Dougherty Valley HS Chemistry
Nuclear Chem WebQuest

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.

Link #1 - Introduction to Atomic Physics - https://tinyurl.com/5fxkyn8c

1) What is the smallest particle of matter that maintains the properties of that element?

2) Sir Ernest Rutherford concluded what two things about atomic structure? Include some sketched pictures to help describe.

3) The diameter of an atom is usually measured in Angstroms. One Angstrom equals how many meters?

4) How many Angstroms across are most atoms?

5) 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

6) The number of which subatomic particle determines the name/identity of the element?

7) The number and arrangement of which subatomic particle determines most of the atom's properties?

8) Protons and neutrons are composed of even smaller subatomic particles called what?

9) Define isotopes:

10) Fill in the blanks:
Isotopes have the same _____ properties but very different _____ properties.

11) Most isotopes are stable but some are:

12) What is binding energy?	**13)** What does binding energy determine?	**14)** $E = mc^2$, explains the relationship between the binding energy and mass defect. It shows that a small amount of: can produce a large amount of:
15) Define radioactivity:	**16)** Name the three scientists that discovered and researched radioactivity:	**17)** List the three most common types of radioactive decay:
18) Define half-life:	**19)** List what is emitted during each decay type: - Alpha: - Beta: - Spontaneous fission:	

Link #2 - Nuclear Power - https://tinyurl.com/y67jfcrh

20) Discuss the release of energy by fission.	What is meant by uranium enrichment?
21) Explain the role of control rods in a fission reaction.	**22)** What is critical mass?

Link #3 - Hydrogen Bomb - https://tinyurl.com/9xh2vkcf

23) What nuclei are fused in the nuclear reaction of a hydrogen bomb?	**24)** What function does styrofoam perform in a hydrogen bomb?	**25)** Why is a fission bomb needed as part of an H-bomb?

Link #4 - Nuclear Weapons - https://tinyurl.com/2cdzzrjy	
26) Describe how an atom bomb works.	**27)** Describe how radioactive fallout is produced by the explosion of a bomb.
28) What are the health consequences of radioactive fallout particles?	**29)** Briefly portray a nuclear winter scenario.

Link #5 - Effects of Radiation on the Human Body - 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.