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# CK-12 Earth Science For High School Quizzes and Tests



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Dana Desonie

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CHAPTER

**1**

# HS What is Earth Science? Assessments

## Chapter Outline

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- 1.1 THE NATURE OF SCIENCE
  - 1.2 EARTH SCIENCE AND ITS BRANCHES
  - 1.3 WHAT IS EARTH SCIENCE?
-



# 1.1 The Nature of Science

## Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

*Circle the letter of the correct choice.*

1. A mathematical model is a(n)
  - a. definition that explains how the earth works
  - b. set of equations that represent natural processes
  - c. physical representation of the subject being studied
  - d. model that cannot be tested
2. If a hypothesis explains all the data, there is a whole lot of data, and none of the data contradicts the hypothesis, the hypothesis becomes a(n)
  - a. law
  - b. conclusion
  - c. theory
  - d. secondary hypothesis
3. If performing an experiment in the field, you should
  - a. wear appropriate clothes
  - b. bring enough food and water
  - c. tell others where you are going
  - d. all of the above
4. The lab instructor should be notified when
  - a. anyone is hurt or anything is damaged
  - b. you need an eraser to correct a mistake in your notebook
  - c. you hear a joke and it made you laugh
  - d. there is never a need to notify the lab instructor
5. The way scientists approach their work is called
  - a. faith-based
  - b. scientific method
  - c. program management
  - d. scientific notation
6. To support or refute a hypothesis, scientists must collect
  - a. influence
  - b. donations
  - c. opinions
  - d. data
7. When should you follow instructions in the lab?

- a. at the end of class
  - b. always
  - c. when the teacher is looking
  - d. only when there is a fire
8. Which of the following best describe a hypothesis?
- a. A plausible explanation
  - b. A questionable assumption
  - c. A pretty good guess
  - d. The closest match
9. Which of the following is not a scientific model?
- a. problematic
  - b. conceptual
  - c. mathematical
  - d. physical
10. The goal of science is to
- a. disprove religious ideas
  - b. find the absolute indisputable truth
  - c. make tremendous inventions to advance humankind
  - d. understand the natural world
11. An independent variable
- a. is the change that occurs because a measurement is not made precisely.
  - b. inconsistent with the results from other experiments.
  - c. is the factor that will be manipulated.
  - d. is the result of the experiments.
12. Which of the following is not an assumption that scientists must make?
- a. Natural laws are the same everywhere and at any time.
  - b. Scientific ideas are less likely to be shown to be wrong the more they have been tested.
  - c. A scientific idea will be accepted if there is only a small amount of evidence that goes against it.
  - d. Scientific ideas can change or be thrown out, as needed.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. Always follow instructions in the lab
- \_\_\_\_\_ 14. Never eat or drink in the lab
- \_\_\_\_\_ 15. A scientific question does not need to be testable
- \_\_\_\_\_ 16. An dependent variable can be manipulated
- \_\_\_\_\_ 17. Science should not make moral judgments

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. A scientific question must be able to be proven wrong; that is it must be \_\_\_\_\_.
19. A \_\_\_\_\_ is a plausible answer to a question.
20. A \_\_\_\_\_ model ties together many ideas in an attempt to explain a phenomenon.
21. A hypothesis that has been repeatedly tested that has no significant evidence against it is called a(n) \_\_\_\_\_.

22. A touchable representation of an object, such as a globe, is a \_\_\_\_\_.
23.  $F = G \frac{m_1 m_2}{r^2}$  is a \_\_\_\_\_ of gravity.
24. In the experiment the \_\_\_\_\_ were kept the same while the independent variable was tested.
25. The role of \_\_\_\_\_ is to monitor scientific work.

**Short Answer**

*Answer each question in the space provided.*

26. List the steps involved in the scientific approach to solving a problem.

27. Why are student scientists sometimes told that they should try to disprove their hypotheses?

## 1.2 Earth Science and Its Branches

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A tsunami would probably be best understood by a(n)
  - a. climatologist
  - b. oceanographer
  - c. tsunamist
  - d. astronomer
2. Minerals are studied primarily by a
  - a. miner
  - b. astrologer
  - c. geologist
  - d. meteorologist
3. The study of weather patterns is known as
  - a. meteorology
  - b. geology
  - c. astronomy
  - d. oceanography
4. What is geology?
  - a. the study of Earth's oceans
  - b. the study of weather
  - c. the study of the stars
  - d. the study of Earth
5. Which area of Earth science includes the study of ancient organisms?
  - a. astronomy
  - b. meteorology
  - c. geology
  - d. paleontology
6. Which area of Earth science includes the study of stars?
  - a. astronomy
  - b. geology
  - c. hydrology
  - d. meteorology
7. Which branch of Earth science would most likely use telescopes
  - a. geology

- b. astrology
  - c. astronomy
  - d. climatology
8. Which branch of science studies the effects people have on their environment?
- a. environmental science
  - b. archeology
  - c. meteorology
  - d. geology
9. Which is not a branch of Earth science?
- a. oceanography
  - b. climatology
  - c. astronomy
  - d. astrology
10. The branch Earth science that deals with 70 percent of Earth's surface is
- a. oceanography
  - b. climatology
  - c. environmental science
  - d. meteorology

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Physical oceanographers are concerned with the motion of ocean water.
- \_\_\_\_\_ 12. Scientists that primarily study earthquakes are called seismologists
- \_\_\_\_\_ 13. Meteorologists are interested in the study of meteors
- \_\_\_\_\_ 14. Climatologists forecast weather for the upcoming week
- \_\_\_\_\_ 15. Astronomers study stars to understand people's horoscopes

**Fill in the Blanks**

Fill in the blank with the term that best completes the sentence.

16. The five major branches of Earth science are geology, astronomy, oceanography, environmental science and \_\_\_\_\_.
17. The branch of Earth science that studies water in all its forms is called \_\_\_\_\_.
18. The type of scientist would be best suited to provide scientific information leading to the clean up of pollution in a lake is a(n) \_\_\_\_\_.
19. Scientists that study the rocks and geologic processes within the ocean basins are \_\_\_\_\_.
20. A \_\_\_\_\_ is a scientist who predicts the weather.
21. A \_\_\_\_\_ is a scientist who understands weather over a long period of time.
22. A scientist who studies the rocks and processes on Mars is a(n) \_\_\_\_\_.
23. \_\_\_\_\_ consider how natural processes create and destroy materials on Earth.

**Short Answer**

Answer each question in the space provided.

24. What does a geologist study?

25. How is geology different from Earth Science?

## 1.3 What is Earth Science?

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A contour line
  - a. connects points of equal value
  - b. must not cross another contour line.
  - c. must create a loop with itself.
  - d. all of the above
2. What is the goal of science?
  - a. collect data.
  - b. understand the natural world.
  - c. provide answers to all questions.
  - d. all of the above.
3. Which of the following is NOT part of the scientific method?
  - a. determine scientific laws.
  - b. question.
  - c. experiment.
  - d. collect data.
4. What are factors that must remain the same in an experiment called?
  - a. controls.
  - b. independent variables.
  - c. dependent variables.
  - d. conclusions.
5. Which of the following is an example of a physical model?
  - a. sets of equations.
  - b. weather predictions.
  - c. a globe.
  - d. climate projections.
6. What is not usually found in a map legend?
  - a. scale
  - b. north arrow
  - c. title
  - d. date
7. How much of the Earth's surface is covered in water?
  - a. 50%

- b. 60%
  - c. 70%
  - d. 80%
8. What do paleontologists study?
- a. fossils.
  - b. rocks.
  - c. minerals.
  - d. the moon.
9. What type of map shows changes in elevation on Earth's surface?
- a. Mercator projection
  - b. gnomonic projection
  - c. topographic map
  - d. GPS
10. What is the study of water and its movement called?
- a. climatology.
  - b. meteorology.
  - c. geology.
  - d. hydrology.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Once a theory has been accepted it can never be retracted.
- \_\_\_\_\_ 12. Scientists draw conclusions only from data collection.
- \_\_\_\_\_ 13. A theory can be used to predict behavior.
- \_\_\_\_\_ 14. The scientific community monitors scientific integrity.
- \_\_\_\_\_ 15. Scientific data is always quantitative.
- \_\_\_\_\_ 16. The public controls the quality and types of scientific research.
- \_\_\_\_\_ 17. Peer review is an important part of the publication process in science.
- \_\_\_\_\_ 18. Science can answer every question.
- \_\_\_\_\_ 19. Climate is an example of a system that is easy to model because all the factors are and their interactions are well understood.
- \_\_\_\_\_ 20. Scientists quite commonly fake data.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. \_\_\_\_\_ is the study of Earth's solid materials and structures that create them.
22. When all of the scientific data support a hypothesis none contradicts the hypothesis, the hypothesis may become a(n) \_\_\_\_\_.
23. \_\_\_\_\_ use radars and satellites to forecast the weather.
24. The \_\_\_\_\_ \_\_\_\_\_ is the way scientists approach their work.
25. A plausible explanation that answers a scientific question is called a(n) \_\_\_\_\_.
26. \_\_\_\_\_ helps scientists to visually understand the relationships between data.



27. A \_\_\_\_\_ model ties together many ideas in an attempt to explain a phenomenon.
28. \_\_\_\_\_ deals with any and all aspects of the Earth.
29. \_\_\_\_\_ can help us better understand how and why climate changes.
30. \_\_\_\_\_ scientists study the effects people have on their environment, including the landscape, atmosphere, water, and living things.

**Short Answer**

*Answer each question in the space provided.*

31. Explain how science works when new evidence is found.
32. Explain the importance of peer review.
33. Explain the importance of independent and dependent variables in an experiment. Why is only one variable allowed to change?
34. Describe what a theory is and why a theory might be rejected by the scientific community.

35. Why is it nearly impossible that an established theory, like the theory of evolution, will be rejected by the scientific community?

---

CHAPTER **2**

# HS Studying Earth's Surface Assessments

## Chapter Outline

---

- 2.1 EARTH'S SURFACE
  - 2.2 WHERE IN THE WORLD ARE YOU?
  - 2.3 MODELING EARTH'S SURFACE
  - 2.4 TOPOGRAPHIC MAPS
  - 2.5 USING SATELLITES AND COMPUTERS
  - 2.6 STUDYING EARTH'S SURFACE
-

## 2.1 Earth's Surface

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- For the most part, \_\_\_\_\_ are much older than \_\_\_\_\_.
  - ocean basins, continents
  - continents, ocean basins
  - volcanoes, continents
  - ocean basins, volcanoes
- Ocean basins are all younger than
  - 65 million years
  - 180 thousand years
  - 4.4 billion years
  - 180 million years
- Which is not an important force of erosion?
  - ice
  - heat
  - water
  - wind
- Which of the following are typically found in elevated regions in the mid ocean?
  - ridges
  - canyons
  - basins
  - trenches
- Crustal deformation occurs when two slabs of crust
  - collide
  - slide past each other
  - pull apart
  - all of the above

#### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 6. The oldest continental rocks are millions of years old.
- \_\_\_\_\_ 7. Earth's surface is constantly changing
- \_\_\_\_\_ 8. Mountains rise when continents collide

\_\_\_\_\_ 9. The continental margin is made of oceanic crust.

\_\_\_\_\_ 10. Destructive forces cause landforms to grow

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

11. The deepest places in the oceans are the \_\_\_\_\_.

12. \_\_\_\_\_ forces cause landforms to grow.

13. Agents of erosion that wear down landforms are \_\_\_\_\_ forces.

14. The \_\_\_\_\_ is the longest mountain range on Earth.

15. The large flat areas covered by the ocean is known as a(n) \_\_\_\_\_.

16. Landforms are created when \_\_\_\_\_ are deposited.

17. Large land areas extending from high mountaintops to offshore are called \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

18. Describe the destructive forces that cause landforms to get smaller or disappear.

19. How do the continents and ocean basins differ on a relief map?

20. Describe the types of processes that can change Earth's surface.



## 2.2 Where in the World Are You?

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. How many degrees is Earth's magnetic north pole offset from its geographic north pole?
  - a. 0
  - b. 5.5
  - c. 11.5
  - d. 22.5
2. On a map, are the lines that run parallel to the equator called?
  - a. lines of longitude
  - b. lines of contour
  - c. lines of latitude
  - d. lines of borealis
3. What is the longitude of the prime meridian?
  - a. 0
  - b. 37
  - c. 90
  - d. 180
4. A figure drawn on a map or nautical chart that shows the locations of north, east, south, and west is called a
  - a. sightline
  - b. compass rose
  - c. compass
  - d. standard line
5. Elevation is the height above or below
  - a. Mt. Everest
  - b. the ground
  - c. sea level
  - d. Death Valley
6. On a compass rose, SE means
  - a. Solar Electricity
  - b. South East
  - c. Sun Ends
  - d. Sort of East
7. What feature on a map shows the ratio of map distance to actual earth distance?
  - a. map legend

- b. contour line
  - c. map symbol
  - d. map scale
8. ESE is most accurately described as lying between
- a. E and W
  - b. N and S
  - c. E and S
  - d. E and SE
9. What is the minimum number of points needed for triangulation?
- a. 1
  - b. 2
  - c. 3
  - d. 4
10. What is the reference point for lines of latitude?
- a. the equator
  - b. the prime meridian
  - c. the International Date Line
  - d. the North Pole

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Earth's geographic north pole is the point where the axis of revolution intersects the planet's surface in the north.
- \_\_\_\_\_ 12. The South Pole is located at 180 degrees south.
- \_\_\_\_\_ 13. The International Date Line is located at 180 degrees.
- \_\_\_\_\_ 14. All longitude lines pass through both the North & South poles
- \_\_\_\_\_ 15. The topography of a region is the height or depth of that feature relative to sea level.
- \_\_\_\_\_ 16. One degree latitude is divided into 100 minutes. One minute latitude is divided into 100 seconds.
- \_\_\_\_\_ 17. One degree longitude is divided into 60 minutes. One minute latitude is divided into 60 seconds.
- \_\_\_\_\_ 18. At the Prime Meridian a new day will dawn 12 hours after it arrived at the International Date Line.
- \_\_\_\_\_ 19. A compass needle aligns with geographic north.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

20. A line connecting two locations has a \_\_\_\_\_
21. The \_\_\_\_\_ has a latitude of 0 degrees.
22. A \_\_\_\_\_ is shown on a map to indicate north.
23. A line between a starting and ending point will have a \_\_\_\_\_.
24. All major features of landforms of a region make up its \_\_\_\_\_.
25. There are \_\_\_\_\_ of latitude between the Equator and the North Pole.
26. The height or depth of a region relative to sea level is called its \_\_\_\_\_.
27. The term for giving a location in the third dimension is \_\_\_\_\_.



**Short Answer**

*Answer each question in the space provided.*

28. How is sea level determined?

29. What is the difference between location and direction?

30. Where does  $00^{\circ}00'00''\text{N}$  occur? How about  $90^{\circ}00'00''\text{N}$ ?

31. What is the International Date Line? Where is it located and what happens there?

32. What would be the best way to locate an earthquake?

## 2.3 Modeling Earth's Surface

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. The shape of planet Earth is closest to a
  - a. circle
  - b. sphere
  - c. cone
  - d. rectangle
2. A map that uses contour lines to reveal landforms is a(n)
  - a. radar map
  - b. weather map
  - c. topographic map
  - d. global map
3. Which coordinate system is best for curved surfaces?
  - a. Mercator
  - b. Cartesian
  - c. longitude and latitude
  - d. polar
4. Which projection has correct features at the equator, but highly distorted features near the poles?
  - a. Mercator
  - b. Robinson
  - c. Gnomonic
  - d. Conic
5. Which projection results in a map that is an ellipse rather than a rectangle?
  - a. Mercator
  - b. Robinson
  - c. Gnomonic
  - d. Conic

#### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 6. The shortest distance on a globe is the length of an arc.
- \_\_\_\_\_ 7. In a Mercator projection, compass directions are not straight lines, but a straight line is the shortest distance between the two points.
- \_\_\_\_\_ 8. The National Geographic Society uses the Winkel Tripel Projection

\_\_\_\_\_ 9. Maps are models.

\_\_\_\_\_ 10. A location on a globe must be determined using polar coordinates because a globe is curved.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

11. Maps are \_\_\_\_\_ representations of a \_\_\_\_\_ Earth

12. A \_\_\_\_\_ projection would be best to map Hawaii.

13. A \_\_\_\_\_ map shows average temperatures and rainfall for a region.

14. In a conic map, the location where a map is least distorted is where \_\_\_\_\_.

15. A Robinson projection is best at around \_\_\_\_\_ latitude.

**Short Answer**

*Answer each question in the space provided.*

16. Why are maps necessary?

17. Why is a globe better than a map? Why is a map better than a globe?

18. How could you tell the distance between two points on a globe in miles?

## 2.4 Topographic Maps

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A bathymetric map shows
  - a. depths below sea level
  - b. tree heights
  - c. distance away from the equator
  - d. heights above sea level
2. A geologic map primarily shows
  - a. rock types of a region
  - b. elevation of a region
  - c. geometry of a region
  - d. depth of a region
3. At which scale would features appear at their actual size?
  - a. 1:24,000
  - b. 1:100,000
  - c. 1:01:00
  - d. 1:250,000
4. If a hill has an elevation of 100 ft. and there are 5 contour lines, what is the contour interval?
  - a. 100 ft.
  - b. Each interval is different.
  - c. 500 ft.
  - d. 20 ft.
5. Which of the following represents a basin on a topographic map?
  - a. index contours
  - b. contour intervals
  - c. hatch lines pointing in
  - d. map legends
6. If two contour lines appear to touch it means
  - a. there are at least two elevations at that location.
  - b. the elevation does not change at that location.
  - c. the contour interval is too small.
  - d. the slope is very steep.
7. On a topographic map, Vs that point uphill indicate
  - a. there is a stream channel.

- b. there is a rise in elevation.
  - c. the contour interval is too small.
  - d. the slope is very steep.
8. On a geologic map, different colors indicate
- a. different elevations.
  - b. different rock types.
  - c. different structural features, such as faults and folds./
  - d. landscapes above and below sea level.

**True or False**

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 9. A feature would appear bigger on a map with a scale of 1:24,000 than on one with a scale of 1:100,000?
- \_\_\_\_\_ 10. The distance between contour lines does not always need to be equal
- \_\_\_\_\_ 11. If you walk along a contour line you will be walking uphill.
- \_\_\_\_\_ 12. A contour line must close on itself.
- \_\_\_\_\_ 13. Steep contour lines indicate water.
- \_\_\_\_\_ 14. A relief map uses contour lines to show elevation.
- \_\_\_\_\_ 15. A contour line connects points of equal elevation.
- \_\_\_\_\_ 16. On a bathymetric map, the 200 meter contour is below the 300 meter contour.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

17. Oceanographers use \_\_\_\_\_ maps to depict the features beneath a body of water.
18. \_\_\_\_\_ can never cross with another on a topographic map.
19. The geologist was busy making a \_\_\_\_\_ that showed the location of the rock layers within the county.
20. The difference in elevation between contour lines is called the \_\_\_\_\_ .
21. Contour lines that are very close together indicate \_\_\_\_\_ slopes
22. Contour lines \_\_\_\_\_ cross.

**Short Answer**

*Answer each question in the space provided.*

23. Would a topographic map of the Sierra Nevada mountain range have contour lines that are close together or far apart in most places? Explain.

24. Why can't two contour lines overlap?

25. Describe what a geologic map shows.

26. Compare and contrast the contour lines in a bathymetric map and a topographic map.

## 2.5 Using Satellites and Computers

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- GPS stands for
  - Glacial Positioning System
  - Global Positioning Satellites
  - Global Positioning System
  - Global Placement System
- What does GIS stand for?
  - Geographic Initiating Service
  - Geographic Information System
  - Geologic Igneous Sedimentary
  - Gravitational Incline Slope
- What government organization is in charge of launching satellites?
  - CIA
  - FAA
  - NASA
  - ATF
- A satellite in a polar orbit
  - is excellent for observing and predicting weather.
  - stays in the sky over the same spot.
  - makes one complete orbit around Earth about every 24 hours.
  - orbits at a distance of more than 30,000 km.
- A satellite in a geostationary orbit
  - stays in the sky over the same spot.
  - makes one complete orbit around Earth about every 90 minutes.
  - is best for observing the polar regions.
  - is not as good for communications as satellites in other types of orbits.
- GPS was developed to
  - assist with scientific investigations.
  - provide detailed information on maps.
  - aid in the development of computer software.
  - assist with the military.
- GIS
  - was invented so that scientists could create better geological maps.



- b. is used to create maps containing any sort of spatial information.
- c. needs six satellites to accurately determine a position.
- d. is important for creating weather maps.

## 8. Maps made by computers

- a. are indistinguishable from those made by mapmakers.
- b. are made directly from satellite images with no processing.
- c. contain the same amount of information as maps that are created without computers.
- d. are very important for creating images from other planets.

## 9. Satellites can be used to

- a. get a snapshot of what Earth is like right now.
- b. study the way Earth changes over time.
- c. learn about other planets.
- d. all of the above.

## 10. GPS is

- a. an example of a technology developed by the government that is now used in the public sphere.
- b. most useful within 50 degrees north and south of the equator.
- c. best in urban areas and of much less use in remote locations.
- d. a communication between a locator satellite and a receiver on the ground.

**True or False**

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Satellites can determine the height of the ocean.
- \_\_\_\_\_ 12. A satellite orbits at 3,600 km above Earth in a geostationary orbit.
- \_\_\_\_\_ 13. GPS needs at least six satellites to accurately determine a position.
- \_\_\_\_\_ 14. All but one of Earth's satellites are man-made.
- \_\_\_\_\_ 15. In a geostationary orbit, the satellite orbits the Earth every 90 minutes

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

16. A \_\_\_\_\_ orbit is when the satellite is in sync with the rotation of the Earth.
17. Any object in orbit around another is considered a \_\_\_\_\_
18. A satellite in a \_\_\_\_\_ orbit can see Earth's entire surface in less than a day.
19. A GPS receiver uses at least \_\_\_\_\_ satellites.
20. To create a map with detailed information on fossil fuel use, a scientist would need to utilize \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

21. What is GPS? What is its purpose?

22. Describe how GPS works.

23. Discuss two reasons why studying Earth by satellite so important.

24. Describe the types of scientific data that satellites can collect.

25. Describe the motion of a satellite in a geostationary orbit relative to a spot on Earth and why this is the case.



## 2.6 Studying Earth's Surface

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What do constructive forces do?
  - a. cause landforms to wear down.
  - b. create streams
  - c. create faults.
  - d. cause landforms to build up.
2. How old are ocean basins?
  - a. less than 90 million years.
  - b. less than 180 million years.
  - c. more than 240 million years.
  - d. more than 360 million years.
3. What device aligns itself with magnetic north and can be used to find direction?
  - a. a satellite.
  - b. a compass rose.
  - c. a compass.
  - d. none of the above.
4. Which lines start at the equator and circle around the planet?
  - a. longitude.
  - b. elevation.
  - c. relief
  - d. latitude.
5. What is a 2-D visual representation of a surface with symbols indicating important features?
  - a. a globe.
  - b. a map.
  - c. a projection.
  - d. all of the above.
6. Where is the Mercator Projection most accurate?
  - a. near the poles.
  - b. at the oceans.
  - c. along the edges.
  - d. near the equator.
7. Which projection does the National Geographic Society use?
  - a. Winkel Tripel Projection

- b. Robinson Projection
  - c. Conic Projection
  - d. Mercator Projection
8. What type of map represents locations of geographic features?
- a. bathymetric.
  - b. geologic.
  - c. topographic.
  - d. all the above.
9. What is the average height of the ocean's surface called?
- a. elevation.
  - b. sea level.
  - c. relief.
  - d. none of the above.
10. What type of orbit is a satellite in, if it is 36,000 km above the earth and takes 24 hours to complete one orbit?
- a. geostationary
  - b. polar
  - c. low earth
  - d. none of the above.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. The continents are large land areas extending from high mountain tops to sea level.
- \_\_\_\_\_ 12. The continental margins extend from edge of the continents down steep slopes to the ocean floor and into deep trenches.
- \_\_\_\_\_ 13. The deepest place in the oceans are the ocean trenches.
- \_\_\_\_\_ 14. Locations can be described a variety of ways.
- \_\_\_\_\_ 15. Direction is important for describing moving objects.
- \_\_\_\_\_ 16. Earth's magnetic north pole is the same as its geographic North Pole.
- \_\_\_\_\_ 17. The Prime Meridian is at 180° longitude.
- \_\_\_\_\_ 18. Relief includes all of the geographic features or landforms in a region.
- \_\_\_\_\_ 19. Earth is best represented by a Mercator Map.
- \_\_\_\_\_ 20. Conic projections are only useful for large land areas.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. \_\_\_\_\_ maps use color to show elevations of larger areas.
22. \_\_\_\_\_ maps show average temperature and rainfall.
23. \_\_\_\_\_ maps show storms, air masses, and fronts.
24. The poles are often mapped using the \_\_\_\_\_ projection.
25. The difference between contour lines is called the \_\_\_\_\_.
26. A(n) \_\_\_\_\_ map is a topographic map with the contour lines representing depth below sea level.
27. A(n) \_\_\_\_\_ map shows the rocks and structural features of a region.

28. A(n) \_\_\_\_\_ is a small object that orbits a larger object.
29. Weather satellites are examples of satellite in a \_\_\_\_\_ orbit.
30. \_\_\_\_\_ uses exact geographic locations for GPS receivers along with any type of spatial information to create maps and images.

**Short Answer**

*Answer each question in the space provided.*

31. Explain how hills and depressions are depicted on a topographic map.

32. Explain the importance of latitude, longitude, and elevation.

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CHAPTER **3**

# HS Earth's Minerals Assessments

## Chapter Outline

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- 3.1 **MATTER MATTERS**
  - 3.2 **MINERALS AND MINERAL GROUPS**
  - 3.3 **MINERAL IDENTIFICATION**
  - 3.4 **MINERAL FORMATION**
  - 3.5 **MINING AND MINERAL USE**
  - 3.6 **STUDYING EARTH'S MINERALS**
-

## 3.1 Matter Matters

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- How many oxygen atoms are in a silicon-oxygen tetrahedron?
  - 2
  - 3
  - 4
  - 5
- What is the lightest of all the elements?
  - hydrogen
  - helium
  - neon
  - carbon
- What particles make up the nucleus of an atom?
  - protons only
  - neutrons only
  - neutrons and electrons
  - protons and neutrons
- Which is not an element?
  - hydrogen
  - water
  - argon
  - uranium
- Which is the average of the mass numbers of an element's isotopes?
  - atomic number
  - energy levels
  - atomic mass
  - molecular mass
- Electrons are
  - important components of an atomic nucleus.
  - the main reason the atomic mass of different atoms is different.
  - the main reason an element may have different isotopes.
  - found in a cloud.
- Carbon atoms
  - have 6 protons and 6, 7 or 8 neutrons



- b. have 6 neutrons and 6, 7 or 8 protons.
  - c. have 6 neutrons and 6, 7 or 8 electrons.
  - d. have 6 protons and 6 neutrons.
8. To create a positive ion from a negative ion, there must be
- a. a loss of at least two electrons.
  - b. a gain of at least two electrons.
  - c. the addition of protons in the nucleus.
  - d. the addition of neutrons in the nucleus.
9. With a polar molecule,
- a. the substance is always cold enough to be in the solid state.
  - b. an atom shares one or more electrons with another atom.
  - c. the electrical charges are always equal.
  - d. one side has a slightly positive charge and the other has a slightly negative charge.
10. With a hydrogen bond,
- a. a hydrogen atom is bonded to another hydrogen atom, possibly with another atom; as in water.
  - b. the positive side of one polar molecule is attracted to the negative side of another polar molecule.
  - c. electrons are transferred between atoms.
  - d. an atom shares one or more electrons with another atom.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Protons have a positive electrical charge.
- \_\_\_\_\_ 12. The number of protons plus neutrons gives the atom its atomic mass
- \_\_\_\_\_ 13. When an atom either gains or loses electrons, this creates an molecule.
- \_\_\_\_\_ 14. A covalent bond is the weakest of all chemical bonds
- \_\_\_\_\_ 15. Electrons are always negatively charged

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. A \_\_\_\_\_ is formed when atoms share electrons.
17. An atom can give or receive electrons in a(n) \_\_\_\_\_.
18. An atom with more or less neutrons than protons is a(n) \_\_\_\_\_.
19. Electrons, protons and neutrons make up an \_\_\_\_\_.
20. The part of an atom that is positively charged is called the \_\_\_\_\_.
21. Neon has eight \_\_\_\_\_ in its outer valence shell.
22. The \_\_\_\_\_ of water is 18.01528 amu.
23. A chemical \_\_\_\_\_ is a substance that cannot be made into a simpler form by ordinary chemical means.

### Short Answer

Answer each question in the space provided.

24. When is an atom considered stable?

25. How is an atom different from an ion? Why are ions important?

26. What type of chemical bond keeps two water molecules bonded together? Explain how this type of bonding works.

## 3.2 Minerals and Mineral Groups

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A crystal is a solid in which the atoms are arranged in a \_\_\_\_\_, \_\_\_\_\_ pattern
  - a. regular, non-repeating
  - b. irregular, repeating
  - c. regular, repeating
  - d. irregular, non-repeating
2. About how many minerals are found in the Earth's crust?
  - a. 2000
  - b. 3000
  - c. 4000
  - d. 5000
3. Silicates make up over \_\_\_\_ of the Earth's crust.
  - a. 95%
  - b. 90%
  - c. 50%
  - d. 45%
4. The chemical composition of hematite is
  - a.  $\text{Fe}_2\text{O}_3$
  - b.  $\text{Fe}_3\text{O}_2$
  - c.  $\text{Fe}_2\text{O}_3\text{C}$
  - d.  $\text{H}_2\text{O}_3$
5. The most magnetic mineral is?
  - a. hematite
  - b. magnetite
  - c. halite
  - d. uranium
6. The elements that make up 98.5% of Earth's crust are
  - a. gold, silver, copper, titanium, and the other metals.
  - b. oxygen and silicon
  - c. oxygen, silicon, gold, silver, copper, titanium, and aluminum
  - d. oxygen, silicon, aluminum, iron, calcium, sodium, potassium, and magnesium
7. The two most abundant elements in common minerals are?
  - a. calcium manganese

- b. silicon oxygen
  - c. iron magnesium
  - d. carbon potassium
8. Which of the following is a part of the definition of a mineral?
- a. liquid
  - b. condition
  - c. inorganic
  - d. organic
9. The pattern in which a mineral breaks is called
- a. cracking
  - b. strike
  - c. breaking
  - d. fracture
10. The different appearances of different types of silicates are due to the different
- a. ways the tetrahedrons combine together.
  - b. conditions in which the minerals form.
  - c. chemical compositions, such as the presence or absence of silica.
  - d. shapes of the tetrahedrons.
11. Fluorine, chlorine, bromine and iodine are found in
- a. halide minerals.
  - b. phosphate minerals.
  - c. sulfide minerals
  - d. oxygenate minerals.
12. Phosphate minerals are like silicates except that
- a. phosphorous substitutes for oxygen.
  - b. phosphorous, arsenic or vanadium substitutes for oxygen.
  - c. phosphorous substitutes for silicon.
  - d. phosphorous, arsenic or vanadium substitutes for silicon.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Most minerals are native elements
- \_\_\_\_\_ 14. Minerals are crystalline structures
- \_\_\_\_\_ 15. Most minerals fit into one of two mineral groups.
- \_\_\_\_\_ 16. Silicates are by far the largest mineral group.
- \_\_\_\_\_ 17. Table salt is also known as halite.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The crystalline structure of halite (table salt) creates minerals in the shape of \_\_\_\_\_.
19. A mineral is a naturally occurring, \_\_\_\_\_ substance with a repeating crystalline structure.
20. Minerals are divided into groups based on their \_\_\_\_\_.
21. Minerals are made by \_\_\_\_\_ processes
22. Minerals with only one element are called \_\_\_\_\_.

23. Minerals that form when salt water evaporates are \_\_\_\_\_.
24. The element \_\_\_\_\_ is found in sulfates but not sulfides.
25. The way light reflects off the mineral's surface is called \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Is quartz a mineral? Is glass a mineral? Describe why in each case.

27. What is the basic structure of a carbonate? What makes different carbonates?

28. What are the requirements for a substance to be a mineral?

## 3.3 Mineral Identification

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- A glassy appearing mineral would have a luster that is
  - silky
  - pearly
  - vitreous
  - earthy
- A mineral that splits into even sheets shows which of the following properties?
  - low density
  - consistent streak
  - good cleavage
  - triclinic crystal shape
- Color variety in minerals is caused by
  - chemical impurities
  - change in temperature
  - the number of crystals
  - the crystalline structure
- Diamond has which of the following types of luster?
  - metallic
  - adamantine
  - glassy
  - pearly
- A mineral has a mass of 240 grams and a volume of 60 cubic centimeters. What is its density?
  - $14400\text{g}/\text{cm}^3$
  - $4\text{g}/\text{cm}^3$
  - 8g
  - $4\text{cm}^3/\text{g}$
- What mineral fizzes when it comes in contact with hydrochloric acid?
  - quartz
  - pyrite
  - gypsum
  - calcite
- What would you use the Mohs scale for?
  - to determine a mineral's hardness

- b. to find the mass of a mineral
  - c. to calculate the density of a mineral
  - d. to determine a mineral's fracture
8. When a mineral is rubbed across an unglazed porcelain plate. What mineral property is being tested?
- a. hardness
  - b. luster
  - c. color
  - d. streak
9. Minerals that exhibit fluorescence
- a. have a characteristic fluorite structure.
  - b. have a distinctive smell.
  - c. glow under ultraviolet light.
  - d. give off radiation that can be measured with a Geiger counter.
10. Minerals will break
- a. where their chemical bonds are weakest.
  - b. along flat planes.
  - c. in one direction.
  - d. in patterns such as fibrous, splintery, or smooth-curved.
11. Fluorite is
- a. harder than apatite but softer than calcite.
  - b. harder than gypsum but softer than apatite.
  - c. harder than calcite but softer than feldspar.
  - d. harder than feldspar but softer than apatite.
12. A mineral with vitreous luster looks
- a. pearly.
  - b. glassy.
  - c. resinous.
  - d. none of the above.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. The same mineral can have different shapes.
- \_\_\_\_\_ 14. Corundum can scratch topaz but will be scratched by diamond.
- \_\_\_\_\_ 15. Many minerals are colored by chemical impurities.
- \_\_\_\_\_ 16. Color is a more reliable property than streak because color does not vary.
- \_\_\_\_\_ 17. Fracture is a break in a mineral along certain planes.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A mineral that does not break smoothly along cleavage planes is said to \_\_\_\_\_.
19. Any object with a \_\_\_\_\_ greater than water will sink in water.
20. The reflection of light off a mineral's surface is its \_\_\_\_\_.
21. \_\_\_\_\_ is the color of a mineral's powder.
22. The heft or relative weight of a mineral sample is directly related to the mineral's \_\_\_\_\_.

23. Scientists who study minerals are known as \_\_\_\_\_.
24. The amount of matter in an object is its \_\_\_\_\_.
25. A mineral that has luster like tree sap has \_\_\_\_\_ luster.

**Short Answer**

*Answer each question in the space provided'*

26. Imagine you have in your hand a mineral that you think is quartz. What characteristics would allow you to prove or disprove this initial identification? What characteristics could you not use?

27. Describe three characteristics that will let you determine if a mineral is pyrite or gold.



## 3.4 Mineral Formation

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Magma begins to crystallize below
  - 2,000°C
  - 1,100°C
  - 1,100°F
  - 2,000°F
- What happens to the crystals that form from a magma that cools at a slower rate?
  - crystal size increases
  - crystal size decreases
  - crystals become clearer
  - crystals become darker in color
- Which is not a method of mineral formation?
  - volcanic gases
  - oxidation
  - sedimentation from magma
  - deposition from a saline fluid
- Whether a magma cools slowly or rapidly, the resulting rocks will
  - have the same chemical composition.
  - have the same crystal size.
  - have the same minerals.
  - be granite (slow cooling) or basalt (rapid cooling).
- Minerals form from salt water when
  - the water is heated to a certain temperature, depending on the mineral.
  - the amount of dissolved material becomes too great and the particles come together.
  - the water finds a vein to travel through and deposit particles.
  - the water becomes more acidic and minerals precipitate out.
- New minerals can form from old minerals in a rock when
  - the rock is heated enough that the molecules are released from their structures.
  - the magma cools very rapidly.
  - evaporation brings chemical elements together to form the minerals.
  - the magma cools very slowly.
- Tufa towers are
  - piles of bat guano.

- b. mineral deposits that form as magma cools in a dome-shape.
  - c. found in clear lakes, such as Lake Tahoe in California.
  - d. carbonate structures that form from an alkaline lake.
8. Minerals form from
- a. solids.
  - b. liquids.
  - c. gases.
  - d. all of the above.
9. In a granite, minerals can be distinguished by their
- a. size.
  - b. shape.
  - c. color.
  - d. location.
10. The size of a space that a mineral can form in can determine its
- a. composition.
  - b. color.
  - c. luster.
  - d. size.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. If a rock heats up just enough that the molecules can move around, the rock has become a magma.
- \_\_\_\_\_ 12. There are about 14 conditions that a mineral can form under.
- \_\_\_\_\_ 13. Water can only hold a certain amount of dissolved minerals.
- \_\_\_\_\_ 14. Veins are mineral deposits that fill in cracks.
- \_\_\_\_\_ 15. Any mineral can precipitate from water under the right conditions.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

16. You are holding in your hand a rock that formed from magma. If that rock has tiny crystals, you can say that the rock cooled \_\_\_\_\_.
17. You are holding in your hand a rock that formed from magma. If that rock has large crystals, you can say that the rock cooled \_\_\_\_\_.
18. An extremely large body of water containing a solution of chemical elements that can become minerals is called a(n) \_\_\_\_\_.
19. Kilauea, the most active volcano on Earth, erupts a tremendous amount of \_\_\_\_\_ annually.
20. A rock is a collection of \_\_\_\_\_.
21. The slower magma cools, the larger \_\_\_\_\_ the minerals will form.
22. A rock that contains large crystals of quartz, plagioclase feldspar, potassium feldspar and biotite is called \_\_\_\_\_.
23. Tufa towers form when spring water that is rich in the element \_\_\_\_\_ bubbles up into an alkaline lake.

### Short Answer

*Answer each question in the space provided.*

24. Describe the entire process that creates mineral deposits in veins.

25. What happens to the dissolved minerals when water evaporates?

## 3.5 Mining and Mineral Use

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Placers are valuable minerals found in
  - mountain ranges
  - deserts
  - stream deposits
  - populated areas
- An ore will be mined if it is
  - easy
  - profitable
  - harmful
  - difficult
- Overlying rock is blasted away in which type of mining
  - underground mining
  - surface mining
  - oceanic mining
  - panning
- Gold that weathered out of metamorphic rock in California
  - was located below the soil surface.
  - was located at the soil surface.
  - settled in gravel deposits.
  - none of the above.
- Underground mining approaches depend on
  - the placement of the ore
  - concentration of the ore
  - strength of the surrounding rock
  - all of the above
- The cost of creating a product from a mineral deposit depends on
  - the abundance of the valuable mineral in the deposit.
  - the cost of extracting the mineral from the rock.
  - the cost of refining the ore material.
  - all of the above.
- If the price of a mineral resource goes up,
  - a rock that was not an ore deposit could become an ore deposit.

- b. the value of the ore deposit will go down.
  - c. the price of mining that resource will go up.
  - d. it will be mined.
8. Valuable natural resources are
- a. evenly distributed around the planet.
  - b. more highly concentrated in certain locations by geologic processes.
  - c. collected by surface mining techniques.
  - d. always profitable, or they wouldn't be called valuable.
9. Smelting
- a. is a type of surface mining in which the overlying rock is blasted away.
  - b. is a type of underground mining in which miners blast and tunnel into rock to gain access to the ore deposit.
  - c. causes minerals to segregate so that the valuable ore can be extracted.
  - d. is when a compound is added that attaches to the valuable mineral, which floats and can then be extracted.
10. Examples of gemstones include all of the following except
- a. diamonds
  - b. cubic zirconia
  - c. turquoise
  - d. jade
11. Which of the following is not true of gemstones?
- a. Gemstones are valuable.
  - b. Gemstones are cut so that light bounces back off the cleavage planes.
  - c. Gemstones do not break or scratch easily.
  - d. Gemstones are only used in jewelry.
12. Which of the following is not a use for minerals?
- a. providing energy
  - b. electrical wiring
  - c. adding flavor to food
  - d. creating food containers

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Environmental factors are usually considered in the cost of an ore.
- \_\_\_\_\_ 14. There is much more to the process of ore extraction beyond mining
- \_\_\_\_\_ 15. Pollutants from mining can enter nearby streams
- \_\_\_\_\_ 16. There are currently no laws that say a mine must return the surrounding environment back to its natural state.
- \_\_\_\_\_ 17. Gemstones are primarily used for jewellery.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A(n) \_\_\_\_\_ is a rock from which metals or nonmetals can be removed in usable amounts.
19. In order for a mine to open, a \_\_\_\_\_ plan must be in place for when the mine closes down.
20. Surface mining allows extraction of ores that are \_\_\_\_\_ to the Earth's surface

21. A(n) \_\_\_\_\_ that is used for jewelery is usually cut and polished.
22. Bauxite is a rock that contains valuable amounts of the resource \_\_\_\_\_.
23. Strip mining, placer mining and dredging are examples of \_\_\_\_\_ mining.
24. Coal miners that work in tunnels are engaging in \_\_\_\_\_ mining.
25. The use of chemicals, such as cyanide or acid, to remove ore minerals from rock is called \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. What are some of the environmental side effects of mining?

27. Describe the process of reclamation.

28. How do geologists find mineral deposits and determine their size?

29. Why is it better to recycle aluminum rather than create new aluminum?



## 3.6 Studying Earth's Minerals

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What subatomic particles make up the atomic mass of an element?
  - a. protons and neutrons.
  - b. electrons and neutrons.
  - c. protons and electrons.
  - d. protons, neutrons, and electrons.
2. What type of bond is created when electrons are transferred between atoms?
  - a. hydrogen.
  - b. ionic.
  - c. covalent.
  - d. metallic.
3. Minerals have
  - a. an exact chemical composition, such as  $\text{SiO}_2$ .
  - b. a small range in chemical composition, such as  $(\text{Mg}, \text{Fe})_2\text{SiO}_4$
  - c. a large range in chemical composition, such as  $(\text{Mg}, \text{Fe}, \text{Al}, \text{K}, \text{Na})_2\text{SiO}_4$
  - d. no set chemical composition.
4. Each mineral group has a distinctive chemical feature, such as
  - a. oxides are a metal combined with oxygen.
  - b. sulfides are a metal combined with sulfur and oxygen.
  - c. halides are a salt combined with a metallic atom.
  - d. phosphates are made of phosphate polygons.
5. The specific gravity of a mineral
  - a. is a measure of its density, mass divided by volume.
  - b. is a measure of its mass, the amount of matter in the mineral.
  - c. compares its density to the density of water.
  - d. compares its gravity to the gravity of water.
6. Streak is a more reliable property for identifying a mineral than color because
  - a. all minerals have streak.
  - b. mineral colors vary, but their streak color does not.
  - c. a minerals color can change over time, but it's streak color does not.
  - d. streak and color are nearly always the same.
7. If a rock is heated below the surface to more than  $1,000^\circ\text{C}$  it will
  - a. form a metamorphic rock.



- b. create a magma.
  - c. heat underground water to form vein deposits.
  - d. form geodes if there is space to do so.
8. If pure water is evaporated, what is left behind is
- a. calcium carbonate, like in tufa towers.
  - b. only the mineral halite.
  - c. the minerals halite, gypsum and other evaporites.
  - d. nothing.
9. Recycling an aluminum can
- a. is not very valuable because aluminum is cheap.
  - b. is extremely energy intensive.
  - c. uses much less energy than creating useful aluminum from ore.
  - d. is something other people should do.
10. The environmental costs of mining
- a. are minimal.
  - b. potentially include pollutants entering streams and the soil.
  - c. excess sediments clogging streams and lakes.
  - d. b c

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Carbon-12, carbon-13 and carbon-14 are all isotopes of the same element.
- \_\_\_\_\_ 12. Covalent bonding keeps a water molecule together, but polar bonding keeps water molecules attached to each other.
- \_\_\_\_\_ 13. Minerals that are the same color probably have the same color streak.
- \_\_\_\_\_ 14. The minerals groups are sulfides, sulfates, phosphates, oxates, halides, carbonates, native elements and silicates.
- \_\_\_\_\_ 15. Some minerals have a distinctive taste or smell.
- \_\_\_\_\_ 16. Gemstones have cleavage planes that are in a crystal shape with smooth faces.
- \_\_\_\_\_ 17. Molten rock, wherever it is, is called magma.
- \_\_\_\_\_ 18. Vein deposits are mineral deposits that form when minerals fill cracks in rocks.
- \_\_\_\_\_ 19. Ore is a rock that contains minerals with useful elements.
- \_\_\_\_\_ 20. Toxic chemicals are sometimes put on rock to remove the ore.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The smallest unit of a compound with all of the properties of that compound is a(n) \_\_\_\_\_.
22. The sum of all the masses of all the atoms in a molecule is its \_\_\_\_\_.
23. Atoms are arranged in regular, repeating patterns in a(n) \_\_\_\_\_.
24. The basic carbonate structure is \_\_\_\_\_ carbon atom(s) and \_\_\_\_\_ oxygen atom(s).
25. The property of a mineral that describes what minerals it can scratch or can be scratched by is its \_\_\_\_\_.
26. Some minerals give off \_\_\_\_\_ that can be measured with a Geiger counter.

27. When the amount of dissolved minerals and salts in water becomes too great, these materials will \_\_\_\_\_.
28. Crystals that form when magma cools \_\_\_\_\_ are larger than it cools rapidly.
29. The restoration of a mined region to its natural region is called \_\_\_\_\_ .
30. Metal ores must undergo \_\_\_\_\_ so that the valuable minerals segregate into layers and can be extracted.

**Short Answer**

*Answer each question in the space provided.*

31. Describe how the building blocks of silicates create different shaped minerals.

32. Other than jewelry, what else are minerals used for? List at least 3 things.

33. Explain the difference between surface and underground mining.

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CHAPTER

**4**

# HS Rocks Assessments

## Chapter Outline

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- 4.1 TYPES OF ROCKS
  - 4.2 IGNEOUS ROCKS
  - 4.3 SEDIMENTARY ROCKS
  - 4.4 METAMORPHIC ROCKS
  - 4.5 STUDYING ROCKS
-

## 4.1 Types of Rocks

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- How many rock types are in the rock cycle?
  - 3
  - 4
  - 5
  - 7
- Each type of rock has a particular
  - color.
  - size.
  - set of minerals.
  - shape.
- The texture of a rock is determined by
  - the size of its mineral grains.
  - the shape of its mineral grains.
  - the arrangement of its mineral grains.
  - all of the above.
- When magma cools and hardens, which of the following does it form?
  - Igneous rock
  - Sedimentary rock
  - Metamorphic rock
  - Conglomerate
- The reason two rocks can have the same minerals but with very different sizes is
  - the fragments in one rock are more eroded than the fragments in the other.
  - the rocks cooled at different rates from a magma.
  - the rocks have different compositions.
  - one rock is igneous and one rock is metamorphic.
- Sediments come together by these processes to create sedimentary rocks.
  - compaction and cementation
  - precipitation and cementation
  - compaction and precipitation
  - compaction, cementation, and precipitation
- Weathering breaks rocks down into
  - minerals.

- b. crystals.
- c. sediments.
- d. rocklets.

8. Erosion is the process by which sediments
- a. are broken into smaller pieces.
  - b. are compacted into rock.
  - c. are changed into other types of sediments.
  - d. are transported by running water, ice and gravity.
9. A rock that changes its mineral composition or texture is a(n)
- a. igneous rock.
  - b. sedimentary rock.
  - c. metamorphic rock.
  - d. hard rock.
10. Quartzite forms when
- a. quartz sandstone melts to form a magma that then crystallizes.
  - b. quartz sandstone is exposed to heat and pressure within the planet.
  - c. quartz grains are cemented and compacted.
  - d. quartz grains precipitate from a quartz-rich fluid.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. As magma cools, all of the mineral grains form at the same temperature.
- \_\_\_\_\_ 12. Metamorphism may change the chemical composition of a rock.
- \_\_\_\_\_ 13. Only one type of mineral can be present in a metamorphic rock.
- \_\_\_\_\_ 14. Rocks can be studied through a microscope
- \_\_\_\_\_ 15. A metamorphic rock must have a different mineral composition than its parent rock

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

16. The natural transitions that change one rock type to another rock type are part of the \_\_\_\_\_.
17. Igneous rocks form by the \_\_\_\_\_ of magma
18. One of the two things that rocks are identified primarily by is their \_\_\_\_\_.
19. The other of the two things that rocks are identified primarily by is their \_\_\_\_\_.
20. An exposed rock formation is called a(n)\_\_\_\_\_.
21. The solids that are left behind after a liquid evaporates are called \_\_\_\_\_.
22. Rocks that have formed from previously existing rocks through the actions of heat and pressure are \_\_\_\_\_ - \_\_\_\_\_ rocks.
23. The Grand Canyon was created by \_\_\_\_\_ by the Colorado River.

### Short Answer

*Answer each question in the space provided.*

24. Describe the importance of the rock cycle.

25. What is the process that transforms an igneous rock into a sedimentary rock?

26. Draw a picture of the rock cycle with the three rock types and the processes that connect them. This will be useful as a reference in the rest of this chapter.

## 4.2 Igneous Rocks

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- If only some minerals in a rock become liquid, the rock is undergoing
  - Bowen's Reaction Series.
  - fractional crystallization.
  - partial melting.
  - partial crystallization.
- Which of the following is true?
  - Fractional crystallization is the opposite of partial melting.
  - Fractional crystallization takes place in more mafic rocks, while partial melting takes place in more felsic rocks.
  - Fractional crystallization takes place in more felsic rocks, while partial melting takes place in more mafic rocks.
  - Fractional crystallization is the same as partial melting.
- If each of the minerals below appear in a rock, which was the first mineral to crystallize from the magma?
  - amphibole
  - olivine
  - biotite mica
  - pyroxene
- What magma type contains the greatest amount of  $\text{SiO}_2$ ?
  - rhyolitic magma
  - basaltic magma
  - andesitic magma
  - periodic magma
- Which minerals are associated with the rightbranch of Bowen's reaction series?
  - olivine and pyroxene
  - mica and feldspars
  - feldspars
  - quartz and biotite
- Which term describes igneous rocks that crystallize above the crust
  - extrusive
  - intrusive
  - magma
  - lava

7. Which mineral is the most common in ultramafic rock?
  - a. diamond
  - b. quartz
  - c. pyroxene
  - d. olivine
8. Which of the following affects the melting temperature of magma?
  - a. ore deposits
  - b. silica content
  - c. oxygen content
  - d. potassium content
9. A rock may melt to form a magma if
  - a. pressure is raised.
  - b. temperature is lowered.
  - c. water is added.
  - d. composition is changed.
10. A rock with the small, barely visible crystals of quartz and orthoclase feldspar is likely to be a
  - a. dacite
  - b. granodiorite
  - c. rhyolite
  - d. granite
11. If the silica content of an igneous rock with large, well-formed crystals is around 68%, the rock is a
  - a. dacite
  - b. granodiorite
  - c. rhyolite
  - d. granite
12. Igneous rocks are extremely common because they
  - a. are a large portion of the continents.
  - b. make up most of the seafloor.
  - c. are common in many mountain ranges.
  - d. all of the above.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Temperature, pressure, water, and rock composition are factors that determine if a rock will melt.
- \_\_\_\_\_ 14. Bowen's Reaction Series can be used to determine the range of temperatures at which a mineral will crystallize.
- \_\_\_\_\_ 15. Diorite is a type of basalt.
- \_\_\_\_\_ 16. All magma has the same composition.
- \_\_\_\_\_ 17. Silicon is the most abundant element in the Earth's crust at 46.6%

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Andesite and diorite are in the \_\_\_\_\_ group of igneous rocks.
19. A rock body that forms from magma that cools in the crust is a(n) \_\_\_\_\_.



20. Peridotite and komatiite are types of \_\_\_\_\_ igneous rocks.
21. Quartz is the last mineral to crystallize from a magma according to \_\_\_\_\_.
22. If a lava cools so rapidly that gas is trapped in the rock, that rock will be of the type \_\_\_\_\_.
23. The rock described in the previous problem has \_\_\_\_\_ texture.
24. \_\_\_\_\_ igneous rocks form underground and cool more slowly, causing large crystals to form.
25. A rock is classified as \_\_\_\_\_ if it has low (but not super low) silica content.

**Short Answer**

*Answer each question in the space provided.*

26. Thinking of Bowen's Reaction Series in a general sense, which mineral will be the first to crystallize out of a magma?

27. Describe how a rock with porphyritic texture forms.

28. What are the differences between intrusive and extrusive igneous rocks in how they appear and how they form?

## 4.3 Sedimentary Rocks

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. By what process are surface materials removed and transported from one location to another?
  - a. weathering
  - b. deposition
  - c. transportation
  - d. erosion
2. What are solid particles that have been deposited on the Earth's surface called?
  - a. lava
  - b. sediments
  - c. quartz
  - d. soils
3. What do rock salt, gypsum and dolostone have in common?
  - a. They are all clastic sedimentary rocks.
  - b. They are all chemical precipitates.
  - c. They are all biochemical sedimentary rocks.
  - d. They are all organic.
4. What process breaks solid rock into smaller pieces?
  - a. weathering
  - b. deposition
  - c. cementation
  - d. metamorphism
5. What type of erosion can usually only moved sand or small sized particles?
  - a. glaciers
  - b. water
  - c. landslides
  - d. wind
6. Which of the following is the sedimentary rock with the smallest grains?
  - a. breccia
  - b. conglomerate
  - c. siltstone
  - d. sandstone
7. Large piles of large sediments could have been transported by
  - a. streams

- b. wind
  - c. ocean currents
  - d. glaciers
8. The sizes of the sediments a stream can carry depends primarily on
- a. the energy of the water.
  - b. the roundness of the sediments.
  - c. the composition of the sediments.
  - d. the amount of sediments that are available.
9. The way sediments harden into rock is best described as
- a. compaction.
  - b. lithification.
  - c. cementation.
  - d. precipitation.
10. Compaction occurs when
- a. fluids fill the spaces between sediments and crystallize.
  - b. sediments are squeezed by the weight of overlying sediments.
  - c. chemical sediments precipitate into the clastic sediments.
  - d. fossils fill in the spaces between sediments.
11. Clastic sedimentary rocks are classified by
- a. the presence or absence of biological materials.
  - b. how highly lithified they are.
  - c. the size of the sediments they are made of.
  - d. the location where they precipitated.
12. Rocks that form from the shells of dead organisms are best described as
- a. biochemical sedimentary rocks.
  - b. chemical sedimentary rocks.
  - c. fossil rocks.
  - d. biological sandstone.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Like minerals, sediments cannot include organic materials.
- \_\_\_\_\_ 14. Weathering and erosion are terms that mean different things.
- \_\_\_\_\_ 15. Lithification is the process that breaks rocks into smaller fragments.
- \_\_\_\_\_ 16. Cementation occurs when the fluids in the free spaces of the sediments crystallize.
- \_\_\_\_\_ 17. A biochemical sedimentary rock can form directly from water.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. \_\_\_\_\_ sedimentary rocks are rocks that form when chemical precipitates harden.
19. As sediments are buried underneath newer sediments, weight causes \_\_\_\_\_ to occur
20. Loose sediments harden by process of \_\_\_\_\_ where fluids deposit ions.
21. The process of sediments becoming squeezed into rocks is called \_\_\_\_\_.

22. A breccia is like a \_\_\_\_\_ except that a breccia has angular fragments and the other rock has rounded fragments.
23. The sedimentary rock made of the smallest sediments is called \_\_\_\_\_.
24. If one rock layer is below another rock layer, the rock layer on top is very likely to be \_\_\_\_\_ in age.
25. The mineral that was called a mineral in the previous chapter and is a sedimentary rock in this chapter is \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Describe how sedimentary rocks are classified.

27. What are some uses of sedimentary rocks?

## 4.4 Metamorphic Rocks

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Metamorphism occurs when there is
  - a. heat only.
  - b. pressure only.
  - c. heat and pressure together.
  - d. all of the above.
2. Metamorphic rocks change
  - a. physically only.
  - b. chemically only.
  - c. physically and chemically together.
  - d. all of the above.
3. Contact metamorphism is caused by
  - a. heat from magma
  - b. water pressure
  - c. overlying rock
  - d. atmospheric pressure
4. Ground up marble is commonly found in
  - a. plastics
  - b. paper
  - c. toothpaste
  - d. all of the above
5. Marble is a metamorphosed rock of
  - a. sandstone
  - b. limestone
  - c. quartz
  - d. shale
6. Regional metamorphism is due to extreme pressure caused by
  - a. heat from magma
  - b. water pressure
  - c. overlying rock
  - d. atmospheric pressure
7. What type of rock can become a metamorphic rock?
  - a. Igneous rock

- b. Sedimentary rock
  - c. Metamorphic rock
  - d. all of the above
8. Which of the following is classified as a metamorphic rock?
- a. conglomerate
  - b. phyllite
  - c. shale
  - d. breccia
9. Metamorphism changes rocks because
- a. the minerals need to be stable under the new conditions.
  - b. the rocks melt.
  - c. the conditions break the atoms apart to form new atoms.
  - d. the pressure causes foliation in each mineral.
10. Regional metamorphism can be the result of
- a. extreme heat.
  - b. deep burial.
  - c. intense pressure from all directions.
  - d. melting.
11. Increasing metamorphism of shale will lead to
- a. gneiss then schist then phyllite then slate.
  - b. slate then phyllite then schist then gneiss.
  - c. schist then slate then phyllite then gneiss.
  - d. gneiss then phyllite then slate then schist.
12. The two main types of metamorphism are
- a. igneous and sedimentary.
  - b. extreme and moderate.
  - c. regional and contact.
  - d. foliated and non-foliated.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Foliation occurs when pressure is exerted from all directions equally.
- \_\_\_\_\_ 14. Marble is non-foliated
- \_\_\_\_\_ 15. Slate is metamorphosed shale.
- \_\_\_\_\_ 16. A metamorphic rock nearly always resembles its original parent rock.
- \_\_\_\_\_ 17. Metamorphic rocks are distinguished from igneous and sedimentary rocks because they are foliated.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. During metamorphism, \_\_\_\_\_ move between minerals.
19. A metamorphic rock with alternating bands of light and dark minerals is \_\_\_\_\_.
20. \_\_\_\_\_ metamorphism occurs when existing rock is altered by heat from a nearby magma.
21. A rock that is exposed to so much heat and pressure that it melts will cool to become a(n) \_\_\_\_\_ rock.
22. \_\_\_\_\_ due to geologic processes can cause regional metamorphism.

23. Quartzite is metamorphosed \_\_\_\_\_.
24. Banded layers found in metamorphic rock are known as \_\_\_\_\_.
25. \_\_\_\_\_ is observed in rock that underwent directional pressure.

**Short Answer**

*Answer each question in the space provided.*

26. What processes lead to the creation of hornfels? How can more than one original rock type be metamorphosed to become hornfels?

27. Describe how a metamorphic rock becomes foliated? Under what conditions does this happen?

## 4.5 Studying Rocks

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Which type of rock forms from cooling magma?
  - igneous
  - sedimentary
  - metamorphic
  - all of these.
- Gravel, sand, silt, or clay are types of
  - shards
  - rocklets
  - sediment
  - none of these.
- Who is considered the Father of Geology?
  - Isaac Newton
  - James Hutton
  - Charles Lyell
  - Albert Einstein
- What indicates the temperature at which minerals melt or crystallize?
  - partial melting.
  - fractional crystallization.
  - Bowen's reactions series.
  - all of these.
- How are igneous rocks classified?
  - size and shape
  - composition and grain size
  - texture and grain size
  - none of these
- What is the primary process that causes rocks to become sediment?
  - weathering
  - erosion
  - pressure
  - transport
- Biochemical sedimentary rocks form when living creatures use ions in water to create what?
  - shells



- b. bones
  - c. both of these
  - d. neither of these
8. By raising their pressure temperature enough, rocks may
- a. form new minerals
  - b. form minerals bands
  - c. form layers
  - d. all of these
9. What are the flat layers that form as rocks are squeezed called?
- a. foliation
  - b. layers
  - c. hornfels
  - d. bedding planes
10. Which metamorphic rock makes up the “lead” in pencils?
- a. marble
  - b. graphite
  - c. quartzite
  - d. gneiss

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Rocks are naturally formed, non-living material.
- \_\_\_\_\_ 12. Rocks are made up of only one type of mineral.
- \_\_\_\_\_ 13. Rocks are classified by their texture only.
- \_\_\_\_\_ 14. Precipitates are the solid materials left behind after a liquid evaporates.
- \_\_\_\_\_ 15. As magma cools, different crystals form in the process known as metamorphism.
- \_\_\_\_\_ 16. Erosion occurs when running water, ice, and gravity transports sediments from one place to another.
- \_\_\_\_\_ 17. The rock cycle describes the transformation of one type of rock to another.
- \_\_\_\_\_ 18. A pluton is an igneous extrusive rock body that has cooled in the crust.
- \_\_\_\_\_ 19. Sedimentary rocks were used in the White House because they are the hardest and most stable rocks.
- \_\_\_\_\_ 20. Organic materials are the remains of once-living organisms.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. \_\_\_\_\_ igneous rocks solidify beneath the surface.
22. \_\_\_\_\_ cooling allows time for large crystals to form.
23. Lavas that cool so rapidly that no crystals form have a \_\_\_\_\_ texture.
24. Fluids that crystallize in the spaces between the loose particles of sediments create rock by \_\_\_\_\_.
25. \_\_\_\_\_ metamorphism changes enormous quantities of rock over a wide area.
26. \_\_\_\_\_ metamorphism changes a rock that is in contact with magma because of the extreme heat.
27. The metamorphism of shale produces \_\_\_\_\_.
28. Marble is produced from the metamorphism of \_\_\_\_\_.

29. Cemented sediments become \_\_\_\_\_ sedimentary rocks.

30. \_\_\_\_\_ occurs when sediments are squeezed together by the weight of overlying sediments on top of them.

**Short Answer**

*Answer each question in the space provided.*

31. Briefly describe how igneous rocks form, then describe how both of the two main subcategories form.

32. Briefly describe how sedimentary rocks form, then describe how both of the two main subcategories form.

33. Briefly describe how metamorphic rocks form, then describe how both of the two main subcategories form.

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CHAPTER **5**

# HS Earth's Energy Assessments

## Chapter Outline

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- 5.1 ENERGY RESOURCES
  - 5.2 NON-RENEWABLE ENERGY RESOURCES
  - 5.3 RENEWABLE ENERGY RESOURCES
  - 5.4 EARTH'S ENERGY
-

## 5.1 Energy Resources

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The least expensive and most practical way to try to see that our energy needs will be met in the future is to
  - drill for oil wherever it is found.
  - develop renewable energy sources.
  - develop nuclear fusion.
  - conserve energy whenever possible.
- Kinetic energy is
  - the energy stored in food.
  - the energy that comes from the sun to our planet.
  - the energy contained by a body in motion.
  - the energy stored by a body that is about to do work.
- A roller coaster car at the top of a hill, right before it plunges downward has
  - potential energy.
  - kinetic energy.
  - momentum.
  - electrical energy.
- Energy
  - can be created or destroyed.
  - cannot be created or destroyed.
  - can be created but not destroyed.
  - can be destroyed but not created.
- Fuel
  - can help you to kick a soccer ball.
  - stores energy.
  - releases energy.
  - all of the above.
- Heat is energy because it
  - comes from fossil fuels.
  - causes air to move.
  - can be used to do work.
  - comes from renewable resources.
- Fossil fuels
  - take millions of years to form.

- b. are plentiful all over the planet.
- c. are made of renewable resources.
- d. have few environmental consequences.

8. Wood is a type of

- a. non-renewable energy.
- b. kinetic energy.
- c. biomass energy.
- d. fossil fuel energy.

9. Possible problems with renewable energy sources include

- a. they are limited in their availability.
- b. they may be expensive.
- c. they cause a lot of pollution.
- d. all of the above.

10. For an energy source to be useful, it must

- a. be able to be turned into a useful form of energy.
- b. produce significantly more energy than it takes to produce it.
- c. not produce large amounts of pollutants.
- d. all of the above.

### True or False

*Write true if the statement is true or false if the statement is false.*

\_\_\_\_\_ 11. A fuel is any material that can release energy in a chemical change.

\_\_\_\_\_ 12. All energy sources are renewable.

\_\_\_\_\_ 13. Breathing and blood circulation do not require energy because we are not aware that they are happening.

\_\_\_\_\_ 14. Energy cannot be created or destroyed.

\_\_\_\_\_ 15. Stored energy is called potential energy.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

16. Energy is stored and released by \_\_\_\_\_.

17. When a fuel is burned, most of the energy is released as \_\_\_\_\_.

18. \_\_\_\_\_ is the ability to do work.

19. \_\_\_\_\_ is the energy stored within chemical bonds.

20. The partially decomposed remains of plants and animals make up \_\_\_\_\_.

21. Solar, tidal, and wind energy are examples of \_\_\_\_\_.

22. The energy contained by a body in motion is called \_\_\_\_\_ energy.

23. The energy stored in food is \_\_\_\_\_ energy.

### Short Answer

*Answer each question in the space provided.*

24. Describe what the law of conservation of energy says and give an example of how it works.

25. What is a non-renewable resource? Describe why fossil fuels are non-renewable.

## 5.2 Non-renewable Energy Resources

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Hydrocarbons are found as
  - solids.
  - liquids.
  - gases.
  - all of the above.
- A lot of coal formed around 300 million years ago because
  - the climate was warmer and a lot of land area was in the tropics.
  - the climate was cooler and a lot of land area was in the polar regions.
  - plant-life of all sorts was more common all around the world.
  - there was less oxygen so plant and animal remains were more easily converted to coal.
- A coal deposit that is not economical to mine today would be considered part of our \_\_\_\_\_ .
  - coal reserves
  - coal resources
  - coal reservoirs
  - none of these
- To be useful, oil must be located in a(n) \_\_\_\_\_ rock layer and trapped by a(n) \_\_\_\_\_ rock layer.
  - impermeable, permeable
  - permeable, impermeable
  - impermeable, impermeable
  - permeable, permeable
- Which of the following fuels produces the least amount of carbon dioxide per unit of energy?
  - coal
  - oil
  - natural gas
  - all of these produce the same amount of carbon dioxide.
- Fuel made primarily of methane is called
  - coal
  - petroleum
  - natural gas
  - liquid gas
- The oil and natural gas that remains will last on the scale of \_\_\_\_\_ and the coal will last on the scale of \_\_\_\_\_.

- a. centuries, millennia
  - b. millennia, centuries
  - c. decades, centuries
  - d. centuries, decades
8. Oil, coal and natural gas supply approximately \_\_\_\_\_ of the energy used in the United States
- a. 15%
  - b. 25%
  - c. 45%
  - d. 85%
9. The main gases that are a by-product of burning gasoline are
- a. water vapor and carbon dioxide
  - b. carbon dioxide and sulfur compounds
  - c. sulfur compounds and nitrogen compounds
  - d. nitrogen compounds and carbon dioxide
10. The energy from a nuclear power plant
- a. is growing in use all around the world.
  - b. causes the release of greenhouse gases and other pollutants.
  - c. heats water to create steam, which spins a turbine, which turns a generator.
  - d. is transported along metal fuel rods to electrical power lines.
11. Nuclear power comes from.
- a. combustion of atoms of U 235
  - b. splitting the nucleus of U 235
  - c. fusion of atoms of U 235
  - d. breaking electrons away from the U 235 nucleus
12. Nuclear waste
- a. can be stored in water filled tanks until it is no longer radioactive.
  - b. is a small problem to deal with since nuclear power is pollutant free.
  - c. remains dangerous for hundreds of thousands of years.
  - d. is stored at the Yucca Mountain site in Nevada.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. Fossil fuels come from the remains of ancient organisms.
- \_\_\_\_\_ 14. Hydrocarbons come in liquid form only.
- \_\_\_\_\_ 15. Coal swamps were common in the Carboniferous period.
- \_\_\_\_\_ 16. Fossil fuels usage is falling worldwide.
- \_\_\_\_\_ 17. Nuclear power plants produce so much energy because the process is not controlled, although it is contained.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. Chemicals made of one carbon atom and four hydrogen atoms are called \_\_\_\_\_.
19. A solid fossil fuel that is burned primarily for electricity is \_\_\_\_\_.
20. Coal may contain impurities such as \_\_\_\_\_.



21. Hydraulic fracturing is also called \_\_\_\_\_.

22. \_\_\_\_\_ occurs from the fission of atoms.

23. Ancient organisms that have been preserved in some form over time are \_\_\_\_\_.

24. Many homes throughout the U.S. are heated by clean energy that generates extremely long-term waste problems called \_\_\_\_\_.

25. The fuel for nuclear power plants is \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Describe how fossil fuels form.

27. Describe the process that turns coal into electricity.

## 5.3 Renewable Energy Resources

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The Sun is directly or indirectly responsible for all of the following types of energy:
  - solar, wind, geothermal, and biomass.
  - solar, wind, geothermal, biomass and fossil fuels.
  - solar, wind, biomass and fossil fuels.
  - solar, geothermal, and fossil fuels.
- Solar energy stored in material such as wood, grain, sugar, and municipal waste is (are) called \_\_\_\_\_.
  - fossil fuels
  - biomass energy
  - geothermal energy
  - natural gas
- The primary barrier to using solar energy in the United States is that \_\_\_\_\_.
  - solar power is not technically feasible
  - solar power causes major pollution problems
  - solar power is not economically competitive with other energy sources
  - all of these
- Solar energy
  - needs further research to improve technologies and bring down costs.
  - is the best form of renewable energy to develop everywhere on Earth.
  - is something that will not be developed until long into the future.
  - requires tremendous amounts of space that is better used for other activities.
- People sometimes object to hydroelectric power plants because
  - hydroelectric power produces greenhouse gases.
  - a reservoir may bury natural or cultural resources.
  - dams release too much sediment downstream, which can bury a landscape.
  - hydroelectric power produces nitric acid that falls as acid rain.
- Wind power
  - comes indirectly from solar energy.
  - is cheap to harness on a large scale.
  - is good green energy that is welcomed by people everywhere.
  - produces few pollutants, but a lot of greenhouse gases.
- Geothermal energy
  - has extreme safety issues because it is so hot.

- b. could in principle be harnessed anywhere on Earth.
  - c. requires cool water be pumped into the ground to heat up.
  - d. produces few pollutants, but a lot of greenhouse gases.
8. The largest geothermal power plant in the United States is located near which city?
- a. Chicago
  - b. Los Angeles
  - c. New York
  - d. San Francisco
9. Biofuels
- a. include wood burned in a fire to heat food.
  - b. are used as solids, liquids and even gases.
  - c. born cleanly, with no pollutants or greenhouse gases.
  - d. need energy, fertilizer and cropland to produce.
10. Algae could be an excellent source of power because
- a. it goes straight into a gas tank without needing to be processed.
  - b. algae can grow in many places where food is not grown.
  - c. algae emits no carbon dioxide.
  - d. all of these.

**True or False**

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Wind power has been harnessed for energy for about two decades.
- \_\_\_\_\_ 12. When wood is burned in a fire, it is a biofuel.
- \_\_\_\_\_ 13. Renewable resources will eventually run out.
- \_\_\_\_\_ 14. A tremendous amount of research is going into developing wave and tide power plants.
- \_\_\_\_\_ 15. Most of the suitable sites for hydroelectric dams in the developed world have already been developed.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

16. \_\_\_\_\_ is the fastest growing renewable energy resource in the world.
17. \_\_\_\_\_ energy comes from plants and animals that were recently living.
18. Solar energy is carried between the Sun and Earth as \_\_\_\_\_.
19. Solar energy is the result of the \_\_\_\_\_ of hydrogen into helium.
20. When energy is transferred from a higher temperature object to an adjacent lower temperature object it is called \_\_\_\_\_.
21. The best place to develop hydroelectric power is where streams descend at a a(n) \_\_\_\_\_ grade.
22. The most abundant widely used energy resource in the world is currently \_\_\_\_\_.
23. Wind power is harnessed by a collection of windmills located on a(n) \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

24. How do solar power plants turn sunlight into electricity?

25. Describe how a hydroelectric dam harnesses the energy of stored water.

## 5.4 Earth's Energy

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Most of Earth's energy comes from the Sun. Where does the rest come from?
  - internal heat
  - nuclear fusion
  - biomass
  - fossil fuels
- What type of energy is used when your body breaks down the food you eat?
  - kinetic
  - chemical
  - potential
  - nuclear
- Which of the following energy sources does not produce carbon dioxide?
  - oil
  - nuclear
  - coal
  - natural gas
- Nuclear fission powers \_\_\_\_\_. Nuclear fusion powers \_\_\_\_\_.
  - the Sun; nuclear power plants
  - Earth's internal heat; nuclear power plants
  - nuclear power plants; the Sun
  - Earth's internal heat; the Sun
- Resources that will not run out are
  - non-infinite
  - infinite
  - renewable
  - non-renewable
- Before fossil fuel use became widespread, which of the following did people use for energy?
  - wind
  - water
  - animals
  - all of these
- What is currently the single largest source of energy used in the world?
  - coal

- b. oil
  - c. natural gas
  - d. wind
8. The United States has about \_\_\_\_\_ percent of the world's proven oil reserves.
- a. 55
  - b. 27
  - c. 12
  - d. 2
9. The transfer of light energy from the sun to the earth is known as . . .
- a. reflection
  - b. radiation
  - c. fusion
  - d. fission
10. What is the world's most widely used form of renewable energy?
- a. solar
  - b. wind
  - c. hydroelectric
  - d. geothermal

**True or False**

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. The law of conservation of energy states that energy cannot be created or destroyed.
- \_\_\_\_\_ 12. Potential energy is the energy of anything in motion.
- \_\_\_\_\_ 13. The energy to make electricity comes from heat.
- \_\_\_\_\_ 14. Wind, geothermal, solar and nuclear energy are all examples of renewable energy resources.
- \_\_\_\_\_ 15. Fossil fuels come from living organisms that died and were buried hundreds of millions of years ago.
- \_\_\_\_\_ 16. Hydrocarbons can be solid, liquid or gaseous.
- \_\_\_\_\_ 17. Gasoline is different from other fossil fuels because it is a liquid.
- \_\_\_\_\_ 18. Crude oil is a pure hydrocarbon that needs little refining.
- \_\_\_\_\_ 19. Wind farms are sometimes not developed because they are considered to be unsightly.
- \_\_\_\_\_ 20. Oil is used to produce waxes, plastics, fertilizers, and other products.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

21. \_\_\_\_\_ is the ability to do work and produce change.
22. When you hold a ball above the ground the ball has \_\_\_\_\_ energy.
23. A \_\_\_\_\_ is any material that can release energy in a chemical change.
24. \_\_\_\_\_ resources will not run out because they are extremely abundant or rapidly replaced.
25. Animal skeletons, teeth, shells, coprolites, or any other remains or trace from a living creature that becomes a rock is a \_\_\_\_\_.
26. \_\_\_\_\_ is a liquid fossil fuel that is extremely useful because it can be used in cars and other vehicles.
27. Nuclear power plants use the element \_\_\_\_\_, which must be mined, processed and concentrated into fuel rods.

28. A technique for mining natural gas that involves pumping fluids into a reservoir rock is called \_\_\_\_\_.
29. The transfer of heat to a nearby object that is at a lower temperature through a process called \_\_\_\_\_.
30. \_\_\_\_\_ power is the fastest growing renewable energy source in the world.

**Short Answer**

*Answer each question in the space provided.*

31. What are the upsides of nuclear power? What are the downsides of nuclear power?

32. What are the advantages and disadvantages of wind power?

33. Explain the problems with non-renewable energy sources.

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CHAPTER **6**

# HS Plate Tectonics Assessments

## Chapter Outline

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- 6.1 INSIDE EARTH
  - 6.2 CONTINENTAL DRIFT
  - 6.3 SEAFLOOR SPREADING
  - 6.4 THEORY OF PLATE TECTONICS
  - 6.5 PLATE TECTONICS
-



## 6.1 Inside Earth

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Different types of seismic waves are different in some ways, but they all travel
  - a. at the same speed.
  - b. through all materials.
  - c. outwards in all directions.
  - d. to all of the seismographs.
2. The lithosphere is
  - a. the plates that make up the crust.
  - b. large, flat stones sitting on top of malleable magma.
  - c. the upper part of the mantle.
  - d. the plates that make up the crust and the upper part of the mantle.
3. P-waves
  - a. cannot travel through liquid material.
  - b. arrive at the same time as other types of waves at a seismograph.
  - c. travel at the same speed through Earth's internal layers.
  - d. bend slightly when they travel from one layer to another.
4. S-waves
  - a. cannot travel through liquid material.
  - b. arrive at the same time as other types of waves at a seismograph.
  - c. travel at the same speed through Earth's internal layers.
  - d. bend slightly when they travel from one layer to another.
5. Scientists know that the core is metal because
  - a. Earth's overall density is too high for it to be made just of rock.
  - b. Earth has a magnetic field, which requires liquid metal.
  - c. Some meteorites are metal; they are thought to be similar to Earth's interior.
  - d. all of these.
6. Oceanic crust is more \_\_\_\_\_. Continental crust is more \_\_\_\_\_.
  - a. felsic; mafic
  - b. mafic; felsic
  - c. extrusive; intrusive
  - d. intrusive; extrusive
7. When stresses act on the asthenosphere it
  - a. breaks.

- b. flows.
  - c. experiences earthquakes.
  - d. undergoes metamorphism.
8. Compared to continental crust, oceanic crust is
- a. thicker.
  - b. more dense
  - c. more varied in the rock types it contains.
  - d. more granitic.
9. The mantle is
- a. about half molten.
  - b. made of metal.
  - c. made of felsic minerals.
  - d. made of solid rock.
10. The transfer of heat as hot material moves is
- a. radiation
  - b. conduction
  - c. convection
  - d. heat flow
11. The composition of a rock that is rich in iron- and magnesium-rich silicate minerals is
- a. ultramafic
  - b. mafic
  - c. ultrafelsic
  - d. felsic
  - e. produce the heat that keeps the outer core molten.
12. Radioactive elements
- a. make up a large percentage of the crust.
  - b. travel through the mantle in convection currents.
  - c. are more common in oceanic crust than in continental crust.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. Diamonds come from very deep in the crust or mantle.
- \_\_\_\_\_ 14. The asthenosphere is the very thin outermost layer of the Earth.
- \_\_\_\_\_ 15. The outer core surrounds the inner core and is composed of molten metal.
- \_\_\_\_\_ 16. We can hold something like the core in our hands: a metallic meteorite.
- \_\_\_\_\_ 17. The lithosphere contains Earth's mantle and crust.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. During an earthquake, large amounts of energy are released. This energy travels through rocks as \_\_\_\_\_ - \_\_\_\_\_.
19. S-waves disappear at the core-mantle boundary so scientists know that the outer core is \_\_\_\_\_.
20. \_\_\_\_\_ waves cannot travel through the mantle.
21. The outer brittle layer of the Earth is called the \_\_\_\_\_.

22. When heat moves from higher to lower temperatures by the collisions of atoms it is called \_\_\_\_\_.
23. \_\_\_\_\_ crust is made of igneous, sedimentary and metamorphic rocks.
24. Warm mantle rises and sinks in a(n) \_\_\_\_\_.
25. Peridotite is a rock formed of the minerals pyroxene and \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided*

26. What do the different types of seismic waves indicate about Earth's interior layers?

27. Earth is made of three layers. The innermost and outermost are each made of two layers or types. What are each of these made of?

## 6.2 Continental Drift

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The continents were last all together around
  - 250,000 years ago
  - 2.5 million years ago
  - 250 million years ago
  - 2.5 billion years ago
- Wegener explained that Mesosaurus fossils were found on Africa and South America this way:
  - Africa and South America were joined when Mesosaurus lived and then moved apart.
  - Mesosaurus was a swimming reptile so it swam across the Atlantic Ocean.
  - a land bridge across the Atlantic Ocean connected the two continents.
  - none of these.
- Wegener thought that grooves and rock deposits in rock left by ancient glaciers indicated that the
  - glaciers formed in the middle of the ocean
  - glaciers covered a large part of the planet
  - glaciers were present near the South Pole and the continents moved
  - climate was colder then and the glaciers could survive there
- Mountain ranges located on both side of the Atlantic Ocean
  - are the same height and width.
  - have the same rock types, structures and ages.
  - have ancient fossils and coal seams.
  - are just separate mountain ranges.
- Scientists didn't accept the continental drift idea because
  - there was almost no evidence for it.
  - Wegener was not liked and no one listened to him.
  - there were many other ways to explain the evidence.
  - none of these
- Magnetic minerals in volcanic rock point to
  - the current north magnetic pole.
  - the north magnetic pole at the time they crystallized.
  - the north magnetic pole on the adjacent continent.
  - none of these.
- The magnetic north pole
  - is in the same place as the geographic north pole.

- b. is the location where Earth's axis of rotation is at the surface.
  - c. is in the southern hemisphere and vice versa.
  - d. is in northern Canada.
8. Going back in time, the magnetic north pole
- a. stayed fixed in the same spot.
  - b. moved.
  - c. appeared to move.
  - d. none of these.
9. The best explanation for the past magnetic polarity of Europe and North America is
- a. the north magnetic pole moved.
  - b. the pole stood still and the continents moved.
  - c. the continents moved and the north pole moved.
  - d. none of these.
10. Wegener's idea is correctly referred to as
- a. the continental drift hypothesis.
  - b. the continental drift theory.
  - c. the plate tectonics hypothesis.
  - d. the plate tectonics theory.
11. The path(s) of the north magnetic pole on Europe and North America
- a. come together about 200 million years ago.
  - b. come together about 20 million years ago.
  - c. indicate that there were two north magnetic poles in the past.
  - d. merge into one of the continents are allowed to drift.
12. What was Wegener's continental drift idea?
- a. The continents have moved slowly apart to their current locations.
  - b. The continents have always been located at their current locations.
  - c. The continents are moving slowly together from their current locations.
  - d. None of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Similar fossil records across continents was evidence for continental drift.
- \_\_\_\_\_ 14. Magnetic polarity evidence supports the theory of continental drift.
- \_\_\_\_\_ 15. Alfred Wegener gave up on continental drift because he had no mechanism.
- \_\_\_\_\_ 16. The continents including the continental margins can be pieced together to form a single whole continent.
- \_\_\_\_\_ 17. The magnetic polarity evidence indicates that there were two north magnetic poles in the geologic past.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Alfred Wegener named his single supercontinent \_\_\_\_\_, which means "all Earth" in ancient Greek.
19. Coal is mined in many cold regions, but it is thought to form in \_\_\_\_\_ climates.
20. Devices that measure magnetic field intensity are called \_\_\_\_\_.
21. The most common type of minerals that record the direction and strength of the magnetic field are called \_\_\_\_\_.

22. The seeming movement of the north magnetic pole over time is called \_\_\_\_\_ polar wander.
23. The remains or traces of ancient life are called \_\_\_\_\_.
24. Rocks and structures on both sides of the \_\_\_\_\_ Ocean are very similar.
25. When all the continents are together, it is called a(n) \_\_\_\_\_ continent.

**Short Answer**

*Answer each question in the space provided*

26. How and why does the seed fern, Glossopteris, provide evidence that the continents were once all joined together?

27. Explain why scientists rejected the idea that continents could move about on Earth's surface.

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## 6.3 Seafloor Spreading

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### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. The longer it takes for a sound wave to return to the ship
  - a. the colder the water is.
  - b. the deeper the water is.
  - c. the shallower the water is.
  - d. the more layered the water is.
2. Before they could make seafloor maps, scientists thought the topography of the seafloor
  - a. was just like the topography of the continents.
  - b. had many long linear mountain ranges, like Japan.
  - c. was dotted with lots of small hills, but nothing else.
  - d. was completely flat.
3. All deep sea trenches are located
  - a. in the middle of the mountain ranges.
  - b. at the edges of continents.
  - c. near chains of active volcanoes.
  - d. none of these.
4. In the Atlantic Ocean, the mid-ocean ridge is
  - a. a straight line between the Americas and Europe/Africa.
  - b. a line that nearly has the shape of the coastlines of the Americas and Europe/Africa.
  - c. not visible.
  - d. none of these
5. At a time of reversed magnetic polarity, the north and south poles are
  - a. aligned as they are now.
  - b. in different locations from where they are now.
  - c. in the opposite positions from where they are now.
  - d. none of these.
6. Magnetic polarity stripes
  - a. end at the edge of a continent.
  - b. end at a deep sea trench.
  - c. end at a mid-ocean ridge.
  - d. a or b
7. The thickest sediments in the ocean basins are found
  - a. at the top of the mid-ocean ridge.

- b. in the flat, featureless regions.
  - c. the furthest distance from the mid-ocean ridge axis.
  - d. none of these.
8. The hottest region of the ocean basin is found
- a. at the top of the mid-ocean ridge.
  - b. in the flat, featureless regions.
  - c. the furthest distance from the mid-ocean ridge axis.
  - d. none of these.
9. With distance from the mid-ocean ridge
- a. the crust becomes thicker.
  - b. the sediment becomes thinner.
  - c. the rocks become younger.
  - d. none of these.
10. The oldest oceanic crust is
- a. found at the mid-ocean ridges.
  - b. beneath the least amount of sediment.
  - c. older than the oldest continental crust.
  - d. less than 180 million years old.
11. New oceanic crust is created
- a. at mid-ocean ridges.
  - b. at deep sea trenches.
  - c. within abyssal plains.
  - d. at long, linear chains of volcanoes.
12. Since new oceanic crust is being created
- a. Earth must be getting larger.
  - b. mountains must be rising somewhere.
  - c. old crust must be destroyed somewhere.
  - d. none of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Two different plates of lithosphere lie on each side of the mid-ocean ridge.
- \_\_\_\_\_ 14. The mid-ocean ridge is the longest mountain range on Earth.
- \_\_\_\_\_ 15. The mid-ocean ridge is only found in the Atlantic Ocean.
- \_\_\_\_\_ 16. The seafloor is oldest at the mid-ocean ridges
- \_\_\_\_\_ 17. Heat flow is highest at deep sea trenches.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The depth of the ocean floor can be recorded by using a(n) \_\_\_\_\_.
19. Seafloor maps were made using data gathered during the historical event called \_\_\_\_\_.
20. A map of the seafloor is called a(n) \_\_\_\_\_ map.
21. The flat areas of the oceans are called the \_\_\_\_\_.
22. When the magnetic poles switch positions, the \_\_\_\_\_ becomes the \_\_\_\_\_.



23. Beneath the mid-ocean ridge, there is molten rock in a(n) \_\_\_\_\_
24. The mechanism for drifting continents is \_\_\_\_\_.
25. Old seafloor is destroyed at \_\_\_\_\_

**Short Answer**

*Answer each question in the space provided*

26. Describe the patterns of the magnetic stripes around the mid-ocean ridge.

27. Describe the seafloor spreading hypothesis.

## 6.4 Theory of Plate Tectonics

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Earth's plates are made of slabs of
  - a. crust
  - b. upper mantle
  - c. crust and upper mantle
  - d. asthenosphere
2. How can two lithospheric plates move relative to each other?
  - a. They can only converge or diverge.
  - b. They can only collide or slide along each other.
  - c. They can collide, pull apart, or slide against each other.
  - d. They can only move toward each other.
3. What are the results of plate tectonic processes?
  - a. volcanoes form
  - b. ocean basins form
  - c. mountains form
  - d. all of these
4. The outlines of the plates are located by mapping
  - a. earthquake epicenters.
  - b. continental margins.
  - c. the locations of earthquake faults.
  - d. mid-ocean ridges.
5. What is the driving force for plate tectonics?
  - a. gravity slab pull
  - b. the push of the mid-ocean ridge
  - c. the gravity of the Moon and Sun
  - d. mantle convection
6. If a divergent plate boundary is found within a continent,
  - a. a line of volcanoes forms.
  - b. a subduction zone forms.
  - c. the continent rifts apart.
  - d. none of these.
7. The geological activity at subduction zones is
  - a. the creation of new seafloor.

- b. lots of earthquakes and volcanoes.
  - c. hotspot volcanoes.
  - d. fairly nonexistent.
8. An island arc forms when
- a. two oceanic plates diverge.
  - b. a continental plate subducts beneath an oceanic plate.
  - c. an oceanic plate subducts beneath a continental plate.
  - d. an oceanic plate subducts beneath an oceanic plate.
9. Mountain ranges form at continent-continent convergence zones because
- a. continental plates are too buoyant to subduct.
  - b. these zones are the site of a lot of volcanic activity.
  - c. continental rifting leads to uplift.
  - d. none of these.
10. In the Hawaiian islands, the youngest volcano
- a. is about to subduct into a deep sea trench.
  - b. is above a hotspot.
  - c. is above a mid-oceanic ridge in the Pacific.
  - d. is topped by limestone.
11. Like the Cascades, the Sierra Nevada are the result of
- a. continent-continent convergence.
  - b. subduction of an oceanic plate beneath a continental plate.
  - c. ocean-ocean convergence.
  - d. transform motion like that at the San Andreas Fault.
12. Plate tectonics theory says that
- a. Earth's geography has been the same for all geologic time.
  - b. Earth's geography is continually changing.
  - c. all geological activity happens at plate boundaries.
  - d. continents drift but scientists do not yet know why.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. All geological activity - volcanoes and earthquakes - takes place at plate boundaries.
- \_\_\_\_\_ 14. At transform plate boundaries, two plates move toward each other.
- \_\_\_\_\_ 15. Limestone is found at the top of the Andes due to convergence.
- \_\_\_\_\_ 16. Seafloor spreading is what makes the continents move.
- \_\_\_\_\_ 17. The youngest volcano in Hawaii is below sea level.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. New land is created at a \_\_\_\_\_ plate boundary.
19. The point on Earth's surface above where an earthquake occurs is the \_\_\_\_\_.
20. Large bodies of magma cool to form \_\_\_\_\_.
21. The Hawaiian Island chain was formed by a(n) \_\_\_\_\_.
22. Volcanoes are caused by the \_\_\_\_\_ of one plate under another.

23. The volcanoes of Central America are a(n) \_\_\_\_\_ caused by subduction of tectonic plates.
24. The Himalayan Mountains rise at a(n) \_\_\_\_\_ plate boundary.
25. The continuous joining and separating of landmasses is known as the \_\_\_\_\_ cycle.

**Short Answer**

*Answer each question in the space provided*

26. Draw a picture of two adjacent convection cells. Label the following features: mid-ocean ridge, new oceanic crust, a deep sea trench, the lithosphere, mantle, and core.

27. How do the continents move around on the solid Earth?

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## 6.5 Plate Tectonics

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### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Scientists learn about our planet's interior from
  - a. tracking seismic waves
  - b. probes in deep mines
  - c. diving into deep ocean trenches
  - d. satellite imagery
2. Because S-waves disappear when they reach the outer core, scientists know that it is
  - a. metal.
  - b. molten.
  - c. ultramafic rock.
  - d. not knowable.
3. The lithosphere
  - a. is partially molten.
  - b. is brittle.
  - c. behaves plastically.
  - d. can flow.
4. Which mechanism moves heat from the warmer to cooler places until all are the same temperature?
  - a. radiation
  - b. convection
  - c. conduction
  - d. none of the above
5. During the time of Pangaea,
  - a. organisms lived side-by-side that are now fossils on distant continents.
  - b. there was no Atlantic Ocean.
  - c. there were one magnetic north pole.
  - d. all of these.
6. Across the seafloor, scientists find
  - a. flat, sediment covered bathymetry.
  - b. increasing crust thickness toward the mid-ocean ridges.
  - c. magnetic stripes with normal and reversed polarity.
  - d. none of the above
7. What revealed high mountain ranges and deep trenches in the sea floor?
  - a. bathymetric maps

- b. satellite maps
  - c. topographic maps
  - d. none of these
8. Volcanoes are found at \_\_\_\_\_ plate boundaries; earthquakes happen at \_\_\_\_\_ plate boundaries.
- a. all three types of; all three types
  - b. all three types of; divergent and convergent
  - c. divergent and convergent; all three types of
  - d. divergent and convergent; divergent and convergent
9. \_\_\_\_\_ crust subducts under \_\_\_\_\_ crust because it is \_\_\_\_\_.
- a. Continental; oceanic; denser
  - b. Continental; oceanic; buoyant
  - c. Oceanic; continental; buoyant
  - d. Oceanic; continental; denser
10. What type of plate boundary is found at the San Andreas Fault?
- a. convergent
  - b. divergent
  - c. transform
  - d. none of the above

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Continental crust is thicker and more mafic than oceanic crust.
- \_\_\_\_\_ 12. P-waves can travel through the core.
- \_\_\_\_\_ 13. A new supercontinent forms about every 500,000,000 years.
- \_\_\_\_\_ 14. Continental crust is too thick for hotspot volcanoes to break through.
- \_\_\_\_\_ 15. Metallic meteorites are thought to be representative of the core.
- \_\_\_\_\_ 16. The eastern United States has three types of plate boundaries offshore.
- \_\_\_\_\_ 17. Earth's strong magnetic field is caused by convection in the mantle.
- \_\_\_\_\_ 18. Some rocks found on opposite sides of the Atlantic are extremely similar in type and age.
- \_\_\_\_\_ 19. The continents can fit together like pieces of a puzzle.
- \_\_\_\_\_ 20. Wegener used fossil evidence to support his seafloor spreading hypothesis.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. \_\_\_\_\_ waves move in an up and down motion perpendicular to the direction of travel.
22. The \_\_\_\_\_ is composed of hot, ultramafic rock.
23. The core is mostly composed of \_\_\_\_\_ metal.
24. \_\_\_\_\_ are flat areas in ocean basins, although many are dotted with volcanic mountains.
25. The volcanoes of the \_\_\_\_\_ are caused by the subduction of the Juan de Fuca Plate beneath the North American plate.
26. Seafloor spreading create new oceanic crust at mid-ocean \_\_\_\_\_ and destroy older crust at deep sea \_\_\_\_\_.

27. Geological activity that occurs away from plate boundaries is called \_\_\_\_\_ activity.
28. The edges of continental plates can be drawn by connecting the dots that mark \_\_\_\_\_ epicenters.
29. Lithospheric plates move at the rate of a few \_\_\_\_\_ per year.
30. The line of volcanoes that grows on the upper oceanic plate at ocean-ocean convergence is called a(n) \_\_\_\_\_ - \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

31. List the three types of plate boundaries and describe the motion of each.

32. List the evidence for continental drift.

33. Diagram and describe the internal structure of Earth.

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CHAPTER **7**

# HS Earthquakes Assessments

## Chapter Outline

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- 7.1 STRESS IN EARTH'S CRUST
  - 7.2 THE NATURE OF EARTHQUAKES
  - 7.3 MEASURING AND PREDICTING EARTHQUAKES
  - 7.4 STAYING SAFE IN EARTHQUAKES
  - 7.5 EARTHQUAKES
-



## 7.1 Stress in Earth's Crust

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. The amount of ground displacement in an earthquake is called the \_\_\_\_\_ .
  - a. epicenter
  - b. dip
  - c. slip
  - d. focus
2. When stress causes a material to change shape it has undergone
  - a. confining stress.
  - b. compression.
  - c. strain.
  - d. fracture.
3. When the stress on a rock becomes too high, the rock will
  - a. undergo elastic deformation.
  - b. undergo plastic deformation.
  - c. melt.
  - d. fracture.
4. What type of faulting would be most likely to occur along transform faults?
  - a. normal faulting
  - b. reverse faulting
  - c. strike-slip faulting
  - d. all of these
5. The amount of stress needed to make rocks fracture is less
  - a. at the surface.
  - b. deeper in the crust.
  - c. in the mantle.
  - d. the same throughout Earth's layers.
6. The stresses that cause the Himalaya to rise are
  - a. tension
  - b. compression
  - c. shear
  - d. confining
7. Rock layers in an anticline
  - a. fold upward.

- b. fold downward.
  - c. plunge toward the ground in one direction.
  - d. create a dome.
8. Sediments that become sedimentary rocks are deposited
- a. vertically.
  - b. horizontally.
  - c. along hillsides.
  - d. deformationally.
9. In the Grand Canyon, the Kaibab Limestone is above the Toroweap Formation. We can say that
- a. the Kaibab is the oldest rock layer in the canyon.
  - b. the Toroweap is the oldest rock layer in the canyon.
  - c. the Kaibab is older than the Toroweap.
  - d. the Toroweap is older than the Kaibab.
10. When rocks deform plastically, they tend to
- a. return to their original state.
  - b. fold.
  - c. break.
  - d. fracture.
11. In a normal fault,
- a. the fault plane is roughly vertical.
  - b. the dip of the fault plane is nearly horizontal.
  - c. the hanging wall pushes up relative to the footwall.
  - d. the footwall pushes up relative to the hanging wall.
12. Large mountain ranges, like the Grand Tetons in Wyoming, are uplifted on
- a. normal faults
  - b. reverse faults
  - c. dip-slip faults
  - d. strike-slip faults

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. If very old rocks are above much younger rocks there may be a thrust fault in between.
- \_\_\_\_\_ 14. A deeply buried rock is under compressive stresses.
- \_\_\_\_\_ 15. A mountain range, known as a basin-and-range, is caused by compressive forces.
- \_\_\_\_\_ 16. In a dip-slip fault, the footwall drops down relative to the hanging wall.
- \_\_\_\_\_ 17. In a strike-slip fault, the dip of the fault plane is vertical.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Forces that pull rocks apart are called \_\_\_\_\_.
19. The San Andreas fault is a \_\_\_\_\_ lateral, \_\_\_\_\_ fault.
20. A break in rock along which there is no movement is a(n) \_\_\_\_\_.
21. If a rock returns to its original shape when a stress is removed it has undergone \_\_\_\_\_.
22. A fold that bends down in the center is a(n) \_\_\_\_\_.

23. In a \_\_\_\_\_ fault, the hanging wall moves upward relative to the footwall.
24. The displacement of rocks on either side of a \_\_\_\_\_ fault can be hundreds of miles.
25. An eroded \_\_\_\_\_ will have oldest rock layer found at the core.

**Short Answer**

*Answer each question in the space provided.*

26. List and briefly describe the four different types of stress.

27. Describe the plate tectonics setting that is causing the rise of the Himalaya Mountains.

## 7.2 The Nature of Earthquakes

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Body waves consist of \_\_\_\_\_ .
  - a. P waves only
  - b. S waves only
  - c. P and S waves
  - d. Surface waves
2. Earthquakes cause \_\_\_\_\_ faulting.
  - a. normal
  - b. reverse
  - c. thrust
  - d. all of these
3. How do rock particles move during the passage of a P wave through the rock?
  - a. back and forth parallel to the direction of wave travel
  - b. back and forth perpendicular to the direction of wave travel
  - c. in a rolling circular motion
  - d. up and down perpendicular to the direction of wave travel.
4. How do rock particles move during the passage of a S wave through the rock?
  - a. back and forth parallel to the direction of wave travel
  - b. back and forth perpendicular to the direction of wave travel
  - c. in a rolling elliptical motion
  - d. up and down perpendicular to the direction of wave travel
5. When a P wave travels from a solid to a liquid, its velocity
  - a. stays the same
  - b. increases
  - c. decreases
  - d. ends, because the wave can't travel through a liquid.
6. When a S wave travels from a solid to a liquid, its velocity
  - a. stays the same
  - b. increases
  - c. decreases
  - d. ends, because the wave can't travel through a liquid.
7. Surface waves
  - a. are of two types: Love waves and Rayleigh waves.

- b. travel through the planet.
  - c. are the fastest seismic waves.
  - d. all of these.
8. Shallow earthquakes, less than 20 km deep, are associated with \_\_\_\_\_ .
- a. convergent plate boundaries
  - b. divergent plate boundaries
  - c. transform plate boundaries
  - d. all of these
9. The point where movement occurred which triggered the earthquake is the \_\_\_\_\_ .
- a. dip
  - b. focus
  - c. epicenter
  - d. strike
10. Which of the following major earthquakes did not occur at a plate boundary?
- a. 1812 New Madrid, Missouri
  - b. 1906 San Francisco, California
  - c. 1964 Anchorage, Alaska
  - d. 1989 Loma Prieta, California
11. The San Andreas Fault
- a. is where the Pacific Plate subducts beneath the North American Plate.
  - b. is part of the ring of volcanoes and earthquakes around the Pacific Ocean basin.
  - c. is the fault where all major earthquakes occur in California.
  - d. is the site of shallow, intermediate and deep focus earthquakes.
12. An earthquake in the New Madrid, Missouri seismic zone
- a. would not kill many people; only 20 died in 1812.
  - b. would not kill many people; earthquakes on the fault are fairly small.
  - c. could kill many times more people than in 1812.
  - d. will not happen again; the 1812 quake relieved the stresses.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Earthquakes at divergent boundaries tend to be small.
- \_\_\_\_\_ 14. The height of a seismic wave is known as its wavelength.
- \_\_\_\_\_ 15. Sea waves from earthquakes can devastate coasts but be unnoticed at sea.
- \_\_\_\_\_ 16. The Seismic Wave Theory explains how earthquakes occur.
- \_\_\_\_\_ 17. About 95% of earthquakes occur along the three types of plate boundaries.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Seismic waves that travel through the body of a planet are known as \_\_\_\_\_.
19. The \_\_\_\_\_ of the earthquake was located 10 km below the surface.
20. The lowest point on a wave is the \_\_\_\_\_.
21. \_\_\_\_\_ is the study of earthquakes.
22. The distance between \_\_\_\_\_ and \_\_\_\_\_ is called wavelength.

23. After the Pacific basin, the region most likely to experience earthquakes is the \_\_\_\_\_.
24. The seismic waves that do most of the damage in an earthquake are \_\_\_\_\_.
25. Waves that devastate coastlines and are most often caused by an earthquake is called a(n) \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Describe the seismology of convergent plate boundaries. Where are there earthquakes relative to the subducting plate both horizontally and vertically?

27. Explain elastic rebound theory.

## 7.3 Measuring and Predicting Earthquakes

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- If a seismograph records P-waves but not S-waves from an earthquake, it means
  - the quake wasn't very strong.
  - the quake was very far away.
  - the quake was on the opposite side of the planet.
  - the seismograph was in the wrong spot.
- How often do earthquakes with magnitude between 8.0 and 8.9 occur?
  - about 5 to 10 times per year
  - about once a year
  - about every 5 to 10 years
  - about every 50 to 100 years
- The difference in arrival times between which pair of waves can be used to determine the distance to the epicenter?
  - P and surface
  - A and surface
  - A and P
  - None of the above
- The amplitude of the largest wave during a Richter magnitude 8 earthquake is \_\_\_\_\_ times as in a magnitude 6 earthquake.
  - 2
  - 10
  - 100
  - 1000
- What causes the up-and-down wiggles on the seismogram show above?
  - variations in air pressure
  - ground vibrations
  - tsunami waves
  - electromagnetic pulses
- Where is the focus with respect to the epicenter?
  - directly below the epicenter
  - directly above the epicenter
  - in the P wave shadow zone
  - in the S wave shadow zone

7. Which of the following measures an earthquake's intensity based on the observed effects on people and structures?
  - a. Richter scale
  - b. Modified Mercalli scale
  - c. the Centigrade scale
  - d. the moment magnitude scale
8. Which of the following statements best describes the state of earthquake prediction?
  - a. scientists can accurately predict the time and location of almost all earthquakes
  - b. scientists can accurately predict the time and location of about 50% of all earthquakes
  - c. scientists can accurately predict when an earthquake will occur, but not where
  - d. scientists can characterize the seismic risk of an area, but can not yet accurately predict most earthquakes
9. The longer the difference in the arrival time of the first P-wave and the first S-wave
  - a. the farther away is the epicenter.
  - b. the closer is the epicenter.
  - c. the deeper is the epicenter.
  - d. the shallower is the epicenter.
10. Which of the following statements is true?
  - a. As the distance to an earthquake increases, the elapsed time before the P-waves arrive decreases.
  - b. As the distance to an earthquake increases, the elapsed time before the S-waves arrive increases.
  - c. As the distance to an earthquake increases, the elapsed time between the arrival of the P- and S-waves increases.
  - d. As the distance to an earthquake increases, the ground shaking increases.
11. Who developed the procedure used to measure the size of an earthquake?
  - a. Charles Richter
  - b. James Hutton
  - c. Henri Darcy
  - d. Charles Darwin
12. On the magnitude moment scale, the increase in the amount of energy released from between an 7.2 and a 9.2 earthquake is
  - a. 900 times
  - b. 300 times
  - c. 100 times
  - d. 30 times

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. Seismographs can help to determine the intensity of an earthquake.
- \_\_\_\_\_ 14. The intensity of an earthquake is directly related to its distance from the epicenter.
- \_\_\_\_\_ 15. There are around 150,000 earthquakes that are felt each year.
- \_\_\_\_\_ 16. Scientists have an easier time predicting when an earthquake will occur than where it will occur.
- \_\_\_\_\_ 17. The time difference between the P & S wave shows the intensity of an earthquake.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. The first seismic waves to arrive at a seismograph are the \_\_\_\_\_.





## 7.4 Staying Safe in Earthquakes

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Which of the following hardly ever kills anyone in an earthquake?
  - structures falling
  - ground shaking
  - fire
  - tsunami
- Not too many people died in the Great Alaska Earthquake in 1964 because
  - few people lived in the area.
  - it was not a large quake.
  - the ground was so solid that the shock was absorbed.
  - none of these.
- The magnitude of an earthquake is
  - positively correlated with the number of deaths.
  - negatively correlated with the number of deaths.
  - the most important factor in determining the number of fatalities.
  - just one of several factors that determines the number of fatalities.
- If you want to be safe in an earthquake, build your house on
  - soft sediments that absorb shock.
  - sediments that will undergo liquefaction.
  - solid bedrock.
  - any type of ground is fine, just build a solid house.
- For a skyscraper to be safe in earthquake country, it must be
  - built on soft ground.
  - anchored to bedrock.
  - built on bedrock.
  - b or c
- To stay upright in an earthquake, large buildings must
  - be absolutely stiff so that they do not fall.
  - be built of solid materials like brick and stone.
  - sway so that they absorb shock.
  - b or c
- To make an existing building earthquake safe
  - tear it down and start again.

- b. build an external support structure.
  - c. lift it up and place rollers beneath it.
  - d. b or c
8. To keep gas lines and water mains from breaking in an earthquake,
- a. make them completely solid so that they don't break.
  - b. put them above ground so that they don't break.
  - c. zigzag the pipes so that they bend to absorb ground shaking.
  - d. b c
9. Which of the following is something that you should NOT do during an earthquake.
- a. Take an elevator to the ground floor so that you can run outside.
  - b. Stay away from things that can break or fall on you.
  - c. Dive underneath a sturdy piece of furniture.
  - d. Run to an open area if you are outside.
10. Which of the following is something that you should NOT do after an earthquake.
- a. Turn off water and power to your home.
  - b. Avoid dangerous areas, like hillsides or places where buildings may collapse.
  - c. Help others who need assistance.
  - d. Call everyone you know to tell them about your experience.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. In case of an earthquake, a one day supply of food and water is enough for a family.
- \_\_\_\_\_ 12. Large buildings can be placed on rollers so that they move as the ground moves.
- \_\_\_\_\_ 13. The largest recorded earthquake was 12.3 on the Richter Scale
- \_\_\_\_\_ 14. City planners predict the Mercalli Intensity of a future earthquake around the region.
- \_\_\_\_\_ 15. Elevated freeways cannot be retrofitted for earthquakes

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. When sediments mix with water and become like quicksand, they have undergone \_\_\_\_\_.
17. A building undergoes \_\_\_\_\_ when it is altered to be more safe in an earthquake.
18. In the 1906 San Francisco earthquake, the most damage was done by \_\_\_\_\_.
19. To hold down sway, a large building should have \_\_\_\_\_ (geometry) \_\_\_\_\_ (material) beams.
20. In San Francisco, water and gas pipelines are separated by \_\_\_\_\_ so that one segment can be isolated from the rest.
21. An earthquake kit should have \_\_\_\_\_ days of supplies.
22. \_\_\_\_\_ light bulbs are less of a fire risk than incandescent bulbs.
23. You should have flashlights available if the power goes out and don't forget the \_\_\_\_\_ to keep them working.

### Short Answer

Answer each question in the space provided.

24. List five things that a family in an earthquake zone should do to prepare for an earthquake.

25. Explain why all of the structures built in the United States are not built to meet earthquake standards.

## 7.5 Earthquakes

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Which forces squeeze rocks together, causing them to fold or fracture?
  - shear
  - tension
  - compression
  - strain
- When rocks deform plastically under compression stresses they
  - create folds
  - create faults
  - create shears
  - break
- At which type of plate boundary boundary, do the world's largest mountains grow?
  - transform
  - divergent
  - convergent
  - none of the above
- The sudden release of energy stored in rocks creates
  - earthquakes
  - folds
  - volcanoes
  - none of these
- The main reason there are so many earthquakes around the Pacific ocean basins is
  - the tremendous number of convergent plate boundaries.
  - the tremendous number of divergent plate boundaries.
  - the tremendous number of transform plate boundaries.
  - the extreme solidity of the Pacific plate.
- To find an earthquake epicenter, a seismologist needs to know
  - the intersection of two circles from two seismic stations.
  - the distances from three different seismic stations to the epicenter.
  - the epicenter distance from 10 seismic stations.
  - the difference in the arrival times of the first P- and S-waves at a seismic station.
- As stresses build in a region
  - the rocks break quickly.

- b. the rocks deform plastically and then break.
  - c. the rocks deform plastically but bounce back into shape.
  - d. b c
8. Mountain ranges rise where there are
- a. shear stresses.
  - b. compressive stresses.
  - c. tensional stresses.
  - d. b c
9. A useful earthquake prediction will include the quake's
- a. type
  - b. timing
  - c. magnitude
  - d. b c
10. One reason fewer people die in developed nations than developing ones in the same magnitude earthquake is
- a. there is a lower population density.
  - b. in developed nations, people only build in safe places.
  - c. the quality of construction is better.
  - d. there is better earthquake prediction in developed nations.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Shear stress is the most common stress at transform plate boundaries
- \_\_\_\_\_ 12. A fracture is when the rock breaks.
- \_\_\_\_\_ 13. Stress applied over time often leads to plastic deformation.
- \_\_\_\_\_ 14. Sedimentary rocks are formed with the youngest layers on the bottom and the oldest on top.
- \_\_\_\_\_ 15. Sedimentary rocks layers that are not horizontal are deformed.
- \_\_\_\_\_ 16. An anticline is a fold that bends downward.
- \_\_\_\_\_ 17. The movement of blocks of rocks on one or both sides of a fracture is called a joint.
- \_\_\_\_\_ 18. Slip is the distance rocks move along a fault.
- \_\_\_\_\_ 19. Two converging continental plates smash downwards and create mountain ranges.
- \_\_\_\_\_ 20. In an earthquake, the initial point where the rocks rupture in the crust is called the epicenter.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. Rocks that are pulled apart are under \_\_\_\_\_ .
22. When stress causes a material to change, it has undergone \_\_\_\_\_.
23. \_\_\_\_\_ are deposited horizontally, so sedimentary rock layers are horizontal.
24. A \_\_\_\_\_ is a simple bend in the rock layers so that they are no longer horizontal.
25. A \_\_\_\_\_ is a circular structure in which the rocks bend downward.
26. A \_\_\_\_\_ fault is a type of reverse fault in which the fault plane angle is nearly horizontal.
27. Besides California, the country of \_\_\_\_\_ has a major transform plate boundary.
28. The waves that do the most damage in an earthquake are \_\_\_\_\_ waves.

29. The height of a wave from the center line to its crest is its \_\_\_\_\_.

30. The study of seismic waves is known as \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

31. Explain why the 2004 Indian Ocean Earthquake was so deadly.

32. List the three methods for describing earthquake size. Explain each.

33. Explain the difficulty of earthquake prediction.

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# CHAPTER **8** HS Volcanoes Assessments

## Chapter Outline

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- 8.1** WHERE VOLCANOES ARE LOCATED
  - 8.2** VOLCANIC ERUPTIONS
  - 8.3** TYPES OF VOLCANOES
  - 8.4** VOLCANIC LANDFORMS AND GEOTHERMAL ACTIVITY
  - 8.5** VOLCANOES
-



## 8.1 Where Volcanoes Are Located

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- For mantle rock to melt,
  - pressure must rise.
  - temperature must rise.
  - there must be little to no water.
  - all of these.
- Volcanoes occur at which of the following
  - convergent plate boundaries
  - divergent plate boundaries
  - hotspots
  - all of the above
- Why are there volcanoes in Central America?
  - the area is an extension of the San Andreas Fault
  - subduction at the Middle American Plate
  - subduction of the Juan de Fuca plate
  - none of the above
- Melting takes place at divergent plate boundaries because
  - temperature is lowered.
  - pressure is lowered.
  - water is added
  - all of these.
- At divergent plate boundaries
  - hot mantle rock rises.
  - hot mantle rock sinks back into the mantle.
  - the addition of water stops mantle convection.
  - none of these.
- What is created by volcanoes along mid-ocean ridges?
  - new oceanic crust
  - new continental crust
  - hotspots
  - none of these
- How many hot spots are located on Earth
  - about 50

- b. about 100
  - c. over 1000
  - d. 1
8. Which of the following is NOT a hotspot?
- a. Hawaii
  - b. Iceland
  - c. Galapagos
  - d. Aleutian Islands
9. The Mid-Atlantic ridge rises above sea level in Iceland because
- a. convection brings extra magma to the volcanoes there
  - b. subduction of oceanic crust and water increases lava
  - c. a hotspot is located at the ridge
  - d. none of these
10. Divergent plate boundaries on land
- a. do not have volcanoes
  - b. often are found with hotspots
  - c. do not occur; they are only found in the oceans
  - d. none of these
11. Hotspots are usually found at
- a. convergent plate boundaries
  - b. divergent plate boundaries
  - c. no plate boundaries
  - d. none of these
12. The oldest volcanoes in a hotspot chain
- a. are furthest from the hotspot.
  - b. may be below sea level.
  - c. may be surrounded by coral reefs.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Most volcanoes are found in the Himalayan-Asiatic belt.
- \_\_\_\_\_ 14. Volcanoes erupt because mantle rock melts.
- \_\_\_\_\_ 15. Yellowstone is one of the few hotspots at a convergent plate boundary.
- \_\_\_\_\_ 16. All volcanoes are the result of plate tectonics processes.
- \_\_\_\_\_ 17. Volcanoes occur at convergent plate boundaries.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The Ring of Fire is located around \_\_\_\_\_.
19. The Ring of Fire is lined with \_\_\_\_\_ plate boundaries, which leads to volcanism.
20. Large cracks in the ground through which lava erupts are called \_\_\_\_\_.
21. Volcanoes erupt at mid-ocean ridges along \_\_\_\_\_ plate boundaries.
22. The volcano that is \_\_\_\_\_ in age sits directly above a mantle plume.

23. Along a chain of hotspot volcanoes, the volcanoes generally become \_\_\_\_\_ in size.
24. \_\_\_\_\_ is the process that leads to the Cascades volcanoes in the Pacific Northwest of the U.S.
25. Where there are lots of volcanoes there are also lots of another natural disaster called \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. How does subduction lead to volcanism?

27. What type of crust are most hotspot volcanoes found on? Why is this the case?

## 8.2 Volcanic Eruptions

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Each volcanic eruption is unique in its
  - style of eruption.
  - type of volcanic cone that forms.
  - composition of volcanic rocks that form.
  - all of these
- The composition of magma is determined by several things including
  - the amount of partial melting of the original rock.
  - the eruption style.
  - the type of volcano it erupts from.
  - none of these.
- The higher the viscosity of a magma, the higher its content of
  - iron
  - nickel
  - silica
  - gases
- Effusive eruptions
  - cause little damage.
  - rarely kill anyone.
  - have lavas that contain a lot of gas.
  - all of these.
- A volcano that has had no activity for quite a long time is said to be
  - active
  - extinct
  - sleeping
  - dormant
- The style of a volcanic eruption depends on
  - the steepness of the volcano's slopes.
  - the viscosity of the magma.
  - whether the volcano is dormant.
  - the location of the volcano.
- An eruption at a volcano in the Cascades Range could
  - shoot a column of ash and gas 30,000 feet into the air.

- b. create a large pyroclastic flow.
  - c. explode and collapse into a caldera.
  - d. all of these.
8. An ash plume from a volcano in Iceland
- a. disrupted air travel across Europe for six days in 2010.
  - b. mixed with pollutants in the atmosphere to cause excess acid rain.
  - c. created pillow lavas offshore.
  - d. created A'a and pāhoehoe lavas offshore.
9. When \_\_\_\_\_ lava flows under water, it creates \_\_\_\_\_.
- a. felsic; pillow lavas
  - b. felsic; a'a lavas
  - c. mafic; pillow lavas
  - d. mafic; a'a lavas
10. To see if a volcano will soon erupt, satellites can sense
- a. earthquakes.
  - b. rock fall.
  - c. temperature, deformation and gases.
  - d. nothing; satellites are too high up.
11. A sign that an eruption could soon occur is
- a. a reduction of gas emissions coming from the volcano.
  - b. an decrease in the number and size of earthquakes.
  - c. rocks falling down the volcano's slope.
  - d. all of these.
12. The ability of scientists to predict volcanic eruptions is
- a. excellent in most locations.
  - b. about 50-50.
  - c. an area that needs improvement.
  - d. none of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. At least one of the Cascades volcanoes has been actively erupting for at least a century.
- \_\_\_\_\_ 14. Viscosity is a measure how well a liquid is able to flow.
- \_\_\_\_\_ 15. Volcanic eruptions in Hawaii tend not to be explosive.
- \_\_\_\_\_ 16. A recently erupted volcano is said to dormant.
- \_\_\_\_\_ 17. An increase in earthquake activity is a sign that a volcano may be about to erupt.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Magma and gases collect beneath a volcano in a(n) \_\_\_\_\_.
19. Magmas with lower silica and more olivine and pyroxene are \_\_\_\_\_ magmas.
20. A volcano that is not currently erupting, but has erupted recently is said to be \_\_\_\_\_.
21. A non-explosive volcanic eruption is a(n) \_\_\_\_\_ eruption.
22. A high speed flow of pyroclastics mixed with water is a \_\_\_\_\_.

23. The composition of lava most likely to erupt at the surface is \_\_\_\_\_.
24. Most \_\_\_\_\_ magmas do not erupt, but cool deeper in the crust.
25. A'a and pāhoehoe lavas are from \_\_\_\_\_ eruptions.

**Short Answer**

*Answer each question in the space provided.*

26. Which composition of magma has the most explosive eruptions? Why?

27. How does the change in shape on a volcano indicate that an eruption may occur soon? Give an example.

## 8.3 Types of Volcanoes

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The rock composition of composite volcanoes is
  - ultramafic to mafic
  - mafic to intermediate
  - intermediate to felsic
  - felsic to ultrafelsic
- Some volcanoes have steep slopes because
  - viscous lava solidifies before it gets far down slope.
  - fluid lava solidifies before it gets far down slope.
  - mafic magmas form steep piles.
  - felsic magmas form steep piles.
- Lava that is fluid and flows easily creates
  - cinder cones
  - pyroclastic flows
  - composite cones
  - shield volcanoes
- The opening in the top of a composite volcano is a
  - hole
  - crater
  - fissure
  - vent
- Cinder cones usually grow
  - from large numbers of fluid lava flows.
  - from periodic eruptions of lava and ash.
  - rapidly, usually in a single eruption.
  - in large, explosive eruptions.
- Mount St. Helens and Mt. Fuji are both
  - shield volcanoes
  - supervolcanoes
  - composite volcanoes
  - cinder cones
- Yellowstone and Long Valley are similar because they are both
  - shield volcanoes

- b. supervolcanoes
  - c. composite volcanoes
  - d. cinder cones
8. A composite volcano has layers of
- a. fluid lava and viscous lava
  - b. viscous lava and ash
  - c. ash and fluid lava
  - d. fluid lava, viscous lava, and ash
9. The two largest supervolcanoes in North America are currently
- a. known mostly for their hot water features
  - b. active
  - c. extinct
  - d. none of these
10. A caldera is created by
- a. a set of fluid lava flows evacuating a magma chamber.
  - b. the earthquakes that accompany a large volcanic eruption.
  - c. a set of ash flows and lava flows building up a flat topped volcano.
  - d. the collapse of a volcano into its magma chamber.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Composite volcanoes are made of viscous magma.
- \_\_\_\_\_ 12. The composition of lava in a shield volcano changes over time.
- \_\_\_\_\_ 13. Magma travels through the volcano to the surface through a pipe.
- \_\_\_\_\_ 14. Shield volcanoes are the most common type of volcano.
- \_\_\_\_\_ 15. A volcanic mountain is a mountain that forms when magma is forced upward and flows onto Earth's surface.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. The type of rock that shoots up through the air and has holes where gas bubbles once were is \_\_\_\_\_
17. Magma in supervolcano eruptions tends to be \_\_\_\_\_ in composition.
18. \_\_\_\_\_ volcanoes are found on continents near plate boundaries and are very explosive when they erupt.
19. Crater Lake in Oregon is a(n) \_\_\_\_\_ in old Mount Mazama.
20. Composite volcanoes are made up of layers of lava and \_\_\_\_\_.
21. The most common volcano type at spreading centers and intraplate hot spots is \_\_\_\_\_ volcanoes.
22. The U.S. state with the most shield volcanoes is \_\_\_\_\_
23. A volcano that erupts in enormous, catastrophic eruptions is called a(n) \_\_\_\_\_

### Short Answer

Answer each question in the space provided.

24. Describe the three types of volcanoes that could be erupting right now. How does the composition of the lava cause each one?



25. What is Yellowstone? What might happen if Yellowstone erupts again?

## 8.4 Volcanic Landforms and Geothermal Activity

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Lava domes are created by
  - fluid lava that fills a crater.
  - viscous lava that does not move far from the vent.
  - fluid lava that flows over a large area.
  - alternating layers of silica-rich lava and ash.
- Lava fluid that flows over a large area is called
  - a lava plateau
  - a lava dome
  - a volcano
  - a cinder cone
- Lava domes are created
  - along a fissure
  - within a crater
  - from viscous lava
  - all of the above
- The ocean floor was created by
  - sediment eruptions
  - cinder cone eruptions
  - fissure eruptions
  - None of the above
- What is formed when water comes into contact with hot rock?
  - a geyser
  - a hot spring
  - an earthquake
  - a b
- When lava flows into or erupts into the ocean,
  - it creates geysers.
  - it creates new land.
  - it creates the most explosive eruptions.
  - a b
- A lava plateau is an extensive area of
  - mafic igneous rock.

- b. felsic igneous rock.
- c. igneous rock of a wide range of compositions.
- d. viscous lava.

8. The volcanoes that are currently active on Earth are
- a. cinder cones, composite volcanoes, shield volcanoes and supervolcanoes.
  - b. composite volcanoes and shield volcanoes.
  - c. supervolcanoes.
  - d. cinder cones, composite volcanoes, shield volcanoes
9. Fluid lava flows often erupt through a(n)
- a. lava dome
  - b. lava plateau
  - c. fissure
  - d. hotspot
10. In extremely cold winters, the bison in Yellowstone may stay warm near
- a. fissure eruptions.
  - b. geysers.
  - c. super volcanoes.
  - d. lava domes.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. The rock in lava domes is very rich in silica.
- \_\_\_\_\_ 12. The Big Island of Hawaii is made of one giant shield volcano.
- \_\_\_\_\_ 13. Shiprock in New Mexico is a lava dome.
- \_\_\_\_\_ 14. There are thousands of geysers in volcanic areas all around the world.
- \_\_\_\_\_ 15. The eruptions of some of the geysers in Yellowstone are quite unpredictable.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. The most common landforms created by lava are \_\_\_\_\_.
17. The eruptions that create the seafloor are \_\_\_\_\_ eruptions.
18. A plug of viscous lava that cools near the vent of a volcano is called a(n) \_\_\_\_\_.
19. In the Pacific Northwest, the \_\_\_\_\_ was created by a series of fluid lava flows.
20. When underground water is heated by hot rock so that it flows to the surface it produces a(n) \_\_\_\_\_.
21. When hot water erupts at the surface it is as a(n) \_\_\_\_\_.
22. Igneous \_\_\_\_\_ beneath volcanoes create volcanic landforms.
23. The most predictable geyser in the world is \_\_\_\_\_ in Yellowstone.

### Short Answer

Answer each question in the space provided.

24. How can volcanic eruptions create an island, like Hawaii?

25. Describe how a geyser is created and why it erupts.

## 8.5 Volcanoes

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The Hawaiian islands are found at a(n)
  - divergent boundary
  - hot spot
  - convergent boundary
  - transform boundary
- The most geologically active region in the world is the
  - Ring of Fire
  - Alps
  - Yellowstone Basin
  - Himalaya-Asiatic Belt
- When magma moves beneath a volcano it may cause
  - earthquakes
  - slope deformation
  - an eruption
  - all of these
- Which set of words go together?
  - mafic, high viscosity, silica-rich
  - felsic, high viscosity, silica-poor
  - felsic, high viscosity, silica-rich
  - mafic, low viscosity, silica-rich
- Which set of words go together?
  - felsic, composite volcano, lava dome, cinder cones
  - mafic, shield volcano, lava dome, cinder cones
  - felsic, shield volcano, lava dome, lava plateau
  - felsic, shield volcano, lava plateau, cinder cones
- A volcano that could erupt, but hasn't recently is
  - dead
  - active
  - dormant
  - extinct
- Which type of volcano is Kilauea in Hawaii?
  - shield

- b. composite
  - c. cinder cone
  - d. supervolcano
8. What is the most common type of volcano?
- a. shield
  - b. cinder cone
  - c. composite
  - d. supervolcano
9. Scientists think that supervolcano eruptions could have
- a. permanently altered the composition of the atmosphere.
  - b. caused large land areas to fall into the sea.
  - c. changed the directions of plate movement.
  - d. caused mass extinctions.
10. What is created when water is heated beneath the Earth's surface and erupts to the surface through a narrow passageway?
- a. lava plateau
  - b. lava dune
  - c. geyser
  - d. hot spring

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Subduction at the Middle American Trench creates volcanoes in Hawaii.
- \_\_\_\_\_ 12. Subduction of the Pacific plate into the Aleutian trench creates the Cascades volcanoes.
- \_\_\_\_\_ 13. Lava erupts through long cracks in the ground called fissures.
- \_\_\_\_\_ 14. Intraplate volcanoes are found at convergent plate boundaries.
- \_\_\_\_\_ 15. Volcanoes at divergent plate boundaries create oceanic crust.
- \_\_\_\_\_ 16. A supervolcano eruption occurs about once per century.
- \_\_\_\_\_ 17. A large explosive eruption causes more devastation than the force of the atom bomb dropped on Nagasaki at the end of World War II.
- \_\_\_\_\_ 18. Volcanic gases include sulfur dioxide, carbon dioxide, and water vapor.
- \_\_\_\_\_ 19. Effusive eruptions are much less deadly than explosive eruptions.
- \_\_\_\_\_ 20. Each volcano type has a certain lava composition.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. Some volcanic gases can be monitored using \_\_\_\_\_ .
22. A \_\_\_\_\_ is a vent through which molten rock and gas escape from the magma chamber.
23. The shape of a volcano is related to the composition of its \_\_\_\_\_ .
24. Cinder cone volcanoes usually have a \_\_\_\_\_ at their summit.
25. A \_\_\_\_\_ must erupt more than 1,000 cubic km of material.
26. The factor that most influences the style of volcanic eruption is the amount of \_\_\_\_\_ in the lava.

27. Most volcanoes are the result of the process of \_\_\_\_\_.
28. An explosive eruption may create a \_\_\_\_\_, a large hole into which the mountain collapses.
29. The Andes Mountains that line South America are at a(n) \_\_\_\_\_ boundary.
30. \_\_\_\_\_ are found at divergent plate boundaries as continents break apart.

**Short Answer**

*Answer each question in the space provided.*

31. Describe the plate tectonics of the west coast of the United States and Central America. Where are there volcanoes and why? Where aren't there volcanoes and why?

32. Explain how volcanic eruptions are predicted.

33. How can volcanoes be considered constructive? How can volcanoes be considered destructive?

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CHAPTER

**9**

# HS Weathering and Formation of Soil Assessments

## Chapter Outline

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- 9.1 WEATHERING
  - 9.2 SOILS
  - 9.3 WEATHERING AND FORMATION OF SOIL
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# 9.1 Weathering

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## 9.2 Soils

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## **9.3** Weathering and Formation of Soil

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# CHAPTER **10** HS Erosion and Deposition Assessments

## Chapter Outline

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- 10.1 WATER EROSION AND DEPOSITION
  - 10.2 WAVE EROSION AND DEPOSITION
  - 10.3 WIND EROSION AND DEPOSITION
  - 10.4 GLACIAL EROSION AND DEPOSITION
  - 10.5 EROSION AND DEPOSITION BY GRAVITY
  - 10.6 EROSION AND DEPOSITION
-

## 10.1 Water Erosion and Deposition

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Stream water
  - erodes, but does not deposit.
  - erodes and deposits.
  - deposits, but does not erode.
  - does not deposit or erode.
- A stream overflows its banks onto its
  - base level
  - alluvial plain
  - delta
  - flood plain
- Flooding can wipe out farms and even towns when
  - an earthquake lowers the elevation of the farms and towns.
  - the natural levees get too high.
  - the farms and towns are placed on a floodplain.
  - concrete allows the stream water to run off.
- As a stream exit a canyon into open land, the sediments form a(n) \_\_\_\_\_.
  - alluvial fan
  - fluvial fan
  - sediment fan
  - fan
- A stream's competence is highest when
  - its gradient is nearly flat and it moves slowly
  - it has a higher dissolved load
  - it cannot carry a sediment load
  - it has a steep gradient and faster velocity
- If a stream's competence increases it is likely that
  - the amount of water in the stream has increased.
  - the stream's gradient has increased.
  - either a or b, or both a and b
  - a and b together
- In a meander, the stream
  - erodes at the inside of the bend, and deposits at the outside of the bend.

- b. deposits at the inside of the bend, and erodes at the outside of the bend.
  - c. erodes all along the meander, inside and outside.
  - d. deposits all along the meander, inside and outside.
8. Tiny particles in a stream that can be carried in solution are known as \_\_\_\_\_.
- a. dissolved load
  - b. suspended load
  - c. bed load
  - d. fluvial load
9. In an area known for placer gold, where would you begin to pan?
- a. Inside a meander bend.
  - b. Outside a meander bend.
  - c. Anywhere along a meander.
  - d. Anywhere along the stream
10. A sinkhole forms
- a. when the roof of a lava tube collapses and fills with water.
  - b. when glaciers gouge out a hole in the ground that fills with water.
  - c. when the roof of a limestone cave collapses and fills with water.
  - d. when ice trapped in glacial sediment melts and makes a pond.
11. A river erodes most deeply when
- a. it is at its base level.
  - b. it is meandering across a plain.
  - c. it is farthest from its base level.
  - d. it is carrying a lot of sediment.
12. A stalagmite rises up from the floor of a cave because
- a. water comes through the cave's floor and up.
  - b. water drips down from the ceiling.
  - c. a column breaks into two features, one down from the ceiling, one up from the floor.
  - d. none of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Streams always flow to lower elevations
- \_\_\_\_\_ 14. Meanders are curves in the stream's path.
- \_\_\_\_\_ 15. Flowing water does the work of erosion, but not deposition.
- \_\_\_\_\_ 16. Dissolved load consists of teeny, tiny sediment particles.
- \_\_\_\_\_ 17. Rainwater is a weak acid due to carbon dioxide in the atmosphere.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Moving water below the surface is called \_\_\_\_\_.
19. Sediment that is bumped and pushed along the stream bottom is said to move by \_\_\_\_\_.
20. As a stream traverses flat land, it tends to \_\_\_\_\_.
21. A circular hole formed when the roof of a cave collapses and filled with water is called a(n) \_\_\_\_\_.
22. A(n) \_\_\_\_\_ forms where a stream meets a large body of standing water.

23. The stream that carries the largest particles has the highest \_\_\_\_\_.
24. Streams build natural levees during \_\_\_\_\_
25. A(n) \_\_\_\_\_ is a cave feature that comes down from the ceiling.

**Short Answer**

*Answer each question in the space provided.*

26. Briefly describe the ways that streams carry sediments.

27. What happens to the sediment load if a stream goes from normal flow to flood stage?

## 10.2 Wave Erosion and Deposition

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- A wave is \_\_\_\_\_ that passes through a material.
  - speed
  - energy
  - motion
  - water
- Beaches are formed when
  - waves deposit sediments along the coast
  - waves carry sediments to sea
  - humans erect sea walls
  - tides rise
- Erosion from waves produces which of the following:
  - cliffs
  - sea stacks
  - arches
  - all of the above
- Beaches often appear as a straight line because
  - wave energy focuses on areas that stick out and erodes them more.
  - waves focus the same amount of energy all along the beach.
  - ocean currents move sand so that the beach is a straight line.
  - seawalls built offshore protect sand in straight lines.
- The “bending” of a wave is called
  - reflection
  - refraction
  - refinement
  - reinforcement
- What feature is produced when waves erode through a cliff?
  - tower
  - heel
  - arch
  - bridge
- Where wave action is quiet,
  - sea stacks form.



- b. erosion and deposition of sediment are equal.
  - c. erosion increases.
  - d. sediment is deposited.
8. Large waves form when
- a. strong winds blow steadily over a large region of the ocean.
  - b. gusts of wind blow over a large region of the ocean.
  - c. strong winds blow just offshore.
  - d. gusts of wind blow just offshore.
9. An ocean wave undergoes refraction because
- a. the bottom of the wave is going more rapidly than the top of the wave.
  - b. the top of the wave is going more rapidly than the bottom of the wave.
  - c. the inshore part of the wave goes more slowly so the wave bends.
  - d. the offshore part of the wave goes more slowly so the wave bends.
10. If waves erode the base of a cliff
- a. the cliff will collapse
  - b. they will erode a wave-cut platform
  - c. they will create a sea arch
  - d. they will create a delta
11. If a river carries sediment to the shore and wave action is high
- a. a delta forms
  - b. an alluvial fan forms
  - c. the sand runs back up river
  - d. sand spreads along the beach
12. A structure built perpendicular to a beach that traps sand is a
- a. breakwater
  - b. seawall
  - c. groin
  - d. spit

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Wave energy is dispersed in areas such as bays.
- \_\_\_\_\_ 14. Waves have higher energy in the summer than the winter.
- \_\_\_\_\_ 15. Waves continually move sand along the shore.
- \_\_\_\_\_ 16. A spit is sand feature that is not connected to land
- \_\_\_\_\_ 17. Beaches are made from mineral grains and shell, but not coral pieces.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. \_\_\_\_\_ built along the shore, collect sediments, but deprive the shore down current of sediments.
19. A(n) \_\_\_\_\_ is formed when a wave breaks through the bottom part of a rock, but leaving the upper section in tact.
20. When a sea arch collapses, all that is left is a(n) \_\_\_\_\_.
21. A(n) \_\_\_\_\_ is a long, narrow sandbar that forms along the shore.

22. There is more sand on a beach in the \_\_\_\_\_ season because the waves have \_\_\_\_\_ energy.
23. Between a barrier island and the mainland is a(n) \_\_\_\_\_.
24. In its natural state, a(n) \_\_\_\_\_ defends a shoreline from storms.
25. As compared with a \_\_\_\_\_, which is built onshore, a \_\_\_\_\_ protects a beach and is built offshore.

**Short Answer**

*Answer each question in the space provided.*

26. Briefly describe the erosional features produced by ocean waves.

27. Hurricane Sandy in November 2012 destroyed a lot of property located near the beaches of New Jersey and New York. Given that sea level is rising, what can communities do to prepare for the next storm? Consider all options.

## 10.3 Wind Erosion and Deposition

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Wind as an erosional force is
  - a. stronger than water as an erosional force.
  - b. equally important in all the climate zones.
  - c. dependent on the wind strength and the size of particles.
  - d. all of these
2. Beach dunes are usually made of
  - a. quartz
  - b. marble
  - c. clay
  - d. calcium carbonate
3. Silt and clay blown over large areas are called
  - a. dunes
  - b. plains
  - c. loess
  - d. plateaus
4. The steep side of a sand dune is called
  - a. slip face
  - b. steep face
  - c. face
  - d. cross bed
5. Three examples of wind erosion are
  - a. sand storms, deflation, abrasion
  - b. abrasion, erosion, dunes
  - c. dunes, deflation, abrasion
  - d. abrasion, glacial, dunes
6. In a sandstorm, most sand
  - a. rolls along on the ground.
  - b. blows up very high; as much as 100 feet.
  - c. blows within a meter of the ground.
  - d. blows in spirals, like in a tornado.
7. Sandstorms are more common in arid regions than in humid regions because
  - a. desert sands are weathered to a good size for wind to pick up.

- b. water and vegetation in humid areas hold the sediments down.
  - c. winds are more common and stronger in deserts.
  - d. actually, the open spaces of deserts just makes it seem like they're more common.
8. Desert varnish is a type of
- a. mechanical weathering.
  - b. erosion.
  - c. sandstorm effect.
  - d. chemical weathering.
9. A sand dune's shape is
- a. the same on both sides.
  - b. steeply sloping on the downwind side and gently sloping on the upwind side.
  - c. gently sloping on the downwind side and steeply sloping on the upwind side.
  - d. random in most cases.
10. Mud in the ocean is formed partly of
- a. fine silts and clays blown out from land.
  - b. volcanic ash.
  - c. particles that settle from the surface to the seafloor.
  - d. all of these.
11. Parabolic dunes form in
- a. long straight lines parallel to the wind direction.
  - b. arc shapes that curve in the wind direction.
  - c. U-shapes that curve in the wind direction.
  - d. star-shapes that point in the various directions the wind is blowing.
12. Loess deposits form
- a. where sand-sized sediments are common.
  - b. in oceans.
  - c. in deserts.
  - d. where fine sediments are present.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. Wind can carry small cobbles, sand, silt and clay.
- \_\_\_\_\_ 14. Where quartz sands make up dunes, calcium carbonate has weathered into clay.
- \_\_\_\_\_ 15. Sand dunes have the same slope on both sides.
- \_\_\_\_\_ 16. Loess deposits are wastelands for crops and other vegetation.
- \_\_\_\_\_ 17. Wind erosion makes desert pavement.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. Extremely fine-grained, wind-borne deposit of silts and clays; forms nearly vertical cliffs is called a(n) \_\_\_\_\_ - \_\_\_\_\_.
19. Wind lifts sand just above the surface and bounces it along by \_\_\_\_\_ .
20. A rock or surface that has been sandblasted by blowing sand is a(n) \_\_\_\_\_
21. Wind-blown sediments are usually rounded by the process of \_\_\_\_\_.

22. Long dunes that form parallel to the wind direction are \_\_\_\_\_.
23. Ancient sand dunes display a very distinctive structure known as \_\_\_\_\_.
24. A surface of rocks formed because smaller sediments are blown away is called \_\_\_\_\_.
25. Sediment that is rolled along by wind is transported by \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. How do sand dunes form?

27. Why are dune sands composed of sands that are the same sizes and shapes?

## 10.4 Glacial Erosion and Deposition

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Apart from water and gravity, other erosive agents are
  - ice and wind
  - animals and machinery
  - glaciers and people
  - all of the above
- Valley or alpine glaciers cover what type of ground?
  - flat land
  - mountains
  - valleys
  - coastal
- Glaciers cover how much of the Earth's surface?
  - about 30%
  - less than 1%
  - over 40%
  - about 10%
- Glaciers make valleys in the shape of what letter?
  - V
  - U
  - C
  - W
- Long parallel grooves in the bedrock from glaciers are called:
  - bedrock striations
  - glacial grooves
  - glacial striations
  - None of the above
- The ice in continental glaciers
  - flows outwards from where the snow accumulates.
  - flows down valleys from higher land areas.
  - forms a solid cap that does not move.
  - none of these.
- A boulder dumped by a glacier is called a(n)
  - erratic

- b. arête
  - c. roche moutonnée
  - d. none of these
8. Three or more cirques carved into the top of a mountain create a(n)
- a. horn
  - b. hanging valley
  - c. arête
  - d. moraine
9. Glacial till that is sorted
- a. was deposited by multiple advances and retreats of a glacier.
  - b. was deposited as ground moraine.
  - c. was re-transported by melt water.
  - d. none of these
10. A lake that forms when a block of ice melts in glacial till is a(n)
- a. tarn
  - b. kettle
  - c. varve
  - d. terminal lake
11. Varves
- a. form in lakes in warm climates.
  - b. have dark clays that are deposited in spring runoff.
  - c. have light sands that are deposited in winter.
  - d. can be used to understand the annual cycle of a lake.
12. A glacier is retreating if it
- a. moves quickly down its valley.
  - b. becomes stagnant in place.
  - c. accumulates less snow in a year than melts off.
  - d. none of these.

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Glaciers move very fast, up to 80 mph.
- \_\_\_\_\_ 14. A continent that is covered by ice is said to be under an ice sheet.
- \_\_\_\_\_ 15. Glaciers erode the underlying rock by plucking.
- \_\_\_\_\_ 16. During the most recent ice ages, nearly the entire planet was covered with glaciers.
- \_\_\_\_\_ 17. Glaciers are disappearing at an increased rate.

**Fill in the Blanks**

Fill in the blank with the term that best completes the sentence.

18. Thick layer of sediment deposited under a glacier is called a(n) \_\_\_\_\_.
19. Yosemite Valley was cut by large \_\_\_\_\_ glaciers.
20. Greenland is a large landmass that is covered by a(n) \_\_\_\_\_.
21. Rocks pulled from the walls up high on a mountain create a(n) \_\_\_\_\_.
22. Bridal Veil Falls in Yosemite National Park flows down from a(n) \_\_\_\_\_.

23. A(n) \_\_\_\_\_ is found as tributary and main glaciers meet.
24. \_\_\_\_\_ occurs glacial melt water seeps into cracks, freezes, breaks off pieces of bedrock, and then transported by the glacier.
25. Features that point in the direction the glacier moved are \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. List and describe three geological features that are the result of erosion by glaciers.

27. List and describe three geological features that are the result of deposition by glaciers.



## 10.5 Erosion and Deposition by Gravity

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The rate of erosion by gravity
  - is sudden and dramatic.
  - is very slow over long periods of time.
  - neither of these.
  - either of these.
- Deposition is governed by which of the following?
  - pressure
  - gravity
  - chemical energy
  - potential energy
- How fast can landslides move?
  - up to 30 km per hour
  - up to 100 km per hour
  - up to 300 km per hour
  - up to 1,000 km per hour
- When a rock falls from a cliff face, the agent of erosion is
  - wind
  - water
  - gravity
  - glaciers
- The weather conditions most likely to produce landslides is
  - years of almost non-stop rain.
  - years of drought followed by abundant rain.
  - years of normal weather in a semi-arid climate.
  - years of drought.
- A lahar flows down
  - any type of volcano.
  - any type of igneous rock feature.
  - a composite volcano.
  - any hillside with snow melt or rainwater.
- Logging a hillside makes it
  - less likely to experience mass movements due to gravity.

- b. vulnerable to mass movements by gravity.
  - c. unchanged in its chance of having mass movements.
  - d. none of these
8. Soil that moves very slowly downhill
- a. results in curved tree trunks.
  - b. falls as a whole unit.
  - c. leaves large scars in the hillside.
  - d. cannot be noticed because it is so slow.
9. The rock that is most likely to have landslides is
- a. clay that can become wet and slippery.
  - b. solid rock that can break and fall.
  - c. igneous or metamorphic rock that can change and then fall.
  - d. any type; the type of rock doesn't affect the chance of landslide.
10. To keep a slope from having a landslide, you should
- a. build a retaining wall to hold up soil.
  - b. plant vegetation to hold soil in place.
  - c. install pipes so the excess water is drained.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Curved tree trunks are a sign of land creep.
- \_\_\_\_\_ 12. Undercutting can cause the ground to become unstable.
- \_\_\_\_\_ 13. Landslides cause an average of \$1 million to \$2 million of damage in the U.S. each year.
- \_\_\_\_\_ 14. Landslides can cause earthquakes.
- \_\_\_\_\_ 15. A lahar occurs from the erosion caused by a glacier.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. A large block that moves along a curved surface is a(n) \_\_\_\_\_.
17. The movement type in #16 above is often caused by \_\_\_\_\_.
18. As snow accumulates on a mountain, the risk of a(n) \_\_\_\_\_ increases.
19. Slow mass wasting is referred to as \_\_\_\_\_.
20. Rockfall at the base of a cliff makes a(n) \_\_\_\_\_.
21. Sand on a beach cliff may fall when it is undercut by \_\_\_\_\_.
22. A landslide that falls into a lake or bay may cause a \_\_\_\_\_.
23. A flow of volcanic ash mixed with melted snow is a(n) \_\_\_\_\_.

### Short Answer

Answer each question in the space provided.

24. How does the amount of rain that falls on a slope affect the chances that there will be a landslide?

25. Some day you may want to buy a house on a hillside. Describe the three signs should you look for to see if landslides are a problem in that area.

## 10.6 Erosion and Deposition

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What is created when large sediments build a higher area around the edges of the stream channel?
  - a. meander
  - b. headwater
  - c. natural levees
  - d. none of the above
2. What is a curve in a stream channel called?
  - a. meander
  - b. headwater
  - c. natural levees
  - d. none of the above
3. Stalactites forms when what drips from the ceiling of a cave?
  - a. water
  - b. sulfuric acid
  - c. calcium carbonate
  - d. carbonic acid
4. The bending of waves is called
  - a. reflection
  - b. refraction
  - c. deflation
  - d. none of the above
5. What is produced when waves erode through a cliff?
  - a. a wave-cut platform
  - b. a wave-cut cliff
  - c. an arch
  - d. a sea stack
6. What is a long, narrow pile of rocks built perpendicular to the shoreline in order to keep sand on the beach called?
  - a. breakwater
  - b. barrier island
  - c. sea wall
  - d. groin
7. Stones that have become polished and faceted due to the abrasion by sand particles is called

- a. desert varnish
  - b. ventifacts
  - c. sand dunes
  - d. deflation
8. Which of the following is windblown silt and clay deposited layer upon layer over a large area called?
- a. sand
  - b. slipface
  - c. soil
  - d. loess
9. How much of the Earth is covered in glaciers?
- a. 5%
  - b. 10%
  - c. 15%
  - d. 20%
10. What are large ice sheets that cover relatively flat ground called?
- a. continental glaciers
  - b. alpine glaciers
  - c. valley glaciers
  - d. none of the above

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Flowing water does the work of both erosion and deposition.
- \_\_\_\_\_ 12. Faster streams can only carry smaller particles.
- \_\_\_\_\_ 13. A sinkhole forms if a cave's roof collapses.
- \_\_\_\_\_ 14. Barrier islands act as the first line of defense against storms if they are undeveloped.
- \_\_\_\_\_ 15. Desert pavement is a surface covered by clay that is easily moved by wind.
- \_\_\_\_\_ 16. Cross beds are created when wind blows only in one direction.
- \_\_\_\_\_ 17. Loess deposits make very fertile soils in many regions.
- \_\_\_\_\_ 18. Plucking is the abrasion of rocks by glaciers.
- \_\_\_\_\_ 19. Geologists study moraines to determine when the next ice age will occur.
- \_\_\_\_\_ 20. Landslides are the most dramatic, sudden and dangerous example of earth materials moved by gravity.

**Fill in the Blanks**

Fill in the blank with the term that best completes the sentence.

21. A flat level area surrounding the stream channel is called a \_\_\_\_\_.
22. A stream deposits its sediments in a wide triangular-shaped deposit called a \_\_\_\_\_.
23. A \_\_\_\_\_ is the level area formed by wave erosion as the waves undercut cliffs.
24. Waves spread the sediments along a coastline to create a \_\_\_\_\_.
25. A \_\_\_\_\_ is formed as wind passes over a dune and sand cascades down the crest.
26. \_\_\_\_\_ is the erosional agent that is responsible for the most erosion.
27. Rocks carried by glaciers can scratch deeply into underlying bedrock making long, parallel grooves called \_\_\_\_\_.

28. Linear deposits of rock that were dumped by a glacier are called \_\_\_\_\_.
29. \_\_\_\_\_ are the very dramatic and sudden movement of earth downhill while \_\_\_\_\_ are the same but involving snow.
30. \_\_\_\_\_ is the extremely gradual movement of soil downhill.

**Short Answer**

*Answer each question in the space provided.*

31. Describe the course a stream takes, from its beginning in the mountains, to its ending in the ocean. Integrate as many concepts from this section in as you can. (Just talk about the flow of water?)

32. Briefly describe the depositional features produced by ocean waves.

33. How do sand dunes move?

34. Yosemite Valley was carved by glaciers. Some of the notable features are a large valley, waterfalls and steep cliffs. The rocks that make up the area have grooves; there are boulders sitting around. Describe how glaciers created these features.

35. List the factors that cause a landslide to occur.

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# CHAPTER **11** HS Evidence About Earth's Past Assessments

## Chapter Outline

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- 11.1 FOSSILS
  - 11.2 RELATIVE AGES OF ROCKS
  - 11.3 ABSOLUTE AGES OF ROCKS
  - 11.4 EVIDENCE ABOUT EARTH'S PAST
-



# 11.1 Fossils

## Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

*Circle the letter of the correct choice.*

- Examples of imprint fossils made by compression are
  - drawings on rock made by prehistoric humans
  - frozen remains of elephant-like mammoths
  - footprints and animal tracks
  - fossil leaves
- Fossilized insects have been found preserved in amber which is hardened
  - flower nectar
  - tree sap
  - wood
  - None of the above
- Fossilized stomach contents may indicate
  - the diet of the animal
  - the vegetation type in its habitat
  - whether an animal walked, swam or flew
  - a b
- In petrified wood, the original wood has been slowly replaced by
  - another type of harder wood
  - preserving salts
  - minerals
  - None of the above
- Scientists who study fossils are
  - fossilologists
  - palaeontologists
  - reptilologists
  - geologists
- The body of an animal is more likely to become fossilized if it:
  - is buried deeply in the ground
  - is left on the surface of the ground
  - does not contain bones or other hard body parts
  - all of the above are about equally likely to result in fossilization
- The scientific name for fossilized feces is
  - coprolites

- b. pooprolites
  - c. carbon tubules
  - d. that's too gross; no scientific name exists
8. The unaltered remains of fossilized animals include
- a. petrified wood
  - b. carbon imprints of ferns
  - c. mummified and frozen mammoths
  - d. None of the above
9. Which of the following could be a fossil?
- a. a woman who lived 15,000 years ago found frozen in a glacier
  - b. a penguin that lived 100,000 years ago found mummified in a dry valley in Antarctica
  - c. a wasp inside a 30 million year old block of amber
  - d. all of the above
10. Most of the mammal fossil record consists of
- a. bones
  - b. shells
  - c. footprints
  - d. teeth
11. If a wood fragment that is buried in sediment has minerals deposited in its empty spaces, the process of fossilization is called
- a. permineralization
  - b. molds and casts
  - c. replacement
  - d. exceptional preservation
12. The presence of marine fossils on the top of Mt. Everest indicates
- a. sea level was once higher than the top of Mt. Everest.
  - b. the fossils are not actually marine fossils, but just look like them.
  - c. the rock at the top of Mt. Everest was once under water.
  - d. someone put them up there as a trick.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. In ancient times, fossils inspired legends of monsters.
- \_\_\_\_\_ 14. Chang Qu, 2,000 years ago reported the discovery of "dragon bones," which were probably hominid fossils
- \_\_\_\_\_ 15. Ancient Greeks named ammonites after the ram god Ammon since they look like the coiled horns of a ram
- \_\_\_\_\_ 16. Fossils in older rocks are more similar to animals that live today than fossils in younger rocks.
- \_\_\_\_\_ 17. For a fossil to indicate the climate at the time the organisms lived, you have to assume that the organism lived in the same climate as similar organisms do today.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. Fossils that are left by an organism but were not part of the organism are \_\_\_\_\_ fossils.
19. If a shell dissolves, the empty space in the rock is a(n) \_\_\_\_\_; if that space is filled with rock, it can form a \_\_\_\_\_.

20. Ancient insects can be preserved in \_\_\_\_\_.
21. Shells found in ancient sandstone are \_\_\_\_\_ fossils.
22. If a calcium carbonate shell is taken over by quartz, a fossil forms by \_\_\_\_\_.
23. Fossils are good at telling the story of the history of \_\_\_\_\_ on Earth.
24. The environment of \_\_\_\_\_ refers to the conditions that existed when sediments and organisms were deposited in a place.
25. A fossil that can pinpoint a specific period of time is a(n) \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Why are there more fossils of ammonites than there are of jellyfish?

27. List and briefly describe the types of fossilization.

## 11.2 Relative Ages of Rocks

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- A rock's age compared to the ages of other rocks is called its
  - absolute age
  - confirmed age
  - nominal age
  - none of the above
- The Law of Superposition states that in a section of rock layers
  - the younger rocks are found at the bottom and the older rocks are found at the top
  - the older rocks are found at the bottom and the younger rocks at the top
  - a rock that cuts across other rocks must be younger than the rock it cuts across
  - none of the above
- The rock layers at the Grand Canyon
  - are the same on opposite sides of the river.
  - were formed in different ways on each side of the river.
  - are younger than the Colorado River in that region.
  - none of these.
- A good key bed must be
  - found over a large area.
  - similar to the rock units it is found with.
  - a volcanic ash.
  - all of these.
- The principle of faunal succession recognizes that
  - any type of fossil can be found with any other type of fossils.
  - humans and dinosaurs lived at the same time.
  - fossil organisms become more modern over time.
  - none of these.
- If rock D cuts across rocks layers A and B, but not layer C (which is on top of B) then we know that the relative ages oldest to youngest are
  - A - B - C - D
  - A - B - D - C
  - D - C - B - A
  - C - D - A - B
- Fossil B is younger than Fossil A, but the rock layer containing Fossil B is beneath the rock layer containing Fossil A. What happened?

- a. Steno's laws are wrong
  - b. the ages of the fossils must be wrong
  - c. the rock layers are overturned
  - d. none of these
8. A good index fossil
- a. is found in a local area
  - b. is distinctive
  - c. existed for a long period of time
  - d. all of these
9. The clay layer found at the Cretaceous-Tertiary boundary
- a. is weathered volcanic ash from an enormous eruption.
  - b. contains a high concentration of the element uranium.
  - c. could have come from the impact of an enormous asteroid.
  - d. all of these.
10. To help decipher the geologic history of a region
- a. look for rock units that are part of the same biozone.
  - b. find a key bed throughout the area.
  - c. create a geologic time scale using the rock units you see.
  - d. all of these.
11. In the geologic time scale,
- a. the oldest ages are on the top and the youngest ages are on the bottom.
  - b. the oldest ages are the most finely divided.
  - c. each of the divisions is the same number of millennia.
  - d. the names of time units come from local places where the representative rock layers are found.
12. To understand Earth history you need to know that
- a. the present is the key to the past.
  - b. the geologic time scale covers all time periods evenly.
  - c. natural laws are not always set.
  - d. time flies like arrows.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. In the 1600s, most people believed fossils formed within the rocks as a result of mysterious forces.
- \_\_\_\_\_ 14. Steno believed that marine fossils found in mountains could be explained because of the biblical flood.
- \_\_\_\_\_ 15. James Hutton thought Earth was old because he saw how slowly geological processes like sedimentation work now.
- \_\_\_\_\_ 16. Cross-cutting relationships helps geologists to determine the older and younger of two rock units.
- \_\_\_\_\_ 17. In the process of relative dating, scientists determine the exact age of a fossil or rock.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A fossil that must be studied with the aid of a microscope is called a(n) \_\_\_\_\_.
19. A(n) \_\_\_\_\_ is a rock unit that is defined by a characteristic index fossil or group of fossils.
20. In the Grand Canyon rock layers stretch over wide areas, which illustrates the principle of \_\_\_\_\_.

21. That geological processes are the same back in Earth history is the principle of \_\_\_\_\_
22. Large time periods of erosion can cause a(n) \_\_\_\_\_ in the rock record.
23. The Cretaceous Period ended at the same time as the \_\_\_\_\_ Era.
24. A distinctive layer of rock that can be recognized across a large area is a(n) \_\_\_\_\_.
25. Earth history is divided into two eons called the \_\_\_\_\_ and the \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. What are the three possible explanations to explain how marine fossils are found in rock layers at the tops of tall mountains and why is each likely or unlikely?

27. Why is the phrase "the present is the key to the past" so important for studying Earth history?

## 11.3 Absolute Ages of Rocks

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Trees rings have distinctive patterns because
  - a. each tree reflects its own response to weather conditions.
  - b. a light band represents a warm year and a dark band represents a cool year.
  - c. the width of a band reflects the weather conditions during that season.
  - d. all of these.
2. A core through a glacier contains
  - a. annual layers of ice and dust.
  - b. changes in atmospheric gases over that time.
  - c. changes in the environment over that time.
  - d. all of these.
3. Varves
  - a. have layers of thin sediment from summer, thick clay from winter.
  - b. indicate the temperature conditions from a summer.
  - c. indicate how far the nearby glacier had advanced.
  - d. all of these.
4. Regarding Earth's age, geologists from the 18th and 19th centuries thought
  - a. the planet was around 6,000 years old.
  - b. natural processes occur slowly so Earth must be old.
  - c. Lord Kelvin was right that it was around 240 million years.
  - d. that the number was unknowable.
5. How much percent of the parent isotope remains after 2 half lives?
  - a. 100%
  - b. 50%
  - c. 25%
  - d. 75%
6. The half-life of a radioactive element is
  - a. half the estimated age of Earth's crust
  - b. the time it takes for half of the mass of the parent isotope to decay into the daughter isotope
  - c. half the weight of the original radioactive element
  - d. the time it takes for half of the number of parent isotopes to decay into daughter isotopes
7. The half-life of carbon-14 is about
  - a. 80000 years

- b. 23500 years
  - c. 5730 years
  - d. none of the above
8. Radioactive isotopes
- a. gain or lose particles to become different elements.
  - b. lose electrons, but the nucleus stays intact.
  - c. break apart into different elements.
  - d. none of the above
9. Potassium-argon is good for dating igneous rocks because
- a. potassium is common in many minerals.
  - b. the argon content is zero when the magma first cools.
  - c. the half-life is long.
  - d. all of these.
10. For radiometric dating of Earth's oldest rock, the best isotope system to use is
- a. uranium-238 to lead-206
  - b. potassium-argon
  - c. radiocarbon
  - d. uranium-235 to lead-207
11. The materials that are good for radiometric dating are
- a. index fossils
  - b. sedimentary rocks
  - c. igneous rocks
  - d. any rocks and index fossils
12. Scientific evidence pinpoints the age of Earth at
- a. 4.6 billion years
  - b. 4.6 million years
  - c. 6,000 billion years
  - d. 6,000 years

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. Using radioactivity scientists are able to measure the relative age of some rocks.
- \_\_\_\_\_ 14. Tree ring dating can be used for events going back about 200 years.
- \_\_\_\_\_ 15. The same distinctive pattern of tree rings can be found in all the trees in an area for the same time period.
- \_\_\_\_\_ 16. Lord Kelvin underestimated Earth's age because he did not know about radioactivity.
- \_\_\_\_\_ 17. Scientists drill deep into ice sheets, producing varves hundreds of meters long.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. Rock A is older than Rock B is a(n) \_\_\_\_\_ age. Rock A is 1.2 million years old is a(n) \_\_\_\_\_-age.
19. The outermost ring in a core through a tree indicates when \_\_\_\_\_.
20. Details of the ancient atmosphere can be found in air bubbles from a(n) \_\_\_\_\_.



21. \_\_\_\_\_ is the emission of high-energy particles by unstable isotopes.
22. A(n) \_\_\_\_\_ is formed from the radioactive decay of a parent isotope.
23. Radioactive dating is used to determine the \_\_\_\_\_ of objects.
24. If a zircon crystal has 100 spots for ions of lead and/or uranium, at the time the crystal forms it has \_\_\_\_\_ - \_\_\_\_\_ ions of lead and \_\_\_\_\_ ions of uranium.
25. For radiometric dating to be done the rock must contain measurable amounts of the \_\_\_\_\_ and the \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Explain the reason that potassium-argon is a good technique for finding the radiometric age of an igneous rock.

27. You do radiometric dating on a zircon crystal found in a sandstone and find it to be about 2 billion years old. Explain what you found the age of and what you didn't find the age of.

## 11.4 Evidence about Earth's Past

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Which of the following are body fossils?
  - footprints
  - coprolites
  - burrows
  - bones
- Which of the following can be used to identify a specific period of time?
  - body fossil
  - trace fossil
  - index fossil
  - amber
- A fault or intrusion that is younger than the rocks that it cuts through is called a(n)
  - crosscut.
  - uplift.
  - inversion.
  - none of the above
- The giant asteroid impact that extinguished the dinosaurs was first discovered
  - from widespread key bed that contained the element iridium.
  - when scientists located the giant crater.
  - when large chunks of the asteroid were discovered in Mexico.
  - none of these.
- What is uniformitarianism?
  - Earth is no longer changing
  - the processes that act on Earth today, acted on Earth in the past
  - Earth is constantly changing but the causes of the change today are different than in the past.
  - the process that formed Earth as it is now are no longer in effect today
- Two rock layers that are far apart but have the same index fossil
  - are about the same age.
  - formed in the same environment.
  - are unrelated.
  - none of these.
- To learn about the changes in climate near a glacier, scientists study
  - crevasses

- b. ice cores
  - c. varves
  - d. argon gas
8. Which era do we live in?
- a. Holocene
  - b. Cenozoic
  - c. Quaternary
  - d. Phanerozoic
9. After seven half lives
- a. an isotope pair is no longer useful.
  - b. there is very little parent isotope left.
  - c. there is very little measurable daughter isotope.
  - d. at least 13 more half lives can pass before the pair can't be used.
10. How can you determine how long a giant Sequoia has been alive?
- a. measure the trunk
  - b. count the total number tree rings
  - c. radiocarbon dating
  - d. determine the age of the outermost tree ring

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Fossilization is very common.
- \_\_\_\_\_ 12. A cast is made when the original bone or shell dissolves and leaves behind the an empty space in the shape of the material.
- \_\_\_\_\_ 13. The rule of continuity states that identical rock layers were once connected.
- \_\_\_\_\_ 14. The outermost tree ring indicates when the tree started growing.
- \_\_\_\_\_ 15. An unconformity can be thought of as a loss of time.
- \_\_\_\_\_ 16. Radioactivity was discovered in 1896.
- \_\_\_\_\_ 17. If a zircon crystal is 4.4 billion years old that means that the rock it is in is 4.4 billion years old.
- \_\_\_\_\_ 18. Radioactive isotopes are ideal for dating rocks because they are stable and unchanging.
- \_\_\_\_\_ 19. Different isotopes are used to date materials of different ages.
- \_\_\_\_\_ 20. Potassium-40 decays to argon-40.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. A \_\_\_\_\_ is any remains or traces of an ancient organism.
22. \_\_\_\_\_ is ancient tree sap.
23. The law of \_\_\_\_\_ states that the younger layers are at the top and the oldest are at the bottom.
24. The layers of sediment in a lake can be cored to make a(n) \_\_\_\_\_.
25. An intrusion is \_\_\_\_\_ in age than the rocks it cuts across.
26. The Quaternary Period is divided into the \_\_\_\_\_ and \_\_\_\_\_ epochs.
27. Radiocarbon dating is used to find the age of once living materials between \_\_\_\_\_ and \_\_\_\_\_ years old.

28. A rock is analyzed and found to have 25 atoms of the parent isotope and 175 atoms of the daughter. \_\_\_\_\_ half-lives have passed.
29. With beta decay, the nucleus loses \_\_\_\_\_ .
30. \_\_\_\_\_ allows scientists to assign numbers to the breaks in the geologic time scale.

**Short Answer**

*Answer each question in the space provided.*

31. What are the limits on radiometric dating?

32. What are microfossils? Why are they useful?

33. An ancient artifact conveniently includes a piece of wood that is a complete slice through a tree. How could you use the rings to find the age of the tree? What does that tell you about the age of the artifact?

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CHAPTER **12**

# HS Earth's History Assessments

## Chapter Outline

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- 12.1 EARLY EARTH
  - 12.2 THE PRECAMBRIAN
  - 12.3 PHANEROZOIC EARTH HISTORY
  - 12.4 HISTORY OF EARTH'S COMPLEX LIFE FORMS
  - 12.5 EARTH'S HISTORY
-

## 12.1 Early Earth

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Scientists know that Earth and Moon formed in the same part of the solar system because they have
  - a. nearly the same ratio of rock to metal.
  - b. experienced about the same number of asteroid impacts.
  - c. the same oxygen isotope ratio.
  - d. the same ratio of oxygen to other atmospheric gases.
2. Earth's first crust was probably made of
  - a. anorthosite
  - b. granite
  - c. basalt
  - d. ultramafic peridotite
3. The densest part of planet Earth is the
  - a. core.
  - b. mantle.
  - c. continental crust.
  - d. oceanic crust.
4. The Sun formed
  - a. several hundred million years before the planets.
  - b. about 100,000 years before the planets.
  - c. at around the same time as the planets.
  - d. not long after the planets.
5. Early Earth was intensely hot because of
  - a. short-lived radioactive decay.
  - b. intense bombardment from asteroid impacts.
  - c. contraction of materials due to gravity.
  - d. all of these.
6. Earth separated into layers based on
  - a. gravity
  - b. metallicity
  - c. the tendency for material to recycle
  - d. density
7. For a planet its size, Earth
  - a. has a faster spin.

- b. is rounder.
  - c. has a smaller core.
  - d. has a high oxygen isotope ratio.
8. The earliest atmosphere
- a. was added to by gases in the solar wind.
  - b. vaporized from the heat of asteroid impacts.
  - c. evolved to become the second atmosphere.
  - d. all of these.
9. Gases in the first atmosphere came from
- a. asteroid impacts.
  - b. comet impacts.
  - c. volcanic outgassing.
  - d. all of these.
10. Scientists know that Earth had an ocean by 4 billion years ago because
- a. fossil fish are found in rocks of that age.
  - b. marine sedimentary rocks of that age can be dated.
  - c. high tide lines are found around the basin of the ancient ocean.
  - d. there was water and basins so there must have been oceans.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Planets were created from gravity smashing together large masses of metals and rocks.
- \_\_\_\_\_ 12. Water vapor, carbon dioxide, small amounts of nitrogen, and other gases were supplied by volcanic outgassing.
- \_\_\_\_\_ 13. Due to Earth's large size, it did not experience intense bombardment from asteroid impacts.
- \_\_\_\_\_ 14. Earth accreted from the cloud of dust and gas known as the solar nebula nearly 1.6 billion years ago.
- \_\_\_\_\_ 15. The sun is approximately 100,000 years older than Earth.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. Earth's first and second atmospheres were missing the important gas \_\_\_\_\_
17. Streams carried \_\_\_\_\_ into the early oceans to make them salty.
18. \_\_\_\_\_ occurred as Earth formed, causing distinct layers.
19. The small bodies that came together to form the planets were the \_\_\_\_\_
20. The Moon is almost the same size as the smallest planet, \_\_\_\_\_.
21. Intense heat from the early core was the reason for rapid and vigorous \_\_\_\_\_ in the mantle.
22. The age of the Moon is nearly the same as the age of the rest of the \_\_\_\_\_
23. Earth's first atmosphere was made of the gases \_\_\_\_\_ and \_\_\_\_\_.

### Short Answer

Answer each question in the space provided.

24. How did the Moon form?

25. Briefly describe three ways that scientists learn about the earliest Earth.



## 12.2 The Precambrian

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Precambrian greenstone indicates the presence of
  - volcanoes
  - subduction zones
  - cratons
  - rift valleys
- How old are many of the Precambrian shields?
  - 5.7 billion years old
  - 570 million years old
  - 57 million years old
  - 5.7 million years old
- The building blocks of life are
  - amino acids
  - proteins
  - covalent bonds
  - none of the above
- During the Precambrian
  - all continents were small microcontinents.
  - there was a supercontinent called Rodinia the whole time.
  - large lava flows indicate that the supercontinent Rodinia broke up.
  - there was a solid crust that had solidified like the Moon's crust.
- Scientists know that the chemical reactions that make up the metabolism of modern organisms evolved very early in Earth history because
  - fossils show the same metabolic pathways as modern organisms.
  - there is no other type of metabolic pathway that life could possibly have.
  - very simple bacteria and the most complex organisms today have the same metabolic pathways.
  - none of these.
- Which of the following sentences is true?
  - Nucleic acids carry genetic information from one generation to the next.
  - Genetic information was probably first carried by RNA.
  - The replicator for modern organisms is DNA.
  - All of these.
- Cells may first have come together because

- a. clays provided the structure for organic molecules.
  - b. prokaryotic structures had a symbiotic relationship.
  - c. the molecules began to photosynthesize.
  - d. all of these.
8. LUCA was
- a. a eukaryotic cell.
  - b. the first organisms to use RNA as a replicator.
  - c. the last organism that was ancestor to all life on Earth.
  - d. all of these.
9. Photosynthesis uses carbon dioxide and nutrients in the presence of sunlight to create
- a. food energy and ozone.
  - b. chloroplasts and ozone.
  - c. food energy and oxygen.
  - d. life.
10. Banded-iron formations are important because they
- a. represent the time that large amounts of oxygen entered the atmosphere.
  - b. were deposited mostly during the Cambrian Explosion of life.
  - c. represent the first crust that solidified on Earth.
  - d. are the result of the evolution of cellular respiration.
11. Cratons contain
- a. mafic igneous rocks, which are remnants of the first continents.
  - b. sedimentary rocks, indicating that older rocks had existed before.
  - c. bluestone, indicating ancient subduction zones.
  - d. all of these.
12. Which of the following is true?
- a. Prokaryotes and eukaryotes are both only single celled.
  - b. Prokaryotes are only single-celled; eukaryotes are only multicellular.
  - c. Prokaryotes are single-celled or multicellular; eukaryotes are only multicellular.
  - d. Prokaryotes and eukaryotes are both single-celled or multicellular.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. The current ocean crust is much like the Earth's first crust.
- \_\_\_\_\_ 14. One hypothesis is that Earth was covered with ice about 700 million years ago.
- \_\_\_\_\_ 15. Places the craton crops out at the surface are known as a shield.
- \_\_\_\_\_ 16. Prokaryotic cells can replicate themselves better and so they are more common than eukaryotic cells.
- \_\_\_\_\_ 17. Peptobismo chains are polymers that link together amino acids to form proteins.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. Blue-green algae are modern \_\_\_\_\_.
19. The abundance of \_\_\_\_\_ in the Precambrian era caused oxygen levels to rise in the atmosphere.
20. \_\_\_\_\_ form the core of the ancient continent.
21. A \_\_\_\_\_ relationship is one in which biological units (cells, organisms) help each other but do not harm each other.

22. \_\_\_\_\_ is the chemical work of cells.
23. \_\_\_\_\_ are molecules that pass genetic information to the next generation.
24. \_\_\_\_\_ is the process that producers use to convert carbon dioxide into simple sugars.
25. A eukaryote is different from a prokaryote because it has a \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Briefly describe the three features a molecule needs to be considered alive.

27. Why did the development of photosynthesis make Earth more hospitable for life to evolve?

## 12.3 Phanerozoic Earth History

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- A mountain building event is called:
  - orographic
  - mountainogy
  - orogeny
  - a fissure event
- Pangaea began to break up how long ago?
  - 580 million years ago
  - 300 million years ago
  - 180 million years ago
  - 40 thousand years ago
- In the Grand Canyon
  - all of the Paleozoic is displayed.
  - one transgression and one regression are exposed.
  - evidence of glaciation is clearly exposed.
  - unconformities break up the geological record.
- The Great Unconformity in the Grand Canyon separates
  - transgressions from regressions.
  - Precambrian rocks from Paleozoic rocks.
  - glacial advances from glacial retractions.
  - Paleozoic rocks from Mesozoic rocks.
- A supercontinent breaks up because
  - by the laws of physics, once the plates smash together, an equal and opposite motion must take over.
  - sea level rises and weighs down on the landmass.
  - the buildup of heat beneath the continent causes continental rifting.
  - none of these
- The reasons for a a marine regression could include
  - an increase in the land area covered by glaciers
  - an increase in seafloor spreading
  - a lowering of a landmass
  - all of these
- Evidence for the Taconic Orogeny includes
  - an ancient volcanic arc

- b. the Taconic Mountains of New York
- c. metamorphosed ocean sediments
- d. all of these

## 8. The Paleozoic

- a. begins with the supercontinent Rodinia and ends with the supercontinent Pangaea.
- b. begins with a set of microcontinents and ends with the supercontinent Pangaea.
- c. begins with a set of scattered continents and ends with the supercontinent Pangaea.
- d. begins with the supercontinent Rodinia and ends with a set of microcontinents.

## 9. The Sierra Nevada Mountains are the result of

- a. continental rifting in the basin and range.
- b. subduction of the Farallon plate, intrusions and uplift.
- c. mountain building when Pangaea came together.
- d. intrusions formed by an ancient, now dead, hotspot.

## 10. The Pleistocene ice ages lasted about

- a. 2.6 million years
- b. 260,000 years
- c. 26,000 years
- d. 2,600 years

**True or False**

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. During a marine transgression, such as in the Cretaceous, North America was three land masses separated by seas.
- \_\_\_\_\_ 12. The glaciers on Earth today are remnants of the Pleistocene ice ages.
- \_\_\_\_\_ 13. Orogenies take place rapidly, possibly in tens of thousands of years.
- \_\_\_\_\_ 14. The Paleozoic is the furthest back era of the Phanerozoic and it lasted the longest.
- \_\_\_\_\_ 15. Since the breakup of Pangaea, all the continents have been moving apart.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

16. As Pangaea split apart, the \_\_\_\_\_ Ocean formed.
17. The \_\_\_\_\_ Era began 65.5 million years ago.
18. The global ocean opposite Pangaea is called \_\_\_\_\_.
19. Sedimentary \_\_\_\_\_ are distinctive rock layers that form under known conditions.
20. Since the beginning of the Paleozoic, North America experienced \_\_\_\_\_ marine transgressions.
21. Erosion can indicate a(n) \_\_\_\_\_ in which there is no evidence of what was happening geologically.
22. The sequence limestone, shale, sandstone from bottom to top indicates a marine \_\_\_\_\_.
23. Paleozoic marine \_\_\_\_\_ and marine \_\_\_\_\_ were probably due to changes in the amount of glaciation.

**Short Answer**

*Answer each question in the space provided.*

24. What is the rock sequence that indicates a marine transgression and why?

25. Why does the geologic history of the Cenozoic seem so much more like now than the geologic history of other eras?

## 12.4 History of Earth's Complex Life Forms

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- \_\_\_\_\_ is the disappearance of a species from all parts of geographical range.
  - Fossilization
  - Extinction
  - Radioactive dating
  - Coevolution
- After an extinction
  - a habitat is available for another species to evolve into.
  - no species can fill that habitat.
  - several species will often take the place of a single species.
  - none of these.
- \_\_\_\_\_ is the process by which a single species evolves into several different species in a short period of time.
  - coevolution
  - adaptive radiation
  - punctuated equilibrium
  - macroevolution
- An event in which many types of living things die out completely at the same time is known as \_\_\_\_\_.
  - punctuated equilibrium
  - macroevolution
  - convergent evolution
  - mass extinction
- A species changes over time if
  - its environment changes.
  - it contains genetic variations within the population.
  - changes in the genetic makeup of the species accumulate.
  - all of these.
- The Cambrian is best known for
  - the worst mass extinction in the Phanerozoic.
  - the tremendous swamps that led to the fossil fuel deposits we use today.
  - an incredible increase in the number of species.
  - the origin of life.
- During the Paleozoic, biodiversity increased

- a. during marine transgressions.
  - b. during marine regressions.
  - c. during mass extinctions.
  - d. none of these.
8. An increase in biodiversity took place early in the Mesozoic because
- a. there was a mass extinction just before it began.
  - b. the breakup of Pangaea created many shore areas that were good for different life forms.
  - c. climate was warm and tropical.
  - d. all of these.
9. At the end of the Paleozoic,
- a. more than 95% of all species went extinct.
  - b. a mass extinction occurred that was caused by an asteroid impact.
  - c. dinosaurs and other land animals went extinct.
  - d. none of these.
10. Dinosaurs
- a. are completely extinct.
  - b. are nearly extinct, but one line evolved into birds.
  - c. evolved into birds and mammals.
  - d. are probably living in some faraway place.
11. Compared with Mesozoic reptiles, Cenozoic mammals are
- a. less common and less diverse.
  - b. smaller and less predatory.
  - c. more varied because they can adapt to more environments.
  - d. all of these.
12. Becoming bipedal was important to human ancestors because it
- a. allowed them to see farther and use hands for hunting.
  - b. allowed them to have hands available for farming.
  - c. made them more attractive to the opposite sex.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. During the Mesozoic, phytoplankton became the base of the marine food web.
- \_\_\_\_\_ 14. Adaptations are characteristics of an organism that help it to survive in a given environment.
- \_\_\_\_\_ 15. Mass extinctions are always the result of a tremendous environmental catastrophe, such as an asteroid impact or intense period of volcanism.
- \_\_\_\_\_ 16. A mutation does not provide an organism the ability to adapt.
- \_\_\_\_\_ 17. The Mesozoic period is known as the age of the reptiles.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. \_\_\_\_\_ are the special characteristics that help an organism to survive in its environment.
19. The change in the genetic makeup of species over time is known as \_\_\_\_\_.
20. \_\_\_\_\_ often occurs after a mass extinction.



21. A(n) \_\_\_\_\_ is a change an organism's genes that can be passed through generations.
22. During the \_\_\_\_\_ Era, mammals evolved adaptations that allowed them to live in various environments-on land, in water, and even in the air.
23. Unlike amphibians, reptiles can live away from water because they lay \_\_\_\_\_ eggs, which contain nutrients and water and are protected from the environment.
24. Early in the \_\_\_\_\_ era the fossil record became rich with evidence of many types of marine life.
25. The most common and diverse organism during the Cenozoic has been \_\_\_\_\_

**Short Answer**

*Answer each question in the space provided.*

26. How could an asteroid impact have caused the mass extinction at the end of the Cretaceous?
27. Major events in human evolution occurred at 32,000 years ago, 200,000 years ago, 2 million years ago and 6 million years ago. Briefly describe each. What human ancestor lived about 3 million years ago?

## 12.5 Earth's History

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The age of Earth is approximately
  - 10,000 years
  - 1.1 billion years
  - 2.3 billion years
  - 4.6 billion years
- Earth's first atmosphere was made up of...
  - nitrogen and oxygen
  - carbon and oxygen
  - hydrogen and carbon
  - hydrogen and helium
- What is the source of water vapor, carbon dioxide, and small amounts of nitrogen in the early atmosphere?
  - meteorites
  - volcanic outgassing
  - oceans
  - earthquakes
- Why is ozone important?
  - It is needed for photosynthesis in phytoplankton.
  - It is needed for cellular respiration in animals.
  - It stops high energy ultraviolet radiation from reaching the surface.
  - none of these.
- What is it called when younger rocks cover a craton?
  - platform
  - shield
  - composite
  - fold
- What stores genetic information and passes it onto the next generation?
  - amino acids
  - prokaryotes
  - nucleic acids
  - eukaryotes
- What allowed more complex organisms to form?
  - photosynthesis

- b. carbon dioxide
  - c. ozone layer
  - d. RNA
8. Eukaryotes differ from prokaryotes because they
- a. are multicellular.
  - b. have a nucleus.
  - c. use RNA instead of DNA as their replicator.
  - d. contain organs.
9. What was created when Laurentia and Gondwana collided?
- a. Pangaea
  - b. Eurasia
  - c. Antarctica
  - d. India
10. The Pleistocene ice ages had unique organisms because
- a. extremely thick fur and feathers are needed to stand the cold.
  - b. very large animals are better adapted to the cold.
  - c. they evolved from the Mesozoic dinosaurs.
  - d. none of these.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Asteroids and comets brought all the water to the early Earth.
- \_\_\_\_\_ 12. The early Earth was very cold.
- \_\_\_\_\_ 13. Ancient greenstones indicate the presence of an ancient subduction zone.
- \_\_\_\_\_ 14. The earliest cells were prokaryotes.
- \_\_\_\_\_ 15. Biodiversity in the Paleozoic was linked to marine transgression and regressions.
- \_\_\_\_\_ 16. Mutations are rarely valuable; they usually lead to an organism's death.
- \_\_\_\_\_ 17. The mechanism for evolution is natural selection.
- \_\_\_\_\_ 18. The largest mass extinction occurred at the end of the Cretaceous period.
- \_\_\_\_\_ 19. The dinosaurs went extinct 65 million years ago.
- \_\_\_\_\_ 20. The Cenozoic era should be called the age of the birds.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. The separation of Earth into layers based on density is known as \_\_\_\_\_.
22. The early Earth was hit frequently with \_\_\_\_\_ and \_\_\_\_\_.
23. The earliest felsic continental crust is now found in the ancient cores of continents, called \_\_\_\_\_.
24. The Miller-Urey experiment produced \_\_\_\_\_, which are needed to make \_\_\_\_\_, by passing sparks through a mixture of hydrogen, methane, ammonia, and water.
25. Organic molecules must carry out the chemical work of cells called \_\_\_\_\_.
26. \_\_\_\_\_ allows organisms to use sunlight and inorganic material to create chemical energy that they can use for food.

27. Sea level rises over the land during a \_\_\_\_\_.
28. A mountain building event is an \_\_\_\_\_.
29. Swamps during the \_\_\_\_\_ Period became the coal and petroleum that we use today.
30. \_\_\_\_\_ are differences in a population that helps some members survive better than others.

**Short Answer**

*Answer each question in the space provided.*

31. Why was oxygen needed in the atmosphere before complex life could evolve?

32. How have asteroid impacts affected life on Earth?

33. Explain the importance of adaptation to organisms.

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CHAPTER

**13**

# HS Earth's Fresh Water Assessments

## Chapter Outline

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- 13.1 WATER ON EARTH
  - 13.2 SURFACE WATER
  - 13.3 GROUNDWATER
  - 13.4 EARTH'S FRESH WATER
-

## 13.1 Water on Earth

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Water is stored in
  - ice and snow
  - the atmosphere
  - lakes and streams
  - all of these
- Water is composed of which of the following atoms?
  - 1 oxygen and 2 helium
  - 1 oxygen and 2 hydrogen
  - 2 oxygen and 1 hydrogen
  - 2 oxygen and 2 hydrogen
- Which is not a major part of the hydrological cycle?
  - evaporation
  - transpiration
  - crustation
  - condensation
- The largest amount of fresh water is contained in
  - ice caps, glaciers and inland seas
  - rivers and streams
  - the atmosphere
  - groundwater and soil moisture
- The water cycle
  - begins and ends in the oceans.
  - has no beginning and has no end.
  - begins in the oceans and ends in groundwater aquifers.
  - begins in the atmosphere and ends in the oceans.
- The energy for the water cycle comes from
  - radioactive decay.
  - Earth's internal heat.
  - the Sun.
  - water when it changes state.
- The ocean is salty because
  - only water evaporates.

- b. salts undergo condensation.
  - c. only water infiltrates the ground.
  - d. none of these.
8. Water changes from a liquid to a solid in the process of
- a. precipitation
  - b. evaporation
  - c. condensation
  - d. none of these
9. Water changes from a liquid to a gas in the process of
- a. precipitation
  - b. evaporation
  - c. condensation
  - d. none of these
10. An important reservoir for water is
- a. the oceans
  - b. soil moisture
  - c. the atmosphere
  - d. all of these
11. In the process of transpiration, water goes from the soil
- a. through the ground to an aquifer.
  - b. to the atmosphere by changing from liquid to gas.
  - c. to the atmosphere through a plant.
  - d. none of these.
12. If the climate warms and glaciers melt, sea levels will rise. This means that
- a. there is a constant amount of water on Earth.
  - b. water takes up more space than ice.
  - c. the seas will never lower again.
  - d. none of these.

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. 97% of water on Earth is in the oceans.
- \_\_\_\_\_ 14. Soil moisture is important for plants to grow.
- \_\_\_\_\_ 15. Water is the only substance on Earth and on Mars that is present in all three states of matter – as a solid, liquid or gas
- \_\_\_\_\_ 16. Water turns to gas through condensation.
- \_\_\_\_\_ 17. People use water from nearby streams, but not from further away.

**Fill in the Blanks**

Fill in the blank with the term that best completes the sentence.

18. The movement of water between reservoirs is called the \_\_\_\_\_ .
19. The gas phase of water is called \_\_\_\_\_.
20. Less than 3% of all the water on Earth is \_\_\_\_\_.
21. Freshwater is primarily found in ice sheets, lakes, rivers and \_\_\_\_\_.

22. \_\_\_\_\_ is the process of a substance changing from a solid to gas without going through the liquid phase.
23. Snow and ice can be a(n) \_\_\_\_\_ for water that people can use in the summer when they melt.
24. Surface water infiltrates the ground and enters the \_\_\_\_\_.
25. The amount of time a water molecule stays in the ocean is its \_\_\_\_\_ for the ocean.

**Short Answer**

*Answer each question in the space provided.*

26. Draw the water cycle and label the parts.

27. List two of the remarkable properties of water.



## 13.2 Surface Water

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. The Great Lakes
  - a. contain 12% of the world's fresh surface water.
  - b. have tides.
  - c. are so cold, not much lives in them.
  - d. formed when tectonic faults created basins.
2. The river with the largest water flow is the
  - a. Nile
  - b. Mississippi
  - c. Colorado
  - d. Amazon
3. The study of fresh water bodies and their organisms is called
  - a. limnology
  - b. lakology
  - c. oceanology
  - d. hydrology
4. Two streams meet at a point called:
  - a. conjoinment
  - b. confluence
  - c. consignment
  - d. condense
5. Most lakes formed
  - a. in volcanic craters
  - b. by glaciers
  - c. in down-dropped fault zones
  - d. during marine transgressions
6. The portion of a lake with a lot of scavengers and no plants is the
  - a. littoral zone
  - b. open-water zone
  - c. deep-water zone
  - d. photic zone
7. The portion of a lake with plants growing from the sediment is the
  - a. littoral zone

- b. open-water zone
  - c. deep-water zone
  - d. photic zone
8. Lakes
- a. are all features that last thousands of years.
  - b. are permanent features of a landscape.
  - c. can be seasonal, or can disappear over time.
  - d. none of these.
9. Plants and animals in a swamp must be adapted to
- a. a wide range of temperature conditions.
  - b. high salinity in the water.
  - c. a habitat that is unfavorable for life.
  - d. low oxygen content in the water.
10. Estuaries have high biodiversity because they have
- a. a large diversity of salt content.
  - b. warm water temperatures and high salinity.
  - c. low salinity and a variety of water temperatures.
  - d. a wide range of temperatures, but a small range in salinity.
11. A wetland with trees and vines is a
- a. marsh
  - b. swamp
  - c. estuary
  - d. forest
12. A levee on a river bank
- a. keeps flood waters from going over the banks all along the river.
  - b. does little to protect the land near the river bank.
  - c. may increase flood waters upstream or downstream from the levee.
  - d. none of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Streams usually begin with water from snow melt and possibly springs.
- \_\_\_\_\_ 14. Brackish water is more saline than sea water.
- \_\_\_\_\_ 15. The Great Lakes are so large they can alter the weather.
- \_\_\_\_\_ 16. A tributary is the larger of two streams that join together.
- \_\_\_\_\_ 17. When dams stop floods, farmers need fertilizers for their crops.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The portion of a lake with abundant sunlight is the \_\_\_\_\_ zone.
19. A body of freshwater smaller than a lake is a(n) \_\_\_\_\_.
20. A(n) \_\_\_\_\_ feeds water into a larger stream.
21. A high occurrence of rain can cause a(n) \_\_\_\_\_ in a low lying area.
22. The Aswan Dam was built on the \_\_\_\_\_ River in the country of \_\_\_\_\_.

23. A(n) \_\_\_\_\_ runs down the Rocky Mountain range and separates water into the Pacific and Atlantic oceans.
24. The area where the mouth of a river enters an ocean or lake is a(n) \_\_\_\_\_.
25. Floodwaters that rise very fast create a(n) \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Why would logging a hill mean that floods would be more likely in a region?

27. Draw a picture of a lake and show the aphotic zone, photic zone, littoral zone, open-water zone and deep-water zone. Briefly describe the life found in the littoral, open-water and deep-water zones.

## 13.3 Groundwater

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What happens when the water table is lowered?
  - a. deflation
  - b. inflation
  - c. contraction
  - d. subsidence
2. The Ogallala Aquifer covers
  - a. 4,400 square kilometers
  - b. 44,000 square kilometers
  - c. 4.4 million square kilometers
  - d. 440,000 square kilometers
3. The way water moves through soil particles is called
  - a. capillary action
  - b. vein action
  - c. permeable movement
  - d. porous movement
4. What are the two features of a good aquifer?
  - a. high porosity and high permeability
  - b. low porosity and high permeability
  - c. high porosity and low permeability
  - d. low porosity and low permeability
5. Below ground, the water table
  - a. is flat
  - b. roughly slopes downward to the discharge area
  - c. roughly slopes upward to the recharge area
  - d. roughly follows the slope of the land surface
6. For the water in a groundwater aquifer to stay at the same level
  - a. recharge must be greater than discharge
  - b. recharge must be equal to discharge
  - c. recharge must be less than discharge
  - d. none of these; the two are not related
7. Underground water that is not part of a large water body is a(n)
  - a. aquifer

- b. aquiclude
  - c. spring
  - d. sinkhole
8. During very wet times, the water table will
- a. stay the same
  - b. rise
  - c. fall
  - d. hard to know; water tables are not affected by surface conditions.
9. Groundwater is
- a. a renewable resource that is often used in a renewable way.
  - b. non-renewable resource that is often used in a non-renewable way.
  - c. a renewable resource that is often used in a non-renewable way.
  - d. a non-renewable resource that is often used in a renewable way.
10. Overpumping groundwater can result in
- a. an increase in spring action.
  - b. land faulting.
  - c. salt water incursion.
  - d. all of these.
11. Water seeps out at the surface on its own in a(n)
- a. flowing artesian well
  - b. artesian well
  - c. sinkhole
  - d. none of these
12. Water replenishes an aquifer from
- a. glacial meltwater
  - b. rainfall
  - c. snow melt
  - d. all of these

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. In arid climates, streams may be almost entirely spring fed.
- \_\_\_\_\_ 14. Aquifers are generally found at the same depths.
- \_\_\_\_\_ 15. Land use in an area can affect the amount of water that is available to enter groundwater.
- \_\_\_\_\_ 16. A good aquifer has rock in it that is porous and permeable.
- \_\_\_\_\_ 17. The bottom layer of an aquifer has impermeable rock.

**Fill in the Blanks**

Fill in the blank with the term that best completes the sentence.

18. Sediments or rock with a lot of holes has high \_\_\_\_\_.
19. Water moves by \_\_\_\_\_ from wet areas to drier areas.
20. Areas above oil fields and large water aquifers experience \_\_\_\_\_ with extraction.
21. A rock that water can flow through has high \_\_\_\_\_.
22. A(n) \_\_\_\_\_ is created where groundwater seeps or flows from rock or soil.

23. Florida has so much underground water because the water dissolves the \_\_\_\_\_ rock.
24. When the \_\_\_\_\_ goes down, wells need to be dug deeper.
25. To reach groundwater, people must dig or drill a(n) \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Describe the journey of a water molecule from a raindrop to an aquifer.

27. Describe the Ogallala Aquifer and why it is important.

## 13.4 Earth's Fresh Water

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What percent of the Earth's water is fresh water?
  - a. 4%
  - b. 3%
  - c. 2%
  - d. 1%
2. What is the amount of time a molecule stays in a reservoir?
  - a. wait time
  - b. reservoir time
  - c. residence time
  - d. cycle time
3. With transpiration
  - a. plants absorb water into their tissues
  - b. plants take water from the soil and let water vapor out into the air
  - c. water vapor becomes liquid water in a tiny droplet
  - d. solid water becomes water vapor without first becoming a liquid
4. What are bodies of water that have a current?
  - a. pool
  - b. pond
  - c. stream
  - d. estuary
5. The zone in a lake where there is much life and some can grow from the bottom is the
  - a. littoral zone
  - b. photic zone
  - c. aphotic zone
  - d. none of these
6. In an estuary
  - a. salt water from the sea mixes with fresh water from a stream
  - b. there are few plants and animals
  - c. there is little biodiversity
  - d. all of these
7. Which of the following is true about floods?
  - a. Levees are completely effective at saving development from flooding.

- b. They are very damaging and must be stopped.
  - c. They move large amounts of sediment that provide habitat for organisms.
  - d. None of these.
8. The amount of water that enters the groundwater in a region depends on
- a. local climate
  - b. vegetation cover
  - c. the slope of the land
  - d. all of these
9. Which aquifer supplies one-third of the irrigation in the United States?
- a. Mahomet Aquifer
  - b. Edwards Aquifer
  - c. Kirkwood-Cohansey Aquifer
  - d. Ogallala Aquifer
10. If more water is pumped from aquifer but the water table stays at the same level, you can say that
- a. the aquifer is very full of water.
  - b. the increase in recharge is equal to the increase in pumping.
  - c. the water table will soon go down.
  - d. none of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Water vapor in the atmosphere undergoes precipitation to become tiny droplets of liquid.
- \_\_\_\_\_ 12. Rivers are the largest type of streams.
- \_\_\_\_\_ 13. Lakes are small bodies of water that have no outlet.
- \_\_\_\_\_ 14. The mouth of a water source is where a stream originates.
- \_\_\_\_\_ 15. Lakes do not ever disappear.
- \_\_\_\_\_ 16. Swamps are low oxygen environments that can lead to coal formation.
- \_\_\_\_\_ 17. Brackish water has more salt than fresh water but less than sea water.
- \_\_\_\_\_ 18. Withdrawing too much water from aquifers may cause subsidence.
- \_\_\_\_\_ 19. The aphotic zone for a lake has abundant sunlight.
- \_\_\_\_\_ 20. Streams can only flow downhill.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The movement of water around Earth's surface is the \_\_\_\_\_ cycle.
22. The storage locations for water such as an ocean, glaciers, ponds, or the atmosphere are a(n) \_\_\_\_\_.
23. Water changes from a liquid to a gas by \_\_\_\_\_ to become water vapor.
24. Two streams come together at a \_\_\_\_\_.
25. The smaller of two streams is a \_\_\_\_\_ of the larger stream.
26. A stream may create a \_\_\_\_\_ where water slows and becomes deeper.
27. \_\_\_\_\_ ecosystems can be fragile systems that are sensitive to the amounts and quality of water present within them.



28. \_\_\_\_\_ are shallow wetlands around lakes, streams, or the ocean where grasses and reeds are common.
29. The \_\_\_\_\_ zone is the slope area closest to the edge of water.
30. Water at the mouth of a delta where it meets the ocean is chemically \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

31. Draw the water cycle. Label the reservoirs and processes.

32. Describe the features of a groundwater aquifer.

33. How did the Great Lakes form? What are some of their unique features?

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CHAPTER **14**

# HS Earth's Oceans Assessments

## Chapter Outline

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- 14.1 INTRODUCTION TO THE OCEANS
  - 14.2 OCEAN MOVEMENTS
  - 14.3 THE SEAFLOOR
  - 14.4 OCEAN LIFE
  - 14.5 EARTH'S OCEANS
-

## 14.1 Introduction to the Oceans

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What percent of the Earth is covered in salt water oceans?
  - a. 82%
  - b. 71%
  - c. 65%
  - d. 49%
2. Earth's tallest mountain (base to top) is in the
  - a. Pacific Ocean
  - b. Atlantic Ocean
  - c. Indian Ocean
  - d. Himalaya Mountain Range
3. Which ocean contains the deepest trench?
  - a. Atlantic Ocean
  - b. Indian Ocean
  - c. Arctic Ocean
  - d. Pacific Ocean
4. The most common minerals in seawater are
  - a. calcium chloride
  - b. calcium carbonate
  - c. sodium chloride
  - d. magnesium
5. Salt in the oceans comes from
  - a. deep-sea hydrothermal vents
  - b. near shore salt deposits
  - c. river inflow
  - d. mid-ocean ridges
6. The reason the Dead Sea is so saline is
  - a. the rivers that flow into it carry many salts.
  - b. evaporation is very high.
  - c. there is a lot of runoff from the nearby saline landscape.
  - d. none of these.
7. Water density decreases as
  - a. salinity increases, temperature decreases, pressure decreases

- b. salinity increases, temperature increases, pressure increases
  - c. salinity decreases, temperature increases, pressure decreases
  - d. salinity decreases, temperature decreases, pressure decreases
8. The deepest point in the ocean is a(n)
- a. mid-ocean ridge
  - b. atoll
  - c. submarine trench
  - d. none of these.
9. Deep open water, below 6,000 meters, is the
- a. abyssal zone
  - b. hadal pelagic zone
  - c. hadal zone
  - d. abyssal pelagic zone
10. The ocean zone that is always covered by water, but is fairly shallow in depth is the
- a. intertidal zone
  - b. oceanic zone
  - c. photic zone
  - d. neritic zone

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. The yearly weather at a site on the coast is most likely more moderate than at a site inland about 100 miles.
- \_\_\_\_\_ 12. Biomass is the total mass of a particular organism in a given area.
- \_\_\_\_\_ 13. Brackish water is water that has more salt than fresh water but less than sea water.
- \_\_\_\_\_ 14. Without chlorophyll, there could be no photosynthesis.
- \_\_\_\_\_ 15. Earth really has one ocean since all the oceans are connected.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

16. Between high and low tide is the \_\_\_\_\_ zone.
17. Photosynthesizing organisms must live in the \_\_\_\_\_ zone.
18. \_\_\_\_\_ is the sum of the mass of the living organisms in an area.
19. Water easily dissolves salts because it is a(n) \_\_\_\_\_ molecule.
20. If you add salt to water, the density of the water \_\_\_\_\_.
21. With 33.7% the Dead Sea has the highest \_\_\_\_\_ on Earth; the oceans have an average of 3.5%.
22. Most energy and nutrients in the oceans are supplied by tiny creatures called \_\_\_\_\_.
23. Waves, tides and currents move water around in the \_\_\_\_\_ zone.

### Short Answer

*Answer each question in the space provided.*

24. How do the oceans distribute heat around Earth?

25. Draw a diagram of the ocean and label the major horizontal and vertical divisions.

## 14.2 Ocean Movements

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What causes the Coriolis effect?
  - a. Moon's gravity
  - b. Sun's gravity
  - c. gyres
  - d. Earth's rotation
2. What is the primary cause of the tides?
  - a. Earth's rotation
  - b. The moon's gravity
  - c. the Sun's gravity
  - d. wind
3. Where is wave energy the greatest?
  - a. at the surface
  - b. at the ocean floor
  - c. half way between the surface and the ocean floor
  - d. None of the above
4. A wave breaks because
  - a. the base has friction with the bottom.
  - b. it becomes too tall to be supported by its base.
  - c. it reaches the shore.
  - d. all of these.
5. Wave energy is
  - a. the same from the surface to its greatest depth.
  - b. lowest at the surface and increases with depth.
  - c. greatest at the surface and decreases with depth.
  - d. none of these.
6. The highest high and lowest low tides occur
  - a. in the spring.
  - b. when Sun, Moon and Earth are aligned.
  - c. When Sun and Moon are at 90-degrees to each other relative to Earth.
  - d. during the one-quarter and three-quarter moon.
7. Low tides occur about
  - a. every 24 hours and 50 minutes

- b. every 12 hours and 25 minutes
  - c. every 6 hours and 12.5 minutes
  - d. randomly.
8. Surface currents are created by
- a. local wind patterns
  - b. the depth of the seafloor
  - c. the rotation of the Earth.
  - d. all of these.
9. Thermohaline circulation is due to
- a. salinity differences in water masses.
  - b. temperature differences in water masses.
  - c. density differences in water masses.
  - d. none of these.
10. In the polar regions,
- a. surface water becomes dense so that it undergoes upwelling.
  - b. surface water becomes cold and saline so that it undergoes downwelling.
  - c. warm currents like the Gulf Stream keep ice from forming.
  - d. none of these.
11. Upwelling along the equator
- a. brings nutrients to the surface so there is a lot of life.
  - b. brings warm water to the surface so there are coral reefs where there are islands.
  - c. brings cold, saline water from near South America to near eastern Asia.
  - d. none of these.
12. Dense water downwelling in the polar regions
- a. drives deep water circulation.
  - b. results in upwelling in some coastal and equatorial regions.
  - c. pushes some currents around the surface.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. The greatest effect on tides is from the Sun because it has the greatest gravitational pull on Earth.
- \_\_\_\_\_ 14. The tides are actually waves, with the high tides being the crest and the low tides being the trough.
- \_\_\_\_\_ 15. A wave is a transfer of energy, that initially began with wind.
- \_\_\_\_\_ 16. The first sign that a tsunami is coming could be that water moves out to sea, leaving the shore exposed.
- \_\_\_\_\_ 17. Once the bottom of the wave loses its energy from friction with the ground, the top of the wave starts to slow down.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Surface currents deliver \_\_\_\_\_ around the planet.
19. Tides with the smallest tidal range are called \_\_\_\_\_ tides.
20. \_\_\_\_\_ are pushed along by surface winds.
21. The height difference between adjacent high and low tides is known as the \_\_\_\_\_.

22. The United Kingdom predominantly has rain instead of snow in winter due to the surface current called the \_\_\_\_\_.
23. Dense water sinks in a process called \_\_\_\_\_.
24. During a hurricane, \_\_\_\_\_ may push a large amount of water into the harbor causing boats to crash into one another.
25. The deepest water probably has the \_\_\_\_\_ salinity and the \_\_\_\_\_ temperature of water in that water column.

**Short Answer**

*Answer each question in the space provided.*

26. Hurricanes and other storms do a lot of damage due to storm surge. What is storm surge?

27. Describe the factors that come together to create a gyre.



## 14.3 The Seafloor

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What is the deepest that scuba divers are usually able to go?
  - a. 40 Ft
  - b. 10 m
  - c. 10 Ft
  - d. 40 m
2. What does ROV stand for?
  - a. Renovated Operated Vehicle
  - b. Remotely Obtuse Vehicle
  - c. Remotely Operated Vehicle
  - d. Really Outdated Vehicle
3. What fishing method involves a net that scrapes the ocean floor?
  - a. bottom trawling
  - b. line casting
  - c. bottom feeding
  - d. line trawling
4. What is a map of the seafloor called?
  - a. a topographic map
  - b. a bathymetric map
  - c. a contour map
  - d. a Mercator map
5. Which are not found in the ocean?
  - a. fish
  - b. oil gas
  - c. valuable minerals
  - d. all are found in the oceans
6. To sample seawater,
  - a. divers go down to the right depth, then open and close a bottle.
  - b. bottles along a cable close as a weight is dropped down the cable.
  - c. a submersible goes down to the right depth, then opens and closes a bottle.
  - d. none of these.
7. To get rocks from the seafloor
  - a. a dredge is dragged along the bottom.

- b. a metal tube is dropped to the bottom.
  - c. a drill drills into the crust.
  - d. all of these.
8. Oil platforms can drill in water that is up to
- a. 2000 meters deep
  - b. 1000 meters deep
  - c. 100 meters deep
  - d. 200 meters deep
9. Resources in the oceans are
- a. both living and non-living.
  - b. scarce
  - c. virtually impossible to obtain.
  - d. mostly at the surface.
10. It is difficult to learn about the oceans because they
- a. are saline and cold
  - b. are cold and dark
  - c. have intense currents that are hard to battle
  - d. none of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. To understand ocean chemistry, scientist need samples of seawater from different depths.
- \_\_\_\_\_ 12. It is possible for a submersible to take scientists to depths of up to one mile for observations.
- \_\_\_\_\_ 13. We know more about the dark side of the Moon than we know about the seafloor.
- \_\_\_\_\_ 14. To analyze a rock for paleomagnetism, you need to know its position in the seafloor.
- \_\_\_\_\_ 15. Most oceanographic research is done by scuba divers.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. A map of seafloor features is similar to a \_\_\_\_\_ map of the land.
17. A metal tube that is dropped to the seafloor to collect sediment and rock is a(n) \_\_\_\_\_
18. Alvin is a human operated vehicle, also known as a \_\_\_\_\_
19. If a fish species is being taken at a higher rate than it reproduces, the species is being \_\_\_\_\_
20. Valuable minerals in the seafloor are contained in \_\_\_\_\_ nodules.
21. A bottle used to sample seawater at depth is called a(n) \_\_\_\_\_
22. The Joides Resolution is a ship that has the ability to \_\_\_\_\_
23. Scientists analyze rocks drilled from the seafloor for their paleomagnetism and their \_\_\_\_\_

### Short Answer

Answer each question in the space provided.

24. What are the advantages of an ROV over an HOV for seafloor exploration?

25. What are the problems with bottom trawling?

## 14.4 Ocean Life

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Zooplankton
  - engage in photosynthesis.
  - engage in chemosynthesis.
  - absorb nutrients from the water.
  - eat phytoplankton.
- Light created from a chemical reaction in an organisms is called
  - biological lighting
  - bioluminescence
  - night lighting
  - ledinescence
- What type of organism found in the ocean floats along with the current?
  - whales
  - jellyfish
  - plankton
  - squids
- What part of a fish's body extracts oxygen from the water?
  - bladder
  - gills
  - spleen
  - lungs
- Which of the following is NOT a marine invertebrate?
  - starfish
  - octopi
  - sea worms
  - eels
- One reason that there are few species of marine reptiles is that
  - reptiles cannot swim.
  - reptiles do not eat fish and other marine creatures.
  - most reptiles must lay their eggs on land.
  - most marine reptiles went extinct at the end of the Cretaceous.
- What is the purpose of a swim bladder?
  - to rise and sink to the desired depth

- b. for oxygen away from the surface
  - c. for collecting salt extracted from the kidneys
  - d. for energy for bioluminescence
8. The trait that marine mammals have that land mammals do not is
- a. endothermy
  - b. the ability to give birth to live young
  - c. impervious skin
  - d. hair, ears, jawbones with teeth
9. To keep anchored to rock, intertidal organisms have
- a. hard shells.
  - b. strong attachments.
  - c. tremendous wedging capabilities.
  - d. none of these.
10. Ecosystems with among the greatest biodiversity on Earth include
- a. tide pools.
  - b. the seafloor.
  - c. coral reefs.
  - d. the surface ocean.
11. Corals are
- a. animals
  - b. calcium carbonate
  - c. phytoplankton
  - d. none of these
12. Life in the deepest ocean is
- a. non-existent
  - b. abundant
  - c. about the same as at the surface
  - d. scarce

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. All marine birds come to shore to sleep and raise chicks.
- \_\_\_\_\_ 14. Some zooplankton are juvenile forms of invertebrates.
- \_\_\_\_\_ 15. Plankton are organisms that can swim against the current.
- \_\_\_\_\_ 16. Organisms at hydrothermal vents can live without food energy from the surface.
- \_\_\_\_\_ 17. If an ocean plant can photosynthesize, light must be available to the plant.

**Fill in the Blanks**

Fill in the blank with the term that best completes the sentence.

18. To move and steer, fish have \_\_\_\_\_.
19. \_\_\_\_\_ is the breakdown of chemicals to produce food energy.
20. \_\_\_\_\_ must float in or near the well lit areas of the sea surface to photosynthesize sunlight.
21. The creation of food energy is known as \_\_\_\_\_.
22. With long legs and long bills, shorebirds are well adapted to the \_\_\_\_\_ zone.

23. For protection from drying out and wave energy, organisms in the intertidal have \_\_\_\_\_.
24. Corals are sensitive to pollution and, especially important now, they are sensitive to \_\_\_\_\_.
25. Rounded coral reefs with no land visible at the surface are called \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. What adaptations do marine mammals have to life in the sea and why?

27. What adaptations do fish have for life in the deepest ocean?

## 14.5 Earth's Oceans

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Ocean salinity is high where
  - evaporation is high; fresh water mixing is high
  - evaporation is high; fresh water mixing is low
  - evaporation is low; fresh water mixing is high
  - evaporation is low; fresh water mixing is low
- Organisms in tide pools live
  - in the neritic zone.
  - between the high and low tide marks.
  - in relatively stable conditions.
  - none of these.
- In the zone below where sunlight penetrates, there is
  - no primary productivity.
  - no photosynthesis.
  - no well-developed food web.
  - all of these
- Which zone makes up the majority of the ocean?
  - deep sea
  - photic zone
  - aphotic zone
  - none of these
- Upwelling is important because
  - organisms depend on the nutrient-rich water from the deep.
  - cold water goes down to the seafloor and warm water comes up to the surface.
  - it drives surface ocean currents.
  - it drives deep ocean currents.
- Which tides have the smallest tidal range and occur when the Earth, the Moon, and the Sun form a 90° angle?
  - spring tide
  - neap tide
  - high tide
  - low tide
- Which currents are potentially dangerous that carry large amounts of water offshore quickly?
  - rip currents

- b. longshore currents
  - c. surface currents
  - d. deep currents
8. Thermohaline circulation is driven by
- a. wind
  - b. upwelling
  - c. density
  - d. Coriolis effect
9. Compared with land mammals, marine mammals have
- a. streamlined bodies.
  - b. high metabolic rates.
  - c. kidneys that secrete salt.
  - d. all of these
10. Compared with fish near the surface, fish in the deep sea are
- a. larger.
  - b. better adapted to their environment.
  - c. better able to find food.
  - d. none of these.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. About 71% of the Earth's surface is covered in water.
- \_\_\_\_\_ 12. The average salinity of seawater is 3.5%.
- \_\_\_\_\_ 13. Tsunamis travel across the sea as giant waves, but do most of their damage when they hit shore.
- \_\_\_\_\_ 14. Spring tides occur only in the spring.
- \_\_\_\_\_ 15. Downwelling is where very cold, very saline water is very dense and sinks.
- \_\_\_\_\_ 16. Organisms at hydrothermal vents get energy from chemicals.
- \_\_\_\_\_ 17. There is one high tide and one low tide a day in most locations.
- \_\_\_\_\_ 18. Coral animals are very resilient to temperature changes.
- \_\_\_\_\_ 19. Photosynthetic life has been found near hydrothermal vents.
- \_\_\_\_\_ 20. Manganese nodules are currently being mined as an important source of manganese, copper, nickel, phosphate and cobalt.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. Surface ocean currents bring \_\_\_\_\_ water toward the polar regions and \_\_\_\_\_ toward the equatorial regions.
22. \_\_\_\_\_ is the total mass of living organisms in a given area.
23. Tides are produced by the \_\_\_\_\_ of the Sun and Moon on Earth.
24. \_\_\_\_\_ occur when water piles up at a shoreline as strong winds push waves into the coast.
25. Surface currents are the result of three things: \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
26. Surface ocean currents create loops called \_\_\_\_\_.



27. The \_\_\_\_\_ is a river of warm water in the Atlantic ocean that moderates northern temperatures.
28. A \_\_\_\_\_ is a manned vehicle that can visit the bottom of the ocean.
29. Corals and other animals deposit calcium carbonate to create \_\_\_\_\_ near the shore.
30. Marine mammals cannot live entirely in the aphotic zone because they must come to the surface to \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

31. Briefly describe the three sources of food energy in the oceans.

32. Describe how atolls form.

33. What is the purpose of these four traits to fish living in the oceans: gills, ectothermy, fins and scales?

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CHAPTER **15**

# HS Earth's Atmosphere Assessments

## Chapter Outline

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- 15.1 THE ATMOSPHERE
  - 15.2 ENERGY IN THE ATMOSPHERE
  - 15.3 ATMOSPHERIC LAYERS
  - 15.4 AIR MOVEMENT
  - 15.5 EARTH'S ATMOSPHERE
-

# 15.1 The Atmosphere

## Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

*Circle the letter of the correct choice.*

1. What are the two most common gases in the atmosphere?
  - a. hydrogen and oxygen
  - b. nitrogen and water vapor
  - c. hydrogen and nitrogen
  - d. oxygen and nitrogen
2. The most important gas(es) for life are
  - a. nitrogen and oxygen
  - b. oxygen and carbon dioxide
  - c. oxygen
  - d. nitrogen, oxygen and carbon dioxide
3. Photosynthesis
  - a. uses carbon dioxide and creates oxygen
  - b. uses oxygen and creates carbon dioxide
  - c. uses carbon dioxide and oxygen and creates food energy
  - d. uses food energy and creates carbon dioxide and oxygen.
4. On the Moon
  - a. birds couldn't breathe
  - b. birds couldn't fly
  - c. if birds said "cheap" they wouldn't be heard
  - d. all of these
5. An increase in air pollutant particles
  - a. would have no effect on the number of raindrops
  - b. would have an unknown effect on the number of raindrops
  - c. could produce more raindrops
  - d. might produce fewer raindrops

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 6. The atmosphere protects Earth from harmful solar rays.
- \_\_\_\_\_ 7. Sound waves travel rapidly through empty space.
- \_\_\_\_\_ 8. Carbon dioxide is abundant in the atmosphere.

- \_\_\_\_\_ 9. Ozone is a type of oxygen.
- \_\_\_\_\_ 10. Weather on the Moon is always stormy.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

11. As you increase in altitude, air pressure \_\_\_\_\_ .
12. As oceans and lakes evaporate, \_\_\_\_\_ accumulates in the atmosphere.
13. As air rises, water vapor forms \_\_\_\_\_.
14. Near the surface, as air pressure rises, air density \_\_\_\_\_.
15. Molecules are packed more tightly together in air with higher \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

16. On top of Old Smokey, you drink a bottle of water then close the lid. Back at sea level, you find that the bottle has collapsed. Explain what has happened.

17. Often when there is cloud cover, daytime temperatures are lower and nighttime temperatures are higher. Why?

## 15.2 Energy in the Atmosphere

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- When heat is transferred by the movement of electromagnetic waves it is called
  - convection
  - conduction
  - radiation
  - none of these
- Electromagnetic spectrum
  - is all visible to humans
  - has the highest energy at the short wavelengths.
  - has the highest energy in the infrared.
  - is only able to travel through material
- The vertical movement of air due to the uneven heating is called
  - convection
  - reflection
  - conduction
  - refraction
- Wavelengths that are short and very high energy are
  - infrared
  - radio waves
  - ultraviolet
  - visible light
- Incoming solar radiation may
  - reflect back into space
  - be absorbed by clouds
  - strike the ground
  - all of these
- If you add heat to a gas, the molecules
  - split apart
  - combine into more complex molecules
  - vibrate more rapidly
  - collide less frequently
- When ice melts to become water, the energy released is known as
  - specific heat

- b. latent heat
- c. insolation
- d. ultraviolet radiation

8. Wavelengths of sunlight passing through the atmosphere

- a. all reach Earth's surface
- b. may be filtered out by insolation, conduction, convection and radiation
- c. may be filtered out by ozone, oxygen, water or carbon dioxide
- d. are all absorbed in the atmosphere

9. At winter solstice, the sun's rays hit most directly at

- a. the Equator
- b. the Tropic of Cancer
- c. the Tropic of Capricorn
- d. the South Pole

10. Earth owes its moderate temperature to

- a. greenhouse effect
- b. insolation
- c. the tilt of its orbital axis
- d. the variety of wavelengths of energy from the sun

### True or False

*Write true if the statement is true or false if the statement is false.*

\_\_\_\_\_ 11. The polar regions are colder than the equator because they have higher insolation.

\_\_\_\_\_ 12. Visible light makes up the least energetic waves on the electromagnetic spectrum.

\_\_\_\_\_ 13. The energy added or removed when an object changes state is latent heat.

\_\_\_\_\_ 14. Water has very high specific heat, but the specific heat of ice is very low.

\_\_\_\_\_ 15. The North magnetic pole axis points toward Polaris.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

16. Light, radio waves and gamma rays are examples of \_\_\_\_\_.

17. The transfer of heat between two objects by electromagnetic waves is known as \_\_\_\_\_.

18. Infrared energy is also known as \_\_\_\_\_.

19. Wavelengths with just higher energy than visible light are \_\_\_\_\_ radiation.

20. When you get a sunburn, it is mostly caused by \_\_\_\_\_ radiation.

### Short Answer

*Answer each question in the space provided.*

21. Draw a diagram and label Earth and Sun at summer solstice and at winter solstice.

22. Methane levels are 2.5 times higher and carbon dioxide 35% higher than in about 1950. How did this increase occur? Why is this important? What is the effect?

## 15.3 Atmospheric Layers

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- A change in temperature with distance is known as
  - gradation
  - temperature distance
  - high to low temperature
  - temperature gradient
- Days with inversions may have high pollution because
  - they are cold and people use more fossil fuels.
  - the air is stable and more pollutants can get trapped.
  - they are warm and the air conditioners are running.
  - none of these.
- The Van Allen radiation belts are
  - found in the ionosphere.
  - zones of highly charged particles.
  - the source of the solar wind.
  - all of these.
- What layer of the atmosphere has the lowest temperature?
  - Troposphere
  - Stratosphere
  - Mesosphere
  - Thermosphere
- In the troposphere, temperature \_\_\_\_\_ with altitude because \_\_\_\_\_.
  - decreases; heat radiates from the ground
  - decreases; heat comes from the sun
  - increases; heat comes from the sun
  - increases; heat radiates from the ground
- In the stratosphere, temperature \_\_\_\_\_ with altitude because \_\_\_\_\_.
  - decreases; heat radiates from the ground
  - decreases; heat comes from the sun
  - increases; heat comes from the sun
  - increases; heat radiates from the ground
- If you are lucky enough to see a shooting star (meteor), the light you are seeing is in the
  - Troposphere



- b. Stratosphere
  - c. Mesosphere
  - d. Thermosphere
8. The ozone layer protects life on Earth from
- a. the Sun's high energy ultraviolet radiation.
  - b. global warming.
  - c. the Sun's intense heat.
  - d. none of these.
9. An inversion
- a. has warm air above cold air.
  - b. has cold air above warm air.
  - c. is unstable.
  - d. none of these.
10. Why would you get burns in the mesosphere (if you weren't in a protective suit)?
- a. there are not enough gas molecules to protect you.
  - b. the ozone layer is below you.
  - c. the ions of the mesosphere are high energy and can burn you
  - d. none of these
11. In the thermosphere, the air feels very \_\_\_\_\_ because \_\_\_\_\_.
- a. cold; there are so few gas molecules.
  - b. hot; it is close to the sun.
  - c. hot; it is above most of the atmosphere.
  - d. b c
12. The lights of the aurora are caused by
- a. the Van Allen belts.
  - b. convection in the ionosphere.
  - c. the magnetic field.
  - d. energized gas molecules.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. The ionosphere gets its name because it contains ionized gas molecules and freed electrons.
- \_\_\_\_\_ 14. Warm gas molecules take up more space than cooler gas molecules.
- \_\_\_\_\_ 15. Warmer air is more buoyant than cooler air, which is why the warmer air rises above the cooler air.
- \_\_\_\_\_ 16. The temperature gradient of each layer within the atmosphere is the same.
- \_\_\_\_\_ 17. Gravity pulls the gas molecules towards Earth's center, which is why it's easier to breathe closer to sea level than at the top of a tall mountain.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The ionized layer of the atmosphere is the \_\_\_\_\_.
19. The ozone layer is in the \_\_\_\_\_ layer in the atmosphere
20. Pilots like to fly in the \_\_\_\_\_ layer of the atmosphere because there is little air turbulence.
21. When air warms, its density \_\_\_\_\_ and it moves vertically \_\_\_\_\_ in the atmosphere.

22. The outermost layer of the atmosphere is the \_\_\_\_\_.
23. Reactions between ions released from solar storms and Earth's magnetic field cause a(n) \_\_\_\_\_ near the poles.
24. Virtually all weather takes place in the \_\_\_\_\_ layer of the atmosphere.
25. High speed protons and electrons flinging through space make up the \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Describe the temperature gradient of the troposphere. Is this condition stable or unstable? What is the consequence of this?

27. How does UV radiation damage cells and organisms?

## 15.4 Air Movement

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A low pressure zone forms
  - a. warm air rises
  - b. cold air rises
  - c. water evaporates
  - d. cold and warm air rapidly mix
2. Frigid winds that blow from a plateau through gaps in mountains are
  - a. Katabatic winds.
  - b. Chinook winds.
  - c. Santa Ana winds.
  - d. Foehn winds.
3. Most air movement occurs in which atmospheric layer?
  - a. Troposphere
  - b. Stratosphere
  - c. Mesosphere
  - d. Thermosphere
4. Where do haboobs form?
  - a. in the middle of a sand storm
  - b. in the downdrafts on the front of a thunderstorm
  - c. in the updrafts behind a thunderstorm
  - d. all of these.
5. Advection occurs when
  - a. warm air rises.
  - b. cool air sinks.
  - c. air flows from high to low pressure.
  - d. air flows from low to high pressure.
6. Rain is most likely to fall as an air mass
  - a. descends down a mountain range.
  - b. rises up a mountain range.
  - c. rises over the desert.
  - d. none of these
7. Dry, descending air that lost its moisture as it rose up over a mountain range creates
  - a. Katabatic winds.

- b. mountain breezes.
  - c. Santa Ana winds.
  - d. deserts due to rainshadow effect.
8. Because of Coriolis effect
- a. warm air rises at the equator and cold air sinks at the poles.
  - b. there are three global circulation cells in the northern hemisphere and three in the southern hemisphere.
  - c. air moves counterclockwise in the northern hemisphere and clockwise in the southern hemisphere.
  - d. all of these.
9. Wind in the circulation cells blows
- a. north to south or south to north
  - b. east to west or west to east
  - c. northeast to southwest or southwest to northeast
  - d. southeast to northwest or northeast to southwest
10. The time for an airplane to fly between San Francisco and New York relative to NY to SF is
- a. greater due to the westerly winds.
  - b. less due to the westerly winds.
  - c. greater due to the easterly winds.
  - d. less due to the easterly winds.
11. Precipitation is high
- a. in low pressure areas where air is sinking.
  - b. in high pressure areas where air is rising.
  - c. in high pressure areas where air is sinking.
  - d. in low pressure areas where air is rising.
12. Weather differences between winter and summer in the United States are partly due to
- a. the location of the polar jet stream.
  - b. the location of the Intertropical Convergence Zone.
  - c. the storm pattern.
  - d. none of these.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. The westerly winds travel toward the west.
- \_\_\_\_\_ 14. Cool air sinking creates a high pressure zone at the ground.
- \_\_\_\_\_ 15. Wind is created by air that moves vertically between high and low pressure zones.
- \_\_\_\_\_ 16. Walking on the beach in San Diego in December, one would likely feel a strong sea breeze coming off the ocean.
- \_\_\_\_\_ 17. Air on mountain slopes is heated more than air at the same elevation over an adjacent valley.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. The basis for much of this chapter is that warm air \_\_\_\_\_ and cool air \_\_\_\_\_.
19. In the fall and winter, the \_\_\_\_\_ blow east to west in Southern California.
20. A wind that blows from a mountain to a valley at night when mountain air is cooler is called a(n) \_\_\_\_\_.
21. Wind blows from \_\_\_\_\_ zones to \_\_\_\_\_ zones.

22. A(n) \_\_\_\_\_ occurs at the meeting zone between cold continental air and subtropical air.
23. \_\_\_\_\_ are winds that move downslope.
24. Lower density air rises in a(n) \_\_\_\_\_.
25. Fast flowing air at the boundary of two circulation cells is called a(n) \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. What causes the Hadley cells? How does the air move within the cell? How do temperature and pressure change as the air moves?

27. How do sea breezes form? How do land breezes form? Why are monsoons really just large versions of these winds?

## 15.5 Earth's Atmosphere

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The amount of energy needed to change a material from one physical state to another is called:
  - boiling point
  - latent heat
  - specific heat
  - dew point
- The seasons are caused by
  - the direction Earth's axis is pointing relative to the Sun.
  - greenhouse gases
  - where Earth is in its elliptical orbit.
  - where the sun is in its sunspot cycle
- What is the amount of water vapor in the air called?
  - temperature
  - wind speed
  - humidity
  - altitude
- What is the force of air weighing down over a unit of area called?
  - air pressure
  - air density
  - air temperature
  - none of these
- Which layer of the atmosphere do pilots prefer to fly in?
  - thermosphere
  - mesosphere
  - stratosphere
  - troposphere
- Land breezes blow when
  - warmer ocean air flows over land
  - warmer land air flows over the ocean
  - cooler ocean air flows over land
  - cooler land flows over the ocean
- A surface with high albedo
  - turns light into heat.

- b. reflects light back.
  - c. allows light to pass through.
  - d. none of these
8. What does it mean to say that water has high specific heat?
- a. It takes a lot of energy to raise the temperature of one gram of water by 1-degree C.
  - b. The temperature of water stays relatively constant.
  - c. Large bodies of water can keep the weather more moderate.
  - d. all of these.
9. The temperature gradient of the troposphere means that
- a. the troposphere is very unstable.
  - b. the troposphere is extremely stable.
  - c. the troposphere is prone to inversions.
  - d. the troposphere is prone to rising into the stratosphere.
10. The global winds are created by
- a. convection in the two major circulation cells.
  - b. Coriolis effect.
  - c. advection in the six major circulation cells.
  - d. the location of the jet stream.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Photosynthesis is the process through which CO<sub>2</sub> is created and energy is released.
- \_\_\_\_\_ 12. High temperature particles vibrate faster than low temperature particles.
- \_\_\_\_\_ 13. The moon is bright because it radiates visible light.
- \_\_\_\_\_ 14. Hot strong winds blowing from the east sometimes create fire hazards in the mountains of Southern California.
- \_\_\_\_\_ 15. Most of the energy that reaches the Earth's surface comes from the Sun.
- \_\_\_\_\_ 16. Ozone filters UV but the rest of the sun's radiation comes in unimpeded.
- \_\_\_\_\_ 17. The trade winds got their name because they are so strong people want to trade them for weaker winds.
- \_\_\_\_\_ 18. When the north pole is tilted toward the sun, it is winter in the southern hemisphere.
- \_\_\_\_\_ 19. Heat is held in the atmosphere by greenhouse gases.
- \_\_\_\_\_ 20. During a night time aurora, different gases will emit a different color of light.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. In \_\_\_\_\_, animals use oxygen to convert sugar into food energy they can use.
22. The \_\_\_\_\_ is made of high speed particles, mostly protons and neutrons, traveling outward from the sun.
23. In a \_\_\_\_\_, dense air sinks causing cool temperatures.
24. \_\_\_\_\_ creates some deserts, as air descending down a mountain becomes dry and hot.
25. We feel \_\_\_\_\_ energy as heat.
26. When the Sun's rays shine most directly at the equator this is called the \_\_\_\_\_.

27. \_\_\_\_\_ is a greenhouse gas produced by rotting plants.
28. Ions traveling along magnetic field lines can create waves of brilliant colors called the \_\_\_\_\_ .
29. \_\_\_\_\_ winds are large scale versions of land and sea breezes.
30. \_\_\_\_\_ winds develop when air is forced up over a mountain range.

**Short Answer**

*Answer each question in the space provided.*

31. What is a temperature inversion? How do they form?
32. What is the ozone layer? Why is the ozone layer important?
33. Describe the situation that creates the westerly winds (which travel from southwest to northeast) in the mid-latitudes.



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# CHAPTER **16** HS Weather Assessments

## Chapter Outline

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**16.1 WEATHER AND ATMOSPHERIC WATER**

**16.2 CHANGING WEATHER**

**16.3 STORMS**

**16.4 WEATHER FORECASTING**

**16.5 WEATHER**

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## 16.1 Weather and Atmospheric Water

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Clouds have a big influence on weather by
  - preventing solar radiation from reaching the ground
  - absorbing warmth that is re-emitted from the ground
  - being a source of precipitation
  - all of the above
- Local weather depends on which of the following?
  - air temperature
  - humidity
  - wind speed and direction
  - all of the above
- The percentage of water vapor in a certain volume of air relative to the maximum amount of water vapor that air could contain is known as
  - maximum humidity
  - humidity
  - relative humidity
  - percent humidity
- When humid air near the ground cools below its dew point, what forms?
  - vog
  - fog
  - rain
  - smog
- When warm moist air rises it eventually
  - cools and reaches its dew point.
  - becomes hot and begins to rain.
  - cools and becomes able to hold more water vapor.
  - none of these.
- Clouds are visible because
  - water vapor is visible.
  - they are made of tiny condensed water droplets.
  - they are made of ice crystals.
  - none of these.
- If the weather report says there is 90% humidity, it means that the air

- a. is 90% water vapor.
  - b. is 10% water vapor.
  - c. has 10% as much water vapor as it could hold.
  - d. has 90% as much water vapor as it could hold.
8. When the sky is cloud-free,
- a. days are relatively warm; nights are relatively cold.
  - b. days and nights have a relatively small temperature difference.
  - c. the humidity increases both day and night.
  - d. none of these.
9. Clouds form when
- a. humidity increases but air temperature stays the same.
  - b. air temperature increases, but humidity stays the same.
  - c. the air reaches its cloud point.
  - d. all of these.
10. San Francisco has its famous fog when
- a. warm air from the San Francisco Bay meets with cold air from the Pacific Ocean.
  - b. warm air from the ground travels up the hills and cools to its dew point.
  - c. warm air from the Pacific cools over the cold California current.
  - d. the ground becomes cold enough that the layer of air near the ground reaches its dew point.

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Clouds grow tall because of strong upward vertical air currents.
- \_\_\_\_\_ 12. A particular location's weather does not depend on wind direction.
- \_\_\_\_\_ 13. Climate is the average of a region's weather over time.
- \_\_\_\_\_ 14. Hurricane Katrina made a direct hit on New Orleans, which is why it did so much damage.
- \_\_\_\_\_ 15. Anything over 85% humidity, and the water condenses and forms precipitation.

**Fill in the Blanks**

Fill in the blank with the term that best completes the sentence.

16. The \_\_\_\_\_ occurs when the air has 100% humidity.
17. \_\_\_\_\_ clouds, like cirrus, are made of ice crystals.
18. Air that is \_\_\_\_\_ in temperature can hold more water vapor than air that is \_\_\_\_\_ in temperature.
19. A location's weather depends on air temperature and air \_\_\_\_\_.
20. Precipitation falls when humidity reaches \_\_\_\_\_.
21. Before you see lightning and hear thunder, you will probably see \_\_\_\_\_ clouds.
22. On a cool autumn morning, the fog that appears over a lake is called \_\_\_\_\_ fog.
23. If rain hits a layer of freezing air near the ground it becomes \_\_\_\_\_.

**Short Answer**

Answer each question in the space provided.

24. How do clouds influence weather?

25. How does a hailstone form? When does it fall?

## 16.2 Changing Weather

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A warm front occurs when
  - a. a cold air mass slides over a warm air mass
  - b. two warm air masses meet
  - c. two cold air masses meet
  - d. a warm air mass slides over a cold air mass
2. An occluded forms around what feature?
  - a. warm front
  - b. cold front
  - c. high pressure system
  - d. low pressure system
3. A cold front in winter will produce
  - a. thunderstorms and tornadoes
  - b. strong rain
  - c. cold temperatures and heavy snow
  - d. cold temperatures but clear or slightly cloudy skies
4. Two air masses meet at what?
  - a. a convergence point
  - b. a front
  - c. a medium
  - d. a division point
5. Air masses usually do not form in the temperate zones because
  - a. the region is too unstable.
  - b. the area is not hot or cold enough to affect the air.
  - c. there is too much rain in the mid-latitudes.
  - d. none of these.
6. Which directions do air masses tend to flow?
  - a. cold toward the poles; warm toward the equator
  - b. warm toward the poles; cold toward the equator
  - c. east-west in the global wind belts
  - d. north-south in the global circulation cells
7. What happens when a warm air mass and a cold air mass meet?
  - a. the denser air mass goes beneath the less dense air mass

- b. the less dense air mass goes beneath the denser air mass
  - c. it depends on many factors, only one of which is density
  - d. the two air masses will create a squall line
8. The strongest winds form when
- a. there is a lot of precipitation
  - b. the temperature difference between two air masses is very low.
  - c. the temperature difference between two air masses is very high.
  - d. there is no precipitation
9. Rising air creates
- a. high pressure
  - b. temperature differences
  - c. low pressure
  - d. fronts
10. Compared to a cold front, the change in weather at a warm front is
- a. really quick since the front is steep.
  - b. gradual since the angle of the front is shallow.
  - c. about the same, since the change from one air mass to the other occurs at about the same rate.
  - d. none of these
11. After a cold front passes and the cold air mass is over you
- a. thunderstorms or snow showers precipitate on you.
  - b. a squall line passes overhead.
  - c. the weather is cold and clear or partly cloudy.
  - d. tornadoes and thunderstorms form.
12. Thunderstorms tend to form
- a. in summer and autumn
  - b. in autumn and winter
  - c. in winter and spring
  - d. in spring and summer

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Fronts are always moving.
- \_\_\_\_\_ 14. An air mass is a batch of air that has very similar temperature and humidity.
- \_\_\_\_\_ 15. Air masses generally form over a relatively small area.
- \_\_\_\_\_ 16. A front is the meeting of two air masses that have different densities and do not easily mix.
- \_\_\_\_\_ 17. An occluded front has three air masses: cold, warm, then cold.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A cold front takes over a warm front in a(n) \_\_\_\_\_.
19. A warm air mass will replace a cold air mass in a \_\_\_\_\_.
20. A front occurs that the meeting of one \_\_\_\_\_ with another.
21. The one air mass that forms within North America is cT, which stands for \_\_\_\_\_.
22. Most stormy weather occurs at \_\_\_\_\_.

23. Air masses do not move at a(n) \_\_\_\_\_.

24. The boundary where fronts meet curves due to \_\_\_\_\_.

25. The Pacific Coast has frequent winter storms with lots of precipitation and shifting winds because it has a lot of \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. How and where do air masses form?

27. Imagine that it is a winter day and a warm front comes over you. What is the sequence of clouds and weather that you can observe?

## 16.3 Storms

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A blizzard is not described by which of the following conditions?
  - a. temperatures below 20°F
  - b. winds greater than 35 mph
  - c. relative humidity near 100%
  - d. visibility less than one mile
2. People in the United States are most likely to experience
  - a. thunderstorms
  - b. tornadoes
  - c. hurricanes
  - d. nor'easters
3. What is needed for a thunderstorm to form?
  - a. high ground temperature
  - b. high air temperature
  - c. low air temperature
  - d. low ground temperature
4. The categories of the Saffir-Simpson Hurricane Scale are divided by
  - a. the amount of precipitation
  - b. the wind speed
  - c. the amount of precipitation and the wind speed
  - d. the amount of damage done
5. Which of the following is true?
  - a. You hear thunder before you see lightning.
  - b. You hear thunder and see lightning at the same time.
  - c. You see lightning before you hear thunder.
  - d. The arrival time of sound and light waves is random.
6. Convection in a thunderstorm dies when
  - a. all the raindrops have fallen and no new ones can be created.
  - b. the cloud grows up into the stratosphere and the air cools and stops convection.
  - c. downdrafts cool the base of the cloud so air doesn't rise.
  - d. none of these
7. Thunderstorms that last for several hours do so because
  - a. there are more particulates for drops to condense on.



- b. intense downdrafts bounce off the ground and send warm air back into the cloud.
  - c. they are fed by the intense cycling air of tornadoes.
  - d. none of these.
8. Tornadoes are common in the late spring when
- a. warm wet air from the south meets cold dry air from the north.
  - b. hurricanes come off of the Atlantic and onto land.
  - c. nor-easters come off of the Atlantic and onto land.
  - d. none of these
9. The eye of a hurricane is relatively calm because
- a. it is located at the end of the storm
  - b. there is a lot of precipitation so air motion is downward
  - c. it is a high pressure
  - d. none of these
10. Why do so many hurricanes move toward the U.S., but then change direction and move out to sea?
- a. Hurricanes move away from land as much as possible.
  - b. Hurricanes move with the global winds.
  - c. Hurricanes move away from the Gulf Stream.
  - d. none of these
11. Many blizzards form when
- a. a northern cold air mass meets a warmer, wetter southern air mass.
  - b. when the jet stream is north of its normal winter position.
  - c. strong winds push ocean air into cold continental regions.
  - d. none of these
12. Frigid air warms and collects moisture over the Great Lakes, so that downwind the air
- a. warms the region and rain falls.
  - b. warms the region and skies clear.
  - c. cools and creates a nor'easter.
  - d. cools and drops lots of snow.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Lightning never strikes the same place twice.
- \_\_\_\_\_ 14. For a heat wave to be declared anywhere in the United States, the temperature must be at least 86°F (30°C) for at least three days.
- \_\_\_\_\_ 15. Thunderstorms can form individually or in squall lines along a warm front.
- \_\_\_\_\_ 16. Lightning heats the air so that it expands explosively.
- \_\_\_\_\_ 17. If there were no thunderstorms in Kansas, there would be no tornadoes there either.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. \_\_\_\_\_ snow takes place leeward from when warm moist air enters into a cold front.
19. A(n) \_\_\_\_\_ is a cyclone that forms at the polar front.
20. A \_\_\_\_\_ forms downward from a cumulonimbus cloud.
21. The winds in a \_\_\_\_\_ rotates in a clockwise direction in the northern hemisphere and a counter clockwise pattern in the southern hemisphere.

22. A period of prolonged excessively hot weather for a particular region is called a(n) \_\_\_\_\_.
23. A wind system that rotates around a low pressure center is a(n) \_\_\_\_\_.
24. Mid-latitude cyclones in the U.S. that come off the Atlantic Ocean are called \_\_\_\_\_.
25. For a \_\_\_\_\_ to form, sea surface temperature must be 28°C (82°F) or higher.

**Short Answer**

*Answer each question in the space provided.*

26. How does a cumulonimbus cloud form?

27. How does a hurricane form?

## 16.4 Weather Forecasting

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Lines of equal temperature are called what?
  - isosceles
  - isotacs
  - isobars
  - isotherms
- Which of the following is radar named for?
  - Radio Detection and Ranging
  - Lt. Col. Joseph P. Radar
  - Radio Readings and Wind Direction
  - Radio Direction and Readings
- What does a radiosonde measure?
  - temperature
  - pressure
  - humidity
  - all of the above
- What instrument measures atmospheric pressure?
  - thermometer
  - barometer
  - scale
  - sundial
- What will probably happen if barometric pressure rises?
  - a storm is on its way
  - conditions will remain the same as they are
  - the skies will clear
  - its not possible to say
- To outline a storm and estimate its effects, meteorologists use
  - satellites
  - weather maps
  - radar
  - none of these
- On a weather map, isolines are created
  - by connecting points of equal value

- b. by identifying high and low pressure cells
  - c. at the location of a front.
  - d. none of these
8. A large temperature gradient may indicate a(n)
- a. front
  - b. isotherm
  - c. low pressure cell
  - d. none of these
9. Low or high pressure cells are indicated by
- a. the lowest or highest temperatures
  - b. the lowest or highest wind speeds
  - c. closed isobars
  - d. none of these
10. Where isotach values are very low up high in the troposphere
- a. the jet stream can be located
  - b. a tropical cyclone may develop
  - c. snow is likely to fall
  - d. none of these

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Radiosondes produce a profile of weather conditions in the atmosphere.
- \_\_\_\_\_ 12. Weather predictions are virtually always right.
- \_\_\_\_\_ 13. The least accurate weather forecasts are those made for several days into the future.
- \_\_\_\_\_ 14. Barometers are used to measure wind speeds.
- \_\_\_\_\_ 15. Weather stations have thermometers, barometers, and other measuring devices to monitor weather up high above them in the atmosphere.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

16. The most advanced weather forecasts are done by \_\_\_\_\_.
17. On the warm side of the 0°C (32°F) isotherm, the precipitation would be \_\_\_\_\_.
18. To monitor large scale weather systems, it is best to use a(n) \_\_\_\_\_.
19. The instrument for measuring atmospheric pressure is a \_\_\_\_\_.
20. \_\_\_\_\_ on a map show areas of equal wind speed.
21. \_\_\_\_\_, first used in WWII, uses the reflection of radio waves to determine disturbances.
22. Lines of equal average air pressure at sea level are \_\_\_\_\_.
23. Scientists who forecast weather are \_\_\_\_\_.

### Short Answer

*Answer each question in the space provided.*

24. How are weather models calculated and made into a long-term weather prediction?

25. Why are weather predictions so much more detailed and accurate than they were 50 years ago?

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## 16.5 Weather

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### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- In the Northern Hemisphere, the general direction of the flow of the jet stream is toward the
  - north
  - south
  - east
  - west
- The layer of the atmosphere in which weather change occurs is the
  - mesosphere
  - troposphere
  - thermosphere
  - stratosphere
- Which type of front occurs when the air masses do NOT move?
  - cold
  - warm
  - stationary
  - occluded
- Which of the following is a product of thunderstorms?
  - tornadoes
  - hurricanes
  - typhoons
  - cyclones
- What are the most damaging storms on Earth?
  - tropical depressions
  - hurricanes
  - nor'easters
  - cyclones
- The transfer of heat that takes place when fluids (gases and liquids) are unevenly heated is called
  - reflection
  - conduction
  - radiation
  - convection
- What is the deadliest weather phenomena?
  - heat waves

- b. blizzards
  - c. hurricanes
  - d. tsunamis
8. Which of the following instruments measures air pressure?
- a. tachymeter
  - b. radiosonde
  - c. thermometer
  - d. barometer
9. What clouds are towering clouds with anvil heads that bring thunderstorms?
- a. Nimbostratus
  - b. Cirrocumulus
  - c. Cumulonimbus
  - d. Cirrus
10. The eye of a hurricane is a
- a. high pressure cell
  - b. low pressure cell
  - c. tropical depression
  - d. tropical cyclone

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Radiation is the transfer of energy from one object to another through electromagnetic waves.
- \_\_\_\_\_ 12. Weather maps depict information only from computer models.
- \_\_\_\_\_ 13. Isotherms show temperature gradients.
- \_\_\_\_\_ 14. Isobars are lines of constant wind speed.
- \_\_\_\_\_ 15. Heat waves have decreased in frequency and duration in recent years.
- \_\_\_\_\_ 16. An F6 tornado would cause massive destruction wherever it touches the ground.
- \_\_\_\_\_ 17. A summer heat wave can result if the jet stream stays too far north.
- \_\_\_\_\_ 18. Air masses form mainly in high pressure zones.
- \_\_\_\_\_ 19. Low level winds push air masses.
- \_\_\_\_\_ 20. Because of the stability of temperature inversions, they often produce healthy air in cities.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. \_\_\_\_\_ is the percentage of water vapor a certain volume of air contains relative to the maximum amount it can contain.
22. The temperature at which air becomes saturated with water is called \_\_\_\_\_.
23. \_\_\_\_\_ is a cloud located at or near the ground.
24. An \_\_\_\_\_ is a batch of air that has nearly the same temperature and humidity.
25. Two air masses meet at a \_\_\_\_\_.
26. A \_\_\_\_\_ is a system of winds rotating counterclockwise around a low pressure system in the northern hemisphere.





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# CHAPTER **17** HS Climate Assessments

## Chapter Outline

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- 17.1 CLIMATE AND ITS CAUSES
  - 17.2 WORLD CLIMATES
  - 17.3 CLIMATE CHANGE
  - 17.4 CLIMATE
-

## 17.1 Climate and Its Causes

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The most solar radiation over a year strikes
  - the north and south pole
  - the tropic of cancer and tropic of capricorn
  - the equator
  - the north pole
- At the ITCZ,
  - there is a lot of wind.
  - air rises and precipitation falls.
  - the Hadley and Ferrell circulation cells meet.
  - all of these.
- At about 30°N and 30°S, the air is warm and dry because
  - it originated at the equator.
  - it is a high pressure zone.
  - it is a zone of evaporation.
  - all of these.
- What does ITCZ stand for?
  - Inter Terrestrial Conic Zone
  - Infrared Terrain Conjoined Zone
  - Inter Tropical Convergence Zone
  - None of the above
- What latitudes are sometimes known as horse latitudes?
  - 30 N and 30 S
  - 45 N and 45 S
  - at the equator
  - above 85 N and below 85 S
- The polar jet stream
  - is very near the north or south pole.
  - is where air in the circulation cells is descending.
  - is the meeting of two air masses with different temperatures.
  - all of these.
- The prevailing winds are
  - the ground level portion of one of the circulation cells.

- b. where air in the circulation cells ascends or descends.
  - c. affected by local climate.
  - d. all of these.
8. Compared with lower altitudes, at higher altitudes the air molecules are
- a. less densely packed.
  - b. more densely packed.
  - c. the same density of packing.
  - d. packed with variable density.
9. The ITCZ is
- a. further north in the winter than in the summer.
  - b. further south in the winter than in the summer.
  - c. near the north pole in the summer and the south pole in the winter.
  - d. near the south pole in the summer and the north pole in the winter.
10. Where the two Hadley cells come together
- a. the Intertropical Convergence Zone is created.
  - b. the climate is warm and wet.
  - c. there are often no steady winds.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. The ITCZ shifts to about 5-degrees north of the equator in the summer.
- \_\_\_\_\_ 12. The location of the major wind belts remains the same year round.
- \_\_\_\_\_ 13. Upwelling of deep water may raise the temperature of the nearby land in very cold locations.
- \_\_\_\_\_ 14. The sun is directly above the equator at the solstices.
- \_\_\_\_\_ 15. The latitude of a region affects how much solar radiation a region receives.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. The horizontal movement of air is called advection or \_\_\_\_\_.
17. Weather averaged over the long term is called \_\_\_\_\_.
18. Coastal areas have a \_\_\_\_\_ climate.
19. In the \_\_\_\_\_, the descending air once meant that ships could be delayed for long periods.
20. Coastal \_\_\_\_\_ brings cold, deep water to the sea surface off of California.
21. Collisions between molecules give off \_\_\_\_\_, which warms the air.
22. Air temperature is lower at \_\_\_\_\_ altitude.
23. The amount of solar radiation a spot receives depends on its \_\_\_\_\_.

### Short Answer

Answer each question in the space provided.

24. Describe the two ways that mountain ranges can affect climate.

25. Why do San Francisco, California; Wichita, Kansas; and Virginia Beach, Virginia have such different climates even though they are at about the same latitude?

## 17.2 World Climates

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- To figure out which climate zone you are in you should
  - look at the plants.
  - monitor the temperature of the region.
  - monitor the precipitation of the region.
  - understand the seasons of the region.
- Small areas with climates that differ from the surrounding area are known as?
  - small climates
  - micro areas
  - microclimates
  - abnormalities
- What percent of Earth is covered by desert?
  - 12%
  - 26%
  - 37%
  - 83%
- Dry climate zones
  - have almost no rainfall.
  - experience more evaporation than precipitation.
  - are all desert biomes.
  - all of these.
- Where it is dark and bitterly cold in winter,
  - it is a polar climate.
  - the ground is permanently frozen.
  - there may be so little precipitation, it is a desert.
  - all of these.
- In the Sonoran Desert,
  - there are almost no plants, just shifting sands.
  - plants are adapted to long periods of drought.
  - all plants go dormant during drought.
  - none of these.
- The Koppen classification system depends on
  - temperature

- b. times of year precipitation falls
  - c. amount of precipitation
  - d. all of these
8. Coastal California has a moderate climate because
- a. land breezes warm the winters and sea breezes cool the summers.
  - b. the region receives rain almost year-round.
  - c. mid-latitude storms bring summer and winter rains.
  - d. all of these
9. Continental climates,
- a. have extremely cold winters.
  - b. have an average annual temperature that is fairly mild.
  - c. are not found in the Southern Hemisphere.
  - d. all of these.
10. The humid continental climate
- a. has coniferous trees.
  - b. has long summers and warm winters.
  - c. is found around the polar front.
  - d. all of these
11. There is very little tundra near the South Pole because
- a. the climate is too warm.
  - b. there is little land that is not covered with ice.
  - c. the musk ox and other grazing animals eat it.
  - d. there are too many trees in the region.
12. A small valley could have a different microclimate than the land above it because
- a. the valley is lower in elevation and will be hotter.
  - b. the valley will get less precipitation.
  - c. cold air sinks.
  - d. the air is less dense in the valley.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Right around the equator is the one latitude with no glaciers.
- \_\_\_\_\_ 14. The natural vegetation of a region will indicate what type of climate zone it has.
- \_\_\_\_\_ 15. Tundra plants are small because roots cannot grow deep into the permafrost.
- \_\_\_\_\_ 16. California experiences drought for about five months each winter.
- \_\_\_\_\_ 17. The weather of the tropical wet and dry climate is directly influenced by the location of the ITCZ.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A(n) \_\_\_\_\_ biome contains vast, boreal forests typical of a subpolar climate.
19. Greenland and Antarctica are covered by a(n) \_\_\_\_\_.
20. The \_\_\_\_\_ biome contains low bushes and bunch grasses.
21. A zone that is characterized by the living organisms with in it is a(n) \_\_\_\_\_.
22. Near the equator where part of the year is dry, the vegetation is typically \_\_\_\_\_.

23. Tropical rainforests have the largest number of species of any biome; they have high \_\_\_\_\_.
24. The continental polar air mass lies above the \_\_\_\_\_ climate zone.
25. Ground that is permanently frozen is called \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. What are the features of a Mediterranean Climate as seen in California? How does this affect the vegetation that can grow here?

27. Why do the organisms in a certain climate type share characteristics wherever they are in the world? Discuss arid zone plants as an example.

## 17.3 Climate Change

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Between 900 and 1300 A.D.,
  - Greenland was colonized by the Vikings
  - the Vikings had to leave Greenland
  - the Greenland ice cap grew tremendously
  - the climate was very much like it is today
- How much have temperatures risen since the Pleistocene?
  - 4°C
  - 0°C
  - 4°C
  - 40°C
- The 100,000 year climate pattern is known as
  - Milankovitch cycles
  - sunspot cycles
  - global warming
  - none of these
- If the Northern Hemisphere pointed directly at the Sun when Earth is closest to the Sun, compared to now
  - summers would be colder and winters would be warmer.
  - summers would be warmer and winters would be colder.
  - an ice age would begin.
  - an ice age would end.
- Atmospheric greenhouse gas levels
  - are currently falling
  - are currently stable
  - are not being measured
  - are currently rising
- Sunspots
  - are magnetic storms on the Sun's surface.
  - increase and decrease over a 22-years cycle.
  - are responsible for climate variation like the Medieval Warm Period.
  - all of these.
- Burning trees and burning fossil fuels,
  - increase the ozone content of the atmosphere



- b. release carbon dioxide into the atmosphere
  - c. create an ozone hole that destroy the ozone layer
  - d. none of these
8. Throughout Earth history
- a. climate has warmed
  - b. when greenhouse gas levels are high, temperatures are high
  - c. greenhouse gas levels and temperature have not been related
  - d. climate has cooled
9. As temperatures warm
- a. species move toward the poles
  - b. species move uphill
  - c. species die out
  - d. all of these
10. In response to global warming,
- a. weather will become hotter everywhere
  - b. there will be less rain and snow everywhere
  - c. weather will become more extreme
  - d. there will be more rain and snow everywhere
11. Scientists cannot predict exactly what will happen to climate in the future because they do not know
- a. the amounts of greenhouse gases that will be emitted
  - b. the way the climate system will respond
  - c. whether people will be able to reduce their emissions
  - d. all of these
12. As oceans become more acidic
- a. they will be able to store more carbon dioxide
  - b. creatures with carbonate shells will be unable to grow
  - c. there will be dead zones near river mouths
  - d. none of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Throughout most of Earth history, climate has been cooler than it is today.
- \_\_\_\_\_ 14. For the past 10,000 years, temperatures have risen slowly, steadily, and without decreasing.
- \_\_\_\_\_ 15. Global warming will likely result in a loss of biodiversity.
- \_\_\_\_\_ 16. The variation in sunspot activity is correlated with temperature changes on Earth.
- \_\_\_\_\_ 17. Glaciers covered much of the planet continually between 1.8 million and 10,000 years ago.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. We currently see short-term climate changes with the \_\_\_\_\_ cycle.
19. Monitor stations on Mauna Loa volcano in Hawaii were the first to detect a rise in \_\_\_\_\_.
20. The time period of the ice ages between 1.8 million and 10,000 years ago is known as the \_\_\_\_\_ Epoch.
21. When glaciers advance, sea level \_\_\_\_\_.
22. During the time of Pangaea, most of the land area had a(n) \_\_\_\_\_ climate.

23. People clear tropical rainforests so that they can farm, a process called \_\_\_\_\_ agriculture.
24. Ozone is a pollutant and a greenhouse gas in the \_\_\_\_\_ layer, and filters out ultraviolet radiation in the \_\_\_\_\_ layer.
25. The highest emissions of greenhouse gases per person are from the nation of \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Why do fish die off of South America during an El Niño?

27. Why are scientists increasingly certain that human activities are leading to warmer global temperatures?

## 17.4 Climate

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Climate is the average of weather for a region for at least
  - 100 years
  - 50 years
  - 30 years
  - 10 years
- What is the primary factor that influences the climate of a region?
  - wind
  - latitude
  - rainfall
  - sunlight
- Which type of climate has the greatest temperature differences between day and night and between summer and winter?
  - continental
  - maritime
  - polar
  - none of these
- Which biome consists mostly of grasses, with widely scattered deciduous trees and rare areas of denser forests?
  - tropical rainforest
  - steppe
  - desert
  - savanna
- Which biome do you find where there is extreme cold, little light, little precipitation and small ground-hugging plants?
  - subpolar
  - ice cap
  - steppe
  - polar tundra
- Which of the following is an example of a microclimate?
  - a glacier on top of Mt. Kilimanjaro
  - San Francisco, which is moderated by the Pacific Ocean
  - coastal California, which has a long summer drought
  - the massive expanse of the Amazon Rainforest

7. The most recent ice age ended
  - a. 100 years ago
  - b. 1,000 years ago
  - c. 10,000 years ago
  - d. 100,000 years ago
8. Which of the following weather phenomena causes upwelling off of western South America to shut down?
  - a. El Niño
  - b. La Niña
  - c. normal conditions
  - d. none of these
9. What event corresponded to a time when there were no sunspots?
  - a. Medieval Warm Period
  - b. The Little Ice Age
  - c. the Milankovitch Cycle
  - d. none of these
10. Which greenhouse gas is the product of the burning of fossil fuels and forests?
  - a. ozone
  - b. methane
  - c. carbon dioxide
  - d. chlorofluorocarbons

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. At the ITCZ is the doldrums, called that because ships there were unable to sail due to the lack of steady winds.
- \_\_\_\_\_ 12. Climate has changed throughout Earth history.
- \_\_\_\_\_ 13. The average person in China produces more greenhouse gases than the average US citizen.
- \_\_\_\_\_ 14. Methane is a greenhouse gas released from raising livestock and producing rice.
- \_\_\_\_\_ 15. Dry climate zones cover about 50% of the world's land area.
- \_\_\_\_\_ 16. Rainforests survive a three month drought each dry season.
- \_\_\_\_\_ 17. The polar regions receive the least solar radiation.
- \_\_\_\_\_ 18. Atmospheric carbon dioxide levels are rising.
- \_\_\_\_\_ 19. During Earth history, when greenhouse gas levels were high, temperatures were high.
- \_\_\_\_\_ 20. Average global temperature is rising at an increasing rate.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. \_\_\_\_\_ is the average weather in a location over about 30 years.
22. The \_\_\_\_\_ moves north in the summer, bringing warm equatorial weather with it.
23. A \_\_\_\_\_ climate is strongly influenced by the nearby sea.
24. \_\_\_\_\_ are dominated by densely packed, broadleaf evergreen trees and extreme biodiversity.
25. The scrubby, woody vegetation that thrives in the Mediterranean climate is called a \_\_\_\_\_.
26. In the Northern Hemisphere, the largest changes in climate are being seen in the \_\_\_\_\_.

27. The high \_\_\_\_\_ in the polar regions is because of the ice and snow, which reflects a large amount of the sun's light.
28. The \_\_\_\_\_ are created by the bases of the Hadley, Ferrell, and Polar cells.
29. A climate type and its plants and animals make up a \_\_\_\_\_.
30. As glaciers melt and ocean water expands as it warms, sea level \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

31. Why are the same types of organisms found at similar latitudes and in similar positions on nearly all continents in both the Northern and Southern Hemispheres (with one exception)?

32. How are climate zones classified?

33. What can cause long term climate change?

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# CHAPTER 18 HS Ecosystems and Human Populations Assessments

## Chapter Outline

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- 18.1 ECOSYSTEMS
  - 18.2 THE CARBON CYCLE AND THE NITROGEN CYCLE
  - 18.3 HUMAN POPULATIONS
  - 18.4 ECOSYSTEMS AND HUMAN POPULATIONS
-

# 18.1 Ecosystems

## Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

*Circle the letter of the correct choice.*

- All living creatures and non living things that interact within an area make up which of the following?
  - population
  - habitat
  - community
  - ecosystem
- Energy in an ecosystem flows in how many directions?
  - 1
  - 2
  - 4
  - many
- Herbivores are which type of consumer?
  - Producer
  - Primary consumer
  - Secondary consumer
  - Tertiary consumer
- In which type of relationship does one organism benefit and the other is not harmed?
  - Commensalism
  - Parasitism
  - Mutualism
  - None of the above
- Matter in an ecosystem flows in how many directions?
  - 1
  - 2
  - 5
  - many
- Which of the following is NOT a habitat?
  - A hole in a cactus
  - Under a leaf in a forest
  - Within the intestines of a shark
  - All of the above are habitats
- Which of the following would be highest on the food pyramid?
  - Phytoplankton

- b. Snakes
  - c. Falcons
  - d. Mice
8. Which type of consumer eats both plants and animals?
- a. omnivore
  - b. herbivore
  - c. carnivore
  - d. insectivore
9. Nutrients are useful for
- a. growing an organism's body
  - b. building shells or bones
  - c. creating proteins, fats, carbohydrates and nucleic acids
  - d. all of these
10. When one organism eats another organism, it
- a. receives all of its nutrients.
  - b. receives all of its energy.
  - c. receives all of its energy and nutrients.
  - d. none of these
11. Parasites usually
- a. kill their hosts fairly rapidly.
  - b. do not kill their hosts.
  - c. kill their hosts over a long period of time.
  - d. none of these.
12. Organisms that break dead tissue down into nutrients are
- a. producers
  - b. consumers
  - c. decomposers
  - d. scavengers

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Climate conditions determine the ecosystem that is found at a location.
- \_\_\_\_\_ 14. Every ecosystem has the same general roles that living creatures fill.
- \_\_\_\_\_ 15. Plants living in different regions in the same type of climate have similar adaptations.
- \_\_\_\_\_ 16. A community is all of the species and abiotic factors that coexist within a specific area.
- \_\_\_\_\_ 17. Humans are top consumers.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. An animal that only eats meat is a \_\_\_\_\_.
19. A \_\_\_\_\_ enjoys a relationship that the organisms finds beneficial, but is harmful to its host.
20. An organism that consumes both producers and other consumers for food is called a(n) \_\_\_\_\_.
21. Mice are common \_\_\_\_\_ for birds.
22. Wind is a(n) \_\_\_\_\_ part of an ecosystem.



23. A(n) \_\_\_\_\_ is a combination of all the populations living in an ecosystem.
24. Feeding relationships across multiple trophic levels are displayed on a(n) \_\_\_\_\_.
25. \_\_\_\_\_ for resources and mates can be seen in every aspect of an ecosystem.

**Short Answer**

*Answer each question in the space provided.*

26. What would happen to life on Earth if there were no decomposers?

27. What are the original sources of nutrients? How do nutrients enter and leave an ecosystem?

## 18.2 The Carbon Cycle and the Nitrogen Cycle

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Areas in ecosystems that produce more carbon than they require are known as
  - carbon sink
  - carbon neutral
  - carbon source
  - carbon bank
- What happens during respiration?
  - CO<sub>2</sub> is converted into O<sub>2</sub>.
  - O<sub>2</sub> and sunlight are converted into CO<sub>2</sub> and sugar.
  - CO<sub>2</sub> and water create solar energy and O<sub>2</sub>.
  - O<sub>2</sub> is used to burn sugar to create food energy.
- Nitrogen is an essential component for which of the following?
  - amino acids
  - nucleic acids
  - chlorophyll
  - all of the above
- The amount of time that carbon stays in a reservoir is known as
  - residence time
  - source time
  - reservoir time
  - sink time
- With nitrogen fixing, nitrifying bacteria
  - oxidize ammonia to create nitrates; other bacteria create nitrites from nitrates.
  - oxidize ammonia to create nitrites; other bacteria create nitrates from nitrites.
  - nitrify ammonia to create nitrates; other bacteria create nitrites from nitrates.
  - nitrify ammonia to create nitrites; other bacteria create nitrates from nitrites.
- About what is the current carbon dioxide concentration as measured at Mauna Loa, Hawaii?
  - 200 ppmv
  - 400 ppmv
  - 800 ppmv
  - 1,000 ppmv
- What is the second largest source of atmospheric CO<sub>2</sub>?
  - automobiles

- b. deforestation
  - c. cow flatulence
  - d. industrial pollution
8. When propane burns,
- a. it uses carbon dioxide and produces oxygen and water
  - b. it uses carbon dioxide and oxygen and produces water
  - c. it uses oxygen and produces carbon dioxide and water
  - d. it uses carbon dioxide, oxygen and water
9. When did atmospheric CO<sub>2</sub> begin to increase?
- a. when people started to use fire
  - b. when the ozone layer began to develop a hole
  - c. at the beginning of the Industrial Revolution
  - d. at the start of the Green Revolution
10. Scientists can determine past atmospheric CO<sub>2</sub> levels from
- a. measuring the composition of air bubbles trapped in glacial ice.
  - b. checking human records from pre-industrial times.
  - c. analyzing gas contents in igneous rocks.
  - d. all of these.
11. Greenhouse gases
- a. absorb incoming solar radiation in the atmosphere.
  - b. trap infrared radiation radiating from Earth's surface.
  - c. scatter sunlight from one molecule to another.
  - d. All of these.
12. What happens to incoming solar radiation?
- a. A small amount is absorbed by Earth's surface.
  - b. Some is re-radiated as heat and passes into space.
  - c. A small amount passes through the atmosphere.
  - d. All of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Plants create energy from sunlight.
- \_\_\_\_\_ 14. When an organism decomposes, its carbon is released back into the environment.
- \_\_\_\_\_ 15. Carbon cycles through organisms and into the environment.
- \_\_\_\_\_ 16. Protein, carbohydrates, and fats are all part of the body and all contain carbon
- \_\_\_\_\_ 17. The energy from sunlight and water are necessary components for turning carbon into inorganic carbon through photosynthesis.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Many countries and organizations have been fighting the \_\_\_\_\_ of the Amazon rainforest.
19. Photosynthesis transforms \_\_\_\_\_ carbon into \_\_\_\_\_ carbon.
20. A forest is a carbon \_\_\_\_\_. If that forest burns it is a carbon \_\_\_\_\_.
21. Carbon dioxide is a \_\_\_\_\_ gas in the atmosphere.

22. \_\_\_\_\_ is/are the greatest source of carbon dioxide in the atmosphere.
23. The average CO<sub>2</sub> in December 2012 was 394 ppm. The average for 1958 was 316 ppm. Atmospheric CO<sub>2</sub> has risen \_\_\_\_\_ ppm in \_\_\_\_\_ years.
24. In photosynthesis, CO<sub>2</sub> is converted to \_\_\_\_\_. In respiration, \_\_\_\_\_ is converted to CO<sub>2</sub>,
25. Bacteria fix nitrogen for a plant and when the plant dies it fertilizes the soil. This relationship is \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. How does burning fossil fuels cause average global temperature to increase?

27. What happens when excess nitrogen enters a pond or lake?

## 18.3 Human Populations

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Carrying capacity is achieved when what occurs?
  - the number of births equal the number of deaths
  - the number of births exceeds the number of deaths
  - the number of deaths exceed the number of births
  - the number of deaths falls below 10,000
- Currently how much of ice-free land has been converted to human use?
  - 20%
  - 33%
  - 50%
  - 76%
- If a limiting factor for a species increases, what happens to the carrying capacity?
  - the carrying capacity increases
  - the carrying capacity does not rely on the limiting factor
  - the carrying capacity decreases
  - the carrying capacity doubles
- Species that introduced to new habitats by humans are known as
  - invasive species
  - infestation
  - inept species
  - population merging
- The Green Revolution refers to what?
  - improved energy efficiency
  - improved agricultural productivity
  - improved oil production
  - improved color pigmentation
- The human population in 2013 is estimated to be
  - 10 billion
  - 7 billion
  - 5 billion
  - 2 billion
- What are the goals of sustainable development?
  - help people out of poverty

- b. protect the environment
  - c. use resources no faster than the rate they are regenerated.
  - d. all of the above
8. What is true about the beginning of the Industrial Revolution?
- a. mass production
  - b. widespread use of fossil fuels
  - c. late 1700s
  - d. all of these
9. A century ago a farmer produced enough food for \_\_\_\_\_ people. Now a farmer can feed more than \_\_\_\_\_ people.
- a. 1; 10
  - b. 2.5; 130
  - c. 4; 100
  - d. 8; 50
10. How many times more resources do people in developed nations use than people in undeveloped nations?
- a. they use the same amount
  - b. double
  - c. 10
  - d. 32
11. An example of a damaging species that lives in a new environment and has no predators to stop it is
- a. California Condors in Northern Arizona.
  - b. Mexican Gray Wolves in Southern Arizona.
  - c. Australian Brown Tree Snake in Guam.
  - d. Mule deer in Northwestern Colorado.
12. To better develop sustainably, people can
- a. use more pesticides to further the goals of the Green Revolution.
  - b. use more fossil fuels to improve transportation and manufacturing.
  - c. purchase products that are produced sustainably.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. In a hunter-gatherer society, people relied on the resources they could find where they lived.
- \_\_\_\_\_ 14. Every major advance in agriculture has allowed global population to increase.
- \_\_\_\_\_ 15. The Green Revolution reduced the use of water because it is more efficient.
- \_\_\_\_\_ 16. The natural carrying capacity of Earth for humans is at least equal to the human population of Earth today.
- \_\_\_\_\_ 17. A limiting factor determines the carrying capacity for a species.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A species of organisms introduced into a new environment by humans either purposefully or by accident is a(n) \_\_\_\_\_.
19. In 1979 China enacted a one-child policy over fears of \_\_\_\_\_.
20. The ability to produce automobiles en masse during the \_\_\_\_\_ caused fossil fuels to grow rapidly.

21. \_\_\_\_\_ can kill pests that might harm crops, over recent years the practice has risen health concerns in humans.
22. The rate of growth of the human population is very likely to \_\_\_\_\_ in the coming decades.
23. Humans have caused the extinction rate of wild species to increase at least \_\_\_\_\_ times the normal rate.
24. About 1.2 billion people on Earth do not have access to \_\_\_\_\_ water.
25. In developed nations, resources are overused and pollution is generated due to \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. How could the carrying capacity of an area increase? Give an example.

27. How did the Green Revolution change the carrying capacity of Earth for humans? Is there a reason this could be a problem?

## 18.4 Ecosystems and Human Populations

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- All of the individuals of a single species that occur together at a given place and time are members of the same
  - community
  - population
  - ecosystem
  - niche
- Which of the following is an abiotic factor?
  - bacteria
  - plants
  - light
  - fungi
- Both species benefit in which type of relationship?
  - Commensalism
  - Parasitism
  - Mutualism
  - None of the above
- Nutrients and carbon dioxide are the result of tissue breakdown by
  - herbivores
  - carnivores
  - omnivores
  - decomposers
- If a population is limited by water and nutrients, the population will
  - increase if there is an increase in rainfall.
  - increase if there is an increase in food.
  - decrease if there is an increase in rainfall or food.
  - none of these.
- What percent of energy is passed from organisms of one trophic level to the next?
  - 5%
  - 10%
  - 15%
  - 20%
- Which of the following is the chemical reaction for respiration?
  - $C + O_2 \rightarrow CO_2$



- b.  $C + 2H_2 \rightarrow CH_4$   
 c.  $6CO_2 + 6H_2O + \text{energy} \rightarrow C_6H_{12}O_6 + 6O_2$   
 d.  $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy}$
8. What is the largest source of carbon dioxide in the atmosphere?  
 a. burning fossil fuel  
 b. deforestation  
 c. respiration  
 d. none of these
9. Top predators are scarce because  
 a. they are large and take up a lot of space.  
 b. they are a favorite food of many organisms.  
 c. energy is lost at each trophic level.  
 d. none of these.
10. When greenhouse gases in the atmosphere increase, the  
 a. atmosphere warms.  
 b. atmosphere cools.  
 c. temperature of the atmosphere stays the same.  
 d. effect is not yet known.

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Energy moves through an ecosystem in many directions.  
 \_\_\_\_\_ 12. In commensalism, both species benefit.  
 \_\_\_\_\_ 13. Forests and oceans are carbon sinks.  
 \_\_\_\_\_ 14. Global warming is a consequence of increased carbon dioxide and other greenhouse gases in the atmosphere.  
 \_\_\_\_\_ 15. The carrying capacity can change if more resources become available.  
 \_\_\_\_\_ 16. Current world human population is less than 5 billion.  
 \_\_\_\_\_ 17. Groundwater is replaced as rapidly as it is lost.  
 \_\_\_\_\_ 18. Wild fish are being over harvested.  
 \_\_\_\_\_ 19. One of the most important steps to achieving a more sustainable future is to reduce human population.  
 \_\_\_\_\_ 20. Overpopulation will occur so far in the future that we do not need to worry about it.

**Fill in the Blanks**

Fill in the blank with the term that best completes the sentence.

21. An \_\_\_\_\_ is made up of living creatures and the nonliving things that those creatures need within an area.  
 22. A \_\_\_\_\_ is a single type of organism that can interbreed and produce fertile offspring.  
 23. If food energy passes from grass to a goat, it has passed from one \_\_\_\_\_ to another.  
 24. A producer that is eaten by a grazing herbivore fills the same \_\_\_\_\_ as an organism that does the same things in a different location.  
 25. Ions that are crucial to living things and that pass between them are called \_\_\_\_\_.  
 26. \_\_\_\_\_ are organisms that are introduced into a habitat where they do not belong.

27. Currently, about \_\_\_\_\_ of the world's fresh water is used for agriculture.
28. A \_\_\_\_\_ determines the carrying capacity for a species.
29. If you eat a quiche made of spinach, mushrooms, eggs and chicken, you are a(n)\_\_\_\_\_.
30. For nitrogen in the atmosphere to be useful to organisms it must be \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

31. What does it mean to say that each ecosystem has the same niches, but the same species don't always fill them?

32. How did the Green Revolution change the carrying capacity of the Earth?

33. What is the purpose of sustainable development?

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CHAPTER **19** HS Human Actions and the  
Land Assessments

**Chapter Outline**

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- 19.1 LOSS OF SOILS
  - 19.2 POLLUTION OF THE LAND
  - 19.3 HUMAN ACTIONS AND THE LAND
-

## 19.1 Loss of Soils

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- How do trees prevent soil erosion?
  - Trees keep the wind from blowing hard through an area.
  - The leaves keep rain from striking the ground hard
  - Roots of the trees hold the soil together
  - All of the above
- The Dust Bowl occurred in what time period?
  - 1830s
  - 1870s
  - 1910s
  - 1930s
- What area of the United States was affected by the Dust Bowl?
  - Northeast
  - South
  - Midwest
  - West
- Which activity likely accelerates soil erosion the most?
  - recreational activities
  - farming
  - construction
  - logging
- Soil erosion
  - is a natural process and as such should be left alone.
  - has been accelerated by human activities.
  - is an aesthetic problem but does not real damage to human society.
  - none of these
- Which of the following is an agent of soil erosion?
  - water
  - wind
  - gravity
  - all of the above
- One reason that we there is unlikely to be another Dust Bowl in the Midwestern U.S. any time soon is
  - irrigation from the Ogallala Aquifer.

- b. the planting of erosion-resistant crops.
  - c. concrete barriers around fields protect them from wind.
  - d. all of these.
8. Farming causes soil erosion because
- a. the land is uncovered by plants for part of the year.
  - b. farm machines churn up the soil.
  - c. crop plants are often less able to protect the land than native plants.
  - d. all of these.
9. Old mines are made to cause less soil erosion when
- a. they are kept wet all the time
  - b. trees are planted over them
  - c. they are covered with concrete
  - d. none of these
10. How much topsoil has eroded away since the arrival of Europeans in the United States?
- a. very little
  - b. one-tenth
  - c. one-third
  - d. one-half
11. To reduce soil erosion from agriculture
- a. plant tall trees around the field to protect from wind.
  - b. use large sprinklers to be sure the soil is always moist.
  - c. plant one type of crop in a large region to keep conditions the same.
  - d. all of these.
12. To reduce soil erosion from logging
- a. clear cut an entire area.
  - b. log mostly on steep lands.
  - c. cut a small area and replant the logged area with new seedlings.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Soil is an important natural resource.
- \_\_\_\_\_ 14. The Dust Bowl was caused entirely by bad farming practices.
- \_\_\_\_\_ 15. Off road vehicles cause soil erosion, but hiking, even off trail, does not.
- \_\_\_\_\_ 16. Grazing animals are beneficial to soil as they compact the soil under their hooves.
- \_\_\_\_\_ 17. Soil eroded from logging can bury coral reefs.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The classic novel, *The Grapes of Wrath*, by \_\_\_\_\_ explores the lives of a family during the Dust Bowl.
19. Before agriculture came to the Great Plains the dominant plants were \_\_\_\_\_.
20. The soil that is most likely to erode is the nutrient-rich \_\_\_\_\_.
21. \_\_\_\_\_ agriculture clears tropical rainforests and leaves land open for erosion.
22. \_\_\_\_\_ animals cause soil erosion because they churn up ground with their hooves.

23. Besides removing trees, logging removes \_\_\_\_\_, the dead leaves, that protect forest floors from erosion.
24. Near a parking lot, \_\_\_\_\_ runs off the surface and causes erosion nearby.
25. " \_\_\_\_\_ spaces" in cities, such as parks, help to prevent soil erosion.

**Short Answer**

*Answer each question in the space provided.*

26. What led up to the conditions that caused the Dust Bowl?

27. What can be done to minimize the amount of soil erosion caused by grazing animals?

## 19.2 Pollution of the Land

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Hazardous waste includes substances that are:
  - toxic
  - corrosive
  - flammable
  - all of the above
- How many children die from lead poisoning each year in the U.S.?
  - 10
  - 200
  - 500
  - 10000
- In what year was the Superfund Act passed?
  - 1964
  - 1977
  - 1980
  - 1999
- At Love Canal
  - the hazardous wastes were safely buried.
  - people became sick right after the town was built.
  - the first sign that something was wrong was that children developed cancer.
  - none of these
- Where are Superfund sites located?
  - in densely populated areas
  - spread across the U.S.A.
  - East of the Mississippi River
  - all around the world
- Which of the following is NOT considered a potentially hazardous material?
  - baking soda
  - batteries
  - fertilizers
  - paint
- At Love Canal
  - the problem was uncovered by local residents

- b. the local government detected the problem and dealt with it.
  - c. the state government detected the problem and dealt with it.
  - d. the federal government detected the problem and dealt with it.
8. Nations that produce the most hazardous waste
- a. have the most people.
  - b. have the most industry.
  - c. have the most farmers.
  - d. have the most buildings.
9. Besides cancer, toxic wastes can cause
- a. miscarriages in pregnant women.
  - b. birth defects.
  - c. sickness in children.
  - d. all of these.
10. One way to find toxic waste contamination is to identify
- a. a cancer cluster.
  - b. a person with a certain type of cancer
  - c. an entire population exhibiting flu-like symptoms.
  - d. none of these.
11. China creates a lot of hazardous waste because
- a. they have the world's largest population.
  - b. they are big over-consumers.
  - c. they produce an incredible number of products for developed nations.
  - d. none of these.
12. The Resource Conservation and Recovery Act of 1976 requires that companies
- a. recycle all the materials they produce.
  - b. show the government that they've disposed of wastes properly.
  - c. use only recycled materials to produce their products.
  - d. all of these.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. The Superfund Act has had little effect on the behavior of companies regarding toxic wastes.
- \_\_\_\_\_ 14. If a location is considered a Superfund site, it has been heavily polluted.
- \_\_\_\_\_ 15. The Superfund Act requires companies to be responsible for hazardous chemicals that they put into the environment and to pay to clean up polluted sites.
- \_\_\_\_\_ 16. Pesticides in any amount are not toxic to humans.
- \_\_\_\_\_ 17. Toxic wastes can be located because they are always visible.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. A law passed by the U.S. Congress in 1980 that held companies responsible for any hazardous chemicals that they might create is called a(n) \_\_\_\_\_.
19. A substance that can cause serious harm, including death, or is poisonous is \_\_\_\_\_.
20. A substance that causes dangerous chemical reactions is \_\_\_\_\_.



21. People use \_\_\_\_\_ to kill unwanted insects.
22. The people most likely to sicken first from exposure to hazardous wastes are \_\_\_\_\_.
23. The toxic metal \_\_\_\_\_ damages the brain and nervous system.
24. The toxic metal \_\_\_\_\_ was formerly put into paint and gasoline.
25. A good, non-toxic cleanser that just about everyone has in their kitchen is \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. What does the Superfund Act say?

27. Sometimes substances, such as pesticides, are used and released into the environment without much testing. Later they may be found to be toxic. Is there a potential problem with this?

## 19.3 Human Actions and the Land

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What occurred in the 1930s due in part to the poor farming practices?
  - a. the Great Depression
  - b. the Dust Bowl
  - c. World War I
  - d. World War II
2. What was Love Canal, New York?
  - a. a river
  - b. an abandoned waterway
  - c. a town
  - d. none of these
3. What did the Superfund Act of 1980 require businesses to do?
  - a. inform homeowners of risk from chemicals
  - b. sell polluted land to the government
  - c. pay to clean up the pollution they created
  - d. pay extra taxes if they polluted
4. Lead poisoning
  - a. causes cancer
  - b. causes a person to be "mad as a hatter"
  - c. is common in people who eat a lot of tuna
  - d. may affect young children in homes with old paint
5. Sources of mercury include all of the following except...
  - a. anti-knock gasoline
  - b. volcanic eruption
  - c. burning coal
  - d. electronic appliances
6. Which country produces the most hazardous wastes?
  - a. China
  - b. South Africa
  - c. United States
  - d. Russia
7. How are contaminated sites usually identified?
  - a. the company notifies the EPA

- b. people start getting sick
  - c. the EPA randomly tests areas
  - d. animals show up with mutations
8. To avoid soil erosion
- a. contour hillsides that are to be farmed.
  - b. clear forests to make the landscape all the same.
  - c. introduce worms and other small creatures to the soil.
  - d. none of these.
9. Which of the following recreational activities can accelerate soil erosion?
- a. hiking
  - b. off road trails for ATVs
  - c. camping
  - d. all of the above
10. Which source of erosion is the most destructive?
- a. agriculture
  - b. logging
  - c. mining
  - d. construction

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Logging results in the loss of leaf litter, which protects forest soils from erosion.
- \_\_\_\_\_ 12. Soil erosion is a natural process that has been greatly accelerated by human activities.
- \_\_\_\_\_ 13. The Dust Bowl occurred when farming practices changed for the worse.
- \_\_\_\_\_ 14. Many practices can be adopted to prevent soil erosion.
- \_\_\_\_\_ 15. Surface mining disturbs the land but doesn't contribute to soil erosion.
- \_\_\_\_\_ 16. Fine soil is blown away by wind.
- \_\_\_\_\_ 17. Soil erosion can be reduced in cities by keeping as much "green space" as possible.
- \_\_\_\_\_ 18. The part of soil that is the most important natural resource is caliche.
- \_\_\_\_\_ 19. A Love Canal resident was indirectly responsible for passage of the Superfund Act.
- \_\_\_\_\_ 20. If a company cannot pay to clean a Superfund Site, the taxpayers foot the bill.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. If too many animals are living in the area, the land may become \_\_\_\_\_.
22. Farmland is especially vulnerable to erosion in winter when the land lies \_\_\_\_\_.
23. Using \_\_\_\_\_ to water just the area where a plant is can prevent soil erosion.
24. Topsoil blew in huge storms during the \_\_\_\_\_.
25. Love Canal became a \_\_\_\_\_ site in 1983.
26. A \_\_\_\_\_ material causes serious harm, death, or is poisonous.
27. A \_\_\_\_\_ material destroys other things with chemical reactions.

28. Something is \_\_\_\_\_ if it causes dangerous or unwanted chemical reactions, such as an explosion.
29. Anything that catches fire easily and may send dangerous smoke into the air is called \_\_\_\_\_.
30. The Resources Conservation and Recovery Act of 1976 requires that companies keep track of the \_\_\_\_\_ materials they produce.

**Short Answer**

*Answer each question in the space provided.*

31. What can cause soil erosion?
32. What can you do to reduce soil erosion during your recreational activities?
33. Briefly describe the four types of hazardous waste.

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CHAPTER **20** **HS Human Actions and  
Earth's Resources Assessments**

**Chapter Outline**

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- 20.1 USE AND CONSERVATION OF RESOURCES**
  - 20.2 ENERGY CONSERVATION**
  - 20.3 HUMAN ACTIONS AND EARTH'S RESOURCES**
-

## 20.1 Use and Conservation of Resources

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- How many pounds of minerals are used per person in the U.S.A. per year?
  - 4,000 lbs
  - 23,000 lbs
  - 40,000 lbs
  - 120,000 lbs
- Nations with an abundance of a resource usually do what with it?
  - import more resources
  - export excess resources
  - trade for more of the same resource
  - bury it back into Earth
- The top 11 oil producing countries produce what percent of the world's oil?
  - 50%
  - 60%
  - 70%
  - 80%
- When Country A needs a resource and Country B has it
  - Country B will import it.
  - Country A will export it.
  - Country B will try to conserve it.
  - they could go to war over it.
- Where is much of the electronic waste sent?
  - developing countries
  - Canada
  - dumped in the Pacific Ocean
  - used in construction of buildings
- Which of the following is a renewable resource?
  - oil
  - natural gas
  - forests
  - coal
- In the section on Monongahela National Forest, magnesium and calcium are
  - non-renewable resources

- b. renewable resources
  - c. limiting factors
  - d. none of these
8. Natural resources
- a. can become unusable if they become polluted.
  - b. are useful as long as they are not used up.
  - c. are most valuable if they are renewable.
  - d. none of these.
9. If a forest is logged,
- a. trees can be planted and so the forest is renewable.
  - b. trees can be planted, but a forest takes time to be renewed.
  - c. it can never be the same as it was.
  - d. none of these.
10. Fish reproduce, yet they can be a non-renewable resource if
- a. they become tainted with mercury.
  - b. so many are taken that the population cannot rebound.
  - c. they are no longer desired as a food source.
  - d. none of these.
11. Per capita natural resource use is \_\_\_\_\_ in developing countries because \_\_\_\_\_.
- a. lower; poorer people cannot afford as many products
  - b. higher; there are more people in these countries
  - c. lower; they do not want to have the same lifestyle developed nations have
  - d. higher; rich people in developing countries use more resources than anyone
12. Many of the goods people in wealthier nations use are produced in developing nations because
- a. labor costs are lower
  - b. environmental regulations are less stringent
  - c. it is less expensive to ship goods than to make them in the developed nations
  - d. all of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Drinking bottled water is better for you and the environment.
- \_\_\_\_\_ 14. It is usually better to throw something away than to fix it.
- \_\_\_\_\_ 15. Pollution occurs when a product is produced and when it is tossed away.
- \_\_\_\_\_ 16. All natural resources are divided into renewable and non-renewable.
- \_\_\_\_\_ 17. Soil is considered a non-renewable resource.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Oil is the major \_\_\_\_\_ out of the Saudi Arabia.
19. The developed nations \_\_\_\_\_ most of their oil from other nations.
20. When people use resources far out of proportion with other people, they are engaging in \_\_\_\_\_
21. To maintain our lifestyle, we must develop \_\_\_\_\_ to non-renewable resources.
22. Fresh water can be made from seawater by the process of \_\_\_\_\_.

23. To make natural resources last longer we must \_\_\_\_\_ them.
24. A resource that is regenerated many times more slowly than it is used is a \_\_\_\_\_ resources.
25. A good way to conserve resources is to reduce, reuse and \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. What determines the value of a resource?

27. Why should you conserve natural resources by buying less stuff?



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## 20.2 Energy Conservation

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### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- If it takes 3 units of energy to get 18 units of energy, what is the net energy?
  - 21 units of energy
  - 18 units of energy
  - 15 units of energy
  - 3 units of energy
- If you were to replace an incandescent 240V light bulb with a compact fluorescent light at 1,000 lm, how much energy would be saved?
  - 30 W
  - 40 W
  - 70 W
  - 130 W
- Saving energy in industry is
  - not possible, since little energy is used.
  - possible if equipment is designed to be efficient.
  - possible if new materials are used.
  - none of these.
- The amount of usable energy available from a resource after subtracting the amount of energy needed to make the energy is known as
  - sum energy
  - net energy
  - gross energy
  - energy
- What are some ways residential areas can use less energy?
  - Turn off lights when not in use.
  - Only run appliances when necessary.
  - Use a fan instead of an air conditioner.
  - All of the above.
- What does it mean if the net energy is less than zero?
  - the system is very efficient
  - the system is energy neutral
  - it takes more energy to get the energy than what is produced by the resource.
  - the resource is renewable

7. What person of the energy use in the United States is used for transportation?
- 14%
  - 33%
  - 45%
  - 67%
8. Which of the following have the highest Net-energy ratio
- solar energy
  - natural gas
  - petroleum
  - coal
9. The cost of an energy source depends on
- the cost of equipment needed to harness it.
  - the cost of transporting it.
  - its energy efficiency.
  - all of these.
10. The amount of energy contained in a resource and the amount of energy needed to get that energy is the \_\_\_\_\_ of that resource.
- net-energy ratio
  - net energy
  - energy efficiency
  - none of these.
11. About the economics of conserving energy:
- It is expensive because you have to buy special equipment.
  - It reduces costs because you use less energy.
  - It reduces costs because you create energy from less expensive sources.
  - All of these
12. If the cost of oil goes up,
- the energy efficiency of oil goes up.
  - the net energy of oil goes up.
  - some sources of oil that were not economical might become economical.
  - none of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Solar energy is the least expensive type of electricity available.
- \_\_\_\_\_ 14. To increase energy efficiency, be sure that equipment is running well.
- \_\_\_\_\_ 15. Filling you car's very low tires could make the vehicle use less gas.
- \_\_\_\_\_ 16. The best energy source would be one that supplies a lot of energy and takes a lot of energy to make it useable.
- \_\_\_\_\_ 17. Individuals can only do a little to increase energy efficiency because most energy is used by industry.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The more efficient an energy source is the more useful \_\_\_\_\_ it will produce.
19. Energy cannot be \_\_\_\_\_ and it cannot be \_\_\_\_\_.

20. As energy transfers forms, some is always lost as \_\_\_\_\_
21. The amount of energy that is left after all the energy that is needed to make it useful is subtracted is known as \_\_\_\_\_
22. Transportation by cars and airplanes is \_\_\_\_\_ energy efficient than transportation by boats and trains.
23. \_\_\_\_\_ bulbs are much more energy efficient than incandescent bulbs for lighting.
24. Like homes, industries should \_\_\_\_\_, reuse and recycle materials.
25. In a home or business, you can set a(n) \_\_\_\_\_ to turn off heat or air conditioning when it is not needed.

**Short Answer**

*Answer each question in the space provided.*

26. List four ways that you can use energy more efficiently or use less energy.

27. Why is higher energy efficiency desirable?

## 20.3 Human Actions and Earth's Resources

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A renewable resource
  - a. will always be a renewable resource.
  - b. can be used so that it becomes non-renewable.
  - c. will always become a non-renewable resource.
  - d. none of these.
2. Wars have been fought over
  - a. oil
  - b. water
  - c. solar energy
  - d. gold
3. How many countries have almost 80% of all the world's oil?
  - a. 10
  - b. 11
  - c. 12
  - d. 13
4. Which country is NOT one of the biggest users of oil?
  - a. United States
  - b. China
  - c. Japan
  - d. Russia
5. What is the amount of usable energy available from a resource after subtracting the amount of energy needed to make the energy called?
  - a. energy efficiency
  - b. net energy
  - c. energy conservation
  - d. all of these
6. Which form of energy yields more net energy than any other source?
  - a. natural gas
  - b. wind
  - c. solar
  - d. petroleum
7. In the United States, what sector uses the most energy?

- a. industry
  - b. commercial
  - c. residential
  - d. transportation
8. Which type of light bulbs are the most energy efficient?
- a. halogen
  - b. incandescent
  - c. fluorescent
  - d. all of these are equally efficient
9. Wildlife is
- a. always a renewable resource
  - b. a renewable resource that can become nonrenewable
  - c. always a nonrenewable resource
  - d. not a resource
10. A high net energy ratio means that an energy source
- a. produces more energy than it takes to be harnessed
  - b. is less expensive than other energy sources
  - c. does not produce many pollutants
  - d. all of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Natural resource use is generally lower in developing countries because people cannot afford many products.
- \_\_\_\_\_ 12. The nations that consume the most oil are the nations that produce the most oil.
- \_\_\_\_\_ 13. Pollution from discarded material degrades the land, air, and water.
- \_\_\_\_\_ 14. Consumerism leads to greater resource use, but it also leads to more waste.
- \_\_\_\_\_ 15. All of our electronic wastes are recycled within our country.
- \_\_\_\_\_ 16. Electronic wastes pose a problem for human health and the environment.
- \_\_\_\_\_ 17. Recycling can help conserve natural resources.
- \_\_\_\_\_ 18. To get more energy, we use a lot of energy.
- \_\_\_\_\_ 19. Turning off lights when not in a room is an easy way to conserve energy.
- \_\_\_\_\_ 20. Replacing old appliances with newer models doesn't save energy.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. We need to \_\_\_\_\_ natural resources so they will last longer.
22. \_\_\_\_\_ describes how much useful work is extracted from one unit of energy.
23. In the developing world, \_\_\_\_\_ are often more lax, which lowers the cost of resource extraction.
24. \_\_\_\_\_ means that less energy is needed, which reduces costs.
25. Set \_\_\_\_\_ to automatically turn off heat or air conditioning when buildings are closed to conserve energy.
26. Energy can be used more efficiently getting more \_\_\_\_\_ out of each unit of energy.

27. Materials, such as gravel and sand, are technically \_\_\_\_\_ but there is so much of them available that we are unlikely to ever run out.
28. \_\_\_\_\_ can be regenerated or grow so rapidly that they reappear at the same rate or faster than they are used.
29. When we practice \_\_\_\_\_, we make sure resources will be available in the future.
30. \_\_\_\_\_ are resources that cannot be regenerated on a useful timescale.

**Short Answer**

*Answer each question in the space provided.*

31. If Nation A needs a natural resource that Nation B has a lot of, why might Nation A have trouble getting that resource from Nation B?

32. Why is energy conservation beneficial?

33. List 5 ways that natural resources can be conserved.

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CHAPTER **21** **HS Human Actions and Earth's Water Assessments**

**Chapter Outline**

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- 21.1 HUMANS AND THE WATER SUPPLY**
  - 21.2 PROBLEMS WITH WATER DISTRIBUTION**
  - 21.3 WATER POLLUTION**
  - 21.4 PROTECTING THE WATER SUPPLY**
  - 21.5 HUMAN ACTIONS AND EARTH'S WATERS**
-

## 21.1 Humans and the Water Supply

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- One of the largest water resources for California comes from which river?
  - Central Valley River
  - Sacramento River
  - Colorado River
  - Mississippi River
- Regarding water use, developing nations use
  - a greater percentage for industry.
  - more for industry than for agriculture.
  - more for household uses than any other category.
  - a greater percentage for agriculture.
- Water use in recreational activities accounts for what percentage of water usage?
  - 1%
  - 6%
  - 12%
  - 17%
- What method of irrigation allows water to slowly trickle over crops?
  - slow irrigation
  - drip irrigation
  - low hanging irrigation
  - puncture irrigation
- What percent of water is used for agriculture globally?
  - 27%
  - 45%
  - 66%
  - 91%
- What percentage of water from traditional irrigation is wasted?
  - 15% - 36%
  - 5% - 10%
  - 33% - 45%
  - 37% - 84%
- For aquaculture to be successful,
  - the species must be able to reproduce in captivity.



- b. the farms must be as close to a natural ecosystem as possible.
- c. the fish and shellfish stocks must be genetically engineered to survive in captivity.
- d. all of these.

## 8. Industrial uses of water include

- a. golf courses for CEOs to play on.
- b. ponds and lakes on industrial sites.
- c. cooling in power plants.
- d. all of these

## 9. The source of much of the groundwater used in California is

- a. the rain and snow that falls each year.
- b. seepage from the Pacific Ocean.
- c. seepage from the state's rivers.
- d. thousands of years of snow melt.

## 10. Water use in Northern and Southern California

- a. is equal. Both parts of the state use about the same amount of water.
- b. is greater in Northern, even though Southern receives more moisture.
- c. is greater in Southern, even though Northern receives more water.
- d. is variable. The relative amount each part receives changes annually.

**True or False**

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. In normal year, about 40% of the water used in California comes from groundwater.
- \_\_\_\_\_ 12. Shrimp farms are converted from mangrove forests and salt marshes.
- \_\_\_\_\_ 13. One way to get farmers to use less water, is to have the government charge them more for it.
- \_\_\_\_\_ 14. Recreational and environmental water use is mostly consumptive.
- \_\_\_\_\_ 15. Aquaculture farmers have yet to develop a method of farming shellfish.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

16. Agriculture of the sea is known as \_\_\_\_\_.
17. The best way to water crops in the desert would be by \_\_\_\_\_.
18. \_\_\_\_\_ water use takes the water out of the ecosystem.
19. When water is recaptured, treated and returned to the water supply it is considered to be \_\_\_\_\_.
20. People use water for swimming, fishing, boating and other activities. This is a(n) use of water \_\_\_\_\_.
21. The water used by creatures in a wetland is a(n) \_\_\_\_\_ use of water.
22. Water shortages lead to a loss of life forms, known as a loss of \_\_\_\_\_.
23. California relies on \_\_\_\_\_ in the Sierra Nevada mountain to feed rivers with the water the state needs.

**Short Answer**

*Answer each question in the space provided.*

24. What actions should you take to use less water at home?

25. What are dangers of aquaculture?

## 21.2 Problems with Water Distribution

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Bacteria and other disease-causing agents found in water are known as
  - pathogens
  - halogens
  - carcinogens
  - partitions
- If all bacteria reproduce in one minute and you start with 10 bacteria, after 5 minutes you have
  - 50
  - 160
  - 320
  - 500
- Bacteria in water can grow at what rate?
  - exponentially
  - linearly
  - polynomially
  - none of the above
- Water is a \_\_\_\_\_ resource, and it is \_\_\_\_\_.
  - renewable; unlimited
  - non-renewable; unlimited
  - renewable; limited
  - non-renewable; limited
- People today use how much more water than they did 100 years ago?
  - 2 times
  - 4 times
  - 6 times
  - 10 times
- Water scarcity can have dire consequences for which of the following?
  - people
  - environment
  - economy
  - all of the above
- What percentage of the world's population does not have access to clean drinking water?
  - 10%

- b. 20%
  - c. 30%
  - d. 40%
8. What will happen to the amount of water available to each person in the future?
- a. it will increase
  - b. it will decrease
  - c. it will remain the same
  - d. it will become saltier
9. Which of the following areas receives the least amount of water per area per year?
- a. Kauai, Hawaii
  - b. Northern California
  - c. Northern Africa
  - d. Southern India
10. Although many people currently face water scarcity, it is estimated that by 2025,
- a. all nations will be able to provide clean water for their residents.
  - b. some people will not have access to clean water, but a smaller percentage than today.
  - c. about 40% of people will face water scarcity.
  - d. nearly half of people won't have enough water to meet their daily needs.
11. Pathogens include
- a. infectious bacteria
  - b. toxic chemicals
  - c. radioactive materials
  - d. all of these
12. Waterborne diseases are the leading cause of death
- a. nowhere ever.
  - b. in young children in many nations.
  - c. in people of all ages worldwide.
  - d. in people of all ages in many nations.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. No matter where you are in the world, if water comes out of a tap it is safe to drink.
- \_\_\_\_\_ 14. Many people in the world have no choice but to drink from the same polluted river where sewage is dumped.
- \_\_\_\_\_ 15. Getting rid of pathogens in contaminated water requires complicated, high-tech solutions.
- \_\_\_\_\_ 16. There is no sign of water scarcity today, but there could be in the future.
- \_\_\_\_\_ 17. Global warming has an effect on water supply.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. Other than drinking, the most important use of water is \_\_\_\_\_.
19. Nearly one quarter of the world's people have access to less water in a year than some people in the United States use in a \_\_\_\_\_.
20. Wars are now fought over energy, but someday they may be fought over \_\_\_\_\_.

21. The portion of the planet that is predicted to have the most serious water problems in 2024 is around the \_\_\_\_\_.
22. Deforestation keeps trees from returning water to the atmosphere by \_\_\_\_\_.
23. About 1.1 billion people, \_\_\_\_\_ of the entire population, does not have access to safe water.
24. Long periods with less rain than normal for a region are called \_\_\_\_\_.
25. Changes in rainfall patterns are predicted to occur in the future due to \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. The map of projected water scarcity in 2025 has a regions that are blue (little or to water scarcity), many nations that are brown (economic water scarcity) and a large swath of red (physical water scarcity). Describe in general what this means and the general attributes of nations in each of those three color?

27. How is global warming predicted to affect water distribution?

## 21.3 Water Pollution

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- The Gulf of Mexico oil spill began with
  - a ship running around on a rocky shoal.
  - a rig that cracked apart in a storm.
  - a rig explosion that killed 11 workers.
  - an onshore pipeline breaking apart.
- Booms placed on the ocean surface collect oil in which method of oil spill cleanup?
  - removal
  - dispersal
  - containment
  - sinkage
- During the spill, NOAA imposed a fishing ban on how much area of the Gulf region?
  - one-half
  - one-third
  - one-fourth
  - the whole region
- Coastal pollution is a big problem because
  - it can close beaches, which are important for recreation.
  - fish and shellfish that we rely on for food live in coastal areas.
  - people can become sick if they swim in contaminated coastal water.
  - all of these.
- Industrial pollutants include
  - radioactive substances.
  - chemicals.
  - heat.
  - all of these.
- Which method of dealing with the oil involves burning it?
  - removal
  - containment
  - dispersal
  - sinkage
- Dead zones are found mostly
  - off of industrialized areas in developed nations.

- b. in the Gulf of Mexico.
  - c. off of farming areas in developing nations.
  - d. none of these.
8. The Gulf of Mexico oil spill was difficult to deal with because
- a. the type of oil was especially viscous.
  - b. the leak was in very deep water.
  - c. the rig was very close to shore.
  - d. all of these.
9. Chemical dispersants
- a. can be used to break up and spread apart oil.
  - b. are the method recommended by scientists to deal with an oil spill.
  - c. are made of generally safe chemicals.
  - d. all of these.
10. The temperature of a lake may rise if the water is
- a. released from a reservoir.
  - b. used to cool a power plant.
  - c. exposed to oil drilling.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Water pollution contributes to water shortages by making some water sources unavailable for use.
- \_\_\_\_\_ 12. One way to reduce pollution from an oil spill is to burn the oil.
- \_\_\_\_\_ 13. Animal waste, and fertilizers can help bring important nutrients to nearby water sources with their run off.
- \_\_\_\_\_ 14. Water pollution includes any contaminant that gets into lakes, streams, and oceans.
- \_\_\_\_\_ 15. Factory farms pollute ocean water with animal wastes.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. Oil rigs are built in deeper water than ever because of the development of new \_\_\_\_\_ techniques.
17. A change in the temperature of a natural water body caused by human activity is called \_\_\_\_\_.
18. Pollutants from the Mississippi River create a region with little life called a(n) \_\_\_\_\_ in the Gulf of Mexico.
19. Oil from a spill may kill \_\_\_\_\_, which form the base of the ocean food chain.
20. Most ocean pollution comes from \_\_\_\_\_.
21. A potent neurotoxin found in San Francisco Bay is the heavy metal, \_\_\_\_\_.
22. Wastewater from septic tanks, sewers, and yards are part of \_\_\_\_\_ pollution.
23. A dead zone forms when there is little dissolved \_\_\_\_\_ in the water.

### Short Answer

Answer each question in the space provided.

24. Describe how a dead zone forms.

25. How did the Gulf of Mexico oil spill affect the people living in nearby regions?



## 21.4 Protecting the Water Supply

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Cleaning water pollutants in the ocean is difficult because
  - the ocean is so polluted
  - the ocean is cold
  - the ocean is so vast
  - the ocean is so deep
- In what year was the Clean Water Act passed?
  - 1972
  - 1977
  - 1982
  - 1987
- Contaminants in water that need to be treated include
  - bacteria, algae, viruses, and fungi
  - some elements
  - chemical pollutants
  - all of these
- Water purification
  - increases acidity
  - does not always produce water that is safe for drinking
  - removes all contaminants
  - none of these
- What can governments and international agencies do to prevent pollution and clean up the oceans?
  - pass laws
  - provide funding
  - enforce laws
  - all of the above
- In a wastewater treatment plant, water is treated
  - in one single process.
  - in a two-step process.
  - in multiple processes.
  - over several years.
- What was one goal of the Plan of Action of the 2002 Earth Summit?
  - To cut the number of people without access to safe drinking water by 2015 in half.

- b. To reduce to zero the number of people without access to safe drinking water by 2015.
  - c. To cut the number of people without access to safe drinking water by 2050 in half.
  - d. To reduce to zero the number of people without access to safe drinking water by 2050.
8. To discard motor oil
- a. put it in the storm sewers.
  - b. put it down the drain.
  - c. put it on the ground.
  - d. take it to an approved disposal facility.
9. The source of most ocean pollution is
- a. land
  - b. oil wells
  - c. marine organisms
  - d. ships at sea
10. Years after the Exxon Valdez oil spill
- a. the region was free of contaminants.
  - b. the rocks and sand beneath the beach surface were coated with oil.
  - c. there was oil coating all surfaces around the region.
  - d. oil continued to float along the surface of the water.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Clean Water Act sets standards for water quality for industry, agriculture, and domestic uses.
- \_\_\_\_\_ 12. Water purification adds iron and sulphur to the water to make it drinkable.
- \_\_\_\_\_ 13. It is easier to clean water that has become polluted than to keep it from becoming polluted.
- \_\_\_\_\_ 14. The goal of water treatment is to make water suitable for such uses as drinking water, medicine, agriculture, and water parks.
- \_\_\_\_\_ 15. Wastewater contains hundreds of contaminants.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

16. To protect water, it is necessary to pass \_\_\_\_\_.
17. \_\_\_\_\_ nations have few or no water treatment facilities.
18. \_\_\_\_\_ produces drinking water by removing organisms, elements and chemical pollutants.
19. \_\_\_\_\_ removes contaminants, such as solids and particles from wastewater.
20. Since passage of the \_\_\_\_\_ many wastewater treatment plants have been constructed. .
21. The acronym for the Environmental Protection Agency is \_\_\_\_\_.
22. The acronym for the National Oceanic and Atmospheric Administration is \_\_\_\_\_.
23. Water conservation will become more important as human population \_\_\_\_\_.

### Short Answer

*Answer each question in the space provided.*

24. What are some ways that you can conserve water in and around your home?

25. What does the clean water act give the Environmental Protection Agency the authority to do?

## 21.5 Human Actions and Earth's Waters

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Infectious organisms, such as bacteria or fungi, are called
  - a. pathogens
  - b. parasites
  - c. toxogens
  - d. diseasogens
2. People in some parts of the world cannot get enough clean water because
  - a. there is not enough water
  - b. they have no way to bring the water to the people
  - c. there is not enough money for treatment plants
  - d. all of these
3. Recreational activities account for what percent of water usage?
  - a. 1%
  - b. 5%
  - c. 30%
  - d. 45%
4. Scientists estimate that half of the world's population will not have enough water by what year?
  - a. 2015
  - b. 2020
  - c. 2025
  - d. 2030
5. Droughts
  - a. are entirely natural phenomena.
  - b. can be exacerbated by deforestation.
  - c. are increased by oil spills coating the water.
  - d. none of these.
6. How many people do not have access to safe water for drinking, hygiene, and domestic use?
  - a. 1.1 billion
  - b. 2.2 billion
  - c. 3.3 billion
  - d. 4.4 billion
7. What is the most widespread source of water contamination in developing countries?
  - a. municipal pollution

- b. agricultural pollution
  - c. raw sewage
  - d. industrial pollution
8. The percentage of people living with water scarcity globally is
- a. the same as it has been since 1995.
  - b. doubling each year.
  - c. decreasing as nations develop better water purification facilities.
  - d. none of these.
9. Recovery from the BP oil spill
- a. is complete.
  - b. is not over; more effects are being discovered.
  - c. was nearly complete after workers cleaned beaches and organisms.
  - d. is nearly done; there is just a bit of oil in beach sands.
10. Which of the following was harmed by the BP Oil Spill in 2010?
- a. endangered species
  - b. commercial fishing
  - c. tourism
  - d. all of the above

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Aquaculture is increasing human food resources.
- \_\_\_\_\_ 12. Aquatic organisms are extremely resistant to pollution.
- \_\_\_\_\_ 13. Thermal pollution can be harmful for aquatic organisms.
- \_\_\_\_\_ 14. The EPA has helped to improve water quality.
- \_\_\_\_\_ 15. Oil spills are well understood and easy to clean up.
- \_\_\_\_\_ 16. Many technologies are available to conserve water.
- \_\_\_\_\_ 17. Irrigation is only rarely used in agriculture today.
- \_\_\_\_\_ 18. Golf courses use very little water compared to other recreational activities.
- \_\_\_\_\_ 19. The winter snow pack of the Sierra Nevada mountains provides some of the water for California.
- \_\_\_\_\_ 20. Water is unevenly distributed around the world.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. \_\_\_\_\_ water use includes water that can be recycled and reused.
22. \_\_\_\_\_ water takes water out of the ecosystem.
23. \_\_\_\_\_ uses pipes and tubes to deliver small amounts of water directly to the soil at the roots of each plant or tree.
24. \_\_\_\_\_ occur when a region experiences usually low precipitation for months or years.
25. About \_\_\_\_\_ of all diseases are caused by drinking unsafe water.
26. A \_\_\_\_\_ is an area of hundreds of kilometers of ocean with fish or plant life.
27. \_\_\_\_\_ is any rise or fall in water temperature that is not weather related.

28. \_\_\_\_\_ removes contaminants, such as solids and particles, from sewage.
29. Drinking water is produced through the process of \_\_\_\_\_.
30. In the United States, the Clean Water Act gives the \_\_\_\_\_ the authority to set water quality standards.

**Short Answer**

*Answer each question in the space provided.*

31. What is the best way to have clean water (to keep it clean or to clean it once it's polluted)? How does society see to it that this happens?

32. What creates a dead zone?

33. Explain the methods for dealing with oil spills.

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CHAPTER **22** HS Human Actions and the  
Atmosphere Assessments

**Chapter Outline**

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- 22.1 AIR POLLUTION
  - 22.2 EFFECTS OF AIR POLLUTION
  - 22.3 REDUCING AIR POLLUTION
  - 22.4 HUMAN ACTIONS AND THE ATMOSPHERE
-

## 22.1 Air Pollution

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- 9 out of 10 of the smoggiest cities are in which state?
  - California
  - New York
  - Texas
  - Florida
- In the US, western cities experience more \_\_\_\_\_ pollution and eastern cities experience more \_\_\_\_\_ pollution
  - primary; secondary
  - tropospheric; stratospheric
  - secondary; primary
  - stratospheric; tropospheric
- Slash-and-burn is done primarily
  - for energy
  - to clear land for agriculture
  - to clear land for construction
  - none of these
- How many pollutants does the Clean Air Act regulate?
  - 100
  - 89
  - 189
  - 289
- How many tons of pollutants are entered into the atmosphere every year?
  - 1 million
  - 16 million
  - 90 million
  - 160 million
- Pollutants may collect
  - on the leeward side of mountain ranges.
  - in inversions.
  - when there is little wind.
  - all of these.
- Materials that are naturally occurring, but added to the atmosphere in abnormal quantities are known as



- a. pathogens
  - b. pollutants
  - c. carcinogens
  - d. spills
8. Smog that forms from a reaction with sunlight is known as
- a. photographic smog
  - b. photochemical smog
  - c. photosynthesized smog
  - d. photogenic smog
9. Pollutants remain over an area until they
- a. are transported away by wind
  - b. carried to the ground by rain or snow
  - c. transformed into other compounds
  - d. all of these
10. Nitrogen oxides
- a. form from chemical reactions in car exhaust in sunlight.
  - b. are greenhouse gases and contribute to acid rain.
  - c. are converted to a toxic form by bacteria.
  - d. all of these.
11. A lot of pollutants come from coal and petroleum
- a. whenever they are burned.
  - b. when they are pure.
  - c. when they burn incompletely.
  - d. none of these
12. The pollutants from biomass burning are much the same as from fossil fuel burning because
- a. biomass and fossil fuels are the same type of material in different forms
  - b. nearly all things burn to produce the same particles and gases
  - c. biomass is a type of fossil fuel
  - d. none of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Particulate pollution can reduce photosynthesis.
- \_\_\_\_\_ 14. Nearly half of air pollution in the US comes from transportation.
- \_\_\_\_\_ 15. Burning fossil fuels releases carbon dioxide into the atmosphere.
- \_\_\_\_\_ 16. The six most important pollutants regulated by the clean air act are ozone, particulates, sulfur dioxide, nitrogen dioxide, carbon dioxide and lead.
- \_\_\_\_\_ 17. Mercury is not toxic as a gas, but after bacteria convert it to methyl mercury.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The Clean Air Act was signed in the year \_\_\_\_\_ .
19. The carbon, nitrogen and sulfur oxides; particulates, lead and some organic compounds are \_\_\_\_\_-pollutants.

20. Once widely used in paint, gasoline and pipes, this pollutant causes brain damage and blood poisoning: \_\_\_\_\_ - \_\_\_\_\_ .
21. An odorless, colorless gas that is harmless in the atmosphere except as a greenhouse gas is \_\_\_\_\_ .
22. Burning coal and petroleum produces  $\text{SO}_2$ , which mixes with water in the to produce \_\_\_\_\_ .
23. \_\_\_\_\_ enter the atmosphere from volcanic eruptions, windblown dust, industry and vehicles .
24. Volatile organic compounds enter the atmosphere by \_\_\_\_\_ .
25. In an oxygen-poor environment, organic material decomposes to form the greenhouse gas \_\_\_\_\_ .

**Short Answer**

*Answer each question in the space provided.*

26. How does ozone pollution form? Where in the U.S. is it the most common?

27. If smoke from burning trees or dust blown in wind is natural, why is it considered a pollutant? What type of pollutant is it?

## 22.2 Effects of Air Pollution

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Particulates
  - a. increase asthma attacks.
  - b. significantly reduce rates of skin cancer.
  - c. are responsible for neurological diseases.
  - d. have no effect on human health.
2. 1% loss of ozone can increase skin cancer cases by what percent?
  - a. 1%
  - b. 6%
  - c. 9%
  - d. 12%
3. Because of pollution, people in the United States can see about \_\_\_\_\_ as far as they could see 200 years ago.
  - a. 100%
  - b. 55%
  - c. 20%
  - d. 0%
4. Ozone a pollutant in the \_\_\_\_\_, but beneficial in the \_\_\_\_\_.
  - a. stratosphere; thermosphere
  - b. thermosphere; troposphere
  - c. ionosphere; thermosphere
  - d. troposphere; stratosphere
5. Limestone buildings and sculptures are eroded primarily by which of the following?
  - a. UV radiation
  - b. acid rain
  - c. ozone pollution
  - d. CFCs
6. The phenomenon of pollutants adding up in an organism for life is known as
  - a. bioaccumulation
  - b. accumulation
  - c. bioaddition
  - d. biopollutants
7. Which fish species would typically contain the most mercury?

- a. krill
  - b. shark
  - c. trout
  - d. oyster
8. Which human-made chemical primarily breaks down ozone molecules?
- a. CFCs
  - b. NOs
  - c. TNT
  - d. NOAA
9. On the pH scale, 7 is \_\_\_\_\_; below 7 is \_\_\_\_\_; above 7 is \_\_\_\_\_.
- a. neutral; basic; acidic
  - b. pure acid; basic; acidic
  - c. neutral; acidic; basic
  - d. pure base; basic; acidic
10. When the pH of a lake drops below 4.5,
- a. fish cannot live
  - b. organic material cannot decay
  - c. wildlife populations decline
  - d. all of these
11. Acid rain is a problem
- a. directly below where it is created
  - b. far downwind from where it is created
  - c. everywhere
  - d. only in places where there is a lot of limestone
12. One single CFC molecule can destroy as many as \_\_\_\_\_ ozone molecules.
- a. 10
  - b. 1,000
  - c. 100,000
  - d. 10 million

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Lung cancer rates are increasing entirely because the numbers of smokers are increasing.
- \_\_\_\_\_ 14. Ozone loss near the North and South Poles is about the same.
- \_\_\_\_\_ 15. A small amount of air pollution has no effect on human health.
- \_\_\_\_\_ 16. Particulates reduce the amount of sunshine that reaches the ground.
- \_\_\_\_\_ 17. Acid rain is produced by nitrogen and sulfur-oxides in the atmosphere.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. High \_\_\_\_\_ levels increase asthma, lung disease and viral infections, such as the flu.
19. \_\_\_\_\_ occurs as the addition of toxic substance concentrations increase up the food web.
20. \_\_\_\_\_ has been a big problem in dissolving limestone structures.
21. Compounds that bioaccumulate are usually stored in the organism's \_\_\_\_\_.

22. Acid rain is neutralized by \_\_\_\_\_ rocks.

23. The ozone layer protects Earth surface from \_\_\_\_\_.

24. For ozone loss to occur, CFCs freeze onto nitric acid molecules in \_\_\_\_\_.

25. It is likely that the Mad Hatter was mad because he had \_\_\_\_\_ poisoning.

**Short Answer**

*Answer each question in the space provided.*

26. Describe how ozone breaks down beginning in the polar spring.

27. How does bioaccumulation of mercury occur?

## 22.3 Reducing Air Pollution

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A carbon tax
  - a. encourages people to behave in ways that reduce carbon emissions.
  - b. encourages conservation.
  - c. charges money for carbon emissions.
  - d. all of the above
2. A vehicle that runs on gasoline and electric power is known as
  - a. a hybrid vehicle
  - b. a combustible engine vehicle
  - c. an electric vehicle
  - d. a diesel vehicle
3. Catalytic converters
  - a. break down carbon dioxide into carbon monoxide and oxygen.
  - b. only work when they are hot.
  - c. reduce pollutants in autos to nearly zero.
  - d. all of these.
4. In 1985, the British Antarctic Survey found that ozone levels
  - a. over the South Pole were decreasing.
  - b. over both poles were increasing.
  - c. were lower over the poles, although they were stable.
  - d. none of these.
5. Removing carbon from the atmosphere is known as
  - a. carbon sequestration
  - b. carbon stealing
  - c. unpolluting
  - d. carbon burying
6. Since the passage of the Clean Air Act, emissions of the six major pollutants have decreased by how much?
  - a. 10%
  - b. 50%
  - c. 70%
  - d. 90%
7. To best develop alternative energy sources,
  - a. develop wind and solar everywhere.

- b. develop the appropriate source for a region.
  - c. nuclear is more useful than wind or solar.
  - d. give up and use fossil fuels.
8. The part on a car that speeds up chemical reactions and break down nitrous oxides are called
- a. fuel injector
  - b. fuel cell
  - c. catalytic converter
  - d. air intake
9. The system that gives monetary incentives to nations to develop emission reducing technologies
- a. trade-and-spend
  - b. spend-and-reduce
  - c. cap-and-trade
  - d. cap-and-reduce
10. In the process of gasification,
- a. coal is superheated to make syngas, filtered and then used.
  - b. a small amount of energy creates a large amount of clean energy.
  - c. biofuels are added to gasoline to create a cleaner fuel.
  - d. all of these.
11. The Montreal Protocol
- a. controls greenhouse gas emissions.
  - b. phases out the production of hazardous substances in developing nations and then in developed nations.
  - c. requires that more developed nations assist developing nations.
  - d. all of these.
12. An example of artificial carbon sequestration is carbon
- a. being stored by a forest.
  - b. being placed in salt layers or coal seams.
  - c. entering seawater.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. A fuel cell converts solar energy into electrical energy.
- \_\_\_\_\_ 14. Removing particles from emissions is a difficult process.
- \_\_\_\_\_ 15. Ozone destruction creates the ozone hole where the layer is dangerously thin.
- \_\_\_\_\_ 16. By doing nothing about climate change, we are doing something.
- \_\_\_\_\_ 17. Without the Montreal Protocol, there would have been a huge increase in skin cancer cases in the U.S.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A substance that increases (or decreases) the rate of a chemical reaction but is not used up in the reaction is called a(n) \_\_\_\_\_.
19. Carbon can be removed from the atmosphere through the process of \_\_\_\_\_.
20. Ethanol, fuel made from corn is a(n) \_\_\_\_\_.
21. To reduce pollutants, modern cars are equipped with a(n) \_\_\_\_\_.

22. A \_\_\_\_\_ converts chemical energy into electrical energy.
23. To encourage energy efficiency, people could be charged a(n) \_\_\_\_\_ when they emit carbon dioxide.
24. Trees in a forest store carbon dioxide. When the forest burns, the greenhouse gas \_\_\_\_\_.
25. Wild ideas about capturing carbon or putting a mirror into orbit to reflect sunlight are in the field of \_\_\_\_\_ - \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. How did the Montreal Protocol help the ozone layer?

27. Describe how artificial carbon capture and sequestration might work. Is this happening now?



## 22.4 Human Actions and the Atmosphere

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Pregnant women and young children should not eat much shark, pike, albacore and halibut because of
  - the possibility of lead poisoning.
  - bioaccumulation of mercury.
  - volatile organic compounds.
  - none of these.
- Which of the following is NOT a primary pollutant?
  - carbon dioxide
  - nitrogen oxide
  - sulfur dioxide
  - ozone
- When does the amount of photochemical smog peak?
  - dawn
  - midday
  - twilight
  - night
- Rain
  - is naturally acidic.
  - turns to acid rain from ozone in the troposphere.
  - has become more alkaline in some locations in recent decades.
  - all of these.
- Which pollutant reduces visibility?
  - ozone
  - oxides
  - particulates
  - none of these
- The effect of CFCs on stratospheric ozone was first discovered
  - from mathematical calculations.
  - by ozone measurements over Antarctica.
  - when temperatures began to rise.
  - when carbon dioxide levels began to rise.
- It is important to develop biofuels as an alternative energy source because they
  - have a greater net energy than other sources.

- b. can be used to power cars and trucks.
  - c. take no processes, just grow them and go.
  - d. all of these
8. Which of the following is NOT a possible effect of ozone loss?
- a. cataracts
  - b. skin cancer
  - c. reduced crop yields
  - d. respiratory illnesses
9. What reduces air pollutants from motor vehicles?
- a. muffler
  - b. fuel cell
  - c. catalytic converter
  - d. all of these
10. The effect of banning CFCs has been to
- a. increase the ozone hole
  - b. stabilize the ozone hole
  - c. eliminate the ozone hole
  - d. none of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. The energy from hydrogen fuel cells comes from breaking apart hydrogen.
- \_\_\_\_\_ 12. The Montreal Protocol banned ozone-destroying substances abruptly.
- \_\_\_\_\_ 13. Increased particles in the air could increase rainfall.
- \_\_\_\_\_ 14. Using food crops like corn for biofuels can increase food prices.
- \_\_\_\_\_ 15. The Clean Air Act regulates only six pollutants.
- \_\_\_\_\_ 16. Clean coal releases almost no greenhouse gases.
- \_\_\_\_\_ 17. Photochemical smog occurs most in hot, humid locations.
- \_\_\_\_\_ 18. The increase in motor vehicles in and around cities has increased ozone and other pollutants.
- \_\_\_\_\_ 19. Particulates reduce the amount of sunshine that can reach the ground.
- \_\_\_\_\_ 20. The asthma rate has been decreasing worldwide.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. Algae may be a better source of \_\_\_\_\_ than food crops like corn.
22. \_\_\_\_\_ provides a monetary incentive for nations to develop technologies that will reduce emissions.
23. A \_\_\_\_\_ is a financial method of trying to reduce carbon dioxide emissions.
24. To remove carbon dioxide from the atmosphere, you could plant trees. This is one method of \_\_\_\_\_.
25. \_\_\_\_\_ can cause brain damage or blood poisoning.
26. Nitrogen- and sulfur-oxides emitted from coal plants creates \_\_\_\_\_.
27. To clear land for farming, forests may be burned in a process known as \_\_\_\_\_.
28. \_\_\_\_\_ can occur naturally from volcanic eruptions or windblown dust.

29. \_\_\_\_\_ is a greenhouse gas that forms when organic material rots.

30. In the stratosphere, \_\_\_\_\_ screens out harmful ultraviolet radiation.

**Short Answer**

*Answer each question in the space provided.*

31. Why might algae be a better source of biofuels than corn or other food crops?

32. Explain what caused the ozone hole. What effect has the Montreal Protocol had on it?

33. What does the Clean Air Act do? What has been the result of its passage? Has it solved the problem it was meant to solve?

## CHAPTER

**23****HS Observing and  
Exploring Space Assessments****Chapter Outline**

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- 23.1**    **TELESCOPES**
  - 23.2**    **EARLY SPACE EXPLORATION**
  - 23.3**    **RECENT SPACE EXPLORATION**
  - 23.4**    **OBSERVING AND EXPLORING SPACE**
-

## 23.1 Telescopes

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A spectrometer can determine all of the following except
  - a. the temperature of the star.
  - b. the composition of the star
  - c. whether the star is moving towards or away from Earth.
  - d. the rotational speed of the star.
2. If you see a star that is 30,000 light years away, you are viewing it as it
  - a. appears right now
  - b. appeared 1 light year ago
  - c. appeared 30,000 years ago
  - d. appeared when it formed
3. If you wanted to view the stars in the night sky, would you use
  - a. an electron microscope
  - b. a refracting telescope
  - c. a magnifying glass
  - d. a radio telescope
4. The distance between two wave peaks is known as
  - a. frequency
  - b. amplitude
  - c. wavelength
  - d. voltage
5. What does a light year measure?
  - a. time
  - b. distance
  - c. luminosity
  - d. chemistry
6. An electromagnetic wave
  - a. has an electric field and a magnetic field.
  - b. oscillates between high and low energy values.
  - c. is visible to the human eye.
  - d. all of these
7. The \_\_\_\_\_ the wavelength, the \_\_\_\_\_ the frequency.
  - a. Longer; lower

- b. longer; higher
  - c. shorter; lower
  - d. none of these
8. What is the speed of light?
- a. 300,000,000 meters per second
  - b. 3,000,000 meters per second
  - c. 300 meters per second
  - d. 3,000,000,000 meters per second
9. Visible light is
- a. a small part of the electromagnetic spectrum.
  - b. the only light that humans can detect.
  - c. best for observing astronomical objects.
  - d. all of these
10. The faintest, most distance objects are observed as
- a. gamma rays
  - b. ultraviolet rays
  - c. visible light
  - d. radio waves
11. Space telescopes are important because they are
- a. less expensive to operate than land-based telescopes.
  - b. above most of the atmosphere, which gives them better access to starlight.
  - c. able to gather more types of waves than land-based telescopes.
  - d. simpler to use than land-based telescopes so more astronomers have access to them.
12. The Greeks knew that planets were different from stars because they
- a. are larger and brighter
  - b. move in the opposite direction
  - c. wander across the background of the other stars
  - d. are not included in any constellations

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Electromagnetic radiation energy that is transmitted through space as a photon.
- \_\_\_\_\_ 14. A light-years is the amount of light that reaches Earth in one year.
- \_\_\_\_\_ 15. Radio telescopes are linked together to observe the same object so that they can gather more data on that object.
- \_\_\_\_\_ 16. If you view the Andromeda Galaxy through a telescope, you are seeing it as it was 2.5 million years ago.
- \_\_\_\_\_ 17. SETI is the Search for Extra-Terrestrial Intelligence.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A pattern of stars in the sky is a(n) \_\_\_\_\_.
19. A high-energy band of the electromagnetic spectrum, \_\_\_\_\_, are useful in both astronomy and medicine.
20. A telescope that uses mirrors to collect and focus light is a(n) \_\_\_\_\_.

21. A(n) \_\_\_\_\_ can travel long distances due to its long wavelength.
22. A(n) \_\_\_\_\_ is a scientist who uses telescopes and other tools to study the universe.
23. Hubble, a \_\_\_\_\_ telescope, has been in orbit since 1990
24. Starlight can be broken into colors by a(n) \_\_\_\_\_.
25. The shortest wavelength, highest energy part of the electromagnetic spectrum is \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Make a simple diagram of the electromagnetic spectrum. Show higher and lower energy, longer and shorter wavelengths, infrared, x-rays, radio waves, visible light, and gamma rays.

27. What did Galileo observe with his (very primitive) telescope?

## 23.2 Early Space Exploration

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. Voyager 1 is the first human-made object to
  - a. leave Earth's orbit.
  - b. orbit the Sun.
  - c. fly by Pluto.
  - d. leave interstellar space.
2. An satellite with an orbit that is fixed above one location over Earth is known as what type of orbit?
  - a. polar
  - b. low earth orbit
  - c. high earth orbit
  - d. geostationary
3. Which of the following is one of Newton's Laws of Motion?
  - a. To every action, there is an equal and opposite reaction.
  - b. An object in motion will remain in motion forever and always.
  - c. Every object is attracted to every other object proportionately to its volume.
  - d. Gravity equals mass times the speed of light.
4. The reaction force that propels rockets into space is known as
  - a. friction
  - b. thrust
  - c. momentum
  - d. gravitational pull
5. What was the name of the first artificial satellite to orbit Earth?
  - a. Explorer
  - b. Apollo 11
  - c. Sputnik 1
  - d. Sputnik 9
6. The first satellite was launched in \_\_\_\_\_ and the first man stepped on the moon in \_\_\_\_\_, a difference of \_\_\_\_\_ years.
  - a. 1949; 1972; 23
  - b. 1953; 1968; 15
  - c. 1957; 1969; 12
  - d. 1971; 1979; 8
7. The purpose of using multiple stages in a rocket is to



- a. be able to take humans into space.
  - b. be able to orbit Earth.
  - c. reduce the rocket's weight in steps.
  - d. none of these.
8. An object can go into orbit because of the law of
- a. universal gravitation.
  - b. conservation of momentum.
  - c. angular momentum.
  - d. none of these.
9. Which two countries were involved in the space race?
- a. China India
  - b. U.S.A and U.S.S.R.
  - c. Brazil U.S.S.R.
  - d. U.S.A. U.K.
10. For a rocket to enter Earth orbit, it must be launched
- a. at the right speed.
  - b. from the right location.
  - c. straight up.
  - d. all of these.
11. The American president who committed the U.S. to being the first to land a man on the moon was
- a. John F. Kennedy
  - b. Jimmy Carter
  - c. Franklin D. Roosevelt
  - d. Harry Truman
12. The military, social and political conflict between the U.S. and the Soviet Union
- a. resulted in a large ground war.
  - b. was known as the Cold War.
  - c. was known as the Space Race.
  - d. led to World War II.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. The only two nations to put a human on the moon so far are the U.S. and China.
- \_\_\_\_\_ 14. A satellite is an object that orbits a smaller object.
- \_\_\_\_\_ 15. The mission to put a man on the Moon was Apollo 11.
- \_\_\_\_\_ 16. There are records showing rockets have been in existence since the 13th century.
- \_\_\_\_\_ 17. Newton's Third Law of Motion helps explain how a rocket will travel in space.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The first living creature in space was a(n) \_\_\_\_\_ .
19. Satellites that orbit relatively close to Earth are in a(n) \_\_\_\_\_.
20. A \_\_\_\_\_ is an unmanned spacecraft that collects data on objects in space.
21. The path a satellite takes around an object is its \_\_\_\_\_.

22. Force equals mass times \_\_\_\_\_.
23. The launch of the spacecraft \_\_\_\_\_ by the country \_\_\_\_\_ ignited the Space Race.
24. We can only be connected by mobile phones because we have \_\_\_\_\_.
25. If you wanted to keep an eye on the weather of a particular region on Earth, you would put a satellite in a \_\_\_\_\_ orbit.

**Short Answer**

*Answer each question in the space provided.*

26. How does a rocket move through the vacuum of space?

27. How did the conflict between the U.S. and the U.S.S.R. lead to Neal Armstrong's step on the Moon?

## 23.3 Recent Space Exploration

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- How many Space Shuttle disasters have there been?
  - 0
  - 1
  - 2
  - 4
- The International Space Station has had people on board since \_\_\_\_\_, and it is \_\_\_\_\_.
  - 1969; is joint project between the US and USSR/Russia.
  - 1989; is solely a US spacecraft.
  - 2000; is a joint project between several nations.
  - 2008; solely a Russian spacecraft.
- Skylab was launched in \_\_\_\_\_, and it was \_\_\_\_\_.
  - 1971; the first space station
  - 1969; a launch pad for the Apollo missions
  - 1973; the first American space station
  - 1979; an international project between the US and the USSR
- One major focus of space exploration currently is
  - putting humans back on the Moon.
  - sending a team to Mars and back.
  - chemical study of the rocks of Venus.
  - seeking places that might once have been hospitable to life.
- Which planet currently has rovers on it?
  - Jupiter
  - Mars
  - Mercury
  - Venus
- A space station is
  - launched and constructed in pieces.
  - designed for defense purposes.
  - home to astronauts from one country at a time.
  - none of these.
- What features make a space shuttle unique?
  - It can explore the inner solar system.

- b. It can haul cargo into space.
  - c. It can fly like an airplane.
  - d. It can land on the moon and return.
8. If you want to see what happened to a lake before and after a hurricane, you would use
- a. geospatial satellites.
  - b. Landsat images.
  - c. rovers.
  - d. none of these.
9. A space station in orbit is powered by
- a. nuclear energy.
  - b. fossil fuels.
  - c. solar energy.
  - d. all of these.
10. Smaller solar system objects, like asteroids, may give us clues as to
- a. how the solar system formed.
  - b. what planets are made of.
  - c. when the solar system formed.
  - d. all of these.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. One purpose of the International Space Station is to conduct medical research.
- \_\_\_\_\_ 12. The booster rockets attached to the space shuttle are the only part of the space shuttle that are not reusable.
- \_\_\_\_\_ 13. Although astronomers have attempted, they have yet to place a satellite that can orbit at the same rate that Earth spins.
- \_\_\_\_\_ 14. Mir is the Russian space center.
- \_\_\_\_\_ 15. The record for one crew inhabiting a space station is ten years.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

16. Besides studying other solar system bodies, NASA satellites keep an eye on planet \_\_\_\_\_.
17. If you wanted to live for several months in space, you would try to get aboard a(n) \_\_\_\_\_.
18. The space shuttle launched from \_\_\_\_\_, but landed in one of several places.
19. The part of the space shuttle that comes back to Earth with astronauts aboard is the \_\_\_\_\_.
20. A space shuttle takes off like a(n) \_\_\_\_\_ and lands like a \_\_\_\_\_.
21. Humans are currently in orbit around Earth in the \_\_\_\_\_.
22. Besides Earth, the planet we know the most about is \_\_\_\_\_.
23. Looking for conditions that might have allowed microbial life, the Curiosity \_\_\_\_\_ vehicle explores the planet \_\_\_\_\_.

### Short Answer

*Answer each question in the space provided.*

24. What caused the accidents that brought down two space shuttles and killed their crews?

25. Why are satellites important for understanding changes on Earth? Give an example.

## 23.4 Observing and Exploring Space

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- How long does it take sunlight to get from the Sun to Earth?
  - 8 seconds
  - 8 minutes
  - 8 hours
  - 8 days
- After the sun, which star is closest to us?
  - Sirius
  - Polaris
  - Betelgeuse
  - Proxima Centauri
- The distance between two adjacent oscillations is called a(n) . . .
  - wavelength
  - frequency
  - amplitudes
  - crest
- Which telescopes are best for the viewing the surface of Earth's moon or the rings of Saturn?
  - refracting telescope
  - reflecting telescope
  - radio telescope
  - none of the above
- Who created the first reflecting telescope?
  - Galileo
  - Sir Isaac Newton
  - Hermann Oberth
  - John Herschel
- With his first telescope, Galileo could see
  - stars outside our galaxy.
  - the orbiting moons of Mars.
  - sunspots.
  - all of these
- The United States space program has
  - spacecraft out beyond the edges of the solar system.

- b. rovers on Mars.
  - c. satellites around the inner planets.
  - d. all of these.
8. Satellite studying Earth can tell us
- a. how Earth systems affect one another.
  - b. what the weather will be like in a region
  - c. how the planet changes over time.
  - d. all of these.
9. The rover, Curiosity, is
- a. studying Mars to see if conditions were once favorable to life.
  - b. passing out of the solar system into interstellar space.
  - c. going to be the first craft to land on the moon in more than three decades.
  - d. in the atmosphere of Venus to learn about greenhouse effect.
10. Which type of orbit are most weather satellites put in?
- a. geostationary
  - b. low earth
  - c. high earth
  - d. none of these

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. The galaxy we live in, the Milky Way, is about 100,000 light years across.
- \_\_\_\_\_ 12. Visible light is a large part of the electromagnetic spectrum.
- \_\_\_\_\_ 13. Very hot stars emit light primarily in the ultraviolet wavelength.
- \_\_\_\_\_ 14. The earliest telescopes were refracting telescopes.
- \_\_\_\_\_ 15. The United States launched Sputnik on October 4, 1957.
- \_\_\_\_\_ 16. President Truman established NASA.
- \_\_\_\_\_ 17. All five space shuttles performed many missions and returned to Earth safely.
- \_\_\_\_\_ 18. Mir and the International Space Station housed scientists from the US, Russia and elsewhere.
- \_\_\_\_\_ 19. Early space exploration was driven by cooperation between the United States and the USSR.
- \_\_\_\_\_ 20. The Space Shuttle program ended in 2011.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. Light is one type of \_\_\_\_\_ energy that is transmitted through space as a wave.
22. A(n) \_\_\_\_\_ is a unit of distance that is defined as the distance that light travels in one year.
23. \_\_\_\_\_ measures the number of wavelengths that pass a given point every second.
24. Radio telescopes collect and focus \_\_\_\_\_.
25. Bright and odd bodies that wander across the night sky were called \_\_\_\_\_ by the ancient Greeks.
26. \_\_\_\_\_ are patterns of stars in the sky.
27. A(n) \_\_\_\_\_ is any object that orbits a larger object.
28. Astronaut Neal Armstrong was the first human to step on the moon. It happened in July of \_\_\_\_\_.

29. A \_\_\_\_\_ is an unmanned spacecraft that is sent to collect data by flying near or landing on an object in space.

30. The Cassini mission has been studying the planet \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

31. What are the limitations of Earth-based telescopes?

32. What are the advantages of a reflecting telescope?

33. What can an astronomer learn from the spectrum of a star?



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CHAPTER **24** **HS Earth, Moon, and Sun Assessments**

**Chapter Outline**

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- 24.1 PLANET EARTH
  - 24.2 EARTH'S MOON
  - 24.3 THE SUN
  - 24.4 THE SUN AND THE EARTH-MOON SYSTEM
  - 24.5 EARTH, MOON, AND SUN
-

## 24.1 Planet Earth

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- An imaginary line running through the poles of Earth is called
  - orbit
  - pole
  - magnetic pole
  - axis
- At what speed does Earth revolve around the Sun?
  - 17 miles per second
  - 17 miles per hour
  - 1 mile per 17 seconds
  - 17 miles per day
- Earth is divided into hemispheres, how many are there?
  - 2
  - 4
  - 6
  - 8
- How long does it take the Earth to make one rotation on its axis?
  - one day
  - one month
  - one year
  - one week
- How many degrees does the Earth turn in one day?
  - 90 degrees
  - 180 degrees
  - 360 degrees
  - 1080 degrees
- One revolution of Earth is equal to what time span?
  - 1 day
  - 1 month
  - 1 year
  - 1 decade
- What causes Earth's seasons?
  - it's rotation

- b. it's tilt
- c. it's revolution
- d. it's orbit

8. What is the shape of Earth?

- a. a sphere
- b. a sphere that bulges a bit at the poles
- c. a sphere that bulges a bit at the equator
- d. an egg

9. Earth's magnetic field is due to

- a. the convection of metal in Earth's inner core
- b. a bar magnet that is lodged between the magnetic poles
- c. the force of the Sun's magnetic field
- d. none of these

10. As Earth orbits the Sun it moves

- a. at the same speed all the time
- b. slower at aphelion and faster at perihelion
- c. faster at aphelion and slower at perihelion
- d. faster at sunspot maximum and slower at minimum

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Earth's orbit around the Sun is highly elliptical.
- \_\_\_\_\_ 12. We need to have leap year because Earth takes slightly more than 365 days to orbit the Sun.
- \_\_\_\_\_ 13. Earth's shape is called an oblate spheroid.
- \_\_\_\_\_ 14. The ancient Greeks knew that Earth was round.
- \_\_\_\_\_ 15. The Earth's crust is made up of about 75% iron which produces strong magnetic fields.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. The portion of Earth between the equator and the South Pole is called the \_\_\_\_\_
17. Like Earth, the other planets of the solar system are \_\_\_\_\_
18. A(n) \_\_\_\_\_ is the division of a sphere into halves.
19. One \_\_\_\_\_ of earth is equal to one day.
20. Earth's path around the sun is in the shape of a(n) \_\_\_\_\_ .
21. The part of Earth that tilts toward the Sun in Southern Hemisphere summer is \_\_\_\_\_
22.  $23\frac{1}{2}^\circ$  is Earth's \_\_\_\_\_
23. Earth makes one complete journey around the Sun in \_\_\_\_\_ days.

### Short Answer

Answer each question in the space provided.

24. How does Foucault's pendulum show that Earth rotates on its axis?

25. What two lines of evidence that Earth is spherical did people have before spacecraft?

## 24.2 Earth's Moon

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- How hot does the Moon get during the day?
  - 90°F
  - 121°F
  - 197°F
  - 225°F
- How long does it take for the Moon to orbit Earth?
  - 1 day
  - 7.4 days
  - 19.2 days
  - 27.3 days
- The thickness of the Moon's crust is \_\_\_\_\_ on the near side and \_\_\_\_\_ on the far side.
  - 60 km, 100 km
  - 100 km, 100 km
  - 60 km, 60 km
  - 100 km, 60 km
- The dark areas on the Moon are referred to as "seas" because they are
  - ancient dried lake beds
  - dried ocean basins
  - basalt lavas
  - seawater
- The lighter areas that can be seen on the Moon are called what?
  - maria
  - LOE
  - basins
  - terrae
- What is the most dominant feature on the surface of the Moon?
  - volcanoes
  - craters
  - river basins
  - fault lines
- Plate tectonics on the Moon
  - is very similar to plate tectonics on Earth

- b. ended very early in Earth history
  - c. is more rapid than on Earth
  - d. is nonexistent
8. What was happening on the Moon between about 3.0 to 3.5 billion years ago?
- a. volcanic activity due to plate tectonics
  - b. tremendous flooding
  - c. bombardment by meteorites
  - d. alien colonizations
9. Lunar temperatures are more extreme than Earth's because the Moon
- a. is closer to the Sun
  - b. rotates faster on its axis
  - c. doesn't have an atmosphere
  - d. has higher internal heat
10. Regarding their chemical composition, the Moon's crust and mantle are
- a. uniform in composition
  - b. very similar to Earth's crust and mantle
  - c. much more rich in lighter minerals
  - d. much more rich in darker minerals

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. The Moon is the Earth's only natural satellite.
- \_\_\_\_\_ 12. Most of the maria are on the Moon's near side.
- \_\_\_\_\_ 13. The Moon has recorded some of the coldest temperatures in the entire solar system.
- \_\_\_\_\_ 14. There is no evidence of volcanic activities on the Moon, which explains why there are no mountain ranges on it.
- \_\_\_\_\_ 15. The Moon's internal structure is like Earth's the layers are just smaller.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. A smaller body that moves around a larger body in space is a(n) \_\_\_\_\_
17. Since the Moon's gravity is one-sixth Earth's, an astronaut could jump \_\_\_\_\_ times as high on the Moon.
18. A(n) \_\_\_\_\_ results from meteorite impacts on the surface of an object.
19. The lunar highlands are called \_\_\_\_\_.
20. The minerals of the terrae crystallized out of a(n) \_\_\_\_\_.
21. The dominant elements found in the Moon's crust are magnesium, aluminum, oxygen and \_\_\_\_\_.
22. The lunar crust is composed primarily of \_\_\_\_\_ rocks.
23. The Moon's mantle is made primarily of the minerals orthopyroxene and \_\_\_\_\_

### Short Answer

Answer each question in the space provided.

24. What is the Moon's far side and why does it have one?

25. Describe the highlands and lowlands on the Moon and what made them that way.

## 24.3 The Sun

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. About how long does it take sunlight to reach the Earth?
  - a. 8 seconds
  - b. 8 minutes
  - c. 8 hours
  - d. 8 days
2. How is helium made in the Sun's core?
  - a. nuclear fission
  - b. friction
  - c. nuclear fusion
  - d. decomposition
3. How long can solar prominences last?
  - a. up to 5 hours
  - b. up to 3 days
  - c. up to 8 days
  - d. up to several months
4. In the solar system, what percent of the mass is the Sun?
  - a. 50.3%
  - b. 67.8%
  - c. 94%
  - d. 99.8%
5. During a solar eclipse the part of the Sun that shows beyond the Moon is the
  - a. corona
  - b. photosphere
  - c. radiative zone
  - d. prominence zone
6. The Sun's central core is
  - a. plasma
  - b. molten metal
  - c. molten rock
  - d. photons
7. Which layer heats back up to 2 to 5 million°C
  - a. core



- b. corona
  - c. chromosphere
  - d. photosphere
8. Which layer of the Sun contains photons that move extremely slow?
- a. corona
  - b. core
  - c. radiative zone
  - d. convection zone
9. Most atoms in the Sun exist as
- a. photons
  - b. plasma
  - c. light
  - d. silicate minerals
10. The energy that powers the Sun comes from
- a. hydrogen fusing to form helium
  - b. radioactivity
  - c. helium fusing into heavier elements
  - d. nuclear fission
11. Where loops of the Sun's magnetic field disrupt the Sun's heat, there are
- a. solar flares
  - b. solar prominences
  - c. sunspots
  - d. solar winds
12. Hot material rises and then plunges back downward in the
- a. radiative zone
  - b. corona
  - c. convective zone
  - d. chromosphere

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Because of the extensive heat, the energy released in the core travels rapidly through the radiative zone.
- \_\_\_\_\_ 14. A solar flare can knock out power grids on Earth.
- \_\_\_\_\_ 15. The Sun has by far, the greatest mass in the solar system.
- \_\_\_\_\_ 16. The layers of the Sun are unidentifiable, because the Sun is not a solid.
- \_\_\_\_\_ 17. Plasma is a solid.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A(n) \_\_\_\_\_ is a plasma loop flowing between sunspots.
19. Energy moves from atom to atom as electromagnetic waves in the \_\_\_\_\_ of the Sun.
20. The \_\_\_\_\_ is the visible surface of the Sun.
21. Energy moves as flowing cells of gas in the \_\_\_\_\_ of the Sun.
22. \_\_\_\_\_ is matter where the electrons are stripped away from the atoms.



## 24.4 The Sun and the Earth-Moon System

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- At what tilt of Earth would the seasons be most extreme at the poles?
  - 0 degrees
  - 25 degrees
  - 55 degrees
  - 90 degrees
- In which month does the summer solstice occur?
  - January
  - December
  - July
  - June
- The Sun moves which way across the sky?
  - North to South
  - West to East
  - East to West
  - South to North
- Two times during the year, the Sun is directly over the equator. What are these times called?
  - equinoxes
  - solstices
  - eclipses
  - capricorn and cancer
- What are the two distinct parts of Earth's shadow during a solar eclipse?
  - light and dark
  - umbra and penumbra
  - panera and umbrella
  - inner and outer
- If the Moon is more than half lit, but the left side is unlit, the phase is
  - first quarter
  - waxing gibbous
  - waning gibbous
  - last quarter
- When the Earth and Sun are in line but the Moon is perpendicular to the Earth, what type of tide occurs?
  - neap tide

- b. spring tide
  - c. null tide
  - d. waning tide
8. When the full moon moves through Earth's shadow, what occurs?
- a. solar eclipse
  - b. high tide
  - c. low tide
  - d. lunar eclipse
9. Summer days are longer and nights are shorter
- a. everywhere on Earth
  - b. most distinctly toward the poles
  - c. most distinctly at the equator
  - d. none of these
10. You know that Earth is not closer to the Sun in the summer because
- a. it is winter in the Southern Hemisphere.
  - b. it is summer in the Southern Hemisphere.
  - c. Earth is always the same distance from the Sun.
  - d. none of these.
11. A lunar eclipses lasts for
- a. hours as the Moon passes through Earth's penumbra.
  - b. minutes as the Moon passes through Earth's shadow.
  - c. hours as the Moon passes through Earth's umbra.
  - d. none of these.
12. The Sun's effect on tides is smaller because
- a. being gaseous the Sun has a smaller gravitational pull
  - b. the Moon is so much larger
  - c. the Sun is so much farther away
  - d. the Sun's effect is cancelled out by the Moons.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. A lunar eclipse generally lasts between 5-10 minutes.
- \_\_\_\_\_ 14. Birds may become confused during a lunar eclipse and think that it is nighttime.
- \_\_\_\_\_ 15. Earth's rotation means that there is a cycle of daylight and darkness approximately every 24 hours.
- \_\_\_\_\_ 16 The seasons are caused by the tilt of Earth's axis of rotation relative to its plane of orbit around the Moon.
- \_\_\_\_\_ 17. A shadow on the Earth and blocks Earth's view of the Sun during a solar eclipse.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

18. A(n) \_\_\_\_\_ moon is when the moon is 51 –99% full.
19. A(n) \_\_\_\_\_ is the outer part of the shadow that remains partially lit during an eclipse.
20. A(n) \_\_\_\_\_ is when the Moon falls into the shadow of the Earth.
21. The amount of time it takes for Earth to rotate once on its axis is \_\_\_\_\_

22. When the Moon is half lit we call it a \_\_\_\_\_ moon.
23. If the Moon is between Earth and Sun and the nearside is dark, it is a(n) \_\_\_\_\_
24. The moon is less than half lit during its \_\_\_\_\_ phase.
25. The time between two full moon phases is \_\_\_\_\_ .

**Short Answer**

*Answer each question in the space provided.*

26. Describe the positions of the Sun and Moon during spring tides. Describe what happens to water levels during spring tides.

27. Imagine that you live along the Tropic of Cancer. What is the position of your home relative to the Sun at summer solstice, winter solstice and at the equinoxes? Talk about this in terms of Earth's tilt.

## 24.5 Earth, Moon, and Sun

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Which of the following is the actual shape of the Earth?
  - spherical
  - oblate spheroid
  - egg-shaped
  - oval
- The spinning motion of Earth on its \_\_\_\_\_, which creates an Earth \_\_\_\_\_.
  - rotation; year
  - revolution; day
  - rotation; day
  - revolution; year
- Why does the Earth have seasons?
  - its tilt
  - its elliptical orbit
  - its rotation
  - its magnetic field
- The weather on the Moon is
  - extremely hot, but calm.
  - variable.
  - hot and cold, and stormy.
  - nonexistent.
- Water on the Moon is found as
  - vapor in the atmosphere
  - liquid in soil
  - ice in deep craters
  - vapor, liquid and ice like on Earth
- We only see one side of the Moon because
  - when the far side faces us it is a new moon and it is dark.
  - the far side faces us only at night.
  - one rotation and one revolution take the same amount of time.
  - none of these
- What is the visible surface of the sun?
  - photosphere

- b. chromosphere
  - c. corona
  - d. none of the above
8. The convection of molten metal in Earth's outer core results in
- a. plate tectonic motions
  - b. volcanism
  - c. the auroras
  - d. the magnetic field
9. Solar flares
- a. they release large amounts of radiation.
  - b. can knock out entire power grids.
  - c. can knock out communications.
  - d. All of the above.
10. The geology of the Moon can be described as
- a. light colored minerals that crystallized from a magma ocean.
  - b. dark colored basalts that erupted from magma produced by mantle convection.
  - c. craters formed from volcanic eruptions.
  - d. all of these.

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. Earth's magnetic field acts like a giant bar magnet.
- \_\_\_\_\_ 12. Earth's orbital path is an ellipse.
- \_\_\_\_\_ 13. Earth's orbit causes its seasons.
- \_\_\_\_\_ 14. The Moon is Earth's only natural satellite.
- \_\_\_\_\_ 15. The chromosphere is much hotter than the photosphere.
- \_\_\_\_\_ 16. Solar prominences are only visible during a total eclipse.
- \_\_\_\_\_ 17. The summer solstice occurs on July 21.
- \_\_\_\_\_ 18. A lunar eclipse occurs when a full moon moves through the Earth's shadow.
- \_\_\_\_\_ 19. Flat areas of basaltic rock are characteristic of the terrae areas of the Moon.
- \_\_\_\_\_ 20. During the crescent moon phase, the moon is seen as a sliver.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. The closest the Earth gets to the sun each year is called the \_\_\_\_\_ on about January 3rd and the farthest is called the \_\_\_\_\_ on July 4th.
22. The Moon's surface has been altered tremendously by the \_\_\_\_\_ left by meteorite impacts.
23. The lunar maria is made of \_\_\_\_\_.
24. The fourth state of matter made up of superheated gas with a positive electrical charge is called \_\_\_\_\_.
25. \_\_\_\_\_ are cooler, darker areas on the Sun.
26. \_\_\_\_\_ are violent eruptions that release huge amounts of energy.
27. \_\_\_\_\_ are areas that occur when an object obstructs a light source so that the darkness takes the shape of the object.





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CHAPTER **25**

# HS The Solar System Assessments

## Chapter Outline

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- 25.1 INTRODUCTION TO THE SOLAR SYSTEM
  - 25.2 INNER PLANETS
  - 25.3 OUTER PLANETS
  - 25.4 OTHER OBJECTS IN THE SOLAR SYSTEM
  - 25.5 THE SOLAR SYSTEM
-

## 25.1 Introduction to the Solar System

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- In the geocentric model of the universe objects in the sky are
  - in layered spheres with the Sun at the center
  - attached to the stars of the firmament
  - making elliptical orbits around Earth
  - in layered spheres with the Sun in the fourth sphere
- Viewed from Earth the planets move
  - in the same direction as the stars
  - sometimes with and sometimes opposite the stars
  - some with and some against the stars
  - in a circular motion
- The first evidence that objects could orbit something besides Earth came from observations of
  - the Galilean moons.
  - Saturn's rings.
  - the phases of Venus.
  - planetary epicycles.
- The heliocentric model of the solar system was
  - invented by Aristotle and other Greek philosophers.
  - described by Copernicus and supported by Galileo.
  - invented by Galileo.
  - invented by Ptolemy and supported by Aristotle.
- Extrasolar planets are found by
  - detecting the star's radial velocity due to the planet's gravitational pull.
  - a temporary, periodic dimming in the star's brightness as the planet moves in front of it.
  - direct imaging
  - all of these
- Why is a day on Mercury equal to 57 Earth days?
  - Mercury rotates very slowly on its axis
  - Mercury revolves very slowly around the Sun
  - Venus has a gravitational pull on Mercury
  - On Mercury, the time for one revolution is the same as for one rotation
- The force of gravity between objects depends on their \_\_\_\_\_ and \_\_\_\_\_
  - volume; their acceleration

- b. mass; the distance between them
  - c. size; their gravitational potential energy
  - d. density; kinetic energy
8. Galileo's discovery that Venus has phases was important because it provided evidence that Venus
- a. orbits the Sun
  - b. orbits Earth
  - c. has at least one moon
  - d. orbits the Sun more quickly than does Earth
9. Features of the solar system include that
- a. all planets lie in the same plane
  - b. most planets orbit the Sun in the same direction
  - c. all planets rotate in the same direction
  - d. all of these
10. Material in the nebula was drawn together by gravity, which released \_\_\_\_\_ energy; small particles collided to create large particles, which released \_\_\_\_\_ energy.
- a. gravitational; potential
  - b. gravitational potential; potential
  - c. gravitational potential; kinetic
  - d. gravitational; kinetic
11. The cloud that was the nebula began to spin as it collapsed due to
- a. gravity
  - b. gravitational potential energy
  - c. angular momentum
  - d. kinetic energy
12. The inner planets and outer planets are, in order from the Sun
- a. inner: Venus, Mercury, Mars, Earth; outer: Saturn, Jupiter, Neptune, Uranus
  - b. inner: Mars, Venus, Earth, Mercury; outer: Saturn, Uranus, Jupiter, Neptune
  - c. inner: Earth, Mercury, Venus, Mars; outer: Saturn, Uranus, Neptune, Jupiter
  - d. inner: Mercury, Venus, Earth, Mars; outer: Jupiter, Saturn, Uranus, Neptune

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. If you know a planet's orbit you can determine its distance from the Sun.
- \_\_\_\_\_ 14. Copernicus' model has a problem because he thought that the planets moved in circular orbits.
- \_\_\_\_\_ 15. The orbits of the planets are quite elliptical.
- \_\_\_\_\_ 16. One astronomical unit is the distance from Earth to Sun, or 150 million km.
- \_\_\_\_\_ 17. All of the planets in the solar system rotate in the same direction.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The widely accepted explanation for how the solar system formed is the \_\_\_\_\_.
19. We currently accept the \_\_\_\_\_ model of the universe.
20. After the Sun, the largest object in the solar system is \_\_\_\_\_.
21. Ptolemy thought that the \_\_\_\_\_ was at the center of the universe.

22. As of 2006, Pluto has been classified as a(n) \_\_\_\_\_.
23. To form the planets, gravity brought together clumps of matter to make \_\_\_\_\_.
24. The axis of rotation for all of the planets is roughly \_\_\_\_\_ to the orbital plane.
25. The oldest moon rocks are \_\_\_\_\_ years old.

**Short Answer**

*Answer each question in the space provided.*

26. What is the composition of the outer versus the inner planets? Why is this the case?

27. How did the Sun form the solar nebula?

## 25.2 Inner Planets

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- A day is
  - the time it takes for a planet to rotate once on its axis
  - the time it takes for Earth to rotate once on its axis
  - the time it takes for a planet to go around the Sun once
  - the time it takes for the Sun to rotate once on its axis
- Why does Mars appear red?
  - blood from many Martian wars
  - iron oxide in the soil
  - lava flowing across the surface
  - large storms
- The number of impact craters on Mercury means that the planet is
  - too close to the Sun to be hit much by meteorites
  - continually being resurfaced by volcanism
  - not geologically active
  - subject to constant storms
- Olympus Mons, the largest volcano in the solar system, is on the planet \_\_\_\_\_ and is a \_\_\_\_\_-volcano.
  - Mars; composite
  - Mars; shield
  - Venus; composite
  - Venus; shield
- Regarding life on the inner planets:
  - Earth has a lot of biodiversity
  - Venus is thought to have microbes beneath its thick atmosphere
  - Mars has fossil microbes so life existed there at some time
  - all of these
- Why is Venus the hottest planet?
  - It is closest to the Sun
  - It has a powerful greenhouse effect.
  - It has the most internal heat
  - It spins the fastest.
- Large volcanoes surrounded by plains of lava describes the surface of

- a. Mercury
  - b. Venus
  - c. Earth
  - d. Mars
8. Which planet has an atmosphere that is thin, mostly carbon dioxide, but with only a small greenhouse effect?
- a. Mercury
  - b. Venus
  - c. Earth
  - d. Mars
9. What is the atmosphere of Venus made of?
- a. nitrogen and oxygen, with some carbon dioxide
  - b. sulfur dioxide and methane
  - c. carbon dioxide, with some sulfur dioxide
  - d. methane and ammonia
10. How can planetary scientists tell that volcanoes on a planet are caused by plate tectonics?
- a. They are covered by lots of craters.
  - b. They are very large and tall.
  - c. They line up like at plate boundaries.
  - d. none of these
11. Evidence for liquid water in the Martian past include
- a. water-eroded canyons
  - b. crystals known to precipitate from water
  - c. the presence of polar ice currently
  - d. all of these
12. Regarding the atmosphere of the inner planets
- a. Earth has the most greenhouse effect
  - b. Mars has the thickest
  - c. Venus and Mercury are very similar
  - d. none of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. All of the inner planets were geologically active at some time in their history.
- \_\_\_\_\_ 14. It takes Earth 365.24 days to orbit the Sun.
- \_\_\_\_\_ 15. Besides Earth, the only inner planet with a large moon is Venus.
- \_\_\_\_\_ 16. Except Earth, the inner planets are all solid throughout.
- \_\_\_\_\_ 17. The inner planets spin faster and have shorter orbits around the Sun than the outer planets.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. One \_\_\_\_\_ equals one rotation of the Earth on its axis.
19. The main rock type of the inner planets is \_\_\_\_\_.
20. The deepest canyon in the solar system is on the planet \_\_\_\_\_.
21. Because the planets nearest the Sun are rocky, they are called the \_\_\_\_\_ planets.

22. The planet most similar to Earth in size and density is \_\_\_\_\_.
23. The planet in our sky that rises and sets very near to the Sun is \_\_\_\_\_.
24. The planet with the most volcanoes is \_\_\_\_\_.
25. Mercury has \_\_\_\_\_ (short, long) days and (short, long) years.

**Short Answer**

*Answer each question in the space provided.*

26. If humans wanted to build a colony on another planet, which should they choose and why?

27. Venus has a small number of impact craters. Mars has more than Earth but less than the Moon. What does this mean about the geologic processes of each of these four planetary bodies?

## 25.3 Outer Planets

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- How long does it take Jupiter to revolve around the Sun?
  - 1 Earth year
  - 5 Earth years
  - 9 Earth years
  - 12 Earth years
- How long does it take light from the Sun to reach Uranus?
  - 5 days
  - 1 minute
  - 2 hours and 40 minutes
  - 3 days and 4 hours
- When Galileo looked through his telescope he saw
  - four moon of Jupiter
  - four moons of Saturn
  - Neptune and Uranus' rings
  - all of these
- Europa seems to be liquid beneath its surface ice because it is heated by
  - radioactive decay.
  - its molten core.
  - the Sun.
  - the intense gravitational pull of Jupiter.
- What explains the existence of Saturn's rings?
  - They are ice that has been flung out from the planet.
  - They are material from a moon that broke into pieces.
  - They are rocks that have been flung out from the planet.
  - No one has any idea.
- What is the Giant Red Spot?
  - A giant storm on Jupiter
  - Mars
  - A an enormous volcano on Neptune
  - The outermost ring on Saturn
- Which moon of Saturn highly resembles early Earth?
  - Cassini



- b. Galileo
- c. Titan
- d. Thor

8. Neptune was discovered

- a. because there was a gravitational pull affecting Uranus' orbit
- b. by accident through a telescope
- c. by the Hubble Space telescope
- d. it wanders across the sky like the other planets

9. Neptune's appearance is always changing because

- a. its temperature rises above and falls below the freezing point of water.
- b. its dark spots are on an 11-year cycle
- c. it has strong seasons
- d. it has an extremely turbulent atmosphere

10. Uranus and Neptune appear blue because

- a. they are composed of solid water ice
- b. their methane filters out red light
- c. they are covered by blue oceans
- d. they are covered by blue algae

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. The Great Dark Spot on Neptune has existed at least since the planet was first observed.
- \_\_\_\_\_ 12. Most moons in the solar system are captured asteroids.
- \_\_\_\_\_ 13. Jupiter's four largest moons are larger than the dwarf planet Pluto.
- \_\_\_\_\_ 14. Astronauts have brought back samples from Europa so they can test for signs extraterrestrial life.
- \_\_\_\_\_ 15. Saturn is unique because it is the only planet with rings.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

16. The planet that is tilted on its side is \_\_\_\_\_.
17. The four largest moons of Jupiter are known as \_\_\_\_\_.
18. The planets beyond the asteroid belt are known as the \_\_\_\_\_.
19. The planet that is less dense than water is \_\_\_\_\_.
20. The liquid on Europa is probably mostly \_\_\_\_\_.
21. Besides four moons, when Galileo looked through his telescope he saw \_\_\_\_\_.
22. Plate tectonics, in which the plates are ice sheets, may be occurring on \_\_\_\_\_.
23. Jupiter is made mostly of \_\_\_\_\_ with some helium and methane.

### Short Answer

Answer each question in the space provided.

24. Why are the outer planets made primarily of hydrogen and helium, but not the inner planets?

25. What is Titan and why is it especially interesting?

## 25.4 Other Objects in the Solar System

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- When the solar system formed, most of the matter became
  - asteroids and comets
  - planets
  - part of the Sun
  - space dust
- Near-Earth asteroids
  - have orbits that cross Earth's
  - number more than 4,500
  - could strike Earth at any time
  - all of these
- Halley's Comet was seen most recently in 1985-1986. When is it expected to return?
  - 2030
  - 2061
  - 2092
  - 2185
- What could Pluto-Charon be classified as?
  - two asteroids
  - a planet and a moon
  - a double dwarf planet
  - a planet and a dwarf planet
- The asteroid belt is located between which two planets?
  - Earth Mars
  - Mars Jupiter
  - Jupiter Neptune
  - Mercury Venus
- Scientists value meteorites because they
  - are material from the earliest solar system
  - are an important source of valuable metals
  - contain metals not otherwise found on Earth
  - none of these
- Pluto needed to be reclassified because
  - it was struck by a large asteroid and got smaller

- b. technology discovered a lot about Pluto and other solar system objects
  - c. astronomers wanted to have eight planets-four inner, four outer
  - d. astronomers needed something to do
8. The asteroid belt probably represents debris that
- a. was a large planet that was broken apart by an asteroid impact.
  - b. could strike Earth at any time
  - c. couldn't form a planet due to Jupiter's gravity.
  - d. none of these
9. A planet cannot be part of the asteroid belt because a planet
- a. has a different orbit from the asteroids in the belt
  - b. is rounded
  - c. clears its space of debris like asteroids
  - d. is too large to be in the asteroid belt
10. Where do shorter period comets come from?
- a. the Kuiper belt
  - b. other solar systems
  - c. the Moon
  - d. the asteroid belt
11. Which of the following are dwarf planets?
- a. Pluto
  - b. Eris
  - c. Makemake
  - d. all of the above
12. Why is the dwarf planet Ceres not classified as a large asteroid?
- a. it is rounded
  - b. it is too large
  - c. it does not have craters
  - d. it is a moon of Pluto

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. All shooting stars strike the ground and become meteorites.
- \_\_\_\_\_ 14. Comet orbits are similar in shape to planet orbits.
- \_\_\_\_\_ 15. The longest period comets come from the Kuiper belt cloud.
- \_\_\_\_\_ 16. Any object whose orbit crosses Earth's can collide with Earth.
- \_\_\_\_\_ 17. What Pluto's discoverer thought was the single planet was really two bodies, Pluto and Charon.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. The scientific term for a shooting star is a(n) \_\_\_\_\_.
19. When a space rock strikes Earth, it is a(n) \_\_\_\_\_.
20. A rocky body that has not yet entered Earth's atmosphere is a(n) \_\_\_\_\_.
21. Small rocky bodies that orbit the Sun are \_\_\_\_\_.
22. Pluto's orbit is located in in the \_\_\_\_\_.

23. If you wanted to learn about the Oort cloud, you would study \_\_\_\_\_.
24. Comet Hale-Bopp of 1997 had two tails, one of dust and one of \_\_\_\_\_.
25. When Earth passes through an old comet tail we experience a(n) \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Why do comets have tails?

27. Why is Pluto a dwarf planet, but not a planet any more?

## 25.5 The Solar System

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Copernicus' model of the solar system got better when
  - Earth was placed at the center
  - Kepler determined that planets move in ellipses
  - Galileo discovered galaxies
  - none of these
- Who proposed the heliocentric model of the universe?
  - Galileo
  - Kepler
  - Ptolemy
  - Copernicus
- Galileo's telescope helped the Copernican model by showing that
  - Venus orbits the Sun
  - moons orbit Mars
  - planets have elliptical orbits
  - all of these
- Which planet has the longest year?
  - Jupiter
  - Saturn
  - Uranus
  - Neptune
- If you know a planet's orbital period you can determine its
  - composition
  - age
  - distance from the Sun
  - rotation rate
- The asteroid belt is most likely
  - a failed planet
  - a large planet that broke apart
  - something that formed at the beginning of the solar system
  - no one knows
- All of the outer planets are primarily composed of what elements?
  - hydrogen and helium

- b. hydrogen and carbon
- c. carbon and neon
- d. lithium and carbon

8. Jupiter has

- a. exactly the composition of the Sun.
- b. a storm that has been active for at least 300 years
- c. a total of four moons
- d. all of these

9. How long does it take the Earth to revolve around the Sun?

- a. 29.5 days
- b. 24 hours
- c. 365.24 days
- d. 1 month

10. The most likely place for life to be found elsewhere in the solar system is

- a. the surface of Venus
- b. the Great Dark Spot of Neptune
- c. the moon of a gas giant
- d. nowhere. There is no chance of finding extraterrestrial life in the solar system.

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. Neither the Earth nor our Sun is at the center of the universe.
- \_\_\_\_\_ 12. More than a million exoplanets have been identified.
- \_\_\_\_\_ 13. Mars is the only planet in the solar system besides Earth that has liquid water.
- \_\_\_\_\_ 14. A day is longer than a year on Venus.
- \_\_\_\_\_ 15. The outer planets all have a lot of weather.
- \_\_\_\_\_ 16. Mars is red due large amounts of iron oxide in the soil.
- \_\_\_\_\_ 17. In the geocentric model the planets and stars are in spheres around Earth.
- \_\_\_\_\_ 18. Saturn is the only planet with rings.
- \_\_\_\_\_ 19. Saturn's rings probably formed from the breakup of one of its moons.
- \_\_\_\_\_ 20. Neptune was knocked sideways by a collision with a giant asteroid.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

21. The model that the Sun is the center of the universe is called the \_\_\_\_\_ model.
22. A \_\_\_\_\_ is a giant cloud of gas and dust.
23. The thick clouds of Venus create this climate phenomenon: \_\_\_\_\_.
24. The only inner planet with a large natural satellite is \_\_\_\_\_.
25. The possibility of a liquid water ocean on \_\_\_\_\_ make it a candidate to look for extraterrestrial life.
26. Scientist are interested in Saturn's moon, \_\_\_\_\_, because it is similar to what Earth was like before life developed.
27. Uranus and Neptune are blue due to \_\_\_\_\_.





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CHAPTER **26** HS Stars, Galaxies, and the Universe Assessments

**Chapter Outline**

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- 26.1 STARS
  - 26.2 GALAXIES
  - 26.3 THE UNIVERSE
  - 26.4 STARS, GALAXIES, AND THE UNIVERSE
-

## 26.1 Stars

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Scientists collide particles in particle accelerators to
  - simulate the conditions of the birth of the universe.
  - simulate nuclear fusion in a star's core.
  - fuse subatomic particles.
  - all of these
- To classify a star by color and temperature:
  - the hottest are red; the coolest are blue-white
  - yellow stars like our Sun are hottest
  - the hottest are blue; the coolest are red
  - the hottest are white; the coolest are red
- The more massive a main sequence star, the \_\_\_\_\_ its temperature because \_\_\_\_\_
  - higher; it burns heavier elements, which burn hotter
  - lower; the nuclear fusion is deeper in the star
  - lower; it burns heavier elements, which burn cooler
  - higher; it must burn more hydrogen to keep from collapsing
- The energy emitted from stars is in the form of
  - neutrino streams
  - electromagnetic radiation
  - radio waves
  - solar wind
- How are stars classified?
  - color and luminosity
  - color and size
  - size only
  - age and size
- When a mid-size star, like our Sun, becomes a \_\_\_\_\_ and then stops fusion it becomes a(n) \_\_\_\_\_ and then eventually \_\_\_\_\_.
  - red giant; white dwarf; fades out
  - red giant; red supergiant; explodes as a supernova
  - blue dwarf; white dwarf; supernova
  - blue giant; blue dwarf; fades out
- What can't escape a black hole?

- a. light
  - b. mass
  - c. matter
  - d. all of the above
8. What cloud formation are stars born in?
- a. nursery
  - b. nebula
  - c. Oort cloud
  - d. Kuiper belt
9. What is the energy source for all stars?
- a. nuclear fusion
  - b. nuclear fission
  - c. solar
  - d. hydrothermal
10. Energy production in a star takes place in the
- a. convective zone
  - b. core
  - c. radiative zone
  - d. corona
11. If you watch the sky for a while you can tell the brightest star Sirius from a bright planet because
- a. they are different colors
  - b. the planet exhibits retrograde motion
  - c. Sirius is an obvious binary star
  - d. Sirius appears much larger than any planet
12. The neutrons in a neutron star form when density becomes so immense that
- a. protons and electrons fly off.
  - b. neutrinos fuse together.
  - c. protons and electrons fuse together.
  - d. none of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. The energy source for all stars is nuclear fusion.
- \_\_\_\_\_ 14. Stars emit energy out into space as electromagnetic radiation.
- \_\_\_\_\_ 15. Our Sun is about half way through its life span.
- \_\_\_\_\_ 16. A black hole emits dark electromagnetic radiation that we can't see.
- \_\_\_\_\_ 17. A person living in Colorado would continue to see the same constellations, in the same location year-round.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. A small to mid-sized star that has collapsed is called a(n) \_\_\_\_\_.
19. A(n) \_\_\_\_\_ can only be seen indirectly, since it emits no light.
20. An explosion of a red giant star results in a(n) \_\_\_\_\_.



## 26.2 Galaxies

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. A galaxy can contain how many stars?
  - a. up to 500
  - b. up to 30,000
  - c. up to 10 million
  - d. up to many billions
2. How are irregular galaxies shapes formed?
  - a. collisions with other galaxies
  - b. gravitational pull from other galaxies
  - c. a b
  - d. none of the above
3. How wide is the central bulge of the Milky Way?
  - a. 1,000 - 6,000 light years
  - b. 1 light year
  - c. 100 light years wide
  - d. 12,000 - 16,000 light years
4. Open clusters
  - a. are stars that formed from the same nebula
  - b. usually contain a small number of stars, like the Seven Sisters
  - c. are only visible through a telescope
  - d. all of these
5. What are stars that are grouped closely together called?
  - a. star systems
  - b. similar systems
  - c. star partners
  - d. star neighbors
6. What type of galaxy is the Milky Way Galaxy?
  - a. spiral galaxy
  - b. elliptical galaxy
  - c. irregular galaxy
  - d. none of the above
7. Spiral galaxies have
  - a. lots of young stars

- b. lots of blue stars
  - c. lots of dust and gas
  - d. all of these
8. Most elliptical galaxies have very little gas and dust because
- a. they are very young
  - b. the dust and gas have already formed stars
  - c. the dust and gas is pulled into supermassive black holes at the center
  - d. none of these
9. The evidence that the Milky Way is a spiral galaxy includes
- a. the spiral arms that we can see from space telescopes
  - b. the velocities of stars that show rotational motion
  - c. the age is typical of spiral galaxies
  - d. all of these
10. Globular clusters
- a. have a lot of dust in them
  - b. contain a few hundred to a few thousand stars
  - c. contain mostly reddish stars
  - d. all of these

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 11. The distant galaxies we can see are all spiral galaxies.
- \_\_\_\_\_ 12. Most of the galaxies we see from Earth are dwarf galaxies.
- \_\_\_\_\_ 13. Giant elliptical galaxies tend to have mostly younger blue stars.
- \_\_\_\_\_ 14. Every star that you can see in the night sky is in the Milky Way Galaxy.
- \_\_\_\_\_ 15. The Sombrero Galaxy got its name because it is a spiral galaxy with a large central bulge.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

16. The closest galaxy to Earth is the \_\_\_\_\_ Galaxy.
17. Why would two galaxies collide? \_\_\_\_\_
18. A system of two stars in a solar system is known as a(n) \_\_\_\_\_.
19. A(n) \_\_\_\_\_ is comprised of hundreds of thousands of stars that are held together by gravity.
20. Earth resides in the \_\_\_\_\_ Galaxy.
21. The Milky Way is a \_\_\_\_\_ type of galaxy.
22. A binary star is a \_\_\_\_\_ consisting of two stars orbiting around their common center of mass.
23. The feature containing the largest number of stars from a few million to a few billion is a(n) \_\_\_\_\_.

### Short Answer

*Answer each question in the space provided.*

24. Open clusters tend to be younger than globular clusters. What evidence do astronomers have that points to the ages of these features?

25. Describe the Milky Way Galaxy and Earth's place in it.

## 26.3 The Universe

### Lesson Quiz

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

1. What did Edwin Hubble discover by observing absorption spectrum lines?
  - a. blueshift
  - b. redshift
  - c. yellowshift
  - d. greenshift
2. What explains the phenomenon that Hubble discovered?
  - a. the universe is becoming warmer
  - b. the universe is becoming cooler
  - c. the universe is collapsing
  - d. the universe is expanding
3. Scientists believe dark energy can explain what phenomenon?
  - a. the creation of the universe
  - b. the increasing rate of expansion of the universe
  - c. the collapse of the universe
  - d. the shape of the universe
4. Scientists believe what percent of the matter in the universe is dark matter?
  - a. 35%
  - b. 50%
  - c. 65%
  - d. 80%
5. The farther away a galaxy is
  - a. the faster it is moving away from us
  - b. the slower it is moving away from us
  - c. the faster it is coming toward us
  - d. the slower it is coming toward us
6. What does it mean if light is redshifted?
  - a. The object is moving away from the observer
  - b. The object is moving towards the observer
  - c. The object is slowing down
  - d. The object is moving perpendicular to the observer
7. The outside edges and interior of a galaxy rotate at the same speed. This is evidence for the existence of
  - a. dark matter



- b. dark energy
  - c. gravitational lensing
  - d. the Big Bang
8. What is the background temperature of the universe?
- a. 0K
  - b. 3K
  - c. 18K
  - d. 294K
9. The background radiation of the universe is
- a. absolute zero; all energy is tied up in stars
  - b. hot between galaxies and other features
  - c. left over from the Big Bang
  - d. none of these
10. Gravitational lensing indicates the existence of dark matter because
- a. light cannot escape the intense gravity of dark matter
  - b. only gravitational lensing can explain how dark matter can escape gravity
  - c. there is higher gravity than can be explained by the matter that is visible.
  - d. none of these
11. Dark matter is
- a. ordinary matter that does not emit radiation
  - b. unusual matter that may or may not have gravity
  - c. MACHOS and/or WIMPS
  - d. not well understood; at this time no one is certain
12. Scientists know the fate of the universe and it is
- a. it will expand forever
  - b. it will eventually start to collapse and do another Big Bang
  - c. it will expand to a point and then stay static
  - d. not well understood; at this time no one is certain

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 13. Redshift is the shift of absorption bands toward the red end of the spectrum.
- \_\_\_\_\_ 14. Hubble's Law states, the farther away a galaxy is, the faster it is moving away from us.
- \_\_\_\_\_ 15. The percentage of the universe that is made of matter has decreased since the beginning.
- \_\_\_\_\_ 16. Cosmetology is study of the universe.
- \_\_\_\_\_ 17. The universe contains about a hundred million galaxies.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

18. \_\_\_\_\_ is a form of energy that has not yet been directly observed.
19. A few seconds after the universe began, the subatomic particles \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ could form.
20. The \_\_\_\_\_ is everything.
21. When you look to the far edge of the universe, you are seeing \_\_\_\_\_.

22. Astronomers calculate the origin of the universe at around \_\_\_\_\_ years.
23. Light or sound is shifted as an object moves toward or away from an observer. This phenomenon is called \_\_\_\_\_ Effect.
24. As the universe \_\_\_\_\_ (contracts/stay the same size/expands) the galaxies within it \_\_\_\_\_- (contract/stay the same size/expand).
25. The gravitational pull from dark matter is called \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

26. Describe the first few minutes after the Big Bang.

27. Describe two lines of evidence for the Big Bang origin of the universe.

## 26.4 Stars, Galaxies, and the Universe

### Chapter Test

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

#### Multiple Choice

*Circle the letter of the correct choice.*

- Stars differ in all of the following ways except. . .
  - size
  - temperature
  - age
  - composition
- A main sequence star is powered by
  - nuclear fission reactions
  - the fusing of helium into the heavier elements
  - the fusing of hydrogen into helium
  - none of these
- The coolest stars are \_\_\_\_\_; the hottest stars are \_\_\_\_\_.
  - yellow; orange
  - blue; orange
  - yellow; yellow
  - red; blue
- Our star, the Sun, will likely end its life as a
  - red giant
  - black hole
  - white dwarf
  - supernova
- A star forms from
  - a nebula; gravity causes material to collapse until fusion begins
  - particles or rock and metal that smash together to form a body that begins nuclear fusion
  - a supernova explosion that releases material into space
  - none of these
- Evidence for the Big Bang includes
  - the background radiation in the universe of 0K
  - blueshift, indicating that the universe is expanding
  - ancient matter that appears in stardust
  - none of these
- Galaxies are
  - made of billions to trillions of stars

- b. stationary in space
  - c. elliptical, spiral or irregular
  - d. none of these
8. What did the Andromeda Nebula turn out to be?
- a. a galaxy
  - b. a gas cloud where stars are created
  - c. the farthest galaxy that astronomers can see
  - d. none of these
9. The farther away a galaxy, the faster it is moving away from us is called. . .
- a. Hubble's Law
  - b. the law of reverse gravitation
  - c. the Big Bang Theory
  - d. the Doppler Effect
10. By analyzing the spectrum of light from distant galaxies, astronomers learned that they are
- a. made of different materials
  - b. moving away from us
  - c. hotter the farther out they are
  - d. none of these

### True or False

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 11. A star's color is determined by the temperature at its core.
- \_\_\_\_\_ 12. Stars have a life cycle.
- \_\_\_\_\_ 13. The element helium was first discovered in the spectrum of the Sun.
- \_\_\_\_\_ 14. A neutron star is made almost entirely of neutrons.
- \_\_\_\_\_ 15. Black holes are so dense that not even light can escape their gravity.
- \_\_\_\_\_ 16. Galaxies are divided into three types according to their shape.
- \_\_\_\_\_ 17. The study of the universe is called astrology.
- \_\_\_\_\_ 18. The Big Bang Theory is the most widely accepted cosmological explanation on how the universe formed.
- \_\_\_\_\_ 19. Dark matter can be observed even though it emits no electromagnetic radiation.
- \_\_\_\_\_ 20. Scientists think dark energy makes up 71% of the total energy in the universe.

### Fill in the Blanks

Fill in the blank with the term that best completes the sentence.

21. A \_\_\_\_\_ is a giant ball of glowing gas at a very, very high temperature.
22. A \_\_\_\_\_ explosion contains so much energy that atoms can fuse together to produce gold, silver, and uranium.
23. \_\_\_\_\_ is the apparent shift in position that takes place when the position of the observer changes.
24. The \_\_\_\_\_ contains all the star systems, galaxies, gas and dust, plus all the matter and energy in existence.
25. By analyzing the spectrum lines of a star, astronomers can learn its \_\_\_\_\_.
26. The \_\_\_\_\_ of the galaxies means that the universe is expanding.

27. A pattern of stars in the sky is a(n) \_\_\_\_\_.
28. \_\_\_\_\_ are groups of young stars held together by gravity.
29. \_\_\_\_\_ are collections of millions to many billions of stars.
30. \_\_\_\_\_ are spherical groups of old stars held together by gravity.

**Short Answer**

*Answer each question in the space provided.*

31. How does a supernova form and what would the universe be like if there weren't any?

32. What evidence do astronomers have for the existence of dark matter and dark energy?

33. Describe the location of planet Earth as accurately as you can.

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**CHAPTER 27****HS Earth Science Unit  
Assessment****Chapter Outline**

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- 27.1 UNIT 1: INTRODUCTION TO THE STUDY OF EARTH TEST**
  - 27.2 UNIT 2: EARTH'S MINERAL AND ENERGY RESOURCES TEST**
  - 27.3 UNIT 3: PROCESSES INSIDE EARTH TEST**
  - 27.4 UNIT 4: PROCESSES ON EARTH'S SURFACE TEST**
  - 27.5 UNIT 5: EARTH'S PAST TEST**
  - 27.6 UNIT 6: EARTH'S WATER TEST**
  - 27.7 UNIT 7: WEATHER AND CLIMATE TEST**
  - 27.8 UNIT 8: THE ENVIRONMENT AND HUMAN ACTIONS TEST**
  - 27.9 UNIT 9: ASTRONOMY TEST**
-

## 27.1 Unit 1: Introduction to the Study of Earth Test

Unit 1 chapters: *What is Earth Science?* and *Studying Earth's Surface*

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

Circle the letter of the correct choice.

- Which of the following is the longest mountain range on Earth?
  - mid-ocean ridge
  - Andes
  - Great Dividing Range
  - Himalayas
- Which imaginary line circles Earth below the equator (Southern Hemisphere)?
  - Tropic of Cancer
  - Tropic of Capricorn
  - Equator
  - Prime Meridian
- Which of the following is not created by constructive forces?
  - Mt. Fuji
  - Mt. Everest
  - Barringer (aka Meteorite) Crater in Arizona
  - East African Rift
- What is the main disadvantage of a Mercator projection?
  - distortion near the equator
  - distortion of landmasses
  - distortion near the poles
  - true direction is not shown
- How many satellites are needed to determine the longitude and latitude of an object by GPS?
  - 3
  - 4
  - 24
  - 12
- Which of these coordinates is not valid?
  - $41^{\circ}52'55''\text{N } 87^{\circ}37'40''\text{W}$
  - S  $22.90^{\circ}$ , W  $43.20^{\circ}$
  - N  $98.33^{\circ}$ , W  $76.15^{\circ}$
  - $0^{\circ}0'00''\text{N } 0^{\circ}0'00''\text{W}$
- Which of the following scientists would most likely study hurricanes?
  - hydrologist
  - meteorologist
  - geochemistry
  - paleontology

8. Which of the following should not be done in the laboratory?
  - a. wearing goggles
  - b. tying long hair back
  - c. keeping your area clean
  - d. eating and drinking
9. What is the procedure used by scientists to do their work?
  - a. assumptions
  - b. scientific method
  - c. deductive reasoning
  - d. inductive reasoning
10. What is the goal of science?
  - a. Answer all questions.
  - b. Explain how things work.
  - c. Understand the natural world.
  - d. Find a cure for cancer.
11. What is the term for a plausible explanation to a scientific question?
  - a. hypothesis
  - b. theory
  - c. law
  - d. none of the above
12. What process is used to collect data when it is not possible for practical or ethical reasons to perform experiments?
  - a. inductive reasoning
  - b. research
  - c. observation
  - d. all of these

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 13. Constructive forces cause landforms to grow
- \_\_\_\_\_ 14. Hydrology includes Oceanography
- \_\_\_\_\_ 15. A scientific question must be testable.
- \_\_\_\_\_ 16. Research is not essential to the scientific process.
- \_\_\_\_\_ 17. Testable questions are needed for scientists to understand the natural world.
- \_\_\_\_\_ 18. A map is not a good example of a physical model.
- \_\_\_\_\_ 19. A conceptual model ties together many ideas in an attempt to explain a phenomenon.
- \_\_\_\_\_ 20. The idea that moon formed when a Mars-sized planet hit the Earth is a good example of a conceptual model.
- \_\_\_\_\_ 21. In the science lab, it is important to follow directions at all times.
- \_\_\_\_\_ 22. In the field, it is not necessary to have a first aid kit.
- \_\_\_\_\_ 23. The ocean basins are all younger than 180 million years.
- \_\_\_\_\_ 24. Volcanic eruptions are an example of a destructive force.
- \_\_\_\_\_ 25. Direction is not important for the study of earth science.



**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

26. The Marianas Trench is the deepest \_\_\_\_\_ in the world.
27. The first map projection was developed by Gerardus \_\_\_\_\_ in 1569.
28. On a globe, the shortest distance between two points is a(n) \_\_\_\_\_.
29. A chart used to locate an underwater shipwreck is a(n) \_\_\_\_\_.
30. A weather satellite travels around Earth in a \_\_\_\_\_ orbit.
31. \_\_\_\_\_ is the midpoint between high and low tide.
32. Triangulation is one way of determine the \_\_\_\_\_ of an object.
33. The branch of Earth science that interests me most is \_\_\_\_\_.
34. \_\_\_\_\_ maps show elevations using contour lines to reveal landforms.
35. Why are there more earthquakes in India than in South Africa? is a(n) \_\_\_\_\_.

**Short Answer**

*Answer each question in the space provided.*

36. Why are four satellites required by the GPS system to determine your location?

37. What does a geologist study?

38. What is peer review? Why is it important to the scientific community?

39. List 4 major branches of Earth Science and explain how they relate to the Earth.

40. What is GIS and why is it useful?

## 27.2 Unit 2: Earth's Mineral and Energy Resources Test

Unit 2 chapters: *Earth's Minerals, Rocks, and Earth's Energy*

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

Circle the letter of the correct choice.

- Which of these makes up an atomic mass number?
  - the number of protons
  - the number of neutrons
  - the number of protons, neutrons and electrons
  - the number of neutrons and protons
- Which is rarely very useful for mineral identification?
  - cleavage
  - luster
  - color
  - hardness
- Which of the following is not a mineral?
  - coal
  - diamond
  - table salt
  - quartz
- What igneous rock has no visible crystals as a result of rapid cooling?
  - breccia
  - obsidian
  - andesite
  - pegmatite
- An ore deposit
  - contains many valuable minerals.
  - is profitable to mine.
  - is a mineral deposit in which the price is rising.
  - is made of different metals.
- Which of the following does not affect the formation of magma?
  - temperature
  - pressure
  - volume
  - mineral composition
- Which of the following is sometimes used as building material?
  - talc
  - slate
  - limestone
  - diamond

8. During metamorphism, extreme pressure often leads to
  - a. foliation
  - b. the creation of magma
  - c. extremely high temperatures
  - d. crystallization
9. During lithification, sediments undergo
  - a. cementation
  - b. compaction
  - c. compaction and/or cementation
  - d. crystallization
10. In the rock cycle
  - a. an igneous rock or a metamorphic rock can become a sedimentary rock.
  - b. a sedimentary rock can become an igneous or a metamorphic rock.
  - c. a sedimentary rock can become a different sedimentary rock.
  - d. any rock can become any other type of rock.
11. The accident at the Fukushima Daiichi Nuclear Power Plant in Japan was due to
  - a. operator error.
  - b. a large earthquake.
  - c. the nuclear reaction proceeding too rapidly.
  - d. a political upheaval.
12. What type of energy is derived from heated groundwater?
  - a. solar energy
  - b. geothermal energy
  - c. hydroelectric energy
  - d. nuclear energy
13. Renewable energy sources typically are
  - a. cleaner than non-renewable energy sources.
  - b. cheaper than non-renewable energy sources.
  - c. better developed than non-renewable energy sources.
  - d. more transportable than non-renewable energy sources.
14. Useful solar power comes from
  - a. panels on a building's roof.
  - b. plants with large numbers of mirrors and a receiver.
  - c. metal boxes that can be used as ovens.
  - d. all of these.
15. Biomass energy will likely
  - a. rely mostly in crop plants like corn.
  - b. rely more heavily on algae and other non-food crops.
  - c. rely increasingly on trees and other non-farmed plants.
  - d. not play a major role in our energy future.

**True or False**

*Write true if the statement is true or false if the statement is false.*

\_\_\_\_\_ 16. Water can only hold a certain amount of dissolved minerals.

\_\_\_\_\_ 17. An atom's nucleus has a positive electrical charge.

- \_\_\_\_\_ 18. A mineral is a naturally-occurring, inorganic substance, that has a specific chemical composition, and a crystalline structure.
- \_\_\_\_\_ 19. The United States produces as much energy as it consumes.
- \_\_\_\_\_ 20. The more a metamorphic rock resembles its parent rock, the more metamorphism it has likely undergone.
- \_\_\_\_\_ 21. The joining of isotopes to make molecules is chemical bonding.
- \_\_\_\_\_ 22. Hydrogen bonds are weak bonds between polar molecules.
- \_\_\_\_\_ 23. Metamorphism occurs because of crystallization and pressure.
- \_\_\_\_\_ 24. Silicate minerals form in different shapes due to the different ways the silica tetrahedra come together.
- \_\_\_\_\_ 25. Different types of minerals crystallize from magma at different temperatures.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

26. \_\_\_\_\_ are valuable minerals found in stream gravels.
27. Halide minerals are \_\_\_\_\_ that form when water evaporates.
28. A \_\_\_\_\_ sedimentary rock can contain sediments, organic materials and chemical precipitates.
29. Living creatures can make rocks that are called \_\_\_\_\_ sedimentary rocks.
30. Energy moves from high temperatures to lower temperatures in adjacent materials through \_\_\_\_\_.
31. Water is a \_\_\_\_\_ because it has an uneven electrical charge.
32. The largest mineral group is the \_\_\_\_\_.
33. Mohs scale ranks the \_\_\_\_\_ of 10 minerals.
34. Multiple elements are bonded together in a(n) \_\_\_\_\_.
35. \_\_\_\_\_ metamorphism takes place in rock that is exposed to the heat of a nearby magma.

**Short Answer**

*Answer each question in the space provided.*

36. How would you test the hardness of an unknown mineral? Why would you do this?

37. Explain the difference between surface and underground mining. How might mining damage the environment?

38. Describe the two different ways that igneous rocks form. What characteristics will you see in the rocks that form in each way?

39. Explain the problems with non-renewable energy sources.

40. Choose one renewable energy source and explain why it would be your preferred energy source.

## 27.3 Unit 3: Processes Inside Earth Test

Unit 3 chapters: *Plate Tectonics, Earthquakes, and Volcanoes*

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

Circle the letter of the correct choice.

- Compared with continental lithosphere, oceanic lithosphere is
  - thinner, less dense, and more likely to subduct
  - thicker, more buoyant and less likely to subduct
  - thinner, denser, and more likely to subduct
  - thicker, denser, and less likely to subduct
- At a divergent plate boundary,
  - sediments are extremely thick
  - new seafloor is created
  - old seafloor is destroyed
  - crust is neither created nor destroyed
- Which is not true of Earth's lithosphere?
  - it is brittle
  - it is broken into plates
  - it is made of the crust and the mantle
  - it can have both oceanic and continental crust
- When an oceanic plate converges with a continental plate
  - the less dense oceanic plate slides under the denser continental plate.
  - the denser oceanic plate slides under the less dense continental plate.
  - the less dense oceanic plate slides past the denser continental plate.
  - the denser oceanic plate slides on top of the less dense continental plate.
- The theory of plate tectonics is
  - the idea that plates of lithosphere move around Earth's surface due to convection in the core.
  - the theory that continents move around on Earth's surface, although no one is quite sure how that happens.
  - the idea that new seafloor is created and old seafloor is destroyed
  - a combination of the observations that the continents were joined and moved apart with the mechanism of seafloor spreading.
- With increasing distance from the epicenter, the difference in P and the S wave arrival times \_\_\_\_\_.
  - increases
  - decreases
  - stays constant
  - none of the above
- Which of the following observations may indicate a forthcoming destructive earthquake?
  - an increase in the frequency of smaller earthquakes
  - rapid tilting of the ground

- c. rapid changes in water levels in wells
  - d. all of these
8. When stresses build up in a rock, the rock will
- a. break
  - b. fold
  - c. remain unchanged
  - d. any or all of these
9. The Richter magnitude scale measures
- a. the total energy released by an earthquake
  - b. the energy released by the largest jolt in an earthquake
  - c. the intensity of what residents felt and the damage the quake did
  - d. all of these
10. Deadly ocean waves that come from an earthquake are called
- a. tidal waves
  - b. sea waves
  - c. tsunami
  - d. rogue waves
11. Subduction results in volcanoes because
- a. the hot plate heats the mantle so it melts.
  - b. sediments contain water, which lowers the melting point of the mantle above the plate.
  - c. the subduction plate releases pressure on the region so the mantle melts.
  - d. none of these.
12. Magma with high silica will probably cause
- a. an effusive eruption, such as a lava plateau
  - b. an explosive eruption or an igneous intrusion
  - c. pillow basalts
  - d. a chain of hotspot volcanoes
13. A volcano made from lots of fluid flows of mafic lava is a(n)
- a. shield volcano
  - b. supervolcano
  - c. composite volcano
  - d. cinder cone
14. A volcano's slope may change shape before an eruption because
- a. gases and magma move up into a magma chamber
  - b. earthquakes move ground around
  - c. gases expand as they change in composition
  - d. none of these
15. Above a hotspot, you may find
- a. chains of shield volcanoes increasing in age with distance.
  - b. a giant caldera and evidence of catastrophic eruptions.
  - c. nothing but normal continental crust.
  - d. any or all of these.

**True or False**

*Write true if the statement is true or false if the statement is false.*



- \_\_\_\_\_ 16. Continental crust is made almost entirely of felsic rock.
- \_\_\_\_\_ 17. Sediment is thickest near the shore where it comes off the continents in rivers and on wind currents.
- \_\_\_\_\_ 18. The mantle is solid, ultramafic rock that can flow.
- \_\_\_\_\_ 19. Heat flow by the rapid collisions of atoms from a warmer to a cooler place is called convection.
- \_\_\_\_\_ 20. Alfred Wegener proposed that the continents were once united into a single supercontinent called Pangaea.
- \_\_\_\_\_ 21. A reverse fault in which the fault plane angle is nearly horizontal is a strike-slip fault.
- \_\_\_\_\_ 22. An anticline forms by folding of rock layers caused by compressive forces.
- \_\_\_\_\_ 23. All major earthquakes occur at plate boundaries.
- \_\_\_\_\_ 24. The ground type over where an earthquake occurs is a major factor in determining how much damage will be caused.
- \_\_\_\_\_ 25. Pangaea was Earth's first supercontinent.

### Fill in the Blanks

*Fill in the blank with the term that best completes the sentence.*

26. When the magnetic polarity reverses, the \_\_\_\_\_ becomes the \_\_\_\_\_ and the \_\_\_\_\_ - becomes the \_\_\_\_\_ .
27. \_\_\_\_\_ in the mantle drive plate movements.
28. Oceanic crust is created at features in the oceans called \_\_\_\_\_.
29. Tectonic plates slide past each other at a(n) \_\_\_\_\_ plate boundary.
30. Plumes of magma rise to the surface and create volcanoes at \_\_\_\_\_.
31. There have been only five earthquakes in human history with the highest magnitude, above a \_\_\_\_\_.
32. Most volcanoes are found around the Pacific Ocean basin because there are so many \_\_\_\_\_ .
33. A bend that causes rocks to be inclined relative to the horizon is a(n) \_\_\_\_\_.
34. A mountain composed of layers of lava and ash is a \_\_\_\_\_ .
35. The lithospheric plates can be identified by mapping \_\_\_\_\_ .

### Short Answer

*Answer each question in the space provided.*

36. List the evidence for continental drift, both Wegener's evidence and the evidence that came afterwards.

37. Describe the three types of plate boundaries. What types of volcanoes and earthquakes are found at each?

38. What determines how deadly an earthquake is?

39. Why are no rocks in the oceans older than 180 million years? Why was this discovery so important?

40. Describe the three types of volcanoes (not supervolcanoes) for their size, lava composition and style of eruption.

## 27.4 Unit 4: Processes on Earth's Surface Test

Unit 4 chapters: *Weathering and Formation of Soil* and *Erosion and Deposition*

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

Circle the letter of the correct choice.

- Which is not a type of mass movement?
  - creep
  - avalanche
  - beach deposits
  - landslide
- Soil that was moved by erosion is a
  - residual soil
  - tropical soil
  - mass wasting soil
  - transported soil
- As sediments exit a steep canyon onto open land, they form a(n) \_\_\_\_\_.
  - alluvial fan
  - fluvial fan
  - sediment fan
  - fan
- Gases such as carbon dioxide, sulfur dioxide and nitrogen oxides mix with water in the atmosphere to create
  - calcium carbonate
  - acids
  - greenhouse gases
  - ozone
- Soil is
  - easily eroded.
  - essential for modern society.
  - a renewable resource if carefully managed.
  - all of these.
- Wind erosion is strongest in which type of region?
  - arid
  - humid
  - ocean
  - tropical
- Farms on hillsides may have soil plowed in curved bands because it
  - prevents fires from spreading if one starts.
  - exposes more topsoil.
  - exposes more bedrock to reduce landslides.
  - reduces erosion.

8. The characteristics of soil found in the arid western U.S. include
  - a. heavy chemical weathering
  - b. high organic material
  - c. a concentration of calcium carbonate
  - d. heavy leaching
9. What weathering chemicals are made by decaying plants?
  - a. alkalis
  - b. acids
  - c. salts
  - d. bases
10. A small lake on flat land in limestone rock is probably a(n)
  - a. tarn
  - b. kettle
  - c. cirque
  - d. sinkhole
11. The long- term temperature and precipitation in a region determines its
  - a. weather
  - b. climate
  - c. soil type
  - d. vegetation
12. Since streams erode the outer bend and deposit along the inside curve,
  - a. meanders migrate laterally over time.
  - b. meanders straighten out over time.
  - c. they become incised meanders.
  - d. they overflow onto the floodplain.
13. A column forms when
  - a. a stalactite from the ceiling and a stalagmite from the floor join.
  - b. a stalagmite from the ceiling and a stalactite from the floor join.
  - c. travertine flows downhill in a column-like structure.
  - d. calcite flows downhill in a column-like structure.
14. Creep is
  - a. the transport of sediment grains pushed along the surface by wind.
  - b. the sliding of soil slowly down a hillside.
  - c. both of these.
  - d. neither of these.
15. Which of the following is not the result of cirques?
  - a. two on the sides of a ridge form an arête
  - b. three near the top of a mountain form a horn
  - c. one in glacial till form a sinkhole
  - d. one filled with water is a tarn

**True or False**

*Write true if the statement is true or false if the statement is false.*

\_\_\_\_\_ 16. Mechanical weathering may increase the rate of chemical weathering, but not the reverse.

\_\_\_\_\_ 17. Flowing water does the work of erosion, but not deposition.

- \_\_\_\_\_ 18. If you stop water from rising into one area - e.g. with a levee or breakwater - the water will probably flood a nearby location.
- \_\_\_\_\_ 19. Wind and streams both cause abrasion.
- \_\_\_\_\_ 20. Rust is a form of oxidation.
- \_\_\_\_\_ 21. The layer of soil containing the most organic material is the C horizon.
- \_\_\_\_\_ 22. Stalactites are formed by calcium sulfate.
- \_\_\_\_\_ 23. A natural levee does not protect nearby lands from flooding.
- \_\_\_\_\_ 24. Plate tectonics processes build up landforms, erosional processes destroy landforms.
- \_\_\_\_\_ 25. Loess is windblown silt and clay deposited layer on layer over a large area.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

26. A(n) \_\_\_\_\_ is a slip of a single mass of soil or rock.
27. A(n) \_\_\_\_\_ is a mixture of light-colored, coarse sediments layered with darker, fine sediments deposited in a glacial lake.
28. A river starts at its \_\_\_\_\_ and ends at its mouth.
29. A(n) \_\_\_\_\_ is formed as waves erode undercut cliffs.
30. \_\_\_\_\_ are faceted stones formed by abrasion from sand particles.
31. \_\_\_\_\_ carries dissolved minerals to lower layers in the soil.
32. A tropical soil in which intense chemical weathering has left behind the least soluble minerals is a(n) \_\_\_\_\_ - \_\_\_\_\_
33. Small bits of minerals, rocks, shells and coral make up \_\_\_\_\_
34. A \_\_\_\_\_ is a curve in a stream channel.
35. \_\_\_\_\_ water does the work of both erosion and deposition.

**Short Answer**

*Answer each question in the space provided.*

36. Explain how mechanical weathering differs from chemical weathering.

37. Draw and describe a soil profile.

38. How do streams deposit natural levees and why are they important?

39. As glaciers melt back, what depositional features do you expect to see?

40. List and define each of the human-made structures that protect shorelines.

## 27.5 Unit 5: Earth's Past Test

Unit 5 chapters: *Evidence About Earth's Past* and *Earth's History*

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

Circle the letter of the correct choice.

- Ice cores contain information about
  - the age of the ice going back millions of years.
  - how the atmosphere has changed.
  - how glaciers have advanced and receded over time.
  - all of these.
- Which of the following spans of time is the longest?
  - Phanerozoic
  - Paleozoic
  - Cambrian
  - Precambrian
- Fossils are
  - the remains of ancient life.
  - the evidence of the activities of ancient life.
  - formed by permineralization, replacement, and compression, among others.
  - all of these.
- Using the law of lateral continuity, geologists can
  - link together the geologic history of a region.
  - determine the relative ages of rock strata.
  - determine the absolute ages of rock strata.
  - all of these.
- The guiding principle for understanding Earth history is
  - the present is the key to the past
  - the more things change the more they stay the same
  - nothing ever changes
  - we can't know about the past because natural laws change
- During the \_\_\_\_\_ (which makes up almost 90% of Earth's history) simple anaerobic forms of life appeared and were followed by photosynthetic forms, which added oxygen to the atmosphere.
  - Paleozoic
  - Precambrian
  - Mesozoic
  - Devonian
- Carbon 14 has a half life of 5,730 years. In 11,460 years the ratio of parent to daughter isotope will be
  - 75:25
  - 50:50
  - 25:75

- d. 12.5:87.5
8. Gases in the early atmosphere came from
- comets, volcanism and photosynthesis.
  - comets and volcanism.
  - volcanism, photosynthesis and cellular respiration.
  - photosynthesis and cellular respiration.
9. Which of the following statements is true about fossilization?
- It is a common occurrence.
  - It is more common for animals from mountains and forests than for those from deserts and oceans.
  - Small animals with light weight, thin bones are more likely to become fossils than are large animals with heavy, dense bones.
  - none of the above
10. Earth's second atmosphere was
- composed mostly of hydrogen and helium
  - very similar to the atmosphere we have now
  - lacking in oxygen
  - very rich in ozone and carbon dioxide
11. Scientists think the mass extinction that occurred 66 million years ago was the result of
- massive volcanic eruptions
  - the impact of a Mars-sized planet
  - an asteroid impact
  - climate change
12. The oldest felsic continental crust, when found at the surface is a(n)
- platform
  - craton
  - microcontinent
  - shield
13. A cell needs
- a way to replicate itself
  - a metabolism
  - a way to separate itself from its environment
  - all of these.
14. The fossil record shows that
- present day life forms evolved from earlier life forms.
  - life evolves from simple to complex in a straight line.
  - animals evolved from plants, which evolved from bacteria.
  - life does not change over time, but life forms stay the same until they go extinct.
15. Biological evolution is
- the idea that humans evolved from chimps.
  - the changes in a population that accumulate over time.
  - the idea that all life was created by a supreme being over a very brief period of time.
  - the idea that the changes in life forms over time have led to the pinnacle - humans.

**True or False**

*Write true if the statement is true or false if the statement is false.*



- \_\_\_\_\_ 16. Land organisms can be buried by mudslides, volcanic ash, or sand to eventually become fossilized.
- \_\_\_\_\_ 17. Cross-cutting relationships helps geologists to determine the older and younger of two rock units.
- \_\_\_\_\_ 18. During the Paleozoic, there were six marine transgressions.
- \_\_\_\_\_ 19. The largest mass extinction occurred at the end of the Cenozoic, when the dinosaurs died out.
- \_\_\_\_\_ 20. Different isotope pairs are used to date materials of different ages.
- \_\_\_\_\_ 21. About fifty percent of all living organisms become fossils.
- \_\_\_\_\_ 22. The layers of sediment created in lakes are called varves.
- \_\_\_\_\_ 23. Multicellular organisms evolved from early eukaryotes.
- \_\_\_\_\_ 24. The mechanism for change in a population of organisms is natural selection.
- \_\_\_\_\_ 25. Pangaea was created when Laurentia and Gondwana collided.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

26. Continents sometimes collide and form a(n) \_\_\_\_\_, like Rodinia.
27. Absolute dating of substances can be determined using \_\_\_\_\_.
28. Swamps during the \_\_\_\_\_ Period became the coal and petroleum that we use today.
29. The principle of \_\_\_\_\_ states that we can understand what happened in the past because the processes are the same as what happens today.
30. A mountain building event that takes place when a continent runs into another landmass is a(n) \_\_\_\_\_.
31. The Phanerozoic began \_\_\_\_\_ years ago and ended \_\_\_\_\_ years ago.
32. The Earth is approximately \_\_\_\_\_ years old.
33. The \_\_\_\_\_ era was the age of the dinosaurs.
34. Ancient \_\_\_\_\_ indicates the presence of an ancient subduction zone.
35. \_\_\_\_\_ were essential for the origin of life because they link together to form proteins.

**Short Answer**

*Answer each question in the space provided.*

36. Why was oxygen needed in the atmosphere before complex life could evolve?

37. What is the current hypothesis for how eukaryotes evolved from prokaryotes?

38. Explain the difference between absolute age and relative age.

39. Briefly describe two lines of evidence that Earth is 4.6 billion years old.

40. What are adaptations? How do adaptations develop?

## 27.6 Unit 6: Earth's Water Test

Unit 6 chapters: *Earth's Fresh Water* and *Earth's Oceans*

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

Circle the letter of the correct choice.

- The difference between a pond and a lake is
  - just size; ponds are smaller.
  - ponds form from ice age glacial activity; lakes from volcanic eruptions and faulting.
  - lakes form from ice age glacial activity; ponds from volcanic eruptions and faulting.
  - ponds are smaller and they usually have no outlet.
- What type of rock layer can water not penetrate?
  - impermeable
  - permeable
  - porous
  - sandstone
- Water basins are separated by a
  - separation
  - divide
  - barrier
  - levee
- Salt water from the sea mixes with fresh water from a river in a(n)
  - marsh
  - estuary
  - swamp
  - wetland
- The deepest trench in the ocean is Marianas Trench, how deep is it?
  - 3,814 ft
  - 53,418 ft
  - 35,814 ft
  - 135,481 ft
- If ocean water freezes near the poles, the remaining water will probably
  - sink because it is more saline.
  - sink because it is warmer than the ice.
  - float because it is warmer than the ice.
  - float because it is more dense.
- Which best describes the water movements caused by the Coriolis effect?
  - clockwise in the southern hemisphere and counterclockwise in the northern hemisphere
  - clockwise in the northern hemisphere and clockwise in the southern hemisphere
  - clockwise in the northern hemisphere and counterclockwise in the southern hemisphere
  - counterclockwise in the northern hemisphere and counterclockwise in the southern hemisphere

8. Wetlands
  - a. are not very valuable and so are often filled in.
  - b. remove pollutants from water.
  - c. are low in biodiversity.
  - d. none of these.
9. Ocean currents bring
  - a. surface water to the deep sea; deep water to the surface.
  - b. cool polar water to the equator; warm equatorial water to the polar regions
  - c. nutrients from the deep sea to the surface
  - d. all of these
10. About half of the world's primary productivity is provided by
  - a. phytoplankton
  - b. kelp and seaweed
  - c. rainforest plants
  - d. zooplankton
11. Organisms that are endothermic, give birth to live young, and have kidneys that excrete salt are
  - a. marine reptiles
  - b. marine amphibians
  - c. shorebirds
  - d. marine mammals
12. What percentage of the Earth's water is fresh water?
  - a. 1%
  - b. 2%
  - c. 3%
  - d. 4%
13. What drives deep ocean circulation?
  - a. downwelling
  - b. upwelling
  - c. thermohaline circulation
  - d. Coriolis effect
14. Tide pool organisms must be protected from
  - a. the mix of fresh and salt water.
  - b. drying out.
  - c. intense predation.
  - d. all of these.
15. Chemosynthetic bacteria
  - a. provide food to other organisms.
  - b. receive shelter from other organisms.
  - c. are part of the hydrothermal vent ecosystem.
  - d. all of these.

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 16. Soil is an important reservoir for water.
- \_\_\_\_\_ 17. A tributary is the larger of two streams that join together.

- \_\_\_\_\_ 18. Flooding is a natural part of a river's behavior.
- \_\_\_\_\_ 19. With transpiration, trees takes up water from the soil and releases it into the air through their leaves.
- \_\_\_\_\_ 20. Streams come together at a confluence.
- \_\_\_\_\_ 21. Kelp forests are found in the littoral zone.
- \_\_\_\_\_ 22. Whales, dolphins and manatees are cetaceans.
- \_\_\_\_\_ 23. In wet areas, the top of a stream is also the top of the water table.
- \_\_\_\_\_ 24. Recharge into the Ogallala Aquifer is only about one-HALF the amount of draw down from pumping.
- \_\_\_\_\_ 25. The aphotic zone makes up the majority of the ocean.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

26. \_\_\_\_\_ occurs when water moves from wet to dry regions of soil.
27. Water vapor in the atmosphere becomes water droplets in a cloud by the process of \_\_\_\_\_.
28. H<sub>2</sub>O in gaseous form is \_\_\_\_\_.
29. \_\_\_\_\_ is the time a water molecule stays in a reservoir.
30. \_\_\_\_\_ are consumers that float at the surface their whole lives.
31. The height of a(n) \_\_\_\_\_ increases as it nears the shore.
32. If a lot of water is pumped from an aquifer the water table will \_\_\_\_\_.
33. \_\_\_\_\_ are the daily rise and fall of sea level at any given place.
34. \_\_\_\_\_ are potentially dangerous currents that carry large amounts of water offshore quickly.
35. \_\_\_\_\_ have the smallest tidal range and occur when the Earth, Moon, and Sun form a 90° angle.

**Short Answer**

*Answer each question in the space provided.*

36. Draw a diagram of the water cycle and label the reservoirs and processes that connect them. What phase is water in in each of the reservoirs?

37. Describe the causes of floods and their effects.

38. Describe how wells access water. What can happen if a lot of wells are pumping from the same aquifer?

39. Describe the composition of ocean water.

40. Describe what causes tides. What are spring tides and neap tides?

## 27.7 Unit 7: Weather and Climate Test

Unit 7 chapters: *Earth's Atmosphere, Weather, and Climate*

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

Circle the letter of the correct choice.

- Which of the following decreases with an increase in altitude?
  - air pressure
  - visibility
  - water vapor
  - none of the above
- You are in a moist forest, thick with tall coniferous trees. Which biome are you probably in?
  - subpolar
  - humid continental
  - marine west coast
  - humid subtropical
- Which appear thin and wispy?
  - Stratus
  - Nimbostratus
  - Altostratus
  - Cirrus
- At autumnal equinox the sun is directly above
  - the Tropic of Capricorn
  - the Tropic of Cancer
  - the South Pole
  - the Equator
- In which layer of the atmosphere does all weather take place?
  - Troposphere
  - Stratosphere
  - Mesosphere
  - Thermosphere
- Which of the following is a measure of how fast atoms in a material are moving?
  - pressure
  - albedo
  - temperature
  - radiation
- Thunderstorms form when
  - the ground is warm and updrafts form
  - ground temperature is higher than 28-degrees Centigrade
  - a high pressure cell is over the area
  - lightning releases heat energy so the storm grows

8. Which of the following adds oxygen to the atmosphere?
  - a. forest fires
  - b. photosynthesis
  - c. weathering of rocks
  - d. life processes of animals
9. What features does an air mass have nearly identical throughout?
  - a. fog and humidity
  - b. pressure and temperature
  - c. pressure and humidity
  - d. temperature and humidity
10. Which weather phenomena is the most deadly per year?
  - a. hurricane
  - b. heat wave
  - c. tornado
  - d. blizzard
11. If the readings on your barometer fall,
  - a. a change in weather is coming
  - b. storm clouds are probably on the way
  - c. clear skies are probably coming
  - d. you don't know anything about the future; barometers can't be used to predict weather
12. A squall line is
  - a. the line where cold air transitions to warm air at a warm front.
  - b. the location where a cold front catches up to a warm front, resulting in cold, warm and then cold.
  - c. the location where a front stops and remains stationary.
  - d. a line of thunderstorms along a cold front.
13. Outside one morning the plants are coated with water but it didn't rain. The wetness is because
  - a. a fog came in overnight.
  - b. an inversion caused water to condense on the plants.
  - c. the air near the plants cooled to below its dew point.
  - d. this couldn't happen. It must have rained.
14. El Niño events
  - a. occur when ocean temperatures get high.
  - b. cause the trade winds to reverse direction or stop.
  - c. stop upwelling off of western South America.
  - d. all of these
15. Carbon dioxide levels in the atmosphere
  - a. have been rising at least since 1958
  - b. rose in the 1950s and 1960s, but are now stable
  - c. have been declining since around 1972
  - d. none of these

**True or False**

Write true if the statement is true or false if the statement is false.

- \_\_\_\_\_ 16. The sun is the source of heat for the troposphere.
- \_\_\_\_\_ 17. Many characteristics of a storm can be mapped using radar.



- \_\_\_\_\_ 18. Pilots prefer to fly in the stratosphere because of the lack of turbulence.
- \_\_\_\_\_ 19. As temperature decreases, relative humidity decreases.
- \_\_\_\_\_ 20. The thermosphere contains the ozone layer.
- \_\_\_\_\_ 21. Water has a high specific heat.
- \_\_\_\_\_ 22. Ozone is the only atmospheric gas that filters out some wavelengths of solar radiation.
- \_\_\_\_\_ 23. UVC causes sunburns and is dangerous to plants when it reaches the Earth's surface.
- \_\_\_\_\_ 24. Each layer of the atmosphere is different because it has a different temperature gradient.
- \_\_\_\_\_ 25. A continental climate has a greater difference in temperature between day and night than a maritime climate.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

26. The low pressure zone near the equator where Hadley Cells meet is the \_\_\_\_\_.
27. In \_\_\_\_\_ tropical rainforest is cleared and burned and then farmed until the soil is no longer fertile.
28. Winds blow from \_\_\_\_\_ pressure zones to \_\_\_\_\_ pressure zones.
29. A(n) \_\_\_\_\_ is an uphill airflow.
30. The planet is divided into \_\_\_\_\_ major climate groups.
31. Lines of equal pressure are called \_\_\_\_\_.
32. Relatively warm air on the cold ground may lead to \_\_\_\_\_.
33. In a(n) \_\_\_\_\_ the air mass does not move.
34. \_\_\_\_\_ describes what the atmosphere is like at a specific time and place.
35. \_\_\_\_\_ is the measure of how well a surface reflects light.

**Short Answer**

*Answer each question in the space provided.*

36. What is the effect of there being more solar radiation striking at the equator than toward the poles?

37. Describe the greenhouse effect. Why is greenhouse effect so important to life on Earth?

38. How and under what conditions does a hurricane form?

39. What happens when air masses meet?

40. Climate has changed throughout Earth history. Why is climate change dangerous now?

## 27.8 Unit 8: The Environment and Human Actions Test

Unit 8 chapters: *Ecosystems and Human Populations*, *Human Actions and the Land*, *Human Actions and Earth's Resources*, *Human Actions and Earth's Water*, and *Human Actions and the Atmosphere*

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

Circle the letter of the correct choice.

1. Which type of relationship does a bee have with a flower that it is pollinating?
  - a. Commensalism
  - b. Parasitism
  - c. Mutualism
  - d. None of the above
2. Which of the following had the single greatest impact on allowing humans to increase their carrying capacity?
  - a. raising livestock
  - b. building shelter
  - c. making tools
  - d. farming
3. Carbon sinks include
  - a. forests, oceans, the atmosphere
  - b. volcanic eruptions
  - c. fossil fuels being burned
  - d. igneous and metamorphic rocks
4. Toxic chemicals, flammable compounds, and substances that cause dangerous chemical reactions are all
  - a. cancer causing
  - b. hazardous wastes
  - c. illegal in the United States
  - d. all of these
5. To conserve resources, we should all
  - a. reduce consumption
  - b. reuse products when we can
  - c. recycle materials
  - d. all of these
6. Which of the following is a product of aquaculture?
  - a. shellfish
  - b. potatoes
  - c. golf courses
  - d. clean, safe water
7. The net-energy ratio of solar energy is 5.8 and of petroleum is 4.9. This means that
  - a. solar energy is cheaper to use than petroleum.
  - b. more usable energy is obtained per unit of solar than of petroleum.
  - c. the overall energy loss is greater for solar than for petroleum.

- d. all of these.
8. Which of the following can increase the conservation of water?
- Convert to more efficient methods of irrigation
  - Reduce household demand
  - water lawns less
  - all of the above
9. The best way to be sure energy resources will continue to be available is to
- develop new sources of fossil fuels.
  - develop new alternative energy sources.
  - conserve energy.
  - develop nuclear fusion.
10. Clean, safe water is
- available to about one-fifth of all the world's people.
  - going to become available to more people in the coming decades.
  - available to nearly all of the world's people.
  - none of these.
11. The ozone hole is caused by
- photochemically produced ozone.
  - ozone-destroying chemicals in the stratosphere.
  - CFCs on polar stratospheric clouds near the north pole.
  - none of these.
12. World Health Organization estimates how many people per year die from complications caused by air pollution?
- 2 million
  - 12 million
  - 22 million
  - 200 million
13. Most ocean pollution comes from
- oil spills
  - ships at sea
  - acid rain
  - land
14. Which soil layer is the most likely to erode?
- topsoil
  - A Horizon
  - B Horizon
  - bedrock
15. A cap-and-trade system provides a monetary incentive
- to individuals to conserve energy.
  - to nations to develop conservation strategies and technologies.
  - to regions to reduce carbon dioxide emissions by promoting conservation.
  - none of these.

**True or False**

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 16. When glaciers retreat, the sea level falls.
- \_\_\_\_\_ 17. Climate determines the ecosystem within a given area.
- \_\_\_\_\_ 18. Producers are the food energy for many other organisms.
- \_\_\_\_\_ 19. Incandescent light bulbs are the most energy efficient.
- \_\_\_\_\_ 20. To reduce energy use, it is important to get as much work out of a unit of energy as possible.
- \_\_\_\_\_ 21. The cost of a resource depends on its availability, the cost of extracting and delivering it and the politics of the situation.
- \_\_\_\_\_ 22. A vulture is an example of a scavenger.
- \_\_\_\_\_ 23. Charles Darwin predicted the human population would continue to grow until we have exhausted all of our resources.
- \_\_\_\_\_ 24. Wildlife is always a renewable resource.
- \_\_\_\_\_ 25. The largest cause of soil erosion is agriculture.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

26. \_\_\_\_\_ is a government program to identify and fund the cleanup of extremely hazardous waste sites.
27. Nitrogen in fertilizer causes algae to grow because that nutrient is a(n) \_\_\_\_\_.
28. The energy level within a food chain is known as the \_\_\_\_\_.
29. \_\_\_\_\_ of resources, particularly by developed nations, is unsustainable in the long term.
30. Earth's supply of petroleum will be used up in decades meaning that it is a \_\_\_\_\_ resource.
31. The total amount of energy that is possible to extract from a resource is the \_\_\_\_\_.
32. The small island nation of Tuvalu with few natural resources must \_\_\_\_\_ nearly all of its goods.
33. If we do not reduce carbon emissions, we may develop geoengineering to remove carbon from the atmosphere known as \_\_\_\_\_.
34. Organisms that can lead to diseases are known as \_\_\_\_\_.
35. Most cities have plants that process \_\_\_\_\_ to remove contaminants from wastewater.

**Short Answer**

*Answer each question in the space provided.*

36. Explain the difference between niche and habitat.

37. What can be done to reduce soil erosion on farmland?

38. For alternative energy sources like solar, wind and biofuels to replace fossil fuels, what would need to happen?

39. What has happened to water use in the past 100 years in developed and developing nations? What is predicted to happen to water use in the next 50?

40. How can people reduce air pollution?

## 27.9 Unit 9: Astronomy Test

Unit 9 chapter: *Observing and Exploring Space, Earth, Moon, and Sun, The Solar System, and Stars, Galaxies, and the Universe*

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

### Multiple Choice

*Circle the letter of the correct choice.*

1. A rocket moves in space because the action force of the engines
  - a. thrusts in a forward motion against the atmosphere
  - b. causes a temperature differential on top and bottom of the rocket propelling it forward
  - c. creates a reaction force of the gases on the rocket
  - d. none of these
2. What is the shape of Earth's path around the Sun?
  - a. square
  - b. circle
  - c. sphere
  - d. ellipse
3. Which layer of the Sun is the part that we see?
  - a. core
  - b. chromosphere
  - c. photosphere
  - d. corona
4. When the new moon passes directly between Earth and the Sun, what occurs?
  - a. solar eclipse
  - b. neap tides
  - c. lunar eclipse
  - d. none of these
5. Who was the first man to set foot on the moon?
  - a. James Lovell
  - b. Buzz Aldrin
  - c. Neil Armstrong
  - d. Edward Hubble
6. The Sun is made of
  - a. hydrogen and helium gas
  - b. hydrogen and a little helium in the form of plasma
  - c. helium gas and some rock and metal in the core
  - d. burning metal and gas
7. Who invented the first reflecting telescope?
  - a. Edward Hubble
  - b. Sir Isaac Newton
  - c. Galileo Galilei

- d. Johannes Kepler
8. Why are elliptical galaxies typically reddish?
- they are blue shifted towards Earth
  - they contain older stars
  - there is nebular gas within them
  - they contain newer stars
9. Which planetary body has felsic highlands surrounded by mafic basalt lavas?
- Moon
  - Mercury
  - Venus
  - Mars
10. According to the nebular hypothesis, the solar system formed
- from the collapse of a giant cloud of gas and dust
  - in a supernova explosion
  - in the first few minutes after the Big Bang
  - none of these
11. Who first observed that an object can orbit something besides Earth?
- Copernicus
  - Galileo
  - Ptolemy
  - Einstein
12. Which of the following is NOT part of the definition of a planet?
- Must orbit a star.
  - Must have enough gravity that it is spherical.
  - Must have cleared its orbit of debris.
  - Must have water.
13. To learn about the material that makes up the interiors of planets, scientists study
- volcanic rocks
  - the surface of the Moon
  - meteorites
  - the solar wind
14. Spherical groups of old stars tightly held together by gravity are
- nebulae
  - galaxies
  - open clusters
  - globular clusters
15. Evidence for the Big Bang includes that the universe is expanding and there is
- a small amount of heat remaining
  - a small amount of reverberating sound remaining
  - blueshift of the farthest out galaxies
  - none of these

### True or False

*Write true if the statement is true or false if the statement is false.*

- \_\_\_\_\_ 16. The Earth has seasons because of its elliptical orbit around the Sun.



- \_\_\_\_\_ 17. The Earth's crust is made up of about 75% iron which produces strong magnetic fields.
- \_\_\_\_\_ 18. A satellite in a geostationary orbit hovers over the same position on Earth.
- \_\_\_\_\_ 19. Galileo invented the first telescope.
- \_\_\_\_\_ 20. All of the spacecraft we have sent out for exploration are within our solar system.
- \_\_\_\_\_ 21. When you observe a galaxy far, far away you are seeing what it looked like billions of years ago.
- \_\_\_\_\_ 22. Radio telescopes are best used to study objects within our solar system.
- \_\_\_\_\_ 23. Space-based telescopes provide clearer views of the planets and other stars.
- \_\_\_\_\_ 24. The Universe began about 13.7 billion years ago and the Solar System about 5 billion years ago.
- \_\_\_\_\_ 25. You would weigh one-sixth of your current weight on the moon.

**Fill in the Blanks**

*Fill in the blank with the term that best completes the sentence.*

26. The \_\_\_\_\_ is an enormous, oval-shaped storm on Jupiter.
27. Most of the solar system's mass is in \_\_\_\_\_ .
28. When Moon and Sun are on opposite sides of Earth the tides will be \_\_\_\_\_.
29. For there to be weather, a planet or satellite must have a(n) \_\_\_\_\_
30. During a solar eclipse, Earth falls into the \_\_\_\_\_ of the moon.
31. At the center of many galaxies is a(n) \_\_\_\_\_.
32. Sunspots occur in \_\_\_\_\_ year cycles.
33. Moving a rocket through space requires \_\_\_\_\_.
34. All galaxies and stars that we observe appear to have a \_\_\_\_\_ in their light spectra.
35. The \_\_\_\_\_ model places the Sun at the center of the solar system.

**Short Answer**

*Answer each question in the space provided.*

36. List the terrestrial planets and describe their common characteristics.

37. What did Galileo observe with his telescope that changed the way people thought about the solar system and why?

38. Explain the difference between asteroids, meteoroids, and comets.

39. Why is Pluto now considered a dwarf planet?

40. What started the space race? How did the United States react?