

Chemical Bonding

Chemical Bonding

Review Skill: Structure of the atom

1. What three subatomic particles make up an atom?

Protons, neutrons, and electrons



Chemical Bonding

Review Skill: Structure of the atom

- 2. In a neutral atom, the number of electrons equals the number of _____.
- Number of electrons is equal to the number of protons



Chemical Bonding

Review Skill: Structure of the atom

- 3. Describe the nucleus of the atom.
 - The nucleus is at the center of the atom. The nucleus of an atom contains protons, positively charged particles, and neutrons that carry no charge at all.



Chemical Bonding

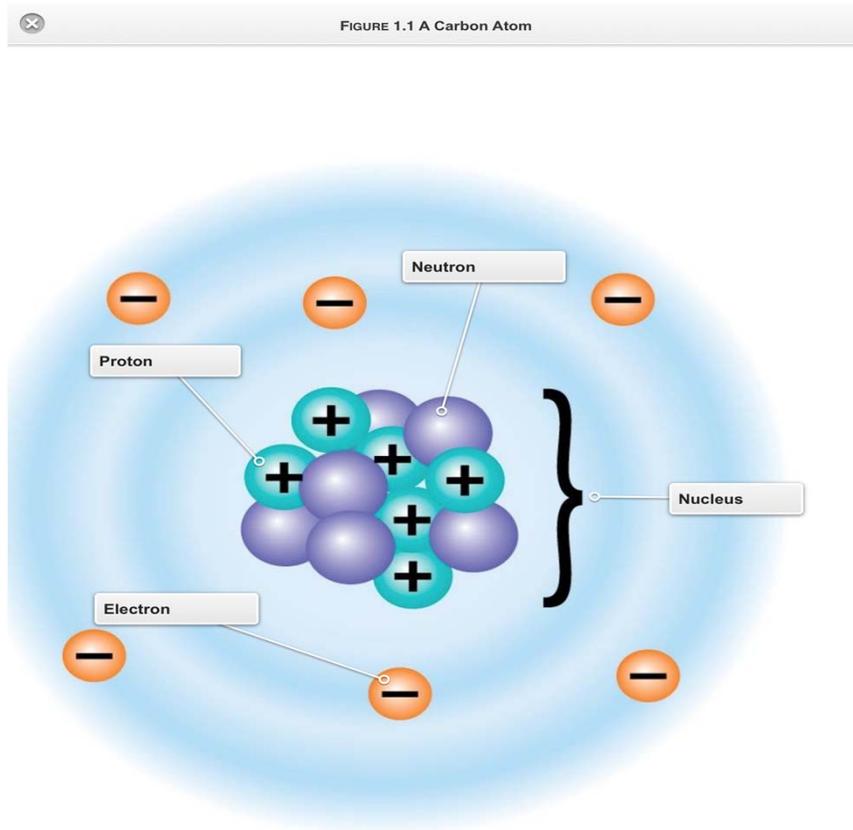
Review Skill: Structure of the atom

- 4. Describe the electrons of an atom.
- negatively charged
- in constant motion around nucleus
- if same number of protons and electrons, positive and negative charges balance out and atoms are electronically neutral



Chemical Bonding

Review Skill: Structure of the carbon atom



Chemical Bonding

Review Skill: Element

6. What is an element?

- pure substance
- consisting of one type of atom
- having the identical atomic number



Chemical Bonding

Review Skill: Element

7. What is an atomic number?

number of protons in nucleus of an element = atomic number



Chemical Bonding

Review Skill: Element

8. Give some examples of elements.

➤ C for carbon (6 protons and 6 electrons)

➤ H for hydrogen

➤ Na for sodium

➤ Hg for mercury



Chemical Bonding

Vocabulary

Compound

- a material
 - formed by the chemical combination
 - of elements in definite proportions
-
- Compounds can be chemically decomposed into simpler substances.

• Na

Cl

NaCl



sodium metal

+



chlorine gas

→



table salt

Chemical Bonding

Vocabulary

Compound

- a material
 - formed by the chemical combination
 - of elements in definite proportions
-
- Water - contains two atoms of hydrogen for each
 - atom of oxygen. H₂O

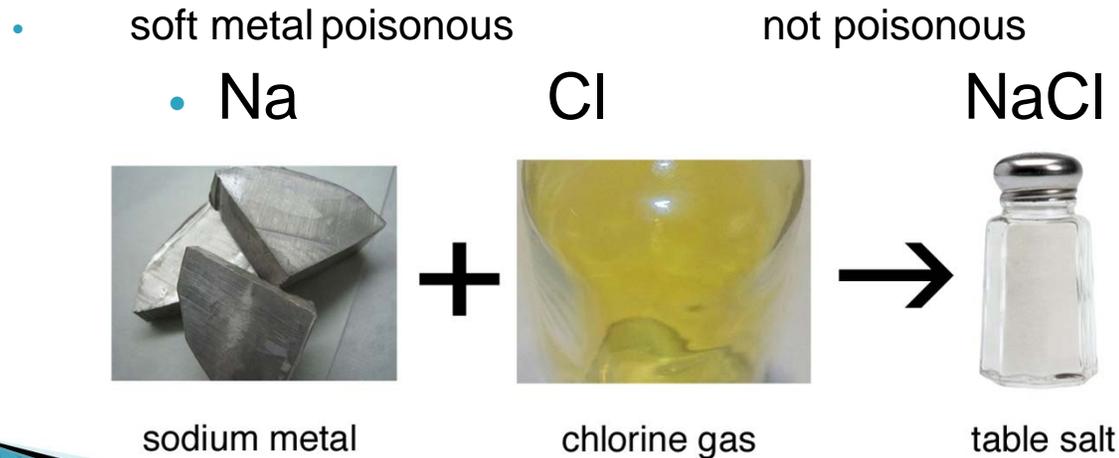


Chemical Bonding

Vocabulary

Big Idea

The physical and chemical properties of a compound are usually very different from those of the elements from which it is formed.



Chemical Bonding

Vocabulary

Bond formation involves the electrons that surround each atomic nucleus.

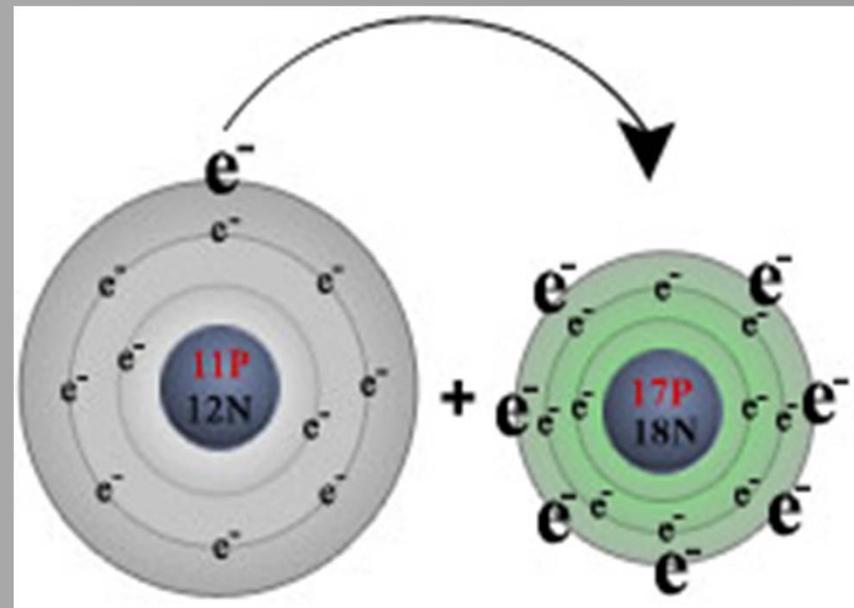
The electrons that are available to form bonds are called **valence electrons**.



Chemical Bonding

▶ Ionic bonding

- ❑ Electrons are completely transferred from one atom to another



Na

Cl

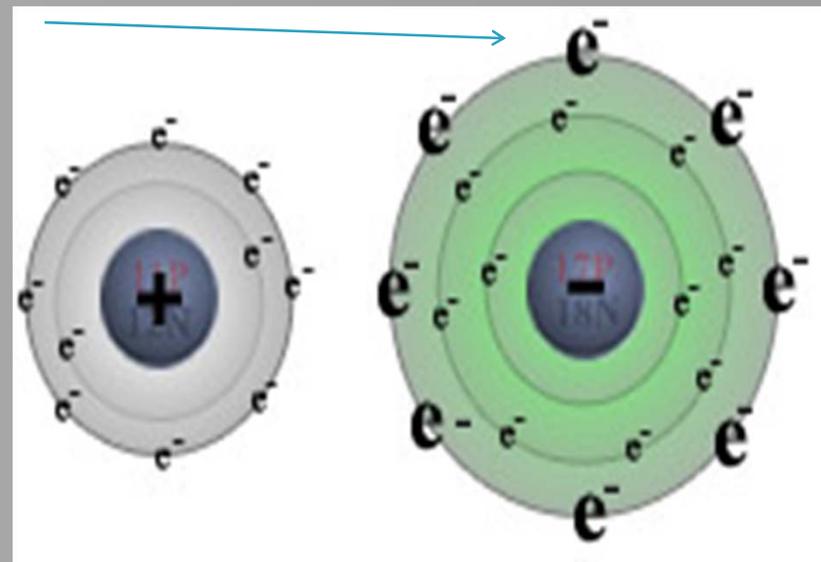
Chemical Bonding - Ionic Bonds

□ The sodium loses its one valence electron to chlorine.

□ Result -

□ positively charged sodium ion

□ a negatively charged chlorine ion

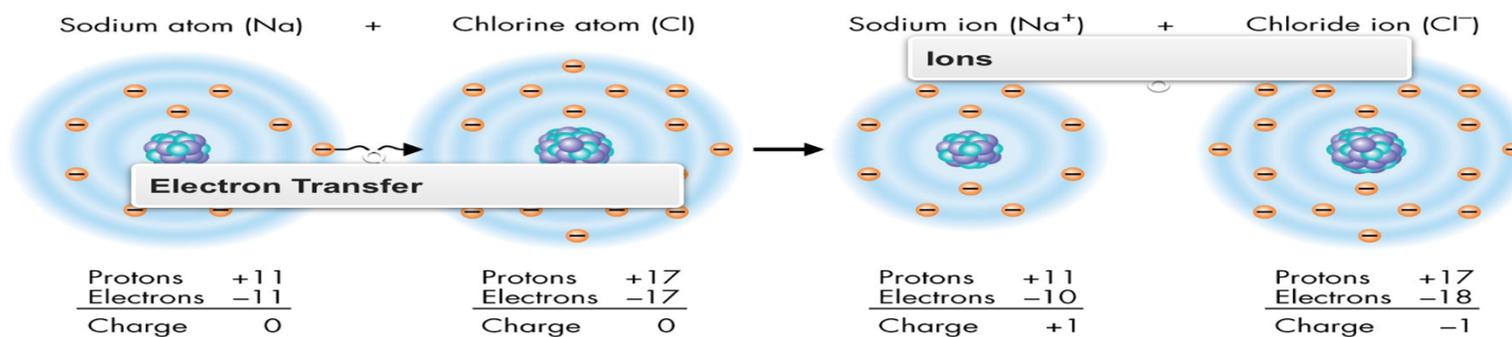


Na
Sodium

Cl
Chlorine



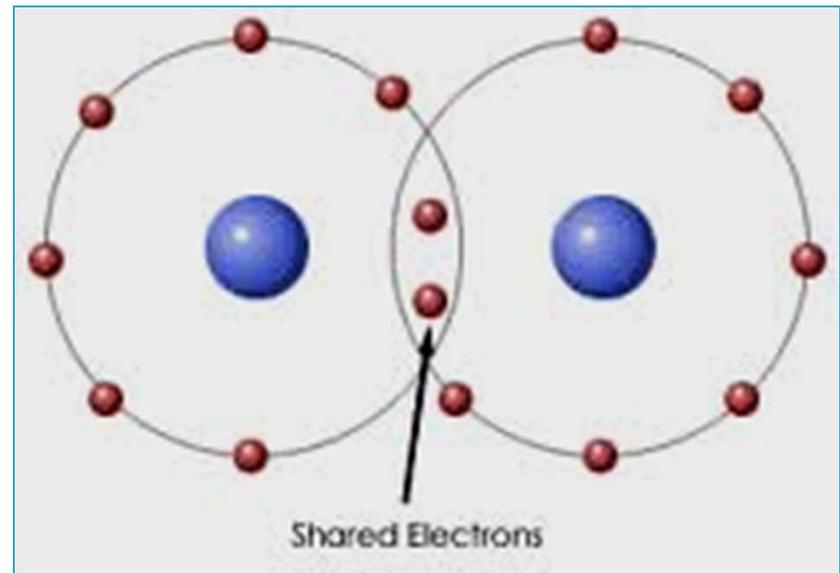
FIGURE 1.4 Ionic Bonding



The compound sodium chloride forms when sodium loses its valence electron to chlorine to form sodium and chloride ions.

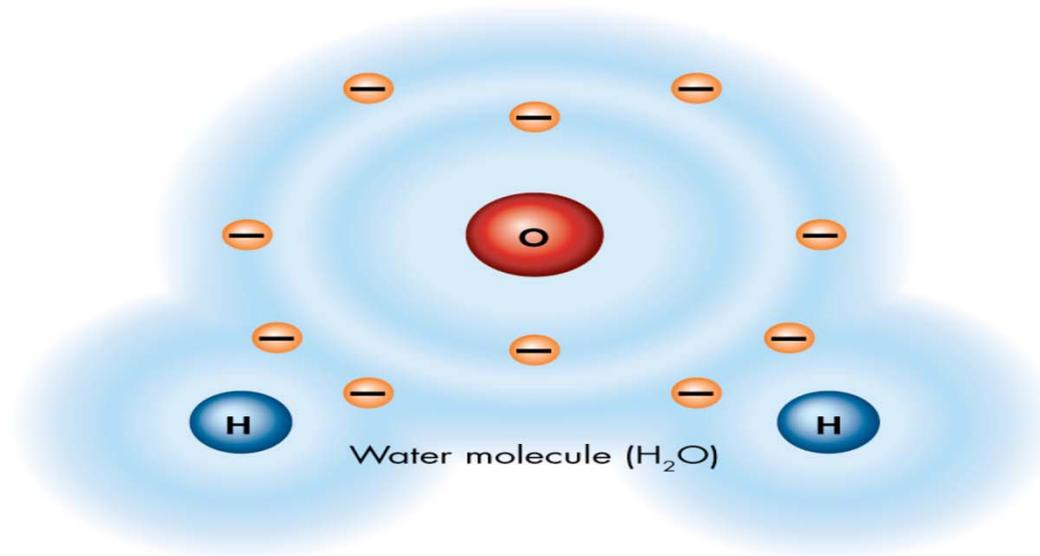
Chemical Bonding - Covalent bonding

- Shares electrons with other atoms
- Moving electrons actually travel around the nuclei of both atoms.



Chemical Bonding - Covalent bonding

FIGURE 1.5 Covalent Bonding



In a water molecule, each hydrogen atom shares two electrons with the oxygen atom.



Chemical Bonding - Covalent bonding

co valent

co - together, shared

valent - valence electrons are available to
form bonds



Chemical Bonds

- ▶ Ionic bonds
 - one or more electrons are transferred
- ▶ Covalent bonds
 - electrons are shared by atoms

Chemical Bonding

Read more about Ionic bonding and
Covalent Bonding

