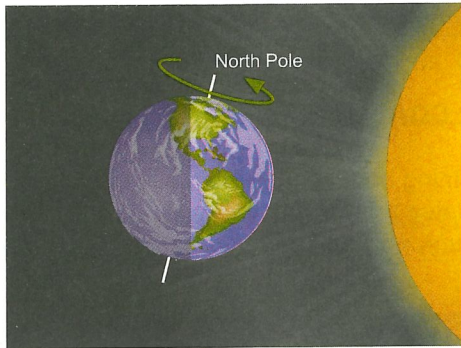


Unit 3 Review

DIRECTIONS: Study the diagram, read the question, and choose the **best** answer.



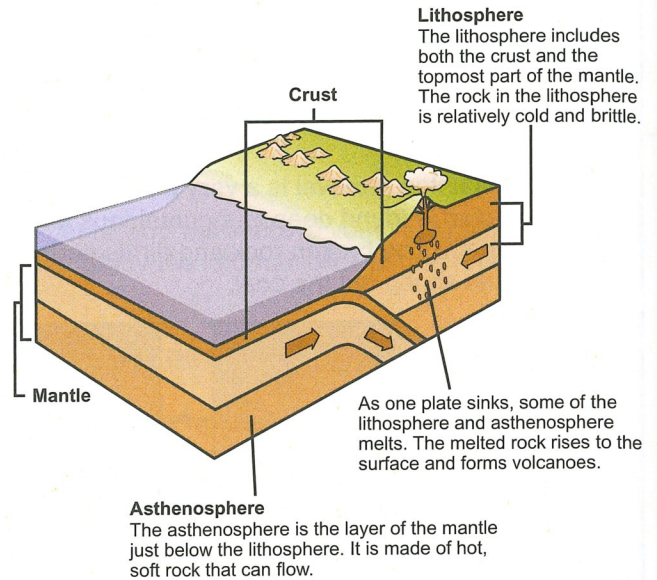
1. Which pattern does the diagram show?
 - A. the cycle of seasons
 - B. the cycle of tides
 - C. the cycle of night and day
 - D. the cycle of lunar phases

DIRECTIONS: Read the passage and question, and choose the **best** answer.

In late 2012, the Hubble Space Telescope gave astronomers their deepest view yet into space—of galaxies 13.2 billion light-years away. These galaxies are 10 billion times dimmer than the human eye could ever detect from Earth on its own. To capture the image, the telescope was trained on one area of stars for more than 500 hours over 10 years. The telescope took 2,000 images of the spot. Scientists combined the light and other radiation from the images. This allowed them to build an image that showed the most distant star systems.

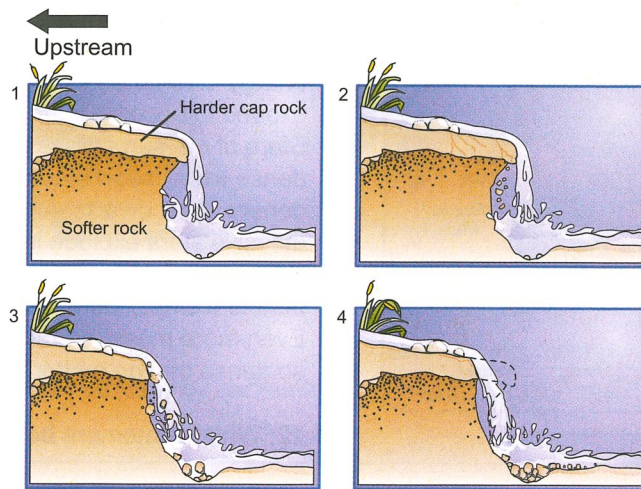
2. Which statement **best** summarizes this passage?
 - A. Scientists have used the Hubble Telescope to view the most distant galaxies ever seen.
 - B. The most distant galaxies are 13.2 billion light-years away.
 - C. The Hubble Telescope has taken more than 2,000 images of galaxies.
 - D. The most distant galaxies are 10 billion times dimmer than human eyes can see.

DIRECTIONS: Study the diagram. Then read each question, and choose the **best** answer.



3. Which layer is made of hot, soft rock?
 - A. crust
 - B. asthenosphere
 - C. lithosphere
 - D. mantle
4. What does the diagram suggest about the structure of Earth?
 - A. The mantle is the thickest layer of rock in Earth's interior.
 - B. The uppermost layer of Earth is the crust.
 - C. The asthenosphere is part of the lithosphere.
 - D. Where plates meet, the crust and the mantle change places.
5. Based on the diagram, where do volcanoes form?
 - A. where air is warmed by ocean waters
 - B. where two plates meet and one slips under the other
 - C. where the asthenosphere is hottest
 - D. where two plates pull apart

DIRECTIONS: Study the diagram, and read the question. Then write your response on the lines. This task may take approximately 10 minutes to complete.



6. The diagram shows the change in a waterfall over time due to weathering and erosion. Interpret the diagram, and then describe the change.

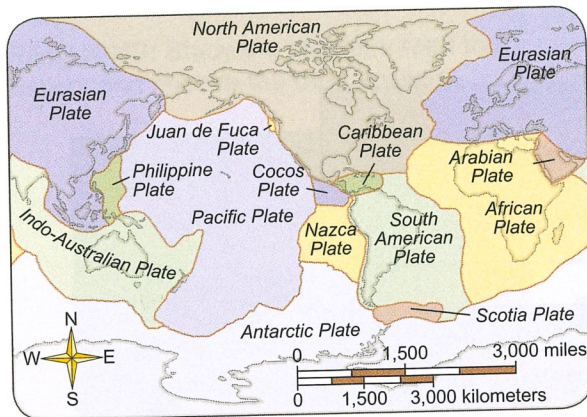
DIRECTIONS: Read the passage and question, and choose the **best** answer.

The Big Bang theory states that all the matter and energy in the universe was once contained inside a tiny, hot, dense mass. A huge explosion blew that tiny mass apart about 14 billion years ago, sending the material that makes up the universe flying outward in all directions. This blast is known as the Big Bang.

7. Which statement is a valid piece of evidence supporting the Big Bang theory?

- A. The universe now contains many different galaxies.
- B. Huge explosions no longer can occur in the universe.
- C. The galaxies in the universe are moving apart rapidly.
- D. There is no life anywhere in the universe except on Earth.

DIRECTIONS: Study the map. Then read each item, and fill in your response in the box.



8. The map shows the plates that form Earth's surface.
9. The theory explains the structure of Earth's crust.
10. The movement of plates causes the formation of different on Earth's surface.

DIRECTIONS: Read the passage and question, and choose the **best** answer.

The air pressure of Earth's atmosphere varies from place to place. This uneven distribution of air pressure causes wind and weather patterns. Storms are associated with lower air pressure, whereas fair weather is associated with higher air pressure. Trade winds occur in a wind zone that circles Earth from about 30 degrees latitude North to about 30 degrees latitude South. In a band around Earth's middle, trade winds from the north blowing southeasterly meet trade winds from the south blowing northeasterly. This band of low pressure is the Intertropical Convergence Zone (ITCZ).

11. Based on the information and the concept of wind, which statement describes the trade winds that meet in the ITCZ?
- They originate in areas of lower air pressure.
 - They originate in areas of higher air pressure.
 - They move to areas of higher pressure.
 - They rarely produce storms.

DIRECTIONS: Read the passage and question, and choose the **best** answer.

Main sequence stars are mostly hydrogen. They use this hydrogen as fuel in nuclear fusion to produce energy. Eventually, stars use up their hydrogen and expand to become huge and relatively cool red giants. Stars of our sun's mass then collapse into small, hot, dense white dwarf stars before becoming cooler, denser black dwarfs. After the red giant stage, more massive stars explode in a supernova. In stars up to four times as massive as our sun, the supernova leaves behind a small, dark, dense body called a neutron star. Even more massive stars become black holes—bodies so dense that no matter or energy can escape them.

12. Which statement **best** identifies a pattern of stars?
- The universe has many different types of stars.
 - Stars use hydrogen as fuel for nuclear fusion.
 - At the end of their life cycles, stars become relatively small, dense bodies.
 - All stars explode in supernovas at the end of their life cycles.

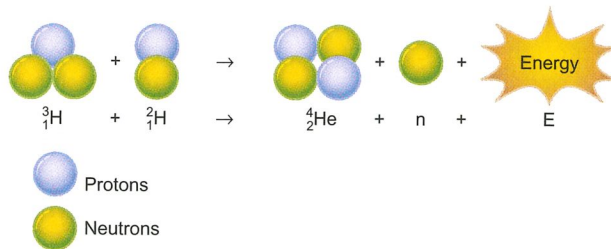
DIRECTIONS: Read the passage and question, and choose the **best** answer.

Through observation and measurement of certain astronomical events, scientists estimate that Earth is about 4.54 billion years old. Through the process of radiometric dating, scientists can identify the exact age of rock by using radioactive isotopes. The various isotopes decay at specific rates and yield certain products when they decay. Scientists can measure the amounts of a particular isotope and the product of its decay within a rock sample. Then they can calculate the age of the rock sample. Scientists have found a mineral determined to be about 4.4 billion years old in a younger rock. They think it was eroded from an older rock.

13. Which statement expresses a conclusion that can be reached about the dating of rock?
- Scientists must know the order in which layers of rock were deposited in land formations to know the exact age of rock.
 - Scientists can use radioactive or nonradioactive isotopes for radiometric dating.
 - Knowing the rate of decay of a radioactive isotope is essential in radiometric dating.
 - After a certain amount of time, the radioactive isotopes in rock destroy it, making radiometric dating of the rock impossible.

DIRECTIONS: Study the model, and read the question. Then write your response on the lines. This task may take approximately 10 minutes to complete.

NUCLEAR FUSION IN THE SUN



14. Express scientific information verbally by explaining the fusion reaction that occurs in the sun.

DIRECTIONS: Study the table. Then read each question, and choose the **best** answer.

Inner Planets	Outer Planets
Rocky bodies	Largely gaseous, with relatively small solid cores
Four planets; two of four have one or two moons	Four planets; all have several moons
Hard surfaces of rock	Surfaces are not made of rock
No systems of rings	All have ring systems
Held in orbit by the sun's gravitational pull	Held in orbit by the sun's gravitational pull
Only one has large quantities of liquid surface water	None have large quantities of liquid surface water
Smallest planets	Largest planets

15. What structural pattern exists among the four inner planets?

- A. large quantity of surface water
- B. system of several thin rings
- C. orbited by one or two moons
- D. small, with a rocky surface

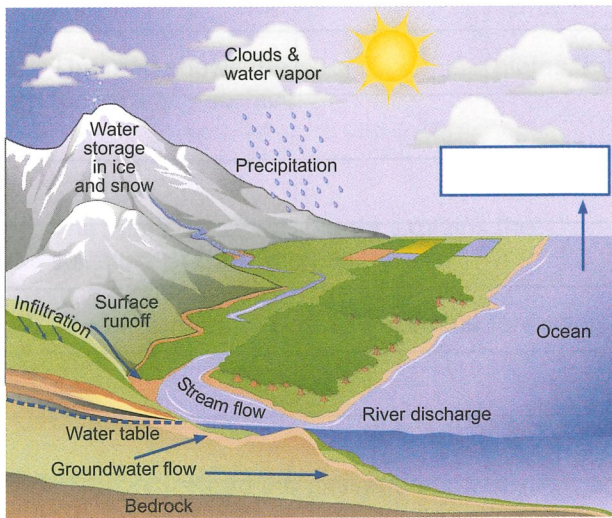
16. What pattern is displayed among the four outer planets?

- A. a body that is completely gaseous
- B. hard surfaces
- C. a lack of rings
- D. several moons

DIRECTIONS: Read the passage and question. Then use the drag-and-drop options to respond.

The ocean affects Earth and Earth's organisms in many ways. One primary way involves the role the ocean plays in the water cycle. Through the process of changing states, water from the ocean becomes water that falls to Earth to become water in the ocean again, and the cycle goes on and on.

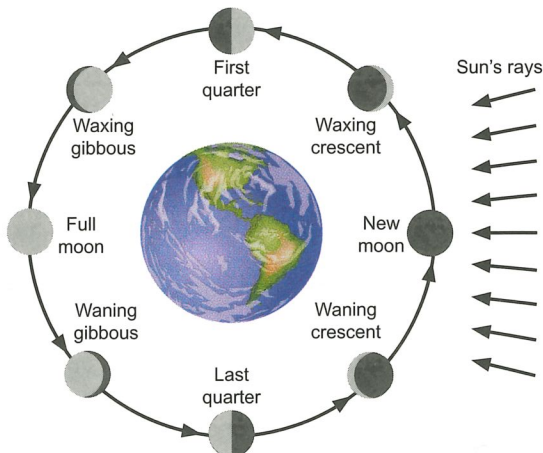
17. Based on the concept of states of matter, what happens when water in the ocean is heated by the sun? Determine which drag-and-drop option identifies this change of state, and record the term in the box on the diagram.



Drag-and-Drop Options

condensation	evaporation
sublimation	melting

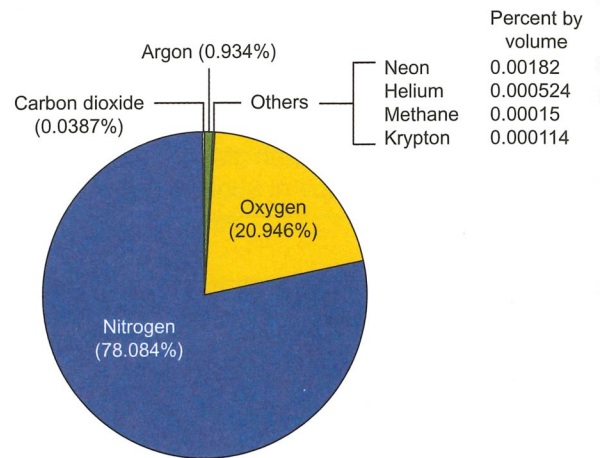
DIRECTIONS: Study the diagram, read the question, and choose the **best** answer.



18. Which sequence represents a complete pattern of lunar phases?
- A. full moon → last quarter → waning crescent → new moon
 - B. new moon → first quarter → full moon → last quarter → new moon
 - C. first quarter → waxing gibbous → full moon → waning gibbous
 - D. last quarter → waning crescent → new moon → waxing crescent

DIRECTIONS: Study the graph, read each question, and choose the **best** answer.

COMPOSITION OF THE ATMOSPHERE



19. Based on the graph, which statement expresses the proportion of oxygen in Earth's atmosphere?
- A. Oxygen is the most plentiful gas in Earth's atmosphere.
 - B. Oxygen makes up less of the atmosphere than any greenhouse gas does.
 - C. Oxygen and the most plentiful gas make up more than 98 percent of the atmosphere.
 - D. There is more oxygen than nitrogen but less oxygen than carbon dioxide.
20. Which statement **best** summarizes the information in the graph?
- A. Earth's atmosphere is made up mostly of nitrogen and oxygen but contains small percentages of other gases.
 - B. Nitrogen is the most prevalent gas in Earth's atmosphere.
 - C. Nitrogen and oxygen are the two primary gases that make up Earth's atmosphere.
 - D. Gases occurring in less plentiful amounts in Earth's atmosphere include carbon dioxide, argon, and helium.

DIRECTIONS: Study the table. Then read the incomplete passage that follows. Use information from the table to complete the passage. For each drop-down item, choose the option that **best** completes the sentence.

Arguments Supporting Wind Energy	Arguments Opposing Wind Energy
Wind produces electricity without producing pollution.	Wind is an unreliable energy source because there are many times when wind does not blow.
Wind is a free source of energy.	There are a limited number of areas where the wind is strong enough to make installing turbines practical.
Wind is a renewable energy source.	Wind turbines range from 200 feet to 400 feet tall—the size of a 20- to 40-story building. They are often placed on ridges or offshore in scenic areas and, therefore, will always encounter local opposition.
About 67 percent of the wind turbines used in the United States today are made in the United States.	Wind is expensive because of the cost of construction and maintenance of turbines.
When subsidies are stripped away, wind costs \$48–\$95/megawatt-hour, natural gas costs \$61–\$231/megawatt-hour, and coal costs \$62–\$141/megawatt-hour.	Birds and bats are often killed when struck by the blades of huge wind turbines.

21. Many people argue for the growth of wind energy, and others argue against it. One of the main arguments in support of wind energy is that it is a free and 21. Drop-down 1 resource. Opponents of wind energy argue that wind is an unreliable resource and that wind turbines are a danger to 21. Drop-down 2.

Drop-Down Answer Options

- 21.1 A. exhaustible
 B. nonrenewable
 C. renewable
 D. depleted

- 21.2 A. airplanes
 B. people
 C. power lines
 D. wildlife

DIRECTIONS: Read the passage and question, and choose the **best** answer.

The National Weather Service (NWS) has created a system of watches and warnings for natural hazards such as tornadoes, hurricanes, flash floods, and blizzards. Tornadoes are a frequent natural hazard in parts of the Midwest and the Great Plains during spring and summer. The NWS issues a tornado watch when atmospheric conditions are right for the development of tornadoes, with advice to stay alert for further information. The NWS issues a tornado warning when a tornado has been seen on the ground or has been spotted on radar. A warning is the signal that it is time to look for shelter from the storm.

22. How do watches and warnings help solve the problem of dealing with strong and dangerous storms, such as tornadoes?
- A. They help prevent dangerous storms.
 - B. They allow people to take cover so that there is less danger of being hurt.
 - C. They allow meteorologists to study severe storms more easily.
 - D. They help people understand how severe storms such as tornadoes form.

DIRECTIONS: Read the passage and question, and choose the **best** answer.

The pH of precipitation is changing in some parts of the United States due to the burning of fossil fuels, primarily in electric power plants. The combustion of coal and oil releases substances such as sulfur dioxide and nitrogen oxides into the air. These substances combine with water to make precipitation more acidic than usual. Acidic precipitation harms forests and can cause the release of aluminum from soil into lakes and streams. The higher levels of aluminum and acidity are deadly to some fish species. Acid precipitation also eats away stone and metal in statues and structures.

23. Which argument is **best** supported by the data presented?
- A. The burning of fossil fuels affects all Earth's systems.
 - B. The health of all animals is harmed by the burning of fossil fuels.
 - C. All across the United States, the burning of fossil fuels is causing acid precipitation.
 - D. All important U.S. monuments must be protected from acid precipitation.

DIRECTIONS: Read the passage. Then read each question, and choose the **best** answer.

Agricultural practices can contaminate drinking-water supplies with fertilizers and pesticides. These chemicals can enter water supplies through runoff and precipitation. Modern animal farming also contributes contamination because many animals live in a small area and their wastes build up and then enter water supplies. The wastes can contain disease-causing organisms and traces of drugs given to the animals. Some people think older methods of rotating crops and letting animals graze and spread wastes over larger areas can help reduce the negative effects of agriculture on drinking water. But for these methods to be accepted, they must be as effective as modern practices.

24. What is the main problem that the passage identifies?
- A. Agriculture uses too much water.
 - B. Some farming practices pollute drinking-water supplies.
 - C. Fertilizers do not increase plant productivity enough.
 - D. Crop rotation does not reduce the effects of pollution.

25. What problem must be overcome if the proposed solutions are to succeed?
- A. There must be a larger supply of fertilizers and pesticides.
 - B. Cropland must become animal pasture.
 - C. Drinking water must come from surface water sources, not groundwater.
 - D. New farming methods must produce the same amount of food as the methods they replace.

DIRECTIONS: Read the passage. Then read each question, and choose the **best** answer.

Most energy used in the United States for producing electricity and fueling motor vehicles comes from fossil fuel sources, such as coal, oil, and natural gas. Very little comes from cleaner alternative sources such as wind, solar power, and geothermal power. Unlike these alternative sources, combustion of fossil fuels produces waste gases, such as carbon dioxide. Carbon dioxide is naturally present in the atmosphere as part of the carbon cycle. For example, decomposition of plant material releases carbon dioxide to the air. But the combustion of fossil fuels has increased dramatically since the start of the Industrial Revolution in the late 1700s—along with the concentration of carbon dioxide in the air. Data suggest that this increase is responsible for changes in climate that could have negative effects on Earth's plant and animal life.

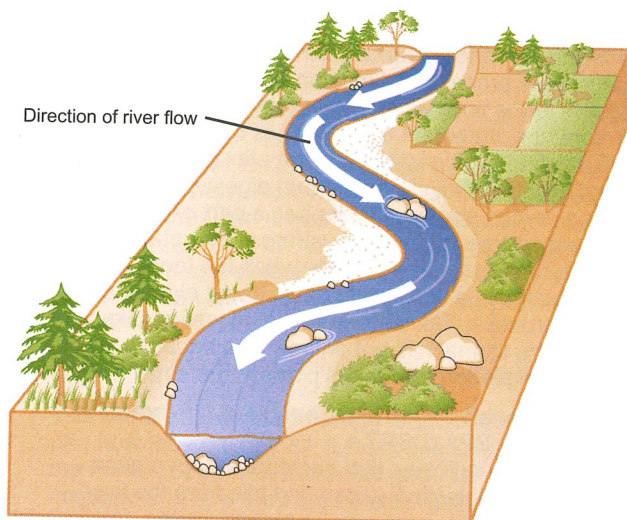
26. What is the basic problem identified in the passage?
- A. People have used fossil fuels since the Industrial Revolution.
 - B. Excess carbon dioxide is entering Earth's atmosphere.
 - C. Too much energy is being used to run electric power plants and motor vehicles.
 - D. Carbon dioxide enters the atmosphere from several natural sources.
27. Based on information in the passage, what is a possible solution?
- A. slowing decomposition of plant material
 - B. changing the atmosphere to absorb more carbon dioxide
 - C. using cleaner alternative energy sources instead of fossil fuels
 - D. using more natural gas instead of coal and oil

DIRECTIONS: Read the passage. Then read the question, and answer by marking the appropriate hot spots.

Water is a powerful force that shapes Earth's surface. Flowing water can pick up and carry rock and sediment from place to place. This process is called erosion. Swiftly moving water causes more erosion than water that moves slowly because water that moves fast can carry more rock and sediment.

A river is one body of water that causes erosion, especially in certain places. A meander is a bend in a river. River water moves fastest on the outside curve of a meander. It moves slowest on the inside curve of a meander.

28. Express your understanding of how a river's flow causes erosion. Mark an X on each part of the diagram where the river causes more erosion.



DIRECTIONS: Read the passage. Then read each question, and choose the **best** answer.

Glen Canyon Dam blocks the Colorado River in northern Arizona, forming a huge reservoir (Lake Powell) behind it. The waters of the lake rush through the dam, producing hydropower for more than 1 million people. The lake is also a dependable source of water for irrigating arid farmland. But Glen Canyon Dam has changed the characteristics of the river below it, altering its flow rate and temperature and removing sediment. As a result, several aquatic species below the dam are no longer in the area. Still, the biggest controversy has been the loss of beautiful Glen Canyon, now deep beneath the waters of Lake Powell. Glen Canyon was especially magnificent, with exquisite rock formations, unique species, and artifacts left behind by the area's ancient peoples. Several groups want to allow the Colorado to flow freely past Glen Canyon Dam again, draining much of Lake Powell and once again exposing Glen Canyon.

29. Which statement summarizes the environmental effects of Glen Canyon Dam?
- A. It provides power for more than 1 million people, but it has caused a significant controversy.
 - B. It has changed the features of the Colorado River, ecosystems, and scenic and historic aspects of the area.
 - C. It has formed a lake whose waters are used for producing power and irrigating farmland.
 - D. It has drained Lake Powell and exposed Glen Canyon.
30. What are the two opposing arguments about Glen Canyon Dam represented in the passage?
- A. hydroelectric power versus the combustion of fossil fuels to produce electricity
 - B. dryland farming with irrigation versus farming with natural precipitation
 - C. the value of natural environments versus the needs of a technically advanced society
 - D. the importance of lakes for producing electric power versus their value for recreation