

Name: \_\_\_\_\_

### Ionic Practice

1. Describe how an ionic bond forms.
2. Ionic bonds form between which two types of elements? Why?
3. For each element, draw the Lewis dots diagram (based on valence electrons).
  - a) K
  - b) F
  - c) Se
  - d) Ca
  - e) O
  - f) N

4. For each set of elements, use the criss-cross method to determine the correct chemical formula.

- a) Ba Cl
- b) Rb Br
- c) Ca O
- d) Li N
- e) Na P
- f) Al F

5. For each compound draw the dot diagrams and show how the electrons are transferred.

- a) NaI
- b) CaF<sub>2</sub>
- c) BaO
- d) K<sub>2</sub>S
- e) RbF
- f) Li<sub>3</sub>N

Name: \_\_\_\_\_

### Covalent Practice

1. Describe how a covalent bond forms.
2. Covalent bonds form between what kinds of elements?
3. For each element, draw the Lewis dots diagram (based on valence electrons).
  - a) N
  - b) Cl
  - c) Se
  - d) P
  - e) Br
  - f) I
4. For each compound, draw the Lewis dot diagram.
  - a) CH<sub>4</sub>
  - b) PH<sub>3</sub>
  - c) H<sub>2</sub>O
  - d) HCN
  - e) N<sub>2</sub>
  - f) BF<sub>3</sub>
  - h) SiO<sub>2</sub>

### Summary of Chemical Bonds

Type of Bond	Describe the bond.	How does it form? (What happens to e-?)	What kind(s) of element(s) form it?	What is the smallest unit called?	Properties
Ionic					
Covalent					
Metallic					

### Molecular Shapes

Formula	Lewis Diagram	Shape	Angle Between Bonds
HBr			
BeF <sub>2</sub>			
BCl <sub>3</sub>			
CH <sub>4</sub>			
NH <sub>3</sub>			
H <sub>2</sub> Se			
HCN			
PF <sub>3</sub>			
CBr <sub>4</sub>			

- Why do atoms obey the octet rule when forming ions?
- An ionic bond occurs between what two types of elements?
- What holds an ionic bond together?
- A covalent bond occurs between what two types of elements?
- Determine the number of valence electrons for each:
  - Be
  - P
  - Cl
- How do each of these elements obey the octet rule when forming compounds? (Do they gain or lose electrons? How many?)
  - gallium:
  - potassium:
  - sulfur:
  - bromine:
- What is the electron configuration for each:
  - a magnesium ion:
  - a bromine ion:
  - a germanium ion:
- What is the net charge on any ionic compound (i.e.  $MgBr_2$ )?
- What is the formula unit when the following elements come together to form a compound?
  - calcium and chlorine
  - lithium and oxygen
  - calcium and sulfur
  - beryllium and phosphorus

- Identify these as characteristics of "ionic", "covalent", or "metallic":
  - conducts electricity when melted or dissolved.
  - usually liquids or gases at room temperature
  - made of a metal and a nonmetal
  - high melting points
  - sea of electrons
  - solids at room temperature
  - forms molecules
  - brittle
  - dissolve easily in water
- List the 7 diatomic molecules:
- In a single covalent bond, how many electrons are being shared between the two atoms?
- What is a lone pair?
- Draw the following molecules and name each shape:
  - $N_2$
  - $Br_2$
  - $HCN$
  - $SeCl_2$
  - $AlCl_3$
  - $PBr_3$
  - $SiBr_4$

- Use the difference in electronegativities to determine the type of bond that each would form (ionic, polar covalent, or nonpolar covalent):
  - magnesium (1.2) and iodine (2.5)
  - calcium (1.0) and oxygen (3.5)
  - carbon (2.5) and selenium (2.4)
- Explain a hydrogen bond:

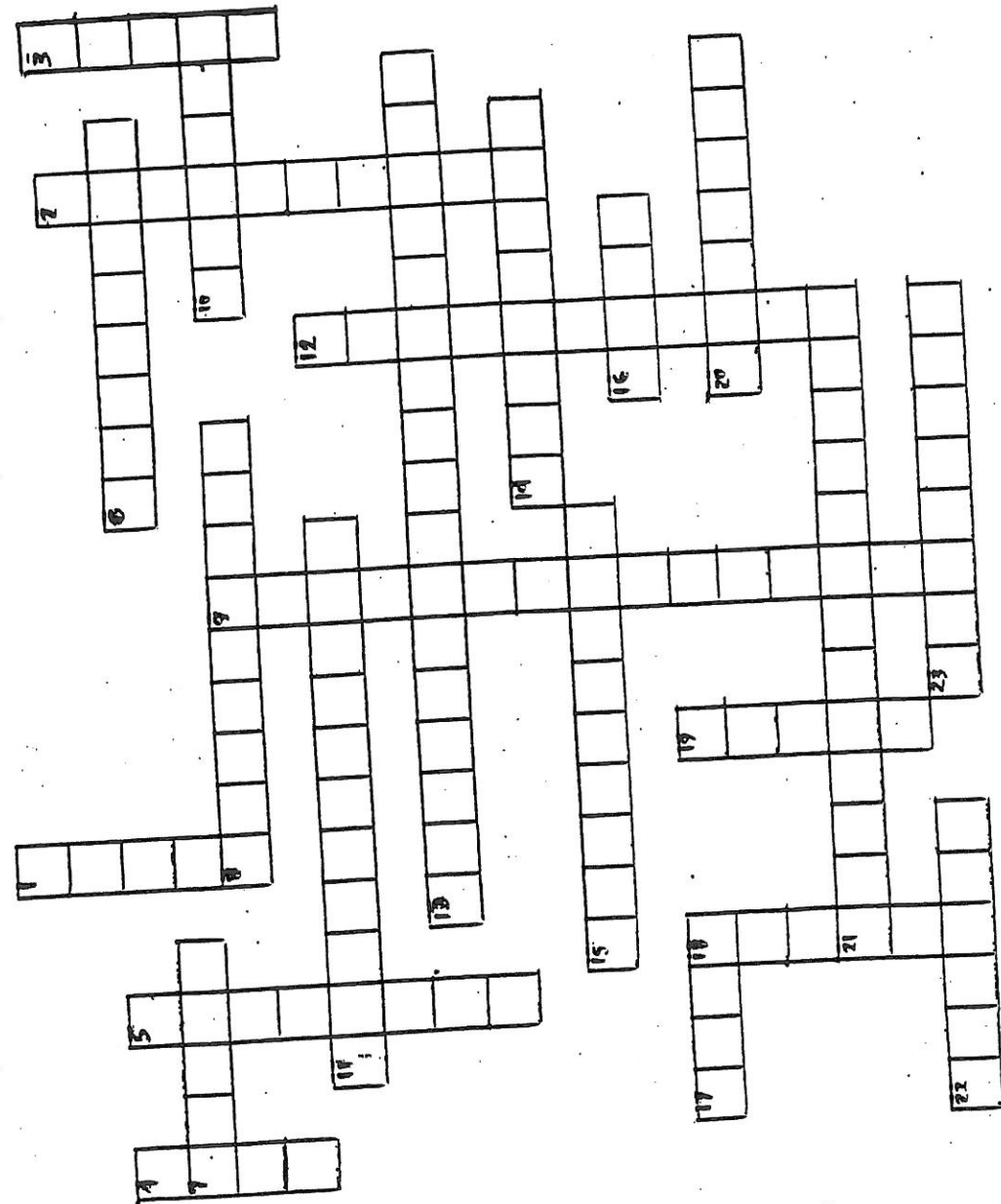
Polarity

Formula	Structure	Name of Shape	Polar?
$F_2$			
$HCl$			
$CO_2$			
$CH_4$			
$H_2O$			
$BeCl_2$			
$NH_3$			
$BF_3$			
$CH_3Cl$			

# Bonding

Across

- 6 The type of bond that involves metals and their "sea" of electrons
- 7 The type of bond formed when electrons are transferred
- 8 Covalent bonds only involve these types of elements



- 10 The intermolecular force that occurs between two polar molecules
- 11 The lowest whole-number ratio of ions in an ionic compound
- 13 This determines what type of bond is formed
- 14 The kind of bond that happens when atoms share electrons
- 15 A property of metals that shows they can be bent (not crumbled)
- 16 The sum of the charges in an ionic compound must always equal this
- 17 The shape of a water molecule
- 20 A regular, repeating arrangement of atoms, ions, or molecules
- 21 A group of atoms with an overall charge
- 22 The shape of a carbon dioxide molecule
- 23 The intermolecular force that occurs between a hydrogen atom of one molecule and either N, O, or F of a different molecule

Down

- 1 The element that is an exception to the octet rule and only needs 6 electrons to be stable
- 2 The intermolecular force that occurs between two nonpolar molecules
- 3 The rule that says atoms bond to attain 8 valence electrons
- 4 The kind of melting point that an ionic compound has
- 5 The type of molecule that consists of 2 of the same type of atom bonded together
- 9 The shape of  $\text{PH}_3$
- 12 The shape of  $\text{CH}_4$
- 18 The shortest covalent bond
- 19 The type of covalent bond that happens when 2 atoms do not share electrons equally