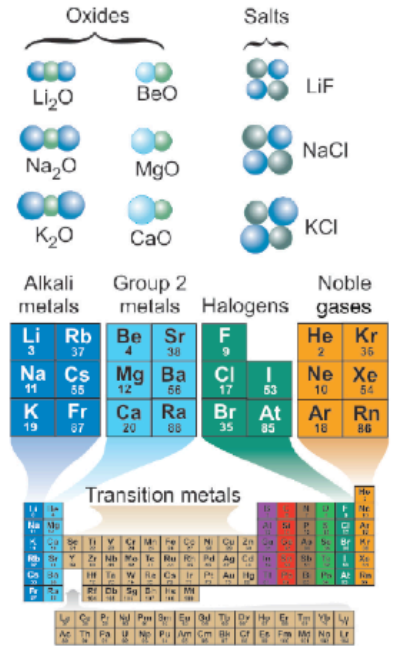
- The periodic table is further divided into periods and groups.
- Each horizontal row is called a period.
- Each vertical column is called a group.

12.3 The Periodic Table

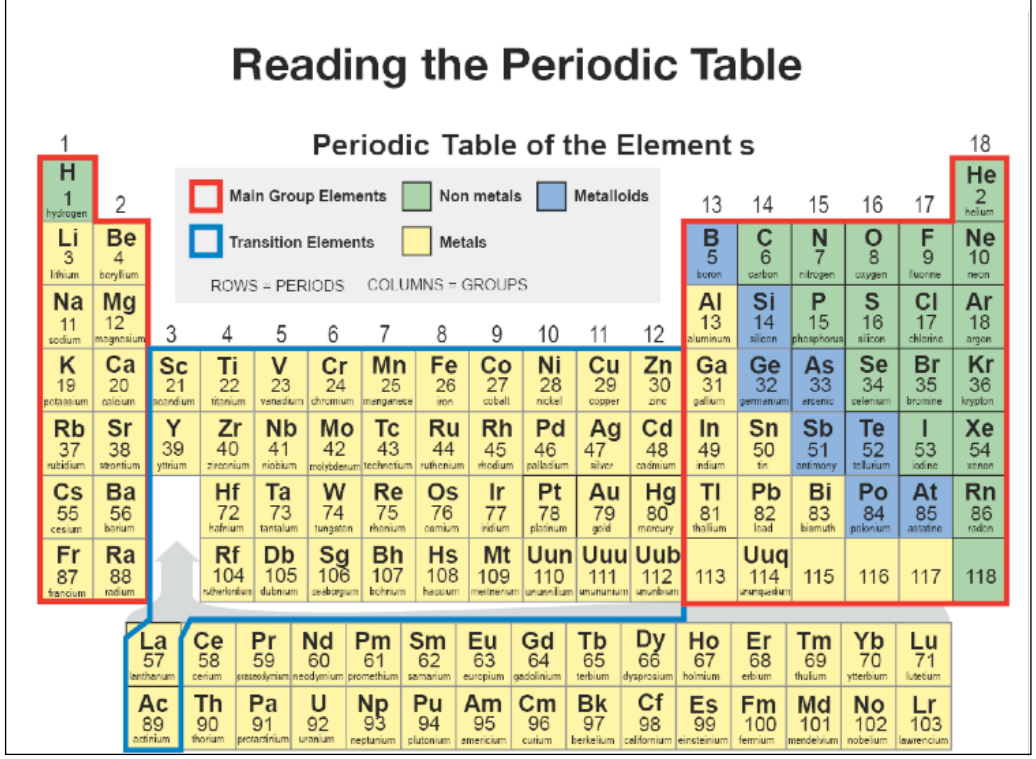
- All the elements in Group 1 of the periodic table form similar compounds.
- The metals lithium, sodium, and potassium all form compounds with a ratio of 2 atoms of the metal to 1 atom of oxygen.



Groups in the Periodic Table



Reading the Periodic Table



12.3 Atomic Mass

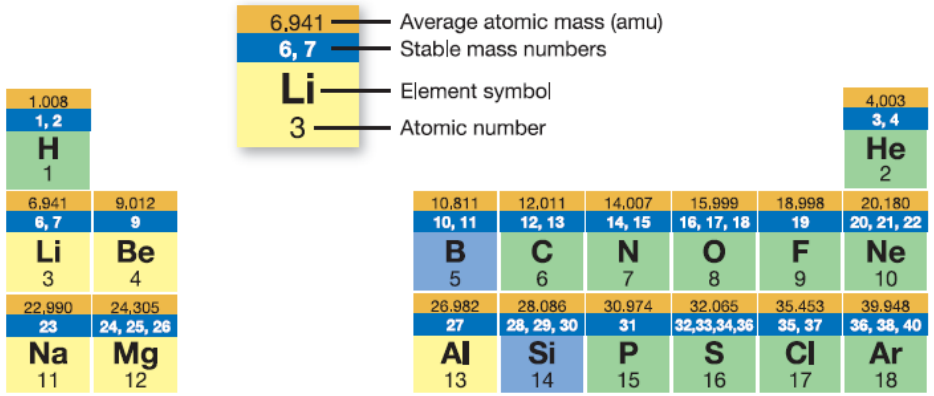
- The mass of individual atoms is so small that the numbers are difficult to work with.
- To make calculations easier, scientists use the atomic mass unit (amu).
- The atomic mass of any element is the average mass (in amu) of an atom of each element.

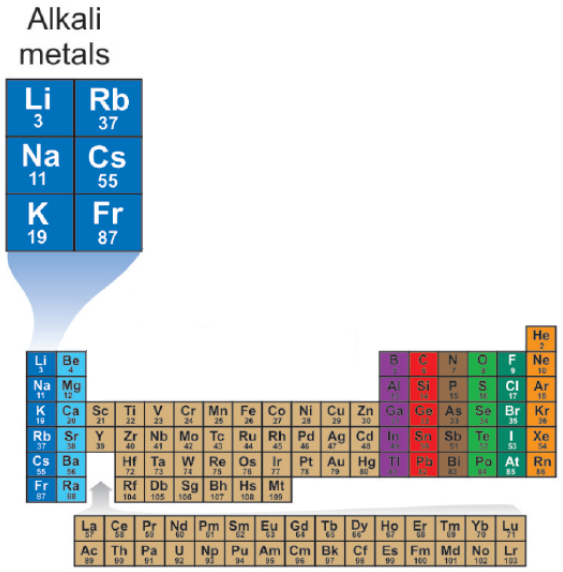
12.3 Atomic Mass

- Atomic masses differ from mass numbers because most elements in nature contain more than one isotope.

12.3 Atomic Number

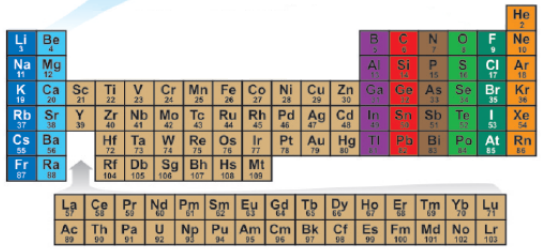
- **Remember, the atomic number is the number of protons all atoms of that element have in their nuclei.**

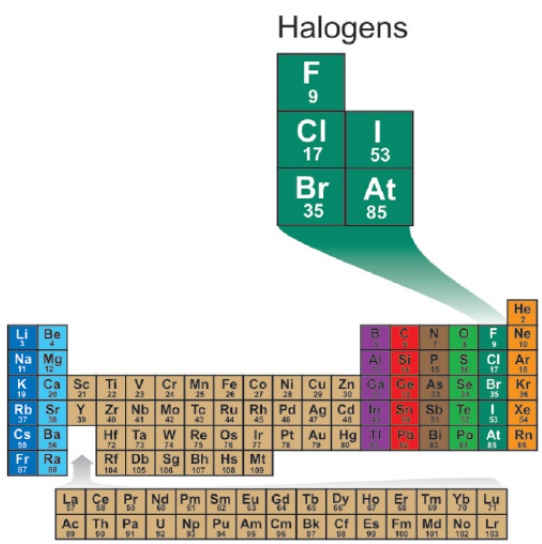


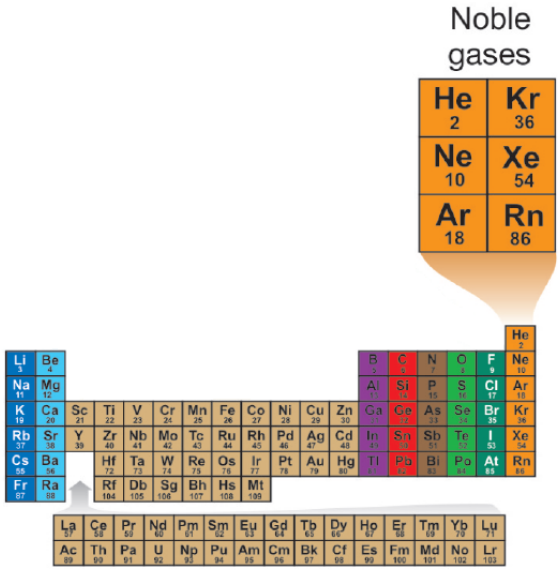

Alkali metals
Li 3
Rb 37
Na 11
Cs 55
K 19
Fr 87

Group 2 metals

Be 4	Sr 38
Mg 12	Ba 56
Ca 20	Ra 88



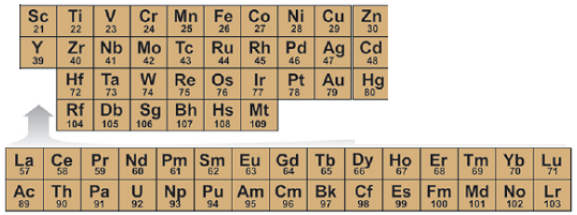

Halogens
F
9
Cl
17
I
53
Br
35
At
85


Noble gases
He 2
Kr 36
Ne 10
Xe 54
Ar 18
Rn 86

12.3 Transition metals

- In the middle of the periodic table are the transition metals, including titanium (Ti), iron (Fe), and copper (Cu).

- These elements are usually good conductors of heat and electricity.



Energy Levels and the Periodic Table