

PERIODIC TABLE REVIEW

➤ Vertical columns

➤ Groups or chemical families

➤ Horizontal rows

➤ Periods

Alkali
metals

Alkaline
earth
metals

Halogens INERT OR
NOBLE
GASES

P
e
r
i
o
d
i
c
t
a
b
l
e

	I A 1	II A 2											III A 13	IV A 14	V A 15	VI A 16	VII A 17	VIII A 18	
1	1 H 1,01																		2 He 4,00
2	3 Li 6,94	4 Be 9,01											5 B 10,81	6 C 12,01	7 N 14,01	8 O 16,00	9 F 19,00	10 Ne 20,18	
3	11 Na 22,99	12 Mg 24,31	III B 3	IV B 4	V B 5	VI B 6	VII B 7	VIII 8 9 10			IB 11	II B 12	13 Al 26,98	14 Si 28,09	15 P 30,97	16 S 32,07	17 Cl 35,45	18 Ar 39,95	
4	19 K 39,10	20 Ca 40,08	21 Sc 44,96	22 Ti 47,90	23 V 50,94	24 Cr 52,00	25 Mn 54,94	26 Fe 55,85	27 Co 58,93	28 Ni 58,71	29 Cu 63,55	30 Zn 65,39	31 Ga 69,72	32 Ge 72,59	33 As 74,92	34 Se 78,96	35 Br 79,90	36 Kr 83,80	
5	37 Rb 85,47	38 Sr 87,62	39 Y 88,91	40 Zr 91,22	41 Nb 92,91	42 Mo 95,94	43 Tc 98,91	44 Ru 101,07	45 Rh 102,91	46 Pd 106,40	47 Ag 107,87	48 Cd 112,41	49 In 114,82	50 Sn 118,71	51 Sb 121,75	52 Te 127,60	53 I 126,90	54 Xe 131,30	
6	55 Cs 132,91	56 Ba 137,33	57-71 La-Lu	72 Hf 178,49	73 Ta 180,95	74 W 183,85	75 Re 186,21	76 Os 190,20	77 Ir 192,22	78 Pt 195,09	79 Au 196,97	80 Hg 200,59	81 Tl 204,37	82 Pb 207,20	83 Bi 208,98	84 Po (209)	85 At (210)	86 Rn (222)	
7	87 Fr (223)	88 Ra (226)	89-103 Ac-Lr	104 Rf (261)	105 Ha (262)														
			6	57 La 138,91	58 Ce 140,12	59 Pr 140,91	60 Nd 144,24	61 Pm 145	62 Sm 150,35	63 Eu 151,96	64 Gd 157,25	65 Tb 158,92	66 Dy 162,50	67 Ho 164,93	68 Er 167,26	69 Tm 168,93	70 Yb 173,04	71 Lu 174,97	
			7	89 Ac 227,03	90 Th 232,04	91 Pa 231,04	92 U 238,03	93 Np 237,05	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (254)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)	

➤ Oxidation

- ❖ How many electrons an atom needs to gain or lose to achieve the maximum number of electrons in its outer most shell.
- ❖ Groups IA to IIIA lose electrons (metals lose e^-)
- ❖ Groups VA to VIIA gain electrons (non metals gain e^-)
- ❖ Group VIIIA is stable (full octet) will not gain or lose e^-

➤ Octet Rule

- ❖ An atom with 8 electrons in its outer most shell (energy level) is chemically stable and unreactive.

Alkali metals

Alkaline earth metals

Halogens INERT OR NOBLE GASES

+1

+2

+4

+3

-4

-3

-2

-1

Periods


	I A													III A	IV A	V A	VI A	VII A	VIII A
	1													13	14	15	16	17	18
1	1 H 1,01	2 He 4,00											13 B 10,81	14 C 12,01	15 N 14,01	16 O 16,00	17 F 19,00	18 Ne 20,18	
2	3 Li 6,94	4 Be 9,01											5 B 10,81	6 C 12,01	7 N 14,01	8 O 16,00	9 F 19,00	10 Ne 20,18	
3	11 Na 22,99	12 Mg 24,31	III B 3	IV B 4	V B 5	VI B 6	VII B 7	VIII 8 9 10			IB 11	II B 12	13 Al 26,98	14 Si 28,09	15 P 30,97	16 S 32,07	17 Cl 35,45	18 Ar 39,95	
4	19 K 39,10	20 Ca 40,08	21 Sc 44,96	22 Ti 47,90	23 V 50,94	24 Cr 52,00	25 Mn 54,94	26 Fe 55,85	27 Co 58,93	28 Ni 58,71	29 Cu 63,55	30 Zn 65,39	31 Ga 69,72	32 Ge 72,59	33 As 74,92	34 Se 78,96	35 Br 79,90	36 Kr 83,80	
5	37 Rb 85,47	38 Sr 87,62	39 Y 88,91	40 Zr 91,22	41 Nb 92,91	42 Mo 95,94	43 Tc 98,91	44 Ru 101,07	45 Rh 102,91	46 Pd 106,40	47 Ag 107,87	48 Cd 112,41	49 In 114,82	50 Sn 118,71	51 Sb 121,75	52 Te 127,60	53 I 126,90	54 Xe 131,30	
6	55 Cs 132,91	56 Ba 137,33	57-71 La-Lu	72 Hf 178,49	73 Ta 180,95	74 W 183,85	75 Re 186,21	76 Os 190,20	77 Ir 192,22	78 Pt 195,09	79 Au 196,97	80 Hg 200,59	81 Tl 204,37	82 Pb 207,20	83 Bi 208,98	84 Po (209)	85 At (210)	86 Rn (222)	
7	87 Fr (223)	88 Ra (226)	89-103 Ac-Lr	104 Rf (261)	105 Ha (262)														
			6	57 La 138,91	58 Ce 140,12	59 Pr 140,91	60 Nd 144,24	61 Pm 145	62 Sm 150,35	63 Eu 151,96	64 Gd 157,25	65 Tb 158,92	66 Dy 162,50	67 Ho 164,93	68 Er 167,26	69 Tm 168,93	70 Yb 173,04	71 Lu 174,97	
			7	89 Ac 227,03	90 Th 232,04	91 Pa 231,04	92 U 238,03	93 Np 237,05	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (254)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)	



➤ Metalloids

- ❖ Separate metals and nonmetals

➤ Transition or D-Block Metals

- ❖ Metals in the middle
 - ❖ Can vary in oxidation number
- 



Alkali metals
Alkaline earth metals

Halogens
INERT OR NOBLE GASES

$\text{Cu}^{2+}/\text{Cu}^{1+}$, $\text{Fe}^{2+}/\text{Fe}^{3+}$, $\text{Sn}^{2+}/\text{Sn}^{4+}$ (tin)
 $\text{Pb}^{2+}/\text{Pb}^{4+}$ (lead), Zn^{2+} , Ag^{1+} (silver)

Transition Metals

	+1 I A 1	+2 II A 2	Transition Metals										+3 III A 13	+4 IV A 14	-3 V A 15	-2 VI A 16	-1 VII A 17	VIII A 18
1	1 H 1,01	2 He 4,00											5 B 10,81	6 C 12,01	7 N 14,01	8 O 16,00	9 F 19,00	10 Ne 20,18
2	3 Li 6,94	4 Be 9,01											13 Al 26,98	14 Si 28,09	15 P 30,97	16 S 32,07	17 Cl 35,45	18 Ar 39,95
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4	19 K 39,10	20 Ca 40,08	21 Sc 44,96	22 Ti 47,90	23 V 50,94	24 Cr 52,00	25 Mn 54,94	26 Fe 55,85	27 Co 58,93	28 Ni 58,71	29 Cu 63,55	30 Zn 65,39	31 Ga 69,72	32 Ge 72,59	33 As 74,92	34 Se 78,96	35 Br 79,90	36 Kr 83,80
5	37 Rb 85,47	38 Sr 87,62	39 Y 88,91	40 Zr 91,22	41 Nb 92,91	42 Mo 95,94	43 Tc 98,91	44 Ru 101,07	45 Rh 102,91	46 Pd 106,40	47 Ag 107,87	48 Cd 112,41	49 In 114,82	50 Sn 118,71	51 Sb 121,75	52 Te 127,60	53 I 126,90	54 Xe 131,30
6	55 Cs 132,91	56 Ba 137,33	57-71 La-Lu	72 Hf 178,49	73 Ta 180,95	74 W 183,85	75 Re 186,21	76 Os 190,20	77 Ir 192,22	78 Pt 195,09	79 Au 196,97	80 Hg 200,59	81 Tl 204,37	82 Pb 207,20	83 Bi 208,98	84 Po (209)	85 At (210)	86 Rn (222)
7	87 Fr (223)	88 Ra (226)	89-103 Ac-Lr	104 Rf (261)	105 Ha (262)													

Periods

Metals ← ↑ → Nonmetals

Metalloids

6	57 La 138,91	58 Ce 140,12	59 Pr 140,91	60 Nd 144,24	61 Pm 145	62 Sm 150,35	63 Eu 151,96	64 Gd 157,25	65 Tb 158,92	66 Dy 162,50	67 Ho 164,93	68 Er 167,26	69 Tm 168,93	70 Yb 173,04	71 Lu 174,97
7	89 Ac 227,03	90 Th 232,04	91 Pa 231,04	92 U 238,03	93 Np 237,05	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (254)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)

➤ Polyatomic ions

- OH^- hydroxide
- NO_3^- nitrate
- HCO_3^- hydrogen carbonate
- CO_3^{2-} carbonate
- SO_4^{2-} sulphate
- PO_4^{3-} phosphate
- NH_4^+ ammonium

➤ Diatomic gases

- I I_2
- have H_2
- no N_2
- bright Br_2
- or O_2
- clever Cl_2
- friends. F_2

Alkali metals
Alkaline earth metals

Halogens
INERT OR NOBLE GASES

Cu^{2+}/Cu^{1+} , Fe^{2+}/Fe^{3+} , Sn^{2+}/Sn^{4+} (tin)
 Pb^{2+}/Pb^{4+} (lead), Zn^{2+} , Ag^{1+} (silver)

Transition Metals

	+1	+2	Transition Metals										+3	+4	-3	-2	-1	VIII A
	I A	II A	III B	IV B	V B	VI B	VII B	VIII			IB	II B	III A	IV A	VA	VIA	VII A	18
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4	19 K 39,10	20 Ca 40,08	39 Y 88,91	40 Zr 91,22	41 Nb 92,91	42 Mo 95,94	43 Tc 98,91	44 Ru 101,07	45 Rh 102,91	46 Pd 106,40	47 Ag 107,87	48 Cd 112,41	49 In 114,82	50 Sn 118,71	51 Sb 121,75	52 Te 127,60	53 I 126,90	54 Xe 131,30
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Diatomi Gases
 I_2
 H_2
 N_2
 Br_2
 O_2
 Cl_2
 F_2

Metals ← ↑ → Nonmetals

Metalloids

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Polyatomic Ions: OH^- , NO_3^- , HCO_3^- , CO_3^{2-} , SO_4^{2-} , PO_4^{3-} , NH_4^+

Periods

➤ Other chemical names often seen in workbook:

➤ NH_3 ammonia gas

➤ CH_4 methane = carbon tetrahydride

Alkali metals
Alkaline earth metals

Halogens
INERT OR NOBLE GASES

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Diatomi Gases
 I_2
 H_2
 N_2
 Br_2
 O_2
 Cl_2
 F_2

Metals ← ↑ → Nonmetals

Metalloids

Other Important

NH_3
 CH_4

6	57 La 138,91	58 Ce 140,12	59 Pr 140,91	60 Nd 144,24	61 Pm 145	62 Sm 150,35	63 Eu 151,96	64 Gd 157,25	65 Tb 158,92	66 Dy 162,50	67 Ho 164,93	68 Er 167,26	69 Tm 168,93	70 Yb 173,04	71 Lu 174,97
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Polyatomic Ions: OH^- , NO_3^- , HCO_3^- , CO_3^{2-} , SO_4^{2-} , PO_4^{3-} , NH_4^+

TYPES OF BONDS

➤ Ionic

- metal + non-metal
- held together by opposite charges

➤ Covalent

- everything else
- sharing of electrons

CROSS-OVER RULE FOR WRITING CHEMICAL FORMULAS

IONIC COMPOUNDS

Step	Example 1	Example 2
Write symbols - place the metal first	Mg O	Al S
Write oxidation #s as superscripts	Mg ²⁺ O ²⁻	Al ³⁺ S ²⁻
Cross over the superscripts	Mg ₂ ⁺ O ₂ ⁻	Al ₂ ⁺ S ₃ ⁻
Divide subscripts by greatest common factor	Mg ₁ O ₁	Al ₂ S ₃
Drop any subscript that is a 1	Mg O	Al ₂ S ₃