Units 1-2

- Types of matter
- Isotopes
- Ions
- Quantum Mechanical Model
- Electron configurations
- Naming Ionic Compounds
- Naming Molecular Compounds
- Empirical and Theoretical Properties of Acids/Bases

atom → C, O, H, Na

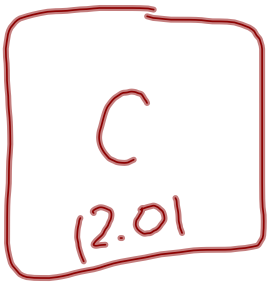
element → ~~type~~ C, O_2

molecule → O_2, H_2O

compound → CO_2, $C_6H_{12}O_6$

Isotope Name	Atomic Number	Mass Number	Symbol	# of Protons	# of Neutrons
carbon-13	6	13	$^{13}_{6}C$	6	7
iron-56	26	56	$^{56}_{26}Fe$	26	30
				9	11
	15	33			

Carbon - 13



p	n	
6	6	= 12
6	7	= 13
6	8	= 14
⋮		

Name	Symbol	Protons	Electrons
calcium ion	Ca^{2+}	20	18
fluoride ion			
copper ion	Cu^{+}	29	28
		16	18

Binary Ionic Compounds - Type I

$CaCl_2$

Ca^{2+} Cl^-
Cl^-

calcium chloride

sodium oxide

Na^+ O^{2-}
Na^+

Na_2O

Binary Ionic Compounds - Type II

$FeCl_3$

Fe^{3+} Cl^-
Cl^-
Cl^-

iron (III) chloride

copper (II) sulfide

Cu^{2+} S^{2-}

CuS

Binary Ionic Compounds - Polyatomic

$LiNO_3$

Li^+ NO_3^- lithium nitrate

sodium sulfate

Na^+ SO_4^{2-} Na_2SO_4

Na^+

Molecular Compounds

N_2O_5

dinitrogen pentoxide

Quantum Mechanical Model of an Atom

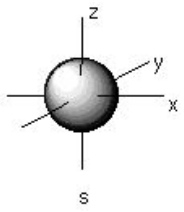
The quantum mechanical model determines the allowed energies an electron can have and how likely it is to find the electron in various locations around the nucleus.

atomic orbital - region of space in which there is a high probability to find an electron

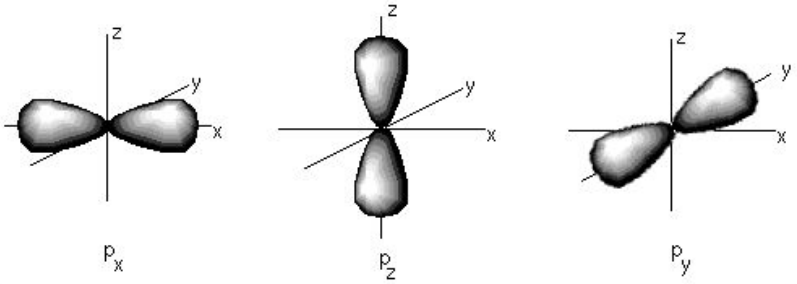
Principal quantum numbers (**n**) represent energy levels of electrons (i.e., n = 1, 2, 3, 4, etc.)

There may be several orbitals with different shapes at different energy levels.

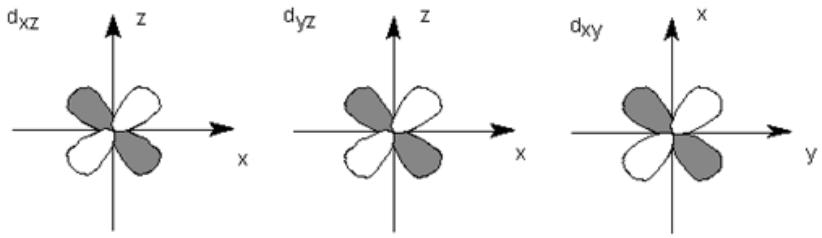
s orbital

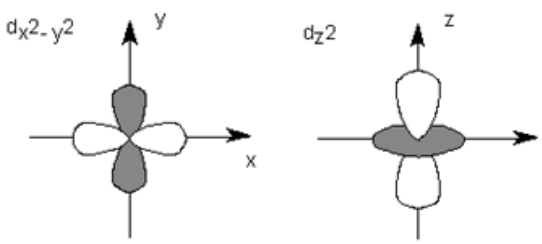


p orbitals

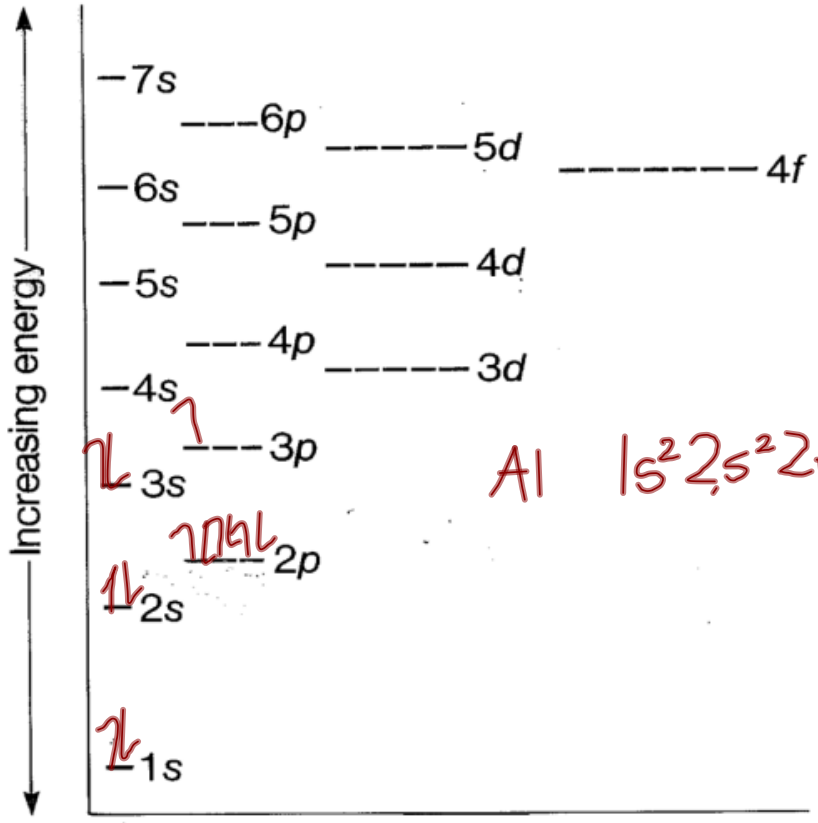


d orbitals





Aufbau Diagram



Al
(13)

Al $1s^2 2s^2 2p^6 3s^2 3p^1$