

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

## A Matter of Attraction: 7th Grade Atomic Matchmakers Quiz

Aspiring chemists will investigate how lithium-ion batteries and industrial catalysts rely on specific electron patterns to power our modern world.

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**1. When an aluminum atom (Group 13) interacts with oxygen to form aluminum oxide, what primary action occurs to create an ionic bond?**

- A. Aluminum shares three pairs of electrons equally with oxygen.
- B. Aluminum transfers three valence electrons to oxygen atoms.
- C. Oxygen transfers its inner-shell electrons to the aluminum nucleus.
- D. Both atoms merge their nuclei to create a heavier element.

**2. In a molecule of Nitrogen gas ( $N_2$ ), the two atoms are held together by a \_\_\_\_\_ covalent bond because they must share three pairs of electrons to reach stability.**

- A. Single
- B. Double
- C. Triple
- D. Metallic

**3. True or False: Metallic bonds are characterized by a 'sea of electrons' that allows metals like silver to conduct electricity and be hammered into thin sheets.**

- A. True
- B. False

**4. Why does Potassium Bromide (KBr) have a much higher melting point than a covalent substance like sugar?**

- A. Covalent bonds are always stronger than ionic bonds.
- B. KBr forms a rigid crystal lattice held by strong electrostatic forces.
- C. Potassium atoms are lighter and move faster when heated.
- D. Sugar molecules are held together by metallic sea-of-electrons.

**5. When atoms share electrons unequally, such as in a molecule of Hydrogen Chloride (HCl), it results in a \_\_\_\_\_ covalent bond.**

- A. Non-polar
- B. Polar
- C. Ionic
- D. Metallic

**6. Which of the following best describes the Octet Rule in the context of chemical bonding?**

- A. Atoms prefer to have exactly eight protons in their nucleus.
- B. Atoms are most stable when they have eight electrons in their valence shell.

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

- C. An atom can only bond with eight other atoms at one time.
- D. Ionic bonds only form between elements in the eighth column of the periodic table.

**7. True or False: In a covalent bond, the atoms involved are typically two non-metals.**

- A. True
- B. False

**8. A mystery substance is found to be brittle, has a high melting point, and conducts electricity only when dissolved in water. This substance most likely contains \_\_\_\_\_ bonds.**

- A. Metallic
- B. Non-polar Covalent
- C. Ionic
- D. Polar Covalent

**9. If an atom of Lithium (1 valence electron) bonds with an atom of Fluorine (7 valence electrons), what is the resulting charge of the Lithium ion?**

- A. -1
- B. 0
- C. +1
- D. +7

**10. True or False: A molecule of Oxygen gas (O<sub>2</sub>) is considered a polar covalent bond because the electrons are shared equally.**

- A. True
- B. False