

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 = 0.333 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 = 101,325 Pa = 14.7 PSI or lb/in ² $R = \frac{0.0821 \text{ L} \cdot \text{Atm}}{\text{mol} \cdot \text{K}}$ $R = \frac{8.314 \text{ J}}{\text{mol} \cdot \text{K}}$ PV=nRT $\frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$
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 $1 \text{ J} = \frac{\text{kg} \cdot \text{m}^2}{\text{s}^2} = \text{N} \cdot \text{m}$ 101 J = 1 L · Atm	

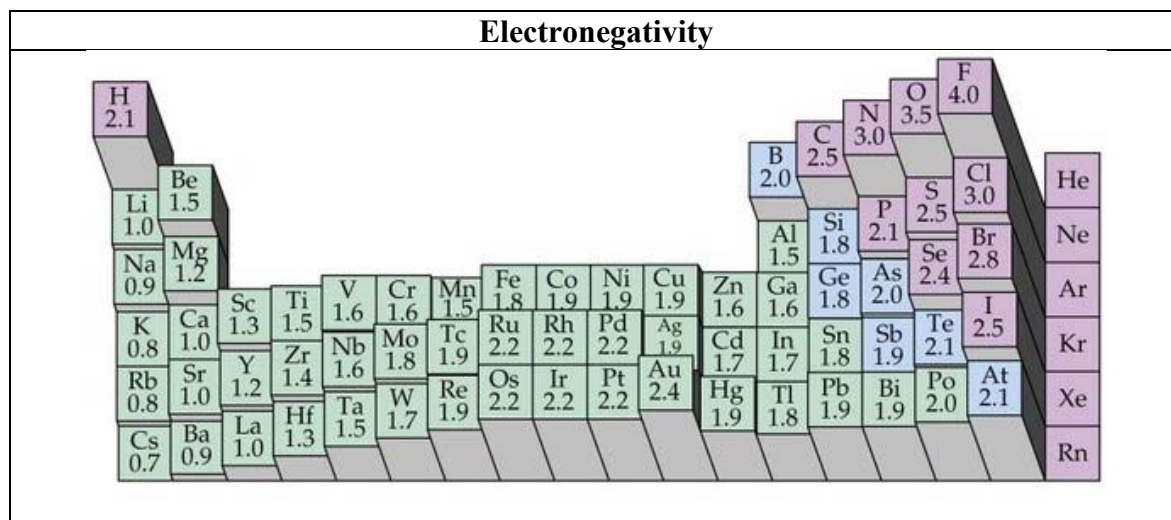
Metric System (g, m, L, and everything else!)				Density (D =M/V)				Specific Heat (q=msΔT)	
Prefix	Symbol	Numerical Value	10 ^X	Substance	(g/mL)	Substance	(g/mL)	Substance	(J/g·°C)
exa	E	1000000000000000000	10 ¹⁸	Wood	0.512	Na	0.97	Water (l)	4.184
peta	P	1000000000000000	10 ¹⁵	Gasoline	0.700	Mg	1.738	Ethyl Ether	2.220
tera	T	1000000000000	10 ¹²	Ethyl Alcohol (Ethanol)	0.789	S	2.07	Ethanol (Ethyl Alcohol)	2.138
giga	G	1000000000	10 ⁹	Methanol	0.792	Al	2.70	Water (s)	2.059
mega	M	1000000	10 ⁶	Vegetable Oil	0.91	Ti	4.51	Water (g)	1.996
kilo	k	1000	10 ³	Water (4 °C)	1.000	Zn	7.14	Ethyl Chloride	1.687
hecto	h	100	10 ²	Acetic Acid	1.05	Sn	7.31	Magnesium	1.020
deka	da	10	10 ¹	Honey	1.36	Fe	7.80	Aluminum	0.900
-	-	1	10 ⁰	Sugar	1.59	Cu	8.90	Iron	0.473
deci	d	0.1	10 ⁻¹	Glycerin	1.26	Ag	10.5	Zinc	0.390
centi	c	0.01	10 ⁻²	Karo Syrup	1.37	Pb	11.34	Copper	0.385
milli	m	0.001	10 ⁻³	Sulfuric Acid	1.84	Hg	13.55	Brass	0.380
micro	μ	0.000001	10 ⁻⁶	Salt (NaCl)	2.16	Au	19.3	Silver	0.237
nano	n	0.000000001	10 ⁻⁹	Steel	7.85	U	18.9	Tin	0.222
pico	p	0.000000000001	10 ⁻¹²	Brass	8.55	Pt	21.5	Gold	0.131
femto	f	0.000000000000001	10 ⁻¹⁵					Lead	0.128
atto	a	0.000000000000000001	10 ⁻¹⁸						

Polyatomic Ions			
Name	Formula	Name	Formula
Acetate	C ₂ H ₃ O ₂ ⁻	Hydroxide	OH ⁻
Ammonium	NH ₄ ⁺	Hypochlorite	ClO ⁻
Arsenate	AsO ₄ ³⁻	Hypoiodite	IO ⁻
Bromate	BrO ₃ ⁻	Iodate	IO ₃ ⁻
Carbonate	CO ₃ ²⁻	Iodite	IO ₂ ⁻
Chlorate	ClO ₃ ⁻	Nitrate	NO ₃ ⁻
Chlorite	ClO ₂ ⁻	Nitrite	NO ₂ ⁻
Chromate	CrO ₄ ²⁻	Oxalate	C ₂ O ₄ ²⁻
Cynide	CN ⁻	Perchlorate	ClO ₄ ⁻
Dichromate	Cr ₂ O ₇ ²⁻	Permanganate	MnO ₄ ⁻
Dihydrogen phosphate	H ₂ PO ₄ ⁻	Phosphate	PO ₄ ³⁻
Hydrogen carbonate (or bicarbonate)	HCO ₃ ⁻	Phosphite	PO ₃ ³⁻
Hydrogen phosphate	HPO ₄ ²⁻	Sulfate	SO ₄ ²⁻
Hydrogen sulfate (or bisulfate)	HSO ₄ ⁻	Sulfite	SO ₃ ²⁻
Hydrogen sulfide	HS ⁻	Thiocyanate	SCN ⁻
Hydrogen sulfite (bisulfite)	HSO ₃ ⁻	Thiosulfate	S ₂ O 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

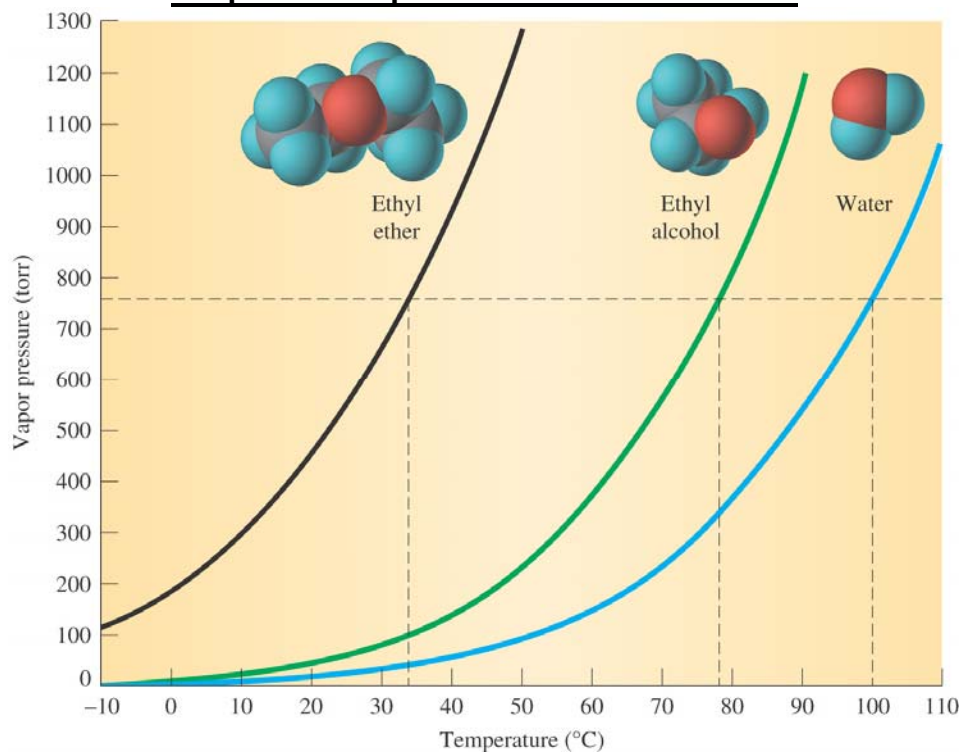
Solubility of Salts (g Salt/100 g H₂O)				
Temp (°C)	KCl	NaCl	KBr	BaCl₂
0.0	27.6	35.7	53.5	31.6
10.0	31.0	35.8	59.5	33.3
20.0	34.0	36.0	65.2	35.7
30.0	37.0	36.3	70.6	38.2
40.0	40.0	36.6	75.5	40.7
50.0	42.6	37.0	80.2	43.6
60.0	45.5	37.3	85.5	46.6
70.0	48.3	37.8	90.0	49.4
80.0	51.1	38.4	95.0	52.6
90.0	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)	Substance	Freezing Point (°C)	K_f ($^{\circ}\text{C} \cdot \text{kg solv.} / \text{mol solute}$)	Boiling Point (°C)	K_b ($^{\circ}\text{C} \cdot \text{kg solv.} / \text{mol solute}$)
Ethyl Chloride	12.3	385	-139	69.0	Water	0.00	1.86	100.0	0.512
Ethyl Ether	34.6	351	-116	97.0	Acetic Acid	16.6	3.90	118.5	3.07
Ethanol	78.4	885	-112	104	Benzene	5.5	5.1	80.1	2.53
Water (H ₂ O)	100.0	2259	0.0	335	Camphor	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			Colligative Properties	
$\text{pH} = -\log[\text{H}^+]$	$\text{pOH} = -\log[\text{OH}^-]$	$\text{pH} + \text{pOH} = 14$	$\Delta T_f = m \cdot K_f$	
$[\text{H}^+] = 10^{-\text{pH}}$	$[\text{OH}^-] = 10^{-\text{pOH}}$	$[\text{H}^+][\text{OH}^-] = 1 \times 10^{-14}$	$\Delta T_b = m \cdot K_b$	

Chapter 13 - Vapor Pressure of Several Gases



Chapter 14 - Solubility of Several Compounds in Water

