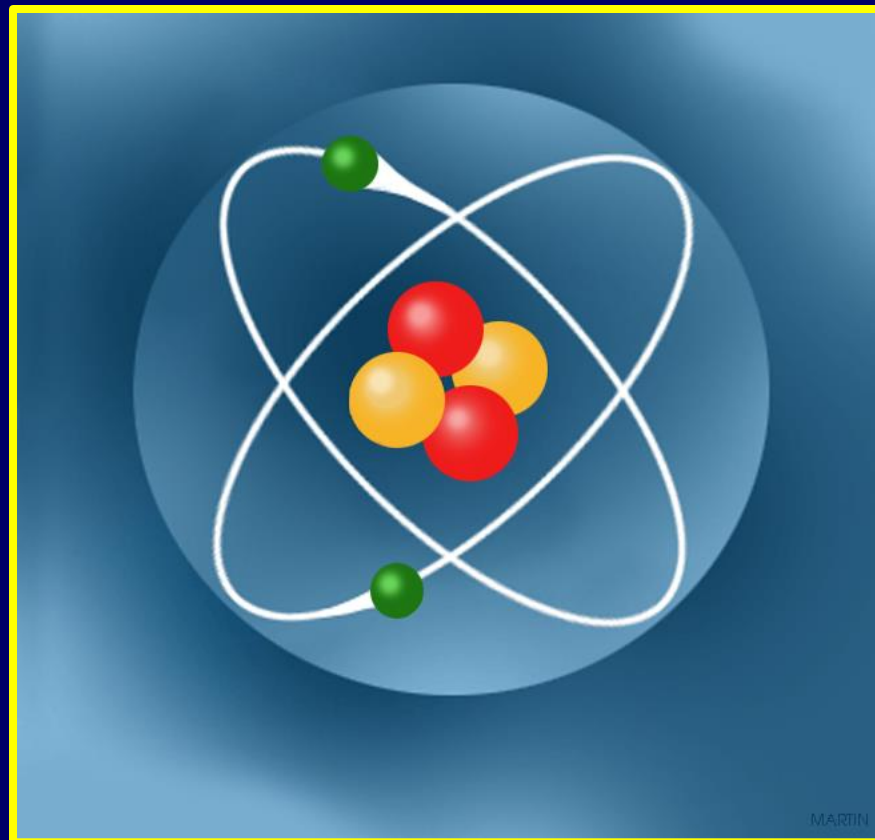


Atomic Structure



I Can Statements

At the end of this lesson, you should be able to say, with confidence:

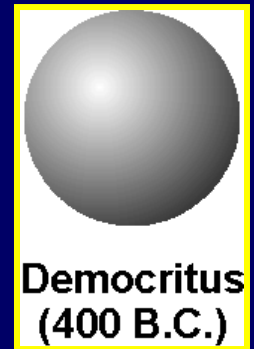
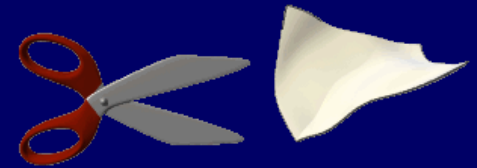
- I can describe the charge and location of protons, neutrons, and electrons within an atom.
- I can explain how each element is distinguished by a unique number of protons.

Democritus

The first person to ever conceive of the idea that matter was made up of smaller pieces, was a Greek philosopher, called Democritus.

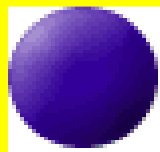


“If you cut a substance until you reached a point you could not cut it anymore, you would be left with an atom”

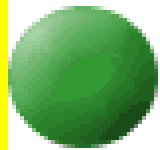


Atomic Structure

The central nucleus contains nearly all the mass of the atom and consists of protons with a positive charge and neutrons with a neutral charge.



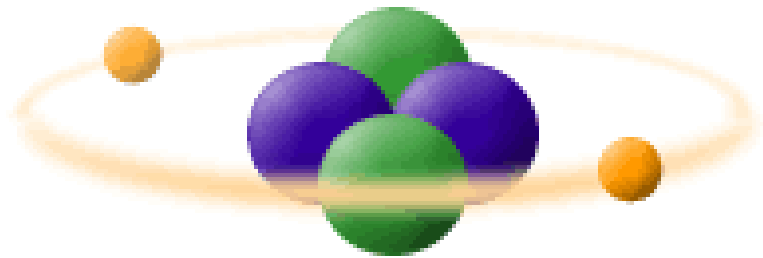
PROTON
has a positive charge



NEUTRON
has no charge



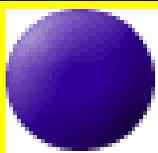
ELECTRON
has a negative charge



Helium

Atomic Structure

Because only the protons have a charge, the overall charge of any nucleus is positive.



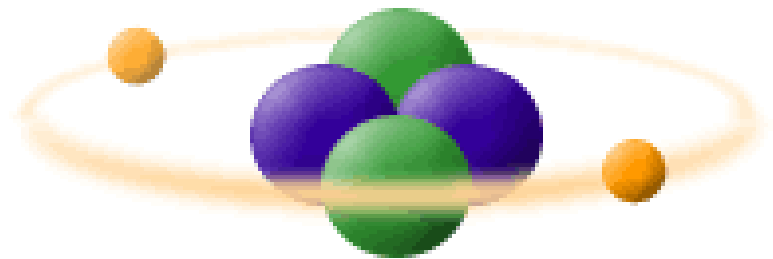
PROTON
has a positive charge



NEUTRON
has no charge



ELECTRON
has a negative charge



Helium

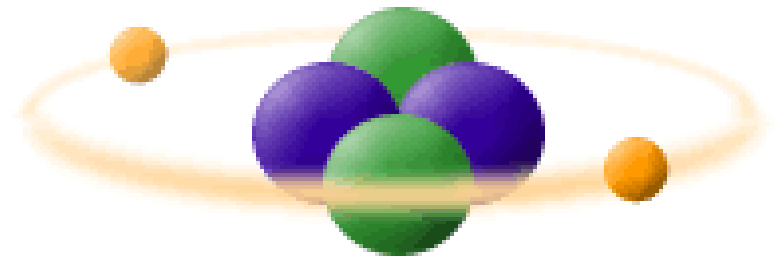
Atomic Structure

Electrons, which have a negative charge, orbit the nucleus.

 **PROTON**
has a positive charge

 **NEUTRON**
has no charge

 **ELECTRON**
has a negative charge

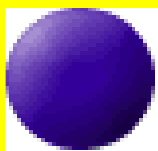


Helium

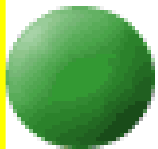
Since the number of protons and electrons in any atom are equal, the charges cancel each other out, so that all atoms contain a neutral charge.

Atomic Structure

Since the number of protons and electrons in any atom are equal, the charges cancel each other out, so that all atoms contain a neutral charge.



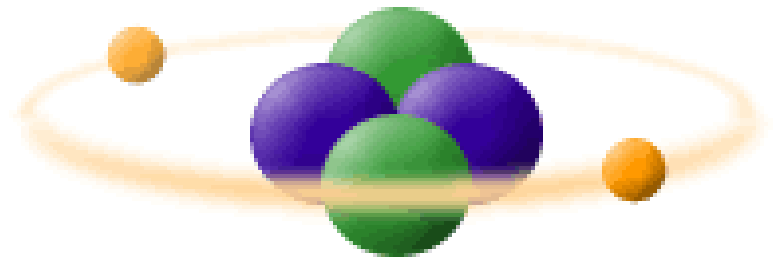
PROTON
has a positive charge



NEUTRON
has no charge



ELECTRON
has a negative charge



Helium


Atomic Structure


Most of the atom is made up of empty space.





Different Atoms

Not all atoms are the same. Different types of atoms have different numbers of protons, neutrons, and electrons.

 **PROTON**
has a positive charge

 **NEUTRON**
has no charge


 **ELECTRON**
has a negative charge





Hydrogen

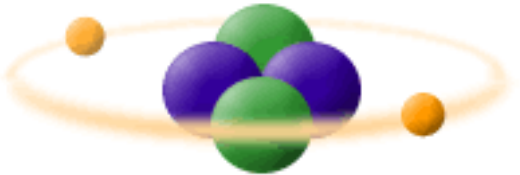
1 Proton
1 Electron

2 Protons
2 Neutrons
2 Electrons

 **PROTON**
has a positive charge

 **NEUTRON**
has no charge

 **ELECTRON**
has a negative charge



Helium

Different Atoms

The different number of subatomic particles give the atoms different characteristics.



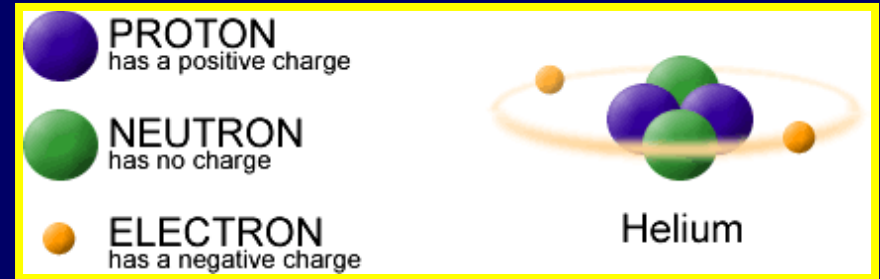
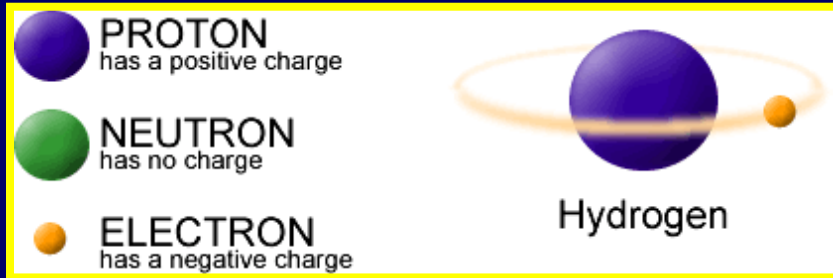
Hydrogen



Helium

Elements

Each different type of atom is called an element.



Which element an atom is,
depends upon the number of
protons in the atom.

Chemical Symbol

Each element is represented by a chemical symbol consisting of either one capital letter or one capital letter and one lower case letter.

H He O N Al K

Chemical symbols are based on their Latin or Greek names.

Na

Natrium
Sodium

Pb

Plumbum
Lead

Periodic Table

Each element is placed on the periodic table, from left to right and top to bottom, according to its number of protons.

Periodic Table of the Elements

1 H 1.008																	2 He 4.003														
3 Li 6.941	4 Be 9.012											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 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.71	29 Cu 63.55	30 Zn 65.38	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	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 95.94	(98)	44 Ru 101.1	45 Rh 102.9	46 Pd 106.4	47 Ag 107.9	48 Cd 112.4	49 In 114.8	50 Sn 118.7	51 Sb 121.8	52 Te 127.6	53 I 126.9	54 Xe 131.3														
55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.1	79 Au 197.0	80 Hg 200.6	81 Tl 204.4	82 Pb 207.2	83 Bi 209.0	84 Po (209)	85 At (210)	86 Rn (222)														
87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (261)	105 Ha (262)	106 Unh (263)	107 Uns (264)			109 Uue (267)																						
																		58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
																		90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np 237.0	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 (260)

The End

