

Chemistry

Periodic Table
of the Elements

	IA																		0	
1	H																			He
2	Li	Be																		Ne
3	Na	Mg																		Ar
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								

* 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

*The sub-atomic particles:
protons, neutrons, electrons*

*Элементарные частицы: протоны,
нейтроны, электроны*

New terms and definitions:

Atomic structure	Строение атома
The sub-atomic particles	Элементарные частицы
Proton	Протон
Neutron	Нейтрон
Electron	Электрон
The nucleus	Ядра
Nucleon	Нуклон
Atomic number	Порядковый номер

Atomic Structure

Learning Objectives:

Do I know ..

- The structure of an atom?
- About the relative size of the nucleus?
- That atoms of a given element have the same number of protons in the nucleus?
- The meaning of the terms 'atomic number' and 'mass number'?

Elements one of the 100+ pure substances

that make up everything in the universe

1																	18				
1 H 1.0079																	2 He 4.0026				
2																13	14	15	16	17	18
3 Li 6.941	4 Be 9.0122															5 B 10.811	6 C 12.011	7 N 14.007	8 O 15.999	9 F 18.998	10 Ne 20.180
11																13	14	15	16	17	18
11 Na 22.990	12 Mg 24.305	3	4	5	6	7	8	9	10	11	12	13 Al 26.982	14 Si 28.086	15 P 30.974	16 S 32.065	17 Cl 35.453	18 Ar 39.948				
19 K 39.098	20 Ca 40.078	21 Sc 44.956	22 Ti 47.867	23 V 50.942	24 Cr 51.996	25 Mn 54.938	26 Fe 55.845	27 Co 58.933	28 Ni 58.693	29 Cu 63.546	30 Zn 65.409	31 Ga 69.723	32 Ge 72.64	33 As 74.922	34 Se 78.96	35 Br 79.904	36 Kr 83.798				
37 Rb 85.468	38 Sr 87.62	39 Y 88.906	40 Zr 91.224	41 Nb 92.906	42 Mo 95.94	43 Tc (98)	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29				
55 Cs 132.91	56 Ba 137.33	57-71 *	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	84 Po (209)	85 At (210)	86 Rn (222)				
87 Fr (223)	88 Ra (226)	89-103 #	104 Rf (261)	105 Db (262)	106 Sg (263)	107 Bh (264)	108 Hs (265)	109 Mt (268)	110 Uun (281)	111 Uuu (272)	112 Uub (285)		114 Uuq (289)								
* Lanthanide series			57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97				
# Actinide series			89 Ac (227)	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)				

Examples of Elements



C = Carbon

Na = Sodium

O = Oxygen

Ca = Calcium

H = Hydrogen

K = Potassium

N = Nitrogen

I = Iodine

S = Sulfur

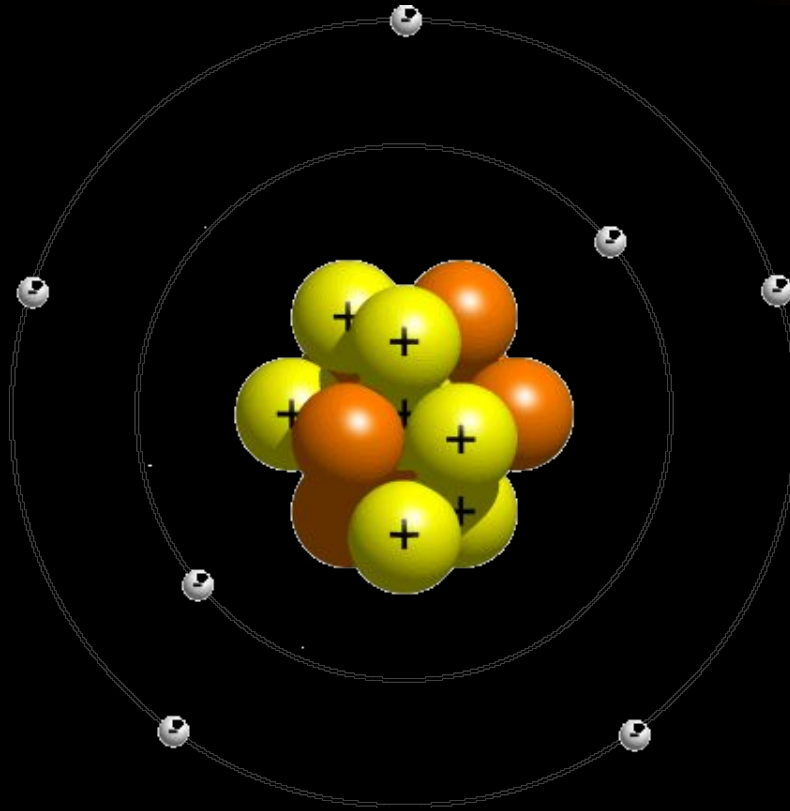
Cl = Chlorine

P = Phosphorus

Working in pairs complete the following:

- Draw an atom
 - It must include all the subatomic particles, their charges and locations.
 - Try to answer the following questions
- *The structure of an atom?*
- *About the relative size of the nucleus?*
- *That atoms of a given element have the same number of protons in the nucleus?*
- *The meaning of the terms 'atomic number' and 'mass number'?*

Atom the smallest particle making up elements

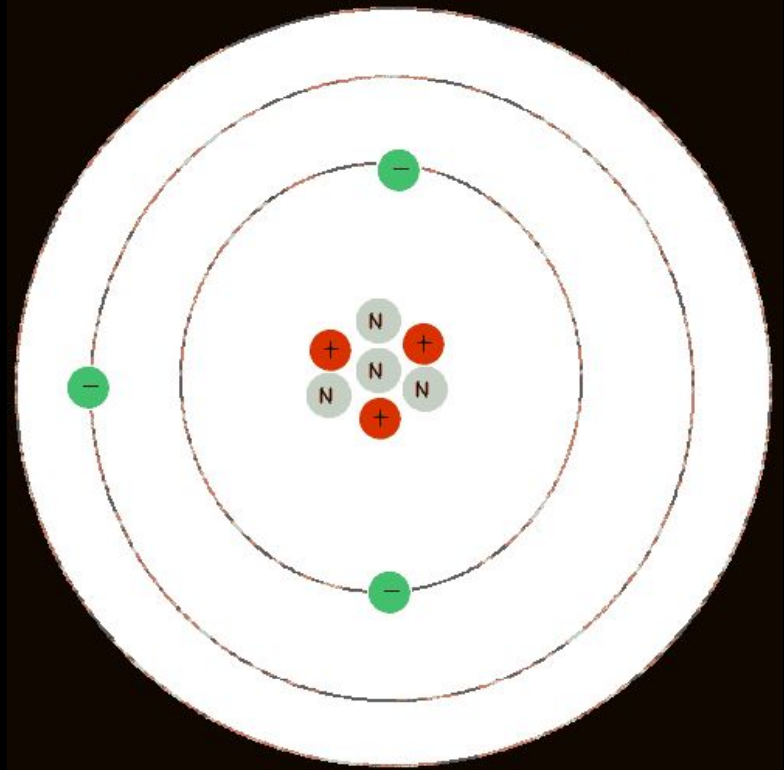


Sub-atomic Particles

Protons p^+ - positive charge, in nucleus

Neutrons n^0 - no charge, in nucleus

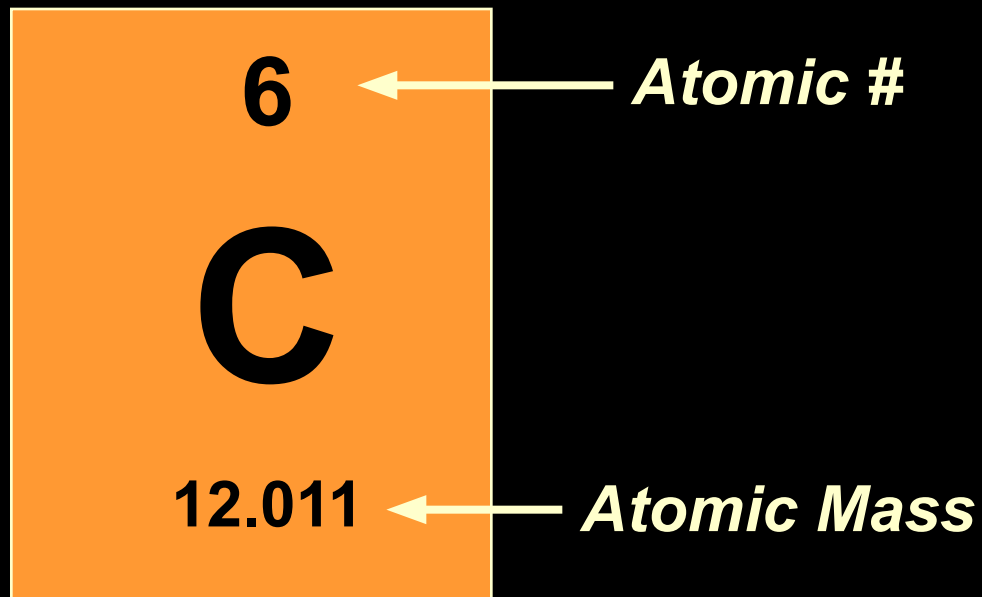
Electrons - e^- negative charge, orbiting nucleus



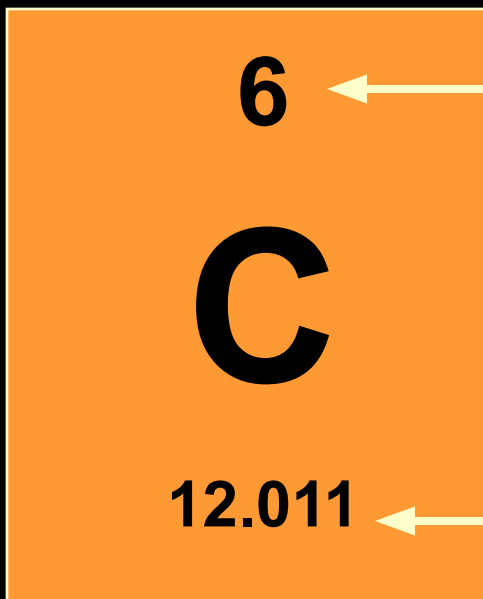


<http://www.pil-network.com/resources/tools>

Drawing an Atom of Carbon



Drawing an Atom of Carbon



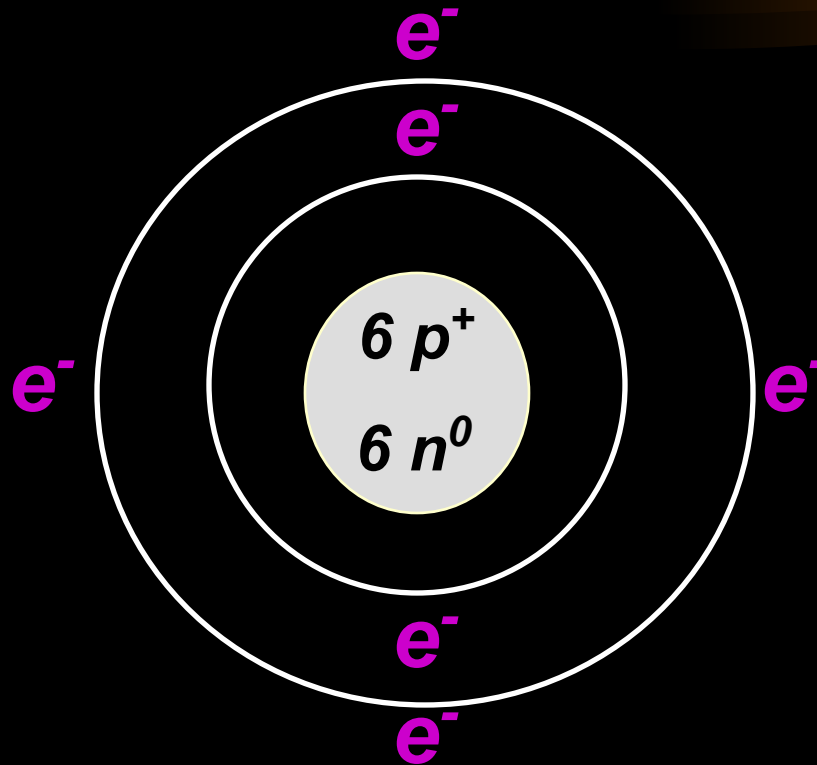
Atomic # = # of p^+ and # of e^-

Carbon has 6 p^+ and 6 e^-

Atomic Mass minus Atomic # = # of n^0

Carbon has 6 n^0

Drawing an Atom of Carbon



exercises

- Task 1. Determine the number of protons and electrons in the atoms of iron and mercury

exercises

- Task 2. An atom of an element has 10 neutrons in the nucleus of an atom and the atomic weight of 19. Determine what is an element?



*Complete the
handout in pairs*


Assessment for learning....




- Using the mini white board answer the following questions individually



*How many protons does
Silicon have?*




*What makes up the
atomic weight of an
atom?*



*How many electrons
does a neutral Calcium
atom have?*



*What element has one
less proton than Boron?*



*What is the atomic
number and Atomic mass
of Argon?*

Chemistry



*Diga, diga, diga, diga,
that's all folks!*

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