

Name: _____

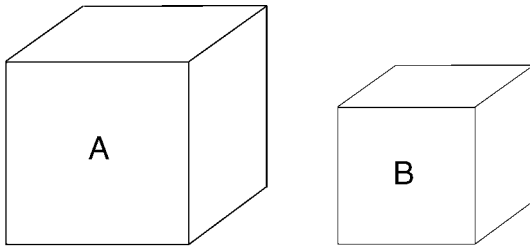
Date: _____

- Wind is caused mainly by air pressure differences that result from
 - uneven heating of the Earth's atmosphere
 - absorption of ultraviolet radiation by Earth's landmasses
 - radiation of heat from Earth's landmasses to water bodies
 - rotation of Earth on its axis

- What is the latent heat of vaporization of water?

- | | |
|-----------------|-----------------|
| A. 1.0 cal/g·C° | B. 0.5 cal/g·C° |
| C. 80.0 cal/g | D. 540.0 cal/g |

- Base your answer(s) to the following question(s) on the 2001 edition of the Earth Science Reference Tables, the diagrams below, and your knowledge of Earth science. The diagrams represent two different solid, uniform materials cut into cubes *A* and *B*.



Mass of A = 320 g Density of B = 3 g/cm³
 Volume of A = 64 cm³ Volume of B = 27 cm³

(Not drawn to scale)

If a parcel of air is heated, its density will

- | | | |
|-------------|-------------|--------------------|
| A. decrease | B. increase | C. remain the same |
|-------------|-------------|--------------------|

- During which process does heat transfer occur because of density differences?

- | | | | |
|---------------|---------------|--------------|---------------|
| A. conduction | B. convection | C. radiation | D. reflection |
|---------------|---------------|--------------|---------------|

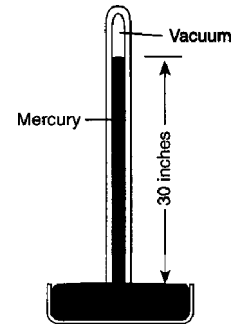
- Which process requires water to gain heat energy from the environment?

- | | |
|-----------------|------------------|
| A. evaporation | B. condensation |
| C. infiltration | D. precipitation |

- Air pressure is usually highest when the air is

- | | |
|-------------------|-----------------|
| A. cool and humid | B. cool and dry |
| C. warm and humid | D. warm and dry |

- Base your answer(s) to the following question(s) on the diagram below of a weather instrument.



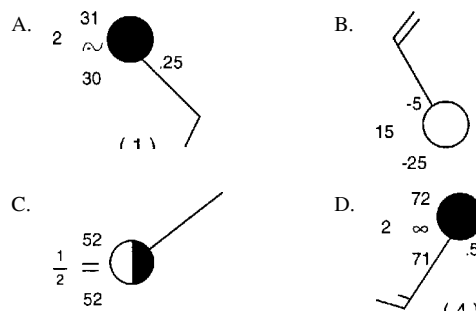
Which weather variable is this instrument designed to measure?

- | | |
|-------------------------|----------------------|
| A. visibility | B. relative humidity |
| C. dewpoint temperature | D. air pressure |

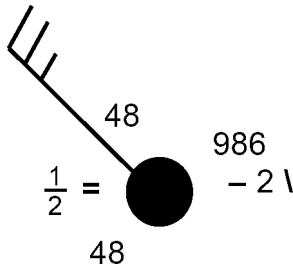
- Why have weather predictions become more accurate and reliable in recent years?

- | |
|--|
| A. Weather conditions now change more slowly than they did in the past |
| B. More people today watch televised weather reports |
| C. Scientists have developed better methods of controlling the weather |
| D. Scientists have developed better technology to observe weather conditions |

- Which station model represents a location that is currently receiving some form of precipitation?

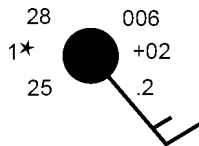


10. Base your answer(s) to the following question(s) on the weather station model shown below.



What is the approximate wind direction and windspeed indicated by the station model?

- A. from the northwest at 15 knots
 B. from the southeast at 15 knots
 C. from the northwest at 25 knots
 D. from the southeast at 25 knots
11. Which statement correctly describes the relative humidity at this station?
- A. The relative humidity is 0% because the cloud cover is 100%.
 B. The relative humidity is 100% because the air temperature and dewpoint are both 48°F.
 C. The relative humidity is 98.6% because 986 is the symbol for 98.6%.
 D. The relative humidity is 50% because is the symbol for 50%.
12. Which weather instrument has most improved the accuracy of weather forecasts over the past 40 years?
- A. thermometer
 B. sling psychrometer
 C. weather satellite
 D. weather balloon
13. What is the air pressure indicated on the weather station model shown?

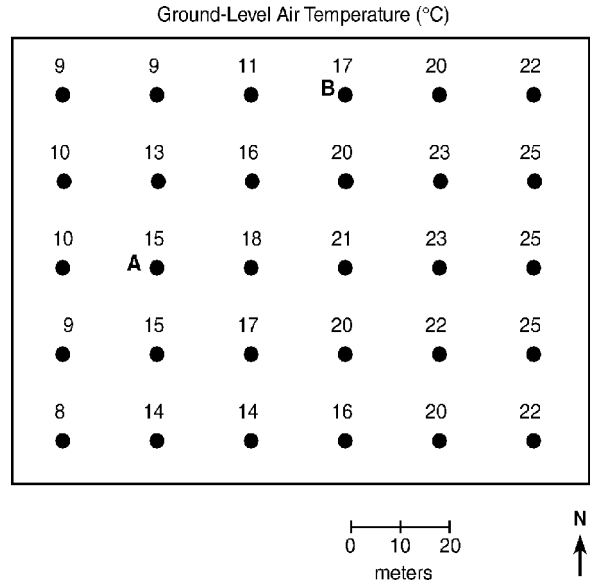


- A. 900.6 mb B. 960.0 mb C. 1000.6 mb D. 1006.0 mb

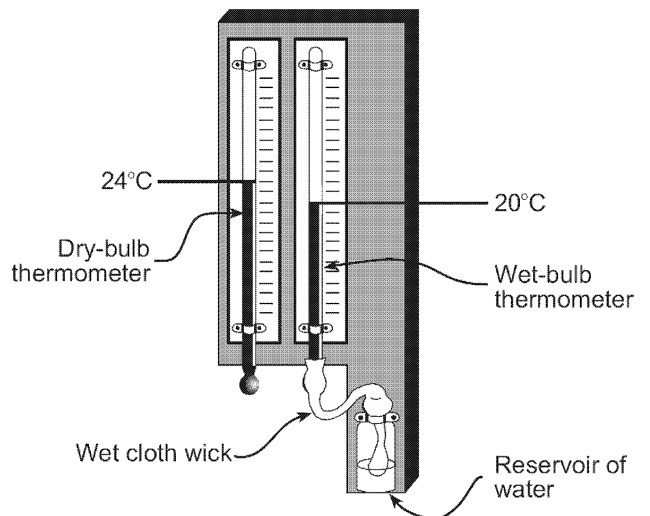
14. Base your answer(s) to the following question(s) on the field map provided below.

The field map shows air temperature at specific locations in an area near a school in New York State. Part of this area is a blacktop parking lot. Accurate temperature readings were taken by Earth science students at 10 am on June 1. Two reference points, A and B, are shown.

On the field map provided, draw only the 15°C and the 20°C isotherms. Isotherms must be extended to the edge of the map.

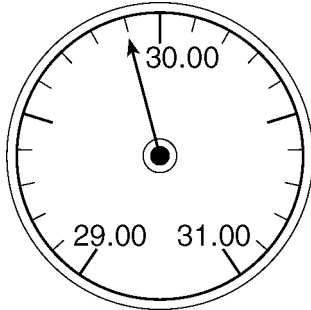


15. Base your answer(s) to the following question(s) on the diagram below, which shows a hygrometer located on a wall in a classroom. The hygrometer's temperature readings are used by the students to determine the relative humidity of the air in the classroom.



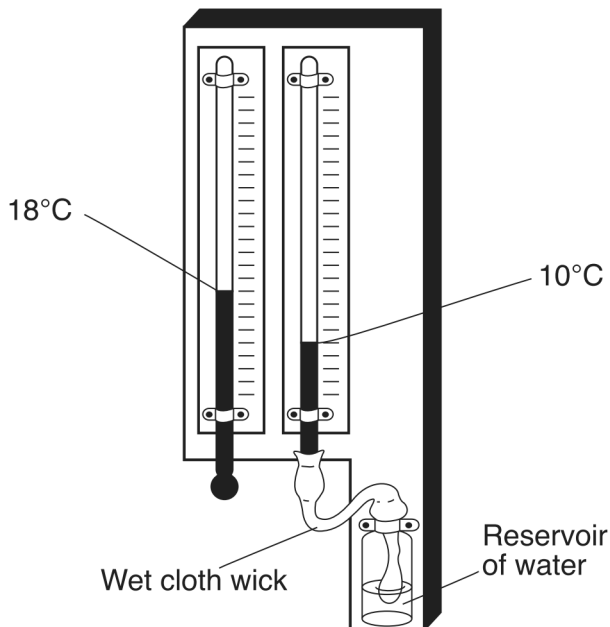
Based on the temperature readings shown in this diagram, determine the relative humidity of the air in the classroom.

16. Students wish to study the effect of elevation above sea level on air temperature and air pressure. They plan to hike in the Adirondack Mountains from Heart Lake, elevation 2,179 feet, to the peak of Mt. Marcy, elevation 5,344 feet. Which instruments should they use to collect their data?
- A. anemometer and psychrometer
 B. anemometer and barometer
 C. thermometer and psychrometer
 D. thermometer and barometer
17. The diagram below represents an aneroid barometer that shows the air pressure, in inches of mercury.



When converted to millibars, this air pressure is equal to

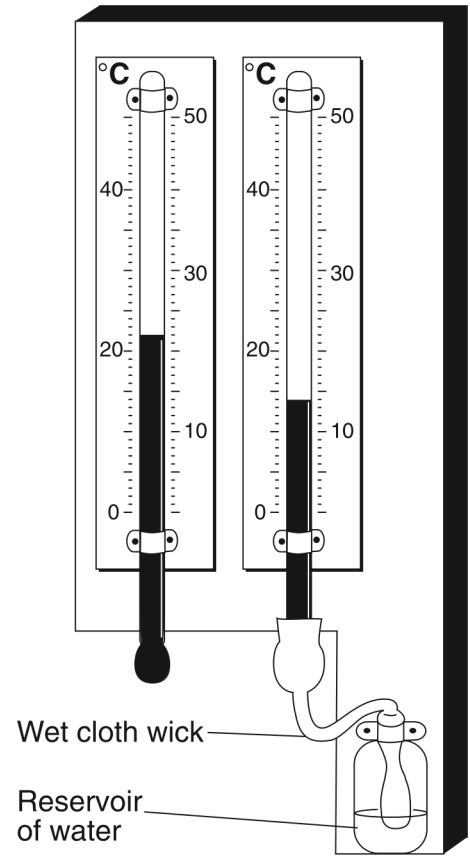
- A. 1009.0 mb B. 1012.5 mb C. 1015.5 mb D. 1029.9 mb
18. The weather instrument below can be used to determine relative humidity.



Based on the temperatures shown, the relative humidity is

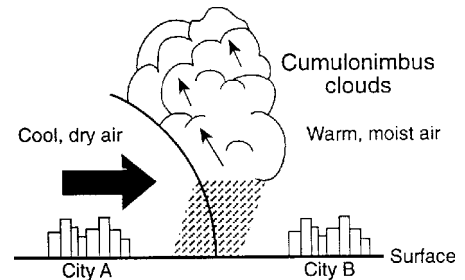
- A. 19% B. 2% C. 33% D. 40%

19. The weather instrument below is used to determine dewpoint and relative humidity.



Based on the temperatures shown, the approximate dewpoint and relative humidity are

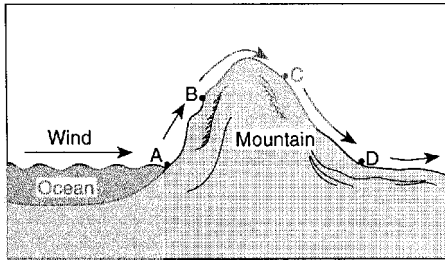
- A. -19°C and 4% B. -5°C and 25%
 C. 8°C and 40% D. 12°C and 53%
20. The cross section below shows a weather front. The large arrow shows the direction of the movement of the cool air mass.



Which type of weather front is shown?

- A. warm front B. cold front
 C. occluded front D. stationary front
21. What is the primary cause of winds?
- A. humidity differences B. air pressure differences
 C. the revolution of Earth D. the rotation of Earth

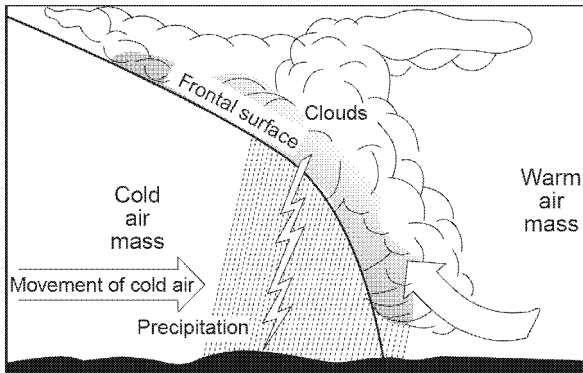
22. The cross section below shows the flow of prevailing winds over a mountain ridge.



Which location is most likely to receive precipitation?

- A. A B. B C. C D. D

23. The accompanying diagram shows a cross section of a cold front.



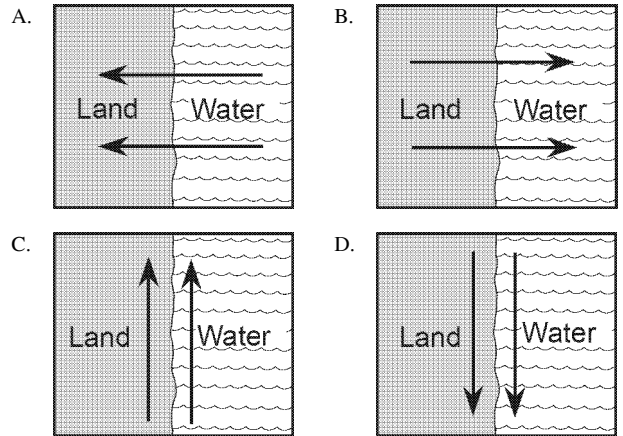
The cloud formation and precipitation shown in the cross section are caused by

- A. cold air rising and warming
 B. cold air sinking and warming
 C. warm air rising and cooling
 D. warm air sinking and cooling

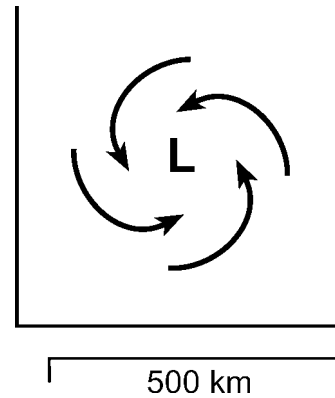
24. What is the dewpoint when the dry-bulb temperature is 14°C and the wet-bulb temperature is 8°C ?

- A. 1°C B. -9°C C. 6°C D. 22°C

25. Adjacent water and land surfaces have the same temperature at sunrise on a clear, calm day. A surface wind develops after the water and land are heated by the Sun for a few hours. On which map do the arrows best represent the direction of this wind?



26. A map view of surface air movement in a low-pressure system is shown.



The air near the center of this low-pressure system usually will

- A. evaporate into a liquid
 B. reverse direction
 C. rise and form clouds
 D. squeeze together to form a high-pressure system
27. The properties of an air mass are mostly determined by the
- A. rate of Earth's rotation
 B. direction of Earth's surface winds
 C. source region where the air mass formed
 D. path the air mass follows along a land surface
28. Snowfall is rare at the South Pole because the air over the South Pole is usually
- A. rising and moist B. rising and dry
 C. sinking and moist D. sinking and dry

29. Which statement about a hurricane is an inference?
- The windspeed is measured at 200 km/hr.
 - The central air pressure is recorded at 946.0 mb.
 - A rain gauge records three inches of rain in less than one hour.
 - Damage from the storm is expected to be extensive.

30. In the Northern Hemisphere, surface winds around the center of a hurricane move

- clockwise and inward
- clockwise and outward
- counterclockwise and inward
- counterclockwise and outward

31. Surface ocean currents resulting from the prevailing winds over the oceans illustrate a transfer of energy from

- lithosphere to atmosphere
- hydrosphere to lithosphere
- atmosphere to hydrosphere
- stratosphere to troposphere

32. Compared to an inland location, a location on an ocean shore at the same elevation and latitude is likely to have

- cooler winters and cooler summers
- cooler winters and warmer summers
- warmer winters and cooler summers
- warmer winters and warmer summers

33. Most tornadoes in the Northern Hemisphere are best described as violently rotating columns of air surrounded by

- clockwise surface winds moving toward the columns
- clockwise surface winds moving away from the columns
- counterclockwise surface winds moving toward the columns
- counterclockwise surface winds moving away from the columns

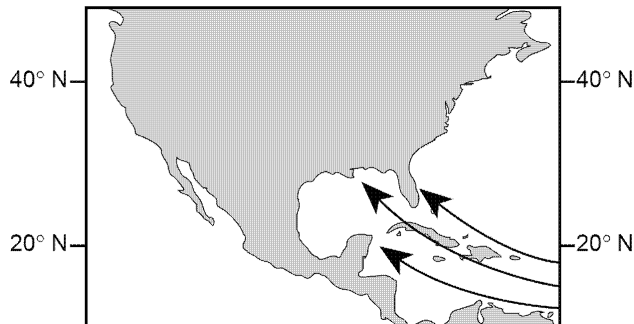
34. Monsoons develop as a result of

- large changes between the temperatures of a continent and neighboring oceans
- a continent and neighboring oceans having nearly the same temperatures
- air rising over Earth's equatorial region
- air sinking over Earth's polar regions

35. To an observer in New York State, the duration of daylight increases continuously from

- March 1 to May 1
- June 1 to August 1
- September 1 to November 1
- December 1 to February 1

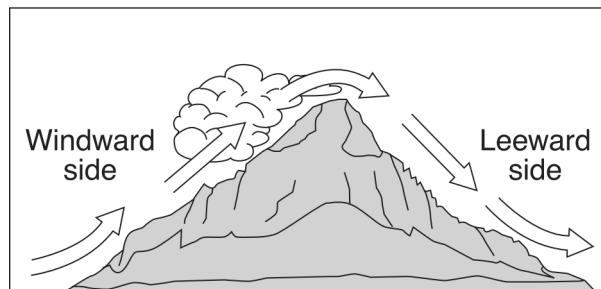
36. The accompanying map shows part of North America.



The arrows shown on the map most likely represent the direction of movement of

- Earth's rotation
- the prevailing northeast winds
- ocean conduction currents
- Atlantic Ocean hurricanes

37. The diagram below shows air movement over a mountain.



Compared to the climate on the windward side of the mountain, the climate on the leeward side of the mountain is

- drier and warmer
- drier and cooler
- more humid and warmer
- more humid and cooler

38. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables*, the data table below, and your knowledge of Earth science. The data table shows a classification system for hurricanes. A storm surge is a dome of water 65 to 80 kilometers wide that sweeps ashore at the coast near the point where the storm center (eye) hits the land.

Safir-Simpson Hurricane Scale

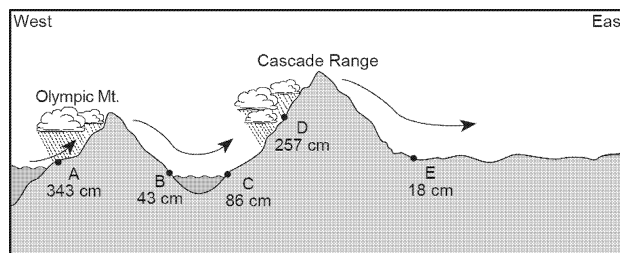
Hurricane Category	Central Air Pressure (mb)	Windspeed (km/hr)	Expected Storm Surge Height (m)	Expected Damage
1	over 979	119–153	1.2–1.5	Minimal
2	965–979	154–177	1.6–2.4	Moderate
3	945–964	178–209	2.5–3.6	Extensive
4	920–944	210–250	3.7–5.4	Extreme
5	below 920	over 250	over 5.4	Catastrophic

Which characteristic must a tropical storm have to be classified as a hurricane on the Safir-Simpson scale?

- A. enough strength to cause catastrophic damage
 B. a storm surge of at least 2.0 m
 C. central air pressure over 980 mb
 D. a windspeed of at least 119 km/hr
39. Which type of air mass is usually the source of the moisture that causes the strong winds and heavy rain found in hurricanes?
- A. mT B. mP C. cT D. cP
40. The difference between the windspeed of a category 1 hurricane and the windspeed of a category 5 hurricane is primarily caused by the differences in
- A. types of clouds B. amounts of precipitation
 C. air-pressure gradients D. air-temperature gradients
41. A hurricane with a central air pressure recorded at 28.70 inches has an expected storm surge of
- A. 1.3 m B. 2.0 m C. 3.3 m D. 4.0 m
42. Compared to land surface temperature changes, water surface temperature changes occur
- A. more slowly because water has a lower specific heat
 B. more slowly because water has a higher specific heat
 C. faster because water has a lower specific heat
 D. faster because water has a higher specific heat

43. Which two climate factors are most directly responsible for the amount of snowfall normally received in Buffalo, New York?
- A. ocean currents and storm tracks
 B. mountain barriers and average temperatures
 C. elevation and potential evapotranspiration
 D. prevailing wind direction and nearness to a large body of water

44. The accompanying diagram shows the average yearly precipitation, in centimeters, at locations A through E across the State of Washington. Arrows indicate the direction of prevailing winds.

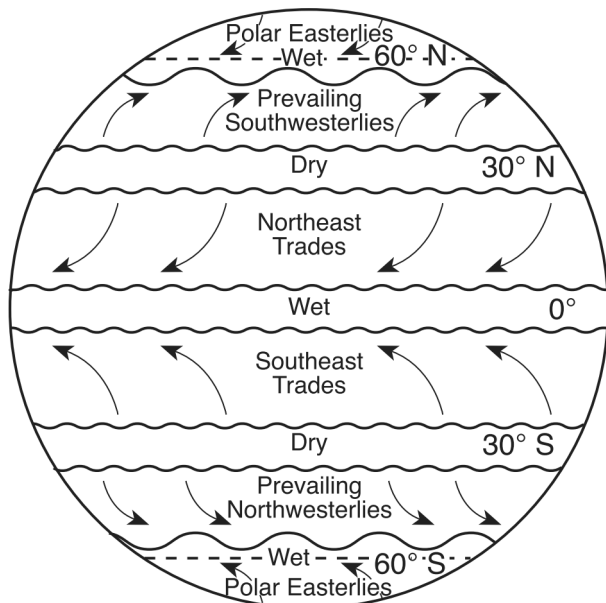


(Not drawn to scale)

Which statement best explains why location B and location E receive relatively low average yearly precipitation?

- A. These locations are on the leeward side of mountain ranges.
 B. These locations are on the windward side of mountain ranges.
 C. These locations receive more insolation than the other locations.
 D. These locations receive less insolation than the other locations.
45. The prevailing southwesterlies wind belt causes most low-pressure weather systems to travel across the United States from the
- A. southwest toward the northeast
 B. northwest toward the southeast
 C. northeast toward the southwest
 D. southeast toward the northwest
46. The Canary Current along the west coast of Africa and the Peru Current along the west coast of South America are both
- A. warm currents that flow away from the Equator
 B. warm currents that flow toward the Equator
 C. cool currents that flow away from the Equator
 D. cool currents that flow toward the Equator
47. Identify by name the surface ocean current that cools the climate of locations on the western coastline of North America.

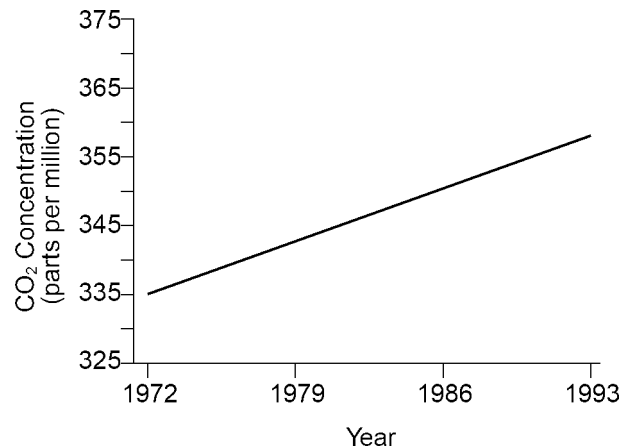
48. Why are the beaches that are located on the southern shore of Long Island often considerably cooler than nearby inland locations on hot summer afternoons?
- A land breeze develops due to the lower specific heat of water and the higher specific heat of land.
 - A sea breeze develops due to the higher specific heat of water and the lower specific heat of land.
 - The beaches are closer to the Equator than the inland locations are.
 - The beaches are farther from the Equator than the inland locations are.
49. An air mass classified as mP usually forms over which type of Earth surface?
- warm land
 - warm ocean
 - cool land
 - cool ocean
50. Which factor most likely causes two cities at the same elevation and latitude to have different yearly average temperature ranges?
- rotation of Earth
 - duration of insolation
 - distance from a large body of water
 - direction of prevailing winds
51. Base your answer(s) to the following question(s) on the map below, which shows Earth's planetary wind belts.



Which climatic conditions exist where the trade winds converge?

- cool and wet
- cool and dry
- warm and wet
- warm and dry

52. Which air mass is associated with low relative humidity and high air temperature?
- maritime polar
 - maritime tropical
 - continental polar
 - continental tropical
53. Most of the air in the lower troposphere at the equatorial low-pressure belt is
- warm, moist, and rising
 - warm, dry, and rising
 - cool, moist, and sinking
 - cool, dry, and sinking
54. The Gulf Stream and North Atlantic Current modify the climate of northwestern Europe by making the climate
- warmer and drier
 - warmer and more humid
 - cooler and drier
 - cooler and more humid
55. In which geographic region are air masses most often warm with a high moisture content?
- Central Canada
 - Central Mexico
 - Gulf of Mexico
 - North Pacific Ocean
56. The accompanying graph represents the average yearly concentration of carbon dioxide (CO₂) in Earth's atmosphere from 1972 to 1993.

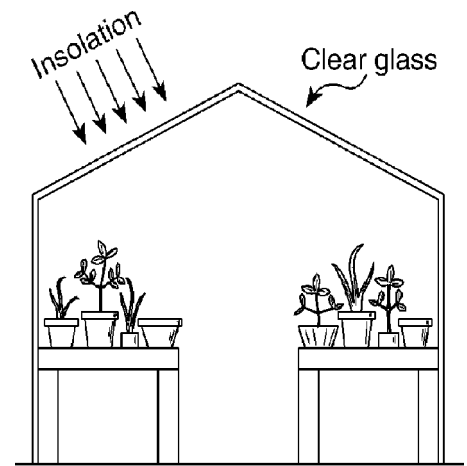


This change in CO₂ concentration most likely caused

- a decrease in the average wavelength of radiation emitted by the Sun
- a decrease in Earth's actual evapotranspiration
- an increase in the absorption of infrared radiation by Earth's atmosphere
- an increase in the thickness of Earth's glaciers

57. Which two gases in Earth's atmosphere are believed by scientists to be greenhouse gases that are major contributors to global warming?
- A. carbon dioxide and methane B. oxygen and nitrogen
 C. hydrogen and helium D. ozone and chlorine
58. For weeks after a series of major volcanic eruptions, Earth's surface air temperatures are often
- A. warmer because ash and dust decrease atmospheric transparency
 B. warmer because ash and dust increase atmospheric transparency
 C. cooler because ash and dust decrease atmospheric transparency
 D. cooler because ash and dust increase atmospheric transparency
59. During an El Niño event, surface water temperatures increase along the west coast of South America. Which weather changes are likely to occur in this region?
- A. decreased air temperature and decreased precipitation
 B. decreased air temperature and increased precipitation
 C. increased air temperature and increased precipitation
 D. increased air temperature and decreased precipitation
60. Energy is transferred from the Sun to Earth mainly by
- A. molecular collisions B. density currents
 C. electromagnetic waves D. red shifts
61. Which color of the visible light spectrum could have a wavelength of 5.5×10^{-5} centimeter?
- A. green B. orange C. yellow D. red

62. The diagram below shows a greenhouse.



Greenhouse

What is the primary function of the clear glass of the greenhouse?

- A. The glass reduces the amount of insolation entering the greenhouse.
- B. The glass allows all wavelengths of radiation to enter and all wavelengths of radiation to escape.
- C. The glass allows short wavelengths of radiation to enter, but reduces the amount of longwavelength radiation that escapes.
- D. The glass allows long wavelengths of radiation to enter, but reduces the amount of shortwavelength radiation that escapes.