

### The Seven SI Base Units

Physical Quantity	Name of Unit	Symbol of Unit
Length	Meter	m
Mass	Kilogram	kg
Time	Second	s
Temperature	Kelvin	K
Amount of substance	Mole	mol
Electric current	Ampere	A
Luminous intensity	Candela	cd

### Common SI Prefixes

Multiple	Prefix
$10^{12}$	<i>tera</i> (T)
$10^9$	<i>giga</i> (G)
$10^6$	<i>mega</i> (M)
$10^3$	<i>kilo</i> (k)
$10^2$	<i>hecto</i> (h)
$10^1$	<i>deca</i> (da)
$10^{-1}$	<i>deci</i> (d)
$10^{-2}$	<i>centi</i> (c)
$10^{-3}$	<i>milli</i> (m)
$10^{-6}$	<i>micro</i> ( $\mu$ )
$10^{-9}$	<i>nano</i> (n)
$10^{-12}$	<i>pico</i> (p)

### Numeric Prefixes in Names of Binary Molecular Compounds

# of Atoms	Prefix	Examples
1	mono	NO nitrogen monoxide
2	di	NO <sub>2</sub> nitrogen dioxide
3	tri	N <sub>2</sub> O <sub>3</sub> dinitrogen trioxide
4	tetra	N <sub>2</sub> O <sub>4</sub> dinitrogen tetroxide
5	penta	N <sub>2</sub> O <sub>5</sub> dinitrogen pentoxide
6	hexa	SF <sub>6</sub> sulfur hexafluoride
7	hepta	IF <sub>7</sub> iodine heptafluoride
8	octa	P <sub>4</sub> O <sub>8</sub> tetraphosphorus octoxide
9	nona	P <sub>4</sub> S <sub>9</sub> tetraphosphorus nonasulfide
10	deca	As <sub>4</sub> O <sub>10</sub> tetraarsenic decoxide

### Some Common Polyatomic Ions

Name	Formula	Typical Compound
<b>Cation</b>		
Ammonium ion	$\text{NH}_4^+$	$\text{NH}_4\text{Cl}$
<b>Anions</b>		
Acetate ion	$\text{C}_2\text{H}_3\text{O}_2^-$	$\text{NaC}_2\text{H}_3\text{O}_2$
Carbonate ion	$\text{CO}_3^{2-}$	$\text{Li}_2\text{CO}_3$
–Hydrogen Carbonate ion	$\text{HCO}_3^-$	$\text{NaHCO}_3$
Hypochlorite ion	$\text{ClO}^-$	$\text{Ca}(\text{ClO})_2$
Chlorite ion	$\text{ClO}_2^-$	$\text{NaClO}_2$
Chlorate ion	$\text{ClO}_3^-$	$\text{NaClO}_3$
Perchlorate ion	$\text{ClO}_4^-$	$\text{KClO}_4$
Chromate ion	$\text{CrO}_4^{2-}$	$\text{K}_2\text{CrO}_4$
–Dichromate ion	$\text{Cr}_2\text{O}_7^{2-}$	$(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
Cyanate ion	$\text{OCN}^-$	$\text{KOCN}$
–Thiocyanate ion	$\text{SCN}^-$	$\text{KSCN}$
Cyanide ion	$\text{CN}^-$	$\text{KCN}$
Hydroxide ion	$\text{OH}^-$	$\text{NaOH}$
Nitrite ion	$\text{NO}_2^-$	$\text{NaNO}_2$
Nitrate ion	$\text{NO}_3^-$	$\text{NaNO}_3$
Oxalate ion	$\text{C}_2\text{O}_4^{2-}$	$\text{CaC}_2\text{O}_4$
Permanganate ion	$\text{MnO}_4^-$	$\text{KMnO}_4$
Phosphate ion	$\text{PO}_4^{3-}$	$\text{Na}_3\text{PO}_4$
–Hydrogen phosphate ion	$\text{HPO}_4^{2-}$	$\text{Na}_2\text{HPO}_4$
–Dihydrogen phosphate ion	$\text{H}_2\text{PO}_4^-$	$\text{NaH}_2\text{PO}_4$
Sulfite ion	$\text{SO}_3^{2-}$	$\text{Na}_2\text{SO}_3$
–Hydrogen sulfite ion	$\text{HSO}_3^-$	$\text{NaHSO}_3$
Sulfate ion	$\text{SO}_4^{2-}$	$\text{Na}_2\text{SO}_4$
–Hydrogen sulfate ion	$\text{HSO}_4^-$	$\text{NaHSO}_4$
Thiosulfate ion	$\text{S}_2\text{O}_3^{2-}$	$\text{Na}_2\text{S}_2\text{O}_3$

### Word Stems Indicating the # of Carbon Atoms in Simple Organic Molecules

Stem	# of C Atoms
<i>meth-</i>	1
<i>eth-</i>	2
<i>prop-</i>	3
<i>but-</i>	4
<i>pent-</i>	5
<i>hex-</i>	6
<i>hept-</i>	7
<i>oct-</i>	8
<i>non-</i>	9
<i>dec-</i>	10

### Common Strong Acids and Strong Bases

ACIDS	
Binary Hydrogen Compounds	Oxoacids
HCl Hydrochloric Acid	HNO <sub>3</sub> Nitric Acid
HBr Hydrobromic Acid	H <sub>2</sub> SO <sub>4</sub> Sulfuric Acid
HI Hydroiodic Acid	HClO <sub>4</sub> Perchloric Acid
BASES	
Group 1A hydroxides	Group 2A hydroxides
LiOH Lithium Hydroxide	Mg(OH) <sub>2</sub> Magnesium Hydroxide
NaOH Sodium Hydroxide	Ca(OH) <sub>2</sub> Calcium Hydroxide
KOH Potassium Hydroxide	Sr(OH) <sub>2</sub> Strontium Hydroxide
RbOH Rubidium Hydroxide	Ba(OH) <sub>2</sub> Barium Hydroxide
CsOH Cesium Hydroxide	

### Some Common Gas-Forming Acid–Base Reactions

Anion	Reaction with H <sup>+</sup>
HCO <sub>3</sub> <sup>−</sup>	HCO <sub>3</sub> <sup>−</sup> + H <sup>+</sup> → CO <sub>2</sub> (g) + H <sub>2</sub> O(l)
CO <sub>3</sub> <sup>2−</sup>	CO <sub>3</sub> <sup>2−</sup> + 2 H <sup>+</sup> → CO <sub>2</sub> (g) + H <sub>2</sub> O(l)
HSO <sub>3</sub> <sup>−</sup>	HSO <sub>3</sub> <sup>−</sup> + H <sup>+</sup> → SO <sub>2</sub> (g) + H <sub>2</sub> O(l)
SO <sub>3</sub> <sup>2−</sup>	SO <sub>3</sub> <sup>2−</sup> + 2 H <sup>+</sup> → SO <sub>2</sub> (g) + H <sub>2</sub> O(l)
HS <sup>−</sup>	HS <sup>−</sup> + H <sup>+</sup> → H <sub>2</sub> S(g)
S <sup>2−</sup>	S <sup>2−</sup> + 2 H <sup>+</sup> → H <sub>2</sub> S(g)

## Water Solubility of Ionic Compounds

SOLUBLE
Nitrates ( $\text{NO}_3^-$ ), Acetates ( $\text{C}_2\text{H}_3\text{O}_2^-$ ), Perchlorates ( $\text{ClO}_4^-$ ) Group 1A metal salts (H, Li, Na, Rb, Cs, Fr), Ammonium salts ( $\text{NH}_4^+$ ) Chlorides (Cl), Bromides (Br), Iodides (I) <i>Exceptions: <math>\text{Pb}^{2+}</math>, <math>\text{Ag}^{2+}</math>, <math>\text{Hg}_2^{2+}</math></i> Most sulfates ( $\text{SO}_4^{2-}$ ) <i>Exceptions: <math>\text{Sr}^{2+}</math>, <math>\text{Ba}^{2+}</math>, <math>\text{Pb}^{2+}</math>, <math>\text{Hg}_2^{2+}</math></i>
INSOLUBLE
Carbonates ( $\text{CO}_3^{2-}$ ), Hydroxides ( $\text{OH}^-$ ), Phosphates ( $\text{PO}_4^{3-}$ ) Sulfides (S) <i>Exceptions: Ammonium and group 1A metal salts of these anions</i>

## Rules for Assigning Oxidation Numbers

1. The sum of all the oxidation numbers in a neutral species is 0.
2. The sum of all the oxidation numbers in an ion is equal to the charge on the ion.
3. Group 1A metals (H, Li, Na, K, Rb, Cs, Fr) have an oxidation number of +1.  
Group 2A metals (Be, Mg, Ca, Sr, Ba, Ra) have an oxidation number of +2.
4. The oxidation number of fluorine in compounds is -1.
5. The oxidation number of hydrogen in compounds is +1.
6. The oxidation number of oxygen in most compounds is -2.
7. Group 7A elements (F, Cl, Br, I, At) have an oxidation number of -1 in binary compounds with metals.  
Group 6A elements (O, S, Se, Te, Po) have an oxidation number of -2 in binary compounds with metals.  
Group 5A elements (N, P, As, Sb, Bi) have an oxidation number of -3 in binary compounds with metals.