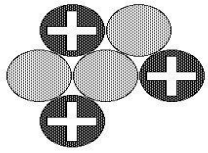
Isotopes

Atoms of a certain element may contain different numbers of

_____

Such atoms are called

Isotopes



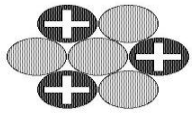
Lithium-__

__ protons

__ neutrons

The number of protons + neutrons =

_____



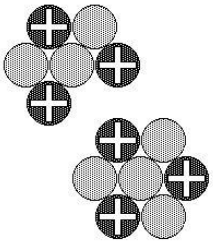
Lithium-__

__ protons

__ neutrons

The number of protons is the same, so we still have lithium. However, we have added one more neutron. We now have two isotopes of lithium.

Isotopes



Naturally occurring Lithium is

92 % Lithium-7

and

8 % Lithium-6

with an Atomic Mass of

Atomic Mass

The weighted _____ of all of the naturally occuring _____ of an element

Isotope Symbols

There are two common ways of symbolizing isotopes.

$${}^{A}_{Z}X \quad \text{or} \quad X\text{-}A$$

X =

A =

Z =

Isotope Symbols

For example, the most common isotope of carbon has 6 neutrons and 6 protons and can be symbolized as:

C or **C-12**

The number of neutrons of an isotope can always be found by subtracting the atomic number from the mass number.

12 - 6 = 6

What is this element?
How many neutrons does this isotope have?

$${}^{94}_{36}X$$

Element…

Neutrons…

Isotopes of Hydrogen

Another example, the most common isotope of hydrogen has no neutrons at all; there's also a hydrogen isotope called _____, with one neutron, and another,_____, with two neutrons.

Hydrogen Deuterium Tritium

For instance, ordinary hydrogen is written ___, deuterium is ___, and tritium is ____.

Isotope Practice

Complete the following chart.

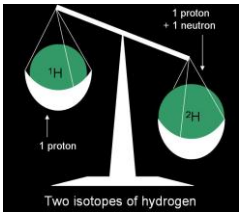
	Protons	Neutrons	Electrons	Symbol
Potassium-39				
Potassium-40				
Potassium-41				

Calculating Atomic Mass

The atomic mass of an element is calculated using weighted averages of the

_____

_____



Calculating Atomic Mass Example

Magnesium occurs in nature in three isotopic forms:

$^{24}_{12}Mg$ $^{25}_{12}Mg$ $^{26}_{12}Mg$

(78.70% abundance) (10.13% abundance) (11.17% abundance)

The relative masses of these three isotopes are 23.985, 24.986, and 25.983 amu, respectively.

Calculate the atomic mass of magnesium for these data.

Step 1…

Mass Contribution = (% Abundance)(Average Mass) *amu*

Sum of Mass Contribution (This is the the atomic mass of the magnesium atom).

Step 2…

Now, add them together.

Calculating Atomic Mass Practice

There are two different types (isotopes) of copper atoms. One type of copper atoms weighs in at 62.93 amu, the other has a mass of 64.94 amu. The lighter isotope is more common with 69.09% . The remainder of the atoms, 30.91 %, have a mass of 64.94 amu.

Find the AVERAGE ATOMIC MASS of an atom of copper.

Step 1…

Mass Contribution = (% Abundance)(Average Mass)

Step 2…

Now, add them together.

Calculating Atomic Mass Practice

Neon has two major isotopes, Neon-20 and Neon-22. Out of every 250 neon atoms, 225 will be Neon-20 (19.992 amu), and 25 will be Neon-22 (21.991 amu) What is the average atomic mass of Neon?

Step 1…

First calculate % Abundance

Step 2…

Mass Contribution = (% Abundance)(Average Mass)

Step 3…

Now, add them together.