

Periodic Table Part 3

Periodic Table showing Main-Group Elements, Transition Metals, and Inner-Transition Metals. The table includes atomic number, symbol, and valence-shell configuration for each element.

Main-Group Elements
s Subshell fills

Transition Metals
d Subshell fills

Inner-Transition Metals
f Subshell fills

Main-Group Elements
p Subshell fills

Legend:
Metal (Blue)
Metalloid (Purple)
Nonmetal (Orange)

Period 1: 1 H (1s¹)

Period 2: 3 Li (2s¹), 4 Be (2s²)

Period 3: 11 Na (3s¹), 12 Mg (3s²)

Period 4: 19 K (4s¹), 20 Ca (4s²)

Period 5: 37 Rb (5s¹), 38 Sr (5s²)

Period 6: 55 Cs (6s¹), 56 Ba (6s²)

Period 7: 87 Fr (7s¹), 88 Ra (7s²)

Transition Metals (d Subshell fills):

Inner-Transition Metals (f Subshell fills):

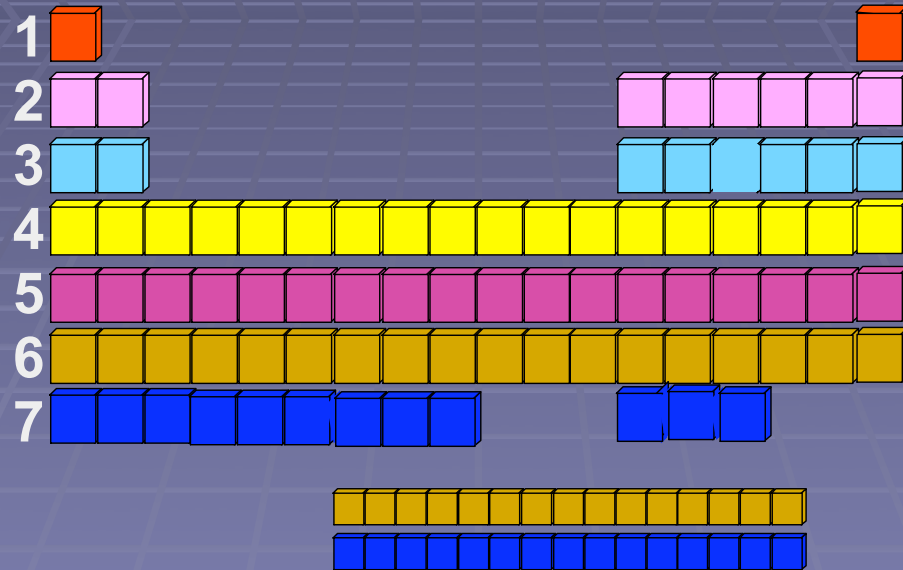
Lanthanides: 58 Ce (4f¹), 59 Pr (4f³), 60 Nd (4f⁴), 61 Pm (4f⁵), 62 Sm (4f⁶), 63 Eu (4f⁷), 64 Gd (4f⁷), 65 Tb (4f⁹), 66 Dy (4f¹⁰), 67 Ho (4f¹¹), 68 Er (4f¹²), 69 Tm (4f¹³), 70 Yb (4f¹⁴), 71 Lu (4f¹⁴)

Actinides: 90 Th (5f²), 91 Pa (5f²), 92 U (5f³), 93 Np (5f⁴), 94 Pu (5f⁶), 95 Am (5f⁷), 96 Cm (5f⁷), 97 Bk (5f⁹), 98 Cf (5f¹⁰), 99 Es (5f¹¹), 100 Fm (5f¹²), 101 Md (5f¹³), 102 No (5f¹⁴), 103 Lr (5f¹⁴)

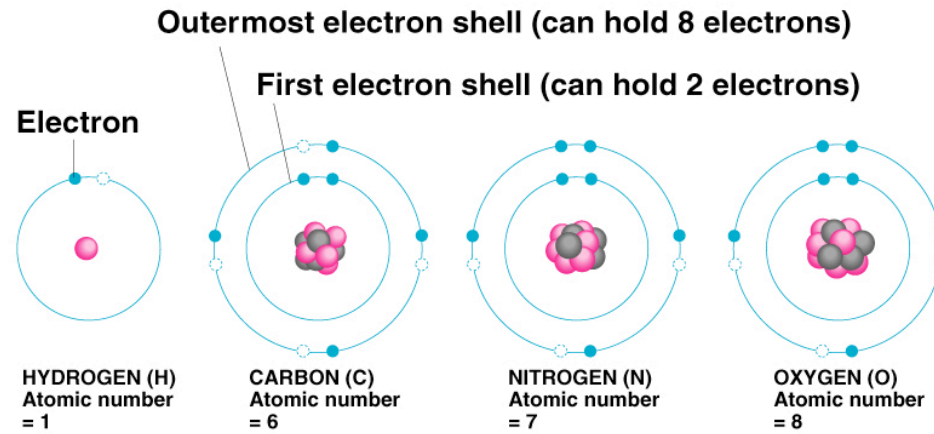
Why do elements in the same family have similar properties?

- Recall that electrons are found in a region outside the nucleus described as the electron cloud.
- The electron cloud is made up of different energy levels, sometimes called shells.
- Each energy level can hold only a certain number of electrons.
 - The first, or innermost, energy level can hold only 2 electrons.
 - The second can hold 8 electrons.
 - The third can hold 18 electrons.

The number of the period tells
you the number of energy levels



Bohr Models of Electron Energy Levels



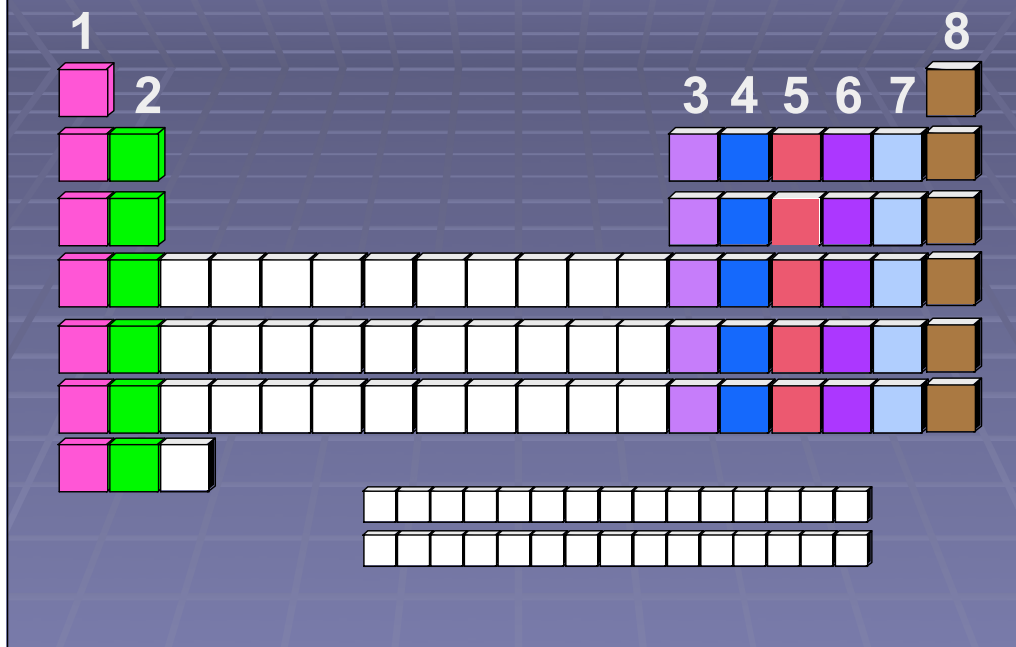
Electrons & Energy Levels

- The electrons in the outermost energy level of an atom are called valence electrons.
- The valence electrons play the most important role in determining if and how an element will combine - or form bonds - with another element.
- How can you tell how many valence electrons there will be?

Valence Electrons

- If you skip the elements in Families 3-12 on the periodic table, the other columns have a very simple pattern for determining the number of valence electrons.
- Column 1 has 1 valence electron.
- Column 2 has 2 valence electrons.
- Column 13 has 3 valence electrons.
- Column 14 has 4 valence electrons, etc.

Valence Electrons



Lewis structures

- Lewis structures, or dot diagrams, are a simple way of showing valence electrons.
- Simply draw a dot to represent each valence electron (max of 8!)
- Follow the pattern below starting with position number 1

