Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Chapter 10 Notes: Nuclear Chemistry**

1. **Radioactivity**: the process in which an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atomic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ emits charged particles of energy.

Draw atom:

Draw radioisotope (unstable):

* 1. The atoms of one element can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into atoms of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ element.
		1. **Example**: Uranium will decay into \_\_\_\_\_ different elements until it becomes \_\_\_\_\_\_\_\_ lead
		2. **Example:** Carbon-\_\_\_ decays into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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* 1. **Types of decays**:
		1. ***\_\_\_\_\_\_\_\_\_\_\_\_*** : Positive particle -\_\_\_\_\_ protons and \_\_\_\_\_\_\_ neutrons (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atom)
		2. ***\_\_\_\_\_\_\_\_\_\_\_\_\_***: an electron
		3. ***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***: a \_\_\_\_\_\_\_ of penetrating energy



* 1. The particles and energy can \_\_\_\_\_\_\_\_ bonds in \_\_\_\_\_\_\_.
		1. What does this mean for humans? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. It can be detected with \_\_\_\_\_\_\_\_\_\_\_ counters or film badges.
1. **Half-life:** the time required for \_\_\_\_\_\_\_\_\_ of a sample of a radioisotope to \_\_\_\_\_\_\_\_\_\_\_.

*If you 100 particles and* ***half-life is 10 years****, figure out the amount of particles after each half-life:*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Half-Life=0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 100 particles |  |  |  |  |  |  |

How many times can you cut a piece of paper in ½ ? \_\_\_\_\_\_



* 1. Rates are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Carbon-\_\_\_\_ is used to determine the \_\_\_\_ of an object.
1. **Strong Nuclear Force:** The \_\_\_\_\_\_\_\_\_ that holds neutrons and protons together in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	1. In unstable nuclei, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the nucleus the more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the isotope.
	2. When the strong nuclear force is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the repulsive \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ force, the isotope becomes unstable.
	3. All elements with more than \_\_\_\_\_\_\_\_ protons are unstable.
2. **Nuclear Fission**: the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an atomic nucleus into \_\_\_\_\_\_\_\_ smaller parts.
	1. Produces a tremendous amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Mass is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into Energy
		1. Used in nuclear power \_\_\_\_\_\_\_\_ & atomic \_\_\_\_\_\_\_\_
		2. E = \_\_\_\_\_\_\_\_\_
	3. **Chain Reactions**: when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ released during the \_\_\_\_\_\_\_\_ initial nucleus trigger a \_\_\_\_\_\_\_\_\_ of nuclear fissions.
		1. Used to make nuclear \_\_\_\_\_\_\_ and generate \_\_\_\_\_\_\_\_ plants
3. **Nuclear Fusion**: nuclei of \_\_\_\_\_\_ atoms combine to form a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ nucleus
	1. Produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. The \_\_\_\_\_\_\_\_\_\_ is powered by fusion of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into Helium
	3. Hydrogen \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**FUSION FISSION**

**H.1.P1-State Standard: Explain how the composition of the nucleus is related to isotopes and radioactivity.**