

**Chapter 12 Geologic Time**

**Section 12.3 Dating with Radioactivity**

*This section explains how radioactivity is used to determine the age of rocks.*

**Reading Strategy**

**Monitoring Your Understanding** Preview the key concepts, topics, headings, vocabulary, and figures in this section. List two things you expect to learn about each. After reading, state what you learned about each item you listed. For more information on this Reading Strategy, see the **Reading and Study Skills** in the **Skills and Reference Handbook** at the end of your textbook.

What I expect to learn	What I learned
1.	
2.	

**Basic Atomic Structure**

1. Is the following sentence true or false? Isotopes of the same element have different mass numbers, or different numbers of neutrons.  
\_\_\_\_\_

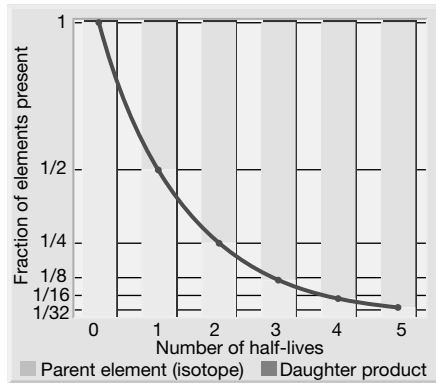
**Radioactivity**

2. The process by which unstable nuclei spontaneously decay is known as \_\_\_\_\_.
3. Circle the letter of the final result of radioactive decay.
  - a. parent element
  - b. radioactive isotope
  - c. stable daughter product
  - d. unstable daughter product
4. Circle the letter of what decays first during radioactive decay.
  - a. parent element
  - b. stable isotope
  - c. stable daughter product
  - d. unstable daughter product

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### Half-Life

Use the graph to answer the following three questions.



- After one half-life, what fraction of the parent element has decayed to a daughter product? \_\_\_\_\_
- After three half-lives, what fraction of the daughter product has formed? \_\_\_\_\_
- How many half-lives must pass before only 1/32 of the parent element remains undecayed to a daughter product? \_\_\_\_\_

### Radiometric Dating

- The procedure called \_\_\_\_\_ provides a way to determine the ages of rocks that contain certain radioactive isotopes.
- Is the following sentence true or false? A radioactive isotope decays at a varying rate from the time it forms. \_\_\_\_\_
- What begins to happen to radioactive uranium as soon as a mineral containing it crystallizes from magma? \_\_\_\_\_
- What conditions are needed for an accurate radiometric date to be obtained from a mineral sample? \_\_\_\_\_

### Dating with Carbon-14

- Circle the letter of the ratio of two substances that is compared in a sample of a dead organism during radiocarbon dating.
  - carbon-12 to uranium 238
  - carbon-14 to carbon-12
  - uranium-238 to lead-206
  - uranium-238 to carbon-12

### Importance of Radiometric Dating

- Is the following sentence true or false? Radiometric dating has been used to determine the age of Earth rocks as old as 4 billion years. \_\_\_\_\_