

**Elements and the Periodic Table** ▪ *Guided Reading and Study*

## Radioactive Elements

*This section explains how radioactive elements change over time and describes how radioactive materials are used.*

### Use Target Reading Skills

*After you read the section, write a definition of each Key Term in your own words in the space below.*

radioactive decay:

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radioactivity:

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alpha particle:

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beta particle:

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gamma radiation:

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tracer:

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### Radioactivity

1. In a process called \_\_\_\_\_, the atomic nuclei of unstable isotopes release fast-moving particles and energy.
2. What did Henri Becquerel discover?

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3. What did Becquerel put away in a drawer?

\_\_\_\_\_

4. What did Becquerel observe when he later took the items out of the drawer?

\_\_\_\_\_

\_\_\_\_\_

5. Becquerel hypothesized that uranium can spontaneously give off energy, or \_\_\_\_\_, all the time.

6. What did Marie and Pierre Curie conclude?

\_\_\_\_\_

\_\_\_\_\_

7. The spontaneous emission of radiation by an unstable atomic nucleus is called \_\_\_\_\_.

**Types of Radioactive Decay**

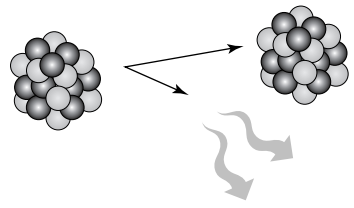
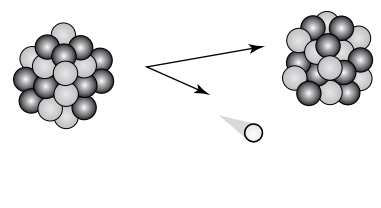
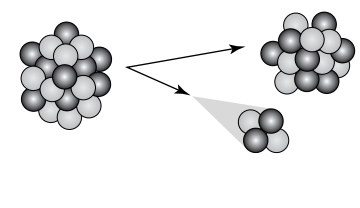
8. Complete the table about radioactive decay.

Radioactive Decay		
Type of Radiation	Description	Electric Charge of Particle
a. Alpha particle		
b. Beta particle		
c. Gamma radiation		

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**Radioactive Elements** *(continued)*

9. Label each illustration below according to which type of radioactive decay it represents.

Radioactive nucleus	No gain or loss of particles	Radioactive nucleus	One less neutron, one more proton	Radioactive nucleus	2 protons and 2 neutrons lost
					
a. _____		b. _____		c. _____	

10. The least penetrating type of radiation is \_\_\_\_\_.
11. Which type of radiation can cause the most damage to cells in the body? \_\_\_\_\_

**Using Radioactive Isotopes**

12. Circle the letter of each use of a radioactive isotope.
- a. growing house plants
  - b. tracing the steps of chemical reactions and industrial processes
  - c. diagnosing and treating disease
  - d. providing sources of energy to generate electricity
13. List two properties of radioactive isotopes that make them useful.

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14. What are tracers?

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15. Why are tracers useful in studying chemical reactions?

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**16.** Circle the letter of each example that describes how radioactive tracers are used.

- a. Scientists study how plants use phosphorus.
- b. Engineers look for weak spots in metal pipes.
- c. Doctors destroy unhealthy cells.
- d. Nuclear power plants produce electricity.

**17.** Describe an example of how a tracer may be used to diagnose a medical problem.

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**18.** Describe an example of how a radioactive isotope may be used to treat a medical problem.

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