

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

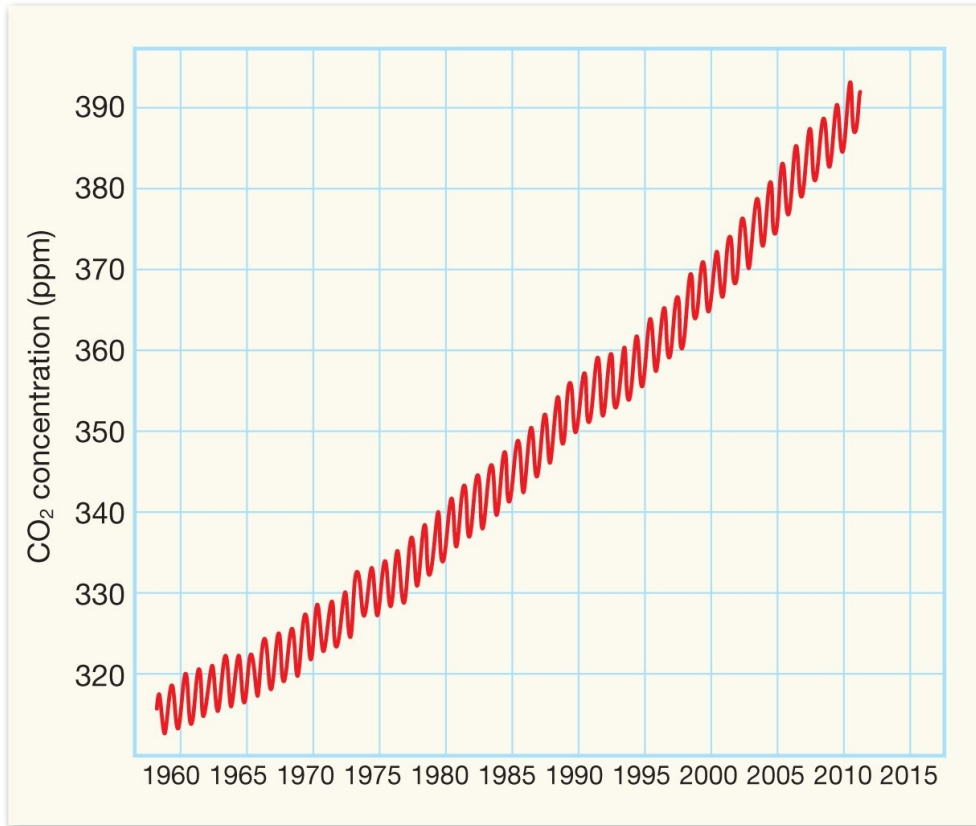
- 1) This country has the greatest variety of weather in the world. 1) \_\_\_\_\_
  - A) United States
  - B) China
  - C) Russia
  - D) South Africa
  - E) Australia
  
- 2) The term *meteorology*: 2) \_\_\_\_\_
  - A) is the study of the atmosphere and its related weather systems.
  - B) can be used interchangeably with *climate* because they have the same meaning.
  - C) is the study of the long-term average weather conditions at a given location.
  - D) is the study of meteors and their effects on the atmosphere.
  
- 3) Which of the following statements is an expression of *climate*? 3) \_\_\_\_\_
  - A) Big Rapids, MI, recorded six inches of snowfall today.
  - B) February is the wettest month in Los Angeles, CA, with an average rainfall of 3.92 inches.
  - C) Tornado warnings are in effect for Oklahoma City, OK.
  - D) Tomorrow's high is forecasted to be 67°F.
  
- 4) A primary difference between the concepts of weather and climate is the: 4) \_\_\_\_\_
  - A) temperature scale used.
  - B) measuring technique used.
  - C) type of weather elements measured.
  - D) time period involved.
  
- 5) The BEST definition of the term *climate* is: 5) \_\_\_\_\_
  - A) a comprehensive statistical analysis of aggregate weather conditions in a specific place or region.
  - B) average weather over a long period of time.
  - C) the weather occurring in the atmosphere at a specific place and time.
  - D) identical to the definition of *meteorology*.
  
- 6) The basic elements of weather and climate include all of the following, EXCEPT: 6) \_\_\_\_\_
  - A) the temperature of the air.
  - B) the chemical composition of the air.
  - C) the pressure of the air.
  - D) the type and amount of cloudiness.
  - E) the humidity of the air.
  
- 7) How many weather-related disasters with costs in excess of \$1 billion occurred in the United States between 2000 and 2013? 7) \_\_\_\_\_
  - A) 12
  - B) 84
  - C) 5
  - D) 34

- 8) The primary function of the *Tropical Rainfall Measuring Mission* is to: 8) \_\_\_\_\_  
 A) utilize remote sensing to measure precipitation amounts in uninhabited rain forests.  
 B) provide satellite data about precipitation in the low latitudes, over both land and water.  
 C) forecast the tracks of hurricanes in the Northern Hemisphere.  
 D) aid in the reconstruction of past climates in the tropics.
- 9) In meteorological terminology, the acronym *TRMM* refers to: 9) \_\_\_\_\_  
 A) the international scientific panel on Technology, Research, and Methods in Meteorology.  
 B) Tropospheric Radiation and Meteorological Measurement.  
 C) the Typical Receipt of Mesospheric Meteors.  
 D) the Tropical Rainfall Measuring Mission satellite.
- 10) In the process of scientific inquiry, a *theory* is best defined as: 10) \_\_\_\_\_  
 A) the initial formulation of an idea based on a few observed facts.  
 B) a final solution to a scientific problem that is proven correct and will never be disproven.  
 C) a hypothesis that has been extensively tested and is generally accepted by the scientific community.  
 D) a "best guess" that may explain how something works, but is as yet untested and unproven.
- 11) Which of the following outlines the steps of the scientific method in the correct order? 11) \_\_\_\_\_  
 A) test hypothesis; develop hypothesis; collect data; accept/modify/reject hypothesis  
 B) collect data; test hypothesis; develop hypothesis; accept/modify/reject hypothesis  
 C) collect data; develop hypothesis; test hypothesis; accept/modify/reject hypothesis  
 D) develop hypothesis; test hypothesis; accept/modify/reject hypothesis; collect data
- 12) Which one of the following is NOT a term used to designate one of the "spheres" of the earth's environment? 12) \_\_\_\_\_  
 A) biosphere                      B) geosphere                      C) atmosphere                      D) aquasphere
- 13) Which of the following spheres is composed exclusively of water? 13) \_\_\_\_\_  
 A) atmosphere                      B) lithosphere                      C) hydrosphere                      D) biosphere
- 14) The common boundary where different parts of a system interact is called: 14) \_\_\_\_\_  
 A) an interface.                      B) the plane of interaction.  
 C) a systemic boundary.                      D) a cycle.
- 15) Which of the following is an example of an *interface*? 15) \_\_\_\_\_  
 A) The formation of the Grand Canyon as running water erodes, transports, and deposits rock.  
 B) The circulation of water through the hydrologic cycle.  
 C) Solar energy traveling through space.  
 D) The formation of an igneous rock as lava cools following a volcanic eruption.
- 16) Earthquakes and volcanoes are both phenomena produced by the: 16) \_\_\_\_\_  
 A) atmosphere.                      B) geosphere.                      C) hydrosphere.                      D) biosphere.
- 17) The least dense portion of the solid Earth is the: 17) \_\_\_\_\_  
 A) core.                      B) mantle.                      C) center.                      D) crust.

- 18) The majority of the water outside of the oceans is in the form of: 18) \_\_\_\_\_  
A) water vapor in the atmosphere.  
B) lakes.  
C) glacial ice.  
D) groundwater.  
E) streams.
- 19) In which sphere would we find insects, plants, humans, and bacteria? 19) \_\_\_\_\_  
A) atmosphere                      B) hydrosphere                      C) geosphere                      D) biosphere
- 20) The earth system: 20) \_\_\_\_\_  
A) is the highest level of system possible.  
B) cannot be affected by anything from space.  
C) is powered solely by the Sun.  
D) includes parts that affect one another.
- 21) An interacting group of parts that is fueled by energy and works to accomplish the movement of matter or energy is called: 21) \_\_\_\_\_  
A) a threshold.                      B) a collection.                      C) a sphere.                      D) a system.
- 22) The Earth subsystem that represents the circulation of Earth's water throughout the hydrosphere, atmosphere, biosphere, and geosphere is know as the: 22) \_\_\_\_\_  
A) evaporative cycle.                      B) hydrologic cycle.  
C) water rotation.                      D) aquasphere.
- 23) *Air* may best be described as: 23) \_\_\_\_\_  
A) a compound.  
B) one of four basic substances that composes all things.  
C) a mixture.  
D) an element.
- 24) The most important source of the free oxygen in our atmosphere is: 24) \_\_\_\_\_  
A) deforestation.  
B) volcanic degassing.  
C) the dissociation of water vapor in the upper atmosphere.  
D) green plants that carry on photosynthesis.
- 25) Photosynthesis: 25) \_\_\_\_\_  
A) was prevalent during the first years of the earth's atmosphere.  
B) releases carbon dioxide into the atmosphere.  
C) releases oxygen into the atmosphere.  
D) is carried out primarily by bacteria.
- 26) Which of these was NOT involved with the formation and evolution of our present atmosphere? 26) \_\_\_\_\_  
A) stratification                      B) outgassing                      C) cooling                      D) photosynthesis

- 27) The first function of water vapor in the earth's original atmosphere was to: 27) \_\_\_\_\_
- A) provide needed nourishment for primitive plants.
  - B) create oxygen.
  - C) fall as rain and thus fill the oceans.
  - D) increase the amount of carbon dioxide in the atmosphere.
  - E) block the solar wind.
- 28) Which one of the following is the MOST abundant gas in the atmosphere? 28) \_\_\_\_\_
- A) carbon dioxide
  - B) oxygen
  - C) hydrogen
  - D) nitrogen
  - E) argon
- 29) Which two gases make up a combined total of 99% of clean, dry air in the homosphere? 29) \_\_\_\_\_
- A) oxygen and carbon dioxide
  - B) nitrogen and oxygen
  - C) carbon dioxide and water vapor
  - D) nitrogen and argon

Consider the following diagram, and then answer the question below.



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- 30) According to current scientific consensus, what is the reason for the upward trend in overall CO<sub>2</sub> concentrations demonstrated in the graph above? 30) \_\_\_\_\_
- A) rapidly increasing fossil fuel combustion and the resulting emissions
  - B) changes in Earth's atmosphere brought about by natural climate variation
  - C) large and increasingly frequent volcanic eruptions
  - D) The causes are still unknown.
- 31) What best explains the "bumps" seen in the seen in the CO<sub>2</sub> concentrations on the graph above? 31) \_\_\_\_\_
- A) changes in plant growth that result in less CO<sub>2</sub> being absorbed during the dormant season
  - B) greater amounts of CO<sub>2</sub> released by the burning of fossil fuels for heat during the winter
  - C) higher levels of traffic producing more CO<sub>2</sub> during the summer travel season
  - D) a cyclic pattern in the eruption of volcanoes, causing more CO<sub>2</sub> to be released each spring
- 32) Scientists believe that a growing amount of this gas in the atmosphere will probably bring about continued warming of the lower atmosphere. 32) \_\_\_\_\_
- A) carbon dioxide
  - B) oxygen
  - C) hydrogen
  - D) nitrogen
  - E) argon

- 33) Carbon dioxide currently has a concentration of \_\_\_\_\_ in the homosphere. 33) \_\_\_\_\_  
 A) 270 ppm                      B) 580 ppm                      C) 400 ppm                      D) 315 ppm
- 34) Which of the following is NOT a variable component of the atmosphere? 34) \_\_\_\_\_  
 A) ozone                      B) water vapor                      C) argon                      D) aerosols
- 35) This variable atmospheric component can exist in all three states of matter (solid, liquid, and gas) at the temperatures and pressures that normally exist on Earth. 35) \_\_\_\_\_  
 A) nitrogen                      B) oxygen                      C) methane                      D) ozone                      E) water
- 36) Water vapor represents what fraction of the air near the earth's surface? 36) \_\_\_\_\_  
 A) about 10 percent  
 B) about 20 percent  
 C) 40 - 100 percent  
 D) less than 4 percent  
 E) 0 - 100 percent
- 37) Which of the following is the MOST important atmospheric component with regard to the earth's climate and the formation of weather systems? 37) \_\_\_\_\_  
 A) oxygen  
 B) water vapor  
 C) argon  
 D) ozone  
 E) nitrogen
- 38) Which one of the following gases has the greatest effect on weather? 38) \_\_\_\_\_  
 A) ozone  
 B) argon  
 C) nitrogen  
 D) water vapor  
 E) oxygen
- 39) Which of these is NOT a significant factor in the role played by particles or dust in the atmosphere? 39) \_\_\_\_\_  
 A) cloud formation                      B) reflection of sunlight  
 C) absorption of sunlight                      D) ozone production
- 40) Dust and aerosols in the atmosphere are associated with all of the following EXCEPT: 40) \_\_\_\_\_  
 A) optical phenomena such as red sky at sunset.  
 B) altering the amount of oxygen in the atmosphere.  
 C) reflection of solar energy.  
 D) condensation and cloud formation.
- 41) The *ozone layer* is found in the: 41) \_\_\_\_\_  
 A) stratosphere.  
 B) troposphere.  
 C) ionosphere.  
 D) thermosphere.  
 E) mesosphere.

- 42) This atmospheric component absorbs damaging ultraviolet radiation from the Sun. 42) \_\_\_\_\_  
 A) argon                      B) nitrogen                      C) neon                      D) ozone                      E) helium
- 43) Studies have shown that on average ozone depletion is greatest over this area. 43) \_\_\_\_\_  
 A) North America  
 B) Antarctica  
 C) the Middle East  
 D) Europe  
 E) Australia
- 44) When chlorofluorocarbons (CFCs) are subjected to sunlight, they release \_\_\_\_\_, in turn leading 44) \_\_\_\_\_  
 to the destruction of ozone molecules.  
 A) hydrogen  
 B) chlorine  
 C) carbon  
 D) carbon dioxide  
 E) nitrogen
- 45) Ozone: 45) \_\_\_\_\_  
 A) is considered beneficial at the surface of the Earth.  
 B) is concentrated in the mesosphere.  
 C) protects life on Earth by filtering harmful UV radiation from sunlight.  
 D) is rapidly depleting for reasons scientists do not yet fully understand.
- 46) The Montreal Protocol: 46) \_\_\_\_\_  
 A) will not create immediate, rapid drops in atmospheric CFC levels.  
 B) was designed primarily to address the problem of global warming.  
 C) was not adhered to by the United States.  
 D) is generally considered a diplomatic disaster by most environmentalists.  
 E) was only signed by 24 countries.
- 47) Atmospheric pressure is caused by: 47) \_\_\_\_\_  
 A) the rotation of Earth.                      B) solar radiation.  
 C) the weight of the air above.                      D) Earth's magnetic field.
- 48) Ninety percent of our atmosphere lies below an altitude of about: 48) \_\_\_\_\_  
 A) 6 km.                      B) 31 km.                      C) 65 km.                      D) 100 km.                      E) 16 km.
- 49) At sea level, how far can a molecule in the atmosphere travel before it collides with another 49) \_\_\_\_\_  
 molecule?  
 A)  $5 \times 10^{-4}$  cm                      B) .004 cm                      C)  $7 \times 10^{-6}$  cm                      D) 2 cm
- 50) With an INCREASE in altitude, air pressure: 50) \_\_\_\_\_  
 A) decreases at a decreasing rate.  
 B) decreases at an increasing rate.  
 C) increases at a decreasing rate.  
 D) increases at a constant rate.  
 E) decreases at a constant rate.

- 51) The four *thermal* layers of the atmosphere in order beginning from the surface are: 51) \_\_\_\_\_  
A) mesosphere, stratosphere, thermosphere, troposphere.  
B) thermosphere, stratosphere, mesosphere, troposphere.  
C) troposphere, stratosphere, mesosphere, thermosphere.  
D) stratosphere, troposphere, mesosphere, thermosphere.
- 52) Which of the following associations is CORRECT? 52) \_\_\_\_\_  
A) troposphere — positive lapse rate  
B) mesosphere — begins at a height of 50 km  
C) thermosphere — high heat  
D) stratosphere — coldest temperatures in the atmosphere
- 53) The term *troposphere* literally means: 53) \_\_\_\_\_  
A) "region of weather."  
B) "layer of life."  
C) region where air "turns over."  
D) "warm air."
- 54) On the average, for every 1 km increase in altitude in the *troposphere* the air temperature: 54) \_\_\_\_\_  
A) rises by day and drops by night.  
B) drops about 6.5 degrees Celsius.  
C) rises about 6.5 degrees Celsius.  
D) remains unchanged for the first 500 m and then drops.
- 55) The *normal lapse rate* applies to the: 55) \_\_\_\_\_  
A) thermosphere.      B) stratosphere.      C) mesosphere.      D) troposphere.
- 56) Assuming the average value of the *environmental lapse rate*, what would be the temperature in the tropopause at a height of 3 km if the temperature at the surface is 20°C? 56) \_\_\_\_\_  
A) 9.2°C  
B) 32.9°C  
C) 0.5°C  
D) The answer cannot be calculated with the information given.
- 57) The summit of Mt. Everest (8.85 km) is most typically found in the: 57) \_\_\_\_\_  
A) thermosphere.      B) stratosphere.      C) troposphere.      D) mesosphere.
- 58) The *troposphere* is most likely to be thickest: 58) \_\_\_\_\_  
A) over the South Pole.  
B) over the equator.  
C) over the Arctic Circle.  
D) at about 45 degrees north and 45 degrees south.  
E) over the North Pole.





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- 59) The name of the instrument being launched with a weather balloon in the photograph above is: 59) \_\_\_\_\_  
A) a TRMM sensor. B) a radiosonde.  
C) a satellite. D) a Doppler radar.
- 60) Which of the following is NOT true of radiosondes? 60) \_\_\_\_\_  
A) They are critical sources of data for weather forecasters.  
B) They are carried aloft by weather balloons.  
C) They send meteorological data to the ground via radio transmitters.  
D) They never record positive lapse rates (increasing temperature with height) until they pass into the stratosphere.
- 61) You are gathering information for a severe weather forecast and you need to know the temperature and relative humidity of the air all the way up to the tropopause. The instrument you need to employ is: 61) \_\_\_\_\_  
A) an aircraft. B) a satellite.  
C) a weather radar. D) a weather balloon with radiosonde.

- 62) The "weather sphere" is in the: 62) \_\_\_\_\_  
 A) mesosphere.                      B) stratosphere.                      C) troposphere.                      D) thermosphere.
- 63) While ascending through the atmosphere, you record temperature *with a standard thermometer* and find that the temperature has risen from  $-48^{\circ}\text{C}$  ( $-54^{\circ}\text{F}$ ) to  $-18^{\circ}\text{C}$  ( $-0.4^{\circ}\text{F}$ ) over the last 10 km (6.2 miles). Which of the following regions of the atmosphere are you most likely in? 63) \_\_\_\_\_  
 A) thermosphere                      B) troposphere                      C) mesosphere                      D) stratosphere
- 64) Ozone is concentrated in the: 64) \_\_\_\_\_  
 A) stratosphere.                      B) troposphere.                      C) mesosphere.                      D) thermosphere.
- 65) The lowest temperatures in the atmosphere exist in the: 65) \_\_\_\_\_  
 A) stratosphere.                      B) mesosphere.                      C) thermosphere.                      D) troposphere.
- 66) The level of the atmosphere with the highest temperatures is the: 66) \_\_\_\_\_  
 A) troposphere.                      B) thermosphere.                      C) mesosphere.                      D) stratosphere.
- 67) If you were to put your hand out into the thermosphere, it would: 67) \_\_\_\_\_  
 A) not feel any heat, because very few air molecules would collide with your skin.  
 B) instantly burn up because of very high temperatures.  
 C) freeze quickly because of the very cold temperatures.  
 D) gradually warm up above body temperature.
- 68) Because of limitations in existing technology, which layer of the atmosphere do we know the LEAST about? 68) \_\_\_\_\_  
 A) Thermosphere                      B) Troposphere                      C) Stratosphere                      D) Mesosphere
- 69) The heterosphere and ionosphere BOTH coincide with the: 69) \_\_\_\_\_  
 A) troposphere.                      B) thermosphere.                      C) mesosphere.                      D) stratosphere.
- 70) The *auroras* that are visible in the southern hemisphere are the: 70) \_\_\_\_\_  
 A) antarctic aurora.                      B) ionic aurora.  
 C) aurora borealis.                      D) aurora australis.
- 71) The approximate altitude of auroral displays is: 71) \_\_\_\_\_  
 A) 80-400 km.  
 B) below 30 km.  
 C) above 1000 km.  
 D) about 50 km.  
 E) above 500 km.
- 72) The *ionosphere* is an atmospheric region defined on the basis of: 72) \_\_\_\_\_  
 A) pressure.                                      B) electrical charges.  
 C) composition.                                      D) temperature structure.
- 73) The aurora borealis will most likely be stronger: 73) \_\_\_\_\_  
 A) nearest the equator.  
 B) when there is a lot of solar flare activity.  
 C) when there are few ions in the ionosphere.  
 D) above the South Pole.

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 74) Weather influences people, but people don't influence weather. 74) \_\_\_\_\_
- 75) Weather and climate are synonymous terms. 75) \_\_\_\_\_
- 76) "Average weather" is an adequate definition of climate. 76) \_\_\_\_\_
- 77) Climate knowledge can be used to accurately predict weather. 77) \_\_\_\_\_
- 78) A scientific hypothesis may be regarded as a tentative explanation of observed facts or events. 78) \_\_\_\_\_
- 79) Scientific hypotheses are rejected when they do not agree with observed data. 79) \_\_\_\_\_
- 80) A scientific law is a brief statement illustrating a basic principle that has been repeatedly supported with observations and measurements. 80) \_\_\_\_\_
- 81) The biosphere interacts with the lithosphere, the hydrosphere, and the atmosphere. 81) \_\_\_\_\_
- 82) Nearly all of planet Earth's mass is in the region known as the hydrosphere. 82) \_\_\_\_\_
- 83) The oceans cover about 50 percent of the earth's surface. 83) \_\_\_\_\_
- 84) At one time the earth's atmosphere contained no free oxygen. 84) \_\_\_\_\_
- 85) Although carbon dioxide is present only in small amounts, it is still very important meteorologically. 85) \_\_\_\_\_
- 86) Carbon dioxide's importance in the atmosphere is solely due to its absorption and release of latent heat. 86) \_\_\_\_\_
- 87) The rise of atmospheric carbon dioxide levels over the last century is largely due to the burning of fossil fuels. 87) \_\_\_\_\_
- 88) Ozone is actually a form of the element hydrogen. 88) \_\_\_\_\_
- 89) Ozone is continually created in our atmosphere by the effects of solar radiation. 89) \_\_\_\_\_
- 90) Ozone is a significant atmospheric component in the warming of the troposphere. 90) \_\_\_\_\_
- 91) The depletion of stratospheric ozone is primarily a problem only in urban areas. 91) \_\_\_\_\_
- 92) Depletion of the ozone layer leads to increased amounts of UV radiation striking the surface of the earth. 92) \_\_\_\_\_
- 93) The largest hole in the ozone layer was observed in 1982. 93) \_\_\_\_\_

- 94) The tropopause is found where the air temperature stops decreasing with height somewhere around 7.5 miles above the surface. 94) \_\_\_\_\_
- 95) Vertical motion in the lower atmosphere is strongly related to the environmental lapse rate. 95) \_\_\_\_\_
- 96) The environmental lapse rate is not constant. 96) \_\_\_\_\_
- 97) Weather occurs in the thermosphere. 97) \_\_\_\_\_
- 98) The stratosphere is an example of a positive lapse rate. 98) \_\_\_\_\_
- 99) The thermosphere has the lowest temperatures in the atmosphere. 99) \_\_\_\_\_
- 100) There is a sharp and definable boundary between the atmosphere and outer space. 100) \_\_\_\_\_
- 101) The atmosphere ends abruptly at an altitude of 30 kilometers. 101) \_\_\_\_\_
- 102) There is no well-defined thermopause. 102) \_\_\_\_\_
- 103) Satellites do not orbit in the thermosphere because the intense heat would quickly incinerate them. 103) \_\_\_\_\_
- 104) The ionosphere is a region within the stratosphere. 104) \_\_\_\_\_
- 105) Auroral displays increase conspicuously at times when sunspots are most numerous. 105) \_\_\_\_\_
- 106) The ions in the ionosphere come primarily from oxygen and nitrogen. 106) \_\_\_\_\_

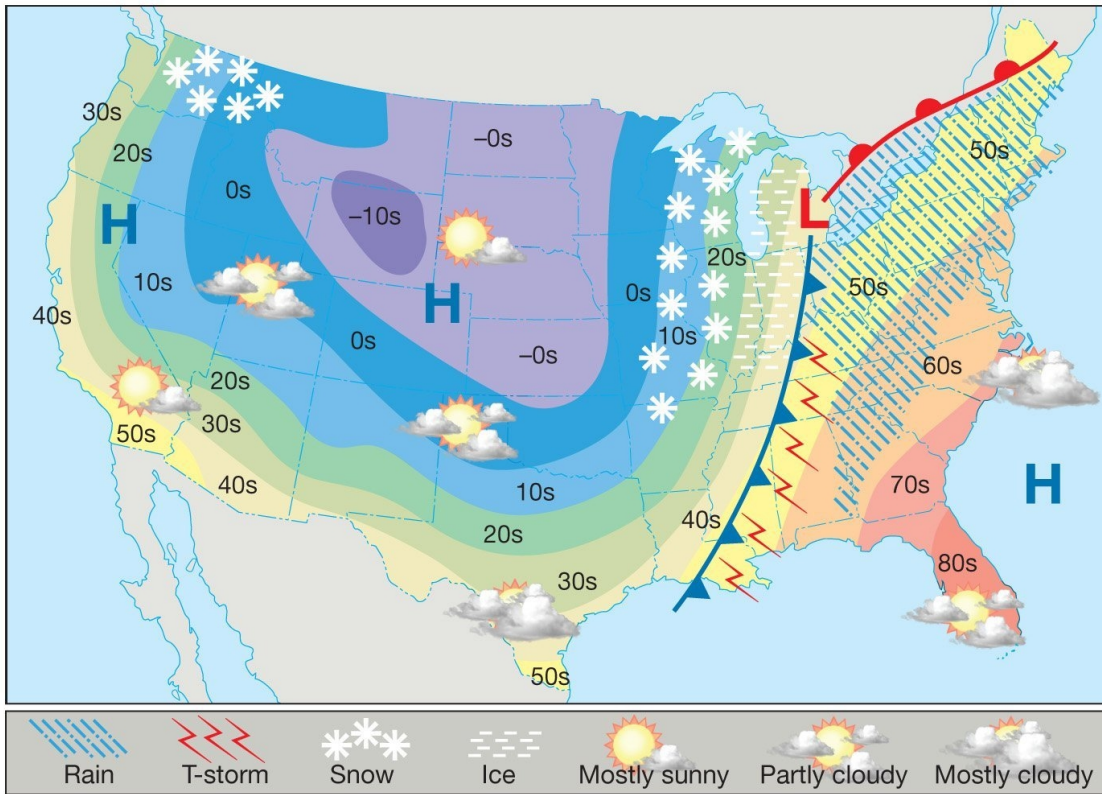
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 107) The state of the atmosphere at a given time and place defines the term \_\_\_\_\_. 107) \_\_\_\_\_
- 108) List four of the basic elements of weather and climate. 108) \_\_\_\_\_
- 109) If a scientific theory is to be accepted and considered useful, it must be able to \_\_\_\_\_. 109) \_\_\_\_\_
- 110) The primary usefulness of satellites in observing the weather is their ability to provide \_\_\_\_\_. 110) \_\_\_\_\_
- 111) The earth's physical environment is traditionally divided into three major parts, one solid, one liquid, and one gaseous. List these three parts. 111) \_\_\_\_\_
- 112) What are the two energy sources for the earth system? 112) \_\_\_\_\_
- 113) List the top four gases that make up the air in the lower 50 miles of Earth's atmosphere and give their concentrations. 113) \_\_\_\_\_

114) A lightweight instrument package that is carried aloft by a balloon and transmits data on temperature, pressure, and humidity is called a(n) \_\_\_\_\_. 114) \_\_\_\_\_

115) The *stratosphere* is home to a layer of gas known as \_\_\_\_\_. 115) \_\_\_\_\_

116) What causes the region of warmer temperatures found in the stratosphere? 116) \_\_\_\_\_



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117) Use the weather map above to answer the following questions. 117) \_\_\_\_\_  
 a) Based on this map, what kind of weather might you generally expect to be associated with a low pressure system (red L)?  
 b) Describe the temperature and precipitation currently occurring in Wisconsin.

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

118) Define the two terms "weather" and "climate." Explain the difference between them.

119) Discuss the role of ozone in the upper atmosphere. In your discussion, explain what ozone does, how it is threatened, and what legislation has been enacted in order to protect it.

Answer Key

Testname: UNTITLED1

- 1) A
- 2) A
- 3) B
- 4) D
- 5) A
- 6) B
- 7) B
- 8) B
- 9) D
- 10) C
- 11) C
- 12) D
- 13) C
- 14) A
- 15) A
- 16) B
- 17) D
- 18) C
- 19) D
- 20) D
- 21) D
- 22) B
- 23) C
- 24) D
- 25) C
- 26) A
- 27) C
- 28) D
- 29) B
- 30) A
- 31) A
- 32) A
- 33) C
- 34) C
- 35) E
- 36) D
- 37) B
- 38) D
- 39) D
- 40) B
- 41) A
- 42) D
- 43) B
- 44) B
- 45) C
- 46) A
- 47) C
- 48) E
- 49) C
- 50) A

## Answer Key

Testname: UNTITLED1

- 51) C
- 52) B
- 53) C
- 54) B
- 55) D
- 56) C
- 57) C
- 58) B
- 59) B
- 60) D
- 61) D
- 62) C
- 63) D
- 64) A
- 65) B
- 66) B
- 67) A
- 68) D
- 69) B
- 70) D
- 71) A
- 72) B
- 73) B
- 74) FALSE
- 75) FALSE
- 76) FALSE
- 77) FALSE
- 78) TRUE
- 79) TRUE
- 80) TRUE
- 81) TRUE
- 82) FALSE
- 83) FALSE
- 84) TRUE
- 85) TRUE
- 86) FALSE
- 87) TRUE
- 88) FALSE
- 89) TRUE
- 90) FALSE
- 91) FALSE
- 92) TRUE
- 93) FALSE
- 94) TRUE
- 95) TRUE
- 96) TRUE
- 97) FALSE
- 98) TRUE
- 99) FALSE
- 100) FALSE

## Answer Key

Testname: UNTITLED1

- 101) FALSE
- 102) TRUE
- 103) FALSE
- 104) FALSE
- 105) TRUE
- 106) TRUE
- 107) weather
- 108) temperature-humidity-clouds-precipitation-air pressure-wind speed-wind direction
- 109) correctly predict observed facts or events
- 110) cloud images, rainfall data
- 111) geosphere(solid)-hydrosphere(liquid)-atmosphere(gaseous)
- 112) the Sun and the earth's interior
- 113) Nitrogen (78%), Oxygen (20.9%), Argon (0.934%), Carbon dioxide (0.040 %)
- 114) radiosonde
- 115) ozone
- 116) Absorption of solar ultraviolet by ozone.
- 117) a) Snow, rain, ice, fronts  
b) Wisconsin is experiencing snow and temperatures in the 10s and 20s (Fahrenheit).
- 118) Weather is the instantaneous state of the atmosphere at a given time and place. Climate is the statistical summary of the weather to be expected in a given place, and includes information such as long term averages and the range of extremes experienced. One of the key differences is time. Weather is focused on the present and immediate future; meteorologists are interested in current observations and short-term forecasting. Climate studies require a long period of observations to allow for generalizations to be made about typical weather in a certain place. Climatologists are often focused on long term trends and shifts in weather patterns rather than specific weather events currently in progress.
- 119) Ozone is a molecule of three oxygen atoms that absorbs ultraviolet energy from incoming solar radiation. In so doing, the ozone molecule is split into individual oxygen atoms. In the process of absorbing UV and splitting apart, the ozone molecule prevents UV from reaching Earth's surface. Once divided, the individual oxygen atoms can re-bond and create a new ozone molecule ready to absorb more incoming UV. Because of its role in shielding the Earth from UV radiation, the ozone layer (found only in the stratosphere) is critical to life on this planet. Unfortunately, scientists identified a hole in the ozone layer several decades ago. Eventually, the scientists Crutzen, Rowland, and Molina were able to identify that this hole was being caused by the presence of CFCs (chlorofluorocarbons) in the atmosphere. CFCs at the time were widely used in a variety of things, including refrigerants, styrofoam, and aerosol cans, because of their excellent thermal properties and long life span. However, the chlorine in CFCs is capable of bonding with ozone in the upper atmosphere and tearing it apart, thus reducing the number of ozone molecules in the ozone layer. The gradual buildup of CFCs in the upper atmosphere caused a hole to form in the ozone. When the world realized that CFCs were the primary cause of the rapidly growing hole in the ozone layer over Antarctica, the international community hastened to enact a treaty which limited and eventually eliminated CFC production and use. This treaty was known as the Montreal Protocol. As CFC production is stopped and existing CFCs work their way out of the system over the next century, it is expected that the ozone layer will recover and the hole will disappear.