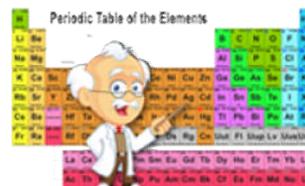


Name: _____ Date: _____
Chemistry

Class Notes

Periodic Table



The periodic table is one of the greatest scientific discoveries of all time. It is third only to the scientific method and the discovery of the microscope. So, it is imperative that you learn the secrets of the periodic table and master how to use it.

Secret #1 the Atomic Number

The atomic number is the **number of protons** in the nucleus of an atom. It is the number of protons that determines the element. The atomic number of hydrogen is "1" and hydrogen has only one proton. The elements are arranged in the periodic table according to the atomic number.

Secret #2 the Modern Periodic Law

The periodic law first presented by Dmitri Mendeleev and then modified by **Henry Moseley**, states that the physical and chemical properties of the elements are periodic functions of the atomic number. This means that there is a repeating pattern in the order of the elements.

Secret #3 the Periods and Families

The seven periods (rows) of the periodic table represent the **seven energy levels** that the electrons occupy. The eight families (columns) represent the orbital positions of the **valence electrons** of the elements.

Secret #4 Electron Configuration

The periodic table also accounts for the electron configuration of an electron. The first two families represent **the "s" orbitals** and the next six families represent **the "p" orbitals**. It is imperative that you take the time to understand how to write an electron configuration especially for valence electrons.

Secret #5 Valence Electrons

Valence electrons are the **electrons occupying the highest energy levels**. It is important to master this concept because the valence electrons are the electrons involved in bonding. You determine the valence electrons by counting the "s" and "p" electrons in that period. You can determine that fluorine has seven valence electrons by going to the second period and count over seven times. How many bonds that fluorine will form is determined by whether fluorine will gain or lose electrons.

Secret #6 the Octet Rule

The octet rule states that **atoms tend to gain or lose electrons** in order to obtain a noble gas valence. A noble gas configuration is the most stable situation and nature tends toward stability.

Whether the atom will gain or lose electrons depends on which requires the least energy. Since it will be easier to gain one electron than lose seven, fluorine will tend to gain one electron creating an anion. So, fluorine will tend to form one bond.

Secret #7 the Driving Force

The driving force behind chemical bonding is the **tendency of atoms to gain, lose or share electrons** in order to obtain maximum stability. If an atom requires two electrons to obtain a noble gas valence then it will gain two electrons by sharing electrons (covalent) or by taking electrons (ionic). Likewise, if an atom needs to get rid of two electrons, it will lose two electrons by giving electrons (ionic) to another atom that needs the electrons.

Secret #7.5 Exceptions

It is extremely important that you remain flexible when studying chemistry or any science because there are almost always exceptions to the rule. Therefore be prepared for complications or exceptions and learn these exceptions. Don't fight it, just go with it.

Periodic Table of the Elements

Legend:

- Alkali Metals
- Alkali Earth Metals
- Transition Metals
- Other Metals
- Lanthanides
- Actinides
- Metalloids
- Other Non Metals
- Halogens
- Noble Gases
- Unconfirmed

Iron (Fe) details:

- Atomic Number: 26
- Atomic Weight: 55.845
- Chemical Symbol: Fe
- Name: Iron

1	2											3	4				
H	He											B	C	N	O	F	Ne
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar		
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca	Sc	Ti	V	Cr	Mn	Fe		
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34		
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se		
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52		
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te		
55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84		
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po		
87	88	89-103	104	105	106	107	108	109	110	111	112	113	114	115	116		
Fr	Ra	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Ff	Uup	Lv	Uus		
		57	58	59	60	61	62	63	64	65	66	67	68	69	70		
		La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb		
		89	90	91	92	93	94	95	96	97	98	99	100	101	102		
		Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No		

***"It's what you learn after you know it all that counts."
- John Wooden***