



Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

**Nuclear Chemistry: Nuclear Equations****Main Idea****Notes**Comparing  
Chemical  
Reactions &  
Nuclear  
Reactions

Similar: mass and charges must be \_\_\_\_\_

Differ: In Nuclear Reactions:

- ✓ elements can change into \_\_\_\_\_ (\_\_\_\_\_)
- ✓ the specific \_\_\_\_\_ is important
- ✓ \_\_\_\_\_ by changes in temperature, pressure, or the presence of catalysts
- ✓ \_\_\_\_\_ slowed down, sped up, or stopped
- ✓ radioactive decay is a \_\_\_\_\_
- ✓ If the product of a nuclear reaction is \_\_\_\_\_, it will also \_\_\_\_\_.

Nuclear \_\_\_\_\_ show how atoms \_\_\_\_\_.

**Example:**

When a nucleus loses an alpha particle, the atom's mass number will \_\_\_\_\_, and its atomic number will \_\_\_\_\_.

The bottom numbers  
(\_\_\_\_\_) on both  
sides \_\_\_\_\_.

The top numbers (\_\_\_\_\_) on  
both sides \_\_\_\_\_.

An Example Alpha Decay Equation

Alpha Decay

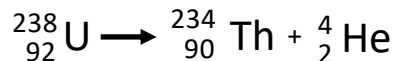


Diagram the above reaction.

**Practice:**

Write the nuclear equation for the alpha decay of radium-226.

Nuclear \_\_\_\_\_ show how atoms \_\_\_\_\_.

**Example:**

When a nucleus loses an beta particle, the atom's mass number will \_\_\_\_\_, and its atomic number will \_\_\_\_\_.

Notice: \_\_\_\_\_ →

An Example Beta Decay Equation

Beta Decay

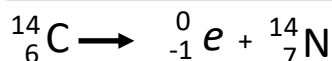
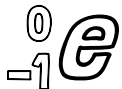


Diagram the above reaction.



# Nuclear Chemistry: Nuclear Equations

Main Idea	Notes
Beta Decay	<p>Beta Decay is the loss of _____ – a high energy _____.</p> <p>Write the nuclear equation for the beta decay of xenon-152.</p> <p><u>In the Nucleus:</u> a neutron ( _____ ) released an _____ leaving a _____.</p> <p>Therefore the mass _____ (lose <math>n^0</math> gain <math>p^+</math>), but with the gain of a <math>p^+</math> the atomic number _____.</p> <p><b>Practice:</b></p> <p>Potassium-40 decays by releasing a beta particle. Write the nuclear equation.</p>
Nuclear Equations	<p>In a problem, the words _____ refer to radiation given off – the particle will be on the _____ of the equation.</p> <p>In a problem, the words _____ refer to radiation taken in by the nucleus – the particle will be on the _____ of the equation.</p>
	<p><b>Partner Challenge</b> Aluminum-27 is bombarded by alpha particles and produces phosphorous-30 and one other particle. Write the nuclear equation.</p>
	<p><b>More Practice!</b></p> <p>Write the nuclear equation for the beta decay of francium-223.</p> <p>Positron Emission of potassium-40</p> <p>Cobalt-59 is bombarded with neutrons.</p> <p>Electron Capture of plutonium-239</p>
	<p><b>The BIG Challenge</b> Plutonium-239 can be produced by bombarding uranium-238 with alpha particles. How many neutrons will be produced as a product of this reaction?</p>
Gamma Rays	<p>Gamma rays are not _____ like alpha and beta particles.</p> <p>Gamma rays are _____ radiation with a very high frequency.</p> <p>When atoms _____ by emitting an alpha or beta particle to form a new atom, the nucleus of the new atom may still have too much energy to be completely _____.</p> <p>The _____ energy is emitted as gamma rays.</p>

