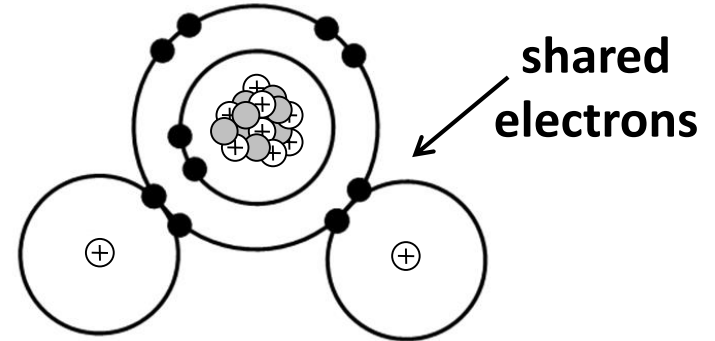


Lesson 7: Naming Binary Covalent Compounds

Nonmetals

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt									



Chemical reactions occur when atoms gain, lose, or **share** electrons.

Sharing electrons creates a covalent bond

Nonmetals can share electrons to form a covalent bond.

This creates a **molecule**.

Determine if a compound is ionic or covalent.

What elements do covalent compounds contain?

Covalent compounds
contain only **nonmetals**.

						He
B	C	N	O	F		Ne
	Si	P	S	Cl		Ar
		As	Se	Br		Kr
			Te	I		Xe
				At		Rn

What elements do ionic compounds contain?

Ionic compounds
contain a **metal** and
a **nonmetal**.

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt									

**Decide whether the compounds on
your notes are ionic or covalent.**

CO_2 _____

N_2O _____

PtO _____

HgCl_2 _____

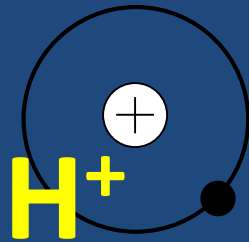
SiO_2 _____

SrBr_2 _____

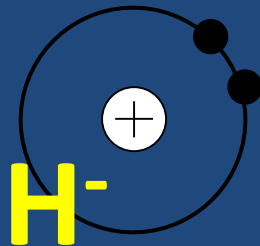
Important Facts:

Because hydrogen only has 1 proton and 1 electron, it behaves differently than any other element on the periodic table of elements.

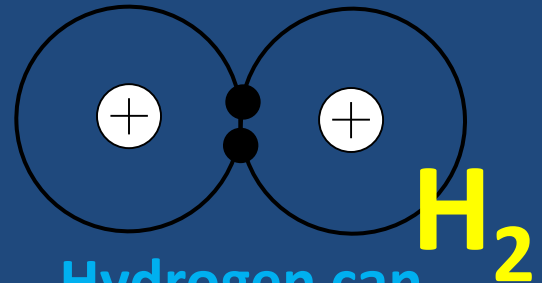
1
H
1.008
Hydrogen



Hydrogen can
donate its 1
electron.



Hydrogen can
gain 1
electron.



Hydrogen can
share
electrons.

This means that hydrogen can act as either a
metal or a **nonmetal**!

There are 7 elements that exist in nature as *diatomic* molecules.

What elements exist as diatomic molecules?

H₂, N₂, O₂, F₂, Cl₂, Br₂, I₂

																	He
Li	Be											B	C				Ne
Na	Mg											Al	Si	P	S		Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se		Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te		Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt									

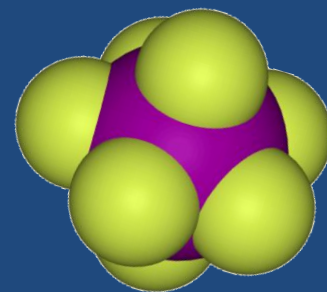
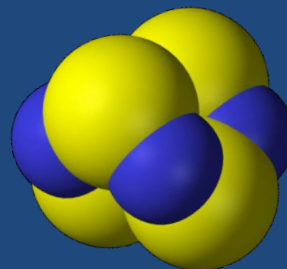
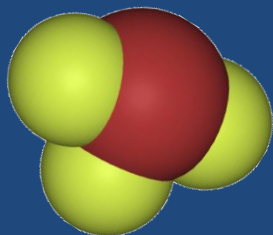
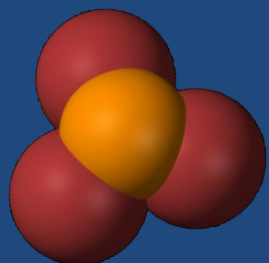
There are millions of covalent compounds. These can be classified into many different types of compounds. Each type of compound has a different set of rules for naming. You will be learning about the easiest type of covalent compound to name:

Binary Covalent Compounds

What does binary mean?

Binary means 2.

Binary covalent compounds are between 2 different nonmetals.



Nonmetals can share electrons in many different ways. This means that two nonmetals can create multiple compounds together.

carbon and oxygen



phosphorous and chlorine



nitrogen and oxygen



Each of these contains a different ratio of elements. Because of this, we have to make sure that the name of the compound explains the correct ratio.

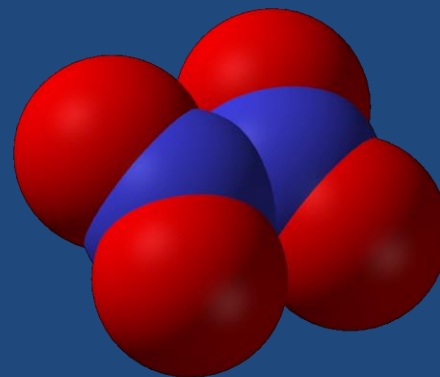
To show the correct ratio of elements, we use **prefixes**.

Prefix	Number
mono	1
di	2
tri	3
tetra	4
penta	5
hexa	6
hepta	7
octa	8
nona	9
deca	10

Steps for Naming Binary Covalent Compounds



dinitrogen **tetroxide**



Step 1: Write the name of the first nonmetal.

Step 2: Write the name of the second nonmetal changing its ending to *-ide*.

Step 3: Add prefixes to specify how many of each element are present.

Rules for Using Prefixes

Rule 1: Prefixes are only for BINARY COVALENT compounds.

Rule 2: The prefix *mono-* is never used on the first element of a binary covalent compound. Without a prefix it is assumed that there is only 1.

Example: CO₂ is carbon dioxide, and not ~~monocarbon dioxide~~.

Rule 3: Remove the **-o** or **-a** from a prefix before adding it to nonmetal that starts with a vowel.

Example: CO is carbon monoxide, and not ~~carbon monoxide~~.

How would you write each of the prefixes in front of oxide?

Remember: Remove the **-o** or **-a** from a prefix before adding it to oxide. Leave **-i** alone.

mono- monoxide

tri- trioxide

penta- pentoxide

hepta- heptoxide

nona- nonoxide

di- dioxide

tetra- tetroxide

hexa- hexoxide

octa- octoxide

deca- decoxide

Name the binary covalent compounds that are found on your notes.

CO_2 : carbon dioxide

CS_2 : carbon disulfide

PBr_3 : phosphorous tribromide

PBr_5 : phosphorous pentabromide

P_2S_5 : diphosphorous pentasulfide

N_2S : dinitrogen monosulfide

SiS_2 : silicon disulfide

NBr_3 : nitrogen tribromide

N_2Cl_4 : dinitrogen tetrachloride

Because of the prefixes, it is very easy to go from the name of a binary covalent compound to its formula.

dinitrogen tetrafluoride



Step 1: Write the symbol of the first nonmetal and the subscript that matches the prefix.

Step 2: Write the symbol of the second nonmetal and the subscript that matches the prefix.

Write the formulas of the binary covalent compounds in your notes.

What is the formula of each of the binary covalent compounds named below.

carbon tetrachloride CCl_4

phosphorous pentachloride PCl_5

dinitrogen monoxide N_2O

carbon monosulfide CS

boron trihydride BH_3

disulfur hexabromide S_2Br_6

silicon disulfide SiS_2

phosphorous triiodide PI_3

nitrogen trichloride NCl_3

iodine heptafluoride IF_7

dinitrogen tetroxide N_2O_4

phosphorous trichloride PCl_3

carbon monoxide CO

iodine monochloride ICl

tetrasulfur tetranitride S_4N_4

dihydrogen monoxide H_2O

chlorine pentafluoride ClF_5

nitrogen dioxide NO_2

Once you decide if a compound is **ionic** or **covalent** you know whether or not to use prefixes.

Only COVALENT COMPOUNDS
use PREFIXES!

Do NOT make the mistake of using prefixes with ionic compounds. You will be forced to decide between answer choices with and without prefixes on your exam. Know the difference!