

Name: Key Date: _____ Period: _____

Chemical Bonding

(Lewis Structures)

How does chemical bonding determine molecule geometry?

1. Using H_2 and F_2 ... which molecule uses the **duet rule** which molecule uses the **octet rule**, why?

$H, H \rightarrow$ duet rule

2. List the steps for drawing Lewis Structures:

1) Sum the valance electrons

2) Identify the center atom

3) Connect the atoms to the central atom

4) Place dots in pairs to complete the octet for all atoms except H (only 2)

3. Complete the following chart:

5) Check the sum of e's - reduce with double + triple bonds

Molecule	Name of Compound	# Valence electrons	Lewis Structure
NH_3	Ammonia	8	$ \begin{array}{c} H \\ \\ H - N - H \\ \\ \cdot\cdot \end{array} $
CH_4	methane	8	$ \begin{array}{c} H \\ \\ H - C - H \\ \\ H \end{array} $
H_2	Hydrogen	2	$H - H$
O_2	oxygen	12	$:\ddot{O} = \ddot{O}:$

H_2O	water	8	$H - \overset{\cdot\cdot}{\underset{\cdot\cdot}{O}} - H$
$4+2=6$ CO_2	Carbon dioxide	16	$\overset{\cdot\cdot}{\underset{\cdot\cdot}{O}} = C = \overset{\cdot\cdot}{\underset{\cdot\cdot}{O}}$
$5+4-1=8$ NH_4^+	Ammonium Ion	8 8	$\left[\begin{array}{c} H \\ \\ H - N - H \\ \\ H \end{array} \right]^+$
$5+18-1=24$ NO_3^-	Nitrate Ion	24	$\left[\begin{array}{c} \overset{\cdot\cdot}{\underset{\cdot\cdot}{O}} \\ \\ \overset{\cdot\cdot}{\underset{\cdot\cdot}{O}} - N = \overset{\cdot\cdot}{\underset{\cdot\cdot}{O}} \\ \end{array} \right]^-$
$8+6=14$ C_2H_6	ethane	14	$\begin{array}{c} H & H \\ & \\ H - C - C - H \\ & \\ H & H \end{array}$
$12+8=20$ C_3H_8	propane	20	$\begin{array}{c} H & H & H \\ & & \\ H - C - C - C - H \\ & & \\ H & H & H \end{array}$
O_3	OZONE	18	$\overset{\cdot\cdot}{\underset{\cdot\cdot}{O}} - \overset{\cdot\cdot}{\underset{\cdot\cdot}{O}} = \overset{\cdot\cdot}{\underset{\cdot\cdot}{O}}$
$4+28=32$ CCl_4	carbon tetrachloride	32	$\begin{array}{c} \overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}} \\ \\ \overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}} - C - \overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}} \\ \\ \overset{\cdot\cdot}{\underset{\cdot\cdot}{Cl}} \end{array}$