

Chapter 18

EARTH'S HISTORY AND ROCKS

Chapter 18 Assessment

Vocabulary

Select the correct term to complete the sentences.

geology	relative dating	radioactive isotope
fossil	paleontologist	absolute dating
geologic time scale	cleavage plane	half-life
mineral	rock	rock cycle
Mohs hardness scale		

Section 18.1

- The _____ is divided into blocks of time called eons, eras, and periods.
- The _____ of uranium is 4.5 billion years.
- _____ is a way of determining the age of something in years.
- An unstable isotope that experiences radioactive decay is called a(n) _____.

Section 18.2

- Through their observations of rock formations, Nicholas Steno and James Hutton helped develop the field of modern _____.
- _____ is a method that involves putting events in the order in which they happened.
- An ancient, preserved shark tooth is an example of a(n) _____.
- A scientist who studies fossils is called a(n) _____.

Section 18.3

- The resistance to scratching that a mineral exhibits is identified using the _____.
- The _____ represents the formation and recycling of rocks by geologic processes.

- A surface along which a mineral cleanly splits is a(n) _____.
- A(n) _____ is a naturally formed solid composed of one or more minerals.
- Quartz is a(n) _____ found in granite.

Concepts

Section 18.1

- Which time period in geologic history lasted the longest time?
- Name the era or time period during which each of the following organisms or events first appeared.

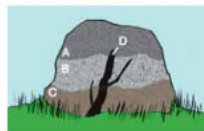
a. dinosaurs	e. modern climate
b. invertebrates	f. Pangaea
c. humans	g. ferns
d. single-celled organisms	h. fishes
- Uranium ultimately decays into a stable element called:

a. lead	c. carbon
b. nitrogen	d. phosphorous
- How might a tree fossil help a scientist understand the climate of certain places millions of years ago?
- You notice that a tree cross-section has a very wide tree ring that occurred in 1985 and a very narrow tree ring that occurred in 1992. From this information, what can you infer about the tree's environment in 1985? In 1992?
- How do scientists know which plants and animals lived at the same time as the dinosaurs?

7. *Lystrosaurus* fossils are found in Antarctica and Africa. How is it possible for fossils of this organism to be found in both places?
8. Is measuring the amount of uranium-238 in a fossil to determine its age relative dating or absolute dating?

Section 18.2

9. If you had a question about where to find trilobite fossils, would you ask a geologist or a paleontologist? Explain your answer.
10. Why are superposition and lateral continuity useful ideas in interpreting how the rocks of the Grand Canyon formed?
11. Use relative dating to identify the order in which each line was drawn. Which line was drawn first? Which line was drawn last?
12. An inclusion is:
 - a. younger than surrounding rock.
 - b. the same age as surrounding rock.
 - c. older than surrounding rock.
13. Due to original horizontality, layers of sediment form in horizontal layers. However, sometimes these layers (once they become rock) are found in other positions. What kinds of events might cause layers of rock to change positions?
14. Put the rock bodies (A, B, C, and D) illustrated at the right in order from oldest to youngest.
15. How do scientists use the ideas of fossil succession to identify how long ago different animals lived?

**Section 18.3**

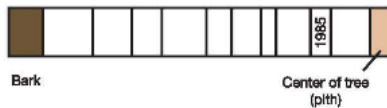
16. Name one similarity and one difference between graphite and diamond.
17. Answer the following questions about pyrite (fool's gold) and gold.
 - a. What is one characteristic that can be used to tell pyrite and gold apart?
 - b. Are pyrite and gold rocks or minerals? Explain your answer.
18. How are minerals distinguished on the Mohs hardness scale? What mineral represents the "bottom" of this scale?
19. What is the rock cycle? List the three groups of rocks that are formed by the rock cycle.
20. Peat and bituminous coal are rocks that are formed from ancient plant remains. What kind of rocks are peat and bituminous coal? Justify your answer.

Problems**Section 18.1**

1. A fossil is determined to be about 280 million years old.
 - a. How do scientists determine the age, in years, of a fossil?
 - b. To which era and period does the fossil belong? What are some organisms that lived during that time?
2. A rock that is 100% uranium goes through three half-lives.
 - a. How many years is three uranium half-lives?
 - b. How much uranium is left after three half-lives: 6.25%, 12.5%, 25%, or 50%?
3. The amount of carbon-14 in a fossil has undergone four half-lives. What is this length of time in years? If the sample contained 10 grams of carbon-14, how much is left now?

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4. Use this tree core diagram to answer the questions. Do not count the bark or pith when determining the age of the tree. One tree ring equals a white area and one dark line.



- How old is the tree?
- What year was this core sample taken?
- Give an example of a year that was probably warm with a lot of rainfall.
- Name a year that was probably cool and dry.

Section 18.2

5. While out on a geology field trip, you find a rock formation that has five layers of rock. A crack goes across all the layers. Answer the following questions using relative dating principles.
- Make a diagram of this rock formation.
 - When did the crack occur—before or after the rock layers formed?
 - How did this rock formation form?

Section 18.3

6. Make a pie graph based on the information provided in Figure 18.15 of the text.
7. You are looking for a birdbath for your garden in a catalog. You see a granite birdbath that costs \$100. You see another birdbath made of limestone that costs \$75. Granite is made of quartz and feldspar. Limestone is mostly made of the mineral calcite. Write a paragraph describing the birdbath you will purchase and why you will purchase it.

Applying Your Knowledge

Section 18.1

- Imagine that you could go back in time and visit any period of Earth's geologic history. Describe which period would you visit and why you would visit it.
- You learned that geologic time is divided into eons, eras, and periods. The Precambrian is divided into the Archean and Proterozoic Eons, and the Phanerozoic Eon is divided into the Paleozoic, the Mesozoic, and the Cenozoic Eras. Research each eon. List one fact about each.

Section 18.2

- Nicolas Steno and James Hutton contributed to the development of modern geology. Through research, find a fact about each of these scientists that was not mentioned in the chapter.
- You want to explain superposition to a group of second graders. Think of a creative model you could use that would help them understand this concept. Describe your model and explain how you would teach superposition.
- Explain in a short paragraph how the shell of an ocean creature could become a fossil.

Section 18.3

6. Use the rock cycle diagram on page 426 to write a story about what might happen to a small amount of hot rock in the mantle as it experiences the rock cycle. Write the story from the point of view of this piece of hot rock. You have not read much about how sedimentary, igneous, and metamorphic rocks are formed at this point, so do your best to write a story based on your reading, but you may also use your imagination.