

## Quiz.

1. A sphere of pure U-235 will explode if it is
  - a) hot enough.
  - b) shaken hard enough.
  - c) big enough.
  - d) small enough.
2. When neptunium emits a beta particle the result is
  - a) a different isotope of neptunium.
  - b) uranium.
  - c) plutonium.
  - d) lead.
3. A nucleon has more mass when it is
  - a) inside the nucleus.
  - b) outside the nucleus.
  - c) both the same
4. The nucleus with the greatest mass is
  - a) hydrogen.
  - b) iron.
  - c) lead.
  - d) uranium.
  - e) plutonium.
5. A proton has the greatest mass in the nucleus of
  - a) hydrogen.
  - b) iron.
  - c) lead.
  - d) uranium.
  - e) plutonium.
6. A nucleon has the least mass in the nucleus of
  - a) hydrogen.
  - b) iron.
  - c) lead.
  - d) uranium.
  - e) plutonium.
7. When two light atoms fuse together, mass
  - a) is converted to kinetic energy of neutrons.
  - b) is created from energy or other forms.
  - c) remains the same.
  - d) is gained.

8. A nuclear process that has relatively few radioactive by-products is
  - a) fission.
  - b) fusion.
  - c) Both of these have comparable radioactive by-products.
  
9. Energy released by the sun results from the process wherein atomic nuclei
  - a) break apart.
  - b) combine.
  - c) both of these
  - d) none of these

Answer Key.

1. c)

Beyond the critical mass, fission material can spontaneously explode.

2. c)

In beta decay one of the neutrons in the atomic nucleus decays into a proton and spits out an electron. Because of this, the atomic number will increase by one. If you look at the Periodic Table of Elements you can see that plutonium follows neptunium.

3. b)

The amount of energy that goes into freeing a nucleon from its atomic nucleus is added to the nucleon as additional mass.

4. e)

Plutonium has the highest number of nucleons of the given elements.

5. a)

Hydrogen has the greatest *mass per nucleon*.

6. c)

Iron has the least mass per nucleon.

7. a)

The products of nuclear fission are less than the sum of their parts because some of the mass is converted into kinetic energy.

8. b)

The by-products of nuclear fusion have relatively light atomic nuclei compared to the by-products of nuclear fission.

9. b)

The sun uses thermonuclear fusion to produce energy.