

Jumpstart #3D

- 1) What are the three main types of nuclear decay particles?
- 2) What are the symbols for all three kinds? Do not forget to include the mass and atomic numbers!

Writing Nuclear Equations

In the reactants and products

Atomic numbers must balance **and**

Mass numbers must balance

Mass #

(p+n)



A

Sy

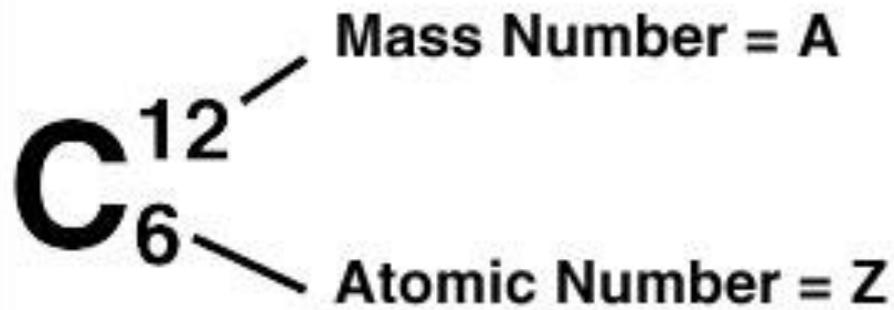
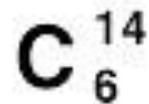
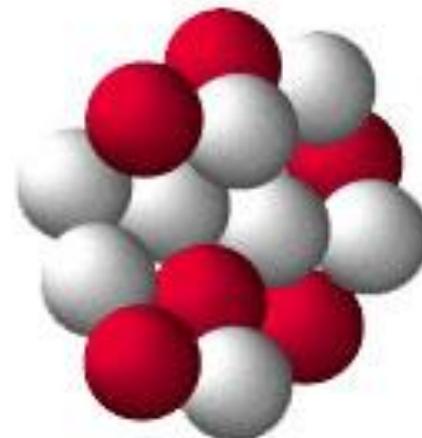
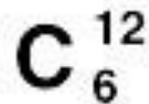
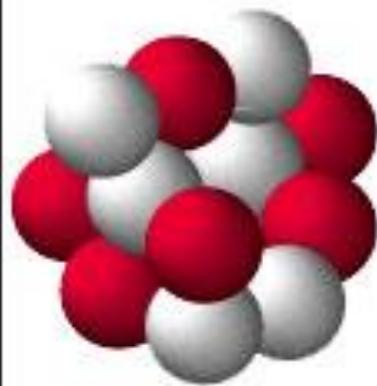
Atomic #

(p)



Z

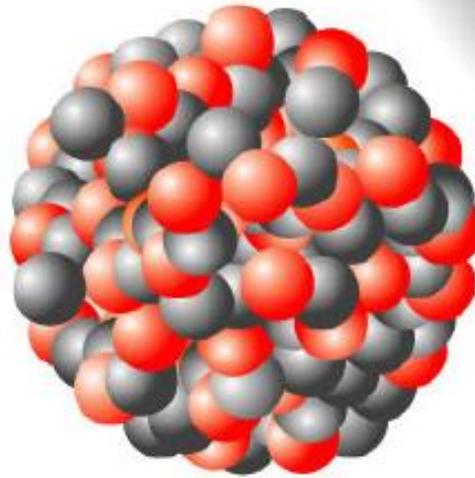
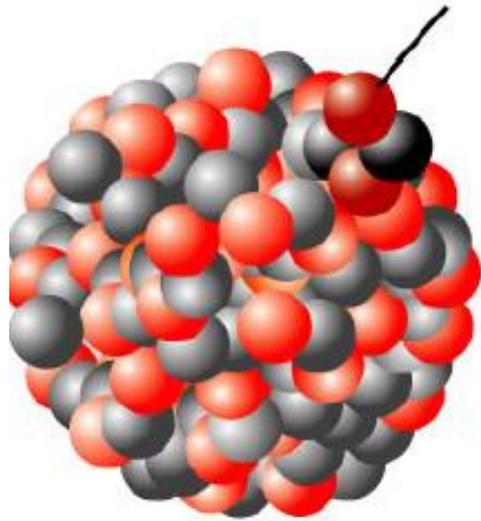
REMEMBER THE
CONSERVATION
OF
MASS/MATTER
LAW???



Alpha Decay



Two protons and
two neutrons lost



+



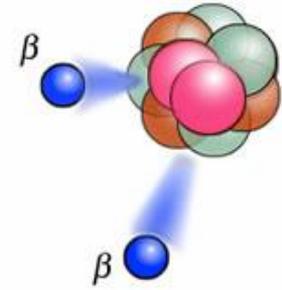
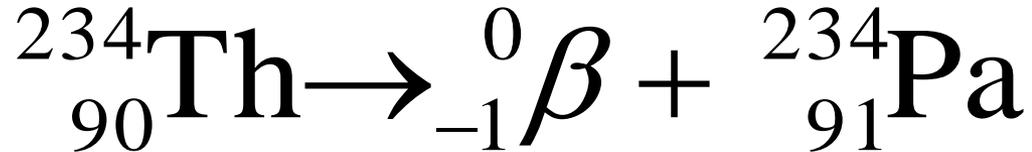
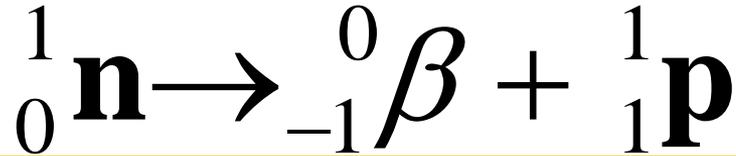
The protons and
neutrons leave as
an alpha particle.



Beta Emission:

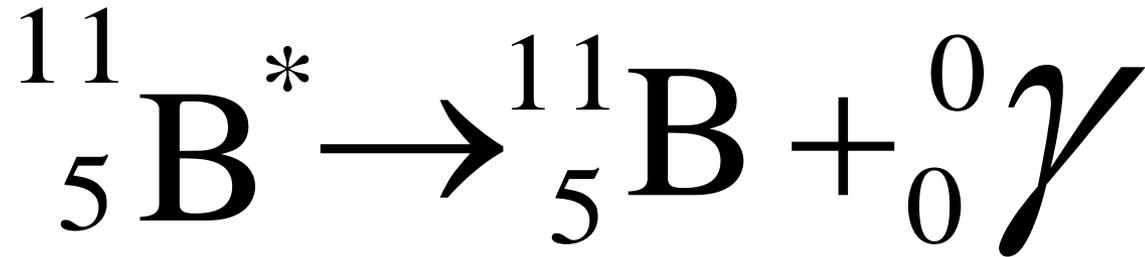
A beta particle is just like an e-.

When beta decay happens, the nucleus changes a neutron into a proton and an e-, and emits the e-



Gamma Radiation:

No change in atomic or mass number

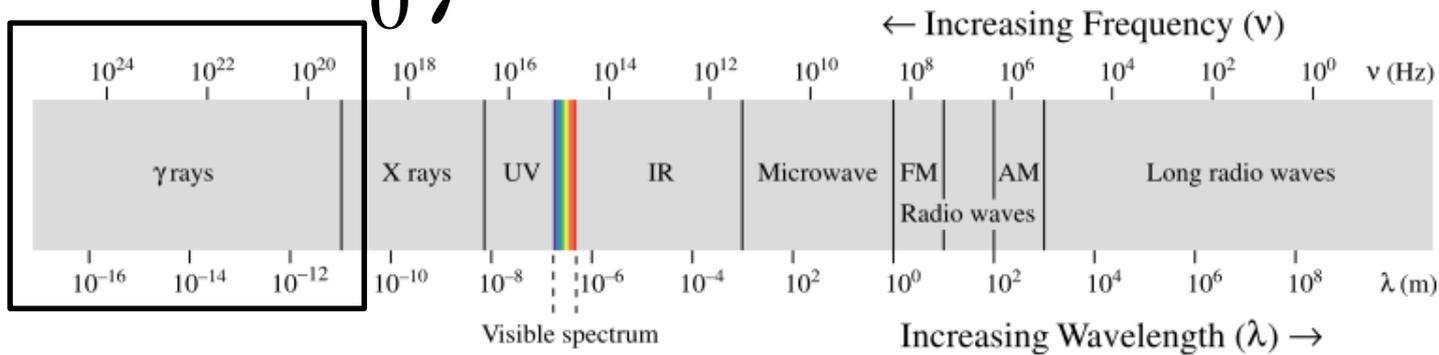


boron atom in a
high-energy excited state

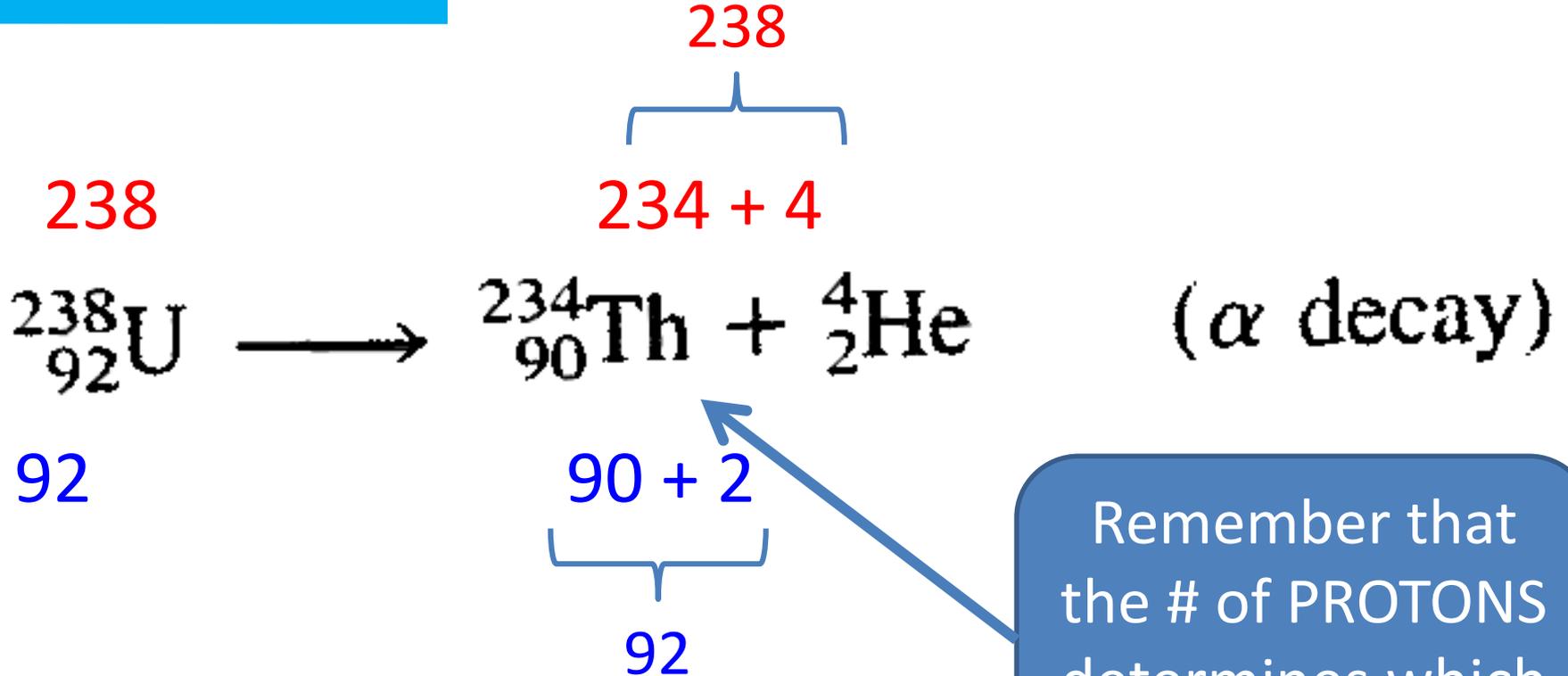
Gamma rays:

These are dangerous EMR waves with no significant mass that are usually emitted with other types of radiation. They penetrate very deeply.

The Symbol: γ



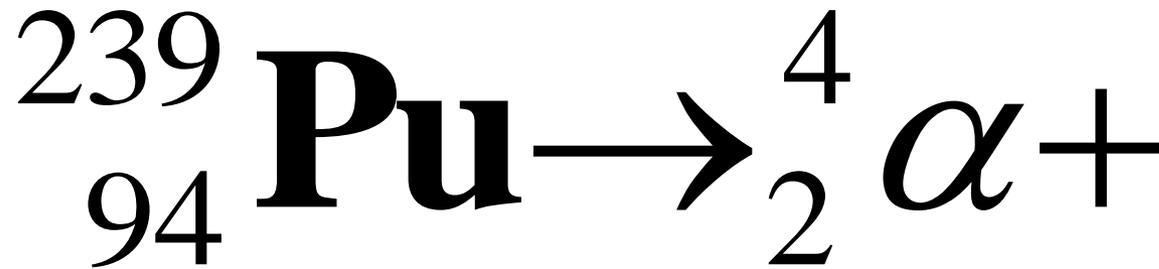
Balancing Nuclear Equations



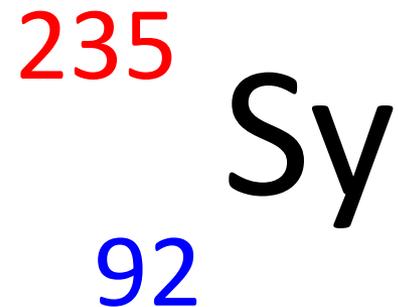
Remember that the # of PROTONS determines which ELEMENT it is!!!

Practice Alpha Emission Problem

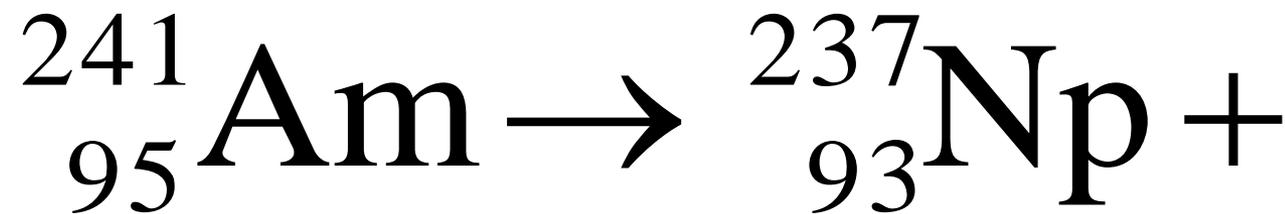
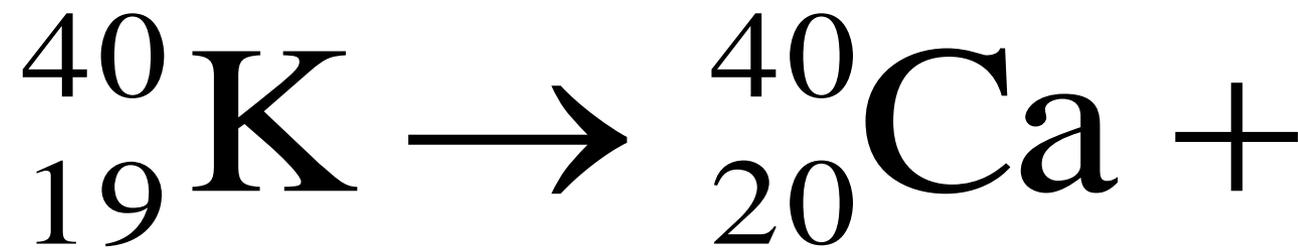
$$239 - 4 = 235$$



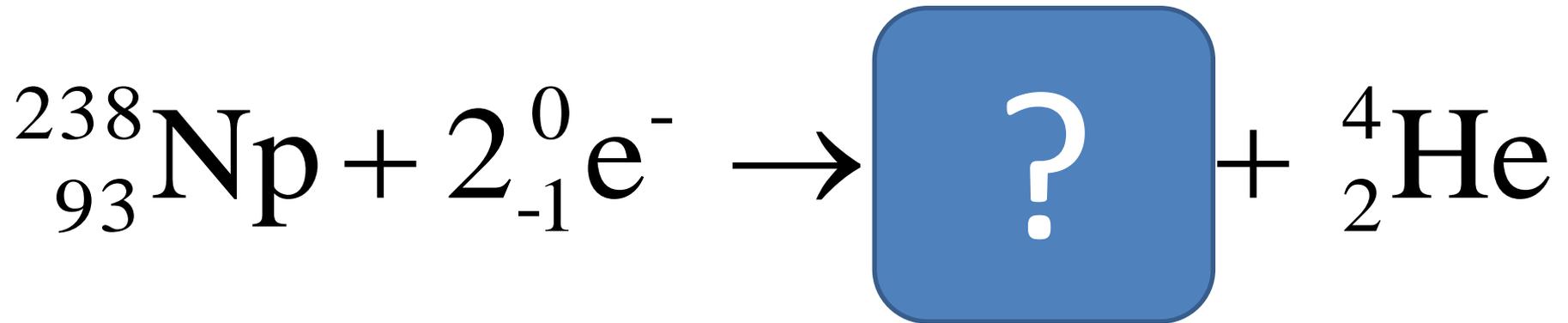
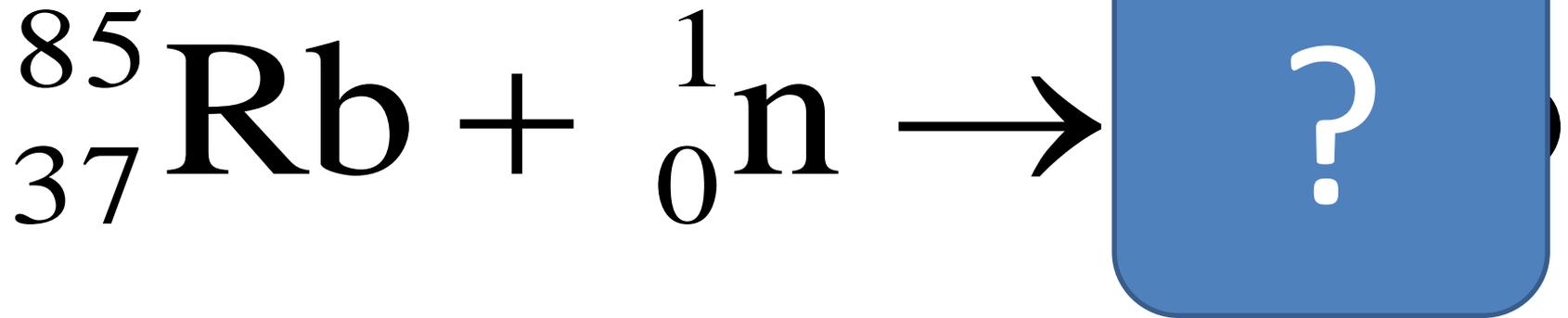
$$94 - 2 = 92$$



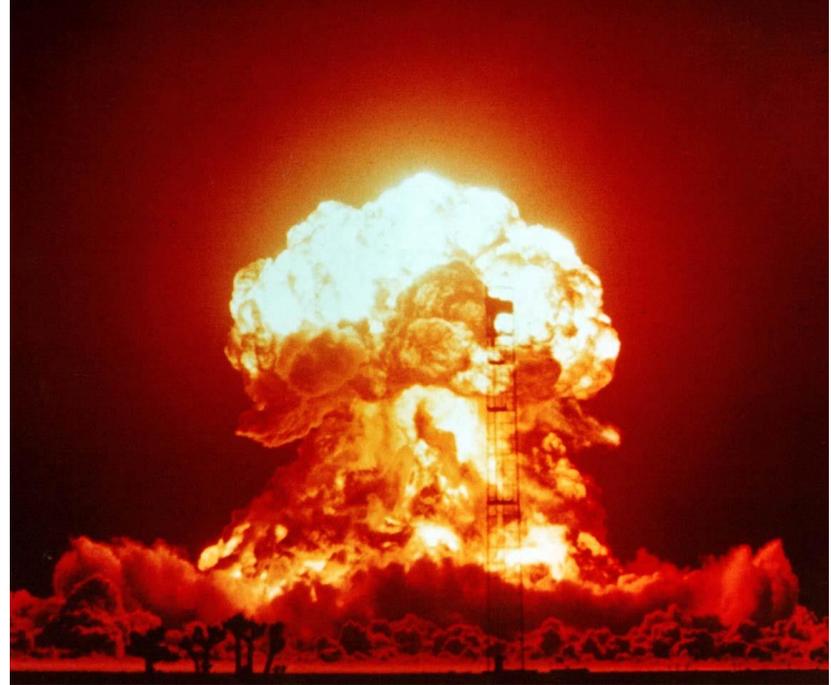
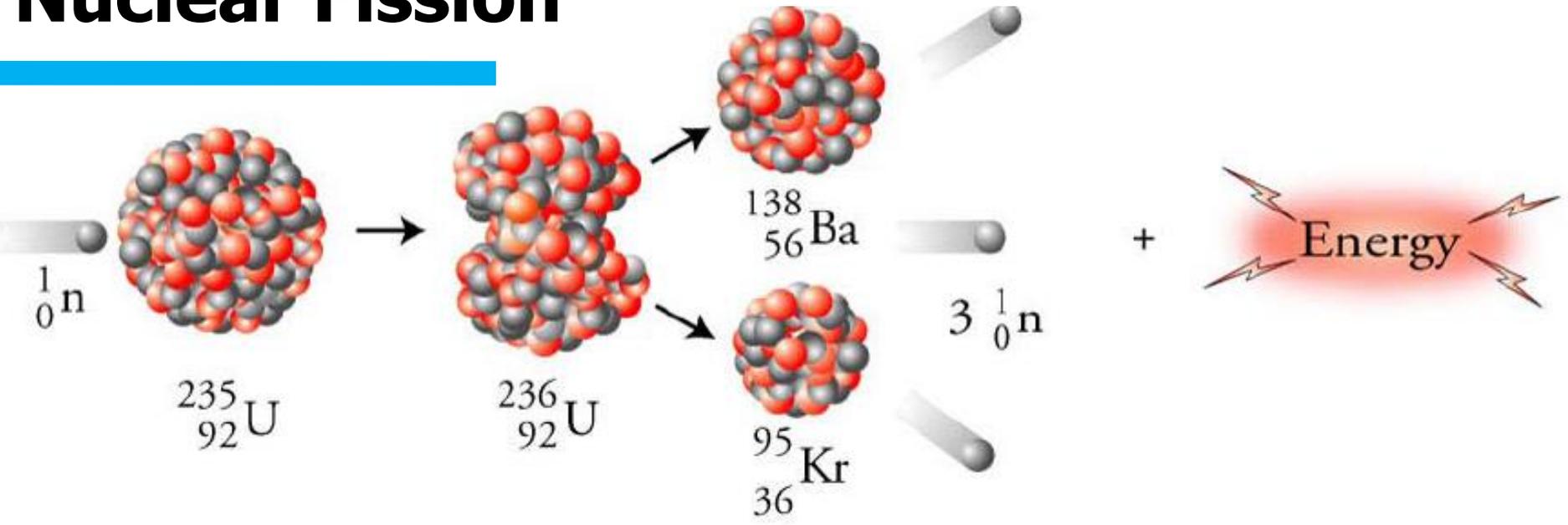
Practice Problems



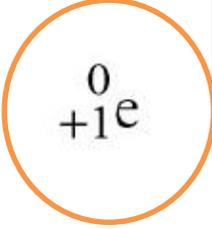
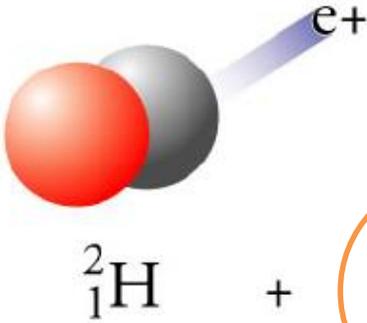
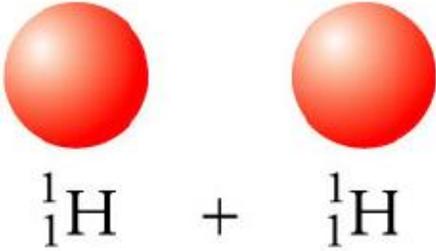
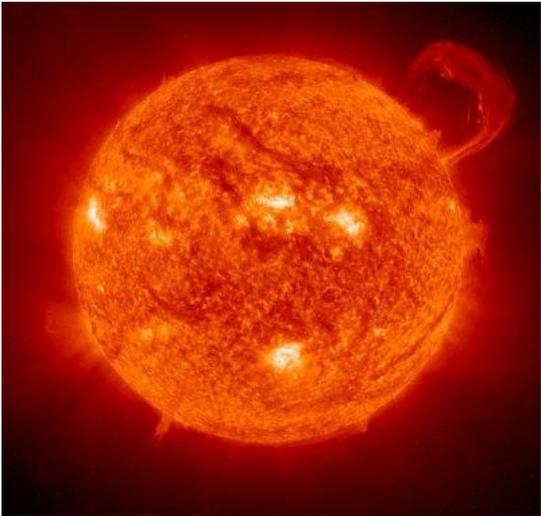
Practice Problems – they can get weird!



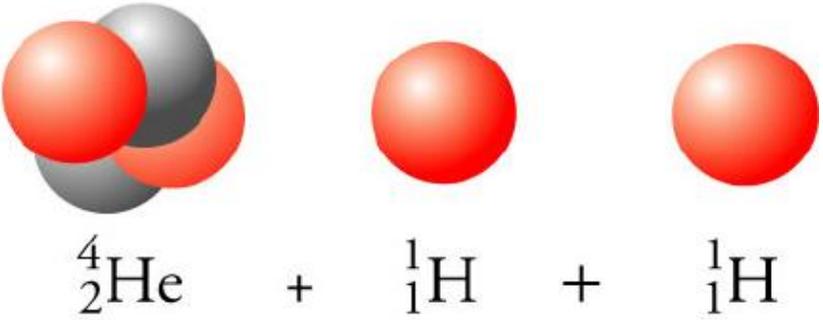
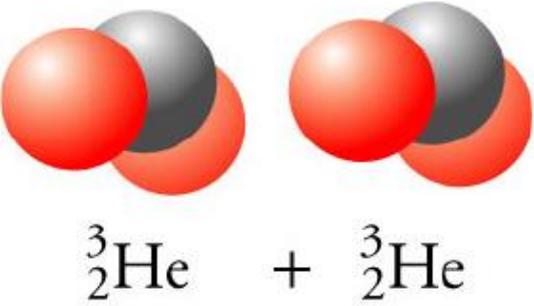
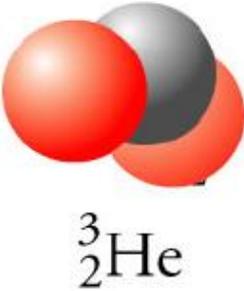
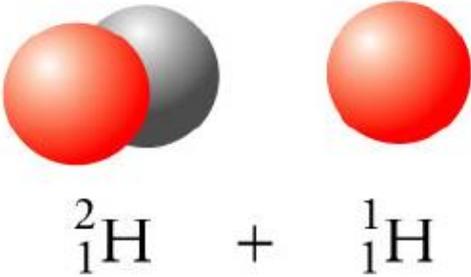
Nuclear Fission



Nuclear Fusion Powers the Sun



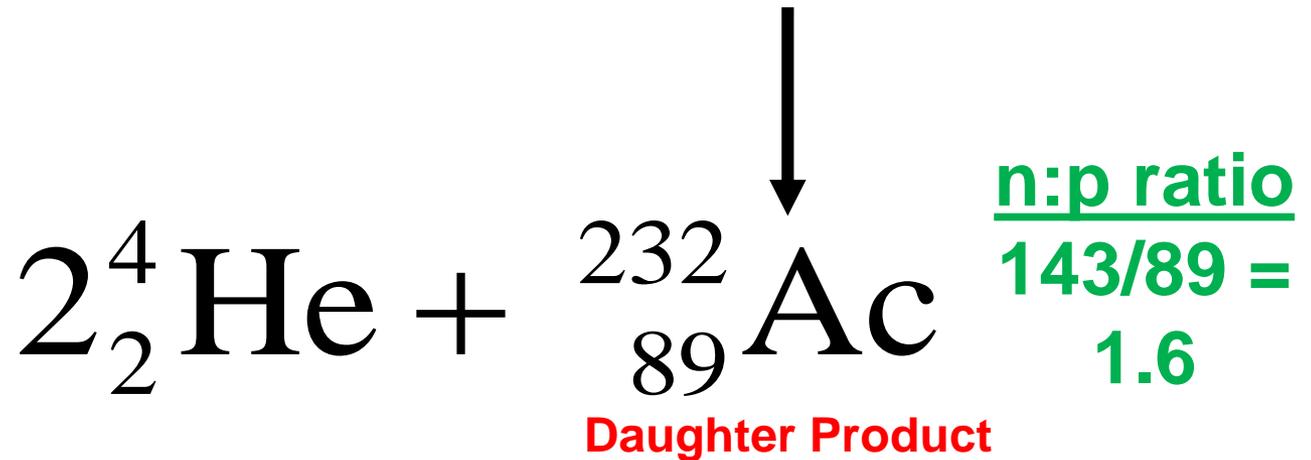
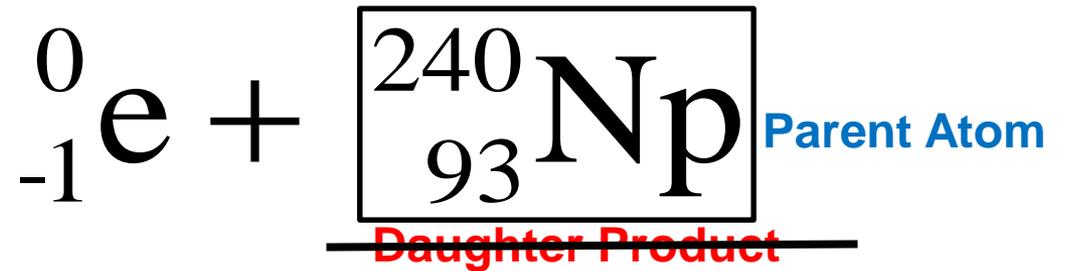
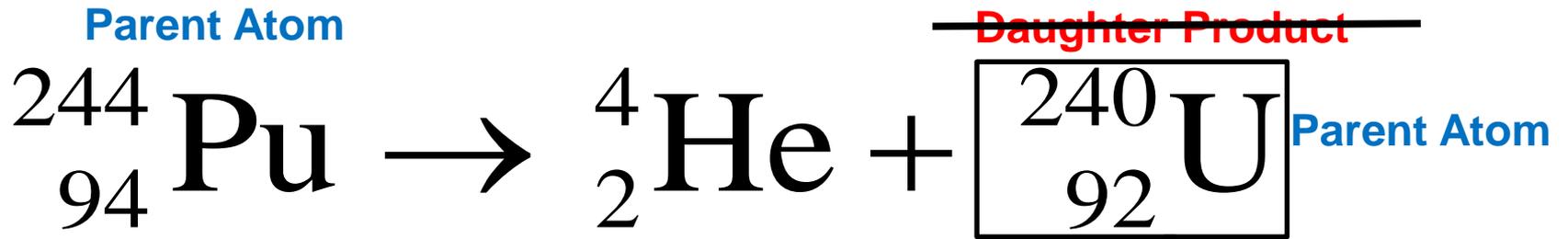
POSITRON



- **Parent Atom**
 - What you start with
- **Daughter Product (Decay Product)**
 - The new atom that is made

Decay Series

- The daughter product of one reaction is still unstable. It will decay into a new daughter product.
 - The daughter product becomes a parent atom for a new reaction!



FIND THE NEUTRON TO PROTON RATIO