Modern Atomic Theory

Summarize: What do we know about the atom so far?

Particle	Relative Mass	Relative Charge	Location
proton	1	+1	Nucleus
electron	0	-1	Orbitals/shells surrounding nucleus
neutron	1	0	nucleus

Recall: Draw the Bohr model of the atom for each of the following:

a) lithium $(3p^+, 4n^0, 3e^-)$

b) phosphorous (15p⁺, 16n^o, 15e⁻)





The modern atomic theory simply revises Bohr's ideas about exact locations of the electrons and how they behave.

Recall: ELECTRONS CAN BE DESCRIBED AS **<u>PARTICLES</u>** OR <u>**WAVES**</u>.

Modern Atomic Theory (Part II)

HOW DO THE STRUCTURES OF ATOMS DIFFER?

Predict: What makes atoms of one element different from atoms of another element?

the atoms of one elements are different due to the amount of protons

To distinguish between elements, they are written with a particular notation:

1)	SYMBOL:	mass number element sy atomic number	mbol or ^A X z	
2)	REPRESENTATION:	element name – mass number		
Example:	27 13 (1)	or	Aluminum – 27 (2)	

Atomic Number and Mass Number

Find the Rule: Complete this table to find the definitions of ATOMIC NUMBER and MASS NUMBER.

Element	Atomic	Mass	Number of	Number of	Number of
	Number	Number	Protons	Electrons	Neutrons
Н	1	1	1	1	0
C	6	12	6	6	6
F	9	19	9	9	10
Al	13	27	13	13	14
K	19	39	19	19	20
Na	11	23	11	11	12
Ar	18	40	18	18	22
V	23	51	23	23	28
В	5	11	5	5	6
0	8	16	8	8	8
Ca	20	42	20	20	22

(Be sure to insert your own example in the last row of the table!)

Summarize: Write the definition of: 1. Atomic Number:

The number of protons

2. Mass Number:

The number of protons plus the number of neutrons

Write a word equation to show how you find:

- 1. number of protons = mass number number of neutrons
- 2. number of electrons = number of protons
- 3. number of neutrons = mass number number of protons

Ions

When an atom loses one or more electrons, it acquires a **<u>positive</u>** charge. When an atom gains one or more electrons, it acquires a **<u>negative</u>** charge. Atoms with a positive or negative charge are called IONS. Because the mass of an electron is so small, the gain or loss of electrons has very little effect on the mass of an ion and we say that the mass number of an ion is the same as that of its 'parent' atom.

The notation for representing an ion consists of writing the chemical symbol of the 'parent' atom with the ion's charge as a superscript to the right.

Example: Calcium (2+) would be written as \rightarrow Ca²⁺

Application: Complete this table:

Ion	Ion symbol using notation	Number of Protons	Number of Electrons	Were Electrons Gained or Lost?	How Many?	Charge
\mathbf{K}^+		19	18	lost	1	+1
O ²⁻		8	10	gained	2	-2
Mg ²⁺		12	10	lost	2	+2
Al ³⁺		13	10	lost	3	+3
Cl-		17	18	gained	1	-1
Na ⁺		11	10	lost	1	+1
Br⁻		35	36	gained	1	-1

Practice: in your textbook page 243, page 248-249 #1-7 (write answers on the board)