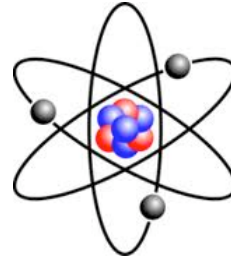


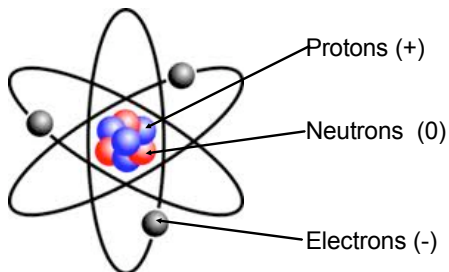
Chapter 4 and 5  
Matter  
Test Review  
7th Grade Science

# Test Tuesday

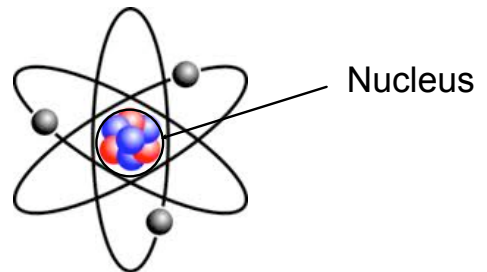
The smallest unit of matter that makes up an element that has all the properties of that element is an atom.



Atoms are made up of subatomic particles



The nucleus is the center of the atoms and includes the protons and neutrons.

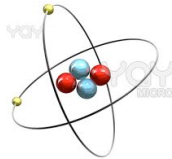


The atomic mass number is the sum of the protons and neutrons in the nucleus

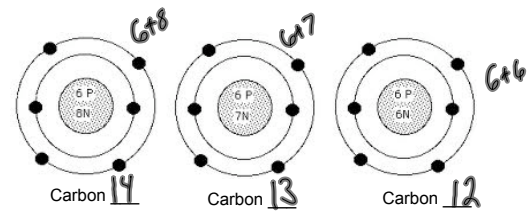


The atomic number is the number of protons in the atom.

2	Atomic Number or Proton Number (Z)
He	Elemental Symbol
4.003	Atomic Mass in amu



Atomic mass number may vary within an element.



Electrons are 1/2000 the mass of a proton, so most of the atoms mass is in the nucleus.

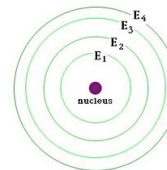


ELECTRON

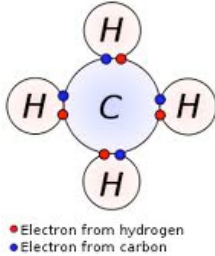


Within an electron cloud, electrons are arranged in energy levels

Energy levels of electrons typically follow at 2, 8, 18, 32 pattern that includes sublevels



Valence number is the number of electrons lost, gained or share in the bonding process



The modern periodic table is arranged by atomic number (and valence number).

## 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	57-71 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	86 Rn
87 Fr	88 Ra	89-103 Ac	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

	1	2	GROUPS										13	14	15	16	17	18	
PERIODS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
2	3	4											5	6	7	8	9	10	
3	11	12	13	14	15	16	17	18											
4	19	20											31	32	33	34	35	36	
5	37	38											49	50	51	52	53	54	
6	55	56	72											81	82	83	84	85	86
7	87	88	104											113	114	115	116	117	118
			57											71					
			89											103					

Families/Groups are listed from 1 -18  
Periods are listed from 1 to 7



Groups or families are arranged in columns. They have similar properties and have the same number of valence electrons

**Valence Electrons in Each Group**

1	2						3	4	5	6	7	8	2
1	2						3	4	5	6	7	8	2
1	2						3	4	5	6	7	8	2
1	2						3	4	5	6	7	8	2
1	2						3	4	5	6	7	8	2
1	2						3	4	5	6	7	8	2

**Transition metals**

--	--	--	--	--	--	--	--	--	--	--	--	--	--

The valence electrons are increasing in numbers from Family 1 to 18

**Alkali Metals Family 1**

Have only one valence electron in the outer level

Li  $2-1$   
Na  $2-8-1$   
K  $2-8-8-1$   
Rb  $2-8-18-1$   
Cs  $2-8-18-32-1$   
Fr  $2-8-18-32-1$

Sublevel

**Alkaline Earth Metals Family 2**

Have two valence electrons in outer level

Beryllium  $4$   
 $2-2$   
Magnesium  $12$   
 $2-8-2$

**Transition Metals Family 3-12**

Valence electron vary, typically have one or two in outer level

Valence

Variable Valence

Boron  
Family 13

Have three valence electrons in outer level

Valence Electrons in Each Group

Lose Electrons Easily      Gain Electrons Easily

Valence electrons lose, gain or share electrons.  
The period pattern is 1, 2, 3, 4, 3, 2, 1, 0

Periods are arranged in rows. They do not have similar properties.




Periods

Active Solid      Inactive (Inert) Gas

**Metals, Nonmetals, and Metalloids**

H																	He														
Li	Be											B	C	N	O	F	Ne														
Na	Mg											Al	Si	P	S	Cl	Ar	metals													
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr														
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	metalloids													
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	nonmetals													
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Uub	—	—	—	—	—	—	—													
																		Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
																		Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

Of the 109 elements, most are metal. Metals are on the left and non metals are on the right. They are separated by a zig zag line.

Metals	Metalloids	Non Metals
		
<p><b>Properties:</b>                      Luster                      Conduct heat and electricity                      High Density                      Ductile                      Malleable                      Corrosive</p>	<p><b>Properties of both</b></p>	<p><b>Properties:</b>                      Low Luster                      Does not conduct heat or electricity                      Low Density                      Not Ductile                      Not Malleable                      Form Compounds easily</p>

	Atomic Number
2	←
He	← Symbol
Helium	← Name
4.0026	← Mass Number