Name: _______________ **Date:** _______________

Answer Key: Molecular Chef: A 5th Grade Secret Recipe for Chemical Bonding

Crack the code of atomic attraction by analyzing why certain elements team up to build the world around us.

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1. Imagine you are building a crystal of Potassium Iodide (KI). If the Potassium atom throws an electron to the Iodine atom like a hot potato, what type of 'atomic glue' is holding them together?

Answer: B) An ionic bond

When one atom transfers an electron to another, they become oppositely charged ions that pull toward each other in an ionic bond.

2. In a molecule of Oxygen gas (O2), two oxygen atoms are 'shaking hands' to share two pairs of electrons. This partnership is specifically called a __________ bond.

Answer: A) Double covalent

Covalent bonds involve sharing electrons; when four electrons (two pairs) are shared, it is a double covalent bond.

3. In a piece of solid Aluminum foil, the electrons are locked strictly in place and cannot move between atoms.

Answer: B) False

Metallic bonds feature a 'sea of electrons' that are delocalized, meaning they move freely, which is why metals conduct electricity.

4. Why do atoms bother to bond in the first place? Think about a ball rolling down a hill to its resting spot.

Answer: C) To reach a stable state with a full outer shell

Atoms bond to achieve stability, usually by filling their highest energy level (valence shell) with electrons.

5. If you dissolve a substance in water and it can then conduct electricity (meaning it has charged parts that move), it most likely used ________ bonding.

Answer: C) Ionic

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Ionic compounds break apart into charged ions when dissolved in water, allowing an electric current to flow.

6. Water (H2O) is a molecule where electrons are shared unevenly, making one side slightly more negative than the other.

Answer: A) True

This is called a polar covalent bond. Oxygen pulls harder on the shared electrons than Hydrogen does.

7. Silver (Ag) is very 'malleable,' meaning it can be hammered into thin sheets without snapping. Which bonding feature allows the atoms to slide past each other?

Answer: C) The flexible 'sea' of shared electrons

Metallic bonds allow metal ions to slide past one another because the 'sea of electrons' acts like a flexible cushion.

8. Nitrogen gas makes up most of our air. Each Nitrogen atom shares 3 pairs of electrons with another Nitrogen atom. This is known as a __________ bond.

Answer: A) Triple

Sharing three pairs of electrons (6 total) creates a triple covalent bond, which is extremely strong.

9. A mystery substance has a very high melting point and looks like a tiny cube under a microscope. When it's a solid, it doesn't conduct electricity. What is it?

Answer: C) An ionic crystal

Ionic crystals like salt have high melting points and fixed ions in solid form, so they don't conduct electricity until melted or dissolved.

10. Covalent bonds usually form between two non-metal atoms.

Answer: A) True

Non-metals tend to share electrons with each other to reach stability, whereas metals tend to lose them to non-metals (ionic).