Name: _____

Period: _____

Covalent Compounds

3.4

When two nonmetals bond neither one is willing to lose their electrons. Why? Because they are too close to having a full octet of valence electrons. So they share.

Use x's or dots for different atoms

If you use only dots you won't be able to see where the electrons came from.

Hard to read

Easy to read

Remember the dots are Valence Electrons

Chlorine has 7 valence electrons
Chlorine needs 1 more to be full.

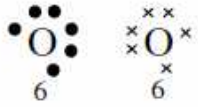
Phosphorus has 5 valence electrons
Phosphorus needs 3 more to be full.

And the dots can be moved to wherever you need them.

Covalent Bonding

You must fulfill two criteria when making covalent bonds:
1) **the individual atoms must have the proper number of valence electrons;**
2) **when bonded each atom must have 8 electrons through sharing.**

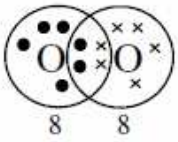
Oxygen does not exist as an individual atom.



Each oxygen has only 6 valence electrons and needs 2 more.

Oxygen is a *diatomic molecule*: it is found as a molecule of 2 atoms.

Molecular Oxygen: O_2



Together each oxygen has 8 valence electrons thru *sharing*.

Oxygen dichloride: OCl_2

Short hand

Short Hand

Though Lewis Dot Diagrams are a powerful tool to determine how elements bond, they take a long time to draw. Chemists use lines to show bonds.

A Covalent Bond

—

Each line means 2 electrons are shared

Single bond—each atom shares 1 electron (2 total)

means

A *single* covalent bond.

Each Fluorine has 7 v.e. plus 1 for the 1 bond = 8!

Double bond—each atom shares 2 electrons (4 total)

means

A *double* covalent bond.

Each Oxygen has 6 v.e. plus 2 for the 2 bonds = 8!

Triple bond—each atom shares 3 electrons (6 total)

means

A *triple* covalent bond.

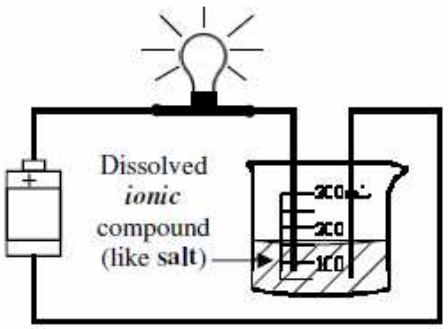
Each Nitrogen has 5 v.e. plus 3 for the 3 bonds = 8!

Electrolytes

Electrolytes are compounds that allow electricity to flow when they are dissolved in water. Ionic compounds are good electrolytes. Covalent compounds are not.

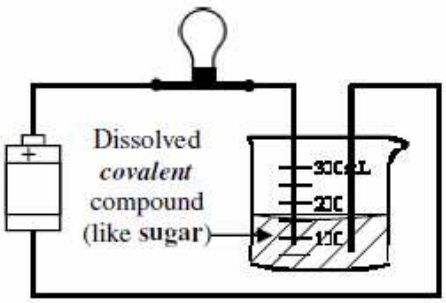
Ionic Compounds are Electrolytes

Ionic compounds dissolve into ions. Ions conduct electricity.



Covalent Compounds are NOT Electrolytes

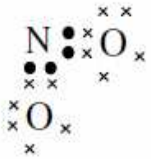
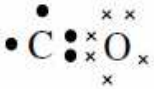
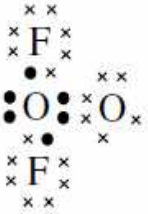
Covalent compounds do not dissolve into ions and do not conduct electricity.



All sections marked with a ⚛ are considered essential concepts and must be completed to receive full credit on WS.

1. X's 2. Covalent 3. Ionic 4. Diatomic Molecule 5. 8 Valence Electrons	A. A bond of negatively and positively charged atoms. B. Used instead of dots to show a different atom's valence electrons. C. A bond where electrons are shared. D. Number of electrons each atom in a covalent compound has after sharing. E. A molecule of two atoms of the same element.	1. Electrolyte 2. Double Bond 3. Triple Bond 4. Line (—) 5. Single Bond	A. When 4 valence electrons are shared. B. Used instead of dots to simplify the writing on bonds. Means 2 electrons. C. Shows 6 valence electrons being shared. D. Something dissolved in water that allows electricity to flow. E. Occurs when 2 valence electrons are shared in a covalent compound.

Decide what's wrong with these covalent compounds and then draw them correctly..

Wrong	*Right*	*Wrong*	*Right*	*Wrong*	*Right*
					

Using the short hand notation, count how many electrons the atoms have and if they have a full number of valence electrons.

P≡ # of electrons: *8* Full? *Yes*.		O— # of electrons: _____ Full? _____	
C= # of electrons: _____ Full? _____		N= # of electrons: _____ Full? _____	
Cl— # of electrons: _____ Full? _____		=Si— # of electrons: _____ Full? _____	
I= # of electrons: _____ Full? _____		—S— # of electrons: _____ Full? _____	

Draw the Lewis Dot Diagram for molecular Chlorine (Cl_2).

Short hand

Draw the Lewis Dot Diagram for molecular Oxygen (O_2).

Short hand

Using Lewis Dot Diagrams to predict how Oxygen and Fluorine will combine.

Short hand

Using Lewis Dot Diagrams to predict how Nitrogen and Bromine will combine.

Short hand

Are these Electrolytes? Yes or No?

NaCl	_____	Li_2S	_____
CO_2	_____	Al_2O_3	_____
$MgCl_2$	_____	SeO	_____
NBr_3	_____	FeO	_____
BeO	_____	$Li(NO_3)$	_____

In this setup, is the dissolved compound ionic or covalent?

How do you know?