Name _____ Period _____ Date _____

Unit 6 5

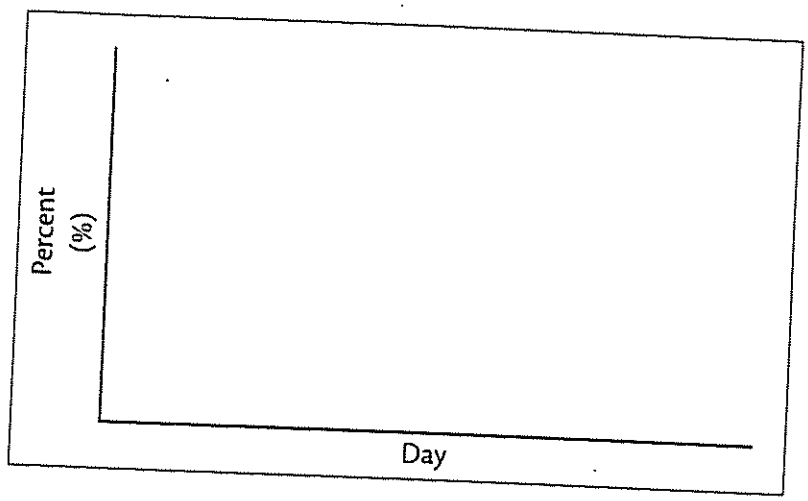
C.1 BUILDING SKILLS SUPPLEMENT: HALF LIFE

1. The half-life of sulfur-38 is 2.87 hours.

   a. After 8.61 hours, what percent of the original radiation is left?

   b. If 3.125% of the original radiation is being emitted, how many half-lives have passed?

2. Calcium-47 has a half-life of 4.5 days. Graph the decay of a sample for 7 half-lives, with time (days) on the *x* axis and amount of original radiation (%) on the *y* axis.



   a. How much calcium-47 radiation remains after two weeks?

   b. When will the calcium radiation be 10% of the original value?

   c. How much of the sample will have decayed after 7 half-lives?

3. If 1250 counts of a 10 000 count radioactive sample is being emitted after one day, what is the half-life of the element?

Name _____ Period _____ Date _____

Unit 6

C.4 BUILDING SKILLS SUPPLEMENT

Write a balanced equation for each of the following nuclear reactions.

Example: Oxygen-16 plus a neutron results in the formation of another element and the release of an alpha particle.

$$^{16}_{8}O + ^{1}_{0}n \rightarrow ^{13}_{6}C + ^{4}_{2}He$$

1. Boron-10 plus a neutron results in the formation of another element and the release of an alpha particle.

2. Beryllium-9 plus a proton results in the formation of another element and the release of an alpha particle.

3. Einsteinium-253 plus an alpha particle results in the formation of another element and the release of a neutron.

4. Lithium-7 plus a proton results in the formation of another element and the release of a neutron.

5. Plutonium-241 plus another particle results in the formation of plutonium-242 and the release of gamma rays.

6. Argon-40 plus an alpha particle produces another element and the release of a neutron.

7. Einsteinium-252 was bombarded by a berylium-9 atom, producing a new element and three neutrons.

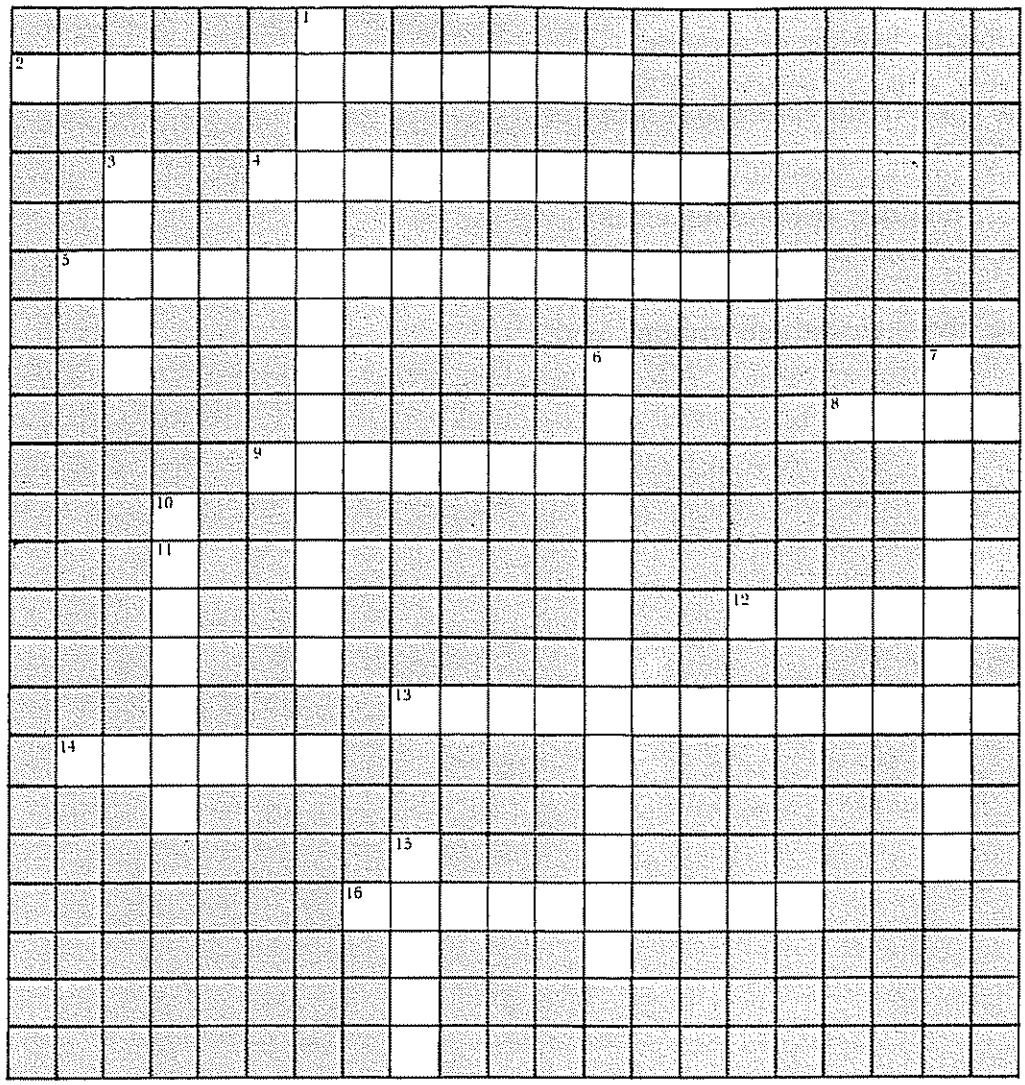
8. Plutonium-239 can be produced by bombarding uranium-238 with an alpha particle. Some neutrons are released.

Name _____ Class _____ Date _____

Chapter 6
Nuclear Energy

Crossword

Using the clues below, fill in the spaces of the puzzle with the correct words.



Across

2. The process by which the nucleus of an atom changes so that a new element forms

4. The process in which the nucleus of a radioactive atom releases 2 protons and 2 neutrons

5. The spontaneous breakdown of an unstable nucleus

8. Type of decay in which a neutron breaks down into a proton and an electron

Down

1. The device in which controlled fission reactions are produced

3. Basic particle of which all nuclear subatomic particles are made

6. Cloudlike region around the nucleus of an atom

7. Binds protons together in the atomic nucleus

Across (cont.)

9. The time it takes for half the atoms in a sample of a radioactive element to decay

11. An element with the same number of protons but a different number of neutrons

12. What is locked within the nucleus of an atom during the binding of protons

13. The name given to the continuous series of fission reactions

14. The _____ number, or the number of protons in an atom's nucleus

16. The sum of the neutrons and protons in a nucleus

Down (cont.)

10. Reaction in which an atomic nucleus splits into two smaller nuclei of roughly equal mass

15. Type of decay that accompanies alpha and beta decay and gives off enormous amounts of energy