|  |  |  |  |
| --- | --- | --- | --- |
|  | **Alpha Particle Emission** | **Beta Particle Emission** | **Gamma Ray Emission** |
| **Symbol** |  |  |  |
| **Mass** | Heavy | Light | No mass |
| **How it changes the nucleus** | * Decreases the mass number by 4
* Decreases the atomic number by 2
 | * Converts a neutron into a proton
* Increases the atomic number by 1
 | * No change to nucleus numbers
* Release of energy
 |
| **Penetration** | Low | Medium | High |
| **Protection provided by** | Skin | Paper, clothing | Lead, thick concrete |
| **Danger** | Low | Medium | High |





**R-14**

**Half Life Equation**

AE = amount ending
AS = amount starting
n = number of half lives

**# of Half Lives**

n = number of half-lives
t = time that has passed
h = length of a half life

**% still radioactive or % decayed**

AE = amount ending
AS = amount starting
n = number of half lives

**Solving for t, or h**

*Same as this version:*

Simply isolate the variable you are trying to solve for