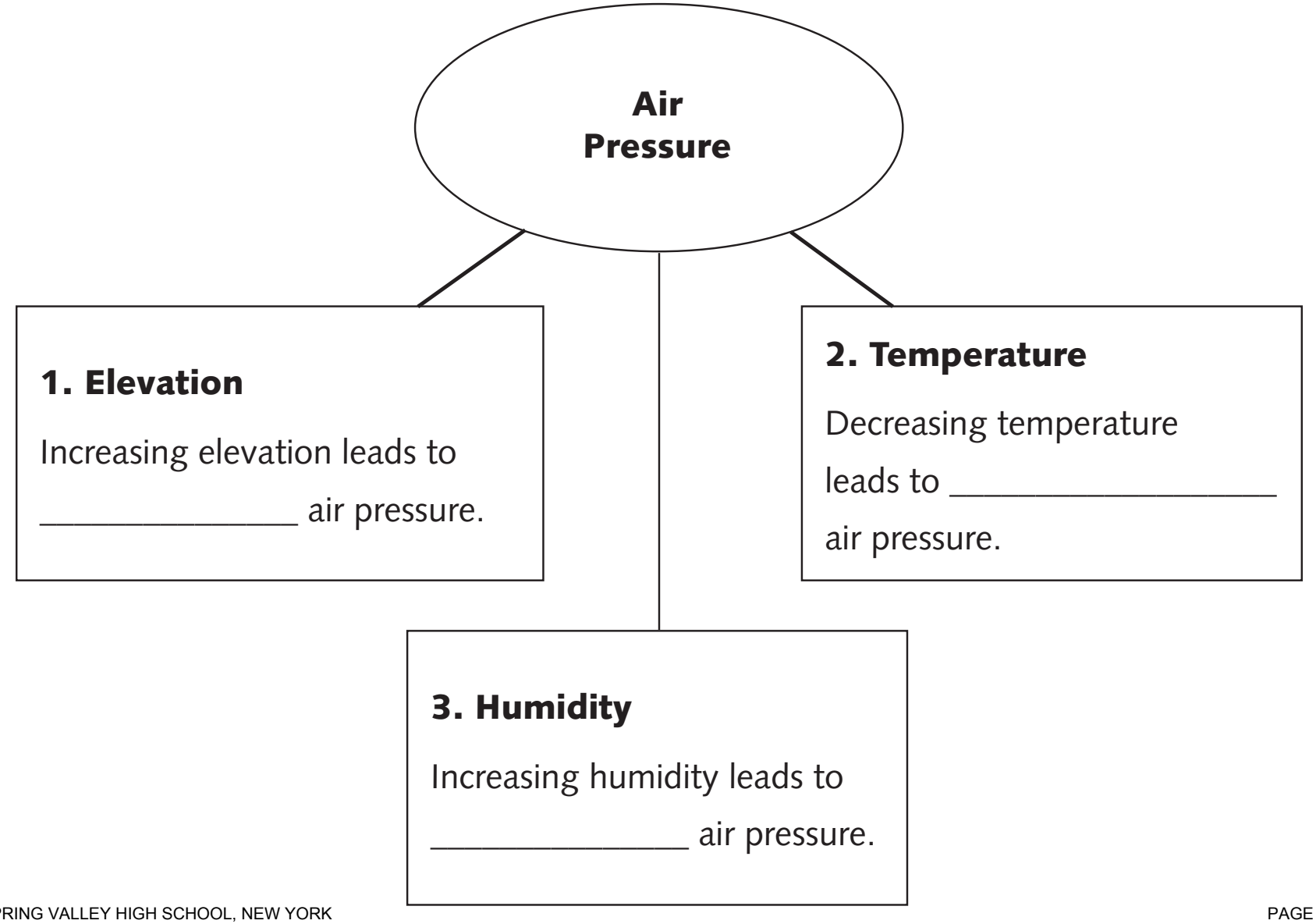
Name _____ Date _____

WEATHER AND CLIMATE VOCABULARY

Complete the organizer to clarify your understanding of the factors that affect air pressure. In each box, explain how a change in the factor affects air pressure.



_____ 1. atmosphere

_____ 2. troposphere

_____ 3. stratosphere

_____ 4. mesosphere

_____ 5. thermosphere

a. the layer of the atmosphere in which temperature increases as altitude increases; contains the ozone layer

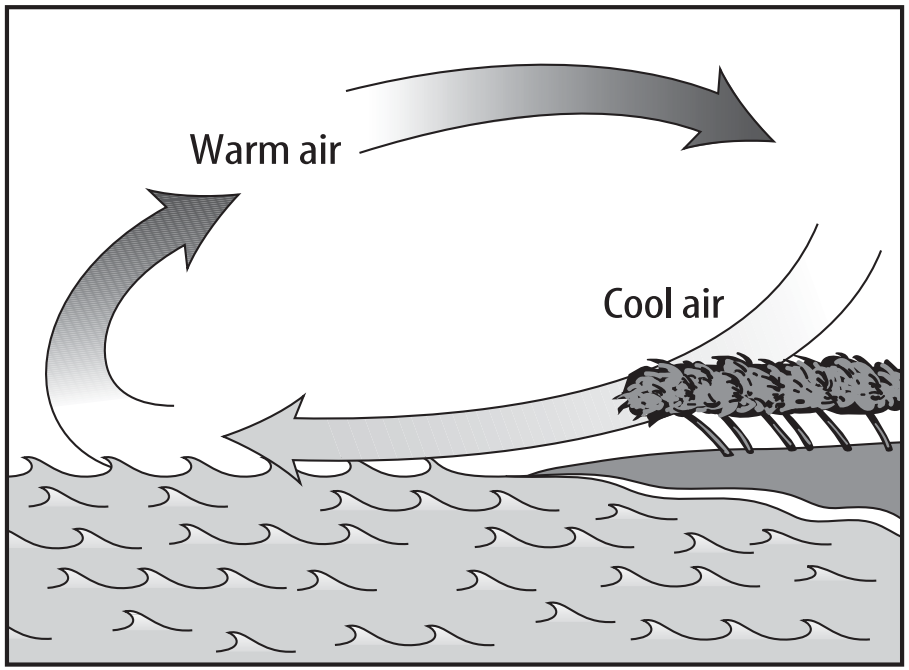
b. the layer of the atmosphere in which temperature decreases as altitude increases

c. the lowest layer of the atmosphere, in which temperature drops at a constant rate as altitude increases; the level where all weather conditions exist

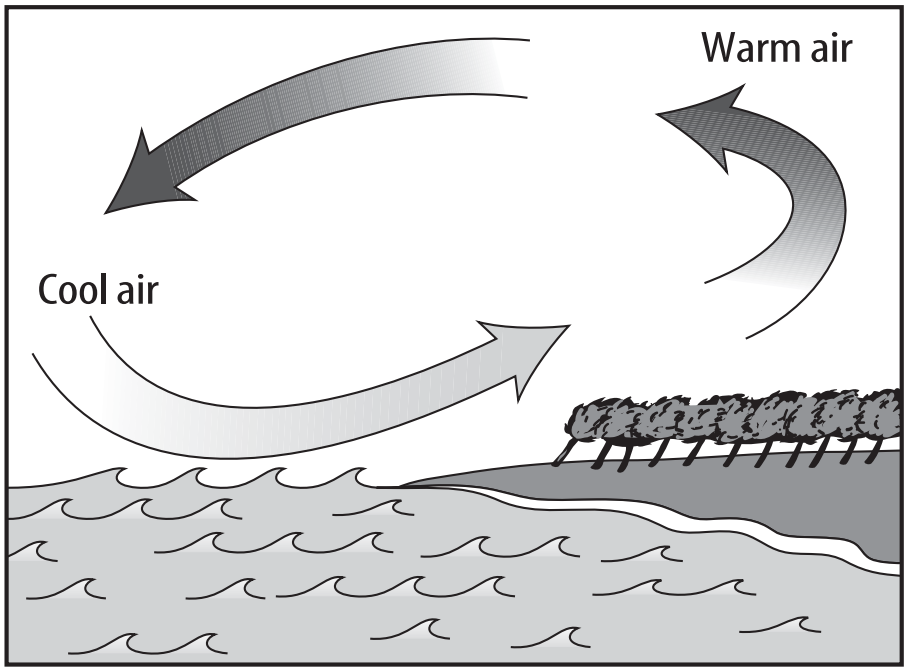
d. the uppermost layer of the atmosphere; includes the ionosphere

e. a mixture of gases, primarily nitrogen, oxygen, and argon, that surround Earth

Directions: *Identify the illustrations below as showing a* **sea breeze** *or* **land breeze**.



1. _____



2. _____

Select the appropriate letter in the figure that identifies each of the following layers of the atmosphere.

_____ mesosphere _____ thermosphere

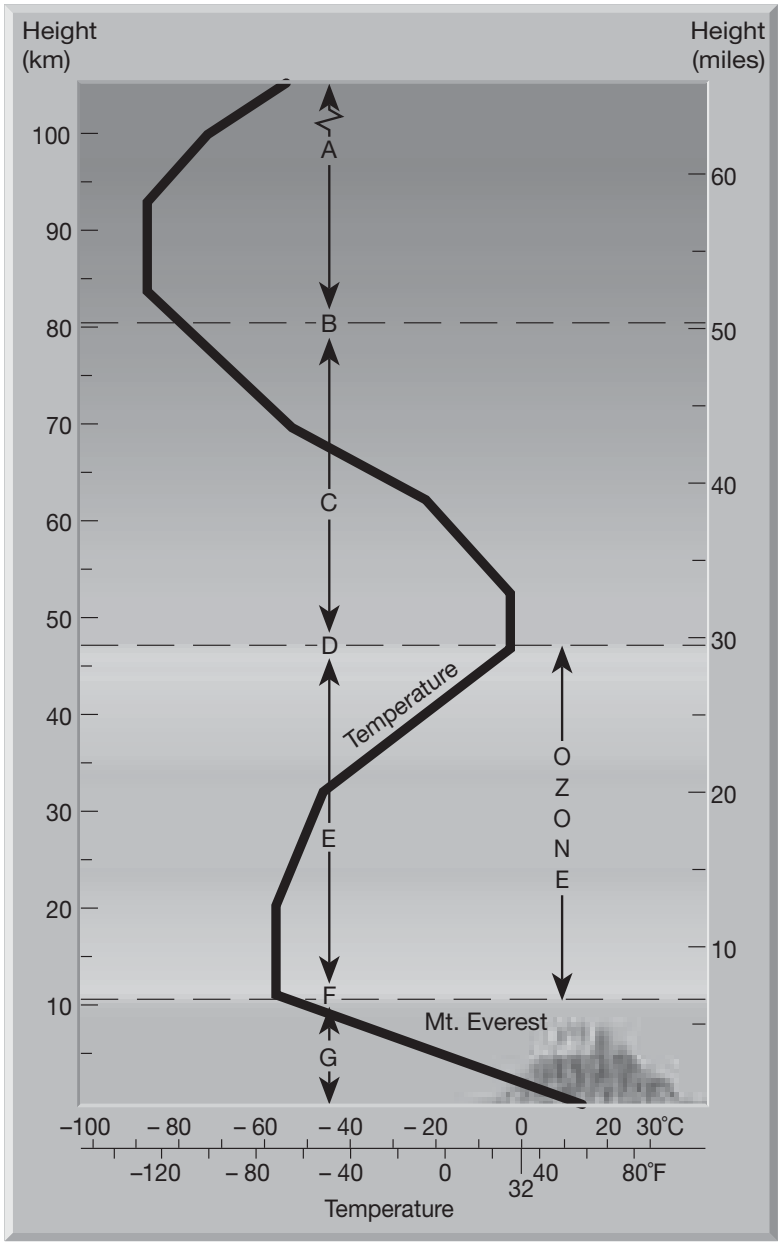
_____ troposphere _____ stratosphere

In the figure, the atmosphere is divided vertically into four layers based on _____.

Circle the letter of the layer of the atmosphere that contains the ozone layer.

a. troposphere b. stratosphere

c. mesosphere d. thermosphere



_____ 1. electromagnetic spectrum

_____ 2. albedo

_____ 3. greenhouse effect

_____ 4. conduction

_____ 5. convection

a. the warming of the surface and lower atmosphere of Earth that occurs when carbon dioxide and water vapor in the air absorb and radiate infrared radiation

b. all the frequencies or wavelengths of electromagnetic radiation

c. movement of matter due to differences in density caused by temperature variations

d. the transfer of energy as heat through a material

e. the fraction of solar radiation that is reflected off the surface of an object

_____ 1. Coriolis effect

_____ 2. trade winds

_____ 3. westerlies

_____ 4. polar easterlies

_____ 5. convection cells

a. prevailing winds that blow from east to west from 30° latitude to the equator in both hemispheres

b. the curving of the path of a moving object from an otherwise straight path due to Earth's rotation

c. the three looping patterns of air flow that exist in each hemisphere

d. prevailing winds that blow from west to east between 30° and 60° latitude in both hemispheres

e. prevailing winds that blow from east to west between 60° and 90° latitude in both hemispheres

Match each description with its front.

	Description	Front
_____	**3.** Cold, dense air moves into a region occupied by warmer air.	a. warm front
_____	**4.** Warm air moves into an area formerly covered by cooler air.	b. cold front
_____	**5.** A cold front overtakes a warm front.	c. occluded front

The figure below shows the rain shadow effect. Use the terms below to identify the labeled items on the lines provided.

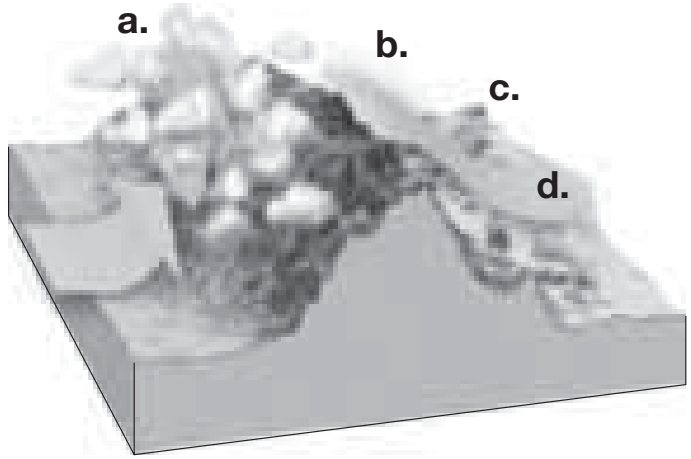
leeward side	warm, dry air	windward side	rain shadow

a. _____

b. _____

c. _____

d. _____



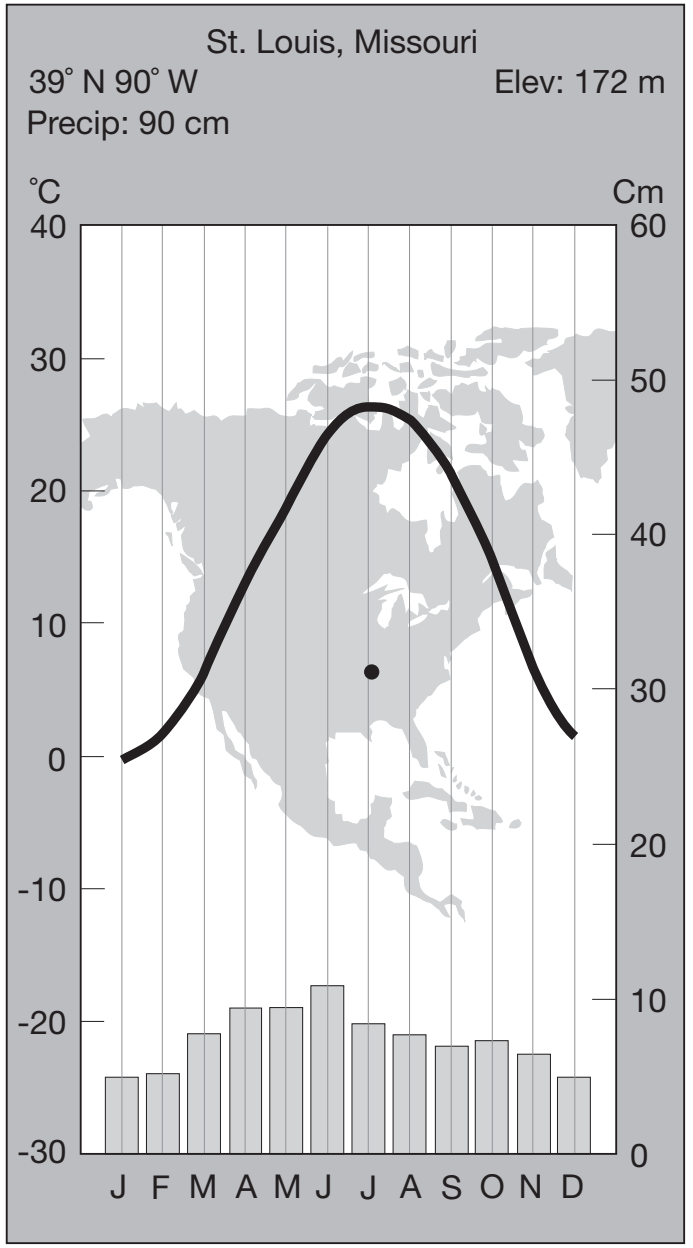
Use the climate diagram for St. Louis, Missouri, on the right to answer the following questions.

a. When does the highest temperature occur? What is the highest temperature?

_____

b. When does the lowest temperature occur? What is the lowest temperature?

_____



_____ **1.** One possible effect of global warming

_____ **2.** The main source of Earth's energy

_____ **3.** Natural heating of Earth's surface caused by certain atmospheric gases

_____ **4.** A rise in global temperatures

_____ **5.** A major greenhouse gas

a. greenhouse effect

b. carbon dioxide

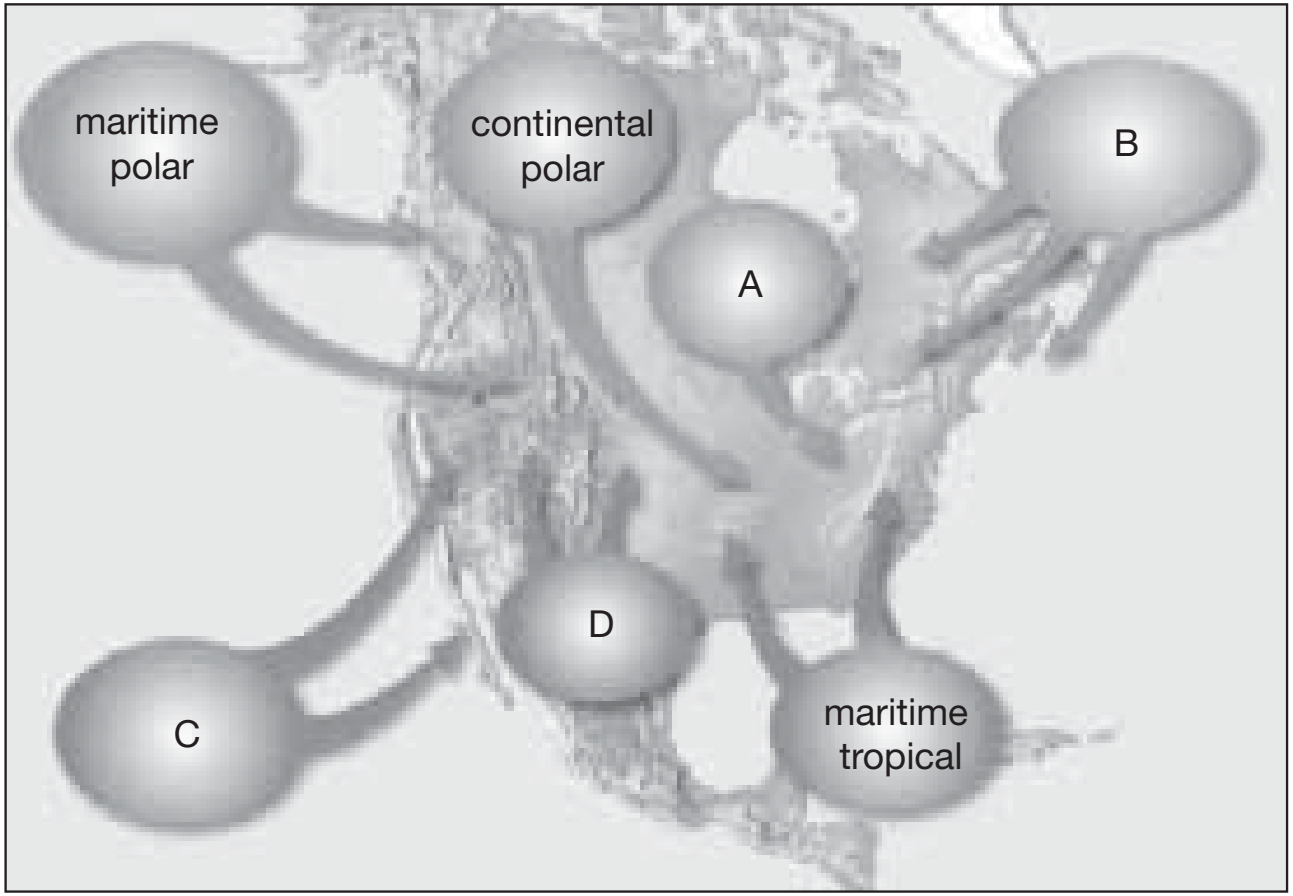
c. global warming

d. flooded coastal cities

e. the Sun

Description	Mechanism of Energy Transfer
_____ **1.** transfer of heat by mass movement or circulation within a substance	a. radiation b. convection c. conduction
_____ **2.** transfer of heat through matter by molecular activity	
_____ **3.** transfer of heat without requiring a medium to travel through	

Identify each labeled air mass on the figure as continental tropical, continental polar, maritime polar, or maritime tropical.



A. _____

B. _____

C. _____

D. _____

Circle the letter of the terms that describe the temperature characteristics of an air mass.

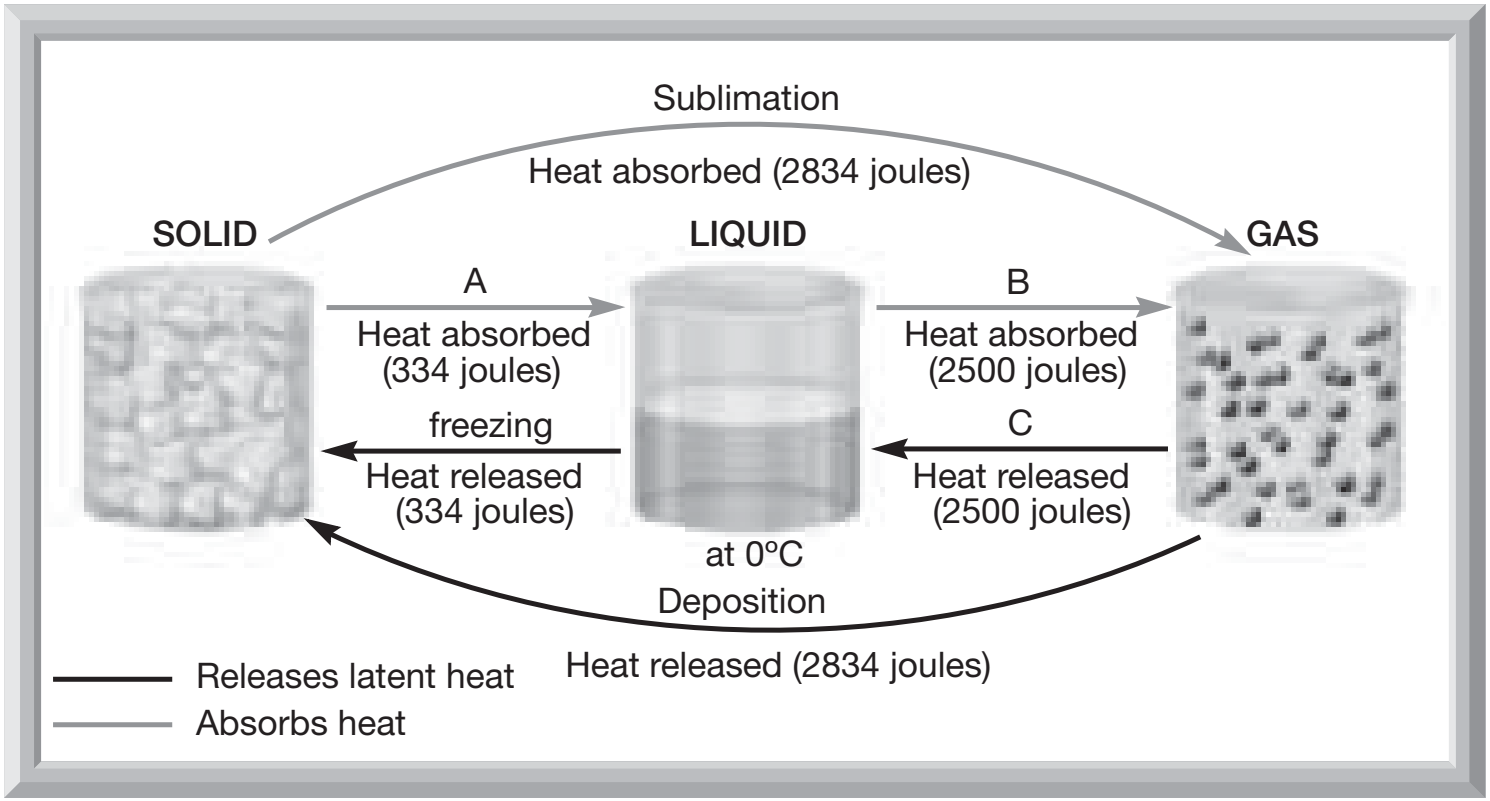
a. continental and maritime

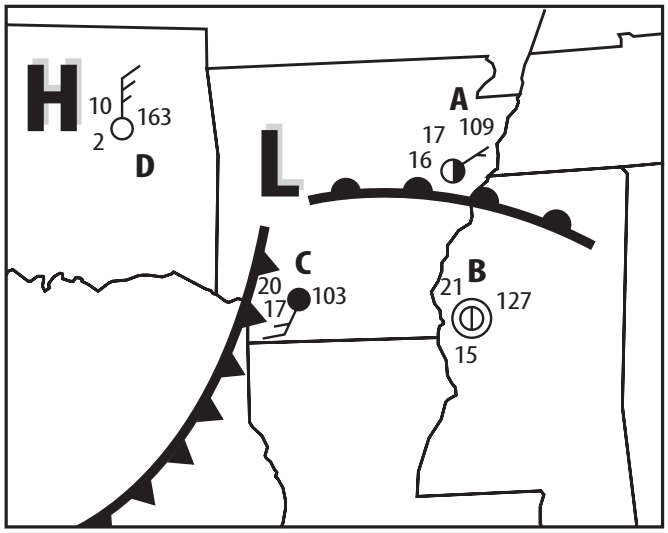
b. polar and maritime

c. polar and tropical

Select the appropriate letter in the figure that identifies each of the following changes of state.

_____ evaporation _____ condensation _____ melting





Directions: *Use the weather map and Weather Map Symbols Reference Handbook to answer the following questions.*

1. Which station has the lowest pressure?

_____

2. How would you describe the wind at Station B?

_____

3. Which station is recording the highest wind speed?

_____

4. Which station has the highest pressure?

_____

5. What kind of front is south of Station A?

_____

6. Which station has the most cloud cover?

_____

7. How might the temperature change at station C over the next few hours? Why?

_____

condensation	**warmer**	**unstable**	**convection**
cumulonimbus	**moisture**	**stable**	

At any moment, more than 2000 thunderstorms are occurring on Earth. Thunderstorms develop from cumulus clouds that grow into huge **(1)** _____ clouds.

Thunderstorms form when three conditions exist that cause cumulus clouds to grow by the energy transfer method of **(2)** _____. First, there must be sufficient **(3)** _____ in the lower atmosphere to condense and release latent heat. Second, some mechanism must make the air rise, causing the cloud to grow. Third, the portion of the atmosphere that the cloud grows through must be **(4)** _____. The rising cloud must stay **(5)** _____ than the air around it in order for the growth to continue.

The cloud's growth stops when the rate of **(6)** _____ in the cloud, which diminishes with height, is insufficient to create enough heat to keep the cloud warmer than the air around it. Growth will also stop if the rising air meets a layer of **(7)** _____ air that it cannot overcome.

_____ 1. World Weather Watch

_____ 2. dew point

_____ 3. isobars

_____ 4. station model

_____ 5. National Weather Service

a. the temperature at which the rate of condensation equals the rate of evaporation

b. an organization that promotes rapid exchange of weather information

c. the U.S. weather forecasting agency

d. lines on a weather map that connect points of equal atmospheric pressure

e. a pattern of meteorological symbols that represent the weather at a particular station

_____ 1. hurricane

_____ 2. cold front

_____ 3. station model

_____ 4. midlatitude cyclone

_____ 5. barometer

_____ 6. air mass

_____ 7. thunderstorm

_____ 8. wind vane

_____ 9. radar

_____ 10. stationary front

a. the front edge of a moving mass of cold air that pushes beneath a warmer air mass like a wedge

b. a usually brief, heavy storm that consists of rain, strong winds, lightning, and thunder

c. a system that uses reflected radio waves to determine the velocity and location of objects

d. an instrument used to determine direction of the wind

e. a severe storm that develops over tropical oceans and whose winds of 120 km/h or faster spiral in toward the low-pressure storm center

f. a large body of air throughout which temperature and moisture content are similar

g. an area of low pressure that is characterized by rotating wind that moves toward the rising air of the central low-pressure region

h. an instrument that measures atmospheric pressure

i. a pattern of meteorological symbols that represents the weather at a particular observing station and that is recorded on a weather map

j. a front of air masses that moves either very slowly or not at all

_____ 1. radiosonde

_____ 2. hurricane

_____ 3. tornado

_____ 4. maritime polar

_____ 5. thunderstorm

_____ 6. continental tropical

_____ 7. radar

_____ 8. anemometer

_____ 9. continental polar

_____ 10. maritime tropical

a. a severe storm that develops over tropical oceans and has strong winds that spiral in toward the intense, low-pressure storm center

b. an air mass characterized by cold, moist air

c. instruments carried aloft by balloons to measure upper-atmospheric conditions

d. an air mass characterized by warm, dry air

e. a destructive, rotating column of air that has very high wind speeds and that may be visible as a funnel-shaped cloud

f. an instrument that measures the speed of the wind

g. an air mass characterized by cold, dry air

h. a system that uses reflected radio waves to determine the velocity and location of objects

i. an air mass characterized by warm, moist air

j. a usually brief, heavy storm that consists of rain, strong winds, lightning, and thunder

_____ 1. specific heat

_____ 2. climate

_____ 3. El Niño

_____ 4. doldrums

_____ 5. monsoon

a. a seasonal wind that blows toward land in summer bringing heavy rains, and that blows away from land in winter, bringing dry weather

b. a periodic event in the eastern Pacific Ocean in which the surface-water temperature turns unusually warm

c. the average weather conditions in an area over a long period of time

d. the quantity of heat required to raise a unit mass 1 K or 1 °C

e. the equatorial belt of low pressure

_____ 1. microclimate

_____ 2. tropical climate

_____ 3. middle-latitude climate

_____ 4. polar climate

_____ 5. highland climate

a. a climate in which temperatures average 18 °C (max) in the coldest month and 10 °C (min) in the warmest month

b. the climate of a small area

c. a climate characterized by variation in temperatures and precipitation over short distances

d. a climate in which average temperatures are near or below freezing

e. a climate typical of equatorial regions

_____ 1. global warming

_____ 2. Milankovitch theory

_____ 3. climatologist

_____ 4. ice core sampling

_____ 5. fossil study

a. the idea that orbital changes lead to climate changes

b. a scientist who gathers data to study climate changes

c. a gradual increase in the average global temperature

d. a method that measures pollen, leaf shapes, and animal adaptations to study past climates

e. a method that measures gases trapped within meltwater to study past climates

_____ 1. layers of the atmosphere

_____ 2. radiation

_____ 3. conduction

_____ 4. convection

_____ 5. Coriolis effect

_____ 6. global winds

_____ 7. trade winds

_____ 8. westerlies

_____ 9. polar easterlies

_____ 10. front

a. all forms of energy that travel through space as waves

b. prevailing winds that blow from west to east between 30° and 60° latitude in both hemispheres

c. the curving of the path of a moving object from an otherwise straight path due to Earth's rotation

d. troposphere; stratosphere; mesosphere; thermosphere

e. polar easterlies meet warm air from the westerlies, creating a stormy area

f. the transfer of energy as heat through a material

g. prevailing winds that blow from east to west between 60° and 90° latitude in both hemispheres

h. prevailing winds that blow from 30° to 0° latitude in both hemispheres

i. looping patterns of air flow, called convection cells, that move from the poles to the equator

j. the movement of matter due to differences in density that are caused by temperature variations; can result in the transfer of energy as heat

_____ 1. mercurial barometer

_____ 2. mesosphere

_____ 3. convection

_____ 4. stratosphere

_____ 5. Coriolis effect

_____ 6. thermosphere

_____ 7. radiation

_____ 8. aneroid barometer

_____ 9. conduction

_____ 10. troposphere

a. the coldest layer of the atmosphere, in which temperature decreases as altitude increases

b. all forms of energy that travel through space as waves

c. an instrument that measures atmospheric pressure by registering the changes in the bending or bulging of the sides of a sealed metal container

d. the uppermost layer of the atmosphere, in which temperature increases as altitude increases; includes the ionosphere

e. an instrument that measures atmospheric pressure by registering changes in the level of mercury inside a tube

f. a layer of the atmosphere in which temperature increases as altitude increases; contains the ozone layer

g. the transfer of energy as heat through a material

h. the lowest layer of the atmosphere, in which temperature drops as altitude increases, and in which weather conditions exist

i. the curving of the path of a moving object from an otherwise straight path due to Earth's rotation

j. the movement of matter due to differences in density caused by temperature variations

Questions

a. What is the dew point?

b. What is sleet?

c. What is fog?

d. What is humidity?

e. What is wind?

f. What is relative humidity?

g. What is weather?

h. What is temperature?

i. What are clouds?

j. What are types of precipitation?

k. What is caused by the interaction of air, water, and Sun?

Answers

_____ **1.** a description of the current state of the atmosphere

_____ **2.** the amount of water vapor in the air

_____ **3.** objects that form as warm air rises, expands, and then cools

_____ **4.** the temperature at which condensation forms from saturated air

_____ **5.** the measurement of the amount of water vapor in the air compared to the amount needed for saturation at a specific temperature

_____ **6.** rain, snow, sleet, and hail

_____ **7.** a stratus cloud that forms near the ground

_____ **8.** the weather

_____ **9.** air moving in a specific direction

_____ **10.** a measure of the average amount of motion of molecules

_____ **11.** rain drops that pass through a layer of freezing air near Earth's surface forming pellets

troposphere
spring equinox
thermosphere
summer solstice
radiation
isotherms
autumnal equinox
conduction
stratosphere
convection
heat
mesosphere
ozone
scattering

The _____ is the bottom layer of the atmosphere.

Many clouds reflect a lot of sunlight because they have a high _____.

Temperatures decrease in the third layer of the atmosphere, the

_____.

The _____ contains only a tiny fraction of the atmosphere's mass.

The _____ is the first day of summer.

In the Northern Hemisphere, the _____ occurs on September 22 or 23.

_____ is a form of oxygen with three oxygen atoms in each molecule.

Solar energy reaches Earth by _____.

March 21 or 22 is the _____ in the Northern Hemisphere.

_____ is the energy transferred from one object to another due to a difference in their temperatures.

The average kinetic energy of the atoms or molecules in a substance is its

_____.

The ozone layer is found in the _____.

When you touch a hot metal spoon, you experience heat transferred by

_____.

The lines on a world isothermal map are called _____.

Water being heated in a pan circulates because of _____.

Light reaches areas that are not in direct light by means of _____.

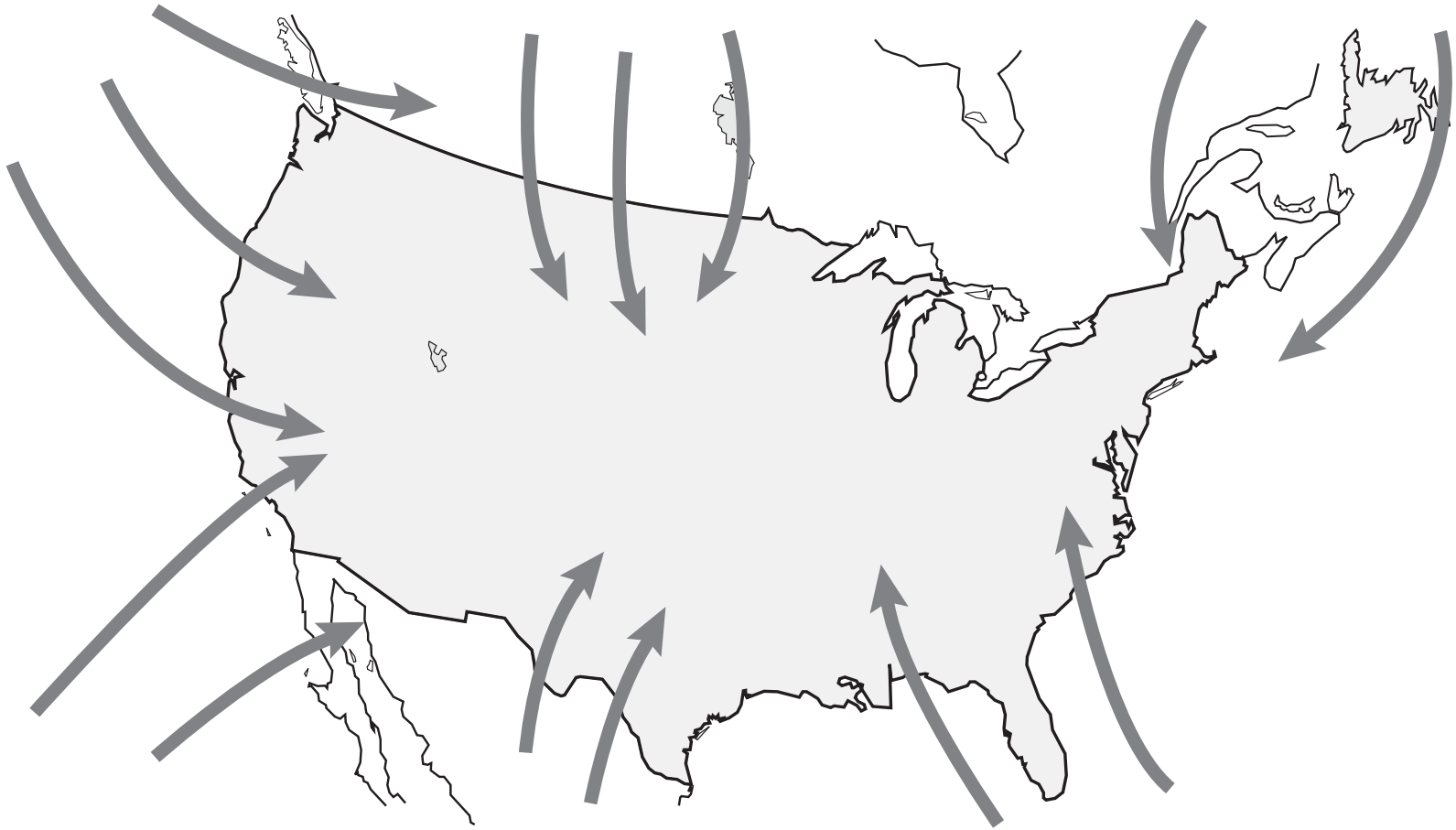
Match each situation to its change in relative humidity.

Situation	Change in Relative Humidity
_____ **7.** Water vapor is added.	a. increases
_____ **8.** Air temperature decreases.	b. no change
_____ **9.** Water vapor is removed.	c. decreases
_____ **10.** Air temperature increases.	

hot/dry cool/moist warm/moist cold/dry

cool/moist warm/moist

9. _____ 10. _____ 11. _____



12. _____ 13. _____ 14. _____

_____ **5.** snow

_____ **6.** rain

_____ **7.** sleet

_____ **8.** hail

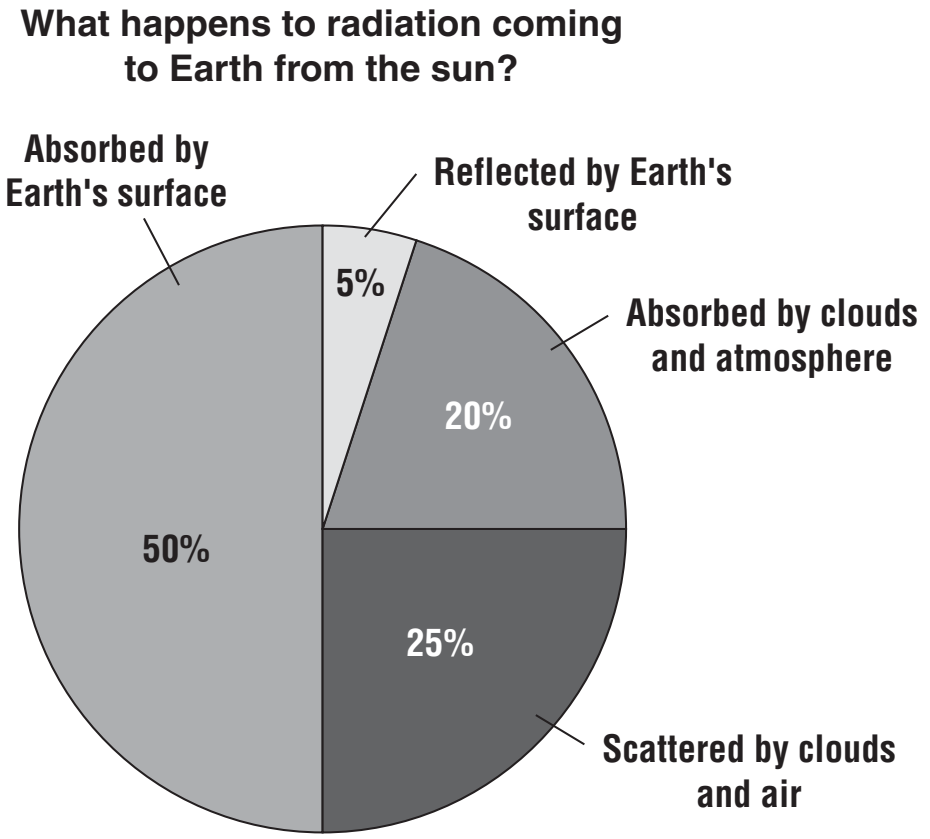
a. water drops that fall when the temperature is above freezing

b. water drops that fall and become solid when the temperature is below freezing

c. water drops that freeze in layers around small nuclei of ice during thunderstorms

d. water drops that pass through a layer of freezing air near the surface, forming ice pellets

Directions: *Answer the following questions on the lines provided using information from the graph.*



1. Why doesn't all radiation directed at Earth reach the surface?

_____

_____

2. What percent of radiation is lost before reaching Earth's surface?

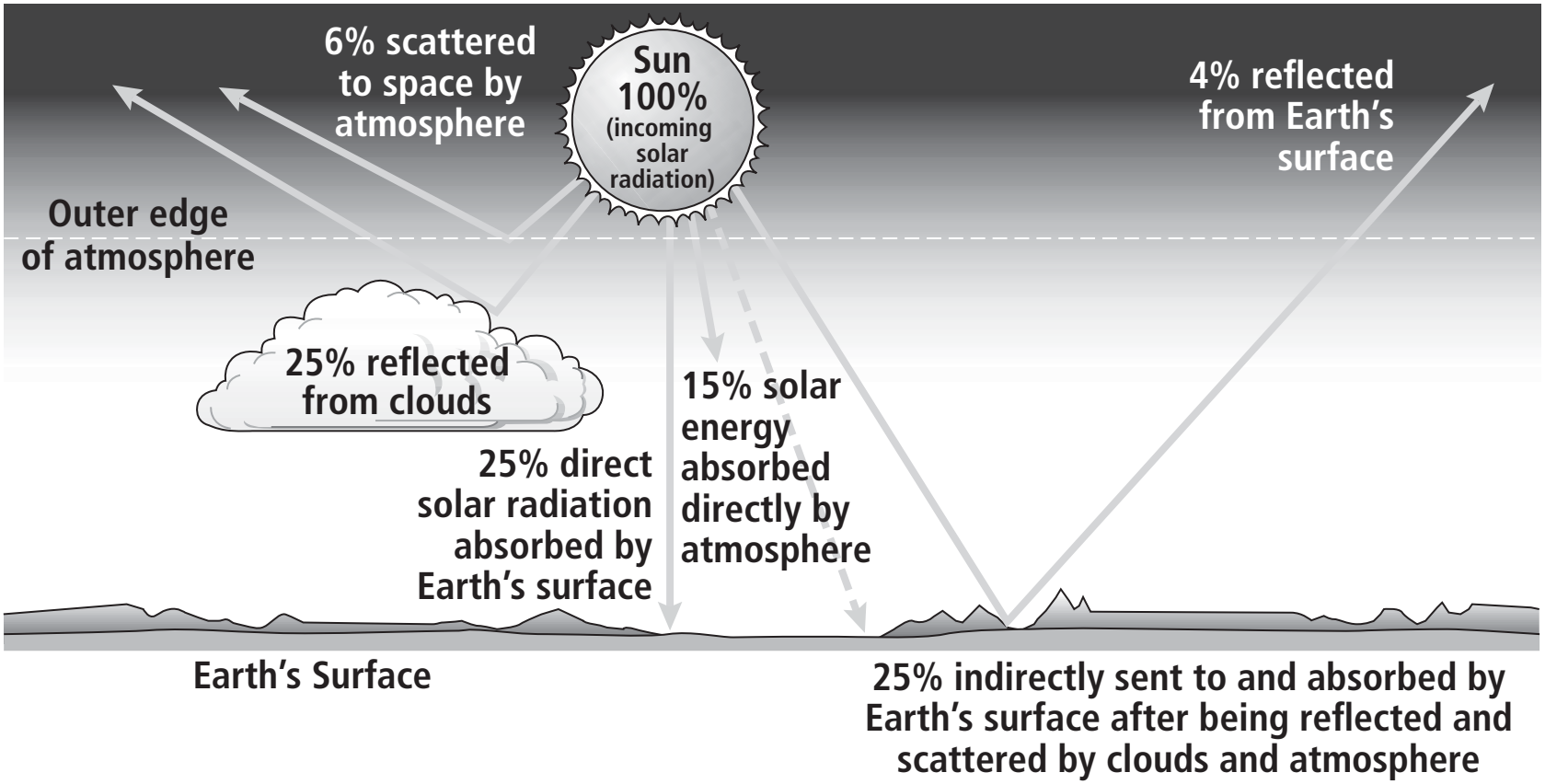
_____

3. What percent of radiation is lost after reaching Earth's surface?

_____

4. What factors in the atmosphere seem to have the greatest effect on the amount of radiation received from the Sun?

_____



What is the source of all energy that reaches Earth? _____

What percentage of the Sun's energy does Earth's surface absorb directly or indirectly? _____

What percentage of the Sun's energy is scattered or reflected back into space? What causes this loss of solar energy?

_____ 1. advection fog

_____ 2. cirrus clouds

_____ 3. stratus clouds

_____ 4. cumulus clouds

_____ 5. radiation fog

a. results from the nightly cooling of Earth

b. form at low altitudes with a top that resembles cotton balls

c. have the highest altitude of any cloud in the sky

d. forms along coasts when warm, moist air moves across a cold surface

e. cover large areas of sky and often block out the sun

_____ 1. supercooling

_____ 2. rain gauge

_____ 3. coalescence

_____ 4. Doppler radar

_____ 5. cloud seeding

a. introduces condensation nuclei into a cloud

b. measures rainfall amounts

c. combines small cloud droplets into large droplets

d. cools a substance without changing its state

e. measures precipitation intensity

For each change of state, write the opposite change of state.

melting	evaporation	sublimation

a. condensation: _____

b. freezing: _____

c. deposition: _____

Match each description with its form of precipitation.

Description	Form of Precipitation
_____ **11.** small particles of ice	a. hail
_____ **12.** drops of water that fall from a cloud and have a diameter of at least 0.5 mm	b. sleet
_____ **13.** ice pellets with multiple layers	c. rain

Select the appropriate letter in the figure that identifies each part of the global circulation model.

_____ NE trade winds

_____ polar easterlies

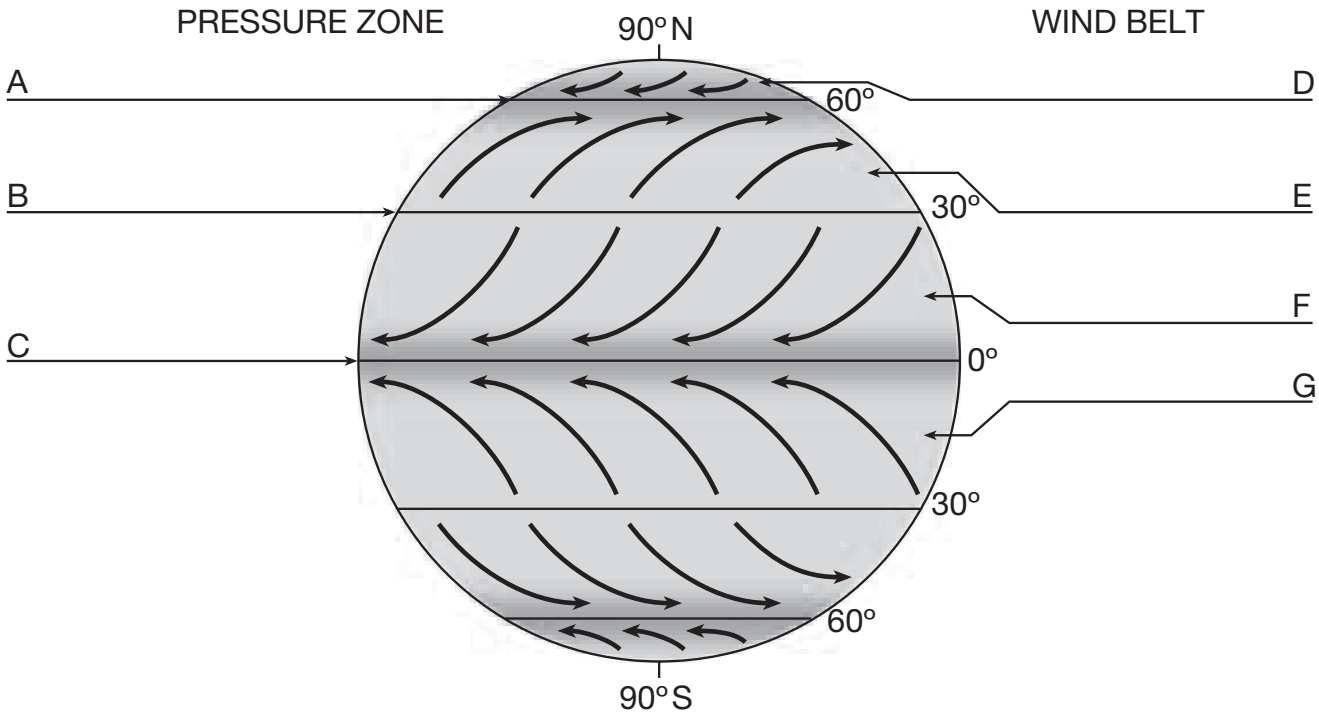
_____ equatorial low

_____ westerlies

_____ subtropical high

_____ SE trade winds

_____ subpolar low



1. pressure exerted by the weight of air above a certain point

2. pressure changes occurring over a given distance

3. device used to measure air pressure

4. describes how Earth's rotation affects moving objects

5. center of low air pressure

6. stormy belt where westerlies encounter polar easterlies

7. seasonal change in wind direction due to summer heating of landmasses

8. easterly wind belts on either side of the equator

9. prevailing winds of the middle latitudes

westerlies
barometer
cyclone
polar front
monsoon
air pressure
pressure gradient
trade winds
Coriolis effect

Vocabulary Terms

1. ◯ _ _ _ _ _ _ _ _ _ _ _

2. _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ ◯ _

3. _ _ _ _ _ _ ◯ _ _

4. _ _ _ ◯ _ _ _ _ _ _ _ _ _ _ _

5. ◯ ◯ ◯ _ _ _ _

6. _ _ ◯ _ _ _ _ _ _ _

7. _ _ _ _ _ ◯ _

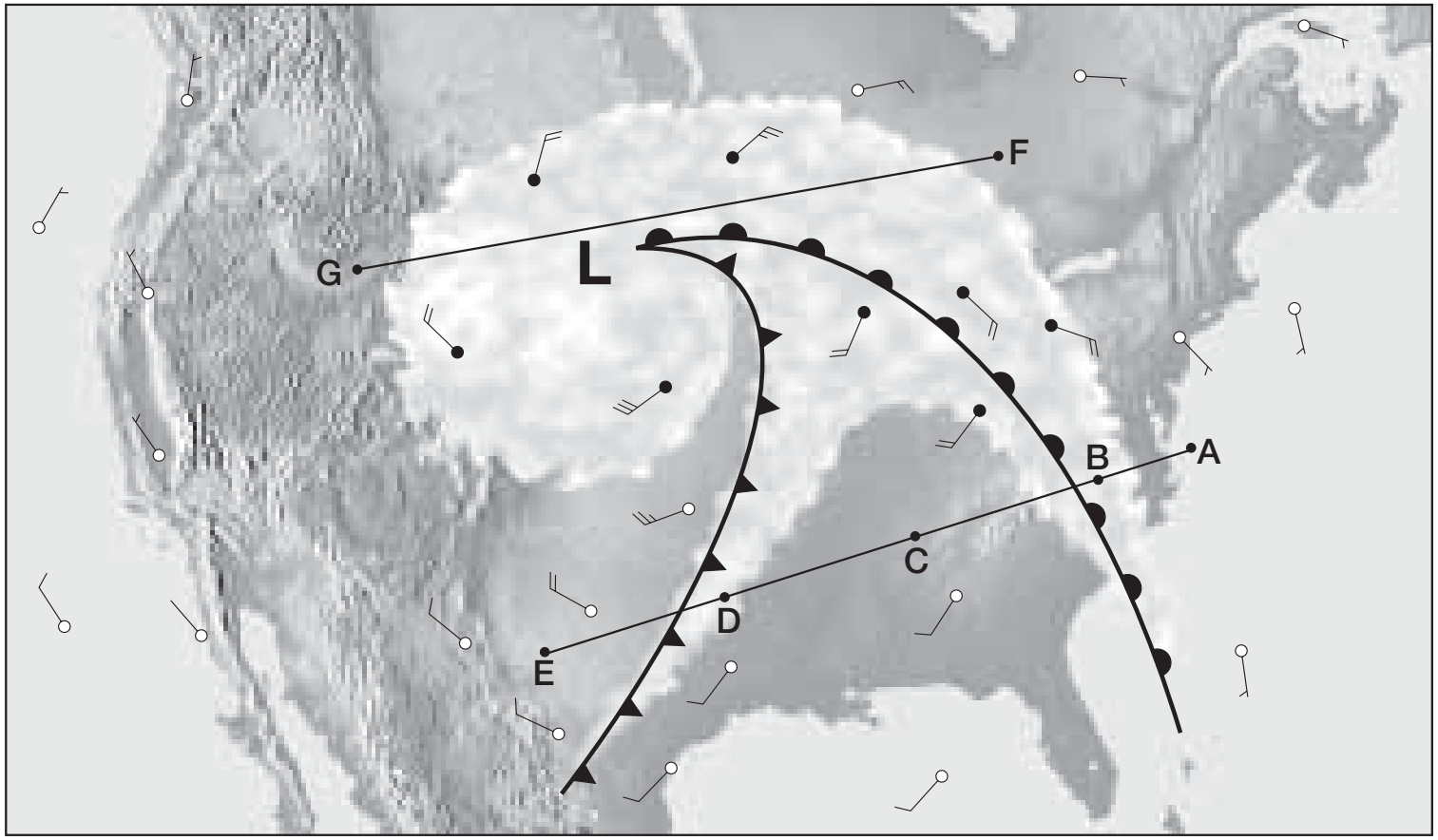
8. _ _ _ _ _ _ _ ◯ _ _

9. _ _ _ _ _ _ _ _ ◯ _

Hidden Word: _ _ _ _ _ _ _ _ _ _ _

Definition: _____

The middle-latitude cyclone shown in the figure is a center of low _____.



Label the type of front shown at each of these locations in the figure as either a warm front or a cold front.

location B: _____ location D: _____

Sentence	Term
_____ **9.** In the temperate zones, the sun's rays strike the Earth at a _____ angle than near the equator.	a. global winds b. precipitation c. smaller
_____ **10.**  _____ distribute(s) heat and moisture around Earth.	
_____ **11.**  Plants influence _____ through transpiration, which releases water vapor from their leaves into the air.	

	Column A	Column B
_____	**1.** An instrument that measures the height of cloud layers and estimates cloud cover	**a.** thermometer
_____	**2.** An instrument that measures wind speed and direction	**b.** barometer
_____	**3.** An instrument that measures temperature	**c.** anemometer
_____	**4.** An instrument that measures air pressure	**d.** hygrometer
_____	**5.** A balloon-borne package of sensors that gathers upper-level weather data	**e.** ceilometer
_____	**6.** An instrument that measures relative humidity	**f.** radiosonde

water vapor **altitude** **Fahrenheit** **heat** **condensation**
dew point **temperature** **lifted condensation level**

Heat and temperature are not the same. **(1)** _____ is a measure of how rapidly or slowly molecules move. In contrast, **(2)** _____ is the transfer of energy that takes place because of temperature differences. Temperature can be measured in degrees Fahrenheit, degrees Celsius, or kelvins. The most commonly used temperature scale in the United States is **(3)** _____.

The atmosphere's temperature plays a role in the formation of rain. Rain drops form when **(4)** _____ in the atmosphere cools and turns from a gas to a liquid. This change in state is called **(5)** _____.

Air must be saturated before condensation can occur. Saturation is the point at which the air holds as much water vapor as it possibly can. The **(6)** _____ is the temperature to which air must be cooled at constant pressure to reach saturation. Until this temperature is reached, condensation cannot occur and rain cannot fall.

Temperature in the lower atmosphere generally decreases with increased **(7)** _____. As air rises, it cools and eventually reaches the temperature at which condensation occurs. The height above the surface at which condensation occurs is the **(8)** _____.

In the space at the left, write *true* if the statement is true; if the statement is false, change the italicized word to make it true.

_____ **1.** *Meteorology* is the study of atmospheric phenomena.

_____ **2.** Weather is the current state of the *lithosphere*.

_____ **3.** Long-term variations in weather for a particular area make up the *climate* of the area.

_____ **4.** The tropics are hotter than the poles because the sun strikes this area of Earth more *indirectly*.

intertropical convergence zone **rotation** **North America** **jet streams**
trade winds **southwest** **polar jet streams** **Coriolis effect**
low pressure **prevailing westerlies** **polar easterlies** **northeast**

The **(1)** _____ deflects moving air to the right in the northern hemisphere and to the left in the southern hemisphere. The cause of this is Earth's **(2)** _____.

Each hemisphere has three basic wind systems. The first, at 30° latitude north and south, is known as the **(3)** _____. There, air sinks, warms, and moves toward the equator from northeast to southwest in the northern hemisphere and from southeast to northwest in the southern hemisphere. When the air reaches the equator, it rises, then moves back toward 30° to start the cycle again. These winds from both hemispheres converge at the equator. They are forced upward, creating an area of **(4)** _____. This area near the equator is called the **(5)** _____.

The second wind system, called the **(6)** _____, flows between 30° and 60° latitude north and south of the equator. Its circulation pattern is opposite that of the wind system discussed above. These winds are responsible for the movement of many weather systems across much of **(7)** _____.

The third wind system, the **(8)** _____, lies between the poles and 60° latitude. In the northern hemisphere, these winds flow from the **(9)** _____ to the **(10)** _____. They flow in the opposite direction in the southern hemisphere.

Narrow bands of fast, high-altitude, westerly winds called **(11)** _____ flow at the boundaries between wind zones in the middle latitudes. These bands of wind steer weather systems in the middle latitudes. The most important one, the **(12)** _____, separates the polar easterlies from the prevailing westerlies.

Complete the table by filling in the type of weather system described. Use the following terms: *front, cold front, occluded front, stationary front, warm front, wave cyclone.*

Description	Weather System
13. Cold, dense air that displaces warm air, forcing the warm air up	
14. Narrow region separating two air masses of different densities	
15. Advancing warm air that displaces cold air	
16. Low-pressure system that heavily influences weather in the middle latitudes	
17. Cold air mass that moves rapidly and overtakes a warm front	
18. Two air masses that meet and do not advance	

Complete the table by checking the correct column for each statement.

Statement	High-Pressure System	Low-Pressure System
19. Characterized by sinking air		
20. Characterized by rising air		
21. Air flows toward center		
22. Air flows away from center		
23. Air moves clockwise in the northern hemisphere		
24. Air moves counterclockwise in the northern hemisphere		
25. Associated with fair weather		
26. Associated with clouds and precipitation		

_____ 1. topography

_____ 2. monsoon

_____ 3. El Niño

_____ 4. climate

_____ 5. microclimate

_____ 6. specific heat

a. the warm-water phase of the ENSO

b. the average weather conditions in an area over a long period of time

c. the amount of energy required to change the temperature of 1 g of a substance by 1 °C

d. the surface features of land

e. the climate of a small area

f. seasonal winds that cause both floods and drought

_____ 7. ice cores

_____ 8. fossils

_____ 9. tree rings

_____ 10. sea-floor sediment

a. where evidence of past climate is found, high levels of ^{18}O in shells of microorganisms indicate cool water, while lower levels indicate warm water

b. where evidence of past climate is found in the remains of plants and animals that had adaptations to a particular environment's climate

c. where evidence of past climate is found in concentrations of gases in ice and meltwater

d. where evidence of past climate is seen in their width

_____ 1. polar climate

_____ 2. tropical climate

_____ 3. foehn

_____ 4. global warming

_____ 5. topography

_____ 6. ice core sampling

_____ 7. middle-latitude climate

_____ 8. subarctic climate

_____ 9. fossil study

_____ 10. microclimate

a. the surface features of land; influences climate by controlling the flow of air

b. the climate of a small area

c. a climate in which temperatures average 18 °C (maximum) in the coldest month and 10 °C (minimum) in the warmest month

d. a method of measuring past climate changes in which pollens indicate climate types

e. a gradual increase in the average global temperature

f. a climate with high temperatures and heavy precipitation for part of the year; typical of equatorial regions

g. a dry wind that flows down the slopes of the Alps

h. a method of measuring past climates in which high levels of CO_2 indicate warm temperatures

i. a climate characterized by average temperatures near or below freezing

j. a climate with the largest annual temperature range of all climates

Directions: *Match each cause with the correct effect. Write the letter of the effect in the blank before the cause*

Cause	Effect
_____ **3.** The equator receives more of the Sun's energy.	**a.** Cold air sinks.
_____ **4.** Warm air is less dense than cold air.	**b.** Air near the equator is warmer.
_____ **5.** The poles receive less of the Sun's energy.	**c.** The Coriolis effect exists
_____ **6.** Cold air is more dense than warm air.	**d.** Warm air rises.
_____ **7.** Warm air molecules are farther apart.	**e.** Warm air is less dense.
_____ **8.** Earth rotates.	**f.** Air near the poles is colder.

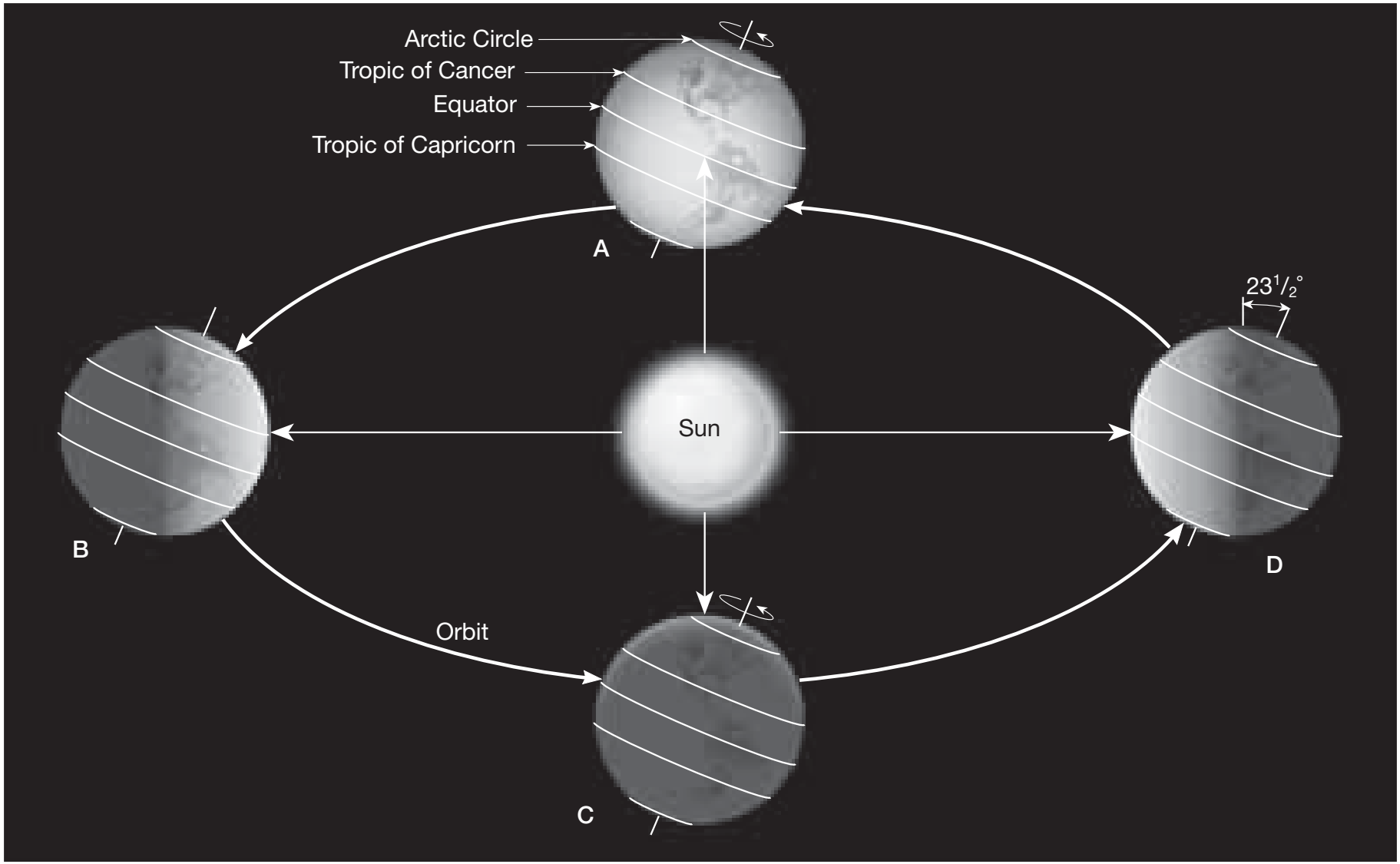
Select the appropriate letter in the figure that identifies each of the following months.

_____ March

_____ June

_____ December

_____ September



Match each location with its effect on temperature. You may use some effects more than once.

	Location	Effect on Temperature
_____	**2.** windward of a large body of water	a. lower temperatures
_____	**3.** at a low altitude	b. higher temperatures
_____	**4.** on a leeward coast	c. more moderate temperatures
_____	**5.** behind a mountain range	d. less moderate temperatures
_____	**6.** at a high altitude	

These figures show side views of the air movement in a high and low. Select the letter of the figure that identifies each of the following air movements.

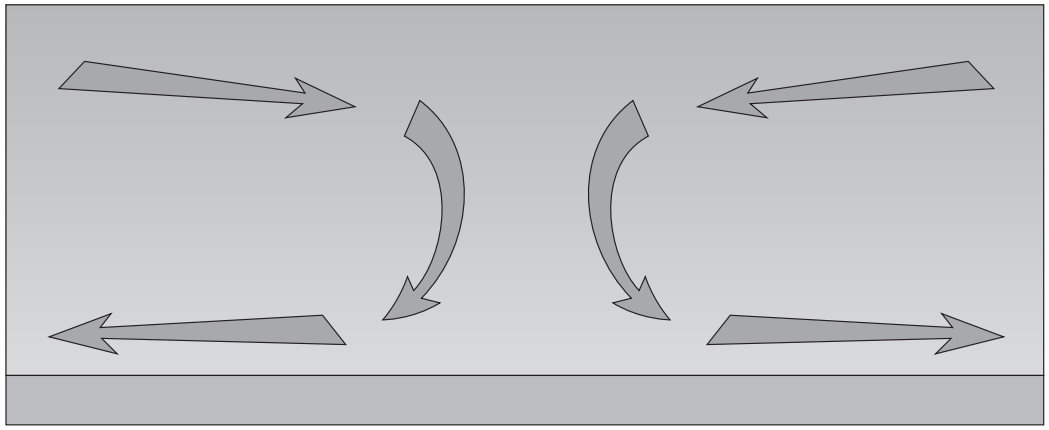
_____ surface low

_____ divergence aloft

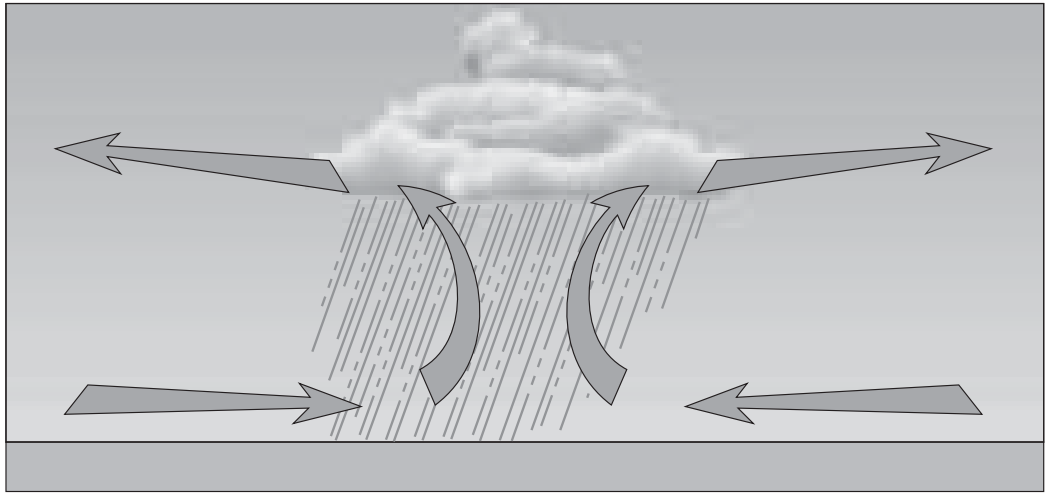
_____ surface high

_____ surface divergence

_____ calm, clear weather



A.



B.

Match each description with its local wind.

	Description	Local Wind
_____	**2.** During the day, heated air along mountain slopes rises.	a. land breeze
_____	**3.** During the day, heated air over land rises, allowing cooler air to move in from over water.	b. sea breeze
_____	**4.** At night, air over land cools and moves out over water.	c. valley breeze
_____	**5.** At night, cooled air along mountain slopes moves downward.	d. mountain breeze

Coriolis Effect	Friction	Pressure Differences

Factors That Affect Wind		
Factor	**Ultimate Cause**	**Effect on Wind**
	unequal heating of Earth's surface by the sun	the greater the pressure difference, the higher the wind
	Earth's rotation	deflects wind to the right in the Northern Hemisphere and to the left in the Southern Hemisphere
	surface terrain	slows air movement, which changes wind direction

Convergence
Orographic lifting
Localized convective lifting
Frontal wedging

Processes That Lift Air		
Process	**Cause of Lifting**	**Typical Resulting Weather Pattern**
	mountains block airflow	clouds and precipitation on windward slopes
	cool, dense air blocks warm, less dense air	clouds and rain
	air in the lower atmosphere flows together	mid-afternoon thunderstorms
	unequal heating of Earth's surface	mid-afternoon rain showers

_____ 1. sublimation

_____ 2. precipitation

_____ 3. cloud

_____ 4. dew point

_____ 5. fog

_____ 6. condensation nucleus

_____ 7. latent heat

_____ 8. absolute humidity

_____ 9. relative humidity

_____ 10. coalescence

a. a suspended particle that provides a surface for condensation

b. formation of a large droplet by the combination of small droplets

c. the temperature at which condensation equals evaporation

d. collection of water droplets or ice crystals suspended in the air

e. energy that is absorbed or released during a phase change

f. the mass of water vapor contained in a given volume of air

g. the process in which a solid changes directly into a gas

h. a mass of water vapor that condenses near the surface of Earth

i. any form of moisture that falls to Earth's surface from clouds

j. the ratio of actual water vapor content in the air to the amount of water vapor needed to reach saturation

_____ 1. absolute humidity

_____ 2. latent heat

_____ 3. coalescence

_____ 4. stratus cloud

_____ 5. dew point

_____ 6. supercooling

_____ 7. cirrus cloud

_____ 8. sublimation

_____ 9. relative humidity

_____ 10. condensation nucleus

a. cooling a substance below its freezing point, condensation point, or sublimation point without a change in state

b. a gray cloud with a flat uniform base

c. energy absorbed or released by matter when it changes phase

d. highest altitude, feathery clouds composed of ice crystals found at the highest altitudes

e. ratio of the amount of water vapor in the air to the amount of water vapor needed to reach saturation

f. a solid particle in the atmosphere that provides the surface on which water vapor condenses

g. the actual amount of water vapor contained in a given volume of air

h. process by which ice changes directly into water vapor

i. formation of a large droplet by the combination of smaller droplets

j. temperature at which the rate of condensation is the same as the rate of evaporation

_____ 1. continental polar

_____ 2. maritime tropical

_____ 3. maritime polar

_____ 4. continental tropical

a. an air mass that originates in southern Atlantic and Pacific areas and brings warm, moist air

b. an air mass that originates in North Atlantic and North Pacific areas and brings cold, moist air

c. an air mass that originates in Canada and brings cold, dry air

d. an air mass that originates in the southwestern United States and brings warm, dry air

_____ 1. cold front

_____ 2. tornado

_____ 3. hurricane

_____ 4. warm front

_____ 5. midlatitude cyclone

_____ 6. thunderstorm

a. an area of low-pressure, rotating wind that moves toward the rising air of the central low-pressure system

b. a destructive, rotating, funnel-shaped column of air with high wind speeds

c. the front edge of a moving mass of cold air that pushes beneath a warmer air mass like a wedge

d. a usually brief, heavy storm with rain, wind, lightning, and thunder

e. a severe storm that develops over tropical oceans, whose strong winds spiral in toward the intense low-pressure center

f. the front edge of advancing warm air mass that replaces colder air with warmer air

_____ 1. anemometer

_____ 2. barometer

_____ 3. wind vane

_____ 4. thermometer

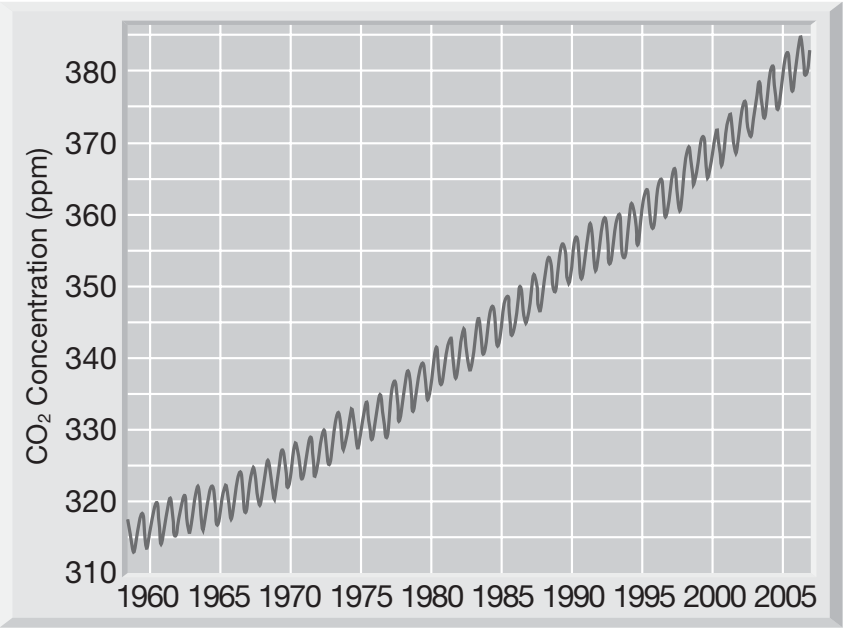
a. an instrument that measures temperature

b. an instrument used to determine the direction of the wind

c. an instrument used to measure wind speed

d. an instrument that measures atmospheric pressure

Use the graph below to answer the following questions.



a. What was the approximate concentration of carbon dioxide in the atmosphere in 1960? _____

b. What was the approximate concentration of carbon dioxide in the atmosphere in 2007? _____

c. What is the approximate difference in carbon dioxide concentration between 2007 and 1960? _____

_____ 1. evaporation

_____ 2. latent heat

_____ 3. condensation

_____ 4. dew

_____ 5. sublimation

a. the condensation that occurs when air comes into contact with grass and cools

b. the process in which fast-moving molecules escape from a liquid to form water vapor

c. the process in which a solid changes directly into a gas

d. the energy absorbed or released by a substance during a phase change

e. the process in which water vapor changes into a liquid