

Families of Elements

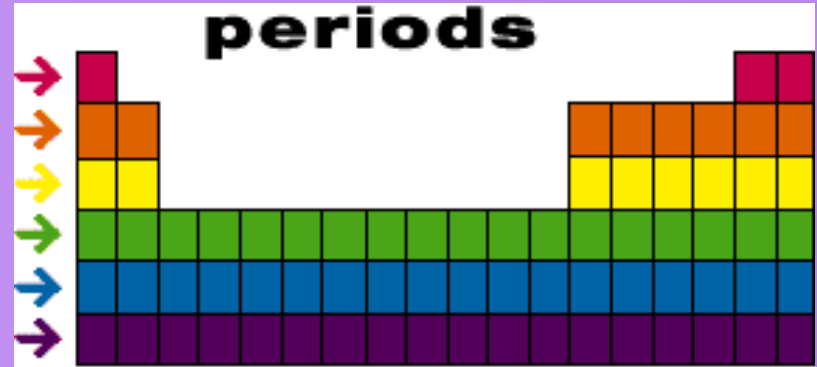
Periodic Table of the Elements

	IA																		0	
1	H																			He
2	Li	Be																		
3	Na	Mg																		
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr		
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe		
6	Cs	Ba	*La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn		
7	Fr	Ra	+Ac	Rf	Ha	Sg	Ns	Hs	Mt	110	111	112	113							

* Lanthanide Series	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
+ Actinide Series	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

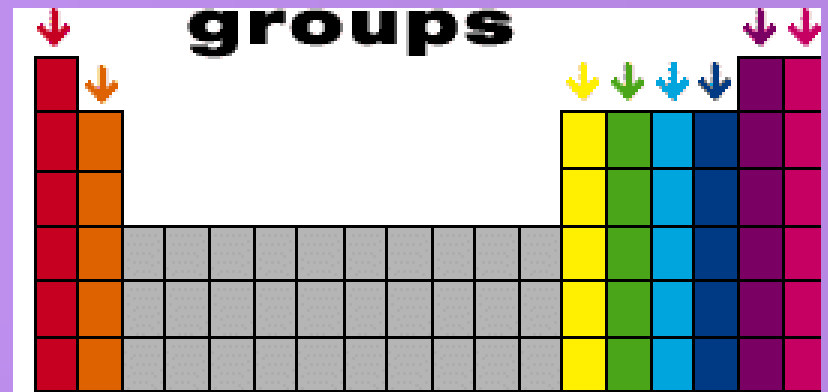
Periods

1. **Period**: horizontal row of elements on the periodic table



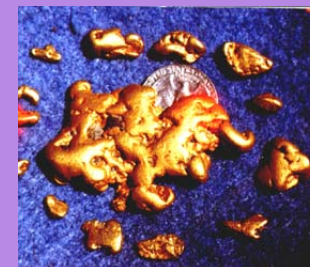
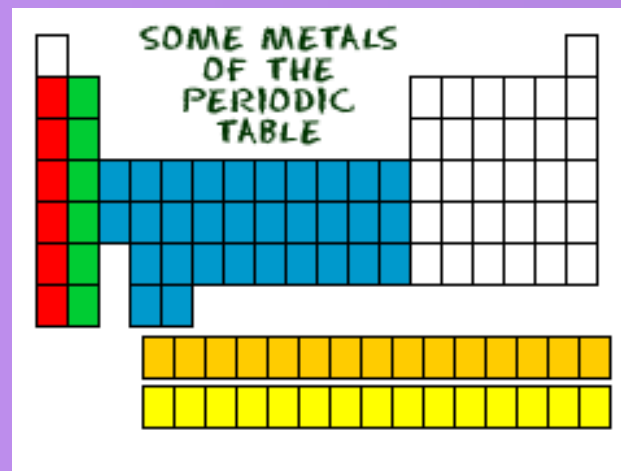
Groups

1. **Groups**: vertical column of elements in the periodic table



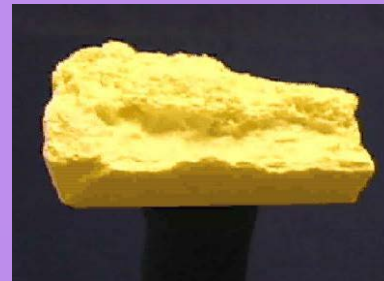
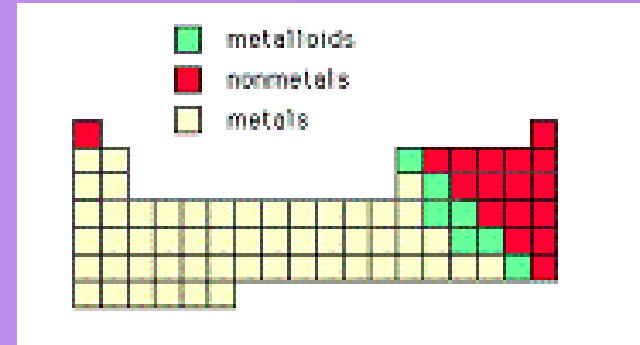
Classification of Elements

1. Elements are classified as metals or nonmetals.
2. Most elements are classified as metals.
 - a. Shiny solids
 - b. Can be stretched & shaped
 - c. Most are good conductors of heat & electricity
3. Metals are on the left of the "black zig zag line" on the periodic table.
4. Examples of metals: Copper, zinc, sodium, calcium



Classification of Elements

5. **Nonmetals**: usually poor conductors of heat & electricity
6. All nonmetals (except H) are found on the right side of periodic table
 - a. May be solids, liquids, or gases at room temperature
 - b. Typically dull & brittle
 - c. Examples: carbon, sulfur, chlorine, neon

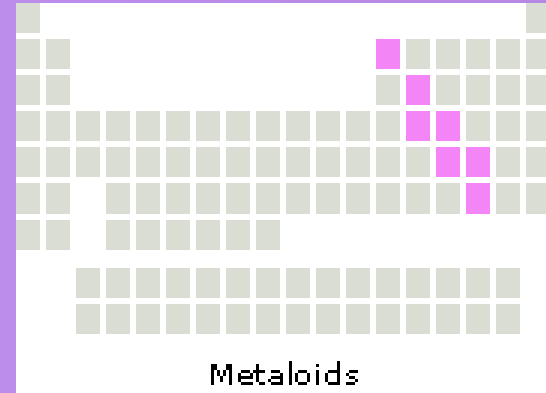


Metalloids = Semiconductors

1. Semiconductors:

elements that are intermediate conductors of heat & electricity

2. Include Boron, Silicon, Germanium, Arsenic, Antimony, Tellurium, and Polonium



Boron occurs naturally as borax



Silicon chips are used in computers.

Families

1. **Family:** group of elements that have similar chemical and physical properties.
2. Some families are arranged in groups. Other families are not.

Periodic Table of the Elements

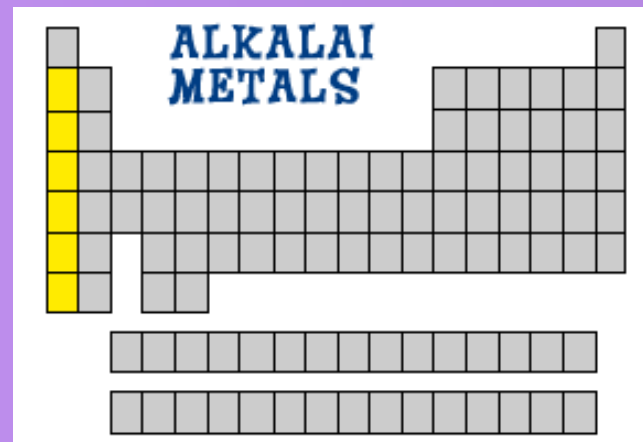
1	IA																										0	
1	H	IIA																										2
2	3	4																	5	6	7	8	9	10				
3	Li	Be																	B	C	N	O	F	Ne				
4	11	12																	13	14	15	16	17	18				
5	Na	Mg	III B	IV B	V B	VIB						VII						IB	IB	III A	IV A	V A	VI A	VII A				
6	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36										
7	K	Ca	Sc	Ti	Y	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr										
8	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54										
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12	87	88	89	104	105	106	107	108	109	110	111	112	113															
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Families are color coded on this periodic table.

Alkali Metals Family

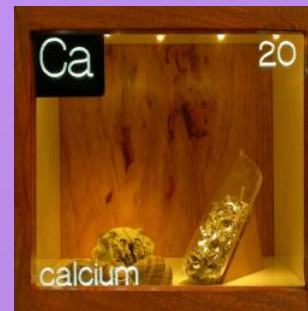
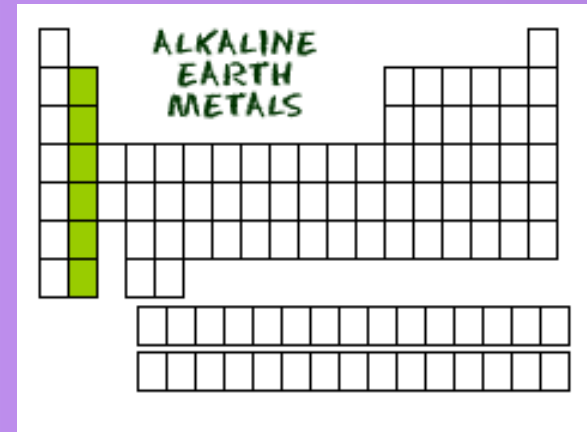
1. Includes: Li, Na, K, Rb, Cs, & Fr
2. All VERY reactive!
3. All have 1 valence electron
4. If put in water, these elements will cause huge explosions!
5. All are metals: soft, shiny, & light weight
 - a. Can't use them to make coins or build buildings
 - b. Not found in isolation in nature (always found in compounds)



Lithium & lithium battery

Alkaline Earth Metals

1. Includes: Be, Mg, Ca, Sr, Ba, & Ra
2. Reactive, but less reactive than alkali metals
3. Have 2 valence electrons in outer shell.
4. Harder and more dense than alkali metals.
5. Not found in isolation in nature. (Always found as compounds)

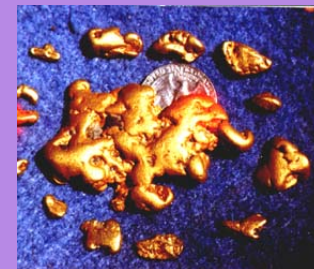
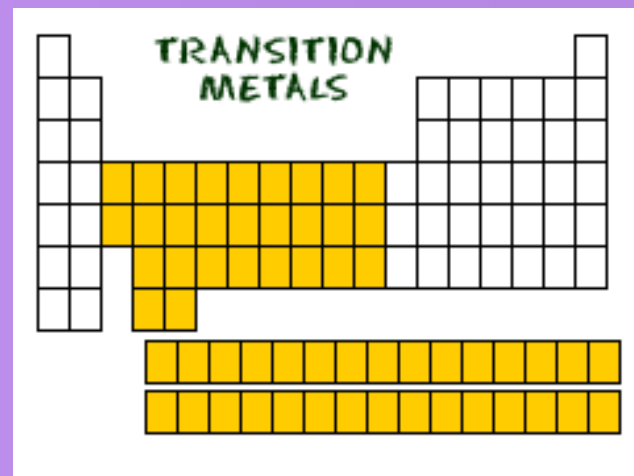


Calcium makes up our bones



Transition Metals

1. Transition metals: Metallic elements located in groups 3-12
2. Ex: Gold, silver, tin, aluminum, copper
3. Much less reactive than Na or Ca
4. Can lose electrons to form positive cations
5. Conduct heat & electricity
6. Can be shaped & stretched without breaking



Halogens

1. Includes: F, Cl, Br, I, and At
2. All have 7 valence electrons.
3. Very reactive – only need to gain 1 more electron to have full outer shell.
4. Form compounds with alkali metals and alkali earth metals

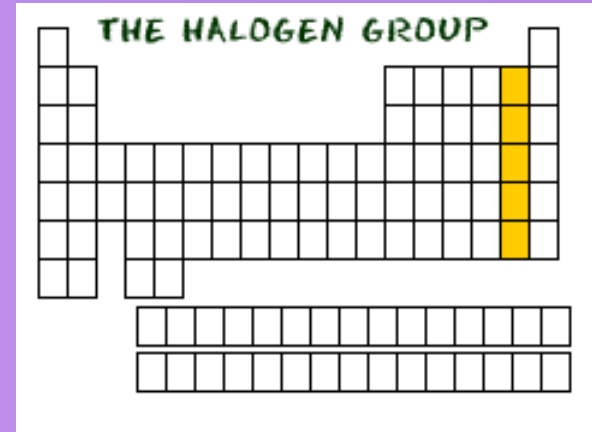
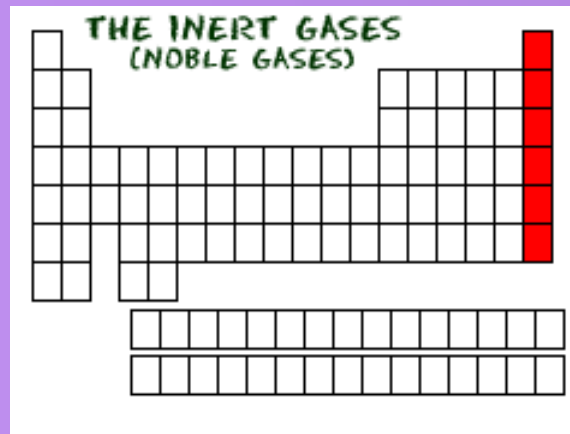


Table salt (NaCl) is formed by Na & Cl combining together

Inert Gases = Noble Gases

1. Group 18 -- includes:
He, Ne, Ar, Kr, Xe, Rn
2. Nonreactive: have full outer shells
 - Don't form compounds in nature
3. Most have 8 valence electrons



4. Noble gases have many uses:
 - Neon – advertising signs
 - Argon –light bulbs
 - Xenon – headlights
 - Helium – cools things & balloons

