Name _____ Period _____

Types of Nuclear Radiation

- _____ emit excess energy from their nuclei to become more stable. The energy released is called _____.
- There are *three main types of radiation* released by radioactive atoms: **Alpha**, **Beta**, and **Gamma radiation.**

α

$^{4}_{2}He$

- _____ are identical to **helium nuclei**.
- Because they are large, **alpha particles** have the least penetrating power.
- _____ dangerous radiation. Can be stopped by a piece of paper. Particles cannot penetrate skin.

- _____ are **electrons** that are emitted as **nuclear radiation**.
- Because they are much smaller, **beta particles** travel faster and can **penetrate skin**.
- Can be stopped by thin sheet of _____ or _____.

β

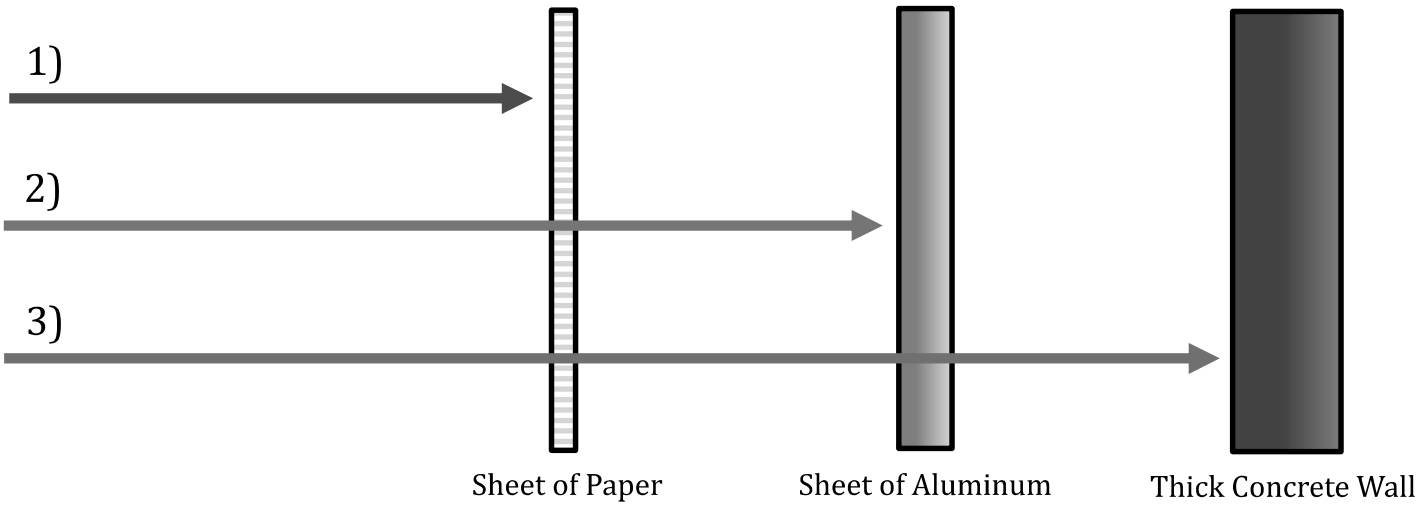
$^{0}_{-1}e$

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

- _____ are emitted in the form of **waves**.
- Gamma rays have **no mass** and high penetrating power. This makes them **extremely dangerous**.
- Can be stopped by thick layers of _____.

Example 1:

Label alpha, beta, and gamma radiation in the diagram below.



Example 2:

An isotope of Uranium-238 emits an alpha particle. Write the equation below.

$$^{238}_{92}U \longrightarrow \_\_\_\_\_ + \_\_\_\_\_$$

Example 3:

An isotope of Carbon-14 emits a beta particle. Write the equation below.

$$^{14}_{6}C \longrightarrow \_\_\_\_\_ + \_\_\_\_\_$$

Example 4:

An isotope of Technetium-99 emits a gamma ray. Write the equation below.

$$^{99}_{43}Tc^{*} \longrightarrow \_\_\_\_\_ + \_\_\_\_\_$$

Name _____ Period _____

Types of Nuclear Radiation – Questions

Instructions: Identify the following descriptions as alpha, beta, or gamma:

1) This radiation can only be stopped by **thick concrete or lead.** _____
2) This particle can be stopped by **clothing** alone. _____
3) During this decay, no protons, neutrons, or electrons are lost. _____
4) During this type of decay, **two protons** are lost. _____
5) This particle has a -1 charge. _____
6) This particle has a mass of 4. _____
7) This type of radiation is identical to an **electron**. _____
8) This form of radiation has **no mass** and **no charge**. _____
9) This particle is represented as a **helium** atom. _____
10) This particle is emitted as in the form of **waves**. _____
11) This particle can be stopped by a **piece of paper**. _____
12) This particle has average (medium) penetrating power. _____
13) This is the **least dangerous** type of radiation. _____
14) This is the **most dangerous** type of radiation. _____

Instructions: Use the nuclear equation below to answer the following questions:

$$^{32}_{15}P \longrightarrow {}^{32}_{16}S + {}^{0}_{-1}e$$

15) The picture above represents **what type** of nuclear decay? _____
16) What is the mass of the starting **phosphorus (P)** atom? _____
17) What is the **mass of the particle released** above? _____
18) Which decay would have caused a **larger change in mass**? _____