

.. **Concept Review:** Complete the passages or statements with the using the word banks.  
You may OR may NOT use all of the words and some you may use twice.

<del>alpha particle</del> <sup>4</sup> / <sub>2</sub> α	<del>radioactivity</del>	<del>gamma ray</del> <sup>0</sup> / <sub>0</sub> γ
<del>beta particles</del> <sup>0</sup> / <sub>-1</sub> β	<del>radiation</del>	<del>X ray</del>

The discovery of the (1) XRAY in 1895 by Wilhelm Roentgen opened a whole new field of research: Among those who worked in this new field were Pierre and Marie Curie. The Curies discovered that some forms of matter give off (2) radiation, a combination of particles and energy. Marie Curie named this process (3) radioactivity. Radiation consist of particles. The form of radiation containing the heavier particle is made up of helium nuclei called (7) alpha. The form of radiation containing the lighter particle consists of electrons called (8) beta.

radiation	less	<del>lead</del>	<del>zero</del>	<del>paper</del>
<del>minus one</del>	<del>plus two</del>	alpha particle	beta particle	<del>gamma ray</del>
penetrate		Ernest Rutherford		<del>aluminum foil</del>

- 9) The form of nuclear radiation that has the greatest penetrating power is the gamma
- 10) The three types of radiation were first identified by Ernest Rutherford
- 11) Each alpha particle carries an electric charge of +2, and can be stopped by a piece of paper.
- 12) Each beta particle carries an electric charge of -1, are 100x more penetrating than alpha, and can damage living tissue, but can be stopped by a piece of thick aluminum foil
- 13) Each gamma ray carries an electric charge of zero, and can only be stopped by thick layers of lead or meters of concrete. Gamma rays cause cellular damage.

# FISSION vs. FUSION

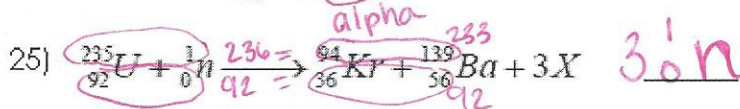
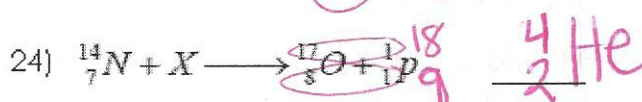
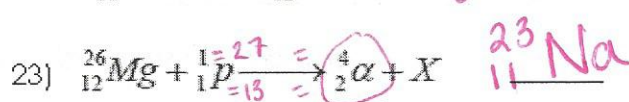
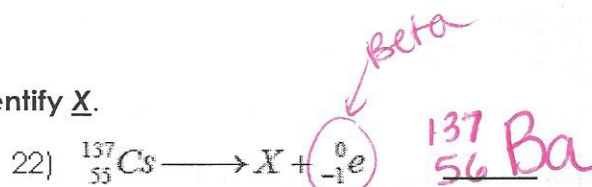
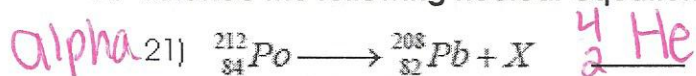
energy	fission	fusion	joining
larger	radioactive waste	split apart	sun

An atom's nucleus can be 14) Split apart into smaller nuclei in a process called 15) fission. When this splitting of the atom is done, a tremendous amount of 16) energy is released. This produces both heat and light energy. This energy, when let out slowly, can be harnessed to generate electricity. When it is let out all at once, it can make a tremendous explosion in an atomic bomb.

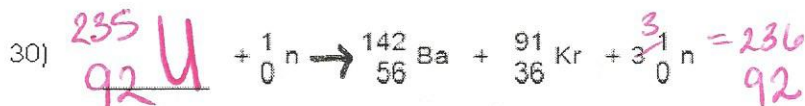
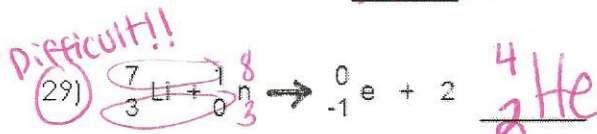
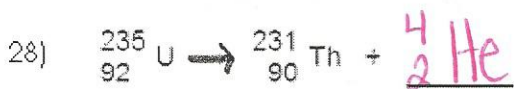
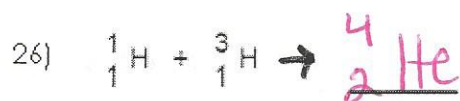
Another form of nuclear energy is called fusion. Fusion means smaller nuclei (the plural of nucleus) to make a 17) larger nucleus. This uses nuclear fusion of hydrogen atoms into helium atoms. This gives off heat and light and other radiation. When two types of hydrogen atoms, deuterium and tritium, combine to make a helium atom and an extra particle called a neutron plus energy, this process is called 18) fusion. Scientists have been working on controlling nuclear fusion for a long time, trying to make a fusion reactor to produce electricity. But they have been having trouble learning how to control the reaction in a contained space. (Fusion can also be used to make nuclear bombs). What's better about nuclear fusion is that it creates less 19) radioactive waste than fission, and its supply of fuel seems nearly unlimited. Fusion occurs on the 20) SUN.

## II. Balancing Nuclear Equations:

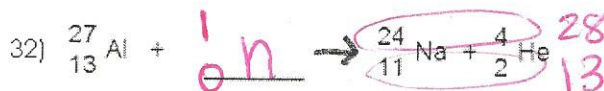
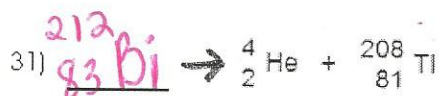
### A. Balance the following nuclear equations and identify X.



### B. Determine the missing particle or atom missing in the nuclear equations below.







### III. Chemical Equations Review:

#### A. Diatomic Molecules:

35) List all 7 Diatomic Molecules

Br<sub>2</sub> I<sub>2</sub> N<sub>2</sub> Cl<sub>2</sub> H<sub>2</sub> O<sub>2</sub> F<sub>2</sub>

B. List the type of reaction, predict the products of the following reactions and balance

