Printout

May 28, 2019 9:04 AM

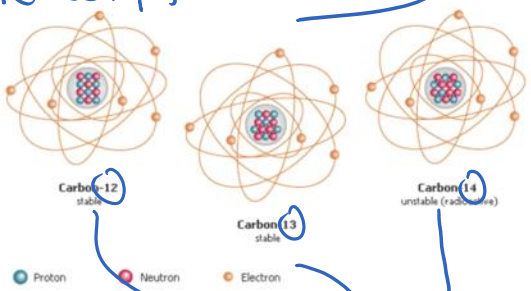
"nucleus of atom"

Name: _____
Date: _____
Block: _____

Nuclear Physics:
Lesson 8 – Isotopes and Radiation

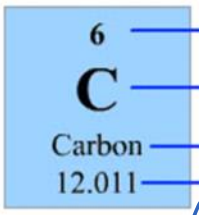
Isotopes

- Isotopes are atoms with different number of nuetrons (Therefore different atomic mass)
- Some isotopes are unstable



Remember:

(# protons)



(Protons + nuetrons)

Isotope Notation

(mass #, round)

$^{M}_{A}E$

M = Atomic Mass (Neutrons + Protons)

A = Atomic Number (Protons)

E = Element

$^{12}_{6}C$ (6 protons + 6 nuetrons)

$^{13}_{6}C$ (6 protons + 7 nuetrons)

$^{14}_{6}C$ (6 protons + 8 nuetrons)

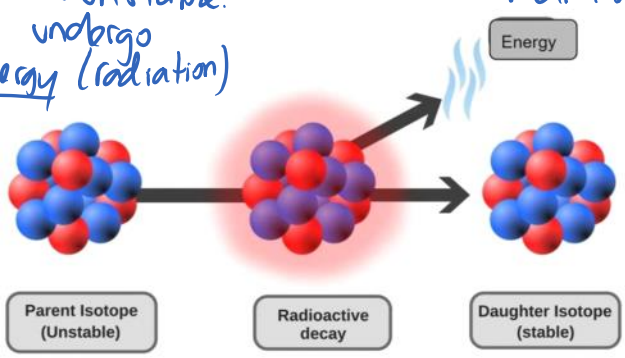
→ unstable.

Radioactive Isotopes

- when isotope is unstable, they undergo radioactive decay and release energy (radiation)

radiation

- Radioactive isotopes decay at random intervals
- time needed for ½ of sample to decay is called: half-life

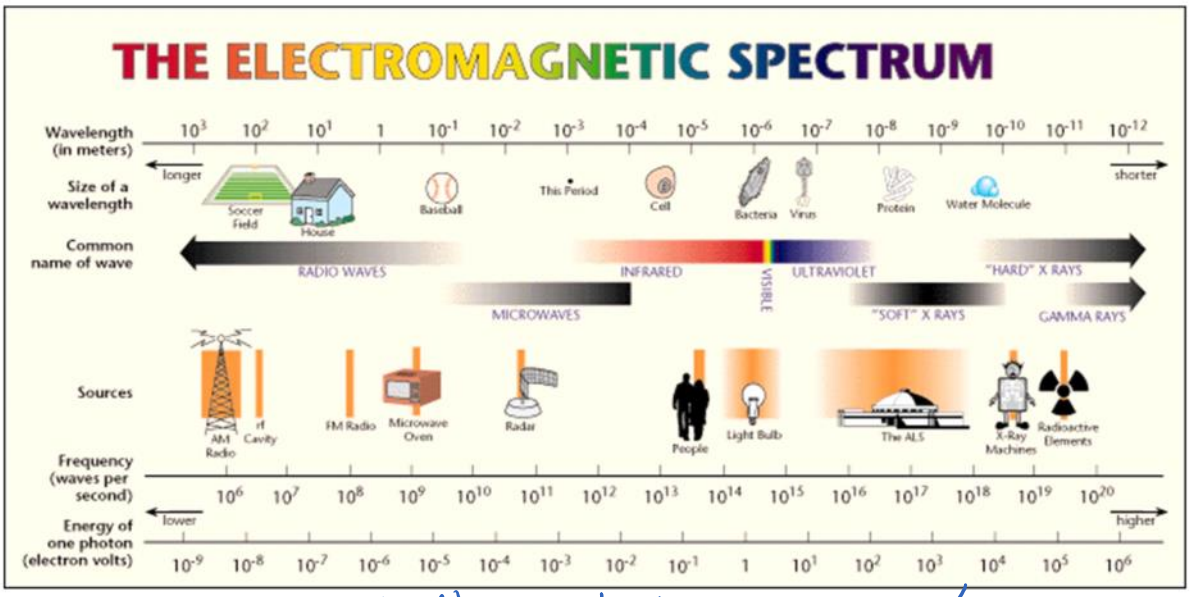


Applications of Radioactive Isotopes

Carbon dating: Carbon-14 (unstable) in living organisms, that decay (half life)
How much carbon-14 depends on how old something is.

Medical imaging: Ex X rays, isotope markers for imaging

Radiation



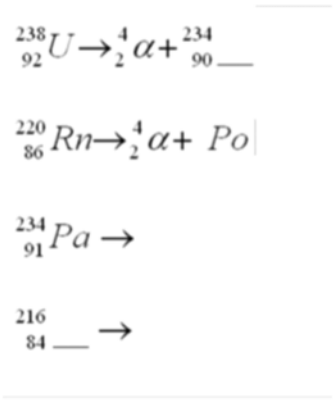
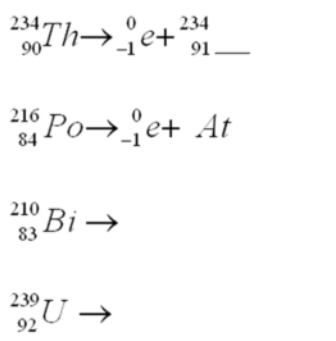
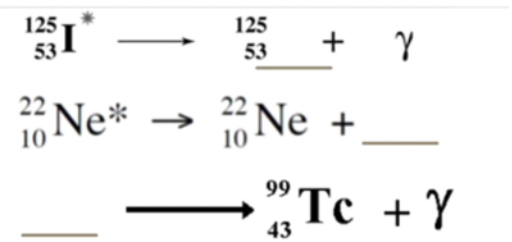
- Shorter the wavelength, the higher the energy (Ex x rays, Gamma rays)
- Radiation that causes damage to cells = ionizing radiation (UV rays, x rays, gamma ray)
- Radiation that does not cause damage to cells = non-ionizing radiation (colour, radiowaves)

Nuclear Physics:

Lesson 9 – Radioactive Decay

Decay:

Transmutation:

Alpha Decay 
Beta Decay 
Gamma Decay 

Nuclear Physics:
Lesson 10 – Nuclear Reactions

Nuclear Energy

Reactions that involve the _____ (rather than its electrons) are known as _____

These reactions are able to release massive amounts of _____

Nuclear reactions are described as either_____ or_____

Fission Reactions

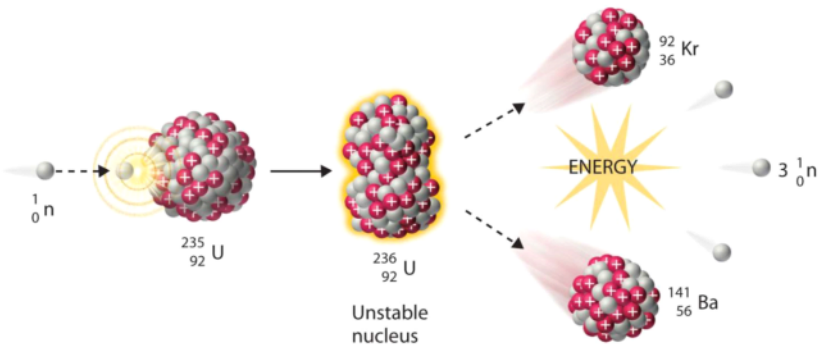
Fission reactions split a _____ into two or more _____

Fission reactions do not often _____

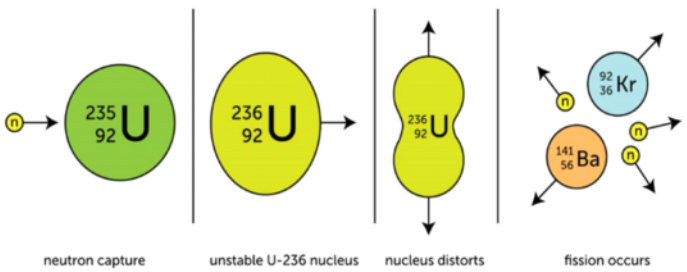
A large relatively unstable isotope has fission_____ by absorbing _____ _____

The addition of a neutron creates an_____ which quickly breaks apart _____ _____

The resulting isotopes may still undergo further decay (Radioactive)

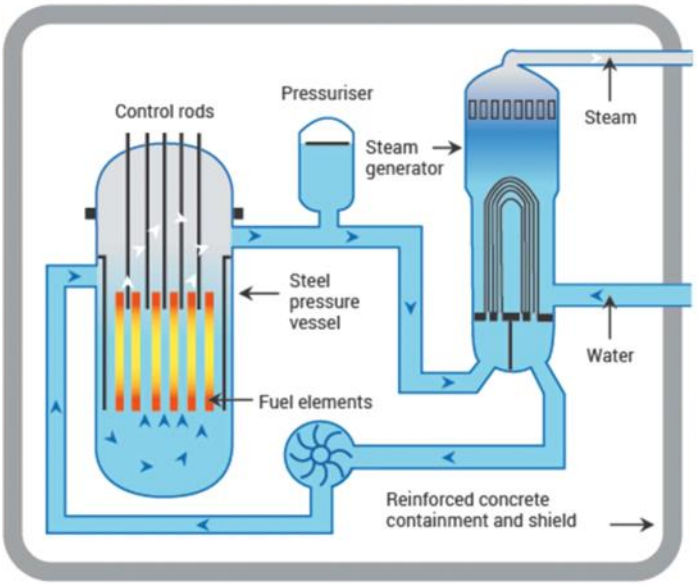


Uranium-235 Fission



Chain Reactions

Nuclear Power Plants



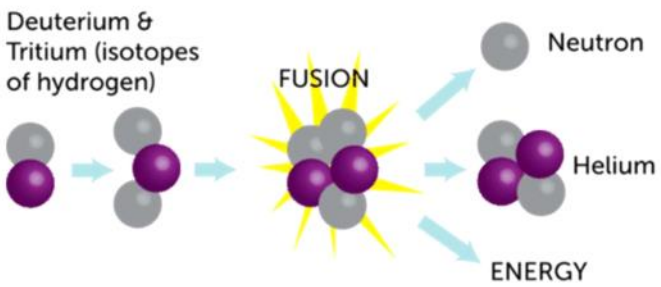
Fusion Reactions

Fusion reactions occur when_____ combine to form a _____ and releasing_____

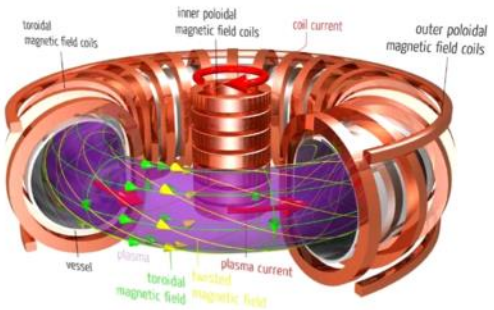
Fusion reactions occur in _____

Extreme _____ are needed to bring nuclei together with enough_____ to cause fusion

Isotopes of _____ are fused to form _____



Fusion Power



Complete the following fission and fusion nuclear equations. Indicate if the equation represents fission or fusion **(circle one)**

9. $^{231}_{91}Pa \rightarrow {}^{192}_{77}Ir + \_\_\_\_\_$

Fission or fusion

10. $^{244}_{94}Pu \rightarrow {}^{141}_{59}Pr + \_\_\_\_\_$

Fission or fusion

11. $^{4}_{2}He + {}^{2}_{1}H \rightarrow \_\_\_\_\_$

Fission or fusion

12. $^{9}_{4}Be + {}^{12}_{6}C \rightarrow \_\_\_\_\_$

Fission or fusion

13. $^{238}_{92}U \rightarrow {}^{128}_{52}Te + \_\_\_\_\_$

Fission or fusion

14. $^{56}_{26}Fe + {}^{59}_{28}Ni \rightarrow \_\_\_\_\_$

Fission or fusion

15. $^{262}_{105}Db \rightarrow {}^{96}_{42}Mo + {}^{28}_{14}Si + \_\_\_\_\_$

Fission or fusion

16. $^{265}_{108}Hs \rightarrow {}^{16}_{8}O + {}^{9}_{4}Be + \_\_\_\_\_$

Fission or fusion