

Chapter 20 Radioactivity and Nuclear Reactions Worksheet 2

Name _____

Matching

Block _____

- | | |
|---------------------|---|
| 1. Geiger counter | A. amount of fissionable material required so that each fission reaction produces approximately one more fission reaction |
| 2. transmutation | B. electron with an atomic mass of 0 and a -1 electrical charge that is emitted at high speed from a decaying atomic nucleus |
| 3. alpha particle | C. process of splitting a large atomic nucleus into two nuclei with smaller masses |
| 4. half-life | D. process of nuclear decay that takes place when the strong force is not able to hold unstable nuclei together permanently |
| 5. gamma ray | E. a type of tool that uses water or ethanol vapor to detect alpha and beta particle radiation |
| 6. tracer | F. process of changing one element to another through radioactive decay |
| 7. beta particle | G. particle with a +2 electrical charge and atomic mass of 4 that is made of two protons and two neutrons and is emitted from a decaying atomic nucleus |
| 8. nuclear fusion | H. amount of time it takes for half the nuclei in a sample of a radioactive isotope to decay |
| 9. critical mass | I. a radioisotope that is used to find or keep track of molecules in an organism |
| 10. strong force | J. process of fusing together two atomic nuclei with low masses to form one nucleus with a larger mass |
| 11. bubble chamber | K. ongoing series of fission reactions |
| 12. nuclear fission | L. force that acts between protons and neutrons in an atomic nucleus and keeps them together |
| 13. cloud chamber | M. electromagnetic wave with no mass and no charge that travels at the speed of light and is usually emitted with alpha or beta particles |
| 14. radioactivity | N. device that measures radioactivity by producing an electric current when radiation is present; emits a clicking sound or flashing light |
| 15. chain reaction | O. a type of tool that uses superheated liquid to detect and monitor the paths of nuclear particles |

Multiple Choice

- 1) What keeps particles in a nucleus together?
 - a) strong force
 - b) repulsion
 - c) electrical force
 - d) atomic glue
- 2) What are the atomic numbers of elements that have been produced artificially?
 - a) greater than 92
 - b) greater than 83
 - c) 83 through 92
 - d) 90 through 111
- 3) What is an electron that is produced when a neutron decays called?
 - a) an alpha particle
 - b) a beta particle
 - c) gamma radiation
 - d) a negatron
- 4) Which of the following describes an isotope's half-life?
 - a) a constant time interval
 - b) a varied time interval
 - c) an increasing time interval
 - d) a decreasing time interval
- 5) For which of the following could carbon-14 dating be used?
 - a) a Roman scroll
 - b) a marble column
 - c) dinosaur fossils
 - d) rocks

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- 6) Which device would be most useful for measuring radiation in a nuclear laboratory?
- a cloud chamber
 - a Geiger counter
 - an electroscope
 - a bubble chamber
- 7) Which term describes an ongoing series of fission reactions?
- chain reaction
 - decay reaction
 - positron emission
 - fusion reaction
- 8) Which process is responsible for the tremendous energy released by the Sun?
- nuclear decay
 - nuclear fission
 - nuclear fusion
 - combustion
- 9) Which radioisotope acts as an external source of ionizing radiation in the treatment of cancer?
- cobalt-60
 - carbon-14
 - gold-198
 - technetium-99
- 10) Which of the following is a common medical application of radiation?
- assist breathing
 - ease pain
 - heal broken bones
 - treat cancer
- 11) Gamma rays _____.
- have no mass and no charge
 - have mass but no charge
 - have no mass but have charge
 - have mass and charge
- 12) During nuclear fission, a nucleus _____.
- grows
 - divides
 - shrinks
 - combines with another
- 13) Only nuclei with _____ atomic numbers can undergo fission.
- small
 - even
 - odd
 - large
- 14) What is the term for an ongoing series of nuclear reactions?
- fission
 - chain reaction
 - fusion
 - nuclear

Answer the following questions

- What is the effect on the mass number and charge of a nucleus when it loses an alpha particle?
- How do the mass number and charge of a nucleus change when it emits a gamma ray?
- Why can't carbon-14 be used to determine the age of fossils that are several hundred thousand years old?