Common Ions

Memorize the names and formulas for these ions NOW! Pop quizzes all year long starting in September!

You do not need to memorize the old-fashioned names in parentheses and italics. They are only there in case you stumble across them on an assignment or online during the year. The roman numerals after some names are required parts of the name! Do not add them to others, and do not forget them on ones that have them.

**+++ Positive Ions – Cations +++**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1+** | | **2+** | | **3+** | | **4+** | |
| Hydrogen | H+ | Cadmium | Cd2+ | Chromium (III) | Cr3+ | Lead (IV)  (*Plumbic*) | Pb4+ |
| Ammonium | NH4+ | Chromium (II) | Cr2+ | Cobalt (III) | Co3+ | Manganese (IV) | Mn4+ |
| Copper (I)  (*Cuprous)* | Cu+ | Cobalt (II) | Co2+ | Gold (III) | Au3+ | Carbon cation | C4+ |
| Silver | Ag+ | Copper (II)  *(Cupric)* | Cu2+ | Iron (III)  (*Ferric*) | Fe3+ | Silicon (IV) | Si4+ |
| Gold (I) | Au+ | Iron (II)  (*Ferrous*) | Fe2+ | Manganese (III) | Mn3+ | Tin(IV)  (*Stannic*) | Sn4+ |
| **And all elements in  Group IA** | | Lead (II)  (*Plumbous*) | Pb2+ | Nickel (III) | Ni3+ | **And Group 4A can potentially make 4+** | |
|  |  | Manganese (II) | Mn2+ | Boron | B3+ |  | |
|  |  | Mercury (II)  (*Mercuric*) | Hg2+ | Aluminum | Al3+ |  |  |
|  |  | Nickel (II) | Ni2+ | Gallium | Ga3+ |  |  |
|  |  | Tin (II)  (*Stannous)* | Sn2+ | Indium | In3+ |  |  |
|  |  | Zinc | Zn2+ |  |  |  |  |
|  |  | Mercury (I)  (*Mercurous*) | Hg22+ |  |  |  |  |
|  |  | **And all elements in Group 2A** | |  |  |  |  |

**--- Negative Ions – Anions ---**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1-** | | **2-** | | **3-** | | **4-** | |
| Acetate | C2H3O2 | Carbonate | CO32 | Borate | BO33- | Carbon anion | C4 |
| Bicarbonate | HCO3 | Peroxide | O22 | Phosphate | PO43- | **And Group 4A can potentially make 4-** | |
| Chlorate | ClO3 | Sulfate | SO42 | Phosphide | P3- |  | |
| Chlorite | ClO2 | Sulfite | SO32 | Phosphite | PO33- |  | |
| Cyanide | CN | Chromate | CrO42- | Arsenate | AsO43- |  | |
| Hydride | H- | Dichromate | Cr2O72- | **And all elements in  Group 5A** | |  | |
| Hydroxide | OH | Oxalate | C2O42 | The “monatomic” anions (made of only one type of atom) from groups 5A, 6A, 7A are named by dropping the ending on the neutral atom’s name and replacing it with  -ide. Because they follow such a dependable pattern, they are not individually named on this common ion list.  *Examples:* F fluorine 🡪 F- fluoride  O oxygen 🡪 O2- oxide  N nitrogen 🡪 N3- nitride | |  | |
| Hypochlorite | ClO | Thiosulfate | S2O32 |  | |  | |
| Nitrate | NO3 | **And all elements in Group 6A** | |  | |  | |
| Nitrite | NO2 |  | |  | |  | |
| Perchlorate | ClO4 |  | |  | |  | |
| Permanganate | MnO4 |  | |  | |  | |
| Thiocyanate | SCN |  | |  | | **R-2** | |
| **And all elements in Group 7A (Halogens)** | |  | |  | |  | |

Other things to Memorize

We do not need these until later in the year – you will be told when to memorize these.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Prefixes** | | | | **Common Molecular Gases** | **Common Acids** | | **Diatomic Elements** | |
| One mono | mono | Six | hexa | F2, Cl2, H2, N2, O2, SO2, | Hydrochloric | HCl | Hydrogen | H2 |
| Two di | di | Seven | hepta | SO3, CO, CO2, H2S, | Sulfuric | H2SO4 | Nitrogen | N2 |
| Three | tri | Eight | octa | NO, NO2, NH3, P2O3, | Nitric | HNO3 | Oxygen | O2 |
| Four | tetra | Nine | nona | P2O5, SiF4, HCl, HBr, | Phosphoric | H3PO4 | Fluorine | F2 |
| Five | penta | Ten | deca | HI, HF, N2O5, N2O3, N2O | **Common Bases** | | Chlorine | Cl2 |
|  | |  |  |  | Ammonia | NH3 | Bromine | Br2 |
|  | |  |  |  | Sodium hydroxide | NaOH | Iodine | I2 |

Strong Acid, Strong Base Handout

Memorize these 15, ALL ELSE ARE considered WEAK

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **7 Strong Acids (H+)**  **All other acids are weak** | |  | **8 Strong Bases (OH-)**  **All other bases are weak** | |
| Hydrochloric acid | HCl |  | Lithium hydroxide | LiOH |
| Hydrobromic acid | HBr |  | Sodium hydroxide | NaOH |
| Hydroiodic | HI |  | Potassium hydroxide | KOH |
| Perchloric acid | HClO4 |  | Rubidium hydroxide | RbOH |
| Chloric acid | HClO3 |  | Cesium hydroxide | CsOH |
| Nitric acid | HNO3 |  | Calcium hydroxide | Ca(OH)2 |
| Sulfuric acid | H2SO4 |  | Strontium hydroxide | Sr(OH)2 |
|  |  |  | Barium hydroxide | Ba(OH)2 |

Pattern for Some Polyatomic Ion Names, and Some Acid Names

If this is helpful to you then great! If not, then just memorize them! 😊

|  |  |  |  |
| --- | --- | --- | --- |
| **Polyatomic Ions Containing Oxygen\*** | | **Acid Nomenclature\*\*** | |
| Per-……..-ate | Greatest number of oxygens | Per-……..-ic | Greatest number of oxygen atoms |
| ……..-ate | Greater | ……..-ic | Greater |
| ……..-ite | Smaller | ……..-ous | Smaller |
| Hypo……-ite | Smallest number of oxygens | Hypo……-ous | Smallest number of oxygen atoms |

**\***Names of polyatomic ions containing oxygen- some elements form several polyatomic ions with oxygen.   
 A series of suffixes and prefixes is used to specify the relative number of oxygen atoms.

**\*\***Acids – Acids are molecular compounds that contain hydrogen bonded to a nonmetal to a group of atoms that behave like a nonmetal. Acids an be either binary or ternary compounds. The names of binary acids have the form Hydro-...-ic acids. The naems of ternary acids use a series of prefixes and suffixes to specify the relative number of oxygen atoms in the molecule.