Chemical Bonding NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Valence Electrons & Groups

* Recall: Valence electrons are the electrons found in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy level of an atom.
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_number of a specific group tells us how many valence electrons an element in that group contains.
* Examples: SODIUM (Na) is in group 1A so it has\_\_\_\_\_\_\_\_\_\_\_\_- valence electron.

Electron Dot Diagrams

* Stable Electron Configurations: when the highest occupied energy level of an atom is filled with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-, the atom is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- and not likely to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* All elements are trying to maintain\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_VALENCE ELECTRONS (this is considered a stable electron configuration)
* We can use Electron \_\_\_\_\_\_\_\_\_\_\_\_\_Diagrams to help us represent the valence electrons in an atom.

Ionic Bonding

* Some elements achieve stable electron configurations through the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of electrons between atoms
* This causes the formation of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-(an atom that has a net positive or negative electric \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

Anions

* An anion is an ion with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_charge.
* Atoms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_electrons in order to get a negative charge and form an anion
* Anions are named by using part of the element name PLUS the suffix \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* *Ex:* Cl- is called a *chloride* ion.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_typically form anions.

Cations

* An ion with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_charge is called a cation.
* Atoms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_electrons in order to gain a positive charge and form cations
* Naming a cation is easy, it is just the element \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Ex: Na+ is just a *sodium* ion.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-tend to form cations

Formation of Ionic Bonds

* In general, a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the force that holds atoms or ions together.
* An \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Bond is the force that holds cations and anions together.
* Ionic bonds are formed when electrons are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from one atom to another
* Metals \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ their electrons to NONMETALS.

Compounds

* A **chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**is a notation that shows what elements a compound contains and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of the atoms or ions of these elements in the compound.
* Example: Magnesium Chloride is written as MgCl2

Ionic Compounds

* Compounds that contain ionic bonds are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_compounds.
* Elements that form ionic compounds create the same chemical formula that was in the previous slide.

Covalent Bonds

* A **covalent bond** is a bond in which two atoms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_a pair of valence electrons.
* The attractions between the shared electrons and the protons in each nucleus \_\_\_\_\_\_\_\_\_\_\_\_\_the atoms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in a covalent bond.
* Covalent bonds form **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_compounds**
* A **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**is a neutral group of atoms that are joined together by one or more covalent bonds.

Tug – of - War

* you might think of the bond as the rope in a tug-of-war, and the shared electrons as the knot in the center of the rope
* each atom in the molecule attracts the electrons that they share

Ionic vs. Covalent Bonds

<http://www.youtube.com/watch?v=_M9khs87xQ8>

Describing Molecular Compounds

* The name and formula of a molecular compound describe the \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of atoms in a molecule of the compound.

**Naming Molecular Compounds**

1. Most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ element written first
2. The second element is changed to end in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_prefixes to describe the number of atoms of a given element in each molecule

**Example: NO2 = nitrogen dioxide**

Writing Molecular Formulas

1. Write the symbols for the elements in the order the elements appear in the name.
2. The prefixes indicate the number of atoms of each element in the molecule.
3. The prefixes appear as subscripts in the formula. (if there is no prefix for an element, there is only one atom of that element in the molecule)

**Example: Diphosphorous tetrafluoride = P2F4**



Structure of Metals

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_atoms are arranged in very compact and orderly patterns.
* Usually have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_structure
* Metallic in their properties and physical appearance
* Examples: Gold, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- Chromium, Zinc

Alloys

* Most of the metals that we encounter in everyday life are not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-metals.
* Alloys are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_composed of two or more elements, at least once of which is a \_\_\_\_\_\_\_\_\_\_.
* Example:
	+ BRASS – most people think brass is just another element off the periodic table but it is actually not. It is an alloy that is comprised of both Silver and Copper.
	+ Bronze – comprised of Copper and Tin.
* Alloys tend to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_than PURE metals.
* Most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is comprised of alloys – mostly made up of silver or gold but with a little bit of other metals mixed in to make them more durable.