

Name _____ Date _____

Ionic Bonding**Directions:** Use the terms below to fill in the questions. Each term will only be used once.

Chemical Bond	Electrons	Ions	
Nucleus	Octet	Electrolytes	valence

- The force that holds two atoms together is called a _____.
- The attachment may form by the attraction of the positively charged _____ and the negatively charged _____ of another atom.
- When an atom gains or loses electrons it forms a(n) _____. The electrons that are gained or lost are the _____ electrons. Elements that have a stable 8 electrons or an _____, do not form ions.
- Ionic bonds regularly form _____ which means they can conduct electricity when dissolved in water.

Directions: choose the correct answer from each of the multiple choice questions below.

- An ionic bond is _____.
 - Attraction of an atom for its electrons.
 - A force that holds together neutral atoms
 - Attraction of atoms for electrons they share
 - A force that transfers electrons from one atom to another
- The overall charge of an ionic compound is always _____.
 - zero
 - positive
 - negative
 - any value
- How many chloride ions are present in a formula unit if chlorine is bonded to the magnesium ion?
 - one half
 - one
 - two
 - four
- Ionic bonds generally occur between _____.
 - Metals
 - non-metals
 - a metal and non-metal
 - noble gases

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Directions: Write the neutral compounds that form between the ions below.

	N^{-3}	O^{-2}	Cl^{-}	NO_3^{-}	SO_4^{2-}	OH^{-}
Ca^{+2}						
H^{+}						
Fe^{+3}						
NH_4^{+}						
Zn^{2+}						
Ag^{+}						
Mg^{+2}						

Directions: Write the Lewis Dot Diagram for the following compounds.

- 1) CaCl_2
- 2) Na_3P
- 3) Al_2O_3

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Covalent, Metallic and Ionic Bond Concepts

Directions: Circle the bond type being described by the statement given.

- | | | | |
|------------------------------------|-------|----------|----------|
| 1. High Melting Point | Ionic | Covalent | Metallic |
| 2. Brittle | Ionic | Covalent | Metallic |
| 3. Conducts electricity as a solid | Ionic | Covalent | Metallic |
| 4. An electrolyte | Ionic | Covalent | Metallic |
| 5. Involves a sea of electrons | Ionic | Covalent | Metallic |
| 6. Low Boiling point | Ionic | Covalent | Metallic |

Directions: Choose the correct answer for each multiple choice question below.

- Which of the following relationships relating to bond length is correct?
 - The shorter the bond the stronger the bond
 - The shorter the bond the weaker the bond
 - The shorter the bond the fewer the electrons making the bond
 - The shorter the bond the lower the bond energy
- How many electrons are shared in a double covalent bond?
 - None
 - Two
 - Three
 - Four
- Which of the following elements represents a diatomic molecule?
 - Lithium
 - Nitrogen
 - Calcium
 - Sulfur
- Which answer places the bonds in order of **decreasing** strength?
 - Ionic, Covalent, Metallic
 - Metallic, Covalent, Ionic
 - Metallic, Ionic, Covalent

Directions: Identify the bond type for each of the examples below (choose: Ionic, Covalent or Metallic)

- | | | | |
|--------------------------|----------------------------|---------------|---------------|
| 1) CO ₂ _____ | 2) BaSO ₄ _____ | 3) Cu _____ | 4) KI _____ |
| 5) CH ₄ _____ | 6) H ₂ O _____ | 7) LiBr _____ | 8) NaOH _____ |

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Molecular Shapes and VSEPR

Directions: Draw the Lewis dot diagram for each of the molecules below. Be sure to also tell the shape that was drawn. Lastly, label each as polar or nonpolar.

Cl_2	H_2S
H_2O	OCl_2
CO_2	CCl_2F_2
NH_3	O_2
CH_4	N_2

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Polarity and Intermolecular Forces

1. What is the difference between an intermolecular force and an intramolecular force?
2. What is the strongest type of intermolecular force for each of the following compounds? (Hint: draw the VSEPR structure first)
 - a. NH_3
 - b. CH_4
 - c. HCl
 - d. F_2
3. Which of the compounds above would have the **highest** boiling point? Why did you choose that compound? Be specific about intermolecular forces.
4. Identify if the compounds in question 2 are polar or non-polar molecule.
5. Unequal sharing of electrons between two bonded atoms indicates a _____.
 - a) Non polar covalent bond
 - b) polar covalent bond
 - c) An ionic bond
6. A molecule of ammonia (NH_3) is _____.
 - a) Nonpolar because it is linear
 - b) Non polar because there is no electronegativity difference
 - c) polar because it is linear
 - d) polar because there is an electronegativity difference and it is trigonal pyramidal .
7. What factor other than electronegativity determines whether a molecule is polar or not?
 - a) Temperature
 - b) its geometry (shape)
 - c) its mass
8. Which of the following molecules will dissolve in water? (Hint: Like Dissolves Like)
 - a) CH_4
 - b) Cl_2
 - c) CO_2
 - d) PF_3