

Oxygen:

symbol _____ atomic number _____
 _____ protons _____ electrons
 electron distribution _____

Oxygen has _____ valence electrons.

Electron Dot Diagram - atom's _____ surrounded by _____
 to represent its _____ electrons

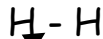
example electron dot diagrams: O Li

Problem Set 1:

Lewis Structure: diagram representing the arrangement of _____
 electrons in a _____.

Most atoms need _____ valence electrons to become stable. The exceptions are H
 and He which need only _____ valence electrons to be stable.

Lewis structure for H₂



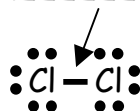
shared pair

- 2 electrons belonging to both _____
- represented by a _____ between symbols

Lewis structure for Cl₂ :

Each Cl atom has _____ valence electrons, giving a total of _____ valence electrons to work with.

_____ pair



unshared pair

- electrons belonging to only one _____
- represented by 2 dots

Lewis structure for HCl:



When more than two atoms bond, you must determine which is central.

The central atom is:

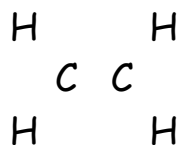
- frequently _____
- never _____
- often atom with _____ electronegativity

Lewis structure for CH₃I:

(There are a total of _____ valence electrons to work with.)

Problem Set 2:

Lewis structure of ethene, C_2H_4 (has total of _____ valence electrons)

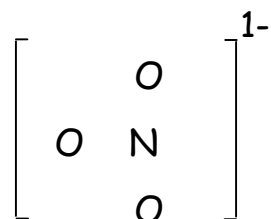


type of bond	pairs of electrons shared

Problem Set 3:

Polyatomic Ion: _____ bonded group of ions with a _____

ex: NO_3^{1-} (has gained _____ electron to give a total of _____ valence electrons to work with)



Work Problem Set 4 on back:

The Chemistry Quiz

CR1. CR2. 1. 2. 3. 4. 5.

CHEMISTRY: A Study of Matter

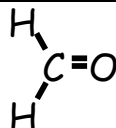
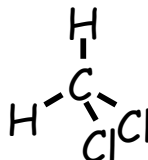
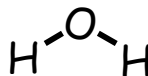
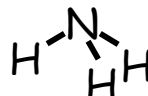
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5.8

Any molecule containing only _____ atoms has a _____ shape.

To predict shapes of molecules with more than 2 atoms we use the VSEPR theory:

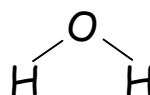
- VSEPR stands for _____ - _____, _____ - _____
- Since electrons _____ each other, electrons pairs will be as _____ apart as possible.

shape	number of atoms bonded to central atom	number of unshared pairs of electrons	example
linear (____° angle)			$O=C=O$
trigonal planar (____° angles)			
tetrahedral (____° angles)			
bent			
trigonal pyramidal			

Polar Molecules:

- must contain at least one _____ bond
- are shaped so that there is a _____ and a _____ end

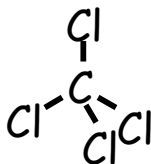
example of a polar molecule:



Non-polar Molecule:

- contains only _____ bonds -or-
- contains polar bonds, but has no _____

example of a non-polar molecule:



Intermolecular Forces

- _____ of attraction _____ molecules
- are _____ than covalent and ionic bonds
- 3 types:
 1. Dipole-dipole forces:
 - force of attraction between the _____ end of one _____ and the _____ end of another molecule
 - the _____ of all the intermolecular forces
 2. Hydrogen Bonding:
 - occurs in molecules with H - _____, H - _____, and H - _____ bonds
 - large _____ charge on H is attracted to an _____ pair of electrons on a neighboring _____
 3. London Dispersion Forces:
 - _____ intermolecular forces resulting from constant _____ of _____
 - the only type of intermolecular force between nonpolar molecules

The Chemistry Quiz

CR1.

CR2.

1.

2.

3.

4.

5.

**Worksheet: Molecular Geometry and
Intermolecular Forces**

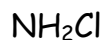
Name _____

Molecular Geometry

A molecule consisting of only two atoms has a _____ shape. A molecule with _____ atoms bonded to the central atom with _____ unshared pair(s) of electrons has a **linear** shape. A molecule with _____ atoms bonded to the central atom with _____ unshared pair(s) of electrons has a **trigonal planar** shape. A molecule with _____ atoms bonded to the central atom with _____ unshared pair(s) of electrons has a **tetrahedral** shape. A molecule with _____ atoms bonded to the central atom with _____ unshared pair(s) of electrons has a **bent** shape. A molecule with _____ atoms bonded to the central atom with _____ unshared pair(s) of electrons has a **trigonal pyramidal** shape.

Predicting Molecular Shapes

Draw each molecule and predict the shape each molecule will form.



Polarity in Molecules

Determine the type of bonds in each of these molecules using the "Table of Electronegativities." Then, determine whether each of these molecules will be polar or nonpolar. Explain your reasoning.

IBr

CCl_4

PCl_3

H_2S

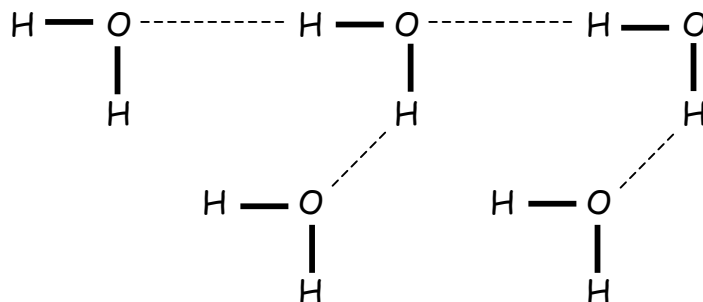
C_2H_2

SO_3

NH_2Cl

Intermolecular Forces

While bonding is the force of attraction WITHIN molecules,
_____ are the forces of attraction BETWEEN molecules.
Circle these forces in the following diagram.



Define "Dipole-dipole Forces."

Define "Hydrogen Bonding."

Define "London-Dispersion Forces."

molecule	Lewis Structure	<i>bonded to central atom:</i> atoms unshared pairs		shape of molecule	TI	polarity of bonds	polarity of molecules
HI							
CBr₄							
H₂S							
HCN							
CCl₄							

molecule	Lewis Structure	<i>bonded to central atom:</i>		shape of molecule	TI	polarity of bonds	polarity of molecules
		atoms	unshared pairs				
SF₂							
PCl₃							
CH₃Cl							
CH₂S							
SCl₂							