

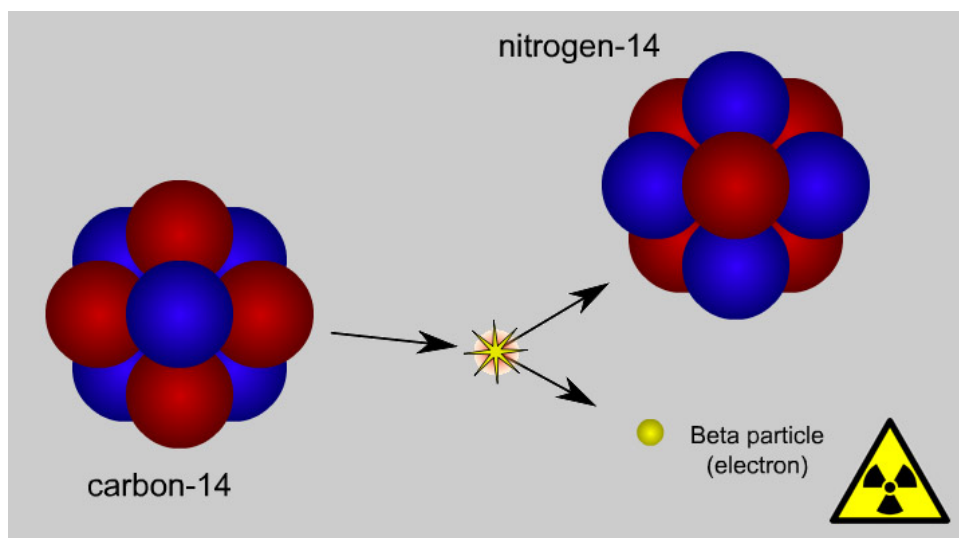
Name \_\_\_\_\_

## Chapter 10 Notes: Nuclear Chemistry

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

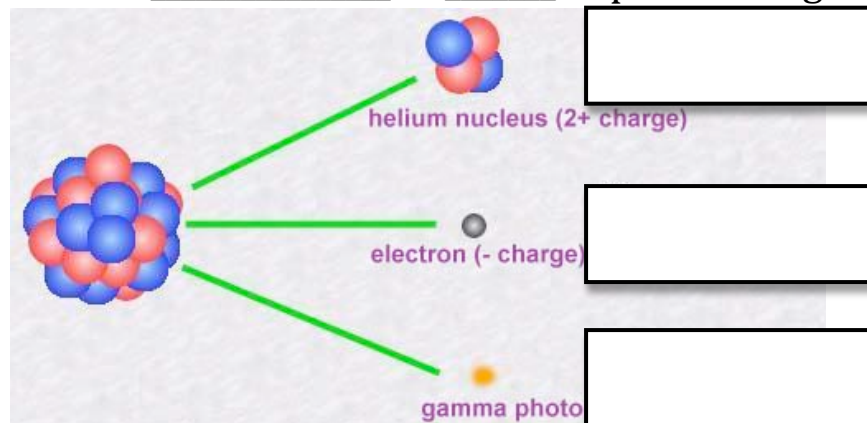
Draw atom:	Draw radioisotope (unstable):
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- a. The atoms of one element can \_\_\_\_\_ into atoms of a \_\_\_\_\_ element.
- Example:** Uranium will decay into \_\_\_\_\_ different elements until it becomes \_\_\_\_\_ lead
  - Example:** Carbon-\_\_ decays into \_\_\_\_\_



**b. Types of decays:**

- i. \_\_\_\_\_ : Positive particle - \_\_\_\_ protons and \_\_\_\_\_ neutrons (\_\_\_\_\_ atom)
- ii. \_\_\_\_\_: an electron
- iii. \_\_\_\_\_: a \_\_\_\_\_ of penetrating energy



- c. The particles and energy can \_\_\_\_\_ bonds in \_\_\_\_\_.
  - i. What does this mean for humans? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

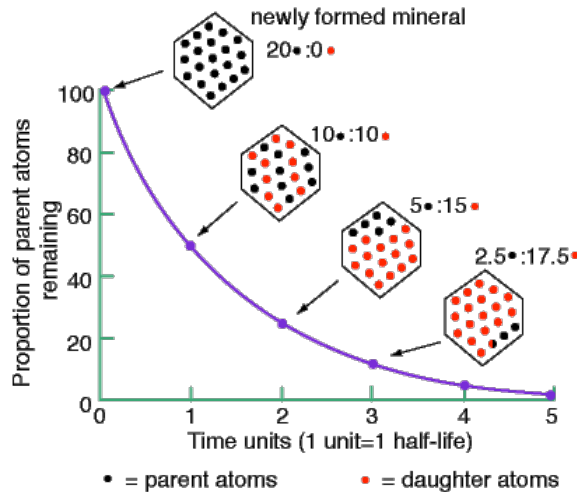
- d. It can be detected with \_\_\_\_\_ counters or film badges.

2. **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:*

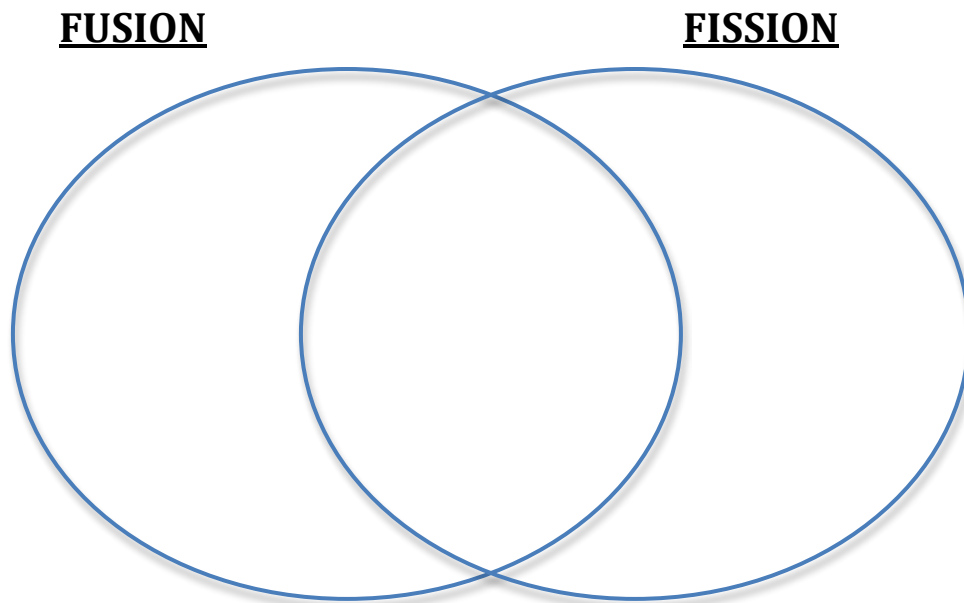
Half-Life=0	1	2	3	4	5	6
100 particles						

How many times can you cut a piece of paper in  $\frac{1}{2}$  ? \_\_\_\_\_



- a. Rates are \_\_\_\_\_
- b. Carbon-\_\_\_ is used to determine the \_\_\_ of an object.
3. **Strong Nuclear Force:** The \_\_\_\_\_ that holds neutrons and protons together in the \_\_\_\_\_.
  - a. In unstable nuclei, the \_\_\_\_\_ the nucleus the more \_\_\_\_\_ the isotope.
  - b. When the strong nuclear force is \_\_\_\_\_ by the repulsive \_\_\_\_\_ force, the isotope becomes unstable.
  - c. All elements with more than \_\_\_\_\_ protons are unstable.
4. **Nuclear Fission:** the \_\_\_\_\_ of an atomic nucleus into \_\_\_\_\_ smaller parts.
  - a. Produces a tremendous amount of \_\_\_\_\_
  - b. Mass is \_\_\_\_\_ into Energy
    - i. Used in nuclear power \_\_\_\_\_ & atomic \_\_\_\_\_
    - ii.  $E = \text{_____}$
  - c. **Chain Reactions:** when \_\_\_\_\_ released during the \_\_\_\_\_ initial nucleus trigger a \_\_\_\_\_ of nuclear fissions.
    - i. Used to make nuclear \_\_\_\_\_ and generate \_\_\_\_\_ plants

5. **Nuclear Fusion**: nuclei of \_\_\_\_\_ atoms combine to form a \_\_\_\_\_ nucleus
- Produces \_\_\_\_\_
  - The \_\_\_\_\_ is powered by fusion of \_\_\_\_\_ into Helium
  - Hydrogen \_\_\_\_\_



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