



Name:

Mark:

Class:

CHEMISTRY

Periodic table

GRADE 11 General

2.2: Development of Periodic Table

Metals, Nonmetals and Metalloids

The periodic table can be divided into metals, nonmetals and metalloids

1	H	2	He
3	Li	4	Be
11	Na	12	Mg
19	K	21	Ca
37	Rb	39	Sr
55	Cs	56	Ba
87	Fr	88	Ra
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		
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		

Metals are:

Hard, strong, lustre (shiny), malleable, ductile, good conductors of electricity and heat

Non-metals are:

gases or dull solids, soft, brittle (easy to break), do not

conduct electricity or heat, good insulators.

Metalloids are:

Properties of metals and nonmetals, Si and Ge are used for computer chips and solar cells.



Groups, Periods and Blocks

The periodic table can also be divided into groups and periods

Group	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Period	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	1 H														2 He				
2	3 Li	4 Be													5 B	6 C	7 N	8 O	
3	11 Na	12 Mg													13 Al	14 Si	15 P	16 S	
4	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	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 Pb	51 Sb	52 Te	53 I	54 Xe	
6	55 Cs	56 Ba	57 La	*	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	
7	87 Fr	88 Ra	89 Ac	*	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	113 Nh	114 Fl	115 Mc	116 Lv	117 Ts	118 Og
	*	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				
	*	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				

Groups – 18 groups in the periodic table, going down in columns

Periods – 7 periods in the periodic table, going across in rows

Example: What element is in group 16, period 6? Pb, Lead

Period number is number of shells.

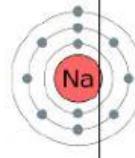
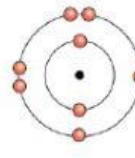
1 shell

2 shells

3 shells

Period 2

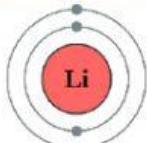
Period 3



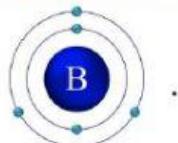
Period 1

End number of group number is valence electrons (Electrons in last shell). Only for groups 1, 2, 13, 14, 15, 16, 17, 18.

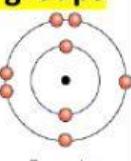
Group 1
16



Group 13



Group



Oxygen atom

1 valence electron .

3 valence electrons .

6 valence electrons .

Group 1 - Alkali metals – Extremely reactive. Most reactive metal. Lithium used for batteries.

Group 2 - Alkaline earth metals – highly reactive. Magnesium used in laptops.

Transition Metals - They are usually hard and dense materials. High melting points and boiling points.

Metalloids - have properties of both metals and nonmetals, used in solar cells and computer chips.



Non-metals - usually gases or dull, brittle solids. Bad conductors of heat and electricity.

Group 17 - Halogens - highly reactive. Most reactive nonmetals. F used in toothpaste

Group 18 - Noble gases - unreactive because they have full shell of electrons. Used in lasers and neon lights bulbs.

Lanthanides – emit light when hit by electrons

Actinides – used in nuclear power.

Number	Symbol	Name	Atomic Mass
1	H	Hydrogen	1.008
2	He	Helium	4.002
3	Li	Lithium	6.941
4	Be	Boron	9.817
5			
6			
7			
8			
9			
10			
11	Na	Sodium	22.990
12	Mg	Magnesium	24.305
13			
14			
15			
16			
17			
18			
19	K	Potassium	39.098
20	Ca	Calcium	40.078
21	Sc	Scandium	44.959
22	Ti	Titanium	47.867
23	V	Vanadium	50.947
24	Cr	Chromium	51.986
25	Mn	Manganese	54.938
26	Fe	Iron	55.845
27	Co	Cobalt	58.933
28	Ni	Nickel	58.693
29	Cu	Copper	63.546
30	Zn	Zinc	65.38
31	Ga	Gallium	69.723
32	Ge	Germanium	72.631
33	As	Arsenic	74.932
34	Se	Selenium	78.971
35	Br	Bromine	79.984
36	Kr	Krypton	83.788
37	Rb	Rubidium	85.460
38	Sr	Samarium	87.62
39	Y	Yttrium	88.903
40	Zr	Zirconium	91.224
41	Nb	Niobium	92.909
42	Mo	Molybdenum	95.95
43	Tc	Technetium	95.907
44	Ru	Ruthenium	101.01
45	Rh	Rhenium	102.206
46	Pd	Palladium	106.42
47	Ag	Argentum	107.886
48	Cd	Cadmium	112.414
49	In	Inertium	114.818
50	Sn	Stannum	118.771
51	Sb	Antimony	121.76
52	Te	Tellurium	127.6
53	I	Iodine	126.904
54	Xe	Xenon	131.293
55	Cs	Cesium	132.905
56	Ba	Boron	137.319
57		Lanthanides	137.649
58	Hf	Hafnium	140.910
59	Ta	Tantalum	140.910
60	W	Tungsten	141.242
61	Re	Rhenium	141.267
62	Os	Osmium	150.217
63	Ir	Iridium	150.217
64	Pt	Platinum	190.005
65	Au	Gold	196.997
66	Hg	Mercury	200.592
67	Bi	Berillium	201.2
68	Pb	Lead	208.593
69	Bi	Boron	208.593
70	Po	Polonium	208.997
71	At	Astatine	210.987
72	Rn	Radium	222.010
73	Fr	Francium	223.010
74	Ra	Radium	226.075
75		Actinides	226.075
76		Rutherfordium	231.010
77		Dubnium	231.010
78		Solitium	231.010
79		Balyanum	234.014
80		Hassium	238.010
81		Mutherfordium	238.010
82		Darmstadtium	238.010
83		Es	238.010
84		Moscovium	238.010
85		Livermorium	238.010
86		Ununhexium	238.010
87		Ununseptium	238.010
88		Ununoctium	238.010
89		Ununnonium	238.010
90		Ununpentium	238.010
91		Ununtrium	238.010
92		Ununhexium	238.010
93		Ununheptium	238.010
94		Ununoctium	238.010
95		Ununnonium	238.010
96		Ununoctium	238.010
97		Ununpentium	238.010
98		Ununtrium	238.010
99		Ununhexium	238.010
100		Ununheptium	238.010
101		Ununoctium	238.010
102		Ununnonium	238.010
103		Ununpentium	238.010
104		Ununtrium	238.010
105		Ununhexium	238.010
106		Ununheptium	238.010
107		Ununoctium	238.010
108		Ununnonium	238.010
109		Ununpentium	238.010
110		Ununtrium	238.010
111		Ununhexium	238.010
112		Ununheptium	238.010
113		Ununoctium	238.010
114		Ununnonium	238.010
115		Ununpentium	238.010
116		Ununtrium	238.010
117		Ununhexium	238.010
118		Ununheptium	238.010

57	La	Lanthanum	138.956
58	Ce	Cerium	140.116
59	Pr	Praseodymium	141.938
60	Nd	Ndium	144.242
61	Pm	Promethium	144.915
62	Sm	Samarium	150.20
63	Eu	Europium	151.964
64	Gd	Gadolinium	157.25
65	Tb	Terbium	159.275
66	Dy	Dysprosium	162.508
67	Ho	Holmium	164.508
68	Er	Erbium	167.259
69	Tm	Thulium	168.934
70	Yb	Ytterbium	173.059
71	Lu	Lutetium	174.967

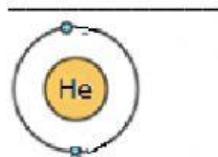
Questions

- Calcium Ca is a type of metal/metalloid/nonmetal _____
- Boron B is a type of metal/metalloid/nonmetal _____
- F is a type of metal/metalloid/nonmetal _____
- True or false: Chlorine Cl is a metal _____
- True or false: Metals are soft and easy to break _____
- True or false: Metalloids are used in making solar cells and computer chips

- What element is in period 5, group 16? _____

8. True or false: Potassium K is in period 4, group 1? _____

9. Look at the diagram of Helium, what period is it in, in the periodic table?



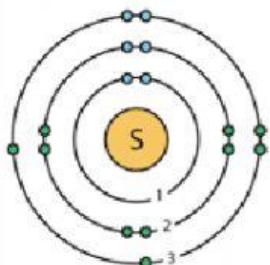
10. Look at the element Sulphur, fill in the missing information

Shells: _____

Period: _____

Valence electrons: _____

Group Number: _____



11. Group 17 elements are called _____

12. True or False: Group 1 are called the transition metals _____

13. Which group of elements have a full shell of electrons? _____

14. What is the name of the group with the most reactive metals?

15. _____ have properties of both metals and nonmetals.

16. True or False: Metals are bad conductors of electricity.

17. What is the name of the group 2 elements?