

Climate Multiple Choice

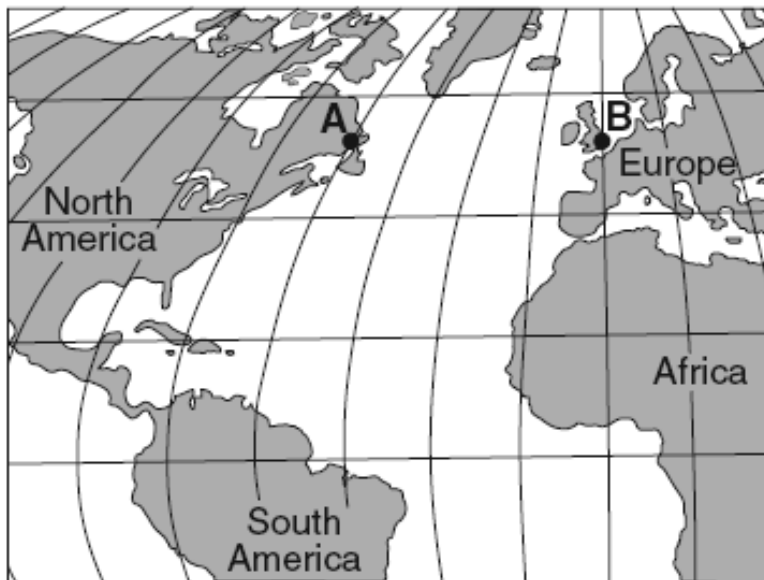
The data table below compares the climates of two United States cities located at approximately 43° north latitude. The data are based on a 30-year period.

Data Table

Location	Maximum Temperature (°F)	Minimum Temperature (°F)	Mean Annual Precipitation (in)	Mean Annual Snowfall (in)
city A	110	-36	23.8	31.9
city B	98	-19	38.2	92.9

1 Which statement best explains the climate variation between these two cities?

- (1) City A and city B are located at the same longitude.
- (2) City A is located at a high elevation, and city B is located at sea level.
- (3) City A is located far inland, and city B is located near a large body of water.
- (4) City A is located on the east coast, and city B is located on the west coast.



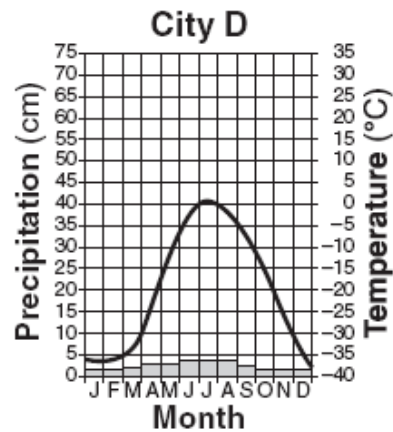
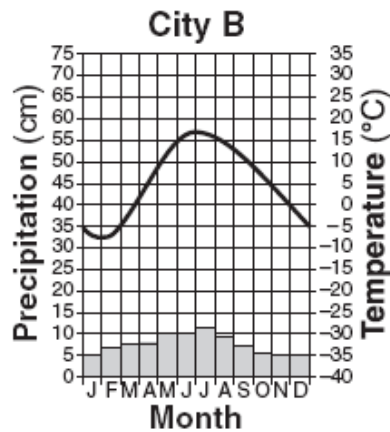
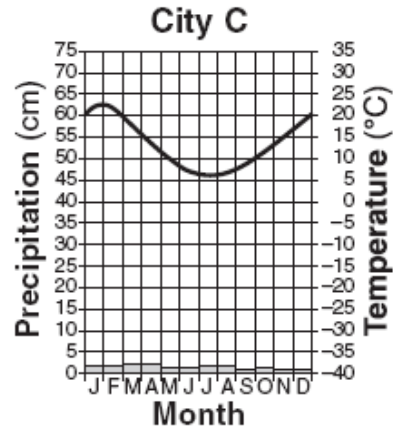
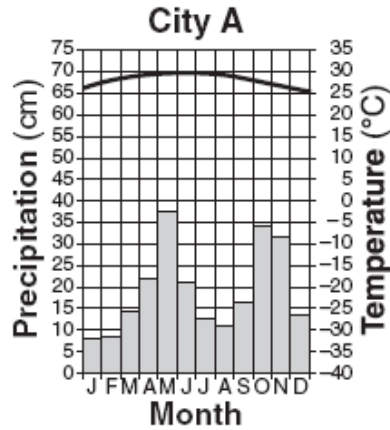
2 Which statement best explains why location A has a cooler climate than location B?



- (1) Location A has a longer duration of insolation each day.
- (2) Location A is influenced by a cold ocean current.
- (3) Location B is farther from the equator.
- (4) Location B has less intense insolation each day.

3 Which ocean current carries cool water toward Earth's equator?

- (1) Alaska Current
- (2) East Australia Current
- (3) Peru Current
- (4) North Atlantic Current

Base your answers to questions 4 through 7 on the climate graphs below, which show average monthly precipitation and temperatures at four cities, A, B, C, and D.



Key	
	Precipitation
	Temperature

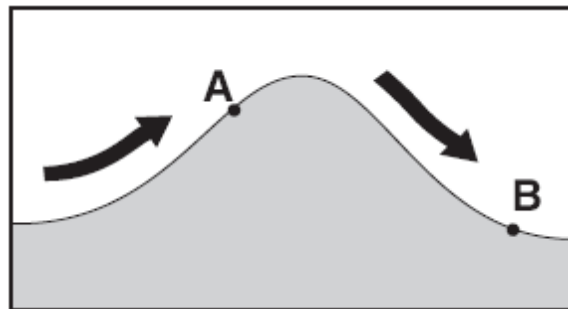
- 4 City A has very little variation in temperature during the year because city A is located
- (1) on the dry side of a mountain
 - (2) on the wet side of a mountain
 - (3) near the center of a large landmass
 - (4) near the equator
-

- 5 During which season does city *B* usually experience the month with the highest average precipitation?
- (1) spring (3) fall
 (2) summer (4) winter
- 6 It can be concluded that city *C* is located in the Southern Hemisphere because city *C* has
- (1) small amounts of precipitation throughout the year
 (2) large amounts of precipitation throughout the year
 (3) its warmest temperatures in January and February
 (4) its warmest temperatures in July and August
- 7 Very little water will infiltrate the soil around city *D* because the region usually has
- (1) a frozen surface (3) a small amount of runoff
 (2) nearly flat surfaces (4) permeable soil

8 Which statement best summarizes the general effects of ocean currents at 20° S latitude on coastal regions of South America?

- (1) The east coast and west coast are both warmed.
- (2) The east coast and west coast are both cooled.
- (3) The east coast is warmed and the west coast is cooled.
- (4) The east coast is cooled and the west coast is warmed.

The arrows on the cross section below show the prevailing wind that flows over a mountain. Points *A* and *B* represent locations on opposite sides of the mountain.



9 Which statement correctly describes the differences in the climates of locations *A* and *B*?

- (1) Location *A* is warmer and drier than location *B*.
- (2) Location *A* is cooler and wetter than location *B*.
- (3) Location *B* is warmer and wetter than location *A*.
- (4) Location *B* is cooler and drier than location *A*.

10 The coldest climates on Earth are located at or near the poles primarily because Earth's polar regions

- (1) receive mostly low-angle insolation
- (2) receive less total yearly hours of daylight
- (3) absorb the greatest amount of insolation
- (4) are usually farthest from the Sun

11 Which two ocean currents are both warm currents that primarily flow away from the equator?

- (1) Guinea Current and Labrador Current
- (2) Brazil Current and Agulhas Current
- (3) Alaska Current and Falkland Current
- (4) Canaries Current and Gulf Stream Current

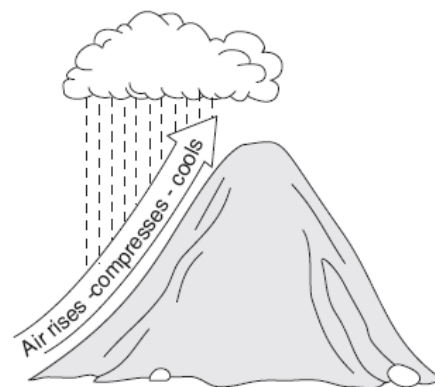
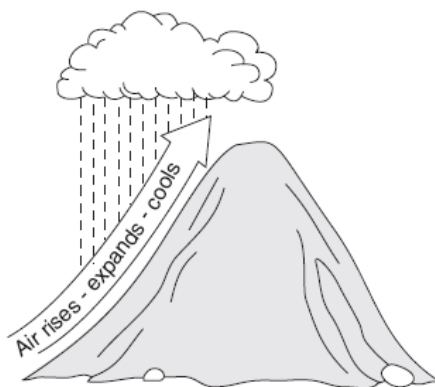
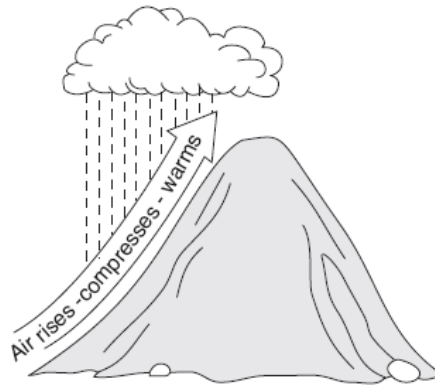
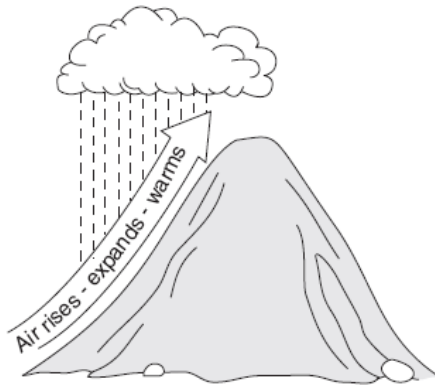
12 Compared to an inland location, a location on an ocean shore at the same elevation and latitude is likely to have

- (1) cooler winters and cooler summers
- (2) cooler winters and warmer summers
- (3) warmer winters and cooler summers
- (4) warmer winters and warmer summers

13 During a dry summer, the flow of most large New York State streams generally

- (1) continues because some groundwater seeps into the streams
- (2) increases due to greater surface runoff
- (3) remains unchanged due to transpiration from grasses, shrubs, and trees
- (4) stops completely because

15 Which diagram best illustrates how air rising over a mountain produces precipitation?



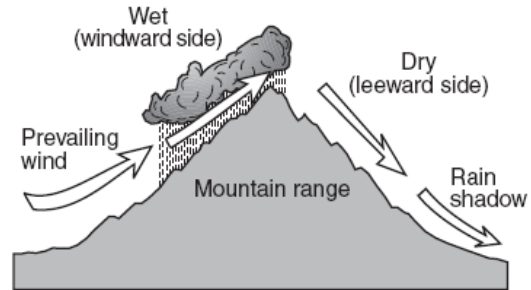
16 Why are the beaches that are located on the southern shore of Long Island often considerably cooler than nearby inland locations on hot summer afternoons?

- (1) A land breeze develops due to the lower specific heat of water and the higher specific heat of land.
- (2) A sea breeze develops due to the higher specific heat of water and the lower specific heat of land.
- (3) The beaches are closer to the Equator than the inland locations are.
- (4) The beaches are farther from the Equator than the inland locations are.

17 On a clear summer day, the surface of land is usually warmer than the surface of a nearby body of water because the water

- (1) receives less insolation
- (2) reflects less insolation
- (3) has a higher density
- (4) has a higher specific heat

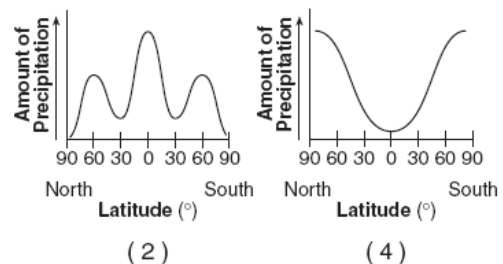
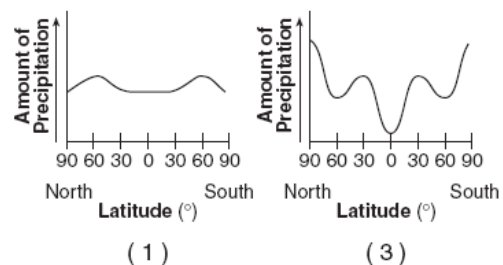
The cross section below shows how prevailing winds have caused different climates on the windward and leeward sides of a mountain range.



18 Why does the windward side of this mountain have a wet climate?

- (1) Rising air compresses and cools, causing the water droplets to evaporate.
- (2) Rising air compresses and warms, causing the water vapor to condense.
- (3) Rising air expands and cools, causing the water vapor to condense.
- (4) Rising air expands and warms, causing the water droplets to evaporate.

19 Which graph best shows the average annual amounts of precipitation received at different latitudes on Earth?



20 Very cold climates occur at Earth's North and South Poles because the polar regions

- (1) are usually farthest from the Sun
- (2) absorb the greatest amount of insolation
- (3) receive the most hours of daylight
- (4) receive low-angle insolation

21 Which ocean current transports warm water away from Earth's equatorial region?

- (1) Brazil Current
- (2) Guinea Current
- (3) Falkland Current
- (4) California Current

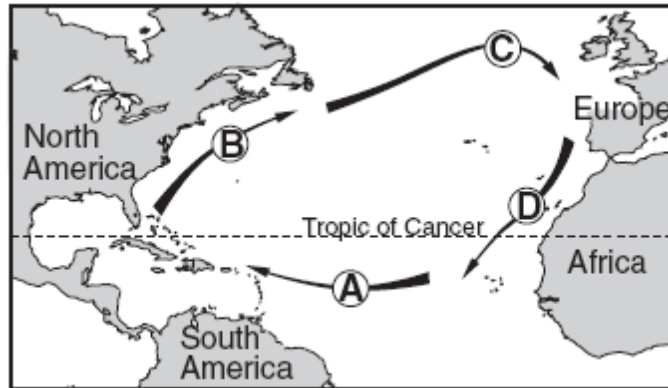
The map below shows the locations of Virginia Beach, Virginia, and Springfield, Missouri.



22 Virginia Beach experiences cooler summers and warmer winters than Springfield because Virginia Beach

- (1) is located closer to the Atlantic Ocean
- (2) is located closer to the equator
- (3) has a greater average yearly duration of insolation
- (4) has a greater average yearly intensity of insolation

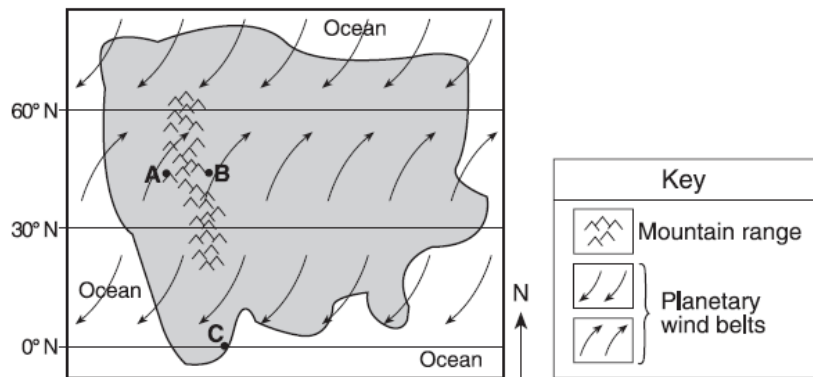
The arrows labeled *A* through *D* on the map below show the general paths of abandoned boats that have floated across the Atlantic Ocean.



23 Which sequence of ocean currents was responsible for the movement of these boats?

- (1) South Equatorial → Gulf Stream → Labrador → Benguela
- (2) South Equatorial → Australia → West Wind Drift → Peru
- (3) North Equatorial → Kuroshio → North Pacific → California
- (4) North Equatorial → Gulf Stream → North Atlantic → Canaries

Base your answers to questions 24 and 25 on the map below, which represents an imaginary continent. Locations *A* and *B* are on opposite sides of a mountain range on a planet similar to Earth. Location *C* is on the planet's equator.



24 Compared to the climate at location *A*, the climate at location *B* would most likely be

- (1) warmer and more humid
- (2) warmer and less humid
- (3) cooler and more humid
- (4) cooler and less humid

25 Location *C* most likely experiences

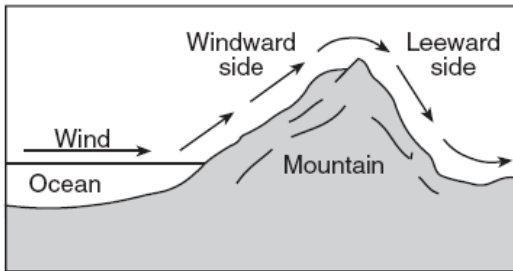
- (1) low air pressure and low precipitation
- (2) low air pressure and high precipitation
- (3) high air pressure and low precipitation
- (4) high air pressure and high precipitation

The arrows in the cross section below show the prevailing winds moving across northern New York State into Vermont during the summer.

26 Compared to the climate of location A, the climate of location B is

- (1) warmer and wetter
- (2) warmer and drier
- (3) cooler and wetter
- (4) cooler and drier

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



27 The heaviest rainfall would most likely occur on which side of this mountain and in which type of air mass?

- (1) on the leeward side, in a mP air mass
- (2) on the leeward side, in a cT air mass
- (3) on the windward side, in a mT air mass
- (4) on the windward side, in a cP air mass

28 Which ocean current flows northeast along the eastern coast of North America?

- (1) Gulf Stream
- (2) North Equatorial
- (3) California
- (4) Labrador

London, England, is located at approximately $51^{\circ} 30'$ north latitude and 0° longitude. Elmira, New York, is located at approximately $42^{\circ} 10'$ north latitude and $76^{\circ} 54'$ west longitude.

29 What is one reason why London has a warmer average winter temperature than Elmira?

- (1) London is located closer to the equator.
- (2) London is located at a higher elevation.
- (3) London's climate is modified by the North Atlantic Ocean Current.
- (4) London's climate is modified by its longer duration of insolation.

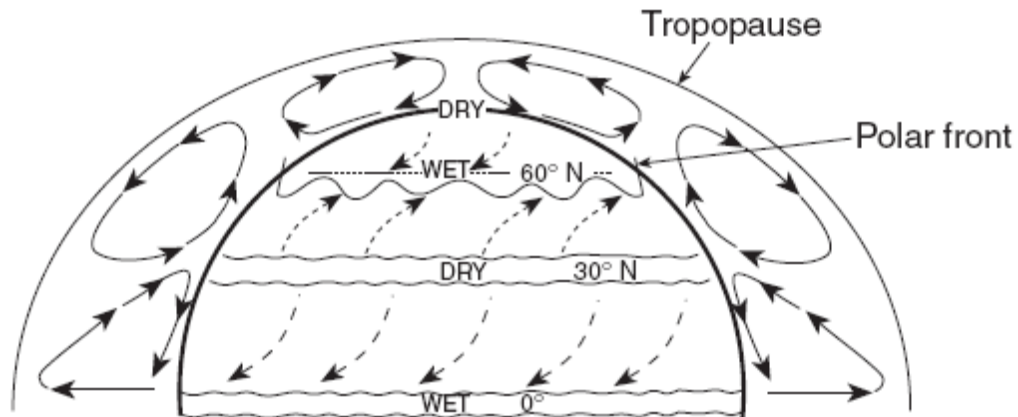
30 Which cold ocean current affects the climate of the northeastern coast of North America?

- (1) Gulf Stream
- (2) Canaries
- (3) Labrador
- (4) North Atlantic

31 Which surface ocean current transports warm water to higher latitudes?

- (1) Labrador Current
- (2) Falkland Current
- (3) Gulf Stream
- (4) West Wind Drift

Base your answers to questions 32 through 34 on the diagram below, which represents the planetary wind and moisture belts in Earth's Northern Hemisphere.



(Not drawn to scale)

32 The climate at 90° north latitude is dry because the air at that location is usually

- (1) warm and rising
- (2) warm and sinking
- (3) cool and rising
- (4) cool and sinking

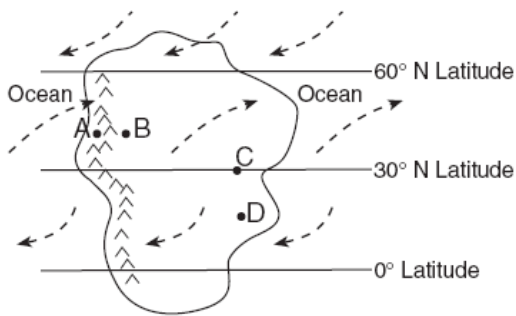
33 The paths of the surface planetary winds are curved due to Earth's

- (1) revolution
- (2) rotation
- (3) circumference
- (4) size

34 The tropopause is approximately how far above sea level?

- (1) 12 mi
- (2) 12 km
- (3) 60 mi
- (4) 60 km

Base your answers to questions 41 through 42 on the map below. The map shows an imaginary continent on Earth. Arrows represent prevailing wind directions. Letters A through D represent locations on the continent. Locations A and B are at the same latitude and at the same elevation at the base of the mountains.



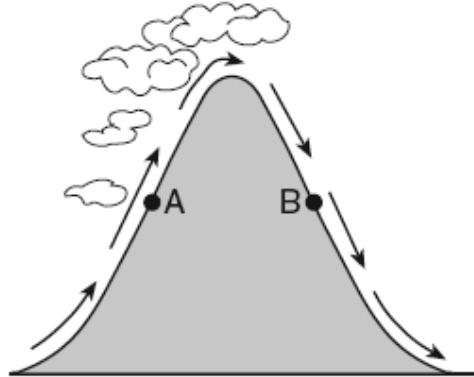
41 Over the course of a year, compared to location B, location A will have

- (1) less precipitation and a smaller temperature range
- (2) less precipitation and a greater temperature range
- (3) more precipitation and a smaller temperature range
- (4) more precipitation and a greater temperature range

42 The climate at location C is much drier than at location D. This difference is best explained by the fact that location C is located

- (1) farther from any mountain range
- (2) closer to a large body of water
- (3) at a latitude that experiences longer average annual daylight
- (4) at a latitude where air is sinking and surface winds diverge

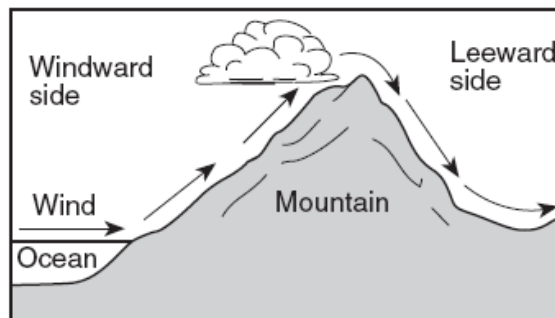
The cross section below shows the direction of air flowing over a mountain. Points A and B are at the same elevation on opposite sides of the mountain.



43 Compared to the air temperature and humidity at point A, the air temperature and humidity at point B are usually

- (1) cooler and drier
- (2) cooler and wetter
- (3) warmer and drier
- (4) warmer and wetter

The diagram below shows how prevailing winds cause different weather conditions on the windward and leeward sides of a mountain range.



44 Clouds usually form on the windward sides of mountains because this is where air

- (1) rises and cools
- (2) rises and warms
- (3) sinks and cools
- (4) sinks and warms

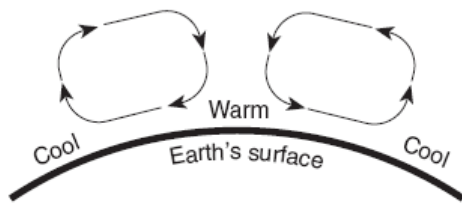
45 Which ocean current brings warm water to the western coast of Africa?

- (1) Agulhas Current
- (2) North Equatorial Current
- (3) Canaries Current
- (4) Guinea Current

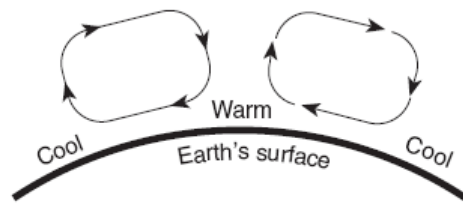
46 Compared to the climate conditions of dry inland locations, the climate conditions of locations influenced by a nearby ocean generally result in

- (1) hotter summers and colder winters, with a larger annual range of temperatures
- (2) hotter summers and colder winters, with a smaller annual range of temperatures
- (3) cooler summers and warmer winters, with a larger annual range of temperatures
- (4) cooler summers and warmer winters, with a smaller annual range of temperatures

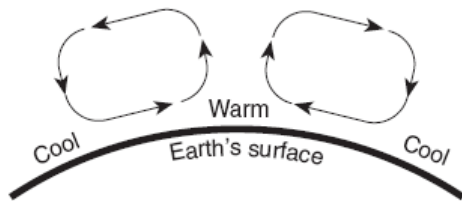
49 The cross sections below show different patterns of air movement in Earth's atmosphere. Air temperatures at Earth's surface are indicated in each cross section. Which cross section shows the most likely pattern of air movement in Earth's atmosphere that would result from the surface air temperatures shown?



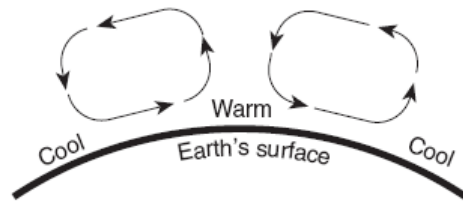
(1)



(3)



(2)



(4)

47 Which two gases have been added to Earth's atmosphere in large amounts and are believed to have increased global warming by absorbing infrared radiation?

- (1) neon and argon
- (2) chlorine and nitrogen
- (3) hydrogen and helium
- (4) methane and carbon dioxide

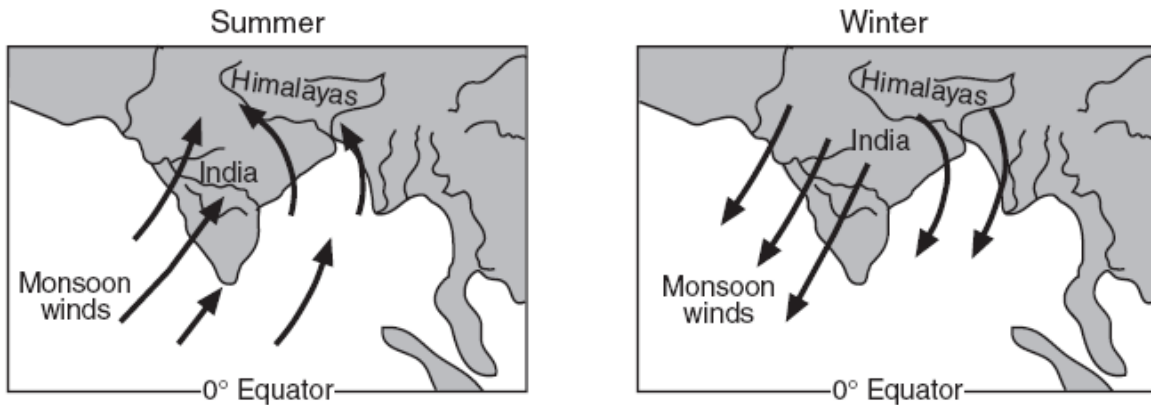
48 The California Ocean Current, which flows along the west coast of North America, is a

- (1) cool current, flowing north
- (2) cool current, flowing south
- (3) warm current, flowing north
- (4) warm current, flowing south

50 Surface ocean currents located at 40° south latitude, 90° west longitude generally flow toward the

- (1) northeast
- (2) southeast
- (3) southwest
- (4) west

The arrows on the two maps below show how the monsoon winds over India change direction with the seasons.



51 How do these winds affect India's weather in summer and winter?

- (1) Summer is cooler and less humid than winter.
 - (2) Summer is warmer and more humid than winter.
 - (3) Winter is warmer and less humid than summer.
 - (4) Winter is cooler and more humid than summer.
-