

## Physical Science Worksheet: Nuclear Energy

### Short Answer

1. How does nuclear fusion create new elements inside stars?
2. The sun is made up mostly of \_\_\_\_\_.
3. The half-life of calcium-47 is about 5 days. Starting with 64 g of this isotope, what would be the amount remaining after 20 days?
4. Fusion reactions require \_\_\_\_\_.
5. Which radioactive particle generally has the lowest penetrating ability?
6. Which radioactive particle has the greatest penetrating ability?
7. To use radioactive dating for a substance, you must know the substance's \_\_\_\_\_.
8. What device uses controlled nuclear fission to produce new radioactive substances and energy?
9. The energy as heat produced by a reactor is used to \_\_\_\_\_.
10. The isotope strontium-90 is produced during the testing of nuclear weapons. If 100.0 mg of strontium-90 was released in the atmosphere in 1960, how much of the radioisotope remains 85 years later? The half life of strontium-90 is 29 years.
11. A radioactive compound Cobalt-60 has a half-life of 5272.0 years. What will be the amount remaining in a 100.0-g sample after 1600.0 years?
12. Why are cadmium or boron rods used in a nuclear fission reactor?
13. During the process of electron capture, an electron from outside the nucleus joins with a proton to form \_\_\_\_\_.
14. One product of all nuclear fission reactions is \_\_\_\_\_.
15. One of the most serious problems surrounding the use of nuclear power plants is \_\_\_\_\_.
16. What does the 4 in  ${}^4_2\text{He}$  represent?
17. What does the 101 in  ${}^{256}_{101}\text{Md}$  represent?
18. What does the 218 in polonium-218 represent?
19. The energy released in a nuclear reaction comes from \_\_\_\_\_.
20. Rank nuclear radiation from most massive to least massive.
21. Which radioactive decay process does *not* reduce the atomic number of a nuclide?
22. Define Alpha particle.
23. Define Beta particle.
24. Define Gamma rays.
25. How does half-life relate to each radioactive substance?
26. How are elements artificially transmuted?
27. In an artificial transmutation, what is required to bombard nuclei with positively charged alpha particles, protons, and other ions?
28. Some artificial radioactive isotopes can be prepared by bombarding stable nuclei with \_\_\_\_\_.
29. Which radioactive particle travels fastest?
30. Radioactive tracers are used to \_\_\_\_\_.
31. Radioactive tracers in fertilizers can be used to measure \_\_\_\_\_.
32. Which process produces nuclei of lower mass than the reactants?
33. Scientists are investigating the possibility of containing fusion reactions within \_\_\_\_\_.