

Ask the right question to find the best answer

Is he popular?

Is he scientist?

Is there any relation of
this man with today's
lesson?



Can i find the
information about him in
the internet ?

Is he alive?

Have I ever heard
his name but have
not seen him?

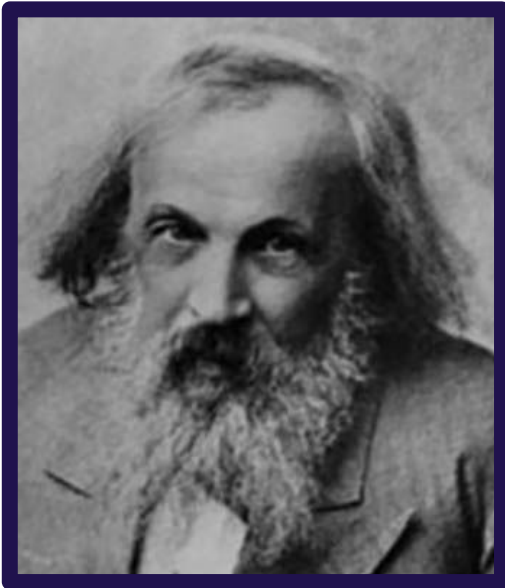
And answer is ...



And Yuri Tsolakovich Oganessian is a Russian **nuclear physicist**.

The 118th chemical element **oganesson** was named after him in 2016, the second instance that an element was named after a living person.

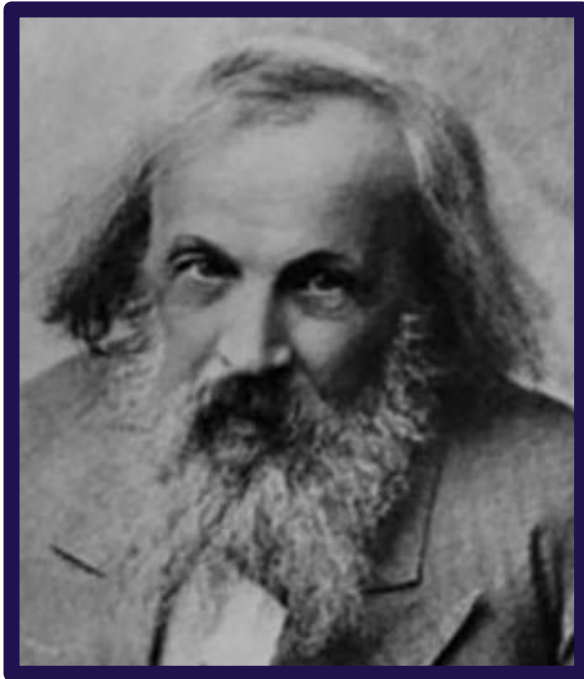
GUESS THE TOPIC



118



GUESS THE TOPIC



ОПЫТЪ СИСТЕМЫ ЭЛЕМЕНТОВЪ.

ОСНОВАННОЙ НА ИХЪ АТОМНОМЪ ВѢСѢ И ХИМИЧЕСКОМЪ СХОДСТВѢ.

	Ti = 50	Zr = 90	? = 180.		
	V = 51	Nb = 94	Ta = 182.		
	Cr = 52	Mo = 96	W = 186.		
	Mn = 55	Rh = 104,4	Pt = 197,4.		
	Fe = 56	Ru = 104,4	Ir = 198.		
	Ni = Co = 59	Pd = 106,5	O = 199.		
H = 1	Cu = 63,4	Ag = 108	Hg = 200.		
Be = 9,4	Mg = 24	Zn = 65,2	Cd = 112		
B = 11	Al = 27,1	? = 68	U = 116	Au = 197?	
C = 12	Si = 28	? = 70	Sn = 118		
N = 14	P = 31	As = 75	Sb = 122	Bi = 210?	
O = 16	S = 32	Se = 79,4	Te = 128?		
F = 19	Cl = 35,5	Br = 80	I = 127		
Li = 7	Na = 23	K = 39	Rb = 85,4	Cs = 133	Tl = 204.
		Ca = 40	Sr = 87,6	Ba = 137	Pb = 207.
		? = 45	Ce = 92		
		?Er = 56	La = 94		
		?Yt = 60	Di = 95		
		?In = 75,5	Th = 118?		

Д. Менделѣевъ

PERIODIC TABLE

Hydrogen H 1.008 1																	Helium He 4.003 2
Lithium Li 6.941 3	Beryllium Be 9.012 4											Boron B 10.81 5	Carbon C 12.01 6	Nitrogen N 14.01 7	Oxygen O 16.00 8	Fluorine F 19.00 9	Neon Ne 20.18 10
Sodium Na 22.99 11	Magnesium Mg 24.31 12											Aluminium Al 26.98 13	Silicon Si 28.09 14	Phosphorus P 30.97 15	Sulfur S 32.07 16	Chlorine Cl 35.45 17	Argon Ar 39.95 18
Potassium K 39.10 19	Calcium Ca 40.08 20	Scandium Sc 44.96 21	Titanium Ti 47.87 22	Vanadium V 50.94 23	Chromium Cr 52.00 24	Manganese Mn 54.94 25	Iron Fe 55.84 26	Cobalt Co 58.93 27	Nickel Ni 58.69 28	Copper Cu 63.55 29	Zinc Zn 65.39 30	Gallium Ga 69.72 31	Germanium Ge 72.63 32	Arsenic As 74.92 33	Selenium Se 78.96 34	Bromine Br 79.90 35	Krypton Kr 83.80 36
Rubidium Rb 85.47 37	Sr 87.62 38	Yttrium Y 88.91 39	Zirconium Zr 91.22 40	Niobium Nb 92.91 41	Molybdenum Mo 95.94 42	Technetium Tc [98] 43	Ruthenium Ru 101.07 44	Rhodium Rh 102.91 45	Palladium Pd 106.42 46	Silver Ag 107.87 47	Cadmium Cd 112.41 48	Indium In 114.82 49	Tin Sn 118.71 50	Antimony Sb 121.76 51	Tellurium Te 127.60 52	Iodine I 126.90 53	Xenon Xe 131.29 54
Cesium Cs 132.91 55	Barium Ba 137.33 56	LANTHANIDES ▼	Hafnium Hf 178.49 72	Tantalum Ta 180.95 73	Tungsten W 183.84 74	Rhenium Re 186.21 75	Osmium Os 190.23 76	Iridium Ir 192.22 77	Platinum Pt 195.08 78	Gold Au 196.97 79	Mercury Hg 200.59 80	Thallium Tl 204.38 81	Lead Pb 207.2 82	Bismuth Bi 208.98 83	Polonium Po [209] 84	Astatine At [210] 85	Radon Rn [222] 86
Francium Fr [223] 87	Radium Ra [226] 88	ACTINIDES ▼	Rutherfordium Rf [267] 104	Dubnium Db [268] 105	Seaborgium Sg [269] 106	Bohrium Bh [270] 107	Hassium Hs [269] 108	Mtnerium Mt [278] 109	Darmstadtium Ds [281] 110	Roentgenium Rg [281] 111	Copernicium Cn [285] 112	Ununium Uut [286] 113	Flerovium Fl [289] 114	Unpentium Uup [289] 115	Livermorium Lv [293] 116	Unseptium Uus [294] 117	Oganesson Og [294] 118

Lanthanum La 138.91 57	Cerium Ce 140.12 58	Praseodymium Pr 140.91 59	Neodymium Nd 144.24 60	Promethium Pm [145] 61	Samarium Sm 150.36 62	Europium Eu 151.96 63	Gadolinium Gd 157.25 64	Terbium Tb 158.93 65	Dysprosium Dy 162.50 66	Holmium Ho 164.93 67	Erbium Er 167.26 68	Thulium Tm 168.93 69	Ytterbium Yb 173.04 70	Lutetium Lu 174.97 71
Actinium Ac [227] 89	Thorium Th 232.04 90	Protactinium Pa 231.04 91	Uranium U 238.03 92	Nepthium Np [237] 93	Plutonium Pu [244] 94	Americium Am [243] 95	Curium Cm [247] 96	Berkelium Bk [247] 97	Californium Cf [251] 98	Einsteinium Es [252] 99	Fermium Fm [257] 100	Mendelevium Md [258] 101	Nobelium No [259] 102	Lawrencium Lr [262] 103

MODERN PERIODIC TABLE

Hydrogen *** H 1.008 1																	Helium *** He 4.003 2
Lithium * Li 6.941 3	Beryllium * Be 9.012 4											Boron * B 10.81 5	Carbon * C 12.01 6	Nitrogen *** N 14.01 7	Oxygen * O 16.00 8	Fluorine *** F 19.00 9	Neon *** Ne 20.18 10
Sodium * Na 22.99 11	Magnesium * Mg 24.31 12											Aluminium * Al 26.98 13	Silicon * Si 28.09 14	Phosphorus * P 30.97 15	Sulfur * S 32.07 16	Chlorine *** Cl 35.45 17	Argon *** Ar 39.95 18
Potassium * K 39.10 19	Calcium * Ca 40.08 20	Scandium * Sc 44.96 21	Titanium * Ti 47.87 22	Vanadium * V 50.94 23	Chromium * Cr 52.00 24	Manganese * Mn 54.94 25	Iron * Fe 55.84 26	Cobalt * Co 58.93 27	Nickel * Ni 58.69 28	Copper * Cu 63.55 29	Zinc * Zn 65.39 30	Gallium * Ga 69.72 31	Germanium * Ge 72.63 32	Arsenic * As 74.92 33	Selenium * Se 78.96 34	Bromine ** Br 79.90 35	Krypton *** Kr 83.80 36
Rubidium * Rb 85.47 37	Sr 87.62 38	Yttrium * Y 88.91 39	Zirconium * Zr 91.22 40	Niobium * Nb 92.91 41	Molybdenum * Mo 95.94 42	Technetium * Tc [98] 43	Ruthenium * Ru 101.07 44	Rhodium * Rh 102.91 45	Palladium * Pd 106.42 46	Silver * Ag 107.87 47	Cadmium * Cd 112.41 48	Indium * In 114.82 49	Tin * Sn 118.71 50	Antimony * Sb 121.76 51	Tellurium * Te 127.60 52	Iodine ** I 126.90 53	Xenon *** Xe 131.29 54
Cesium * Cs 132.91 55	Barium * Ba 137.33 56	ACTINIDES ▼	Hafnium * Hf 178.49 72	Tantalum * Ta 180.95 73	Tungsten * W 183.84 74	Rhenium * Re 186.21 75	Osmium * Os 190.23 76	Iridium * Ir 192.22 77	Platinum * Pt 195.08 78	Gold * Au 196.97 79	Mercury ** Hg 200.59 80	Thallium * Tl 204.38 81	Lead * Pb 207.2 82	Bismuth * Bi 208.98 83	Polonium * Po [209] 84	Astatine * At [210] 85	Radon *** Rn [222] 86
Francium * Fr [223] 87	Radium * Ra [226] 88	ACTINIDES ▼	Rutherfordium * Rf [267] 104	Dubnium * Db [268] 105	Seaborgium **** Sg [269] 106	Bohrium **** Bh [270] 107	Hassium **** Hs [278] 108	Mtnerium **** Mt [281] 109	Darmstadtium **** Ds [281] 110	Roentgenium **** Rg [281] 111	Copernicium **** Cn [285] 112	Uutritium **** Uut [284] 113	Flerovium **** Fl [289] 114	Unpentium **** Uup [289] 115	Livermorium **** Lv [293] 116	Unseptium **** Uus [294] 117	Oganesson **** Og [294] 118
Lanthanum * La 138.91 57	Cerium * Ce 140.12 58	Praseodymium * Pr 140.91 59	Neodymium * Nd 144.24 60	Promethium * Pm [145] 61	Samarium * Sm 150.36 62	Europium * Eu 151.96 63	Gadolinium * Gd 157.25 64	Terbium * Tb 158.93 65	Dysprosium * Dy 162.50 66	Holmium * Ho 164.93 67	Erbium * Er 167.26 68	Thulium * Tm 168.93 69	Ytterbium * Yb 173.04 70	Lutetium * Lu 174.97 71			
Actinium * Ac [227] 89	Thorium * Th 232.04 90	Protactinium * Pa 231.04 91	Uranium * U 238.03 92	Nepthium * Np [237] 93	Plutonium * Pu [244] 94	Americium * Am [243] 95	Curium * Cm [247] 96	Berkelium * Bk [247] 97	Californium * Cf [251] 98	Einsteinium * Es [252] 99	Fermium * Fm [257] 100	Mendelevium * Md [258] 101	Noelium * No [259] 102	Lawrencium * Lr [262] 103			

The structure of MODERN PERIODIC TABLE

MODERN PERIODIC TABLE is very important tool for chemists and scientists.

It is easy to predict the properties of elements by using periodic table.

In **PERIODIC TABLE** all elements *are arranged* from left to right and top to bottom *in order of increasing atomic number*

Atomic number is the order number of elements which is indicated by the **number of protons** of element.

Atomic number = proton number

Hydrogen *** H 1.008 1																	Helium *** He 4.003 2				
Lithium * Li 6.941 3	Beryllium ** Be 9.012 4															Boron * B 10.81 5	Carbon ** C 12.01 6	Nitrogen *** N 14.01 7	Oxygen *** O 16.00 8	Fluorine *** F 19.00 9	Neon *** Ne 20.18 10
Sodium * Na 22.99 11	Magnesium ** Mg 24.31 12															Aluminium * Al 26.98 13	Silicon ** Si 28.09 14	Phosphorus *** P 30.97 15	Sulfur ** S 32.07 16	Chlorine *** Cl 35.45 17	Argon *** Ar 39.95 18
Potassium * K 39.10 19	Calcium ** Ca 40.08 20	Scandium * Sc 44.96 21	Titanium ** Ti 47.87 22	Vanadium *** V 50.94 23	Chromium *** Cr 52.00 24	Manganese *** Mn 54.94 25	Iron * Fe 55.84 26	Cobalt * Co 58.93 27	Nickel * Ni 58.69 28	Copper * Cu 63.55 29	Zinc * Zn 65.39 30	Gallium * Ga 69.72 31	Germanium ** Ge 72.63 32	Arsenic *** As 74.92 33	Selenium *** Se 78.96 34	Bromine *** Br 79.90 35	Krypton *** Kr 83.80 36				
Rubidium * Rb	Strontium ** Sr	Yttrium * Y	Zirconium ** Zr	Niobium *** Nb	Molybdenum *** Mo	Technetium * Tc	Ruthenium ** Ru	Rhodium *** Rh	Palladium * Pd	Silver * Ag	Cadmium ** Cd	Indium * In	Tin ** Sn	Antimony *** Sb	Tellurium *** Te	Iodine *** I	Xenon *** Xe				

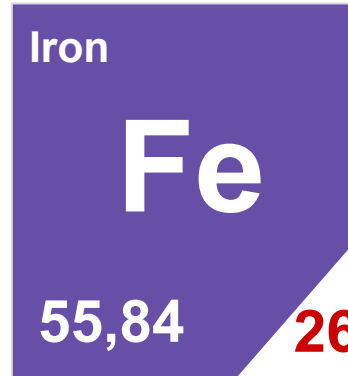
MODERN PERIODIC TABLE

Nowadays, there are **118 chemical elements**. 94 of them are occurred **naturally**, where the remaining 24 elements are **synthetic** elements

Simple periodic table contains **symbol**, **atomic number** and **relative atomic weight** of chemical elements

Hydrogen *** H 1.008 1																	Helium *** He 4.003 2
Lithium * Li 6.941 3	Beryllium ** Be 9.012 4											Boron * B 10.81 5	Carbon ** C 12.01 6	Nitrogen *** N 14.01 7	Oxygen *** O 16.00 8	Fluorine *** F 19.00 9	Neon *** Ne 20.18 10
Sodium * Na 22.99 11	Magnesium ** Mg 24.31 12											Aluminium * Al 26.98 13	Silicon ** Si 28.09 14	Phosphorus *** P 30.97 15	Sulfur *** S 32.07 16	Chlorine *** Cl 35.45 17	Argon *** Ar 39.95 18
Potassium * K 39.10 19	Calcium ** Ca 40.08 20	Scandium *** Sc 44.96 21	Titanium *** Ti 47.87 22	Vanadium *** V 50.94 23	Chromium *** Cr 52.00 24	Manganese *** Mn 54.94 25	Iron *** Fe 55.84 26	Cobalt *** Co 58.93 27	Nickel *** Ni 58.69 28	Copper *** Cu 63.55 29	Zinc *** Zn 65.39 30	Gallium *** Ga 69.72 31	Germanium *** Ge 72.63 32	Arsenic *** As 74.92 33	Selenium *** Se 78.96 34	Bromine *** Br 79.90 35	Krypton *** Kr 83.80 36
Rubidium * Rb	Strontium ** Sr	Yttrium *** Y	Zirconium *** Zr	Niobium *** Nb	Molybdenum *** Mo	Technetium *** Tc	Ruthenium *** Ru	Rhodium *** Rh	Palladium *** Pd	Silver *** Ag	Cadmium *** Cd	Indium *** In	Tin *** Sn	Antimony *** Sb	Tellurium *** Te	Iodine *** I	Xenon *** Xe

How to read the MODERN PERIODIC TABLE



Simple periodic table contains **symbol**, **atomic number** and **relative atomic weight** of chemical elements

Hydrogen *** H 1,008 1	
Lithium * Li 6,941 3	Beryllium * Be 9,012 4
Sodium * Na 22,99 11	Magnesium * Mg 24,31 12
Potassium * K	Calcium * Ca

Scandium *	Titanium * Ti	Vanadium * V	Chromium * Cr	Manganese * Mn	Iron * Fe	Cobalt * Co	Nickel * Ni	Copper * Cu	Zinc * Zn
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Boron * B 10,81 5	Carbon * C 12,01 6	Nitrogen *** N 14,01 7	Oxygen *** O 16,00 8	Fluorine *** F 19,00 9	Neon *** Ne 20,18 10
Aluminium * Al 26,98 13	Silicon * Si 28,09 14	Phosphorus * P 30,97 15	Sulfur * S 32,07 16	Chlorine *** Cl 35,45 17	Argon *** Ar 39,95 18
Gallium * Ga	Germanium * Ge	Arsenic * As	Selenium * Se	Bromine *** Br	Krypton *** Kr

The structure of MODERN PERIODIC TABLE

WHAT IS THE PERIODS?

Hydrogen *** H 1.008 1																	Helium *** He 4.003 2						
Lithium * Li 6.941 3	Beryllium * Be 9.012 4																	Boron * B 10.81 5	Carbon C 12.01 6	Nitrogen *** N 14.01 7	Oxygen *** O 16.00 8	Fluorine *** F 19.00 9	Neon *** Ne 20.18 10
Sodium * Na 22.99 11	Magnesium * Mg 24.31 12																	Aluminium * Al 26.98 13	Silicon * Si 28.09 14	Phosphorus * P 30.97 15	Sulfur * S 32.07 16	Chlorine *** Cl 35.45 17	Argon *** Ar 39.95 18
Potassium * K 39.10 19	Calcium * Ca 40.08 20	Scandium * Sc 44.96 21	Titanium * Ti 47.87 22	Vanadium * V 50.94 23	Chromium * Cr 52.00 24	Manganese * Mn 54.94 25	Iron * Fe 55.84 26	Cobalt * Co 58.93 27	Nickel * Ni 58.69 28	Copper * Cu 63.55 29	Zinc * Zn 65.39 30	Gallium Ga 69.72 31	Germanium * Ge 72.63 32	Arsenic As 74.92 33	Selenium * Se 78.96 34	Bromine * Br 79.90 35	Krypton *** Kr 83.80 36						
Rubidium * Rb 85.47 37	Strontium * Sr 87.62 38	Yttrium * Y 88.91 39	Zirconium * Zr 91.22 40	Niobium * Nb 92.91 41	Molybdenum * Mo 95.94 42	Technetium * Tc [98] 43	Ruthenium * Ru 101.07 44	Rhodium * Rh 102.91 45	Palladium * Pd 106.42 46	Silver * Ag 107.87 47	Cadmium * Cd 112.41 48	Indium * In 114.82 49	Tin * Sn 118.71 50	Antimony * Sb 121.76 51	Tellurium * Te 127.60 52	Iodine * I 126.90 53	Xenon *** Xe 131.29 54						
Cesium * Cs 132.91 55	Barium * Ba 137.33 56	LANTHANIDES ▼	Hafnium * Hf 178.49 72	Tantalum * Ta 180.95 73	Tungsten * W 183.84 74	Rhenium * Re 186.21 75	Osmium * Os 190.23 76	Iridium * Ir 192.22 77	Platinum * Pt 195.08 78	Gold * Au 196.97 79	Mercury ** Hg 200.59 80	Thallium * Tl 204.38 81	Lead * Pb 207.2 82	Bismuth * Bi 208.98 83	Polonium * Po [209] 84	Astatine * At [210] 85	Radon *** Rn [222] 86						
Francium * Fr [223] 87	Radium * Ra [226] 88	ACTINIDES ▼	Rutherfordium **** Rf [267] 104	Dubnium **** Db [268] 105	Seaborgium **** Sg [269] 106	Bohrium **** Bh [270] 107	Hassium **** Hs [269] 108	Meitnerium **** Mt [278] 109	Darmstadtium **** Ds [281] 110	Roentgenium **** Rg [281] 111	Copernicium **** Cn [285] 112	Ununtrium **** Uut [286] 113	Flerovium **** Fl [289] 114	Ununpentium **** Uup [289] 115	Livermorium **** Lv [293] 116	Ununseptium **** Uus [294] 117	Oganesson **** Og [294] 118						

The structure of MODERN PERIODIC TABLE

PERIODS

Horizontal rows are called **periods**

Hydrogen *** H 1.008 1																	Helium *** He 4.003 2					
Lithium * Li 6.941 3	Beryllium * Be 9.012 4																	Neon *** Ne 20.18 10				
Sodium * Na 22.99 11	Magnesium * Mg 24.31 12																	Argon *** Ar 39.95 18				
Potassium * K 39.10 19	Calcium * Ca 40.08 20	Scandium * Sc 44.96 21	Titanium * Ti 47.87 22	Vanadium * V 50.94 23	Chromium * Cr 52.0 24																	Krypton *** Kr 83.80 36
Rubidium * Rb 85.47 37	Strontium * Sr 87.62 38	Yttrium * Y 88.91 39	Zirconium * Zr 91.22 40	Niobium * Nb 92.91 41	Molybdenum * Mo 95.9 42																	Xenon *** Xe 131.29 54
Caesium * Cs 132.91 55	Barium * Ba 137.33 56	LANTHANIDES ▼	Hafnium * Hf 178.49 72	Tantalum * Ta 180.95 73	Tungsten * W 183.84 74																	Radon *** Rn [222] 86
Francium * Fr [223] 87	Radium * Ra [226] 88	ACTINIDES ▼	Rutherfordium **** Rf [267] 104	Dubnium **** Db [268] 105	Seaborgium **** Sg [266] 106																	Oganesson *** Og [294] 118

																Helium *** He 4.003 2
					Carbon * C 12.01 6	Nitrogen *** N 14.01 7	Oxygen * O 16.00 8	Fluorine *** F 19.00 9								Neon *** Ne 20.18 10
				Silicon * Si 28.09 14	Phosphorus * P 30.97 15	Sulfur * S 32.07 16	Chlorine *** Cl 35.45 17								Argon *** Ar 39.95 18	
			Germanium * Ge 72.63 32	Arsenic * As 74.92 33	Selenium * Se 78.96 34	Bromine ** Br 79.90 35						Krypton *** Kr 83.80 36				
		Tin * Sn 118.71 50	Antimony * Sb 121.76 51	Tellurium * Te 127.60 52	Iodine * I 126.90 53						Xenon *** Xe 131.29 54					
	Lead * Pb 207.2 82	Bismuth * Bi 208.98 83	Polonium * Po [209] 84	Astatine * At [210] 85								Radon *** Rn [222] 86				
	Flerovium **** Fl [289] 114	Ununpentium **** Uup [289] 115	Livermorium **** Lv [293] 116	Ununseptium **** Uus [294] 117								Oganesson *** Og [294] 118				

The structure of MODERN PERIODIC TABLE

Hydrogen ***																	Helium ***		
1.008	1																	4.003	2
Lithium *	Beryllium *															Neon ***			
6.941	3	9.012	4													20.18	10		
Sodium *	Magnesium *															Argon ***			
22.99	11	24.31	12											39.95	18				
Potassium *	Calcium *	Scandium *	Titanium *	Vanadium *	Chromium *							Krypton ***							
39.10	19	40.08	20	44.96	21	47.87	22	50.94	23	52.00	24					83.80	36		
Rubidium *	Strontium *	Yttrium *	Zirconium *	Niobium *	Molybdenum *							Xenon ***							
85.47	37	87.62	38	88.91	39	91.22	40	92.91	41	95.94	42					131.29	54		
Caesium *	Barium *	LANTHANIDES	Hafnium *	Tantalum *	Tungsten *							Radon ***							
132.91	55	137.33	56	[138.91]	57	178.49	72	180.95	73	183.84	74					[222]	86		
Francium *	Radium *	ACTINIDES	Rutherfordium ***	Dubnium ***	Seaborgium ***							Oganesson ***							
[223]	87	[226]	88	[227]	89	[267]	104	[268]	105	[269]	106					[294]	118		

PERIODS

Horizontal rows are called **periods**

																Helium ***	
																4.003	2
Carbon ***	Nitrogen ***	Oxygen ***	Fluorine ***	Neon ***													
12.01	6	14.01	7	16.00	8	19.00	9	20.18	10								
Silicon *	Phosphorus *	Sulfur *	Chlorine ***	Argon ***													
28.09	14	30.97	15	32.07	16	35.45	17	39.95	18								
Germanium *	Arsenic *	Selenium *	Bromine **	Krypton ***													
72.63	32	74.92	33	78.96	34	79.90	35	83.80	36								
Tin *	Antimony *	Tellurium *	Iodine *	Xenon ***													
118.71	50	121.76	51	127.60	52	126.90	53	131.29	54								
Lead *	Bismuth *	Polonium *	Astatine *	Radon ***													
207.2	82	208.98	83	[209]	84	[210]	85	[222]	86								
Flerovium ***	Ununpentium ***	Livermorium ***	Ununseptium ***	Oganesson ***													
[289]	114	[289]	115	[293]	116	[294]	117	[294]	118								

The structure of MODERN PERIODIC TABLE

PERIODS

Horizontal rows are called **periods**

There are **seven** periods

Hydrogen ***											Helium ***		
1.008	1											4.003	2
Lithium *	Beryllium *											Neon ***	
6.941	3	9.012	4									20.18	10
Sodium *	Magnesium *											Argon ***	
22.99	11	24.31	12								39.95	18	
Potassium *	Calcium *	Scandium *	Titanium *	Vanadium *							Krypton ***		
39.10	19	40.08	20	44.96	21	47.87	22	50.94	23				
Rubidium *	Strontium *	Yttrium *	Zirconium *	Niobium *								Xenon ***	
85.47	37	87.62	38	88.91	39	91.22	40	92.91	41				
Caesium *	Barium *	LANTHANIDES	Hafnium *	Tantalum *								Radon ***	
132.91	55	137.33	56		72	178.49	72	180.95	73				
Francium *	Radium *	ACTINIDES	Rutherfordium ****	Dubnium ****								Oganesson ****	
[223]	87	[226]	88		[267]	104	[268]	105					

										Helium ***		
										4.003	2	
										Neon ***		
12.01	6	14.01	7	16.00	8	19.00	9				20.18	10
Carbon *	Nitrogen *	Phosphorus *	Sulfur *	Chlorine ***								Argon ***
28.09	13	30.97	14	32.07	15	35.45	16				39.95	18
Germanium *	Arsenic *	Selenium *	Bromine **								Krypton ***	
72.63	31	74.92	32	78.96	33	79.90	34	83.80	35			
Tin *	Antimony *	Tellurium *	Iodine *								Xenon ***	
118.71	49	121.76	50	127.60	51	126.90	52	131.29	53			
Lead *	Bismuth *	Polonium *	Astatine *								Radon ***	
207.2	82	208.98	83	[209]	84	[210]	85	[222]	86			
Flerovium ****	Ununpentium ****	Livermorium ****	Ununseptium ****								Oganesson ****	
[289]	113	[289]	114	[293]	115	[294]	116	[294]	117	[294]	118	

The structure of MODERN PERIODIC TABLE

PERIODS

Horizontal rows are called **periods**

There are **seven** periods

There are **three** short, **two** medium and **two** long periods

1	Hydrogen ***										
2	Lithium *	Beryllium *									
3	Sodium *	Magnesium *									
4	Potassium *	Calcium *	Scandium *	Titanium *	Vanadium *						
5	Rubidium *	Strontium *	Yttrium *	Zirconium *	Niobium *						
6	Caesium *	Barium *	LANTHANIDES	Hafnium *	Tantalum *						
7	Francium ***	Radium ***	ACTINIDES	Rutherfordium ***	Dubnium ***						

										Helium ***
										Neon ***
										Argon ***
										Krypton ***
										Xenon ***
										Radon ***
										Oganesson ***

MODERN PERIODIC TABLE

Short periods

Medium periods

Long periods

Hydrogen *** H 1.008																	Helium *** He 4.0026																		
Lithium * Li 6.941																	Neon ** Ne 20.180																		
Sodium * Na 22.99	11	24.31	12													26.98	13	28.09	14	30.97	15	32.07	16	35.45	17	39.95	18								
Potassium * K 39.10	Calcium	Scandium	Titanium	Vanadium	Chromium	Manganese	Iron	Cobalt	Nickel	Copper	Zinc	Gallium	Germanium	Arsenic	Selenium	Bromine	Krypton																		
Rubidium * Rb 85.47	37	87.62	38	88.91	39	91.22	40	92.91	41	95.94	42	[98]	43	101.07	44	102.91	45	106.42	46	107.87	47	112.41	48	114.82	49	118.71	50	121.76	51	127.60	52	126.90	53	131.29	54
Caesium * Cs 132.91	Barium	LANTHANIDES	Hafnium	Tantalum	Tungsten	Rhenium	Osmium	Iridium	Platinum	Gold	Mercury	Thallium	Lead	Bismuth	Polonium	Astatine	Radon																		
Franium * Fr [223]	87	[226]	88	[267]	104	[268]	105	[269]	106	[270]	107	[269]	108	[270]	109	[281]	110	[281]	111	[285]	112	[286]	113	[289]	114	[289]	115	[293]	116	[294]	117	[294]	118		

The structure of MODERN PERIODIC TABLE

WHAT IS THE GROUPS?

Hydrogen *** H 1.008 1																	Helium *** He 4.003 2
Lithium * Li 6.941 3	Beryllium * Be 9.012 4											Boron * B 10.81 5	Carbon *** C 12.01 6	Nitrogen *** N 14.01 7	Oxygen *** O 16.00 8	Fluorine *** F 19.00 9	Neon *** Ne 20.18 10
Sodium * Na 22.99 11	Magnesium * Mg 24.31 12											Aluminium * Al 26.98 13	Silicon * Si 28.09 14	Phosphorus * P 30.97 15	Sulfur * S 32.07 16	Chlorine *** Cl 35.45 17	Argon *** Ar 39.95 18
Potassium * K 39.10 19	Calcium * Ca 40.08 20	Scandium * Sc 44.96 21	Titanium * Ti 47.87 22	Vanadium * V 50.94 23	Chromium * Cr 52.00 24	Manganese * Mn 54.94 25	Iron * Fe 55.84 26	Cobalt * Co 58.93 27	Nickel * Ni 58.69 28	Copper * Cu 63.55 29	Zinc * Zn 65.39 30	Gallium * Ga 69.72 31	Germanium * Ge 72.63 32	Arsenic * As 74.92 33	Selenium * Se 78.96 34	Bromine *** Br 79.90 35	Krypton *** Kr 83.80 36
Rubidium * Rb	Strontium * Sr	Yttrium * Y	Zirconium * Zr	Niobium * Nb	Molybdenum * Mo	Technetium * Tc	Ruthenium * Ru	Rhodium * Rh	Palladium * Pd	Silver * Ag	Cadmium * Cd	Indium * In	Tin * Sn	Antimony * Sb	Tellurium * Te	Iodine *** I	Xenon *** Xe

The structure of MODERN PERIODIC TABLE

GROUPS

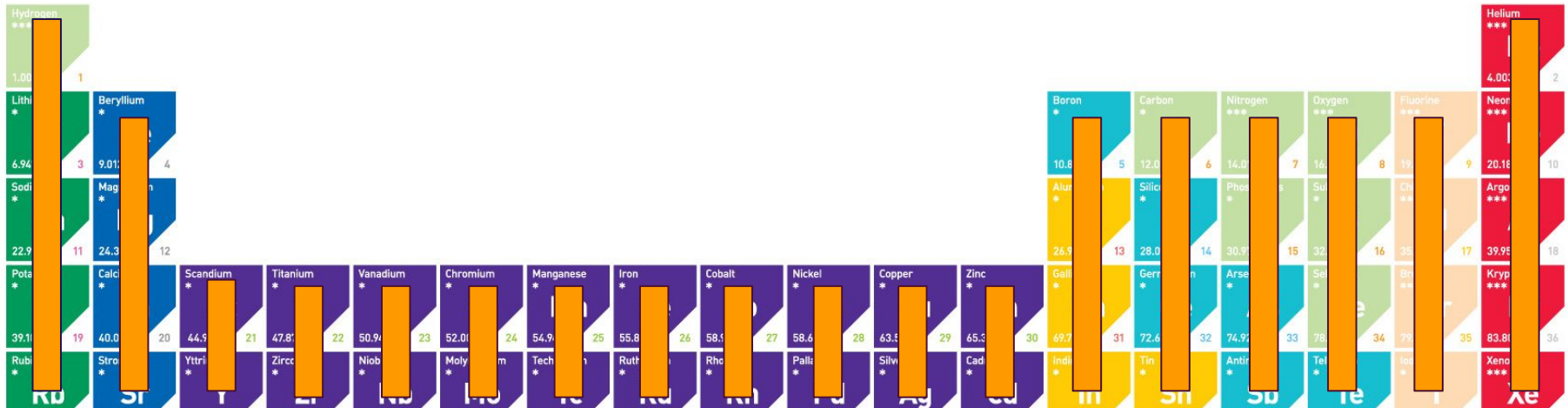
Vertical columns are called GROUPS

Hydrogen *** H 1.008 1																	Helium *** He 4.003 2
Lithium * Li 6.941 3	Beryllium * Be 9.012 4											Boron * B 10.81 5	Carbon *** C 12.01 6	Nitrogen *** N 14.01 7	Oxygen *** O 16.00 8	Fluorine *** F 19.00 9	Neon *** Ne 20.18 10
Sodium * Na 22.99 11	Magnesium * Mg 24.31 12											Aluminium * Al 26.98 13	Silicon * Si 28.09 14	Phosphorus * P 30.97 15	Sulfur * S 32.07 16	Chlorine *** Cl 35.45 17	Argon *** Ar 39.95 18
Potassium * K 39.10 19	Calcium * Ca 40.08 20	Scandium * Sc 44.96 21	Titanium * Ti 47.87 22	Vanadium * V 50.94 23	Chromium * Cr 52.00 24	Manganese * Mn 54.94 25	Iron * Fe 55.84 26	Cobalt * Co 58.93 27	Nickel * Ni 58.69 28	Copper * Cu 63.55 29	Zinc * Zn 65.39 30	Gallium * Ga 69.72 31	Germanium * Ge 72.63 32	Arsenic * As 74.92 33	Selenium *** Se 78.96 34	Bromine *** Br 79.90 35	Krypton *** Kr 83.80 36
Rubidium * Rb	Strontium * Sr	Yttrium * Y	Zirconium * Zr	Niobium * Nb	Molybdenum * Mo	Technetium * Tc	Ruthenium * Ru	Rhodium * Rh	Palladium * Pd	Silver * Ag	Cadmium * Cd	Indium * In	Tin * Sn	Antimony * Sb	Tellurium * Te	Iodine *** I	Xenon *** Xe

The structure of MODERN PERIODIC TABLE

GROUPS

Vertical columns are called GROUPS

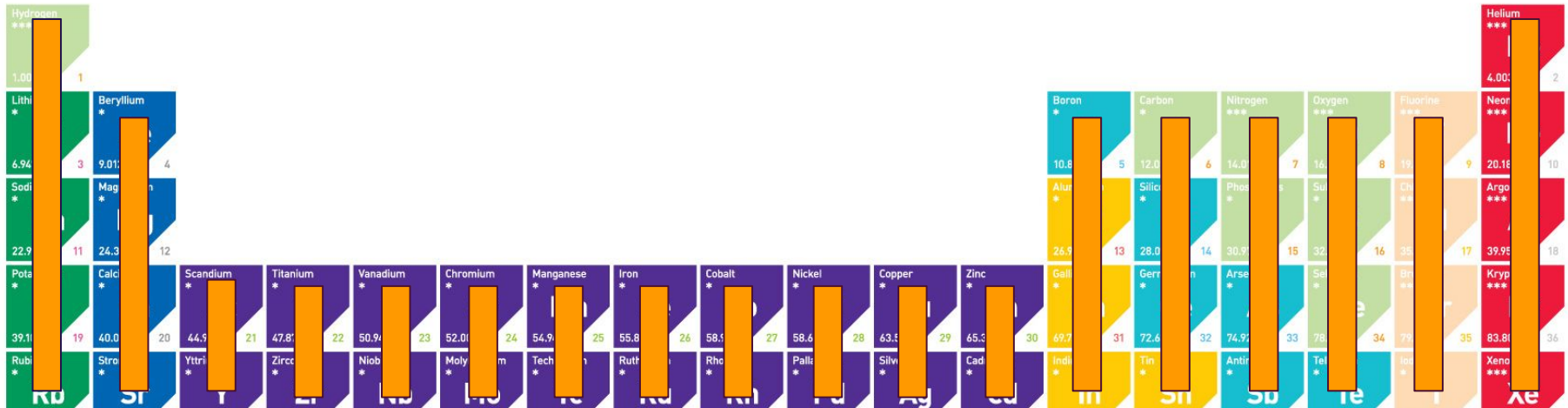


The structure of MODERN PERIODIC TABLE

GROUPS

Vertical columns are called GROUPS

There are 18 columns

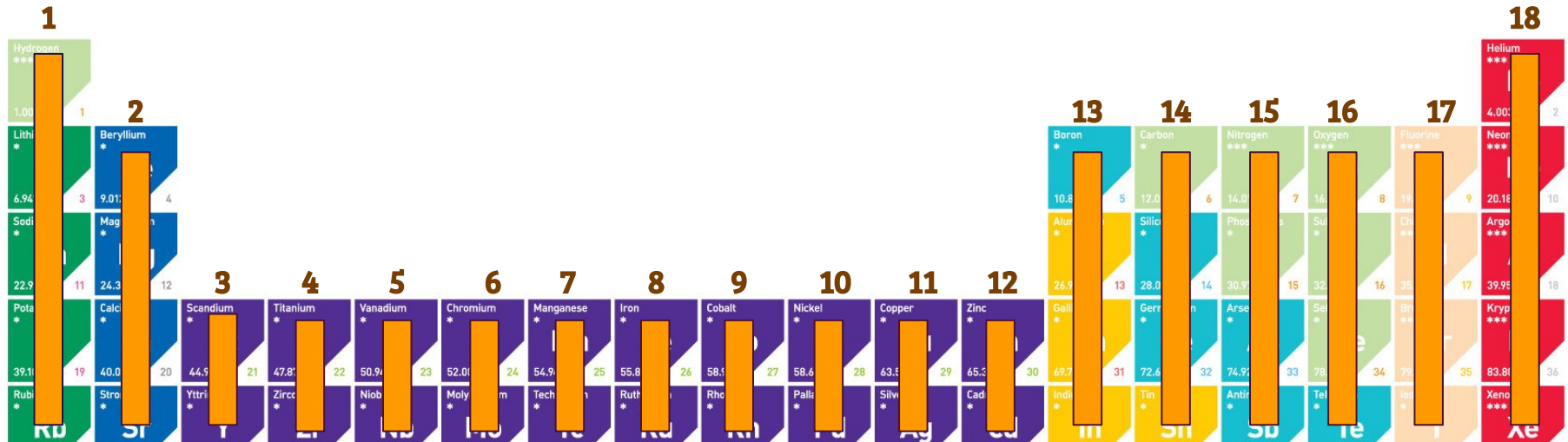


The structure of MODERN PERIODIC TABLE

GROUPS

Vertical columns are called GROUPS

There are 18 columns



The structure of MODERN PERIODIC TABLE

GROUPS

Vertical columns are called GROUPS

There are 18 columns

Groups are classified as A and B groups

Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10	Group 11	Group 12	Group 13	Group 14	Group 15	Group 16	Group 17	Group 18
Hydrogen ***																	Helium ***
1.00																	4.00
Lithium *	Beryllium *											Boron *	Carbon *	Nitrogen **	Oxygen **	Fluorine ***	Neon ***
6.94	9.01											10.8	12.0	14.0	16.0	19.0	20.18
Sodium *	Magnesium *											Aluminum *	Silicon *	Phosphorus **	Sulfur **	Chlorine **	Argon ***
22.9	24.3											26.9	28.0	30.9	32.0	35.4	39.9
Potassium *	Calcium *	Scandium *	Titanium *	Vanadium *	Chromium *	Manganese *	Iron *	Cobalt *	Nickel *	Copper *	Zinc *	Gallium *	Germanium **	Arsenic **	Selenium **	Bromine **	Krypton ***
39.1	40.0	44.9	47.8	50.9	52.0	54.9	55.8	58.9	58.6	63.5	65.3	69.7	72.4	74.9	78.9	79.9	83.8
Rubidium *	Strontium *	Yttrium *	Zirconium **	Niobium **	Molybdenum **	Technetium **	Ruthenium **	Rhodium **	Palladium **	Silver **	Cadmium **	Indium **	Tin **	Antimony **	Tellurium **	Iodine **	Xenon ***
85.4	87.6	88.9	91.2	92.9	95.9	98.9	101.1	102.9	106.4	107.8	112.4	114.8	118.7	121.8	127.6	126.9	131.3

The structure of MODERN PERIODIC TABLE

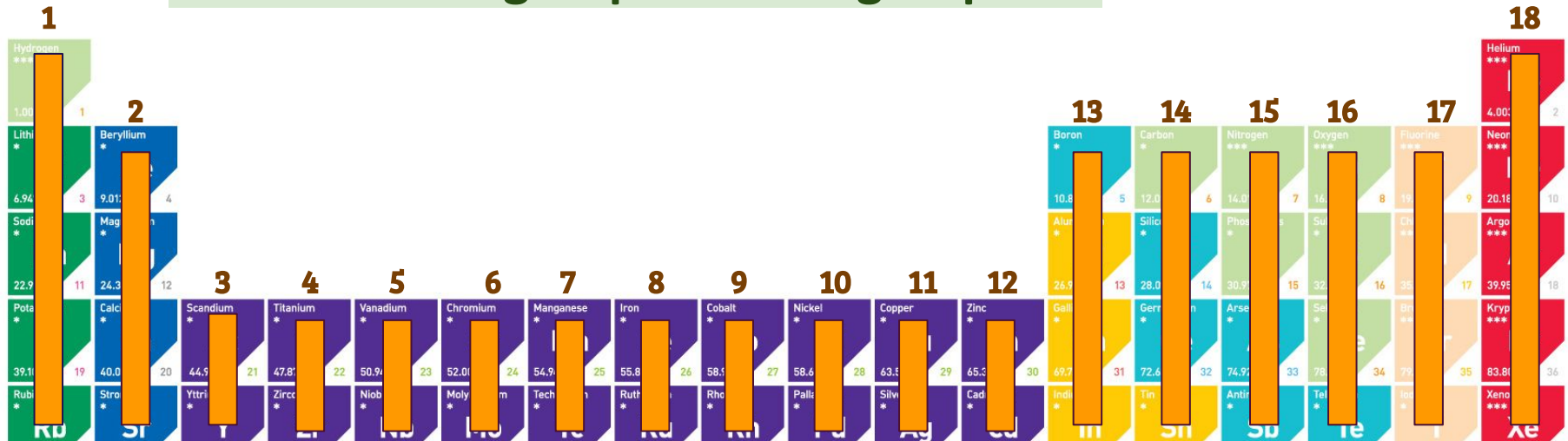
GROUPS

Vertical columns are called GROUPS

There are 18 columns

Groups are classified as A and B groups

There are 8 A groups and 8 B groups



The structure of MODERN PERIODIC TABLE

GROUPS

Vertical columns are called GROUPS

There are 18 columns

Groups are classified as A and B groups

There are 8 A groups and 8 B groups

1A	2A	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	3A	4A	5A	6A	7A	8A			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18			
Hydrogen *** 1.008	Beryllium * 9.012	Scandium * 44.956	Titanium * 47.88	Vanadium * 50.942	Chromium * 52.004	Manganese * 54.938	Iron * 55.845	Cobalt * 58.933	Nickel * 58.693	Copper * 63.546	Zinc * 65.38	Boron * 10.811	Carbon * 12.011	Nitrogen *** 14.007	Oxygen *** 16.000	Fluorine *** 18.998	Helium *** 4.0026			
Lithium * 6.941	Magnesium * 24.305	Calcium * 40.078	Strontium * 87.62	Yttrium * 88.906	Zirconium * 91.224	Niobium * 92.906	Molybdenum * 95.94	Technetium * 98.906	Ruthenium * 101.07	Rhodium * 102.905	Palladium * 106.42	Silver * 107.868	Cadmium * 112.411	Indium * 114.818	Tin * 118.710	Antimony * 121.757	Tellurium * 127.603	Iodine * 126.905	Xenon *** 131.29	
Rubidium * 85.468	Strontium * 87.62	Yttrium * 88.906	Zirconium * 91.224	Niobium * 92.906	Molybdenum * 95.94	Technetium * 98.906	Ruthenium * 101.07	Rhodium * 102.905	Palladium * 106.42	Silver * 107.868	Cadmium * 112.411	Indium * 114.818	Tin * 118.710	Antimony * 121.757	Tellurium * 127.603	Iodine * 126.905	Xenon *** 131.29	Krypton *** 83.80	Argon *** 39.948	Neon *** 20.180

The structure of MODERN PERIODIC TABLE

GROUPS

Vertical columns are called GROUPS

There are 18 columns

Groups are classified as A and B groups

There are 8 A groups and 8 B groups

8 B group has 3 columns

1A	2A	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	3A	4A	5A	6A	7A	8A
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Hydrogen ***																	Helium ***
1.008																	4.0026
Lithium *	Beryllium *											Boron *	Carbon *	Nitrogen *	Oxygen *	Fluorine *	Neon ***
6.941	9.0122											10.811	12.011	14.007	15.999	18.998	20.180
Sodium *	Magnesium *											Aluminum *	Silicon *	Phosphorus *	Sulfur *	Chlorine *	Argon ***
22.990	24.305											26.982	28.086	30.974	32.06	35.453	39.948
Potassium *	Calcium *	Scandium *	Titanium *	Vanadium *	Chromium *	Manganese *	Iron *	Cobalt *	Nickel *	Copper *	Zinc *	Gallium *	Germanium *	Arsenic *	Selenium *	Bromine *	Krypton ***
39.098	40.078	44.956	47.88	50.942	52.004	54.938	55.845	58.933	58.693	63.546	65.38	69.723	72.64	74.922	78.96	79.904	83.80
Rubidium *	Strontium *	Yttrium *	Zirconium *	Niobium *	Molybdenum *	Technetium *	Ruthenium *	Rhodium *	Palladium *	Silver *	Cadmium *	Indium *	Tin *	Antimony *	Tellurium *	Iodine *	Xenon ***
85.468	87.62	88.906	91.224	92.906	95.94	98.906	101.07	102.905	106.42	107.868	112.411	114.818	118.710	121.757	127.6	126.905	131.29

The structure of MODERN PERIODIC TABLE

GROUPS

Vertical columns are called GROUPS

There are 18 columns

Groups are classified as A and B groups

There are 8 A groups and 8 B groups

8B group has 3 columns

1A	2A	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	3A	4A	5A	6A	7A	8A
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Hydrogen ***																	Helium ***
1.00																	4.00
Lithi *	Beryllium *											Boron *	Carbon *	Nitrogen ***	Oxygen ***	Fluorine ***	Neon ***
6.94	9.01											10.8	12.0	14.0	16.0	19.0	20.18
Sodi *	Mag *											Alumi *	Silico *	Phos *	Sul *	Chlor ***	Argo ***
22.9	24.3											26.9	28.0	30.9	32.0	35.4	39.9
Pota *	Calc *	Scandium *	Titanium *	Vanadium *	Chromium *	Manganese *	Iron *	Cobalt *	Nickel *	Copper *	Zinc *	Galli *	Germa *	Arsen *	Selen *	Brom ***	Kryp ***
39.1	40.0	44.9	47.8	50.9	52.0	54.9	55.8	58.9	58.6	63.5	65.3	69.7	72.4	74.9	78.9	79.9	83.8
Rubi *	Stron *	Yttri *	Zirc *	Niob *	Molyb *	Tech *	Ruth *	Rhodi *	Palli *	Silv *	Cadm *	Indi *	Tin *	Antim *	Tell *	Iodi *	Xeno ***
85.4	87.6	88.9	91.2	92.9	95.9	98.9	101.1	102.9	106.4	107.8	112.4	127.4	128.7	127.4	127.6	126.9	131.3

The structure of MODERN PERIODIC TABLE

GROUPS

sometimes called as

FAMILY

1A		2A		3A - 8A										8A																					
1		2		3 - 12										13 - 18																					
Hydrogen ***	1.008	Lithium *	6.94	Beryllium *	9.01	3B	4B	5B	6B	7B	8B	8B	8B	1B	2B	Boron *	10.8	Carbon *	12.0	Nitrogen ***	14.0	Oxygen ***	16.0	Fluorine ***	19.0	Helium ***	4.00								
Sodium *	22.9	Magnesium *	24.3	Scandium *	44.9	Titanium *	47.8	Vanadium *	50.9	Chromium *	52.0	Manganese *	54.9	Iron *	55.8	Cobalt *	58.9	Nickel *	58.7	Copper *	63.5	Zinc *	65.3	Aluminum *	26.9	Silicon *	28.0	Phosphorus *	30.9	Sulfur *	32.0	Chlorine ***	35.4	Argon ***	39.9
Potassium *	39.1	Calcium *	40.0	Yttrium *	88.9	Zirconium *	91.2	Niobium *	92.9	Molybdenum *	95.9	Technetium *	98.9	Ruthenium *	101.1	Rhodium *	102.9	Palladium *	106.4	Silver *	107.8	Cadmium *	112.4	Gallium *	69.7	Germanium *	72.6	Antimony *	74.9	Tellurium *	78.9	Bismuth ***	208.1	Krypton ***	83.8
Rubidium *	85.4	Strontium *	87.6	Rhenium *	186.2	Hafnium *	178.5	Tantalum *	180.9	Tungsten *	183.8	Rhodium *	186.2	Palladium *	189.1	Silver *	197.0	Cadmium *	200.3	Indium *	204.4	Tin *	208.6	Lead *	207.2	Thallium *	204.4	Lead *	208.9	Polonium ***	209.0	Astatine ***	210.0	Radon ***	222.0

ALKALI METALS

1A group of periodic table **is called** Alkali metals.

This group **contains** H (hydrogen), Li (Lithium), Na (sodium), K (potassium), Rb (Rubidium), Cs (Cesium), Fr (Francium)

Alkali metals **are most active** metals. They can react even with air and water, **so they are stored** under the kerosene

Alkali metals **are very soft** metals, so they can be cut by knife

Hydrogen *** H 1.008	
Lithium * Li 6.941	Beryllium * Be 9.012
Sodium * Na 22.99	Magnesium * Mg 24.31
Potassium * K 39.10	Calcium * Ca 40.08
Rubidium * Rb 85.47	Strontium * Sr 87.62
Cesium * Cs 132.91	Barium * Ba 137.33
Francium * Fr [223]	Radium * Ra [226]

But hydrogen is nonmetals, it **is located** in 1A group **because of** its electronic configuration

Cesium **is most active** metal in 1A group

Francium **is radioactive** metals

MODERN PERIODIC TABLE

Hydrogen *** H 1.008 1																	Helium *** He 4.003 2
Lithium * Li 6.941 3	Beryllium * Be 9.012 4											Boron * B 10.81 5	Carbon * C 12.01 6	Nitrogen *** N 14.01 7	Oxygen * O 16.00 8	Fluorine *** F 19.00 9	Neon *** Ne 20.18 10
Sodium * Na 22.99 11	Magnesium * Mg 24.31 12											Aluminium * Al 26.98 13	Silicon * Si 28.09 14	Phosphorus * P 30.97 15	Sulfur * S 32.07 16	Chlorine *** Cl 35.45 17	Argon *** Ar 39.95 18
Potassium * K 39.10 19	Calcium * Ca 40.08 20	Scandium * Sc 44.96 21	Titanium * Ti 47.87 22	Vanadium * V 50.94 23	Chromium * Cr 52.00 24	Manganese * Mn 54.94 25	Iron * Fe 55.84 26	Cobalt * Co 58.93 27	Nickel * Ni 58.69 28	Copper * Cu 63.55 29	Zinc * Zn 65.39 30	Gallium * Ga 69.72 31	Germanium * Ge 72.63 32	Arsenic * As 74.92 33	Selenium * Se 78.96 34	Bromine ** Br 79.90 35	Krypton *** Kr 83.80 36
Rubidium * Rb 85.47 37	Sr 87.62 38	Yttrium * Y 88.91 39	Zirconium * Zr 91.22 40	Niobium * Nb 92.91 41	Molybdenum * Mo 95.94 42	Technetium * Tc [98] 43	Ruthenium * Ru 101.07 44	Rhodium * Rh 102.91 45	Palladium * Pd 106.42 46	Silver * Ag 107.87 47	Cadmium * Cd 112.41 48	Indium * In 114.82 49	Tin * Sn 118.71 50	Antimony * Sb 121.76 51	Tellurium * Te 127.60 52	Iodine ** I 126.90 53	Xenon *** Xe 131.29 54
Cesium * Cs 132.91 55	Barium * Ba 137.33 56	ACTINIDES ▼	Hafnium * Hf 178.49 72	Tantalum * Ta 180.95 73	Tungsten * W 183.84 74	Rhenium * Re 186.21 75	Osmium * Os 190.23 76	Iridium * Ir 192.22 77	Platinum * Pt 195.08 78	Gold * Au 196.97 79	Mercury ** Hg 200.59 80	Thallium * Tl 204.38 81	Lead * Pb 207.2 82	Bismuth * Bi 208.98 83	Polonium * Po [209] 84	Astatine * At [210] 85	Radon *** Rn [222] 86
Francium * Fr [223] 87	Radium * Ra [226] 88	ACTINIDES ▼	Rutherfordium * Rf [267] 104	Dubnium * Db [268] 105	Seaborgium **** Sg [269] 106	Bohrium **** Bh [270] 107	Hassium **** Hs [278] 108	Mtnerium **** Mt [281] 109	Darmstadtium **** Ds [281] 110	Roentgenium **** Rg [281] 111	Copernicium **** Cn [285] 112	Uutritium **** Uut [284] 113	Flerovium **** Fl [289] 114	Unpentium **** Uup [289] 115	Livermorium **** Lv [293] 116	Unseptium **** Uus [294] 117	Oganesson **** Og [294] 118

Lanthanum * La 138.91 57	Cerium * Ce 140.12 58	Praseodymium * Pr 140.91 59	Neodymium * Nd 144.24 60	Promethium * Pm [145] 61	Samarium * Sm 150.36 62	Europium * Eu 151.96 63	Gadolinium * Gd 157.25 64	Terbium * Tb 158.93 65	Dysprosium * Dy 162.50 66	Holmium * Ho 164.93 67	Erbium * Er 167.26 68	Thulium * Tm 168.93 69	Ytterbium * Yb 173.04 70	Lutetium * Lu 174.97 71
Actinium * Ac [227] 89	Thorium * Th 232.04 90	Protactinium * Pa 231.04 91	Uranium * U 238.03 92	Nepunium * Np [237] 93	Plutonium * Pu [244] 94	Americium * Am [243] 95	Curium * Cm [247] 96	Berkelium * Bk [247] 97	Californium * Cf [251] 98	Einsteinium * Es [252] 99	Fermium * Fm [257] 100	Mendelevium * Md [258] 101	Noelium * No [259] 102	Lawrencium * Lr [262] 103

Worksheet 2

Find the Element activity