

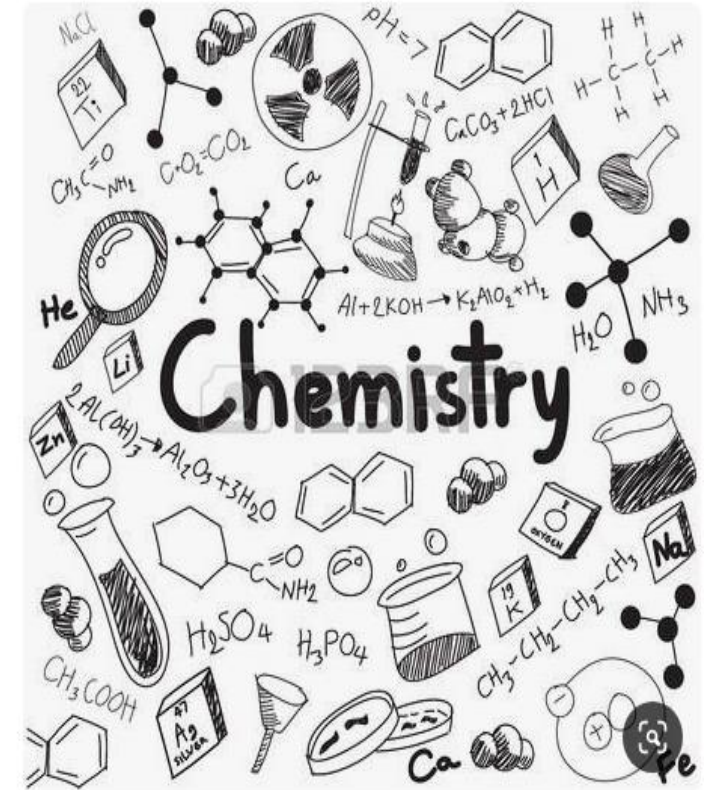
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الوطنية الأرثوذكسية
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- Lesson #1: Inside atoms
- Scholastic Year: 2023-2024
- Grade: 7CS



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Objective:

To be able to find the atomic number, atomic mass, #of protons, #of electrons and #of neutrons of the first 20 elements.



Elements are arranged in the periodic table.

In each block of the periodic table you will find:

1. Element's name.
2. Element's symbol.
3. Atomic number.
4. Mass number.

Periodic Table of the Elements

1 H 1.01																	18 He 4.00																														
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18																														
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95																														
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.88	23 V 50.94	24 Cr 51.99	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.63	33 As 74.92	34 Se 78.97	35 Br 79.90	36 Kr 83.80																														
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.95	43 Tc 98.91	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 127.6	53 I 126.90	54 Xe 131.29																														
55 Cs 132.91	56 Ba 137.33	57-71 Lanthanides	72 Hf 178.49	73 Ta 180.95	74 W 183.85	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 207.20	83 Bi 208.98	84 Po [208.98]	85 At 209.98	86 Rn 222.02																														
87 Fr 223.02	88 Ra 226.03	89-103 Actinides	104 Rf [261]	105 Db [262]	106 Sg [266]	107 Bh [264]	108 Hs [269]	109 Mt [278]	110 Ds [281]	111 Rg [280]	112 Cn [285]	113 Nh [286]	114 Fl [289]	115 Mc [289]	116 Lv [293]	117 Ts [294]	118 Og [294]																														
<table border="1" style="width: 100%; text-align: center;"> <tr> <td>57 La 138.91</td> <td>58 Ce 140.12</td> <td>59 Pr 140.91</td> <td>60 Nd 144.24</td> <td>61 Pm 144.91</td> <td>62 Sm 150.36</td> <td>63 Eu 151.96</td> <td>64 Gd 157.25</td> <td>65 Tb 158.93</td> <td>66 Dy 162.50</td> <td>67 Ho 164.93</td> <td>68 Er 167.26</td> <td>69 Tm 168.93</td> <td>70 Yb 173.06</td> <td>71 Lu 174.97</td> </tr> <tr> <td>89 Ac 227.03</td> <td>90 Th 232.04</td> <td>91 Pa 231.04</td> <td>92 U 238.03</td> <td>93 Np 237.05</td> <td>94 Pu 244.06</td> <td>95 Am 243.06</td> <td>96 Cm 247.07</td> <td>97 Bk 247.07</td> <td>98 Cf 251.08</td> <td>99 Es [254]</td> <td>100 Fm 257.10</td> <td>101 Md 258.10</td> <td>102 No 259.10</td> <td>103 Lr [262]</td> </tr> </table>																		57 La 138.91	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm 144.91	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 173.06	71 Lu 174.97	89 Ac 227.03	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np 237.05	94 Pu 244.06	95 Am 243.06	96 Cm 247.07	97 Bk 247.07	98 Cf 251.08	99 Es [254]	100 Fm 257.10	101 Md 258.10	102 No 259.10	103 Lr [262]
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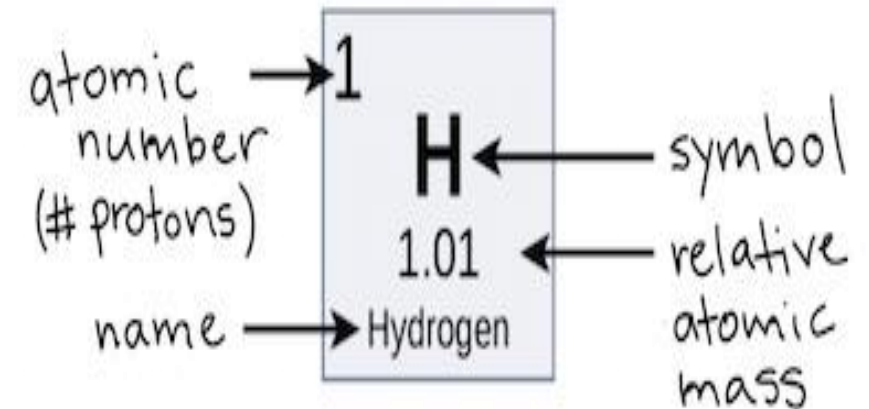
Alkali Metal
Alkaline Earth
Transition Metal
Basic Metal
Semimetal
Nonmetal
Halogen
Noble Gas
Lanthanide
Actinide

Atomic number

The atomic number is the number of protons in an atom of an element (proton number)

atomic number = # protons = # electrons (for pure elements)

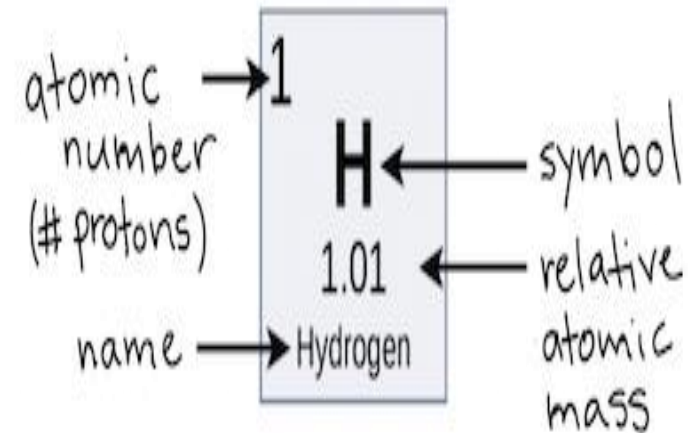
An atom contains equal numbers of protons and electrons.
Since protons and electrons have equal and opposite charges, this means that atoms are have no overall electrical charge.



Mass number

Mass number is the amount of protons and neutrons inside the nucleus.

mass number = protons + neutrons.





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If you want to calculate how many **neutrons** an atom has,
you can simply subtract the atomic number, from the mass number.

$$\# \text{ neutrons} = \text{mass number} - \text{atomic number}$$

Mass number
Number of protons
and neutrons in atom



Atomic symbol
Abbreviation used
to represent atom
in chemical
formulas

Atomic number
Number of protons
in atom



6 protons 
6 neutrons 
6 electrons 

Neutron number
Number of neutrons
in atom

$$N = A - Z$$

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For example:

Element	Symbol	Atomic number	Mass number	Number of electrons	Number of protons	Number of neutrons
Aluminum	<i>Al</i>	<i>13</i>	<i>27</i>	<i>13</i>	<i>13</i>	$(27-13p) = 14$
Lithium	<i>Li</i>	<i>3</i>	<i>7</i>	<i>3</i>	<i>3</i>	$(7-3p) = 4$

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Thank you