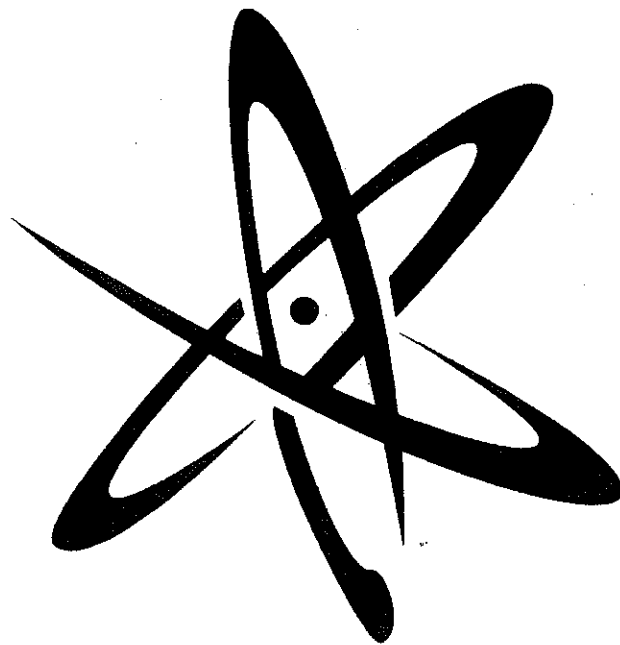


Grade 11
Chemistry 30S

Formulas, Tables, and Charts



Formulas and Other Constants:

1 mol = 6.022×10^{23} particles or atoms or molecules

1 mol = 22.4 L of any gas at STP

$$P_1V_1 = P_2V_2$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$C = \frac{n}{V}$$

$$C_1V_1 = C_2V_2$$

$$C_f = \frac{C_1V_1 + C_2V_2 + \dots}{V_1 + V_2 + \dots}$$



GROUP

1 IA 2 IIA 3 III B 4 IV B 5 VB 6 VI B 7 VII B 8 VIII B 9 10 11 IB 12 IIB 13 III A 14 IV A 15 VA 16 VIA 17 VII A 18 VIII A

Periodic Table of Elements

NONMETALS

NOBLE GASES

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
hydrogen 1 H ⁺ 1.00794(7)	beryllium 4 Be ²⁺ 9.012182(3)											boron 5 B 10.811(7)	carbon 6 C 12.0107(8)	nitrogen 7 N ³⁻ 14.00643(4)(7)	oxygen 8 O ²⁻ 15.9994(3)	fluorine 9 F 18.9984032(5)	helium 2 He 4.002602(2)

Key:
 element name
 atomic number
 element symbol (top: most common)
 atomic weight (mean relative mass)
 blue = solid
 orange = gas
 orange = liquid

TRANSITION ELEMENTS

19 K ⁺ 39.0983(1)	20 Ca ²⁺ 40.078(4)	21 Sc ³⁺ 44.955910(8)	22 Ti ³⁺ 47.867(1)	23 V ⁵⁺ 50.9415(1)	24 Cr ³⁺ 51.9961(6)	25 Mn ²⁺ 54.938049(9)	26 Fe ²⁺ 55.845(2)	27 Co ²⁺ 58.933200(9)	28 Ni ²⁺ 58.6934(4)	29 Cu ²⁺ 63.546(3)	30 Zn ²⁺ 65.39(2)	31 Ga ³⁺ 69.723(1)	32 Ge ⁴⁺ 72.61(2)	33 As ³⁻ 74.92160(2)	34 Se ²⁻ 78.96(3)	35 Br ⁻ 79.904(1)	36 Kr 83.80(1)
37 Rb ⁺ 85.4678(3)	38 Sr ²⁺ 87.62(1)	39 Y ³⁺ 88.90585(2)	40 Zr ⁴⁺ 91.224(2)	41 Nb ⁵⁺ 92.90638(2)	42 Mo ⁶⁺ 95.94(1)	43 Tc 98.9063(9)	44 Ru ³⁺ 101.07(2)	45 Rh ³⁺ 102.90550(2)	46 Pd ²⁺ 106.42(1)	47 Ag ⁺ 107.8682(2)	48 Cd ²⁺ 112.411(6)	49 In ³⁺ 114.818(3)	50 Sn ²⁺ 118.710(7)	51 Sb ³⁺ 121.760(1)	52 Te ²⁻ 127.60(3)	53 I ⁻ 126.90447(3)	54 Xe 131.29(2)
55 Cs ⁺ 132.90545(2)	56 Ba ²⁺ 137.327(7)	57 La ³⁺ 138.90547(7)	58 Ce ³⁺ 140.116(1)	59 Pr ³⁺ 140.90765(2)	60 Nd ³⁺ 144.24(3)	61 Pm ³⁺ 144.9127(1)	62 Sm ³⁺ 150.36(3)	63 Eu ³⁺ 151.964(1)	64 Gd ³⁺ 157.25(3)	65 Tb ³⁺ 158.92534(2)	66 Dy ³⁺ 162.50(3)	67 Ho ³⁺ 164.93032(2)	68 Er ³⁺ 167.26(3)	69 Tm ³⁺ 168.93421(2)	70 Yb ³⁺ 173.04(3)	71 Lu ³⁺ 174.967(1)	72 Hf ⁴⁺ 178.49(2)
87 Fr ⁺ (223)	88 Ra ²⁺ (226.0254)	89-102 actinoids	103 Lr ³⁺ (262.110)	104 Rf ⁴⁺ (261.1089)	105 Db ⁵⁺ (262.1144)	106 Sg ⁶⁺ (263.1166)	107 Bh ⁷⁺ (264.12)	108 Hs (265.1306)	109 Mt (268)	110 Uun (269)	111 Uu (271)	112 Uub (273)	113 Uuh (285)	114 Uuq (289)	115 Uub (289)	116 Uuh (289)	117 Uue (291)

RARE EARTH ELEMENTS

lanthanum 57 La	cerium 58 Ce ³⁺	praseodymium 59 Pr ³⁺	neodymium 60 Nd ³⁺	promethium 61 Pm ³⁺	samarium 62 Sm ³⁺	europium 63 Eu ³⁺	gadolinium 64 Gd ³⁺	terbium 65 Tb ³⁺	dysprosium 66 Dy ³⁺	holmium 67 Ho ³⁺	erbium 68 Er ³⁺	thulium 69 Tm ³⁺	ytterbium 70 Yb ³⁺	lutetium 71 Lu ³⁺
-----------------------	----------------------------------	----------------------------------------	-------------------------------------	--------------------------------------	------------------------------------	------------------------------------	--------------------------------------	-----------------------------------	--------------------------------------	-----------------------------------	----------------------------------	-----------------------------------	-------------------------------------	------------------------------------

Notes: Names have not been assigned to elements 110-112, 114, 116 and 118, so these used are temporary. When the atomic weight is enclosed in brackets, the element's weight is represented by one of the elements more stable isotopes, and no mass data are available.

Names, Formulas, and Charges of Common Ions

POSITIVE IONS (CATIONS)

Name	Symbol	Name	Symbol
aluminum	Al ³⁺	lithium	Li ⁺
ammonium	NH ₄ ⁺	magnesium	Mg ²⁺
barium	Ba ²⁺	manganese(II)	Mn ²⁺
cadmium	Cd ²⁺	manganese(IV)	Mn ⁴⁺
calcium	Ca ²⁺	mercury(I)	Hg ₂ ²⁺
chromium(II)	Cr ²⁺	mercury(II)	Hg ²⁺
chromium(III)	Cr ³⁺	nickel(II)	Ni ²⁺
copper(I)	Cu ⁺	potassium	K ⁺
copper(II)	Cu ²⁺	silver	Ag ⁺
hydrogen,	H ⁺	sodium	Na ⁺
iron(II)	Fe ²⁺	strontium	Sr ²⁺
iron(III)	Fe ³⁺	tin(II)	Sn ²⁺
lead(II)	Pb ²⁺	tin(IV)	Sn ⁴⁺
lead(IV)	Pb ⁴⁺	zinc	Zn ²⁺

NEGATIVE IONS (ANIONS)

Name	Symbol	Name	Symbol
acetate	C ₂ H ₃ O ₂ ⁻ (CH ₃ COO ⁻)	nitrate	NO ₃ ⁻
azide	N ₃ ⁻	nitride	N ³⁻
bromide	Br ⁻	nitrite	NO ₂ ⁻
bromate	BrO ₃ ⁻	oxalate	C ₂ O ₄ ²⁻
carbonate	CO ₃ ²⁻	hydrogen oxalate	HC ₂ O ₄ ⁻
hydride	H ⁻	oxide	O ²⁻
hydrogen carbonate	HCO ₃ ⁻	perchlorate	ClO ₄ ⁻
chlorate	ClO ₃ ⁻	permanganate	MnO ₄ ⁻
chloride (bicarbonate)	Cl ⁻	phosphate	PO ₄ ³⁻
chlorite	ClO ₂ ⁻	monohydrogen phosphate	HPO ₄ ²⁻
chromate	CrO ₄ ²⁻	dihydrogen phosphate	H ₂ PO ₄ ⁻
citrate	C ₆ H ₅ O ₇ ³⁻	silicate	SiO ₃ ²⁻
cyanide	CN ⁻	sulfate (sulphate)	SO ₄ ²⁻
dichromate	Cr ₂ O ₇ ²⁻ (bisulfate)	hydrogen sulfate (sulphate)	HSO ₄ ⁻
fluoride	F ⁻	sulfide (sulphide)	S ²⁻
hydroxide	OH ⁻ (bisulfide)	hydrogen sulfide (sulphide)	HS ⁻
hypochlorite	ClO ⁻	sulfite (sulphite)	SO ₃ ²⁻
iodide	I ⁻ (bisulfite)	hydrogen sulfite (sulphite)	HSO ₃ ⁻
iodate	IO ₃ ⁻	thiocyanate	SCN ⁻