

1. What does it mean for an element to be radioactive?
2. How does an element change during nuclear decay?
3. What is nuclear radiation?
4. Draw the chemical symbol for an alpha particle, a beta particle, and a gamma ray.
5. List the types of radiation from least to most penetrating by giving an example of materials that block them.
6. Write a balanced nuclear equation for the alpha decay of radium-226.
7. Write a nuclear equation that describes the beta decay of hydrogen-3.

8. Write a balanced nuclear equation for the alpha decay of thorium-232.

9. Determine the product of beta decay for strontium-90.

10. Describe 2 sources of background radiation we are exposed to on a daily basis.

11. How does nuclear radiation pose a threat to our health? Also, give an example how it can be beneficial to our health.

12. What is meant by an atom's half-life?

13. Why is Carbon-14 used in dating artifacts less than 50,000 years old?

14. If a radioactive sample has decayed until only one-eighth of the original sample remains unchanged, how many half-lives have elapsed?
15. A certain isotope of technetium has a half-life of six hours. If it is given to a patient as part of a medical procedure, what fraction of the isotope remains in the body after one day?
16. How do scientists perform artificial transmutations.
17. List 2 reasons why particle accelerators are important.
18. Define strong nuclear force-
19. Explain the difference between strong force and electrical force in a nucleus.

20. What is the meaning of $E = mc^2$?

21. What property of fission makes it a useful reaction?

22. What must happen in order for a nuclear reaction to occur?

23. Why is a cooling system necessary in a nuclear reaction?

24. List 2 pros and 2 cons of nuclear energy.

25. How do the products of a fusion reaction differ from the products of a fission reaction?

26. Describe the fusion reaction that occurs on the sun.