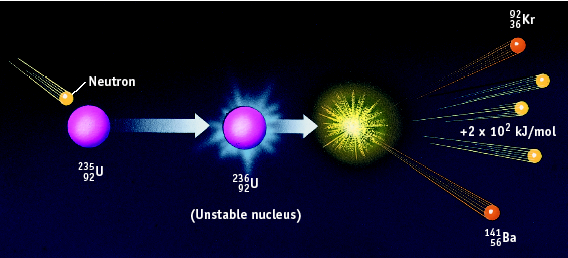
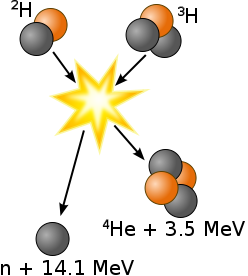
***Nuclear Fission***

* Fission - \_\_\_\_\_\_\_\_ of a nucleus.
  + Very \_\_\_\_\_\_\_ nucleus is split into \_\_ approximately \_\_\_\_\_\_ fragments.
  + \_\_\_\_\_\_\_ reaction releases several \_\_\_\_\_\_\_\_ which split more nuclei.
  + If controlled, \_\_\_\_\_\_ is released slowly (like in nuclear reactors). Reaction control depends on \_\_\_\_\_\_\_\_ the speed of the neutrons (\_\_\_\_\_\_\_\_\_ the reaction rate) and absorbing \_\_\_\_\_\_\_ neutrons (\_\_\_\_\_\_\_\_ the reaction rate).
* Examples – atomic bomb, current nuclear power plants
  + → + + \_\_\_\_\_\_\_\_\_\_\_\_\_

***Nuclear Fusion***

* Fusion - \_\_\_\_\_\_\_\_\_ of a nuclei
* Two light \_\_\_\_\_\_\_ combine to form a \_\_\_\_\_\_\_\_ heavier nucleus
* Does not occur under \_\_\_\_\_\_\_\_\_\_ conditions (+ repels +)
  + Advantages compared to \_\_\_\_\_\_\_
    - Inexpensive, No \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_
  + Disadvantages
    - requires \_\_\_\_\_\_ amount of energy to \_\_\_\_\_\_, \_\_\_\_\_\_\_\_ to control
* Examples – energy output of stars, hydrogen bomb, future nuclear power plants
  + + → + neutron + \_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Half-Life***

* Half Life is the \_\_\_\_ required for \_\_\_\_ of a radioisotope’s \_\_\_\_\_\_ to decay into its \_\_\_\_\_\_\_\_\_.
  + For any radioisotope,

|  |  |
| --- | --- |
| **# of ½ lives** | **% Remaining** |
| 0 | 100% |
| 1 | 50% |
| 2 | 25% |
| 3 | 12.5% |
| 4 | 6.25% |

* For example, suppose you have 10.0 grams of strontium – 90, which has a half life of 29 years. How much will be remaining after x number of years?
  + You can use a table:
  + Or an equation!

|  |  |  |
| --- | --- | --- |
| **# of ½ lives** | **Time (Years)** | **Amount Remaining (g)** |
| 0 | 0 | 10 |
| 1 | 29 | 5 |
| 2 | 58 | 2.5 |
| 3 | 87 | 1.25 |

* Example 1: If gallium – 68 has a half-life of 68.3 minutes, how much of a 160.0 mg sample is left after 1 half life? \_\_\_\_\_\_\_\_ 2 half lives? \_\_\_\_\_\_\_\_\_\_

3 half lives? \_\_\_\_\_\_\_\_\_\_

* Iodine-131 is a radioactive isotope with a half-life of 8 days. How many grams of a 64 g sample of iodine-131 will remain at the end of 8 days? \_\_\_\_\_\_\_\_
* How many grams of a 64 g sample of iodine-131 will remain at the end of 32 days? \_\_\_\_\_\_\_\_