

Section 6.1 - Organizing the Elements

Mendeleev's Periodic Table

- Mendeleev arranged the known elements in order of increasing atomic mass
- he left gaps in the table where there 'should' be something that had not yet been discovered and predicted their properties

	Prediction	Discovery	
atomic mass-	68	69.9	Gallium
density (g/cm ³)-	5.9	5.94	
melting point-	low	30°C	
solubility in acid-	medium	medium	
atomic mass-	72	72.3	Germanium
density (g/cm ³)-	5.5	5.47	
melting point-	high	2830°C	
solubility in acid-	low	low	

The Periodic Law

- Mendeleev's table was developed before we knew about protons, electrons and neutrons
- masses of some of the elements that were on the table seemed out of order

In the modern Periodic Table, elements are arranged in order of increasing atomic number.

- elements within a column, or **group**, have similar properties
- as you move from left to right, within a period, the properties change
- elements on the modern table show a periodic repetition of properties

1 IA 1A	2 IIA 2A	Metals										Metalloids						Nonmetals						13 IIIB 3A	14 IVB 4A	15 VB 5A	16 VIB 6A	17 VIIA 7A	18 VIII 8A												
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	103 Lr	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Uuu	112 Uub	114 Uuq																													
		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																										

Metals, Nonmetals and Metalloids

Metals

- approx. 80% of the known elements are metals
- good conductors of heat and electricity
- high lustre (shiny)
- all are solids at room temperature (except Hg-mercury)
- many are ductile (drawn into wires)
- most are malleable (hammered into shapes)

Nonmetals

- most are gases at room temperature, a few are solids, and one is liquid
- in general, nonmetals are poor or non-conductors of heat and electricity (Carbon is the exception)
- solid nonmetals tend to be brittle and have low lustre

Metalloids

- similar properties to metals AND nonmetals
- ex: pure silicon is a poor conductor of electricity but a small amount of boron mixed with the silicon makes it a good conductor