

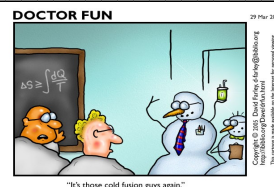
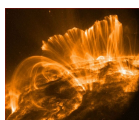
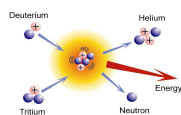
Name: _____

Period: _____

Due Date: _____

Chapter 7: The discovery of radiation and nuclear chemistry

1. Nuclear chemistry is different than normal chemistry because the changes take place in the _____ of the atom.
2. What particles make up the nucleus of the atom? _____ and _____
3. An isotope of an element has the same _____ but different number of _____. This makes this variety _____ or _____ than the more common variety of this element.
4. JJ Thomson discovered the _____ using a vacuum tube connected to a battery.
5. These cathode tubes also produce _____. _____ are not particles, but are like radio waves or light waves but have much shorter wavelengths and so much higher energy. They can _____ through matter.
6. Within a short time of their discovery, _____ were used for _____.
7. Radioactivity is a _____ process.
8. A French chemist and photographer Henri Becquerel discovered _____ when he was trying to _____ minerals of _____.
9. Ernest Rutherford named the first 3 types of _____. The least penetrating type is called _____. It has a _____ charge and a mass of _____. This is the same thing as a _____ only without _____. The next most penetrating type of radioactivity is the _____ particle (named after the second letter of Greek alphabet). It is an _____ being shot out of a nucleus at high speed. Gamma radiation is _____ it is super short wave length and highly energetic.
10. The release of energy and particles from the nucleus is called _____.
11. Many isotopes are not radioactive. They can be perfectly _____.



12. When nuclei give off either alpha or beta _____ . They change into a different _____ because the number of _____ changes. This can be called radioactive _____ .
13. _____ Radiation is strong enough to knock electrons off of other atoms. This forms _____ (atoms with a + or a - charge)
14. When writing nuclear decay reactions we must obey the Law of _____ of _____ and the Law of _____ of _____ .
15. In an atomic symbol, the subscript is the number of _____ or the _____ on the periodic table. It always must match the chemical _____ .
16.
$${}_{84}^{210}\text{Po} \rightarrow {}_{82}^{206}\text{Pb} + \underline{\hspace{2cm}}$$
17. By nuclear process it is possible for a radioactive element to _____ into another element. This the ancient alchemist's dream. It is now possible to turn a few atoms of lead into gold. It would take a nuclear accelerator and millions of \$, but it can be done.
18. In one _____ , one half the amount of radioactive material will decay or turn into another element called a _____ product.
19. If an archaeological sample was found to have 1/16 of the original carbon in it, it would take _____ half-lives
20. When nuclear fission or nuclear fusion takes place, some of the _____ holding the atom together goes missing. This is known as the _____ defect.
21. This mass is converted into pure energy . The amount of energy can be calculated by Einstein's famous equation _____ = _____ .
22. Fusion takes light isotopes and makes them into _____ atoms. This releases more energy per atom than _____ .
23. Stars get their energy from _____ and make new _____ .
24. Stars die out when they produce _____ . It can't be _____ or _____ to get energy out.
25. _____ is the name of splitting heavy isotopes to form lighter ones. This is the power behind the _____ bomb and _____ power plants.