

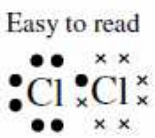
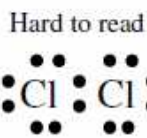
Name: _____
 Period: _____

Covalent Compounds

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.



Remember the dots are Valence Electrons

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



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

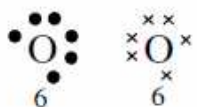
Phosphorus has 5 valence electrons
 Phosphorus needs 3 more to be full.



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.

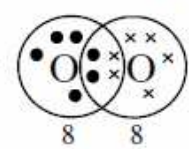
Oxygen does not exist as an individual atom.



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

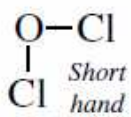
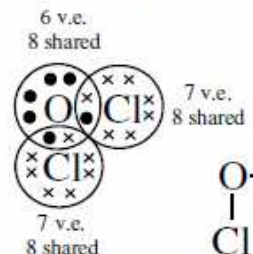
Oxygen is a diatomic molecule: it is found as a molecule of 2 atoms.

Molecular Oxygen: O₂



Together each oxygen has 8 valence electrons thru sharing.

Oxygen dichloride: OCl₂



Short Hand

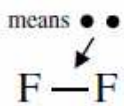
Though Lewis Dot Diagrams are a powerful tool to determine how elements bond, they take a long time to draw. Chemists use lines to show bonds.

A Covalent Bond



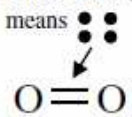
Each line means 2 electrons are shared

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



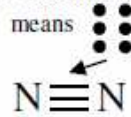
A single covalent bond.
 Each Fluorine has 7 v.e. plus 1 for the 1 bond = 8!

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



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)

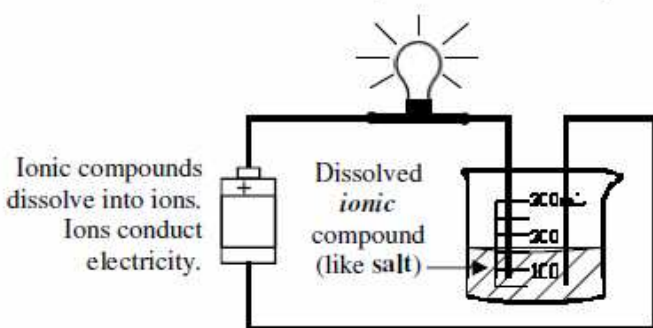


A triple covalent bond.
 Each Nitrogen has 5 v.e. plus 3 for the 3 bonds = 8!

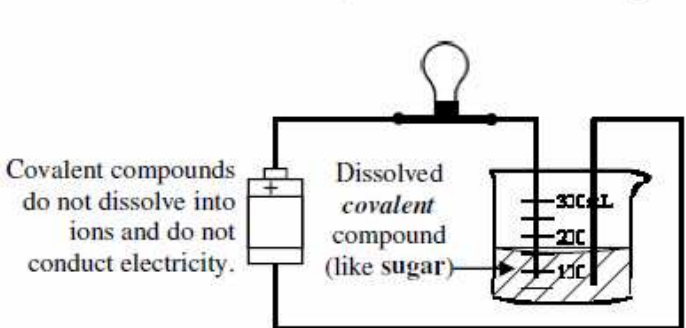
Electrolytes

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



Covalent Compounds are NOT Electrolytes



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

O — # of electrons: _____ Full? _____

C = # of electrons: _____ Full? _____

N = # of electrons: _____ Full? _____

Cl — # of electrons: _____ Full? _____

\equiv Si — # of electrons: _____ Full? _____

I = # of electrons: _____ Full? _____

—S— # of electrons: _____ Full? _____

Draw the Lewis Dot Diagram for molecular Chlorine (Cl₂).

Short hand

Draw the Lewis Dot Diagram for molecular Oxygen (O₂).

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 _____ Li₂S _____

CO₂ _____ Al₂O₃ _____

MgCl₂ _____ SeO _____

NBr₃ _____ FeO _____

BeO _____ Li(NO₃) _____

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

How do you know?

