

Chapter Review

USING KEY TERMS

1. In your own words, write a definition for each of the following terms:
superposition, geologic column, and geologic time scale.

For each pair of terms, explain how the meanings of the terms differ.

2. *uniformitarianism* and *catastrophism*

3. *relative dating* and *absolute dating*

4. *trace fossil* and *index fossil*

UNDERSTANDING KEY IDEAS

Multiple Choice

- _____ 5. Which of the following does not describe catastrophic change?
a. widespread
b. sudden
c. rare
d. gradual
- _____ 6. Scientists assign relative ages by using
a. absolute dating.
b. the principle of superposition.
c. radioactive half-lives.
d. carbon-14 dating.

Chapter Review *continued*

- _____ **7.** Which of the following is a trace fossil?
a. an insect preserved in amber
b. a mammoth frozen in ice
c. wood replaced by minerals
d. a dinosaur trackway
- _____ **8.** The largest divisions of geologic time are called
a. periods. **c.** eons.
b. eras. **d.** epochs.
- _____ **9.** Rock layers cut by a fault formed
a. after the fault.
b. before the fault.
c. at the same time as the fault.
d. There is not enough information to determine the answer.
- _____ **10.** Of the following isotopes, which is stable?
a. uranium-238 **c.** carbon-12
b. potassium-40 **d.** carbon-14
- _____ **11.** A surface that represents a missing part of the geologic column is called a(n)
a. intrusion. **c.** unconformity.
b. fault. **d.** fold.
- _____ **12.** Which method of radiometric dating is used mainly to date the remains of organisms that lived within the last 50,000 years?
a. carbon-14 dating
b. potassium-argon dating
c. uranium-lead dating
d. rubidium-strontium dating

Short Answer

13. Describe three processes by which fossils form.

14. Identify the role of uniformitarianism in Earth science.

Chapter Review *continued*

15. Explain how radioactive decay occurs.

16. Describe two ways in which scientists use fossils to determine environmental change.

17. Explain the role of paleontology in the study of Earth's history.

Chapter Review *continued*

CRITICAL THINKING

18. Concept Mapping Use the following terms to create a concept map: *age, half-life, absolute dating, radioactive decay, radiometric dating, relative dating, superposition, geologic column, and isotopes.*

19. Applying Concepts Identify how changes in environmental conditions can affect the survival of a species. Give two examples.

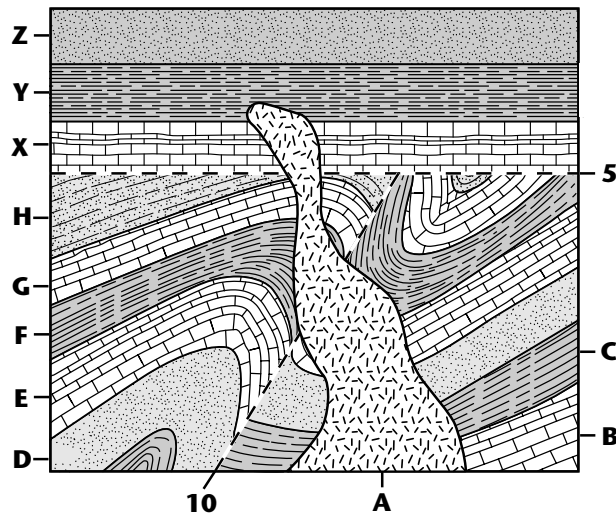
20. Identifying Relationships Why do paleontologists know more about hard-bodied organisms than about soft-bodied organisms?

Chapter Review *continued*

21. Analyzing Processes Why isn't a 100 million-year-old fossilized tree made of wood?

INTERPRETING GRAPHICS

Use the diagram below to answer the questions that follow.



22. Is intrusion A younger or older than layer X? Explain.

23. What feature is marked by 5?

24. Is intrusion A younger or older than fault 10? Explain.

25. Other than the intrusion and faulting, what event happened in layers B, C, D, E, F, G, and H? Number this event, the intrusion, and the faulting in the order that they happened.

10. Scientists know more about organisms that had hard body parts. Scientists also know more about organisms that lived in environments that favored fossilization.

SECTION: TIME MARCHES ON

- Answers will vary. Sample answer: Eras are divisions of geologic time that are divided into periods, and periods are units of geologic time that are divided into epochs.
- B
- The major time intervals represented by the geologic time scale are eons, eras, periods, and epochs
- Geologic time is recorded in rock layers by the differences in the fossils they contain.
- Environmental changes that cause mass extinctions include global climate change, changes in ocean currents, and possible asteroid strikes.
- Answers will vary. Sample answers: the extinction of humans, the extinction of most animal species, the appearance of a new, widespread group of organisms, or a major change in the Earth's climate
- A decrease in the competition between species allows species to move into new parts of the environment and to use new resources.
- 25×64 million years = 160 million years; 7×64 million years = 44.8 million years; $160 - 44.8$ million years = 115.2 million years
- Answers will vary. Sample answer: Uniformitarianism is the theory that gradual geologic processes that we observe in the present were also active in the past. This theory argues that slow gradual change shapes the Earth. Catastrophism is the theory that past episodes of sudden and drastic change are responsible for the major geologic features that change the Earth.
- Answers will vary. Sample answer: Relative dating is a method of comparing rocks or fossils to each other to determine which ones are older. Absolute dating is a method of determining the age of something in years.
- Answers will vary. Sample answer: A trace fossil is any naturally preserved evidence of animal activity. And index fossil is a fossil of an organism that lived during a relatively short, well-defined geologic time span that is used to establish the age of rock layers.
- D
- B
- D
- C
- B
- C
- C
- A
- Answers will vary. Sample answer: Fossils are formed by the process of petrification, in which minerals replace an organism's tissue. Fossils are formed when organisms become trapped in hardened tree sap, or amber. Fossils are formed by sediment that slows decay.
- Uniformitarianism is the guiding principle in Earth science. The same geologic processes shaping the Earth today have been at work throughout Earth's history.
- Radioactive decay occurs as an unstable isotope breaks down into a stable isotope. This happens as the isotope loses an electron and a neutron becomes a proton.

Chapter Review

- Answers will vary. Sample answer: Superposition is the principle that states that younger rocks lie above older rocks in undisturbed sequences. The geologic column is an ideal sequence of rock layers that contains all the known fossil and rock layers on Earth, arranged from oldest to youngest. The geologic time scale is a scale that divides Earth's 4.6 billion year history into distinct intervals of time.

16. Paleontologists use fossils to reconstruct past climates and to determine water depth in the oceans.
17. Paleontologists piece together the history of life on Earth using fossils as their data.
18. An answer to this exercise can be found at the end of this book.
19. Changes in environmental conditions can change or eliminate a species' habitat, so a species cannot meet its basic needs. Both global climate changes and changes in ocean currents can cause the extinction of species.
20. Hard-bodied organisms are more easily preserved, so more of these organisms have been studied.
21. The tree is not made of wood because the wood tissue in the tree was completely replaced by minerals.
22. younger
23. an angular unconformity
24. Intrusion A is younger than fault 10 because the intrusions not disturbed by the fault.
25. folding; Folding occurred, and then the fault occurred. After erosion and deposition of layers X and Y, the intrusion occurred.

Reinforcement

WELCOME TO THE GEOLOGY ROCKS CAFÉ

- a. rye bread
- b. pickles
- c. tomatoes
- d. provolone cheese
- e. turkey
- f. mustard
- g. sourdough bread
- h. onions
- i. lettuce
- j. Cheddar cheese
- k. ham
- l. mustard
- m. sourdough bread
- n. relish
- o. provolone cheese
- p. turkey
- q. mayonnaise
- r. sourdough bread
- s. pickles
- t. tomatoes
- u. lettuce
- v. ham
- w. mustard
- x. rye bread

Dessert bonus: disconformity

Critical Thinking

¡ADIÓS ALAMOSAUROS!

1. **a.** Answers will vary. Sample answer: Like one current theory, Dr. Garza's hypothesis states that the extinction of the dinosaurs was due partly to the impact of a huge asteroid.
b. Answers will vary. Sample answer: One current theory states that the asteroid struck the Earth, causing the dinosaurs to die from a lack of sunlight. Dr. Garza's hypothesis states that the asteroid crashed into the ocean, and that the dinosaurs died as a result of the destruction of their habitat.
2. Answers will vary. Sample answers: asteroid impact: tsunamis, debris in the air, blockage of sunlight, forest fires, death of plants and animals
massive earthquake: tsunamis, flooding, destruction of habitat
drought: death of plants and animals
3. Answers will vary. Sample answer: Dr. Garza should look for disconformities in rock layers and extra thick layers of sediment due to heavy deposition. Sediment layers should contain large numbers of fossilized plants and animals that were buried and preserved in sediment after the flood.
4. Answers will vary. Sample answer: Yes, these discoveries support Dr. Garza's hypothesis. Flowing water would cause dinosaur skeletons in low-lying areas to be disrupted. Skeletons on high ground would not be affected by flooding, so they would remain intact.