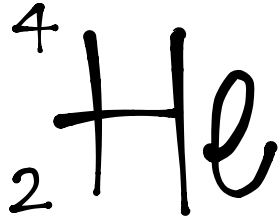# NUCLEAR CHANGE

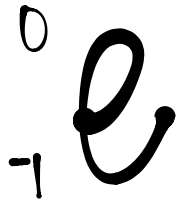α Alpha Radiation
- Alpha particle: 2 neutrons & 2 protons

$$^4_2He$$

- Effect on mass number: Decreases by 4

- Effect on atomic number: Decreases by 2

NUCLEAR CHANGE

β Beta Radiation
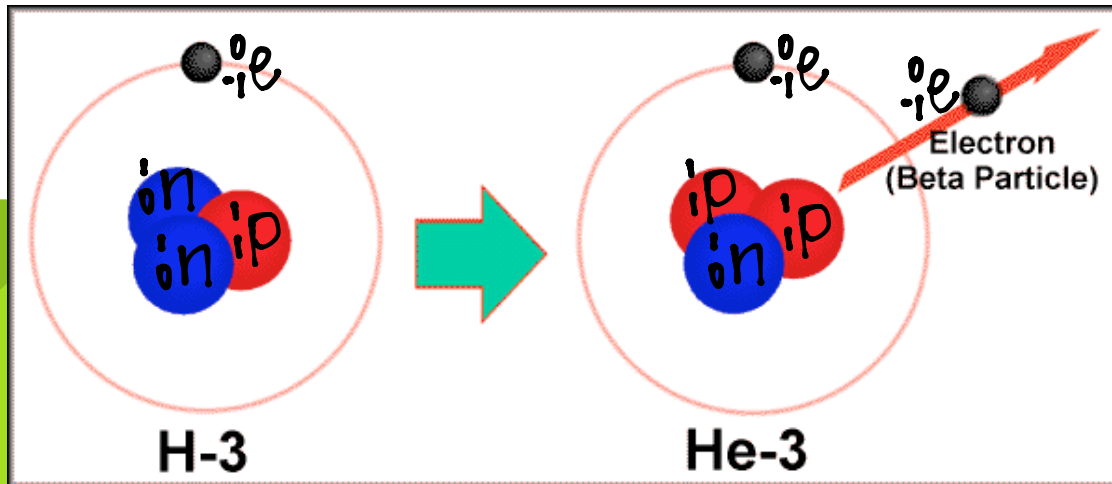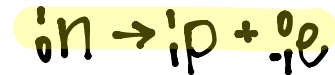
- Beta particle:

$$_{-1}^{0}e$$

- Effect on mass number: Does not effect

- Effect on atomic number: Increases by 1

NUCLEAR CHANGE

Beta Radiation

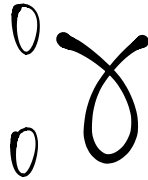- How does an electron come out of the nucleus?

A neutron decays into a proton (stays in the nucleus) & an electron (leaves the nucleus)

$$_0^1 n \rightarrow {}_1^1 p + {}_{-1}^0 e$$

H-3   He-3

Electron (Beta Particle)

NUCLEAR CHANGE
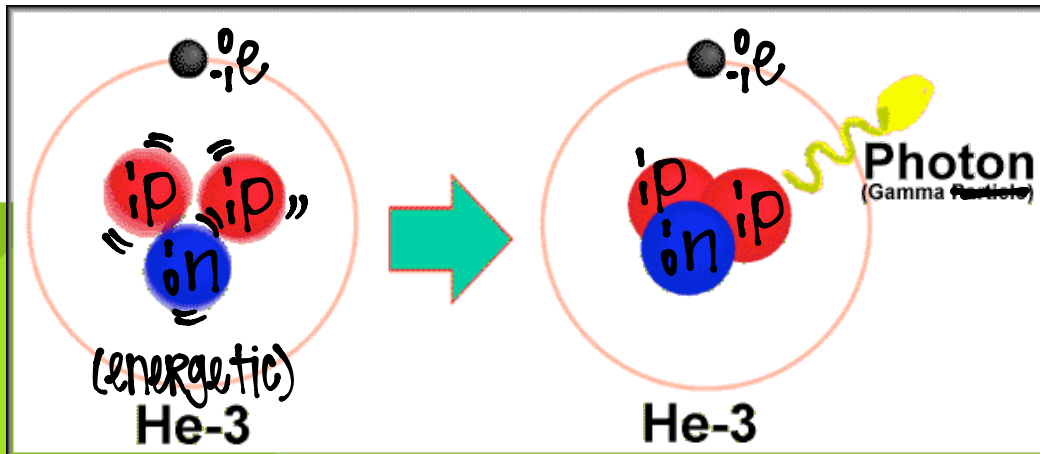
Gamma Radiation

- Gamma emission:

$$^0_0\gamma$$

- Effect on mass number: Does not effect

- Effect on atomic number: Does not effect

NUCLEAR CHANGE

Gamma Radiation

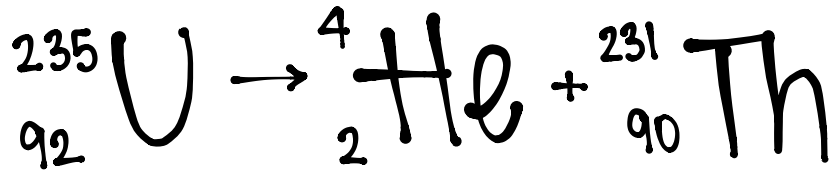- Why is it gamma "emission" instead of gamma "particle"?

In gamma decay energy is released; energy is not a particle

NUCLEAR CHANGE

Nuclear Equations

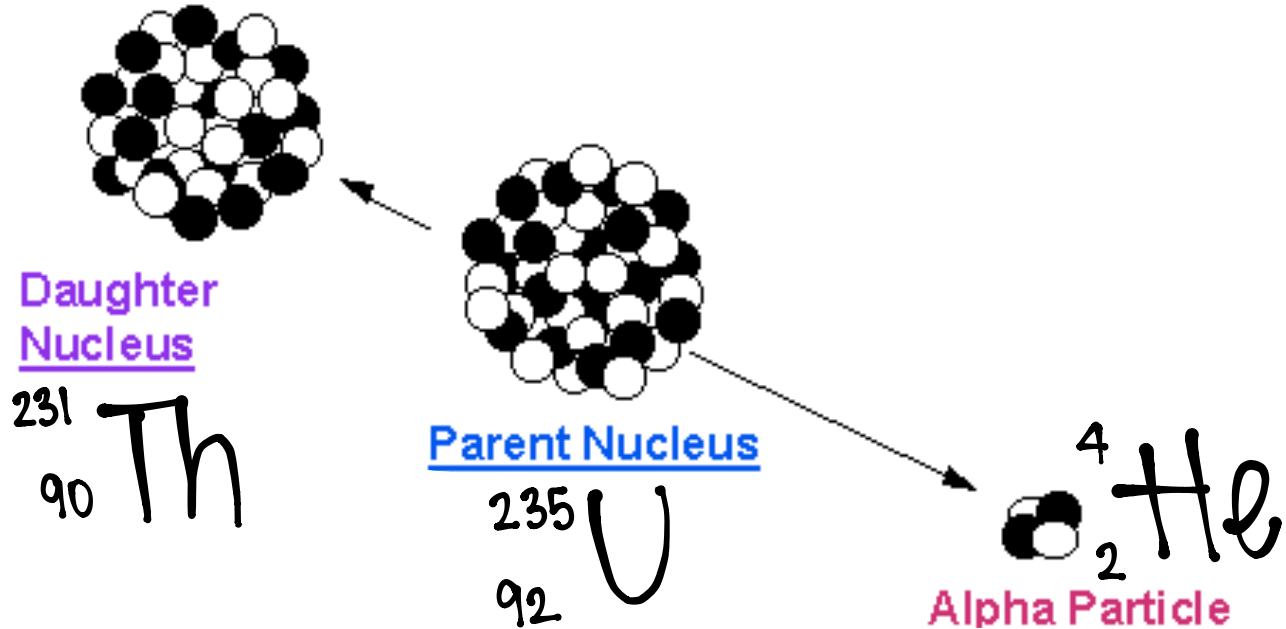- Write the nuclear equation for the alpha decay of uranium-235.

$$^{235}_{92}U \rightarrow \,^{4}_{2}He + \,^{231}_{90}Th$$

top: 235 = 4 + x
bottom: 92 = 2 + x

NUCLEAR CHANGE

Nuclear Equations

- Write the nuclear equation for the alpha decay of uranium-235.

Daughter Nucleus

$$^{231}_{90}\text{Th}$$

Parent Nucleus

$$^{235}_{92}\text{U}$$

$$^{4}_{2}\text{He}$$

Alpha Particle

NUCLEAR CHANGE

Nuclear Equations

- Write the nuclear equation for the beta decay of potassium-40.

$$^{40}_{19}K \rightarrow ^{0}_{-1}e + ^{40}_{20}Ca$$
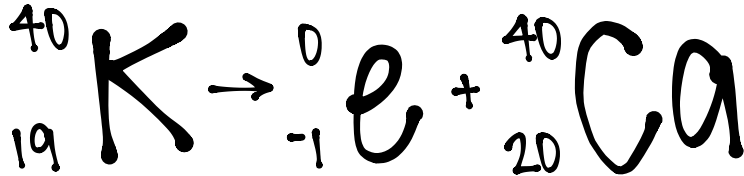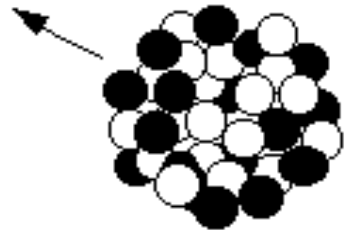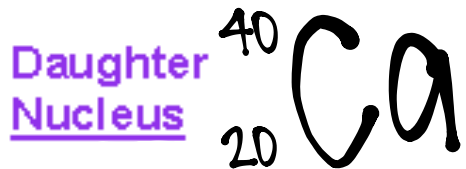
top: 40=0+x
bottom: 19=⁻1+x

NUCLEAR CHANGE

Nuclear Equations

- Write the nuclear equation for the beta decay of potassium-40.

Daughter Nucleus $^{40}_{20}Ca$

Parent Nucleus $^{40}_{19}K$

$^{0}_{-1}e$
Beta Particle

NUCLEAR CHANGE

Nuclear Equations

- Write the nuclear equation for the gamma decay of cobalt-60.

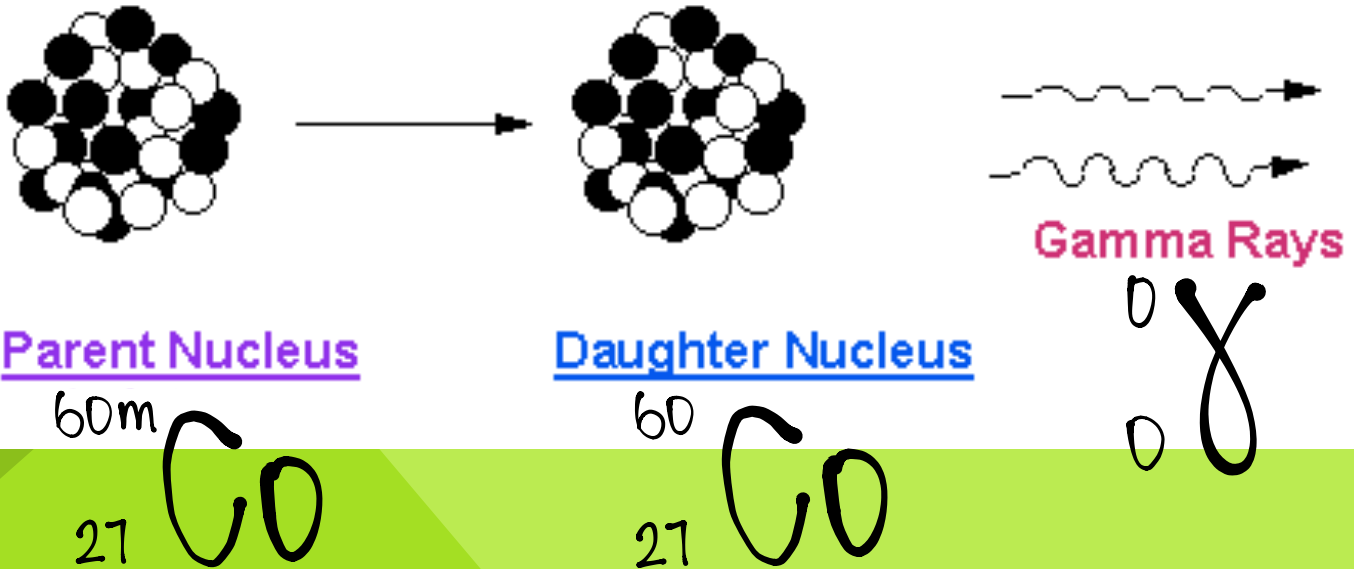$$^{60m}_{27}\text{Co} \rightarrow ^{0}_{0}\gamma + ^{60}_{27}\text{Co}$$
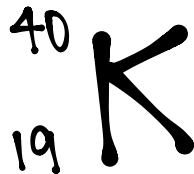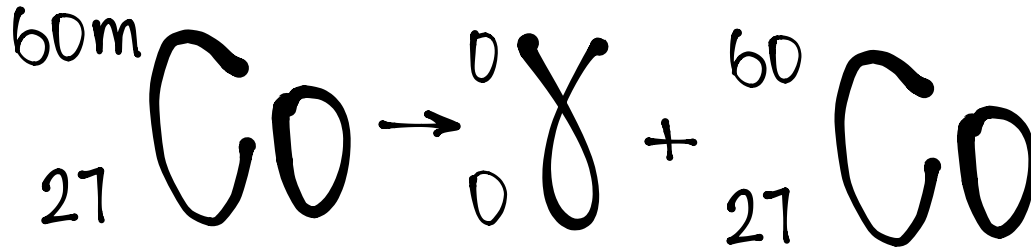
top: 60 = 0+x
bottom: 27 = 0+x

NUCLEAR CHANGE

Nuclear Equations

- Write the nuclear equation for the gamma decay of cobalt-60.

Parent Nucleus

$$^{60m}_{27}Co$$

Daughter Nucleus

$$^{60}_{27}Co$$

Gamma Rays

$$^{0}_{0}\gamma$$

NUCLEAR CHANGE

Nuclear Equations

- Write the nuclear equation for the gamma decay of ^{106}Ag.

$$^{106m}_{41}\text{Ag} \rightarrow\ ^{0}_{0}\gamma + ^{106}_{41}\text{Ag}$$
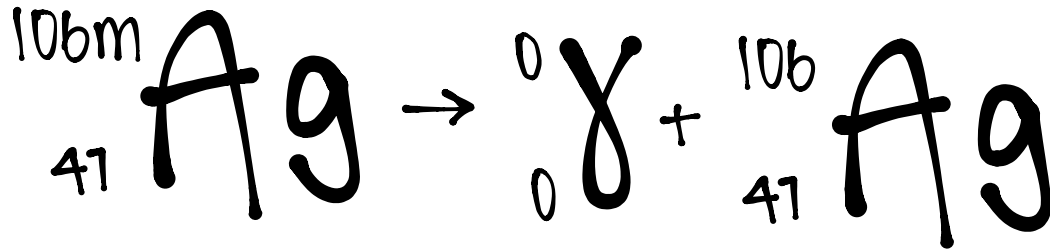
NUCLEAR CHANGE

Nuclear Equations

- Write the nuclear equation for the alpha decay of ^{222}Rn.

$$^{222}_{86}\text{Rn} \rightarrow {}^{4}_{2}\text{He} + {}^{218}_{84}\text{Po}$$
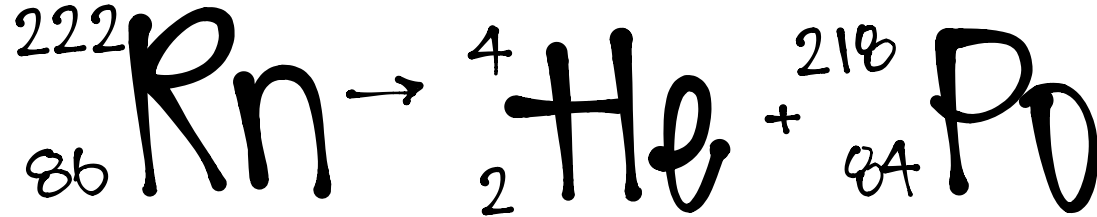
NUCLEAR CHANGE

Nuclear Equations

- Write the nuclear equation for the beta decay of ^{14}C.

$$^{14}_{6}C \rightarrow {}^{0}_{-1}e + {}^{14}_{7}N$$
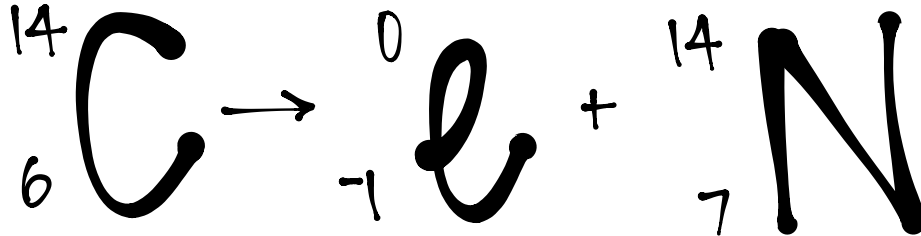
NUCLEAR CHANGE

Radiation Penetration

NUCLEAR CHANGE

Radiation Type	Particle Emitted	Stopped by	Effect on Mass #	Effect on Atomic #
$\propto$	$_2^4 He$	Paper	↓4	↓2
β	$_{-1}^0 e$	Glass	none	↑1
γ	$_0^0 \gamma$ energy	Lead / 1' concrete	none	none