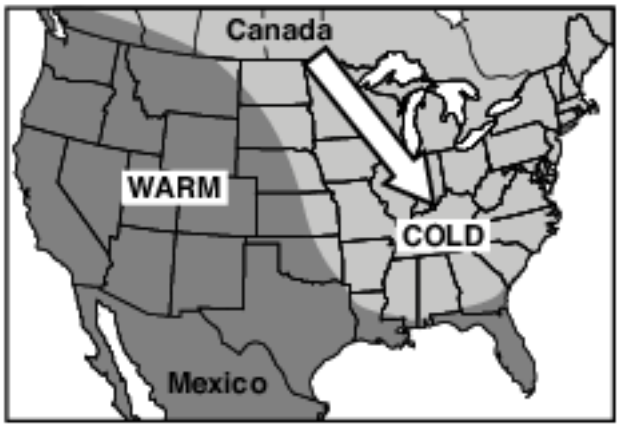
Air Mass

1 The map below shows a cold, arctic air mass that moved southeast from Canada to cover most of the eastern half of the United States during January 2010.



Which shift caused this flow of cold air out of Canada?

(1) the northward shift of the global temperature zones
(2) the northward shift of the Sun's vertical rays
(3) a southward shift of the polar front jet stream
(4) a southward shift of the subtropical jet stream

2 An air mass entering Alaska from the northern Pacific Ocean would most likely be labeled on a weather map as

(1) cP
(2) cT
(3) mP
(4) mT

3 The map of North America below shows the source region of an air mass forming mostly over Mexico.

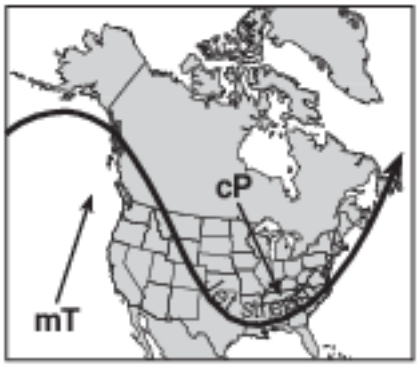
This air mass originating over Mexico is classified as

(1) continental polar
(2) continental tropical
(3) maritime polar
(4) maritime tropical

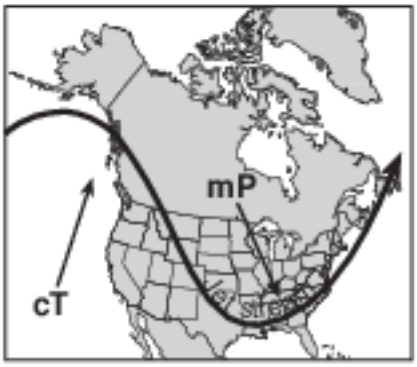
4 The map below shows a position of the polar jet stream over North America in January.

Which map best shows the air-mass movements associated with this jet stream position?

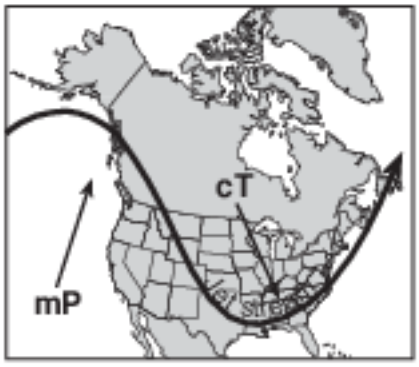
(1)



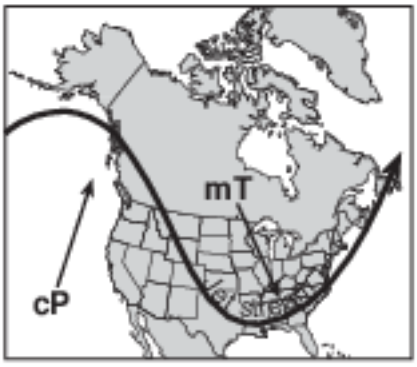
(3)



(2)

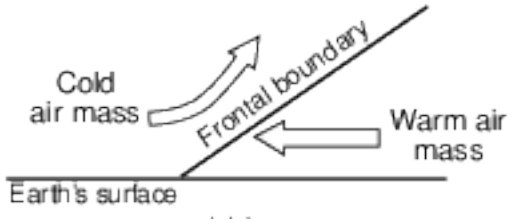


(4)

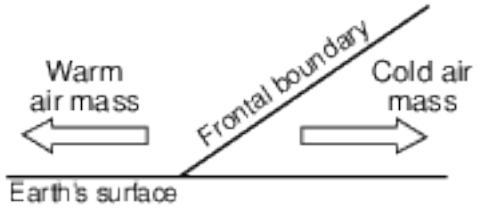


5 Which cross section correctly represents a cold front and the air-mass movements associated with this front?

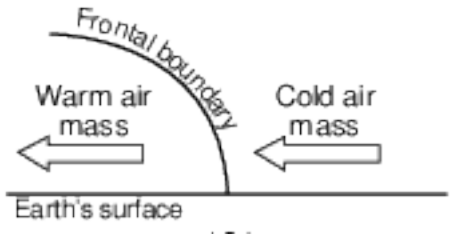
(1)



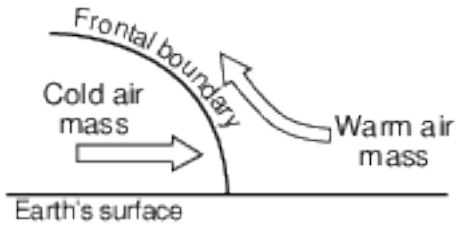
(2)



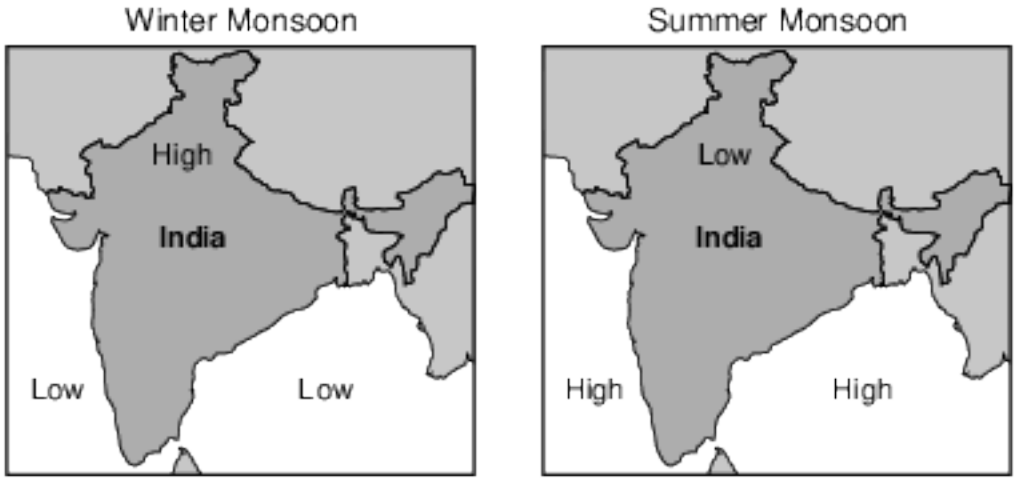
(3)



(4)



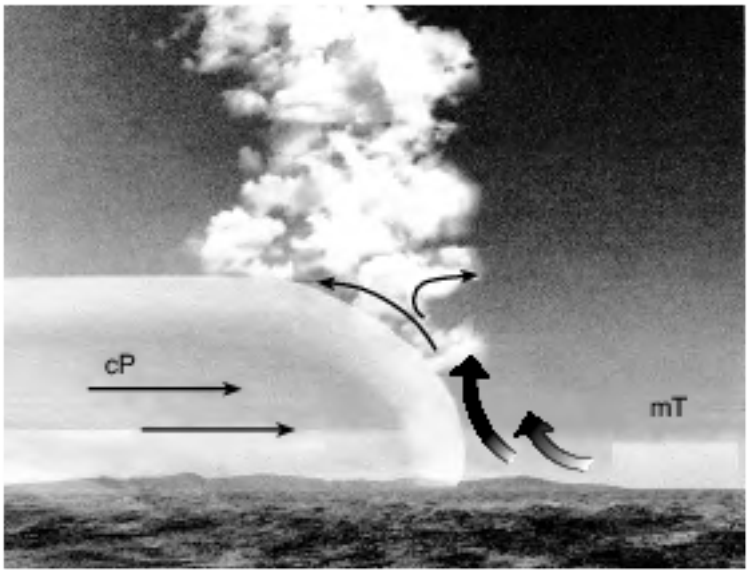
Base your answers to questions 6 on the maps below and on your knowledge of Earth science. The maps show a portion of India and Southeast Asia, bordering on the Indian Ocean, during the winter and summer monsoon seasons. Large areas of high and low air pressure are shown during each season.



6 Which two-letter symbol represents the most likely air mass formed over portions of the Indian Ocean shown on the maps?

(1) mP
(2) mT
(3) cP
(4) cT

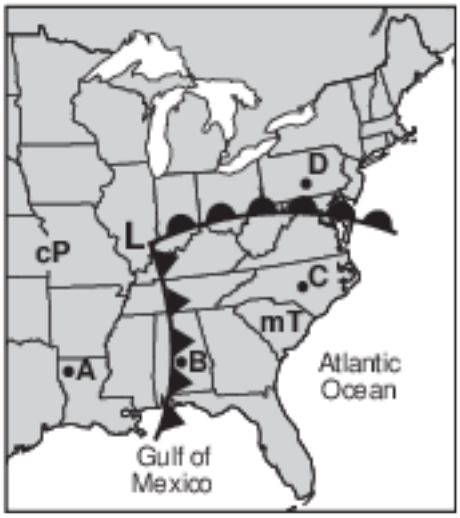
Base your answers to questions 7 on the cross section below and on your knowledge of Earth science. The arrows on the cross section represent the air movement along a weather front between two different air masses. The air masses are labeled.



7 Which statement best describes the difference in air temperature and humidity between the cP and mT air masses?

(1) The mT air mass is warmer and more humid.
(2) The mT air mass is cooler and less humid.
(3) The cP air mass is warmer and less humid.
(4) The cP air mass is cooler and more humid.

Base your answers to questions 8 on the weather map below and on your knowledge of Earth science. The map shows a low-pressure system with two fronts extending from its center (L). Points A, B, C, and D represent locations on Earth's surface. Two different air masses are labeled.



8 Which atmospheric conditions describe the air mass that is influencing weather conditions at location C?

(1) cool and dry
(2) cool and moist
(3) warm and dry
(4) warm and moist

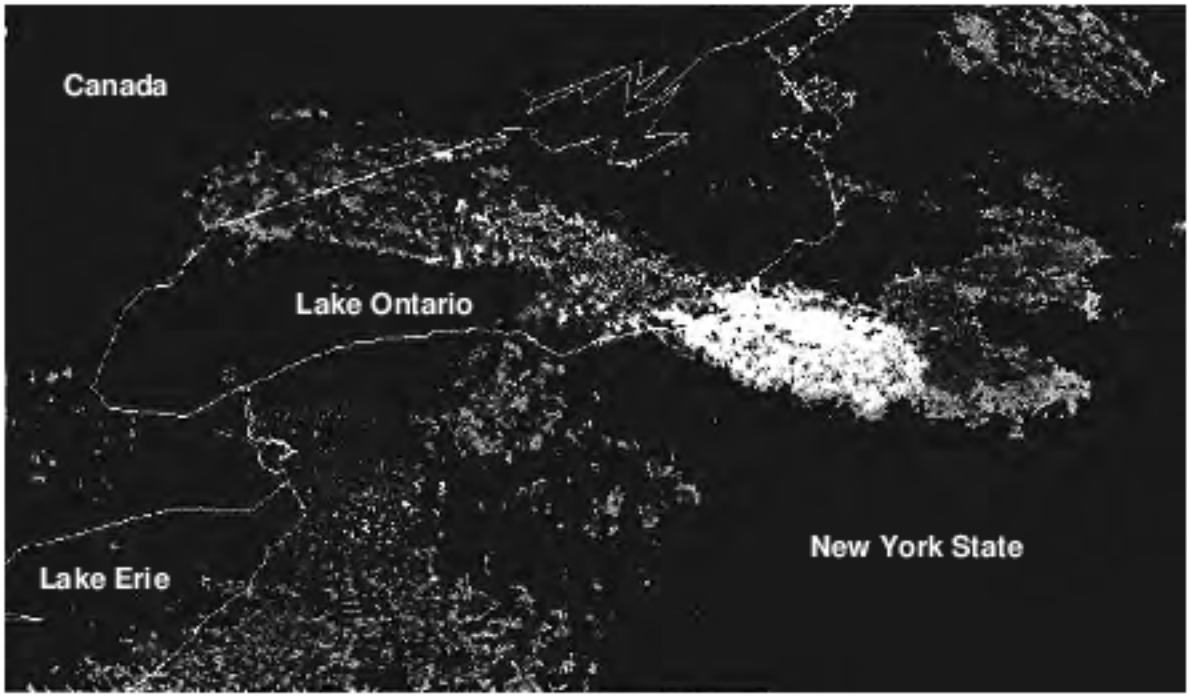
Base your answers to questions 9 on the reading passage about lake-effect snow and the radar image map below, and on your knowledge of Earth science. The radar map shows areas where snowfall was occurring. The whitest area indicates where snowfall was heaviest.

Lake-Effect Snow

In late fall, cold air originating in Canada and then moving over the Great Lakes often produces lake-effect snow in New York State.

When the cold air mass moves across large areas of warmer lake water, water vapor enters the cold air. When this moist air moves over the cooler land, the moisture comes out of the atmosphere as snow. The effect is enhanced when the air that flows off the lake is forced over higher land elevations. The areas affected by lake-effect snow can receive many inches of snow per hour. As the lakes gradually freeze, the ability to produce lake-effect snow decreases.

Radar Image Map



Adapted from: www.erh.noaa.gov

9 What is the most likely two-letter air mass symbol for an air mass from Canada that produces lake-effect snow in New York State?

(1) mT
(2) mP
(3) cT
(4) cP

10 Which type of air mass most likely has high humidity and high temperature?

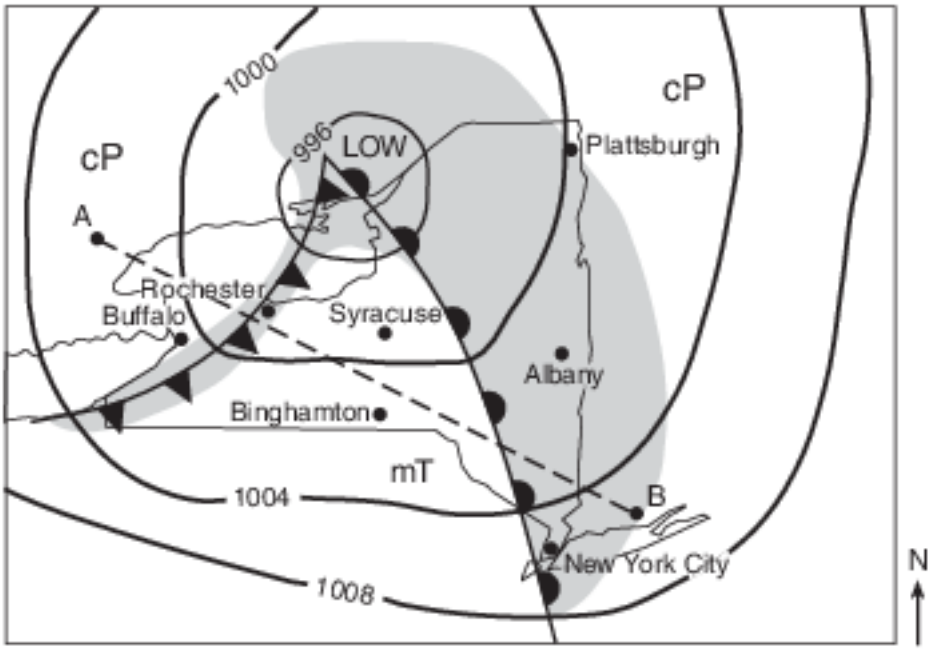
(1) cP
(2) cT
(3) mT
(4) mP

Base your answers to questions 11 on the air pressure field map in image provided and on your knowledge of Earth science. The map shows air pressures recorded in millibars (mb) at locations in eastern North America. Four isobars are shown. Points W, X, Y, and Z represent locations on Earth's surface. Letter L represents the center of a low-pressure system.

11 One air mass associated with this pressure system originally formed over the Gulf of Mexico. Write the two-letter weather map symbol for this type of air mass. [1]

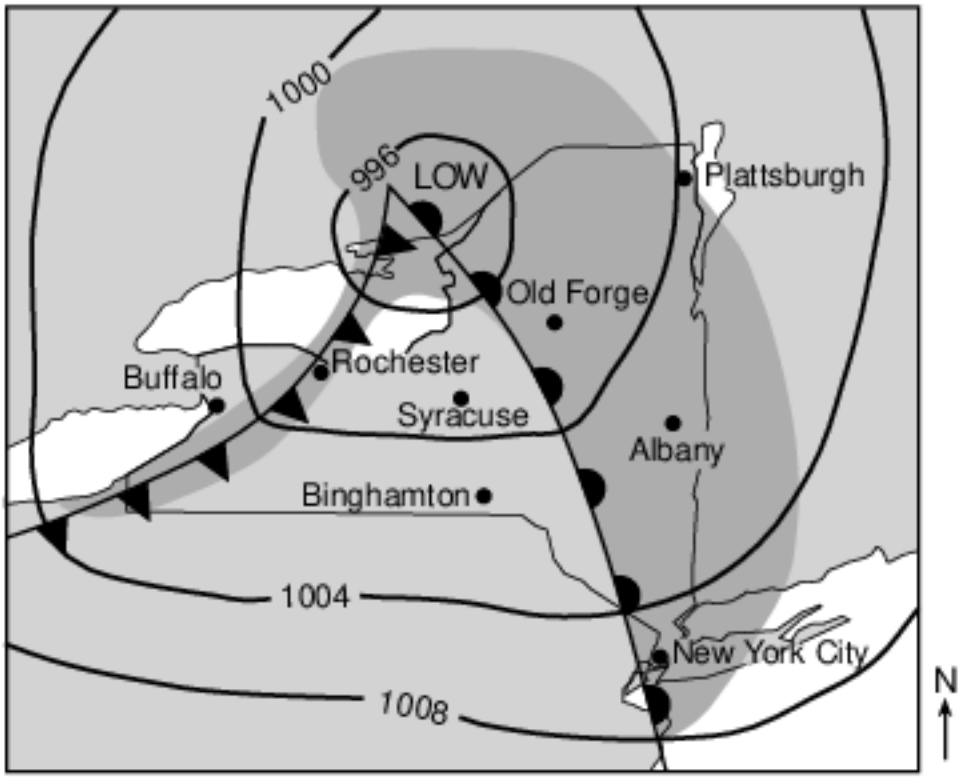
_____

Base your answers to questions 12 on the weather map below and on your knowledge of Earth science. The map indicates the location of a low-pressure system over New York State during late summer. Isobar values are recorded in millibars. Shading indicates regions receiving precipitation. The air masses are labeled mT and cP. The locations of some New York State cities are shown. Points A and B represent other locations on Earth's surface.



12 An air mass acquires the characteristics of the surface over which it forms. In content below, circle the type of Earth surface (land or ocean) and describe the relative temperature of the surface over which the mT air mass most likely formed. [1]
Circle one: land ocean
Relative temperature of Earth's surface:

Base your answers to questions 13 on the weather map below and on your knowledge of Earth science. The map shows the location of a low-pressure system over New York State during summer. Isobar values are recorded in millibars. The darker shading indicates areas of precipitation. Some New York State locations are indicated.



13 Describe the change in air pressure that will most likely occur at Rochester by the time that the cold front has reached Syracuse. Then describe what will most likely happen to the amount of cloud cover in Rochester with this change in air pressure and location of the cold front. [1]
Change in air pressure:
Amount of cloud cover:

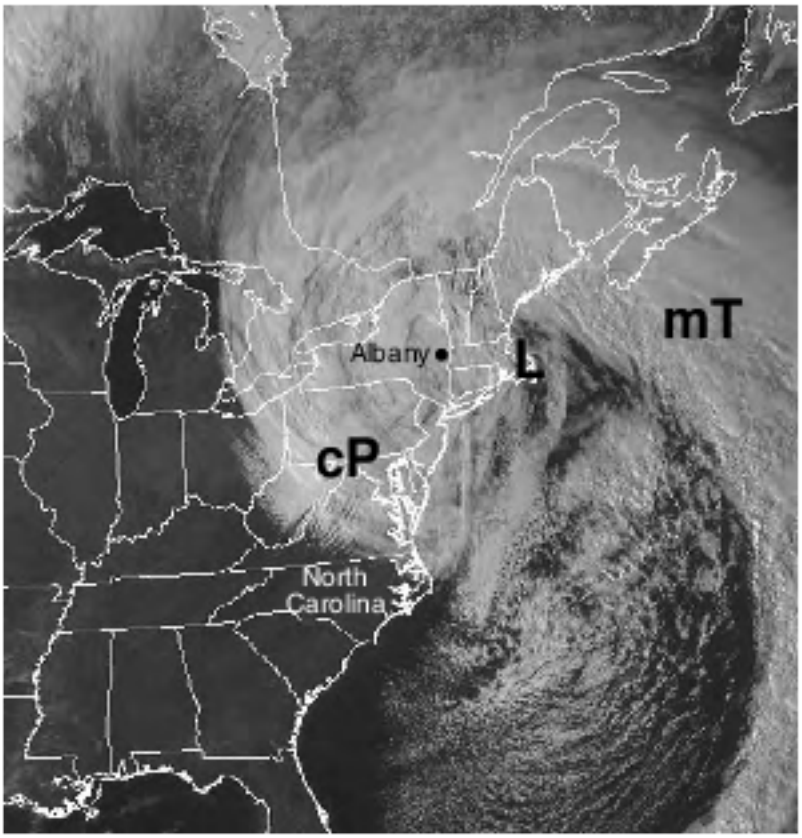
Base your answers to questions 14 on the weather map in image provided and on your knowledge of Earth science. The map shows air temperatures (in °F) at locations in the northeastern United States and part of Canada. Syracuse, New York, is labeled. Line AB represents a stationary frontal boundary.

14 Write the two-letter weather map symbol for the type of air mass that is most likely located north of frontal boundary AB. [1]

Base your answers to questions 15 on the passage and map below and on your knowledge of Earth science. The map shows a satellite image of a nor'easter that influenced the weather of the northeastern United States. The white areas represent clouds associated with this storm system. The locations of North Carolina and Albany, New York, are labeled on the map. The storm's low-pressure center is represented by letter L. Letters cP and mT represent two air masses.

Nor'easters

A nor'easter is a large, low-pressure storm system that moves along the east coast of the United States. The wind over the land blows generally from the northeast as the center of the low passes by a location, hence the name nor'easter. Due to the circulation of winds around the center of the low-pressure system, large amounts of precipitation occur as moist air is carried from the ocean to the land. These storms usually intensify off of the North Carolina coast as they track toward the northeast.



15 Circle the terms that best describe the relative moisture and relative temperature characteristics of the mT air mass compared to the cP air mass shown on the map. [1]
Relative moisture of mT air mass (circle one): more humid less humid the same
Relative temperature of mT air mass (circle one): cooler warmer the same

Answer Keys

1 3

2 3

3 2

4 1

5 4

6 2

7 1

8 4

9 4

10 3

11 Allow 1 credit for mT. Allow credit for either uppercase or lowercase letters.
- Note: Do not allow credit if air-mass letters are reversed, such as Tm or TM.
- For students who used the Spanish edition, either exclusively or in conjunction with the. English edition of the exam, allow credit for the correct two-letter air-mass symbol as it appears in either the English or Spanish 2011 Edition Reference Tables for Physical. Setting/Earth Science.

12 Allow 1 credit for circling ocean and correctly describing the relative temperature of Earth's surface. Acceptable descriptions include, but are not limited to:
- — warmer
- — hot
- — a tropical temperature
- Note: Do not allow credit for a numerical answer because there are no temperatures indicated for
- comparison.

13 Allow 1 credit if both responses are correct. Acceptable responses include, but are not limited to:
- Change in air pressure:
- — slight decrease, then a steady increase
- — generally increasing/rising
- — lower to higher
- — greater
- Amount of cloud cover:
- — It decreased.
- — lower percent
- — clear/0%
- — There are fewer clouds.
- — little cloud cover

14 Allow 1 credit for cP or cA or mP. Allow credit for either uppercase or lowercase letters.
- Note: Do not allow credit if air-mass letters are reversed, such as Ac or Pc.
- For students who used the Spanish edition, either exclusively or in conjunction with the. English edition of the exam, allow credit for the correct two-letter air-mass symbol as it appears in either the English or Spanish 2011 Edition Reference Tables for Physical Setting/. Earth Science.

15 Allow 1 credit for circling both more humid and warmer.