SECTION: DEFORMING THE EARTH'S CRUST

1. Sample answer: Compression is stress that occurs when forces act to squeeze an object. Tension is stress that occurs when forces act to stretch an object.
2. Sample answer: Uplift is the rising of Earth's crust to higher elevations. Subsidence is the sinking of Earth's crust to lower elevations.
3. D
4. The three types of folds include anticlines, which are upward-arching folds; synclines, which are downward-arching folds; and monoclines, in which rock layers are folded so that both ends of the fold are horizontal.
5. The three types of faults include normal faults, in which the hanging wall moves down relative to the footwall; reverse faults, in which the hanging wall moves up relative to the footwall; and strike-slip faults, in which opposing forces cause rock to break and move horizontally.
6. The most common types of mountains are folded mountains, fault-block mountains, and volcanic mountains.
7. Rebound is a process in which Earth's crust slowly springs back to its original elevation.
8. Rift zones are a set of deep cracks in the Earth's crust that form when two tectonic plates pull away from each other. As tectonic plates pull apart, stress builds up between the plates. This stress causes strain in the Earth's crust, and a series of faults form along the rift zone.
9. A reverse fault is likely to form because both reverse faults and folding occur in areas where compression takes place.
10. No, you would be more likely to see volcanic mountains or fault-block mountains where magma is rising along the mid-ocean ridge spreading center.
11. a reverse fault
12. a convergent boundary

Chapter Review

1. Sample answer: Scientists divide the Earth into the crust, mantle, and core based on the chemical elements that make up each of these layers.
2. continental drift
3. asthenosphere
4. Tension
5. uplift
6. B
7. C
8. B
9. D
10. A
11. C
12. Scientists can measure the differences in the speeds of seismic waves that travel through the Earth's interior to calculate the density and thickness of each of the Earth's physical layers.
13. As oceanic crust spreads away from a mid-ocean ridge, the crust carries bands that contain minerals that were aligned with Earth's magnetic field when the crust formed. The similar sequence of bands on both sides of a mid-ocean ridge, even at a large distance from the ridge, indicates that the sea floor is spreading away from acenter point.
14. As new crust forms at mid-ocean ridges, plates on either side of the ridge move away from the ridge. Therefore, continents on those plates also move.
15. Compression and tension are two types of stress that deform rock. Compression squeezes rock at convergent plate boundaries; tension stretches rock at divergent plate boundaries.
16. The global positioning system is a system of satellites that orbit the Earth. Radio signals are continuously beamed from these satellites to ground stations. The distance between satellites and ground stations is recorded. By recording the time it takes for ground stations to move a given distance, scientists can measure the rate at which tectonic plates move.
17. An answer to this exercise can be found at the back of the Teacher Edition.

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18. Answers may vary. The lithosphere at a subduction zone is denser than at a mid-ocean ridge. Convection causes oceanic lithosphere to move away from the mid-ocean ridge. Oceanic lithosphere is also higher at a mid-ocean ridge, so oceanic lithosphere moves down toward the subduction zone because of gravity.
19. Answers may vary. The amount of crust formed is roughly equal to the amount of crust destroyed. If this were not true, the Earth would either be expanding or shrinking.
20. At the time they formed, the folded mountains must have been on the edge of a tectonic plate. New material was later added to the tectonic plate, causing the folded mountains to be located closer to the center of the continent.
21. 50 km
22. 150 km + 250 km + 2,550 km = 2,950 km
23. between 50 km and 150 km
24. 150 km + 250 km + 2,550 km + 2,200 km = 5,150 km

Reinforcement

THE LAYERED EARTH

1. crust
2. mantle
3. outer core
4. inner core
5. crust
6. asthenosphere
7. mesosphere
8. tectonic plate
9. outer core; inner core

A MOVING JIGSAW PUZZLE

1. divergent
2. transform
3. convergent

Critical Thinking

1. Answers may vary. Sample answer: Athena may have a liquid center surrounded by a solid, flexible outer layer.
2. Answers may vary. Sample answer: Athena's top layer must be made of a material less rigid and more flexible than the rock of Earth's crust. Otherwise, it would probably crack due to the stress.
3. The color of the sky and the smell of the air probably do not indicate anything about the planet's inner structure.
4. Answers may vary. Sample answer: If there are events like earthquakes on the planet, they could use seismographs to measure the speed and angles of any seismic waves produced. They also might try to drill into the planet's surface in order to see the layers.
5. Answers may vary. Sample answer: They should discuss their findings with other scientists in the field first. They should then make sure that no other hypotheses can be supported by their data.

Section Quizzes

SECTION: INSIDE THE EARTH

1. C
2. A
3. D
4. B
5. C
6. E
7. A
8. F

SECTION: RESTLESS CONTINENTS

1. D
2. A
3. B
4. B
5. A
6. D
7. C
8. E

SECTION: THE THEORY OF PLATE TECTONICS

1. A
2. C
3. D
4. A
5. E
6. C
7. B
8. F

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