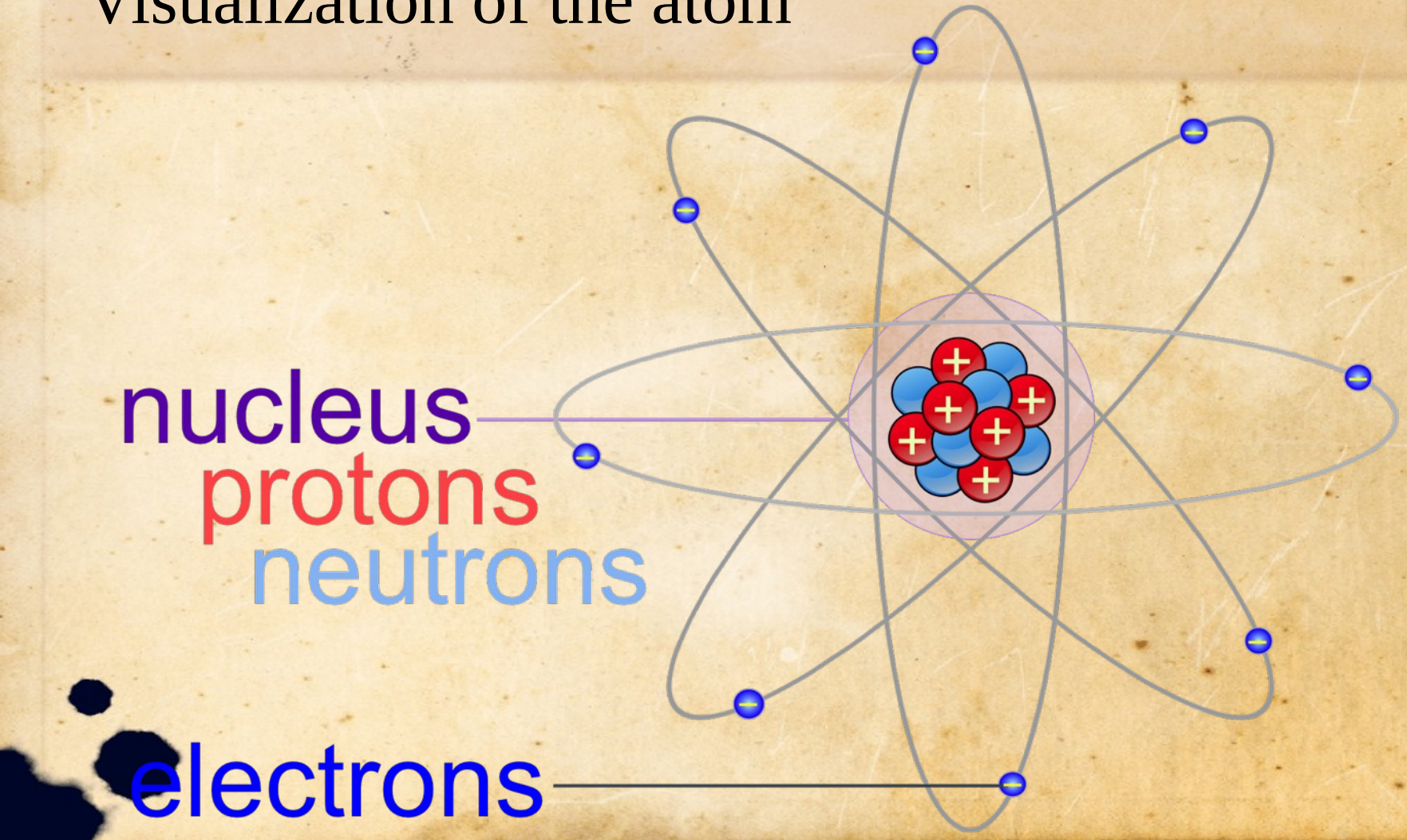
Electronics

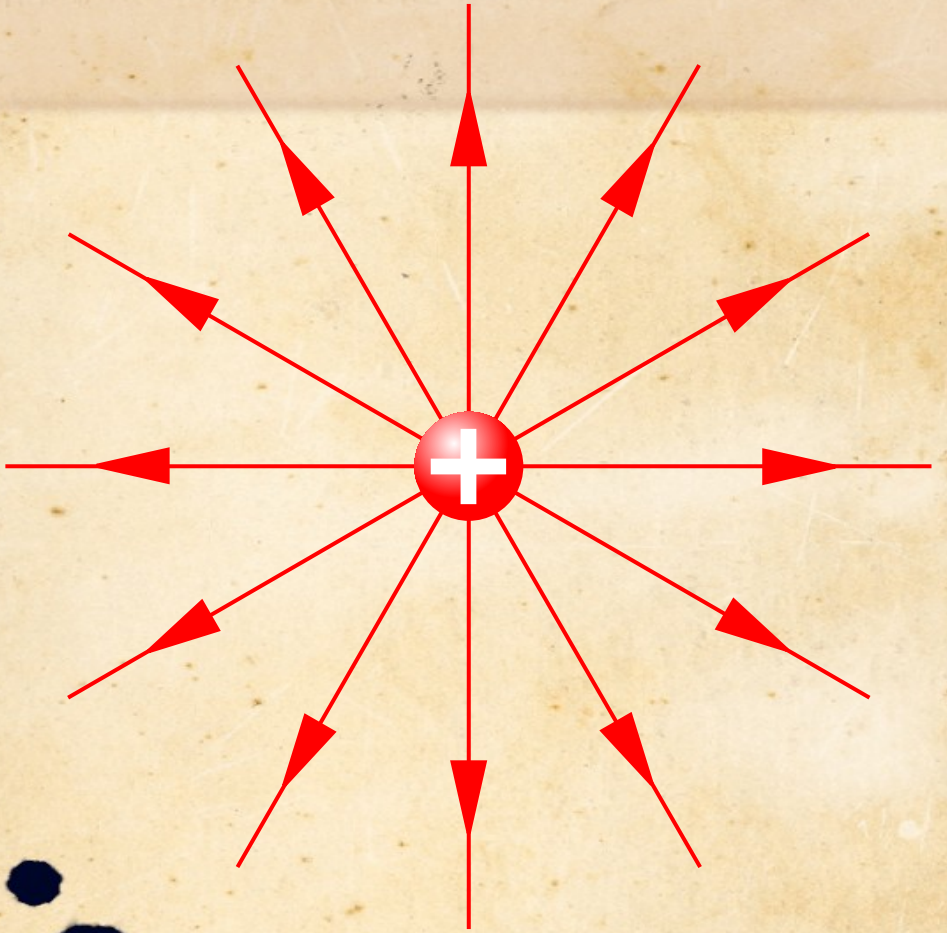
Introduction to Electronics

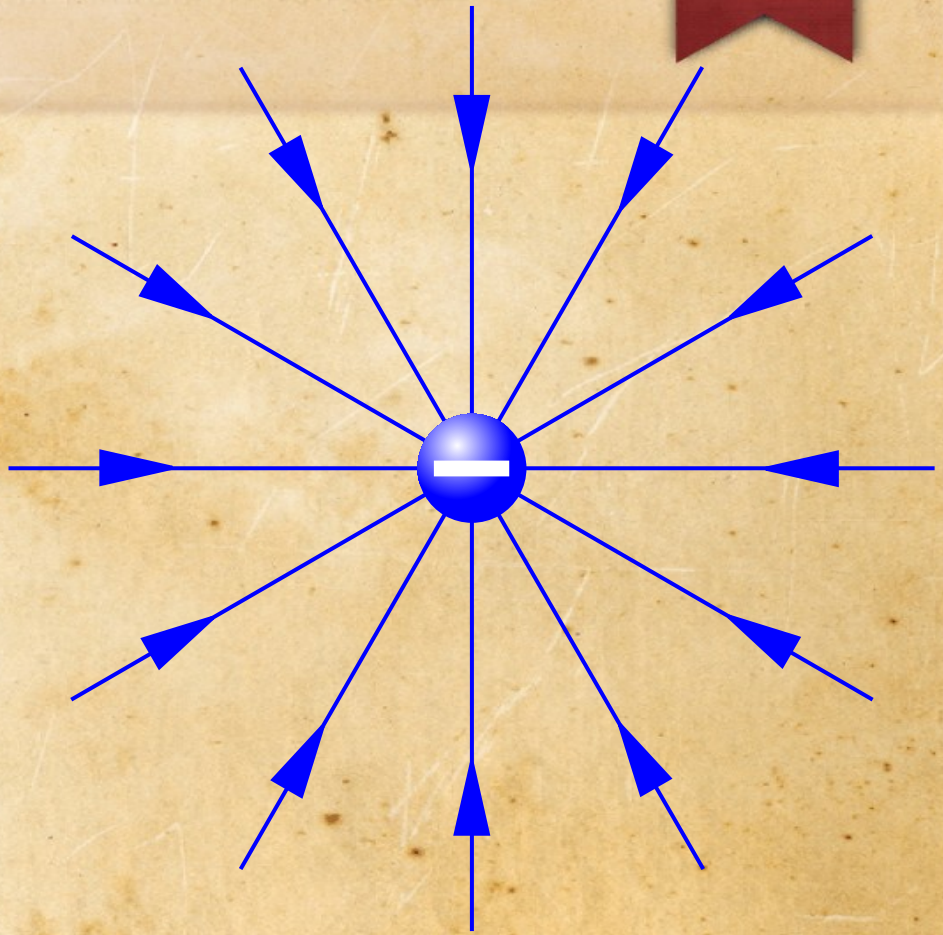
Lecture Contents

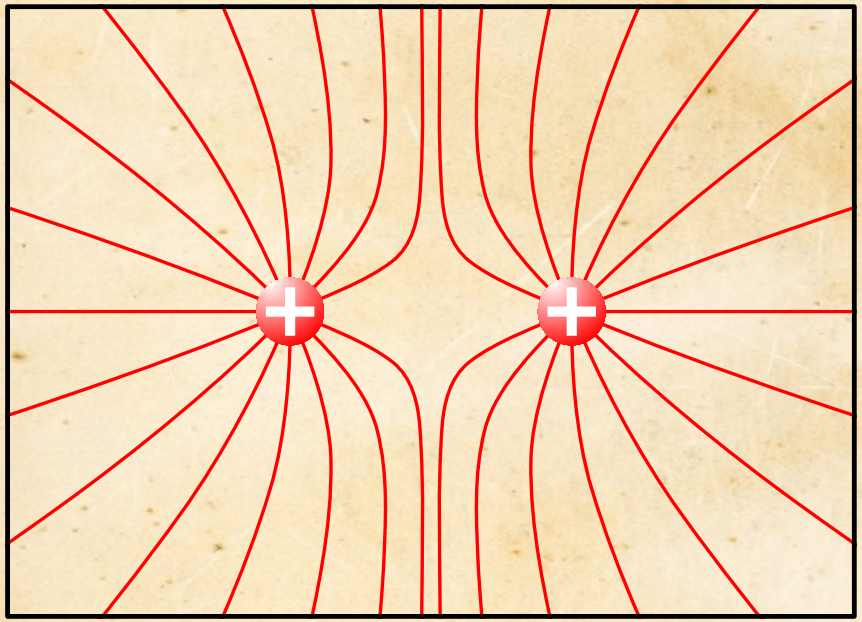
- Chemistry
  - Atoms, charges, electrons
  - Electron flow and current

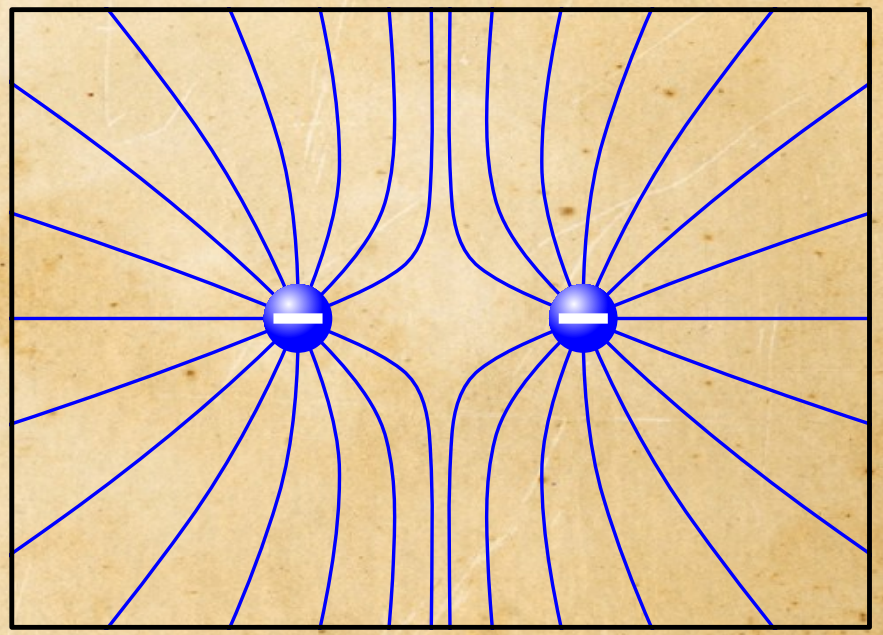
Visualization of the atom

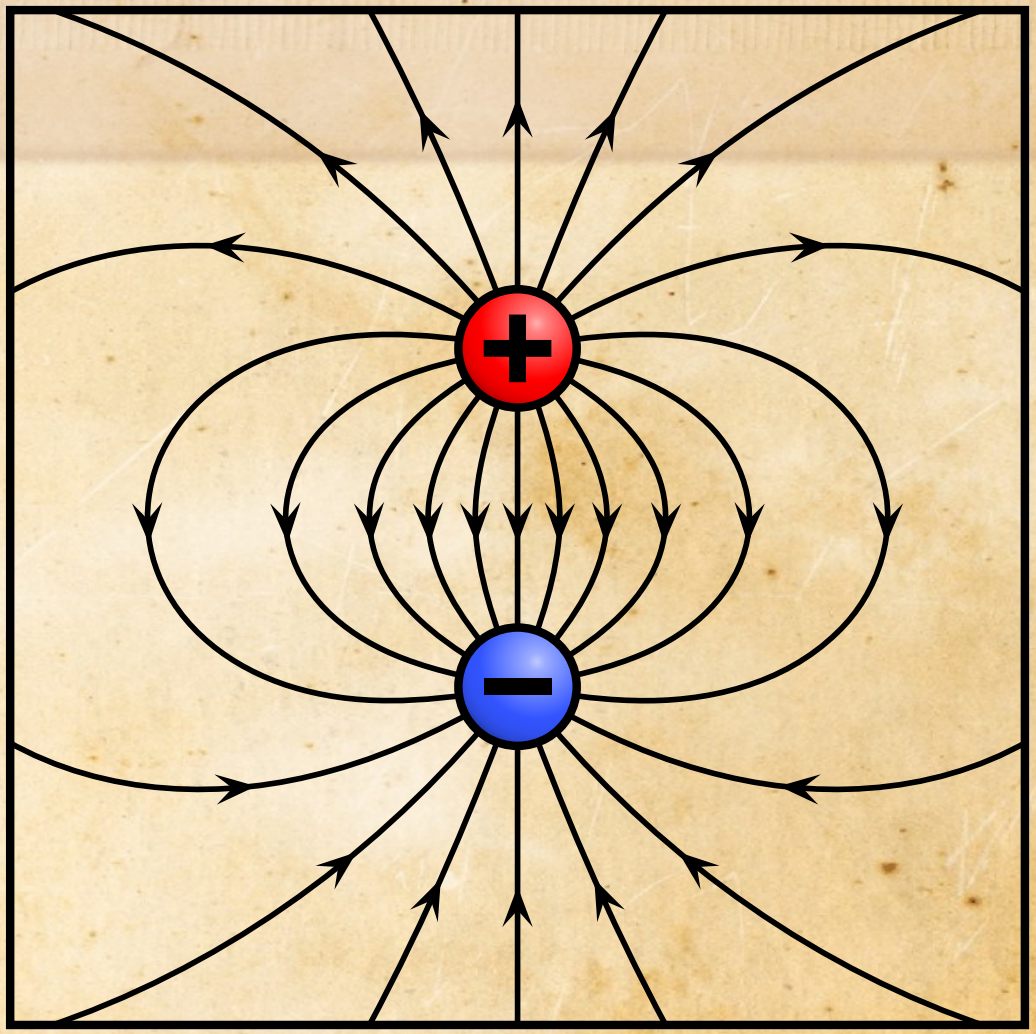




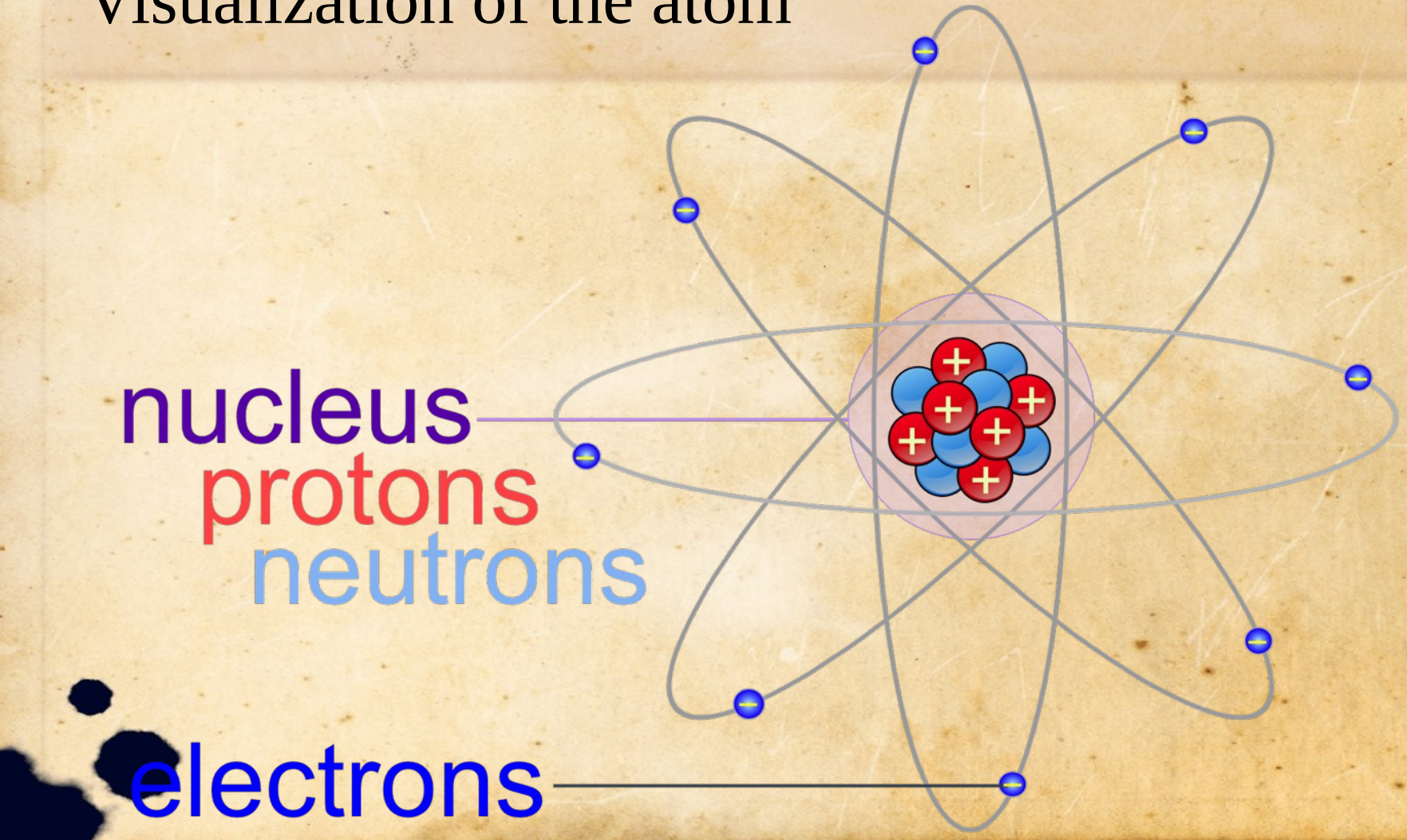


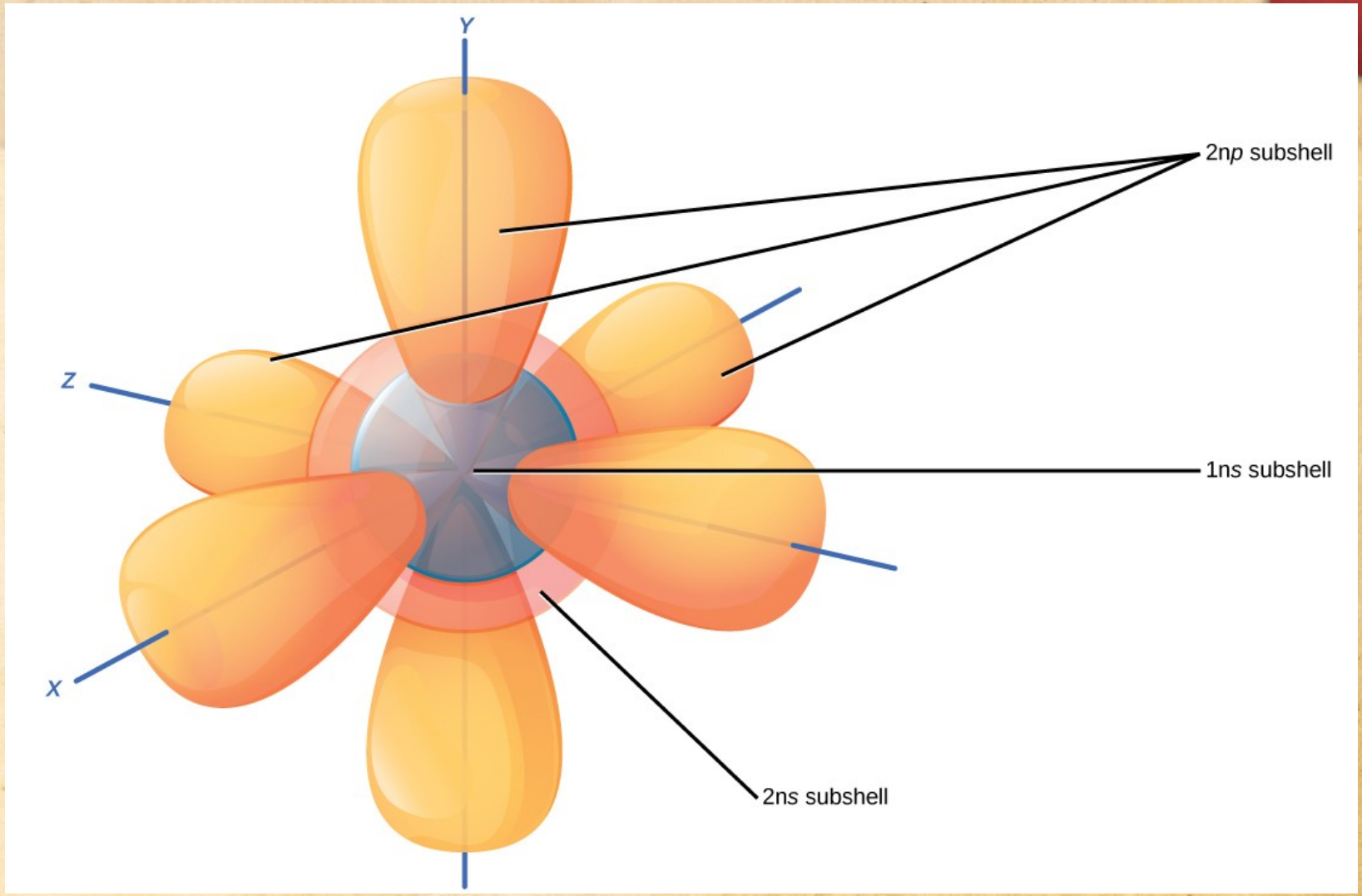




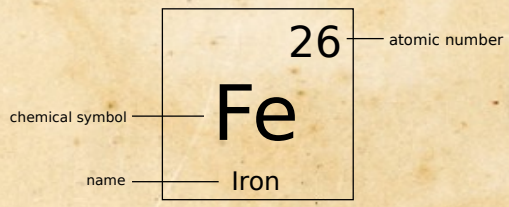


Visualization of the atom




Y
Z
X
2np subshell
1ns subshell
2ns subshell

Periodic Table of the Elements

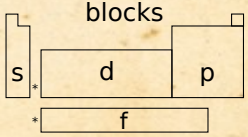


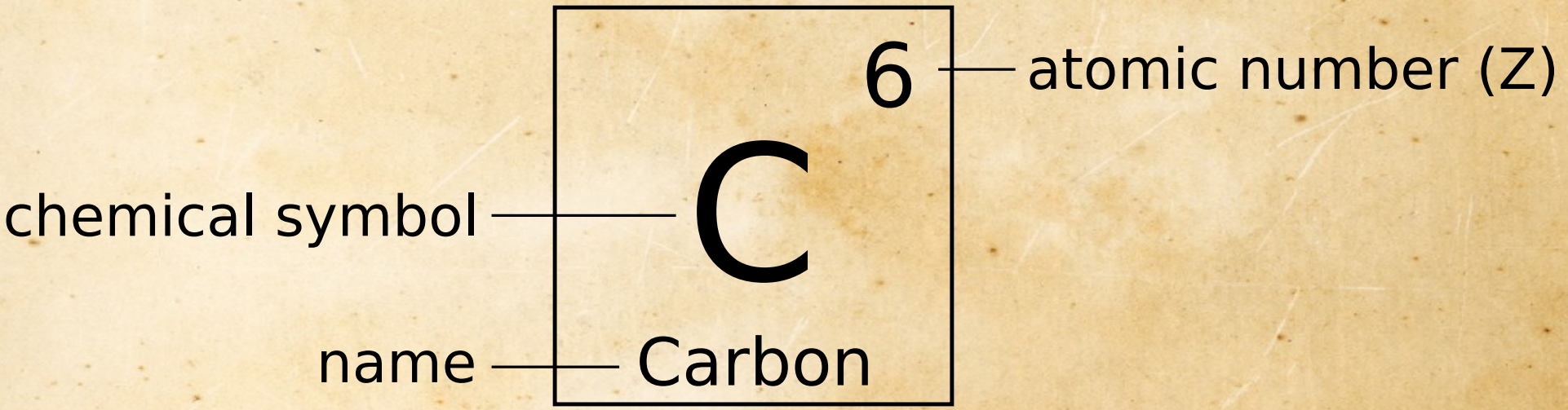
Group 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 H Hydrogen																	2 He Helium
2 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon
3 Na Sodium	12 Mg Magnesium											13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar Argon
4 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton
5 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon
6 Cs Caesium	56 Ba Barium	* 71 Lu Lutetium	72 Hf Hafnium	73 Ta Tantalum	74 W Tungsten	75 Re Rhenium	76 Os Osmium	77 Ir Iridium	78 Pt Platinum	79 Au Gold	80 Hg Mercury	81 Tl Thallium	82 Pb Lead	83 Bi Bismuth	84 Po Polonium	85 At Astatine	86 Rn Radon
7 Fr Francium	88 Ra Radium	** 103 Lr Lawrencium	104 Rf Rutherfordium	105 Db Dubnium	106 Sg Seaborgium	107 Bh Bohrium	108 Hs Hassium	109 Mt Meitnerium	110 Ds Darmstadtium	111 Rg Roentgenium	112 Cn Copernicium	113 Nh Nihonium	114 Fl Flerovium	115 Mc Moscovium	116 Lv Livermorium	117 Ts Tennessine	118 Og Oganesson

Period

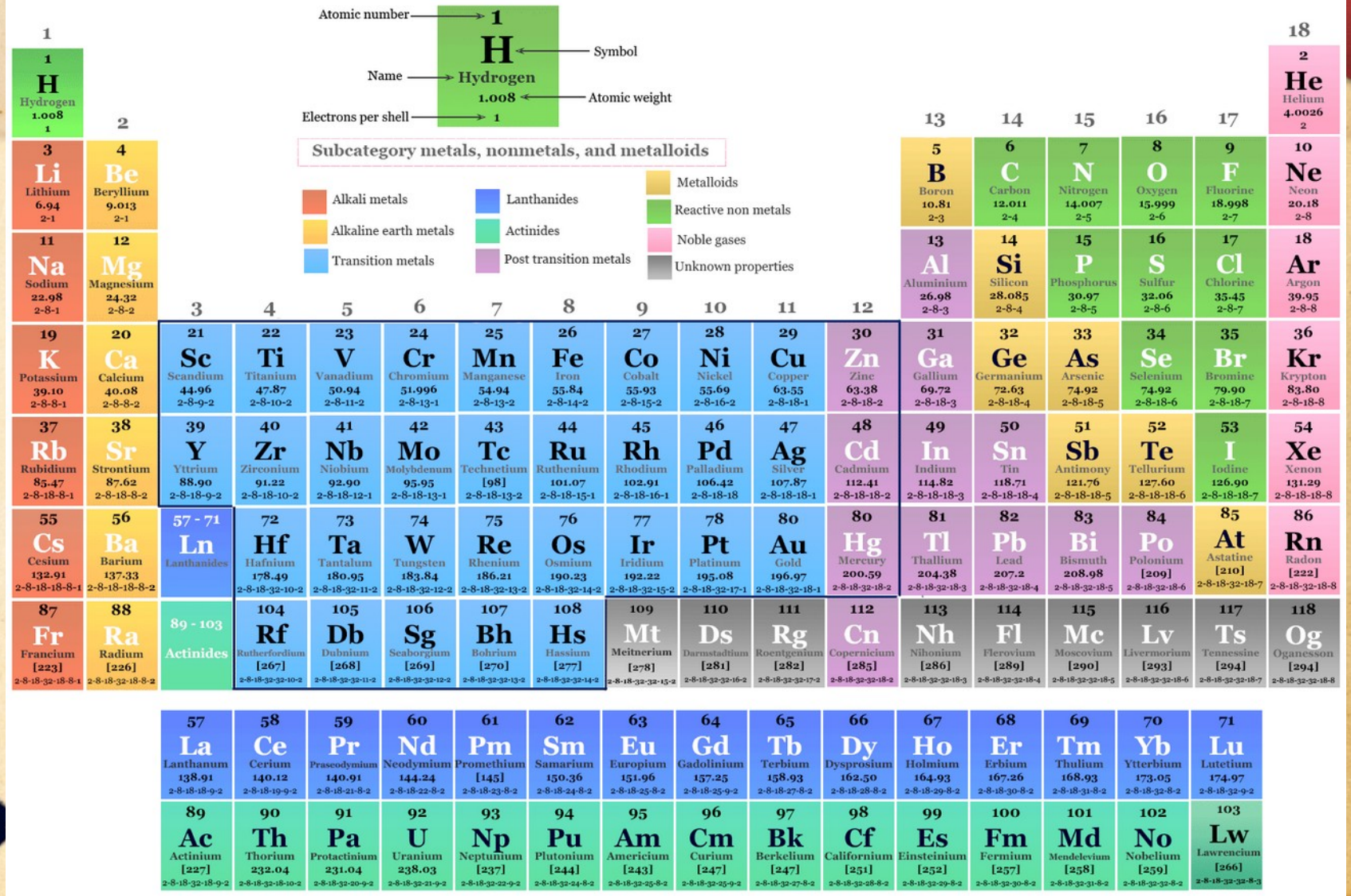
*	57 La Lanthanum	58 Ce Cerium	59 Pr Praseodymium	60 Nd Neodymium	61 Pm Promethium	62 Sm Samarium	63 Eu Europium	64 Gd Gadolinium	65 Tb Terbium	66 Dy Dysprosium	67 Ho Holmium	68 Er Erbium	69 Tm Thulium	70 Yb Ytterbium
**	89 Ac Actinium	90 Th Thorium	91 Pa Protactinium	92 U Uranium	93 Np Neptunium	94 Pu Plutonium	95 Am Americium	96 Cm Curium	97 Bk Berkelium	98 Cf Californium	99 Es Einsteinium	100 Fm Fermium	101 Md Mendelevium	102 No Nobelium

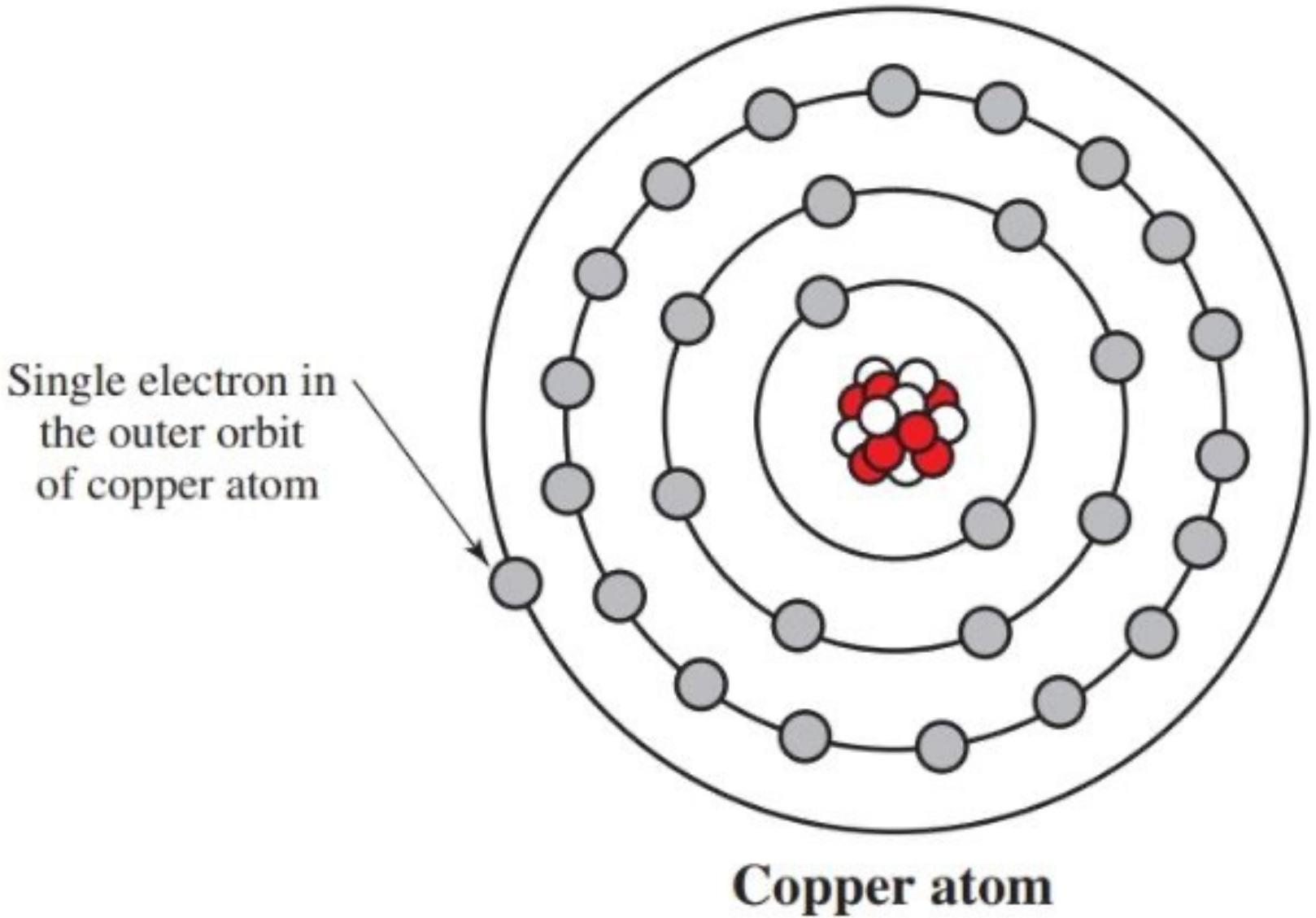
Electron configuration blocks



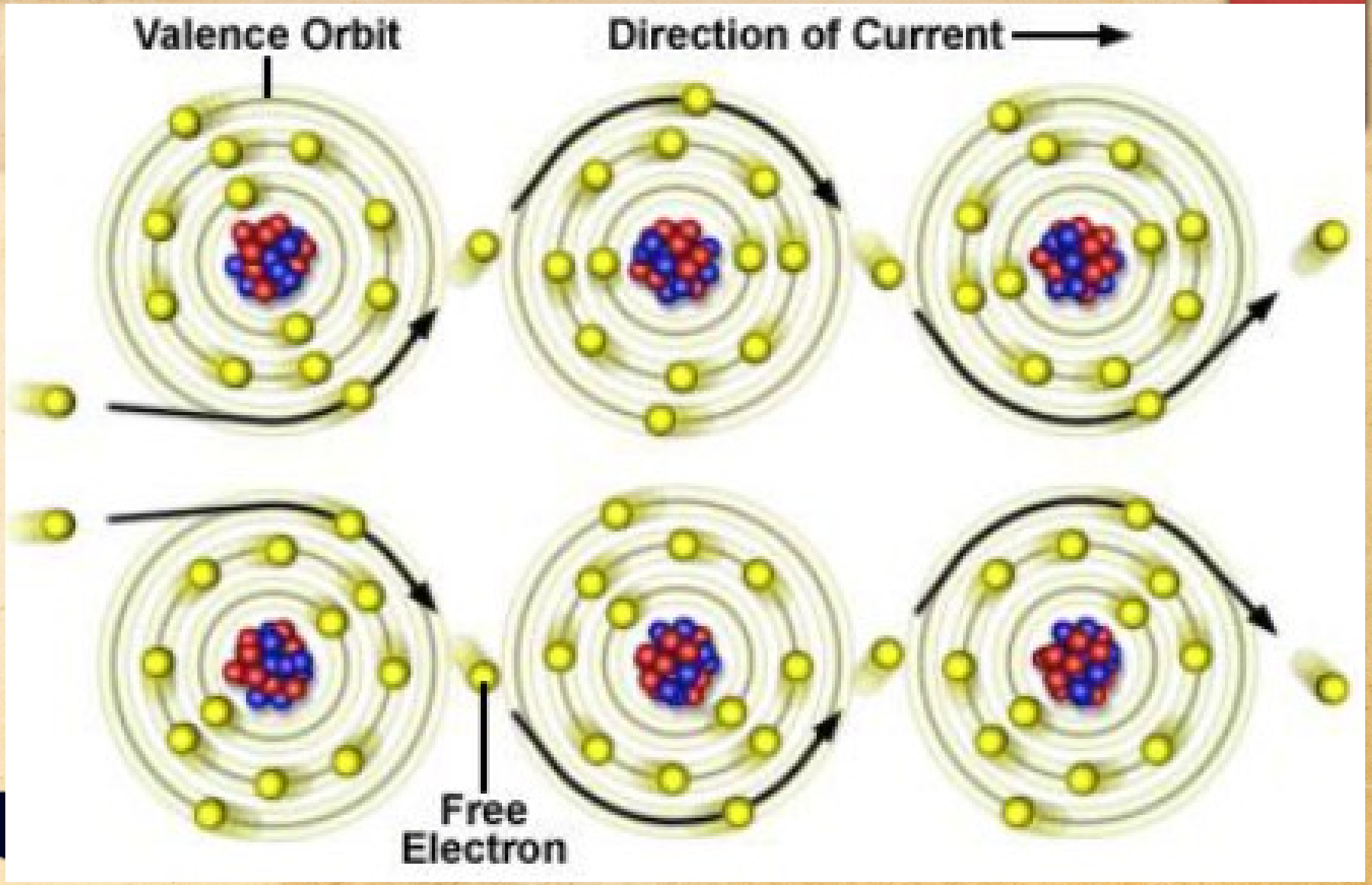

6
atomic number (Z)
chemical symbol
C
name
Carbon

Transition metals in periodic table



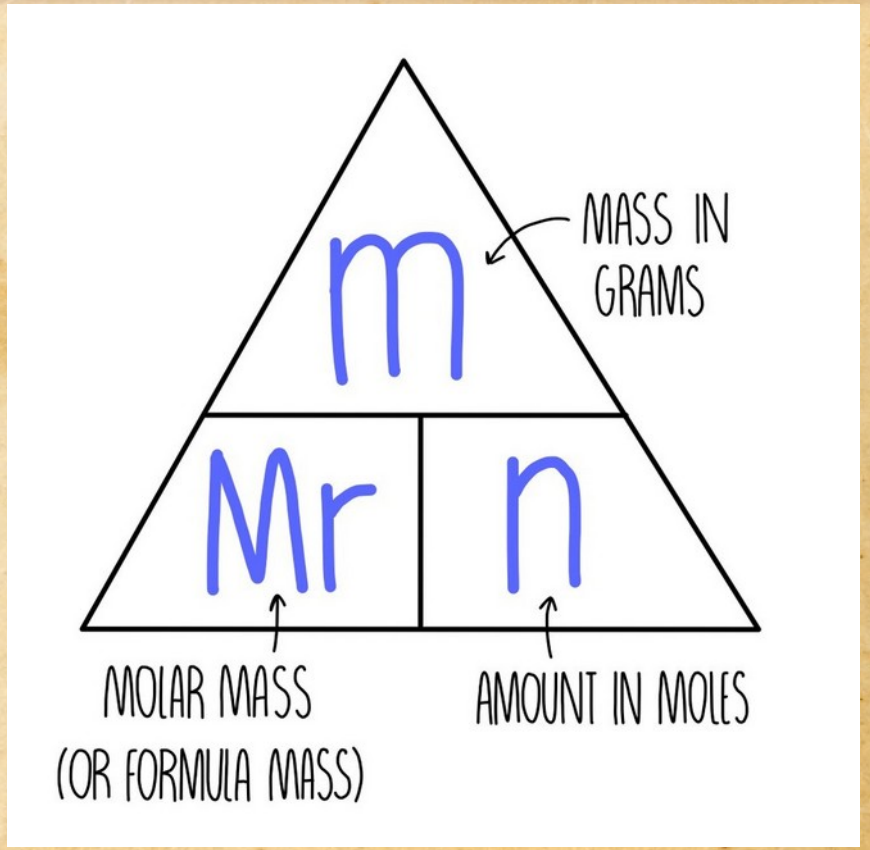


Copper atom


Valence Orbit
Direction of Current
Free
Electron

Chemistry – Avogadro's number

- N_A – Avogadro's number
  - $6.02214076 \times 10^{23}$ particles / mole



Electronics – Coulomb

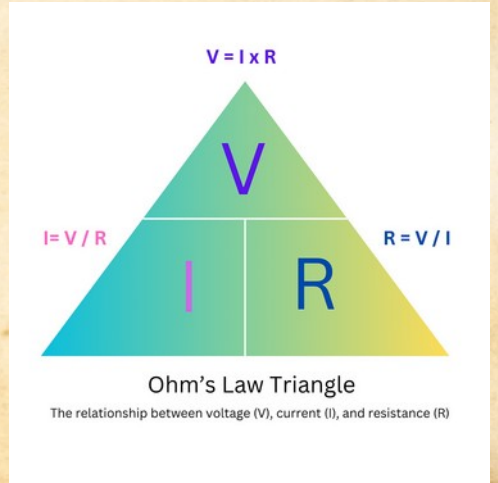
- Avogadro's Number, $N_A = 6.02214076 \times 10^{23}$ particles / mole

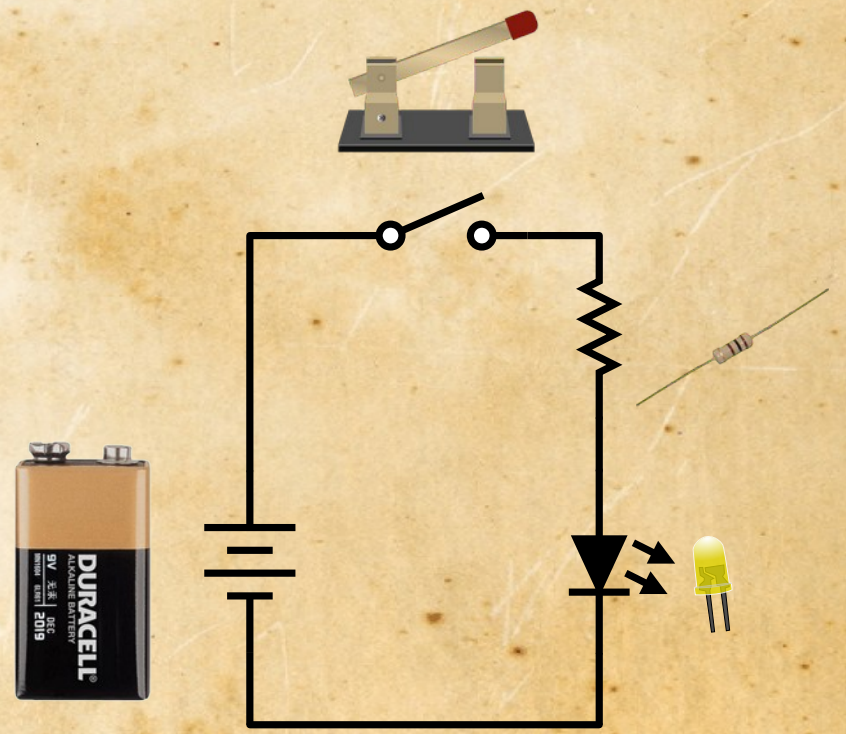
- **Charge:** 1 Coulomb of charge per 6.24150975^{18} electrons
  - 1 electron has a charge of **$1.60217646 \times 10^{-19}$ Coulombs**

- **Current:** 1 Ampere = 1 Coulomb per second

Current and Voltage

- ***Current*** is the amount of charge (the number of electrons) flowing through the circuit per unit time
- ***Voltage*** is the strength with which those electrons are pushed.





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