

JSJ TUITION

Essential Elements: A Periodic Table Guide

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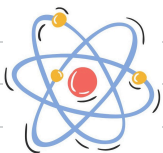
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Elements you need to know

H - Hydrogen

I - Iodine

He - Helium

Pt - Platinum

Li - Lithium

Au - Gold

Be - Beryllium

Hg - Mercury

B - Boron

Pb - Lead

C - Carbon

N - Nitrogen

Diatomic elements:

O - Oxygen

N_2 - Nitrogen

Never

F - Fluorine

H_2 - Hydrogen

Have

Ne - Neon

F_2 - Fluorine

Fear

Na - Sodium

O_2 - Oxygen

Of

Mg - Magnesium

I_2 - Iodine

Ice

Al - Aluminium

Cl_2 - Chlorine

CoLd

Si - Silicone

Br_2 - Bromine

Beer

P - Phosphorus

S - Sulphur

Cl - Chlorine

Ar - Argon

K - Potassium

Ca - Calcium

Cr - Chromium

Mn - Manganese

Fe - Iron

Co - Cobalt

Ni - Nickel

Cu - Copper

Zn - Zinc

Br - Bromine

Pd - Palladium

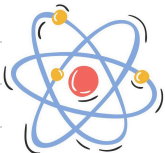
Ag - Silver

p^+ = protons
 n^0 = neutrons
 e^- = electrons

Valency: the bonding ability of an element

G1 G2 → G3 G4 G5 G6 G7 G8
 1 2 3 4 3 2 1 0

Note the difference between
 Valency & Valence
 electrons!



Valence e Groups (Columns) → Periods (rows) → Energy levels of the atom

TABLE 3: THE PERIODIC TABLE OF ELEMENTS
 TABEL 3: DIE PERIODIEKE TABEL VAN ELEMENTE

Alkali metals	Alkaline Earth Metals	Transition Metals (they have varying valency)										Halogens	Noble gases				
G ₁	G ₂											G ₃	G ₄	G ₅	G ₆	G ₇	G ₈
(I)	(II)											(III)	(IV)	(V)	(VI)	(VII)	(VIII)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
2,1	1,5	1,3	1,5	1,6	1,6	1,5	1,8	1,8	1,8	1,9	1,6	1,6	2,0*	2,5	3,0	3,5	4,0
H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar
1	1	7	9	11	12	13	14	15	16	17	18	27	28	31	32	35,5	40
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
0,8	1,0	1,3	1,5	1,6	1,6	1,5	1,8	1,8	1,8	1,9	1,6	1,6	1,8	2,0*	2,4	2,8	3,6
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
39	40	45	48	51	52	55	56	59	59	63,5	65	70	73	75	79	80	84
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
0,8	1,0	1,2	1,4	1,4	1,8	1,9	2,2	2,2	2,2	1,9	1,7	1,7	1,8	1,9	2,1*	2,5	3,4
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
86	88	89	91	92	96	101	103	106	108	112	115	119	122	128	127	131	131
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
0,7	0,9	1,6	1,6	1,8	1,8	1,8	1,9	1,9	1,9	1,9	1,8	1,8	1,9	2,0*	2,5*	2,5*	3,4
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
133	137	139	179	181	184	186	190	192	195	197	201	204	207	209	209	209	210
87	88	89	Lanthanide and Actinide series														
Fr	Ra	Ac															

KEY/SLEUTEL

Atomic number = Number of protons (t) / Atoomgetal

Electronegativity / Elektronegatiwiteit

Symbol / Simbool

Approximate relative atomic mass = $p^+ + n^0$ / Benaderde relatiewe atoommassa

58	59	60	61	62	63	64	65	66	67	68	69	70	71
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
140	141	144		150	152	157	159	163	165	167	169	173	175
90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
232		238											

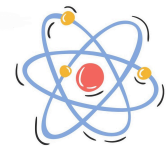
Non-Metals

Metals

* Semi-Metals

○ - liquids at room temperature

Red = Ionic Charges



* If the number of protons = the number of electrons, then it is a **neutral atom**.

* If the number of protons \neq the number of electrons, then it is an **ion**.

There are two types of ions:

- Cations- positive ions (+)
- Anions- negative ions (-)

* To work out the number of neutrons:

$$n^{\circ} = \text{mass number} - \text{atomic number}.$$

Example:

Boron:
$$\begin{aligned} n^{\circ} &= 11 - 5 \\ &= 6 \\ &\rightarrow \end{aligned}$$

* **Valence electrons:** the number of electrons in the last energy level

* **Core electrons:** the number of electrons in the inner (full) energy levels

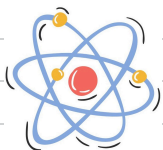
* Types of compounds *

Covalent compounds:

- A bond between a non-metal & non-metal
- They share the electrons

Ionic compounds:

- A bond between a metal & non-metal
- There is a transfer of electrons, from the metal to the non-metal



Periodic trends

In summary:

TABLE 3: THE PERIODIC TABLE OF ELEMENTS
TABEL 3: DIE PERIODIEKE TABEL VAN ELEMENTE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(I)	(II)											(III)	(IV)	(V)	(VI)	(VII)	(VIII)
1 H 1																	2 He 4
3 Li 7	4 Be 9											5 B 10	6 C 12	7 N 14	8 O 16	9 F 19	10 Ne 20
11 Na 23	12 Mg 24											13 Al 27	14 Si 28	15 P 31	16 S 32	17 Cl 35,5	18 Ar 40
19 K 39	20 Ca 40	21 Sc 45	22 Ti 48	23 V 51	24 Cr 52	25 Mn 55	26 Fe 56	27 Co 59	28 Ni 59	29 Cu 63,5	30 Zn 65	31 Ga 70	32 Ge 73	33 As 75	34 Se 79	35 Br 80	36 Kr 84
37 Rb 86	38 Sr 88	39 Y 89	40 Zr 91	41 Nb 92	42 Mo 96	43 Tc 98	44 Ru 101	45 Rh 103	46 Pd 106	47 Ag 108	48 Cd 112	49 In 115	50 Sn 119	51 Sb 122	52 Te 128	53 I 127	54 Xe 131
55 Cs 133	56 Ba 137	57 La 139	58 Ce 140	59 Pr 141	60 Nd 144	61 Pm 147	62 Sm 150	63 Eu 152	64 Gd 157	65 Tb 159	66 Dy 163	67 Ho 165	68 Er 167	69 Tm 169	70 Yb 173	71 Lu 175	86 Rn
87 Fr 226	88 Ra 226	89 Ac	90 Th 232	91 Pa 231	92 U 238	93 Np 237	94 Pu 242	95 Am 243	96 Cm 247	97 Bk 247	98 Cf 251	99 Es 252	100 Fm 257	101 Md 258	102 No 259	103 Lr	

Atomic radius: Size of the atom

- Increases from top to bottom & right to left

Ionisation energy: The minimum amount of energy required to remove an electron from an atom in the gaseous phase

- Increases from bottom to top & left to right

Electron affinity: The amount of energy released when an electron is added to an atom in the gaseous phase

- Increases from bottom to top & left to right

Electronegativity: A measure of the tendency of an atom to attract an electron pair to itself

- Increases from bottom to top & left to right

