

Cheat Sheet CHE 101/111

Mass	Volume	Length	Temperature	Pressure
Imperial Units 1 oz = 16 drams 16 oz = 7000 grains 1 pound = 16 oz. 1 ton = 2000 pounds	Imperial Units 1 cup = 8 fl oz 1 pint = 2 cup 1 quart = 2 pint 1 gallon = 4 quart	Imperial Units 1 chain = 100 links = 4 rods 12 inch = 1 ft = 3 yd 1 furlong = 660 ft 1 mile = 5280 Feet = 80 chains	$^{\circ}\text{C} = \frac{(^{\circ}\text{F} - 32)}{1.8}$ $^{\circ}\text{F} = 1.8(^{\circ}\text{C}) + 32$ $\text{K} = ^{\circ}\text{C} + 273.15$	1 Atm = 760 mm Hg = 760 torr = 101,305 Pa = 14.7 PSI or lb/in ² $R = \frac{0.0821 \text{ L} \cdot \text{Atm}}{\text{mol} \cdot \text{K}} = \frac{8.314 \text{ J}}{\text{mol} \cdot \text{K}}$ $PV = nRT$ $\frac{P_1 V_1}{n_1 T_1} = \frac{P_2 V_2}{n_2 T_2}$
Imperial ↔ Metric 1 kilogram = 2.205 pounds 1 pound = 453.59 grams 1 amu = 1.6606x10 ⁻²⁷ kg	Imperial ↔ Metric 1 gallon = 3.785 liters 1 quart = 0.946 liters 1 Liter = 1.0567 quarts 1 milliliter = 1 cm³	Imperial ↔ Metric 1 meter = 1.0936 yards 1 inch = 2.54 cm (exactly) 1 kilometer = 0.62137 mile 1 mile = 1.609 kilometers 1 angstrom = 10 ⁻¹⁰ meter	Energy 1 cal = 4.184 J 1 eV = 1.602x10 ⁻¹⁹ J $1 \text{ J} = \frac{\text{kg} \cdot \text{m}^2}{\text{s}^2} = \frac{\text{N} \cdot \text{m}}{\text{m}}$ 101 J = 1 L • Atm	

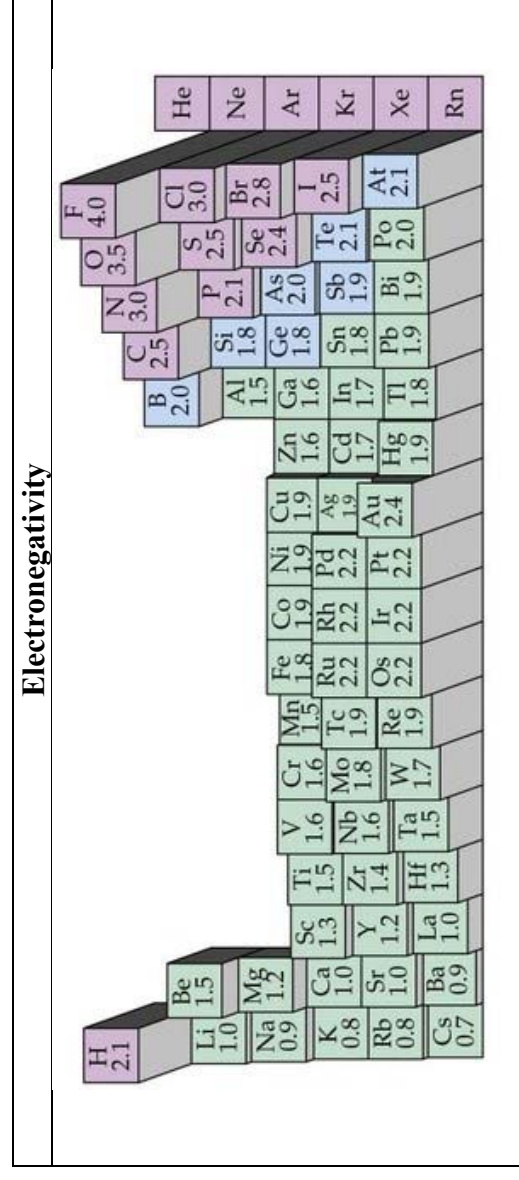
Metric System (g, m, L, and everything else!)		Density (D = M/V)		Specific Heat (q=msΔT)	
Prefix	Symbol	Substance	(g/mL)	Substance	(J/g•°C)
exa	E	Wood	0.512	Na	4.184
peta	P	Gasoline	0.700	Mg	2.220
tera	T	Ethyl Alcohol (Ethanol)	0.789	S	2.138
giga	G	Methanol	0.792	Al	2.059
mega	M	Vegetable Oil	0.91	Ti	1.996
kilo	k	Water (4 °C)	1.000	Zn	1.687
hecto	h	Acetic Acid	1.05	Sn	1.020
deka	da	Honey	1.36	Fe	0.900
-	-	Sugar	1.59	Cu	0.473
deci	d	Glycerin	1.26	Ag	0.390
centi	c	Karo Syrup	1.37	Pb	0.385
milli	m	Sulfuric Acid	1.84	Hg	0.380
micro	μ	Salt (NaCl)	2.16	Au	0.237
nano	n	Steel	7.85	U	0.222
pico	p	Brass	8.55	Pt	0.131
femto	f				0.128
atto	a				

Polyatomic Ions		
Name	Formula	Formula
Acetate	$C_2H_3O_2^-$	OH^-
Ammonium	NH_4^+	ClO^-
Arsenate	AsO_4^{3-}	IO^-
Bromate	BrO_3^-	IO_3^-
Carbonate	CO_3^{2-}	IO_2^-
Chlorate	ClO_3^-	NO_3^-
Chlorite	ClO_2^-	NO_2^-
Chromate	CrO_4^{2-}	$C_2O_4^{2-}$
Cynide	CN^-	ClO_4^-
Dichromate	$Cr_2O_7^{2-}$	MnO_4^-
Dihydrogen phosphate	$H_2PO_4^-$	PO_4^{3-}
Hydrogen carbonate (or bicarbonate)	HCO_3^-	PO_3^{3-}
Hydrogen phosphate	HPO_4^{2-}	SO_4^{2-}
Hydrogen sulfate (or bisulfate)	HSO_4^-	SO_3^{2-}
Hydrogen sulfide	HS^-	SCN^-
Hydrogen sulfite (bisulfite)	HSO_3^-	$S_2O_3^{2-}$

Fixed Charge	
Group 1A Cations (+1): H, Li, Na, K, Rb, Cs	
Group 2A Cations (+2): Be, Mg, Ca, Sr, Ba	
Group 7A Anions (-1): F, Cl, Br, I	
Group 6A Anions (-2): O, S, Se	
Group 5A Anions (-3): N, P	
Misc: Ag^+ , Al^{3+} , Cd^{+2} , Ni^{+2} , Sc^{+3} , Zn^{+2}	
Variable Charge	
As, Au, Co, Cr, Cu, Fe, Hg, Mn, Pb, Sb, Sn, Ti, V	

#	Roman	Molec.	#	Roman	Molec.
1	I	Mono	6	VI	Hexa
2	II	Di	7	VII	Hepta
3	III	Tri	8	VIII	Octa
4	IV	Tetra	9	IX	Nona
5	V	Penta	10	X	Deca

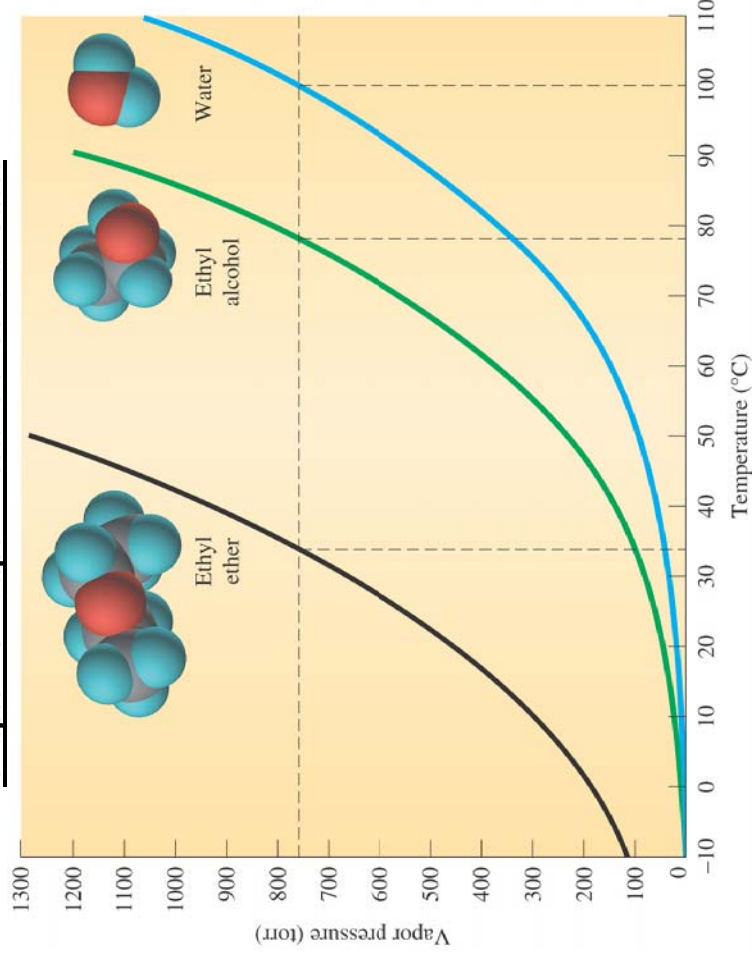
Solubility of Salts (g Salt/100 g H₂O)					
Temp (°C)	KCl	NaCl	KBr	BaCl ₂	
0.0	27.6	35.7	53.5	31.6	
10.0	31.0	35.8	59.5	33.3	
20.0	34.0	36.0	65.2	35.7	
30.0	37.0	36.3	70.6	38.2	
40.0	40.0	36.6	75.5	40.7	
50.0	42.6	37.0	80.2	43.6	
60.0	45.5	37.3	85.5	46.6	
70.0	48.3	37.8	90.0	49.4	
80.0	51.1	38.4	95.0	52.6	
90.0	54.0	39.0	99.2	55.7	
100.0	55.6	39.8	104.0	58.8	



Physical Properties					Colligative Properties ($\Delta T_f = mK_f$ and $\Delta T_b = mK_b$)				
Substance	Bp (°C)	ΔH_{vap} - (J/g)	Mp(°C)	ΔH_{fus} - (J/g)	Freezing Point (°C)	K_f ($\frac{^\circ\text{C} \cdot \text{kg solv.}}{\text{mol solute}}$)	Boiling Point (°C)	K_b ($\frac{^\circ\text{C} \cdot \text{kg solv.}}{\text{mol solute}}$)	
Ethyl Chloride	12.3	385	-139	69.0	0.00	1.86	100.0	0.512	
Ethyl Ether	34.6	351	-116	97.0	16.6	3.90	118.5	3.07	
Ethanol	78.4	885	-112	104	5.5	5.1	80.1	2.53	
Water (H ₂ O)	100.0	2259	0.0	335	178	40.	208.2	5.95	
H ₂ S	-60.3	548	-85.5	69.9					
H ₂ Se	-41.3	238	-65.7	31					
H ₂ Te	-2.0	179	-49.0	-					

pH Scale		
$\text{pH} = -\log[\text{H}^+]$	$\text{pOH} = -\log[\text{OH}^-]$	$\text{pH} + \text{pOH} = 14$
$[\text{H}^+] = 10^{-\text{pH}}$	$[\text{OH}^-] = 10^{-\text{pOH}}$	$[\text{H}^+][\text{OH}^-] = 1 \times 10^{-14}$

Chapter 13 - Vapor Pressure of Several Gases



Chapter 14 - Solubility of Several Compounds in Water

