**Worksheet #5**

**Name: Period: Seat#:**

**DO NOT LEAVE THIS UNTIL THE LAST MINUTE! THIS IS A BIG ASSIGNMENT!**

**Directions:** In this web quest, you will explore nuclear chemistry in real-world situations. You will learn about fusion and fission, types of radiation, its effects on humans, and how nuclear power is produced as well as its repercussions and disasters.

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| **Link #1 - Introduction to Atomic Physics -** [**https://tinyurl.com/5fxkyn8c**](https://tinyurl.com/5fxkyn8c) | | | | | | | |
| 1. What is the smallest particle of matter that maintains the properties of that element? | | | 1. Sir Ernest Rutherford concluded what two things about atomic structure?  Include some sketched pictures to help describe. | | | | |
| 1. The diameter of an atom is usually measured in Angstroms. One Angstrom equals how many meters? | | | | 1. How many Angstroms across are most atoms? | | | |
| 1. Fill in the chart showing the three basic subatomic particles, the charges on the particles, and who discovered each particle. | | | | | | | |
|  | Charge | Mass | | | Who discovered it | | Where is it? |
| Proton |  |  | | |  | | * Nucleus * Orbitals outside nucleus |
| Neutron |  |  | | |  | | * Nucleus * Orbitals outside nucleus |
| Electron |  |  | | |  | | * Nucleus * Orbitals outside nucleus |
| 1. The number of which subatomic particle determines the name/identity of the element? | | | 1. The number and arrangement of which subatomic particle determines most of the atom’s properties? | | | 1. Protons and neutrons are composed of even smaller subatomic particles called what? | |
| 1. Define isotopes: | | | 1. Fill in the blanks: Isotopes have the same    properties but very different   properties. | | | 1. Most isotopes are stable but some are: | |
| 1. What is binding energy? | | | 1. What does binding energy determine? | | | 1. E = mc2, explains the relationship between the binding energy and mass defect. It shows that a small amount of:    can produce a large amount of: | |
| 1. Define radioactivity: | | | 1. Name the three scientists that discovered and researched radioactivity: | | | 1. List the three most common types of radioactive decay: | |
| 1. Define half-life: | | | 1. List what is emitted during each decay type:   - Alpha:  - Beta:  - Spontaneous fission: | | | | |
| **Link #2 - Nuclear Power -** [**https://tinyurl.com/y67jfcrh**](https://tinyurl.com/y67jfcrh) | | | | | | | |
| 1. Discuss the release of energy by fission. | | | | | What is meant by uranium enrichment? | | |
| 1. Explain the role of control rods in a fission reaction. | | | | | 1. What is critical mass? | | |
| **Link #3 - Hydrogen Bomb -** [**https://tinyurl.com/9xh2vkcf**](https://tinyurl.com/9xh2vkcf) | | | | | | | |
| 1. What nuclei are fused in the nuclear reaction of a hydrogen bomb? | | | 1. What function does styrofoam perform in a hydrogen bomb? | | | 1. Why is a fission bomb needed as part of an H-bomb? | |

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| **Link #4 - Nuclear Weapons -** [**https://tinyurl.com/2cdzzrjy**](https://tinyurl.com/2cdzzrjy) | | |
| 1. Describe how an atom bomb works. | | 1. Describe how radioactive fallout is produced by the explosion of a bomb. |
| 1. What are the health consequences of radioactive fallout particles? | | 1. Briefly portray a nuclear winter scenario. |
| **Link #5 - Effects of Radiation on the Human Body -** [**https://tinyurl.com/yc7ep3zf**](https://tinyurl.com/yc7ep3zf) | | |
| **1.** | **2.** | |
| **3.** | **4.** | |
| **5.** | **6.** | |
| **7.** | **8.** | |
| **9.** | **10.** | |
| **What are the 5 most interesting, important, relevant things you learned?** | | |
| **1.** | | |
| **2.** | | |
| **3.** | | |
| **4.** | | |
| **5.** | | |