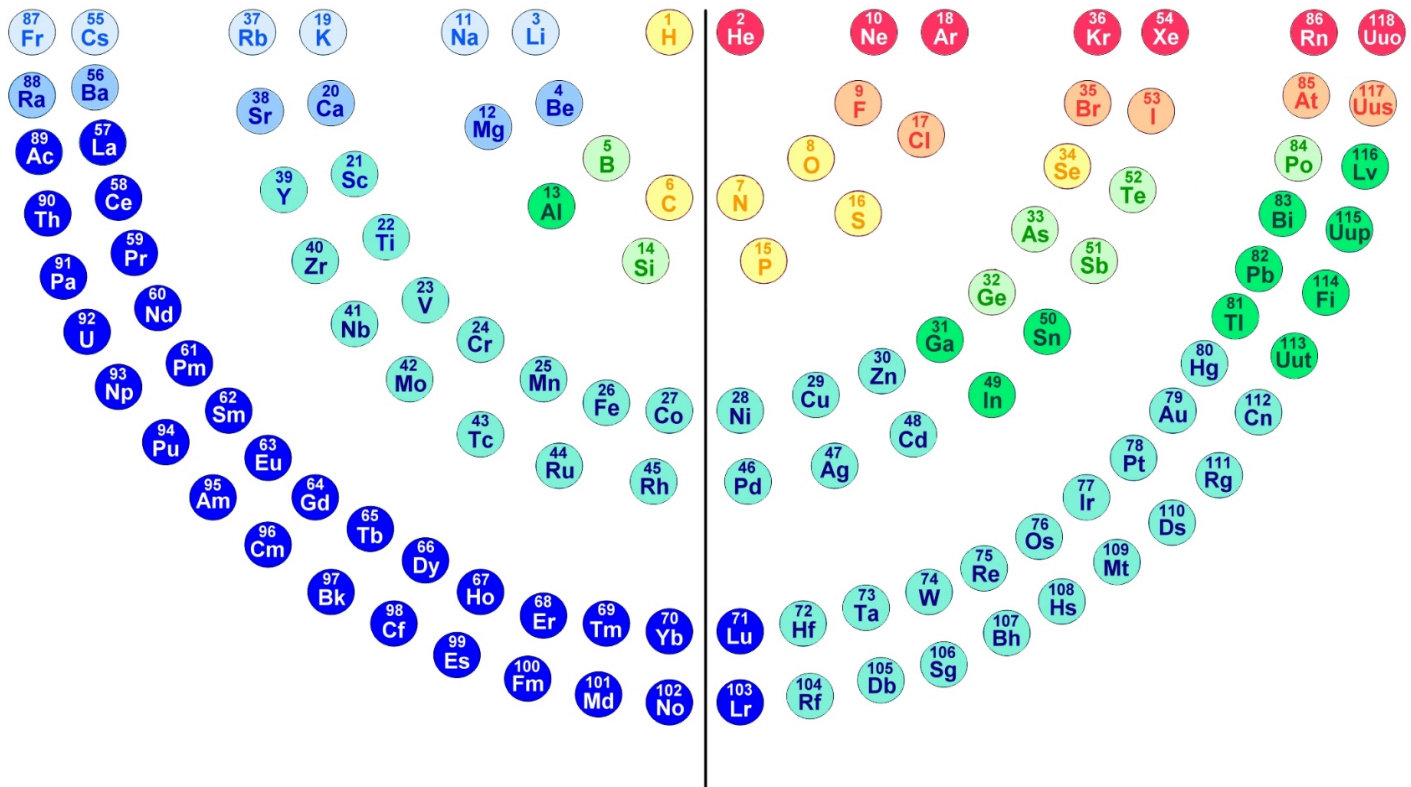


The arrangement of the elements on the periodic table

1 H																	2 He														
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne														
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar														
19 K	20 Ca	21 Sc											22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr				
37 Rb	38 Sr	39 Y											40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe				
55 Cs	56 Ba	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo

Alkali Metals	Alkaline Earth	Lanth./Actinides	Transition Metals	Basic Metals	Semi Metals	Non Metals	Halogens	Noble Gases
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The arrangement of the elements on the periodic table

What is the universe made of? What is the earth made of? And what are the bodies of human beings made of? All visible and invisible matter is made of the chemical elements. Chemists display them in the so-called *periodic table*, a logical arrangement of all elements:

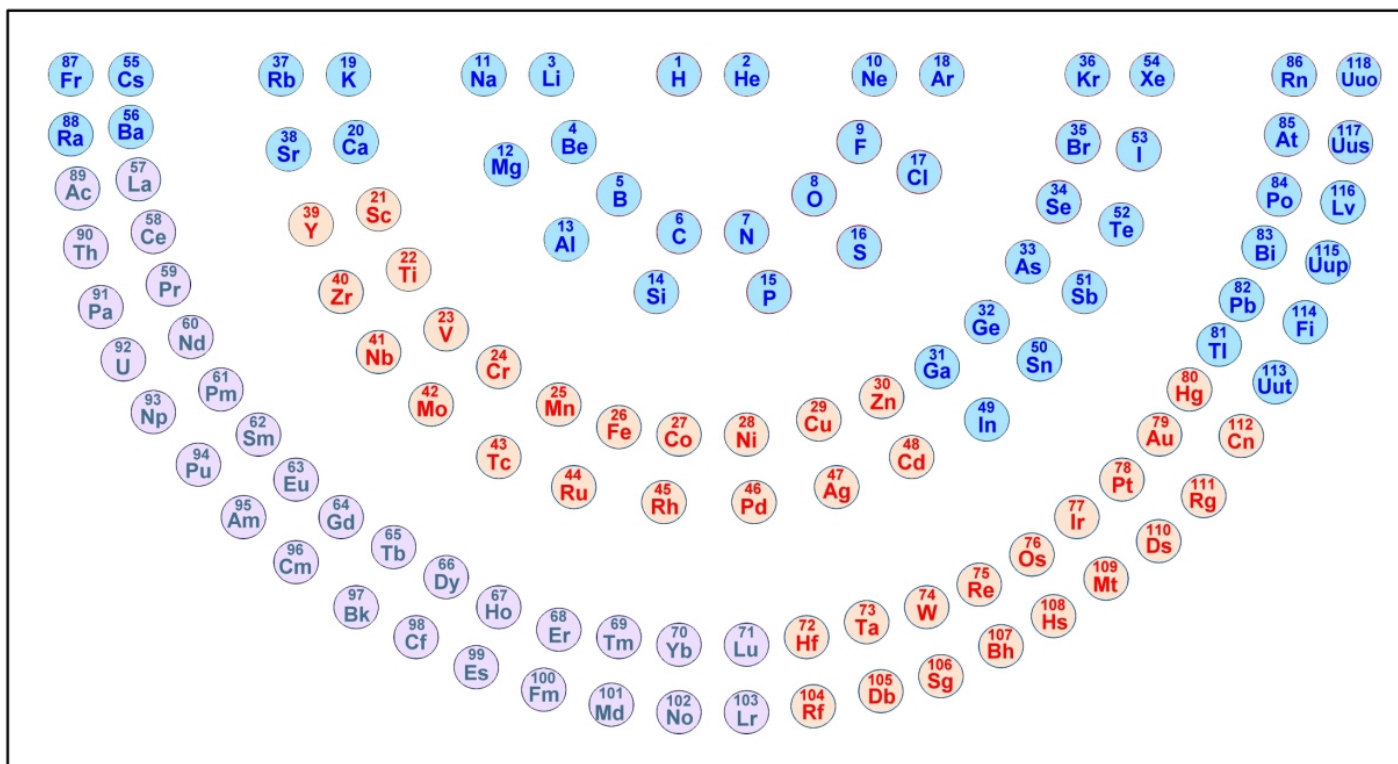
- Step: The **sequence** of the elements is determined by the number of protons in the nucleus (=atomic number, =proton number). This creates a long sequence of elements with a total of 118 elements. The first element is hydrogen (1 proton), the second element is helium (2 protons), the third element is lithium (3 protons) etc.:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	...
H	He	Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	...

- Step: the **groups** of elements are determined by the number of electrons and thus the structure of the respective electron shell. Elements with similar chemical characteristics are arranged in groups. There are 7 rows (= periods with the 7 fundamental electron shells K/L/M/N/O/P/Q) with the **8 main groups (blue)**, **8 secondary groups (red)** and the **lanthanides/actinides (purple; 4-8 sub-groups)**:

	I	II	III											IV	V	VI	VII	VIII	I	II	III	IV	V	VI	VII	VIII						
1 K	1 H																										2 He					
2 L	3 Li	4 Be																				5 B	6 C	7 N	8 O	9 F	10 Ne					
3 M	11 Na	12 Mg																				13 Al	14 Si	15 P	16 S	17 Cl	18 Ar					
4 N	19 K	20 Ca	21 Sc											22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr				
5 O	37 Rb	38 Sr	39 Y											40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe				
6 P	55 Cs	56 Ba	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
7 Q	87 Fr	88 Ra	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo

- Step: the **unification** of the elements results when all the elements with similar chemical and physical characteristics are arranged as closely together as possible. We automatically get a semi-circular representation with four arms:



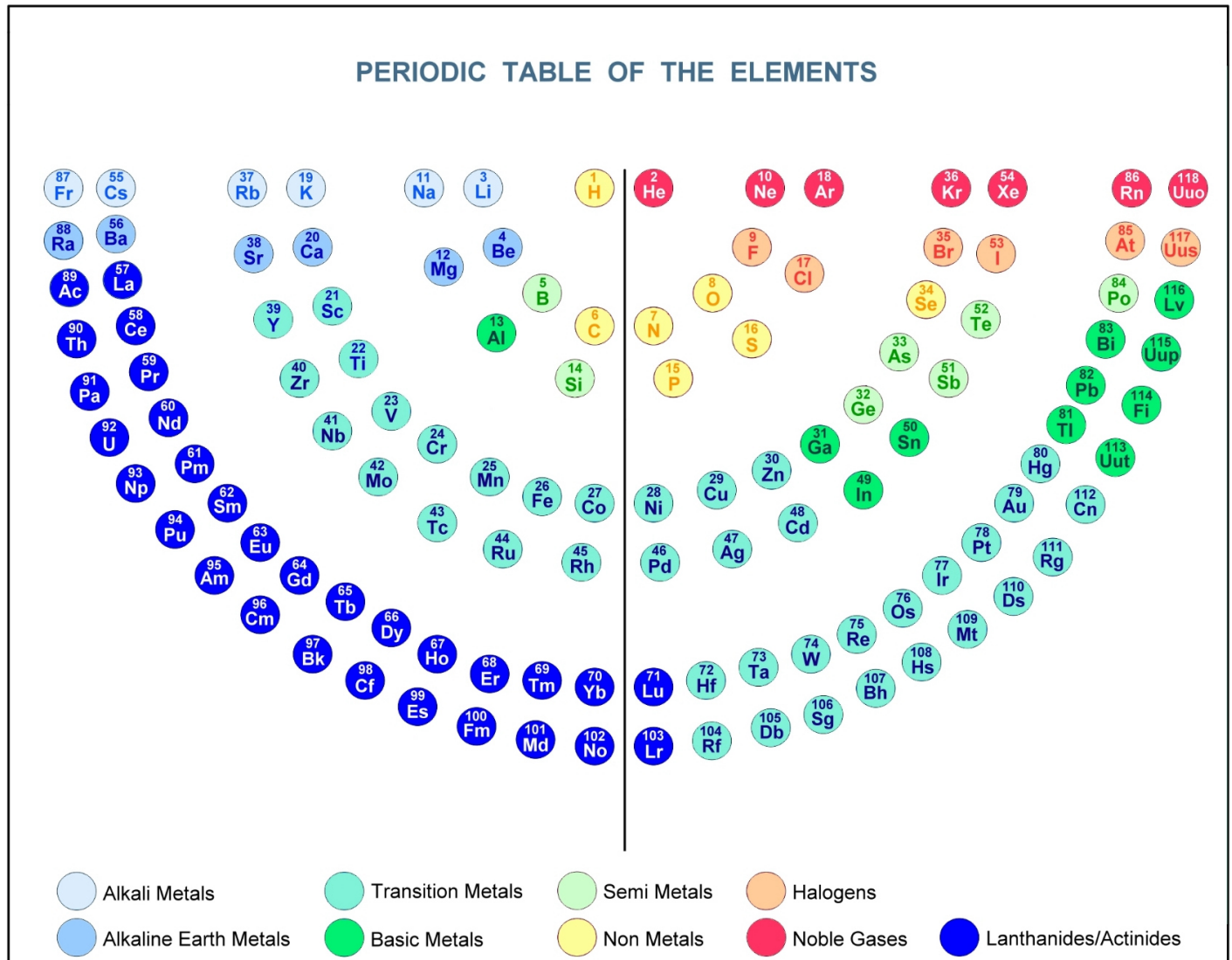
The representation we get after these three steps is reminiscent of a menorah, the biblical seven-branched lamp. Note: But this is according to the Bible not the candlestick of the Jews, but the candlestick of God, for all the peoples who want to go the way of God.

In the following images the elements are grouped by their chemical and physical characteristics and identified by color. The images may be used and published for non-commercial purposes only.

Grouping of the elements on the periodic table

1 H																	2 He														
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne														
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar														
19 K	20 Ca	21 Sc											22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr				
37 Rb	38 Sr	39 Y											40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe				
55 Cs	56 Ba	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo

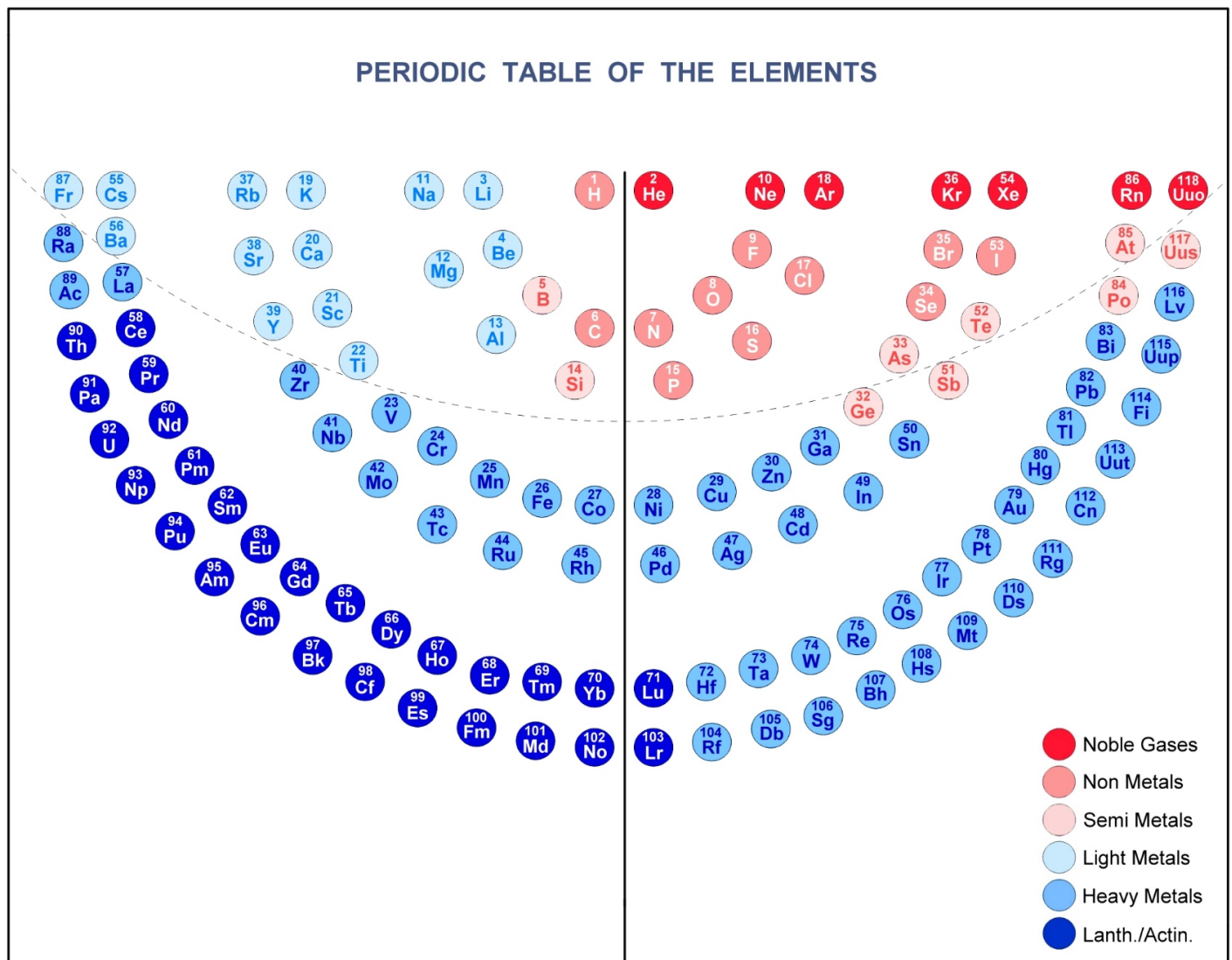
Alkali Metals	Alkaline Earth	Lanth./Actinides	Transition Metals	Basic Metals	Semi Metals	Non Metals	Halogens	Noble Gases
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Grouping of the elements by metallic characteristics

1 H																	2 He														
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne														
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar														
19 K	20 Ca	21 Sc											22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr				
37 Rb	38 Sr	39 Y											40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe				
55 Cs	56 Ba	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn
87 Fr	88 Ra	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Uut	114 Fl	115 Uup	116 Lv	117 Uus	118 Uuo

Lanthanides/Actinides	Heavy Metals	Light Metals	Semi Metals	Non Metals	Noble Gases
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The occupation of the shells – Electron configuration

PERIODIC TABLE OF THE ELEMENTS																																
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			I	II	III	IV	V	VI	VII	VIII										
A	A	B						B	B	B	B	B			B	B	A	A	A	A	A	A	A									
s		d	f					d										p														
1 K 1s ¹																						2 He 1s ²										
2 L 2s ¹	3 Li 2s ²	4 Be 2s ²															5 B 2s ² 2p ¹	6 C 2s ² 2p ²	7 N 2s ² 2p ³	8 O 2s ² 2p ⁴	9 F 2s ² 2p ⁵	10 Ne 2s ² 2p ⁶										
3 M 3s ¹	11 Na 3s ¹	12 Mg 3s ²															13 Al 3s ² 3p ¹	14 Si 3s ² 3p ²	15 P 3s ² 3p ³	16 S 3s ² 3p ⁴	17 Cl 3s ² 3p ⁵	18 Ar 3s ² 3p ⁶										
4 N 4s ¹	19 K 4s ¹	20 Ca 4s ²	21 Sc 4s ² 3d ¹														22 Ti 4s ² 3d ²	23 V 4s ² 3d ³	24 Cr 4s ¹ 3d ⁵	25 Mn 4s ² 3d ⁵	26 Fe 4s ² 3d ⁶	27 Co 4s ² 3d ⁷	28 Ni 4s ² 3d ⁸	29 Cu 4s ¹ 3d ¹⁰	30 Zn 4s ² 3d ¹⁰	31 Ga 4s ² 4p ¹	32 Ge 4s ² 4p ²	33 As 4s ² 4p ³	34 Se 4s ² 4p ⁴	35 Br 4s ² 4p ⁵	36 Kr 4s ² 4p ⁶	
5 O 5s ¹	37 Rb 5s ¹	38 Sr 5s ²	39 Y 5s ² 4d ¹														40 Zr 5s ² 4d ²	41 Nb 5s ¹ 4d ⁴	42 Mo 5s ¹ 4d ⁵	43 Tc 5s ² 4d ⁵	44 Ru 5s ¹ 4d ⁷	45 Rh 5s ¹ 4d ⁸	46 Pd 5s ¹ 4d ¹⁰	47 Ag 5s ¹ 4d ¹⁰	48 Cd 5s ² 4d ¹⁰	49 In 5s ² 5p ¹	50 Sn 5s ² 5p ²	51 Sb 5s ² 5p ³	52 Te 5s ² 5p ⁴	53 I 5s ² 5p ⁵	54 Xe 5s ² 5p ⁶	
6 P 6s ¹	55 Cs 6s ¹	56 Ba 6s ²	57 La 6s ² 5d ¹	58 Ce 6s ² 4f ¹	59 Pr 6s ² 4f ³	60 Nd 6s ² 4f ⁴	61 Pm 6s ² 4f ⁵	62 Sm 6s ² 4f ⁶	63 Eu 6s ² 4f ⁷	64 Gd 6s ² 4f ⁷ 5d ¹	65 Tb 6s ² 4f ⁹	66 Dy 6s ² 4f ¹⁰	67 Ho 6s ² 4f ¹¹	68 Er 6s ² 4f ¹²	69 Tm 6s ² 4f ¹³	70 Yb 6s ² 4f ¹⁴	71 Lu 6s ² 4f ¹⁴ 5d ¹	72 Hf 6s ² 5d ²	73 Ta 6s ² 5d ³	74 W 6s ² 5d ⁴	75 Re 6s ² 5d ⁵	76 Os 6s ² 5d ⁶	77 Ir 6s ² 5d ⁷	78 Pt 6s ¹ 5d ⁹	79 Au 6s ¹ 5d ¹⁰	80 Hg 6s ² 5d ¹⁰	81 Tl 6s ² 6p ¹	82 Pb 6s ² 6p ²	83 Bi 6s ² 6p ³	84 Po 6s ² 6p ⁴	85 At 6s ² 6p ⁵	86 Rn 6s ² 6p ⁶
7 Q 7s ¹	87 Fr 7s ¹	88 Ra 7s ²	89 Ac 7s ² 6d ¹	90 Th 7s ² 6d ²	91 Pa 7s ² 5f ² 6d ¹	92 U 7s ² 5f ³ 6d ¹	93 Np 7s ² 5f ⁴ 6d ¹	94 Pu 7s ² 5f ⁶	95 Am 7s ² 5f ⁷	96 Cm 7s ² 5f ⁷ 6d ¹	97 Bk 7s ² 5f ⁹	98 Cf 7s ² 5f ¹⁰	99 Es 7s ² 5f ¹¹	100 Fm 7s ² 5f ¹²	101 Md 7s ² 5f ¹³	102 No 7s ² 5f ¹⁴	103 Lr 7s ² 5f ¹⁴ 6d ¹	104 Rf 7s ² 5f ¹⁴ 6d ²	105 Db 7s ² 5f ¹⁴ 6d ³	106 Sg 7s ² 5f ¹⁴ 6d ⁴	107 Bh 7s ² 5f ¹⁴ 6d ⁵	108 Hs 7s ² 5f ¹⁴ 6d ⁶	109 Mt 7s ² 5f ¹⁴ 6d ⁷	110 Ds 7s ² 5f ¹⁴ 6d ⁸	111 Rg 7s ² 5f ¹⁴ 6d ⁹	112 Cn 7s ² 5f ¹⁴ 6d ¹⁰	113 Nh 7s ² 5f ¹⁴ 6d ¹⁰ 7p ¹	114 Fl 7s ² 5f ¹⁴ 6d ¹⁰ 7p ²	115 Uup 7s ² 5f ¹⁴ 6d ¹⁰ 7p ³	116 Lv 7s ² 5f ¹⁴ 6d ¹⁰ 7p ⁴	117 Uus 7s ² 5f ¹⁴ 6d ¹⁰ 7p ⁵	118 Uuo 7s ² 5f ¹⁴ 6d ¹⁰ 7p ⁶

Alkali Metals	Alkaline Earth Metals	Lanthanides/Actinides	Transition Metals	Basic Metals	Semi Metals	Non Metals	Halogens	Noble Gases
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K (2 elements)	L (8 elements)	M (8 elements)	N (18 elements)	O (18 elements)	P (32 elements)	Q (32 elements)
1s	2s, 2p	3s, 3p	4s, 3d, 4p	5s, 4d, 5p	6s, 4f, 5d, 6p	7s, 5f, 6d, 7p ...
2 x 1 ² = 2 e ⁻	2 x 2 ² = 8 e ⁻	2 x 3 ² = 18 e ⁻	2 x 4 ² = 32 e ⁻	2 x 5 ² = 50 e ⁻	2 x 6 ² = 72 e ⁻	2 x 7 ² = 98 e ⁻

Atomic orbitals	s = 2 electrons (e ⁻)	p = 6 e ⁻	d = 10 e ⁻	f = 14 e ⁻
	1. and 2. main group (IA, IIA)	3. to 8. main group (IIIA – VIIIA)	8 (or 10) subgroups (IB – VIIIB)	Lanthanides / Actinides

PERIODIC TABLE OF THE ELEMENTS																					
		I	II						III	IV	V	VI	VII	VIII							
		III																			
1	1 K	1s	H														2 He	2	2	2	
2	2 L	2s	Li	Be															8		
	3 M	2p																	6	16	
3	3 M	3s	Na	Mg															2	8	
	4 N	3p																	6		
4	4 N	4s	K	Ca															2	18	
	5 O	4d																	10	36	
5	5 O	5s	Rb	Sr															2	18	
	6 P	5p																	6		
6	6 P	6s	Cs	Ba															2	32	
	7 Q	6d																	10	64	
7	7 Q	7s	Fr	Ra															2	64	
	8	7p																	6	32	
		1 + 12	32										118								

- Noble Gases
- Semi Metals
- Heavy Metals
- Non Metals
- Light Metals
- Lanthan./Actinide