

Name:

Nuclear Chemistry Webquest

In this webquest, 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. Use the links (each header) to help answer the questions. Some websites have more than one page. Please type on this form or complete on separate paper.

Introduction to Atomic Physics

1. _____ is the smallest particle of matter that maintains the properties of that element.
2. Sir Ernst Rutherford concluded what two things about atomic structure:
 - a. _____
 - b. _____
3. Niels Bohr contributed what to atomic structure theory:
 - a. _____
4. What is the unit of measure for the diameter of atoms? _____
5. What is the unit of measure from above equal to? _____
6. An atom consists of three basic subatomic particles. List each below. Include its charge and who discovered it.

Subatomic Particles	Charge	Who discovered it?

7. The number of which subatomic particles determines the chemical element that it is? _____
8. The number and arrangement of which subatomic particle determines most of the atom's properties?
9. Protons and neutrons are composed of even smaller subatomic particles called _____.

10. Define isotopes: _____

11. Isotopes have the same _____ properties but very different _____ properties.

12. Most isotopes are stable but some are _____

13. What is binding energy? _____

14. What does binding energy determine?

15. Einstein's famous equation of relativity, $E = mc^2$, explains the relationship between the binding energy and mass defect. It explains that a small amount of _____ can produce a large amount of _____.

16. Define radioactivity:

17. Name the three scientists that discovered and researched radioactivity:

a. _____

b. _____

c. _____

18. List the three most common types of radioactive decay:

a. _____

b. _____

c. _____

19. Define half-life:

20. List what is emitted during each decay type:

a. Alpha: _____

b. Beta: _____

c. Spontaneous fission: _____

Nuclear Power

21. Discuss the release of energy by fission.

22. What is meant by uranium enrichment?

23. Explain the role of control rods in a fission reaction.

24. What is critical mass?

Hydrogen Bomb

25. What nuclei are fused in the nuclear reaction of a hydrogen bomb?

26. What function does styrofoam perform in a hydrogen bomb?

27. Why is a fission bomb needed as part of an H-bomb?

Nuclear Weapons

28. Describe how an atom bomb works.

29. Describe how radioactive fallout is produced by the explosion of a bomb.

30. What are the health consequences of radioactive fallout particles?

31. Briefly portray a nuclear winter scenario

[The Manhattan Project](#)

32. What was the Manhattan project?

33. What prompted President Franklin D Roosevelt to begin researching atomic energy?

34. Who was the primary scientist that led the Manhattan Project?

Go to <http://www.atomicarchive.com/Effects/radeffects.shtml>

List at least ten things that radiation can do to the human body.