

Forces of Attraction

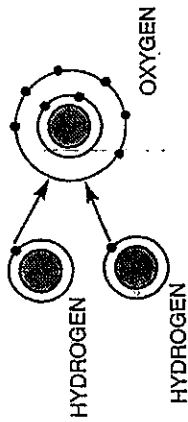
A **chemical bond** is a force that holds atoms together. Some atoms bond with many different substances. Others do not. Whether a substance bonds with another substance depends on the number of valence electrons each substance has. **Valence electrons** are electrons in an atom's outermost electron shell.

According to the **octet rule**, atoms form bonds with other atoms so that they will have eight electrons in their outer shell. Atoms with eight valence electrons are said to be **stable**. Stable elements don't react much with other elements.

Because completed electron shells are the most stable, elements without eight valence electrons react with other elements in order to fill their outer electron shell. There are two ways that atoms may complete their electron shells: they can share electrons, or they can transfer electrons.

Covalent Bonds

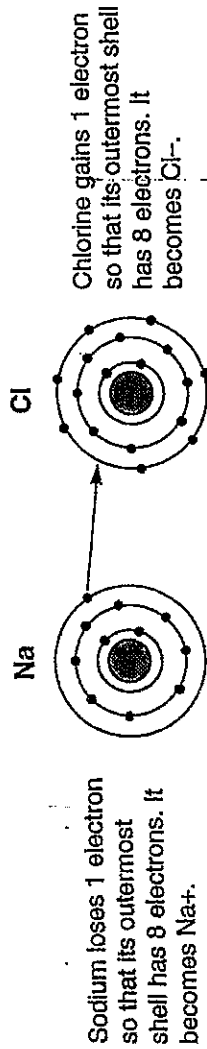
Covalent bonds are formed when atoms share electrons to fill their outer shells. A water molecule (H_2O) forms when two hydrogen atoms form covalent bonds with one oxygen atom.



Ionic Bonds

Ionic bonds are formed when atoms transfer (gain or lose) electrons. When an atom gains an electron (a negative charge), it becomes negatively charged and becomes a negative ion. When an atom loses an electron, it becomes positively charged and becomes a positive ion. Because positives and negatives attract, a bond is formed.

An ionic bond occurs when sodium and chlorine form sodium chloride (salt).



1. The noble gases (helium, neon, argon, krypton, xenon, and radon) do not react readily with other substances. Their outer electron shells are filled. How many electrons do you think noble gases have in their outer shell? _____

2. What rule does this support? _____

3. Define a chemical bond.

4. Electrons that are found in the outer most shell are called _____.

5. A substance will bond with another substance to make a compound depending on the number of _____.

6. What is the octet rule?

7. Atoms with 8 valence electrons are said to be _____ and do not react with other elements.

8. A bond that forms when atoms share their valence electrons to fill their outer orbit is called _____ bonding. An example is _____.

9. When an atom transfers its electrons to form a compound an _____ bond is formed.

10. When an atom gains an electron, it becomes _____ charged and a _____ ion is formed.

11. When an atom loses an electron from its outer orbit, leaving more protons behind, the atom becomes _____ charged and forms a _____ ion.

12. What two elements make up the compound salt?

13. What kind of bond is formed to make the compound salt?

14. Tell the difference between an "atom" and an "ion".