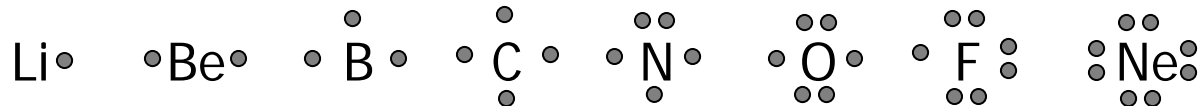


## DRAWING LEWIS STRUCTURES

**Lewis Structures** are chemical symbols using dots to show the valence electrons of atoms. **Valence electrons** are the electrons that are found in the outermost shell of an atom.



Any atom can be shown with its valence electrons. You can either count across a period to the element to determine how many valence electrons are present or simply look at the group A number at the top of the Periodic Table. Remember to only include those electrons found in the "s" and "p" blocks on the Periodic Table as the "d" and "f" block electrons are never added to the valence shell. They are "inner fillers."

Write the Lewis Symbol for the following:

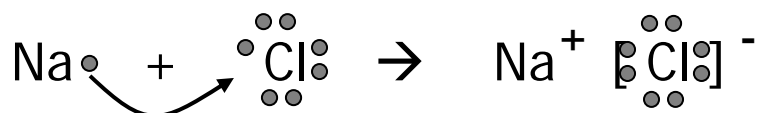


Lewis structures can also be used to illustrate the formation of ionic and covalent bonding.

## IONIC BONDING

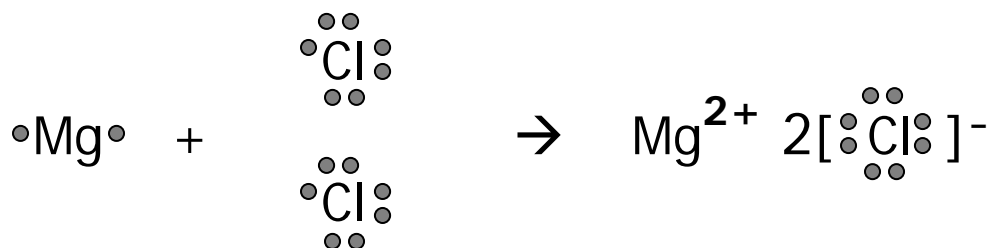
Recall that ionic bonding takes place between metals and nonmetals and occurs through *electron transfer*. Once the electrons are transferred ions are held together through electrostatic attractions (+/-). Lewis structures can be used to show this electron transfer.

EXAMPLE: formation of NaCl

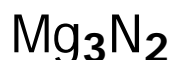
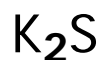


If there is more than one of an atom, simply show all present that take place in the electron transfer:

EXAMPLE: formation of MgCl<sub>2</sub>



Write the Lewis Structures showing the formation of the following compounds:



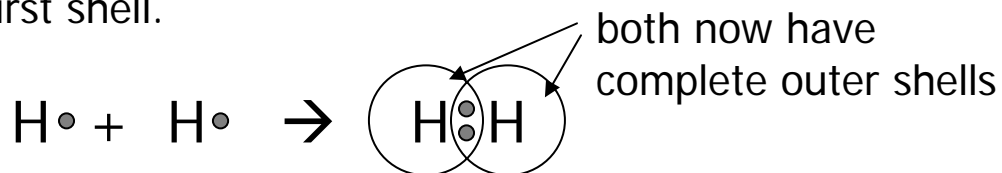
## COVALENT BONDING

Covalent bonding takes place between nonmetals and occurs through ***electron sharing***. Remember, there are no ions present here or charges to hold the compound together.

Covalent bonding takes place to enabling each of the atoms to complete their outershell electrons by ***sharing***.



Notice that each hydrogen now has a full outershell by sharing both electrons. Recall that hydrogen only needs 2 electrons to complete the first shell.



### Rules for Drawing Lewis Structures for Covalent Compounds

1. Count all valance electrons available from each of the atoms in the compound
2. Add these electrons together and divide by 2 to find the number of electron pairs.
3. Arrange the symbols symmetrically around the central atom. (The first atom in the compound is usually the central atom – except Hydrogen)
4. Give each atom an octet (except hydrogen) starting with the central atom.
  - a. If there are left over pairs of electrons place them on the central atom.
  - b. If there are too few pairs to give each atom an octet, move an unshared pair to a position of sharing to create double or triple bonds.