

Pre-AP Chemistry Equations, Constants, and Tables of Information

Units	
Symbol	Name
L	liter(s)
g	gram(s)
atm	atmosphere(s)
Pa	pascal(s)
mm Hg	millimeters of mercury
J	joule(s)
mol	mole(s)
K	kelvin
<i>M</i>	molarity
cal	calorie(s)

Metric Prefixes		
Factor	Prefix	Symbol
10^3	kilo	k
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n

Conversions
1 atm = 760 mm Hg = 760 torr = 101 kPa
1 cal = 4.18 joules
0°C = 273 K

Polyatomic Ions	
Name	Formula
acetate	CH_3COO^- or $\text{C}_2\text{H}_3\text{O}_2^-$
ammonium	NH_4^+
bicarbonate or hydrogen carbonate	HCO_3^-
carbonate	CO_3^{2-}
chromate	CrO_4^{2-}
cyanide	CN^-
dichromate	$\text{Cr}_2\text{O}_7^{2-}$
hydroxide	OH^-
nitrate	NO_3^-
nitrite	NO_2^-
phosphate	PO_4^{3-}
sulfate	SO_4^{2-}
sulfite	SO_3^{2-}

Constants	
Constant	Value
Avogadro's number	6.02×10^{23} particles per mole
Gas constant, <i>R</i>	$0.0821 \frac{\text{L} \cdot \text{atm}}{\text{mol} \cdot \text{K}}$
Specific heat capacity of $\text{H}_2\text{O}(l)$	$4.18 \frac{\text{J}}{\text{g} \cdot \text{K}}$
Standard temperature and pressure	273 K and 1 atm

Activity Series	
	Metals
most easily oxidized	Li
	K
	Ba
	Ca
	Na
	Mg
	Al
	Mn
	Zn
	Cr
	Fe
	Co
	Ni
	Sn
	Pb
	(H_2)
	Cu
	Hg
	Ag
	Pt
least easily oxidized	Au

Solubility Guidelines
All sodium, potassium, ammonium, and nitrate salts are soluble in water.

Equations		
Density	$D = \frac{m}{V}$	D = density m = mass V = volume
Percent error	percent error = $\left(\frac{ \text{accepted value} - \text{experimental value} }{\text{accepted value}} \right) \times 100$	
Percent yield	percent yield = $\left(\frac{\text{actual yield}}{\text{theoretical yield}} \right) \times 100$	
Molarity	molarity = $\frac{\text{moles of solute}}{\text{liter of solution}}$	
Gas laws	$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$ $P_A = X_A \times P_{\text{total}}$ $P_{\text{total}} = P_A + P_B + P_C + \dots$ $PV = nRT$	P = pressure V = volume T = temperature n = moles of gas R = gas constant X = fraction of the gas
Heat	$q = mc\Delta T$	q = heat m = mass c = specific heat capacity ΔT = change in temperature
pH	$\text{pH} = -\log[\text{H}_3\text{O}^+]$	