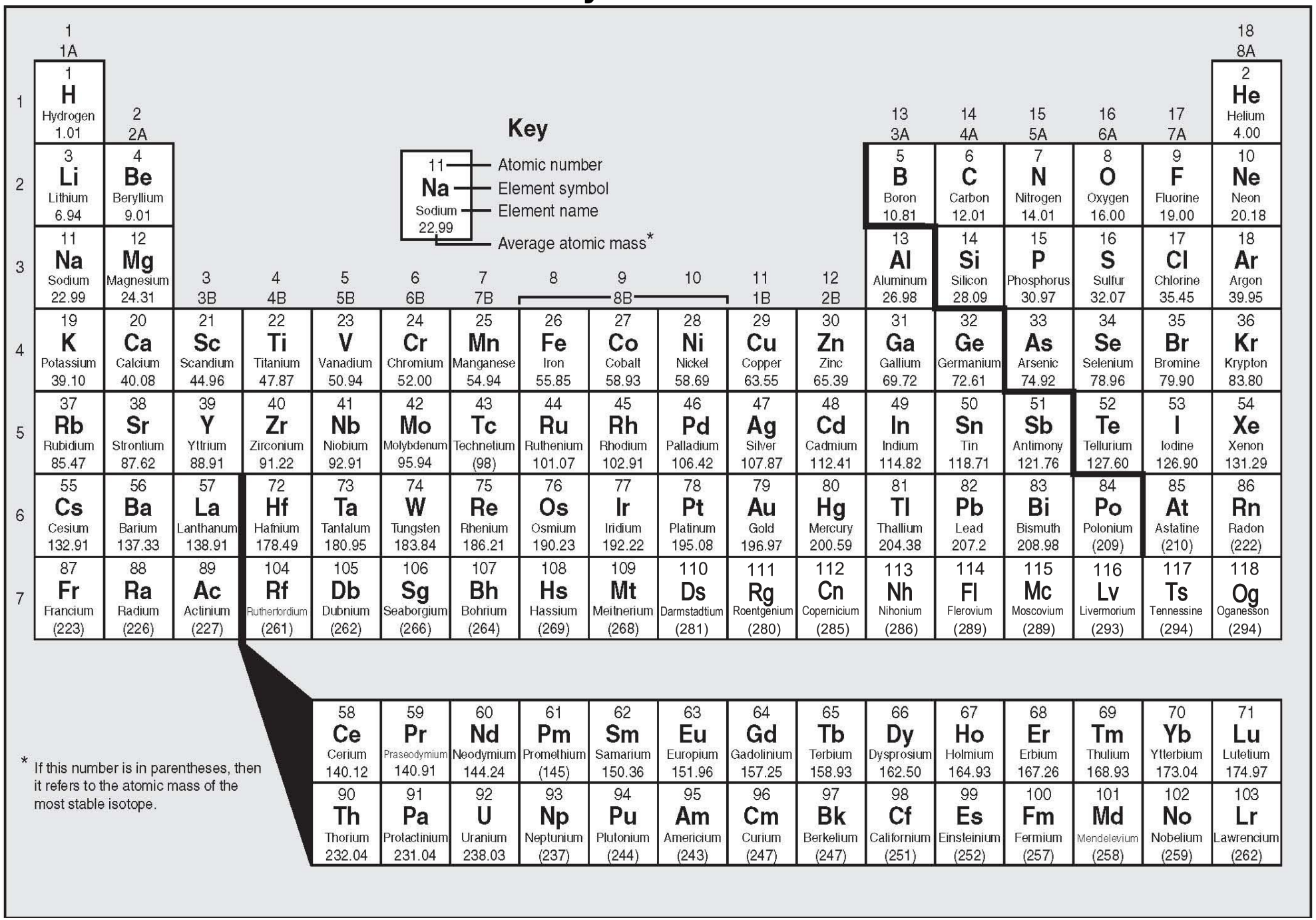
Chemistry Reference Sheet



* If this number is in parentheses, then it refers to the atomic mass of the most stable isotope.

DOUGHERTY VALLEY HS CHEMISTRY EQUATIONS AND CONSTANTS

EQUILIBRIUM and ACID BASE

$K_C = \frac{[C]^C[D]^D}{[A]^A[B]^B}$ $\quad K_p = \frac{(P_C)^C(P_D)^D}{(P_A)^A(P_B)^B}$

$K_a = \frac{[H^+][A^-]}{[HA]}$; $\quad K_b = \frac{[OH^-][HB^+]}{[B]}$

$K_w = [H^+][OH^-]$ $\quad K_w = K_a\ x\ K_b$

$pH = -\log[H^+]$, $\quad pOH = -\log[OH^-]$

$14 = pH + pOH$

Equilibrium Constant:

$K_w = 1.0\ x\ 10^{-14}\ at\ 25℃$

THERMOCHEMISTRY

No Phase Change: $q = mc\Delta T$

Phase Change: $q = m\ x\ \Delta H_{fus}$ $\quad (or\ q = mL_{fus})$

$q = m\ x\ \Delta H_{vap}$ $\quad (or\ q = mL_{vap})$

Calorimetry: $q_{object\ 1} = -q_{object\ 2}$

Specific Heats:

Water $= 4.184\ \frac{J}{g°C}$

Steam $= 1.87\ \frac{J}{g°C}$

Ice $= 2.09\ \frac{J}{g°C}$

Latent Heats:

Fusion $= 334\ \frac{J}{g}$

Vaporization $= 2260\ \frac{J}{g}$

Energy Conversion:

$1\ cal = 4.184\ J$

GASES

Ideal Gas Law: $PV = nRT$

Combined Gas Law: $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

Dalton's Law: $P_{total} = P_A\ x\ P_B\ x\ P_c\ ...$

Molar Mass: $M = \frac{mRT}{PV}$ $\quad n = \frac{m}{M}$

Gas Density: $D = \frac{MP}{RT}$

Kinetic Energy: $KE = \frac{1}{2}mv^2$

Temperature Conversion: $Kelvin = °C + 273K$

Volume of Ideal Gas at STP: $22.42\ \frac{L}{mol}$

Ideal Gas Constants:

$= 8.314\ \frac{L•kPa}{K•mol}$

$= 0.0821\ \frac{L•atm}{K•mol}$

$= 62.4\ \frac{L•mmHg}{K•mol}$

Pressure Conversions:

$1\ atm = 760\ mm\ Hg$

$= 760\ torr$

$= 101{,}325\ Pa$

$= 101.3\ kPa$

$= 14.7\ \frac{lbs}{in^2}$

SOLUTIONS

Molarity: $M = \frac{mole\ solute}{Liters\ of\ solution}$

Mass Percent: $\%\ \frac{mass\ solute}{mass\ solute + mass\ solvent}$

Mole Fraction: $\chi_A = \frac{mol_A\ solute}{mol_A\ solute + mol\ solvent}$

ENTHALPY

$\Delta H_{Bonds} = \Sigma Bonds_{Broken} - \Sigma Bonds_{Formed}$

$\Delta H_{Rxn} = \Sigma \Delta H_{f\ Products} - \Sigma \Delta H_{f\ Reactants}$