

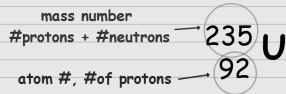
Describing Substances

What is an isotope?

Isotopes are atoms that are the same element but weigh differently due to their number of neutrons.

Some isotopes are radioactive which means their nuclei are unstable and pieces from it fly out (which will change what's left)

Nuclear symbols are used to identify isotopes



The mass of an isotope comes from the number of protons and neutrons, each weighs 1 amu (atomic mass unit).

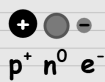
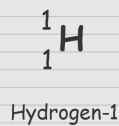
Electrons are about 1000 lighter than a proton and so are insignificant to an atoms mass.

Isotopes: same element, different mass

protons = atomic

mass # = total amu of protons + neutrons

mass = 1 amu

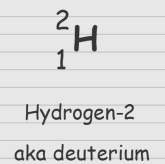


Isotopes: same element, different mass

protons = atomic

mass # = total amu of protons + neutrons

mass = 2 amu



Isotopes: same element, different mass

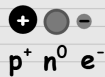
protons = atomic

mass # = total amu of protons + neutrons

mass = 3 amu



Hydrogen-3
aka tritium



	protons	neutrons	mass
${}^{12}_6\text{C}$	$6p^+$	$6n^0$	12 amu 99%
${}^{13}_6\text{C}$	$6p^+$	$7n^0$	13 amu ~1%
${}^{14}_6\text{C}$	$6p^+$	$8n^0$	14 amu <1%

12.01 amu
atomic mass = weighted average of all isotopes
on the Periodic Table!!!

The mass of an element shown on the periodic table has two meanings

1. average mass of an element's atom

2. the mass of one mole of that element.

In other words the mass of 6.02×10^{23} atoms

