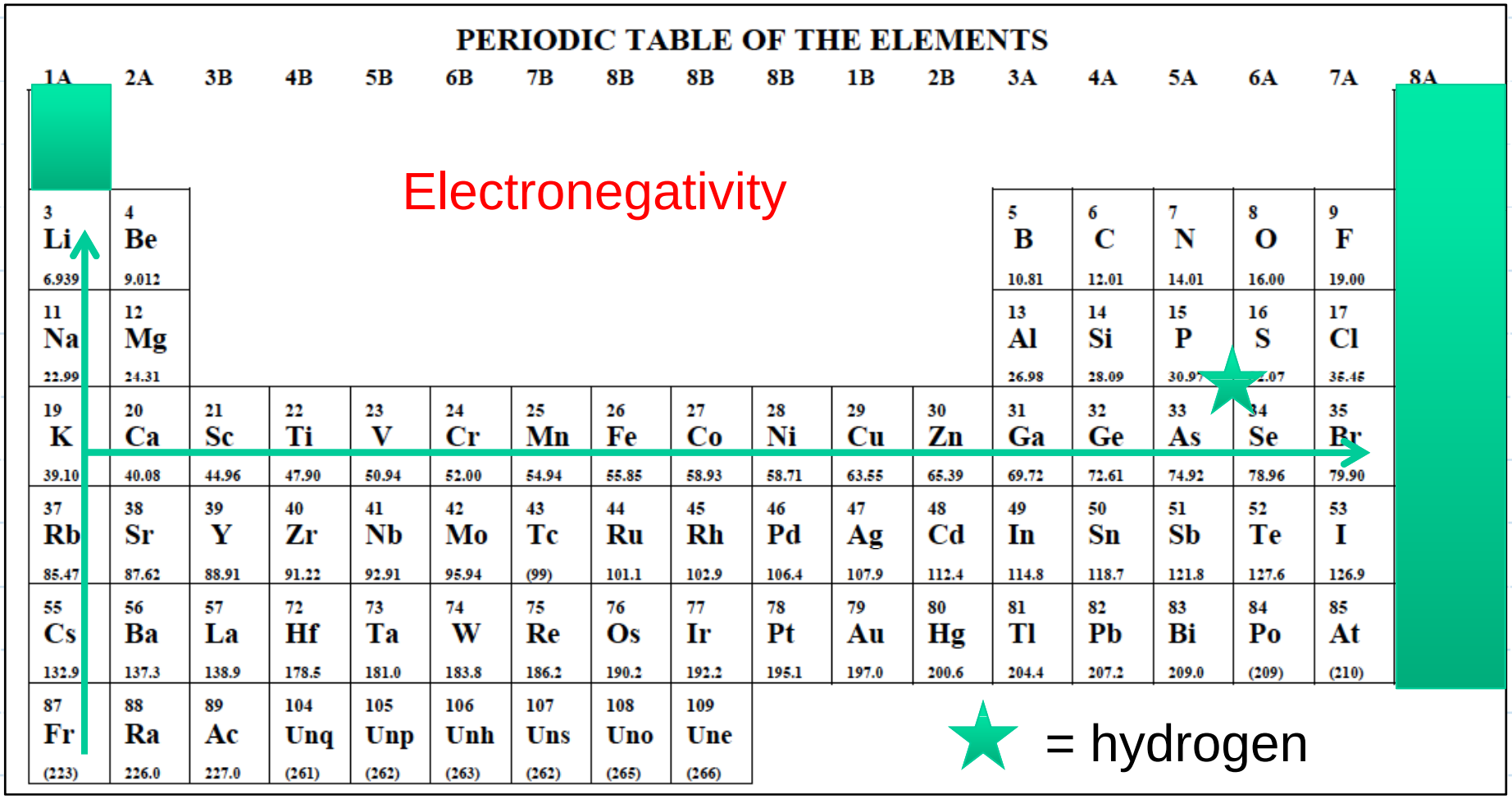
3.6 How Do We Predict Formulas and Name Ionic Compounds.

C *Polyatomics*

Give the correct chemical formula for the ionic compound, sodium phosphate.

Give the correct chemical formula for the ionic compound, aluminum carbonate.

It is a periodic property. That is, it varies in a systematic way when the elements are arranged in the periodic table.



4.3 What Is a Mole and How Do We Use It to Calculate Mass Relationships?

What is the mass in grams of 1 mole of Li.

^{6}Li:	6.015 amu	7.42%
^{7}Li:	7.016 amu	92.58%

$N = 6.0221 \times 10^{23}\ mol^{-1}$ $1\ amu = 1.6606 \times 10^{-24} g$

Important chemical principle(s).

Count by weighing.

Weigh by counting.

Simple arithmetic (often with whole numbers)

A mole is . . . An amount of substance

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A mole is . . . An amount of substance that has the same number of particles as there are atoms in 0.012 kg of ^{12}C.

Strictly speaking, a mole is not a number (like a million). It is the amount of substance that has an Avogadro's number of particles.

By substance we mean a chemically pure substance.

4.3 What Is a Mole and How Do We Use It to Calculate Mass Relationships.

Molar Mass … (Formula Weight)

Al	Si	P	S
13	14	15	16
26.98	28.09	30.97	32.07

IUPAC now replaced some atomic weights with a range: e.g. Si [28.08, 28.09] S [32.05, 32/08]

The numbers in the periodic table are the masses of a very large number of atoms of the individual elements.

4.3 What Is a Mole and How Do We Use It to Calculate Mass Relationships.

Example 1

a) How many ATOMS of fluorine are present in 3.30 moles of BF_3?

b) How many MOLES of fluorine are present in 3.09×10^{22} molecules of BF_3

Now we are counting.

Example 2

How many **MOLES** of water are present in 5.41 grams of this compound ?

a) 0.1 b) 0.2 c) 0.3 d) 0.4 e) Help

Also counting here. We know the weight.

If a grain of rice weighs 18 mg how many grains are there in 5.41 g of rice.

5.3 What Is a Mole and How Do We Use It to Calculate Mass Relationships.

Example 3

How many Grams of ethanol (CH_3CH_2OH) are present in 0.61 moles of this compound ?

a) 46 b) 96 c) 28 d) Help

Now we are weighing by counting.

If a grain of sand weighs 46 mg, what is the weight of 610 grains?

Example 1

Start here Thurs 9/19

Balance the following chemical equation:

$$\_\_Fe_2O_3(s) + \_\_C(s) \quad = \quad \_\_Fe(s) + \_\_CO_2(g)$$

Reactants					
Fe					
O					
C					

Products					
Fe					
O					
C					