

TABLE 9-6
The Periodic Table of the Elements.

Group	I	II											III	IV	V	VI	VII	VIII		
Period 1	1.008 H 1		The number above the symbol of each element is its atomic mass, and the number below the symbol is its atomic number. The elements whose atomic masses are given in parentheses do not occur in nature, but have been prepared artificially in nuclear reactions. The atomic mass in such a case is the mass number of the most long-lived radioactive isotope of the element.																	4.00 He 2
2	6.94 Li 3	9.01 Be 4											10.81 B 5	12.01 C 6	14.01 N 7	16.00 O 8	19.00 F 9	20.18 Ne 10		
3	22.99 Na 11	24.31 Mg 12											26.98 Al 13	28.09 Si 14	30.97 P 15	32.06 S 16	35.45 Cl 17	39.95 Ar 18		
4	39.10 K 19	40.08 Ca 20	44.96 Sc 21	47.90 Ti 22	50.94 V 23	52.00 Cr 24	54.94 Mn 25	55.85 Fe 26	58.93 Co 27	58.70 Ni 28	63.55 Cu 29	65.38 Zn 30	69.72 Ga 31	72.59 Ge 32	74.92 As 33	78.96 Se 34	79.90 Br 35	83.8 Kr 36		
5	85.47 Rb 37	87.62 Sr 38	88.91 Y 39	91.22 Zr 40	92.91 Nb 41	95.94 Mo 42	(97) Tc 43	101.1 Ru 44	102.9 Rh 45	106.4 Pd 46	107.9 Ag 47	112.4 Cd 48	114.8 In 49	118.7 Sn 50	121.8 Sb 51	127.6 Te 52	126.9 I 53	131.3 Xe 54		
6	132.9 Cs 55	137.3 Ba 56	* 57-71	178.5 Hf 72	180.9 Ta 73	183.9 W 74	186.2 Re 75	190.2 Os 76	192.2 Ir 77	195.1 Pt 78	197.0 Au 79	200.6 Hg 80	204.4 Tl 81	207.2 Pb 82	209.0 Bi 83	(209) Po 84	(210) At 85	(222) Rn 86		
7	(223) Fr 87	226.0 Ra 88	† 89-103											<i>Halogens Inert gases</i>						
	<i>Alkali metals</i>																			
	*Rare earths		138.91 La 57	140.12 Ce 58	140.91 Pr 59	144.24 Nd 60	(145) Pm 61	150.4 Sm 62	152.0 Eu 63	157.3 Gd 64	158.9 Tb 65	162.5 Dy 66	164.9 Ho 67	167.3 Er 68	168.9 Tm 69	173.0 Yb 70	175.0 Lu 71			
	†Actinides		(227) Ac 89	232.0 Th 90	231.0 Pa 91	238.0 U 92	(237) Np 93	(244) Pu 94	(243) Am 95	(247) Cm 96	(247) Bk 97	(251) Cf 98	(254) Es 99	(257) Fm 100	(258) Md 101	(255) No 102	(260) Lr 103	(257) Rf 104	(260) Ha 105	

Elements created in the laboratory

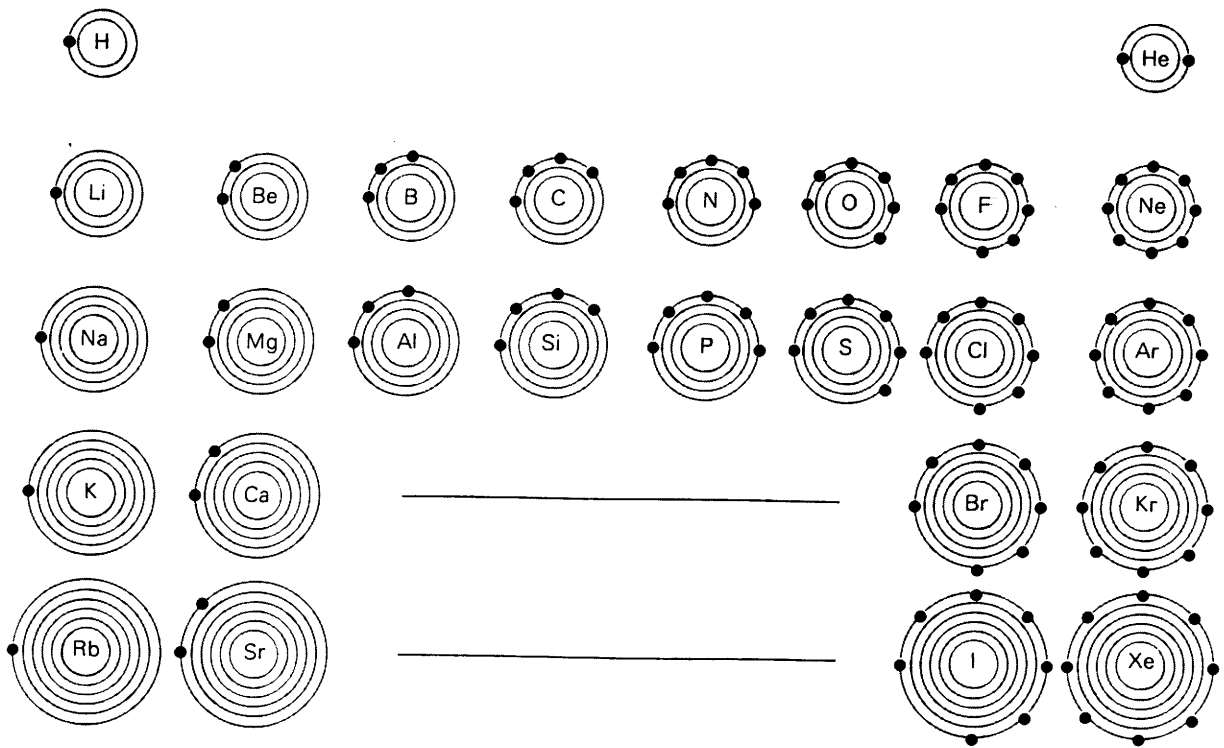


FIG. 9-11
 Electron structures of some atoms. In this schematic representation of Table 9-7 the electrons in filled inner shells are not shown.

TABLE 9-7
Simplified Table of Electron Structures of Some Atoms.
 (Subshells are filled when a shell has 2, 8, or 18 electrons.)

Electrons in	H							He	
1st shell	1							2	
Electrons in	Li	Be	B	C	N	O	F	Ne	
1st shell	2	2	2	2	2	2	2	2	
2d shell	1	2	3	4	5	6	7	8	
Electrons in	Na	Mg	Al	Si	P	S	Cl	Ar	
1st shell	2	2	2	2	2	2	2	2	
2d shell	8	8	8	8	8	8	8	8	
3d shell	1	2	3	4	5	6	7	8	
Electrons in	K	Ca					Br	Kr
1st shell	2	2						2	2
2d shell	8	8						8	8
3d shell	8	8						18	18
4th shell	1	2						7	8
Electrons in	Rb	Sr					1	Xe
1st shell	2	2						2	2
2d shell	8	8						8	8
3d shell	18	18						18	18
4th shell	8	8						18	18
5th shell	1	2						7	8

ISOTOPES

Table 23 MASSES OF SOME NUCLIDES

<i>Element</i>	<i>Symbol</i>	<i>Atomic mass* (u)**</i>	<i>Element</i>	<i>Symbol</i>	<i>Atomic mass* (u)**</i>
hydrogen	${}^1_1\text{H}$	1.007825	sodium	${}^{23}_{11}\text{Na}$	22.98977
deuterium	${}^2_1\text{H}$	2.01410	magnesium	${}^{24}_{12}\text{Mg}$	23.98504
helium	${}^3_2\text{He}$	3.01603		${}^{25}_{12}\text{Mg}$	24.98584
	${}^4_2\text{He}$	4.00260		${}^{26}_{12}\text{Mg}$	25.98259
lithium	${}^6_3\text{Li}$	6.01513	chlorine	${}^{35}_{17}\text{Cl}$	34.96885
	${}^7_3\text{Li}$	7.01601		${}^{37}_{17}\text{Cl}$	36.96590
beryllium	${}^9_4\text{Be}$	6.0198	potassium	${}^{39}_{19}\text{K}$	38.96371
	${}^{10}_4\text{Be}$	8.00531		${}^{41}_{19}\text{K}$	40.96184
	${}^{9}_4\text{Be}$	9.01219	krypton	${}^{86}_{36}\text{Kr}$	94.9
boron	${}^{10}_5\text{B}$	10.01294	molybdenum	${}^{100}_{42}\text{Mo}$	99.9076
	${}^{11}_5\text{B}$	11.00931	silver	${}^{107}_{47}\text{Ag}$	106.9041
carbon	${}^{12}_6\text{C}$	12.00000		${}^{109}_{47}\text{Ag}$	108.9047
	${}^{13}_6\text{C}$	13.00335	technetium	${}^{137}_{52}\text{Te}$	137.0000***
nitrogen	${}^{14}_7\text{N}$	12.0188	barium	${}^{138}_{56}\text{Ba}$	137.9050
	${}^{15}_7\text{N}$	14.00307	lead	${}^{214}_{82}\text{Pb}$	213.9982
	${}^{15}_7\text{N}$	15.00011	bismuth	${}^{214}_{83}\text{Bi}$	213.9972
oxygen	${}^{16}_8\text{O}$	15.99491	polonium	${}^{218}_{84}\text{Po}$	218.0089
	${}^{17}_8\text{O}$	16.99914	radon	${}^{222}_{86}\text{Rn}$	222.0175
	${}^{18}_8\text{O}$	17.99916	radium	${}^{228}_{88}\text{Ra}$	228.0303
fluorine	${}^{19}_9\text{F}$	18.99840	uranium	${}^{235}_{92}\text{U}$	235.0439
neon	${}^{20}_{10}\text{Ne}$	19.99244		${}^{238}_{92}\text{U}$	238.0508
	${}^{22}_{10}\text{Ne}$	21.99138	plutonium	${}^{239}_{94}\text{Pu}$	239.0522

*Atomic mass of neutral atom is given.

**1 atomic mass unit (u) = 1.66043×10^{-27} kg.

***Mass not accurately known. Maximum possible value is given.