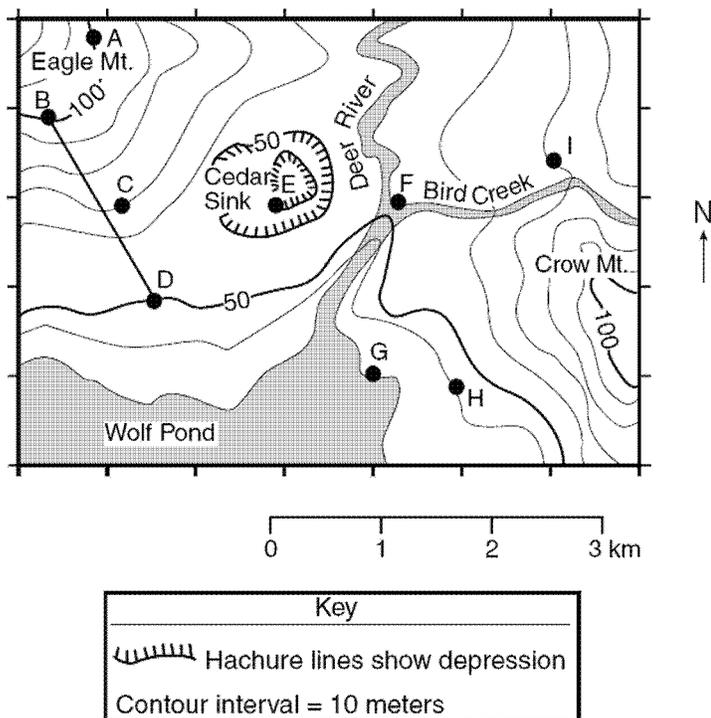


MIDTERM

Name: _____

Date: _____

- Which New York State landscape region is located at 42° N 75° W?
 - Erie-Ontario Lowlands
 - the Catskills
 - Hudson-Mohawk Lowlands
 - Tug Hill Plateau
- Base your answer(s) to the following question(s) on the 2001 edition of the *Earth Science Reference Tables*, the topographic map below, and your knowledge of Earth science. Points A through I are locations on the map. Elevations are shown in meters.

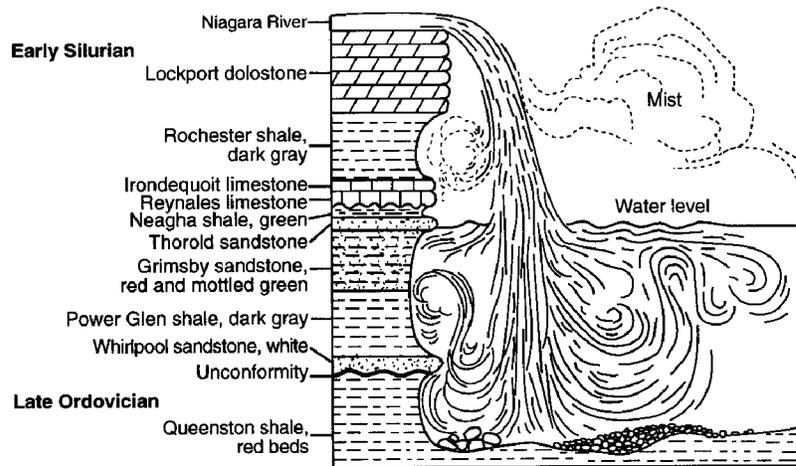


What is the approximate gradient along line BD?

- 25 m/km
 - 50 m/km
 - 100 m/km
 - 150 m/km
- The contour lines crossing Deer River show that the river flows
 - northward out of Wolf Pond
 - northward into Wolf Pond
 - southward out of Wolf Pond
 - southward into Wolf Pond
 - A mineral's crystal shape and cleavage are a direct result of the mineral's
 - hardness
 - abundance in nature
 - arrangement of atoms
 - exposure to the hydrosphere and atmosphere

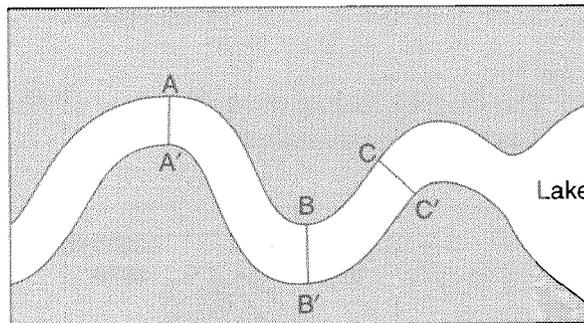
5. Bedrock in the area of Binghamton, New York, consists of
- (1) plutonic igneous rock
 - (2) sedimentary rock layers
 - (3) faulted and tilted volcanic rock
 - (4) folded metamorphic rock
6. Which extrusive igneous rock is composed of approximately 40% quartz, 20% potassium feldspar, 20% plagioclase feldspar, 10% biotite mica, and 10% hornblende?
- (1) rhyolite
 - (2) gabbro
 - (3) granite
 - (4) basalt
7. What are the two most abundant elements by mass found in Earth's crust?
- (1) aluminum and iron
 - (2) sodium and chlorine
 - (3) calcium and carbon
 - (4) oxygen and silicon
8. Which type of climate has the greatest amount of rock weathering caused by frost action?
- (1) a dry climate in which temperatures remain below freezing
 - (2) a dry climate in which temperatures alternate from below freezing to above freezing
 - (3) a wet climate in which temperatures remain below freezing
 - (4) a wet climate in which temperatures alternate from below freezing to above freezing
9. Which factor has the greatest influence on the weathering rate of Earth's surface bedrock?
- (1) local air pressure
 - (2) angle of insolation
 - (3) age of the bedrock
 - (4) regional climate

10. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables*, the diagram below, and your knowledge of Earth science. The diagram shows a cross section of the bedrock where the Niagara River flows over Niagara Falls.

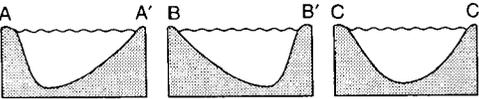
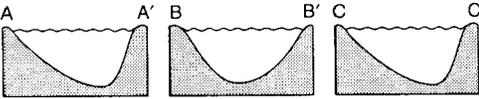
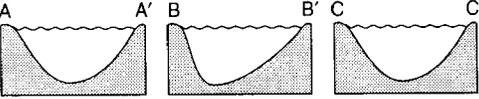
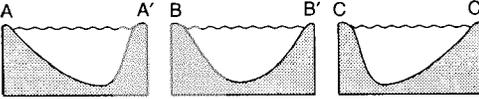


Which kind of rock in this formation appears to be *least* resistant to weathering

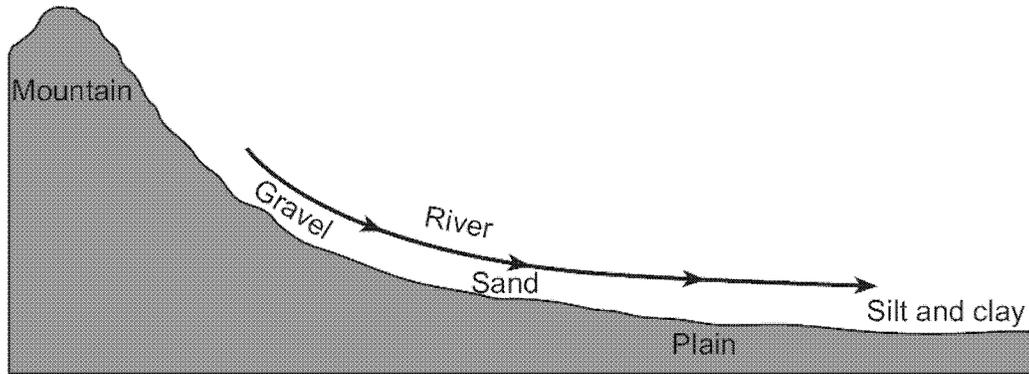
- (1) dolomite (2) shale (3) limestone (4) sandstone
11. The accompanying map represents a meandering stream following a lake. A student measured water depths in the stream at three locations: *A-A'*, *B-B'*, and *C-C'*.



Which set of cross sections best represents the streambed at the three locations?

- (1)  (2) 
- (3)  (4) 

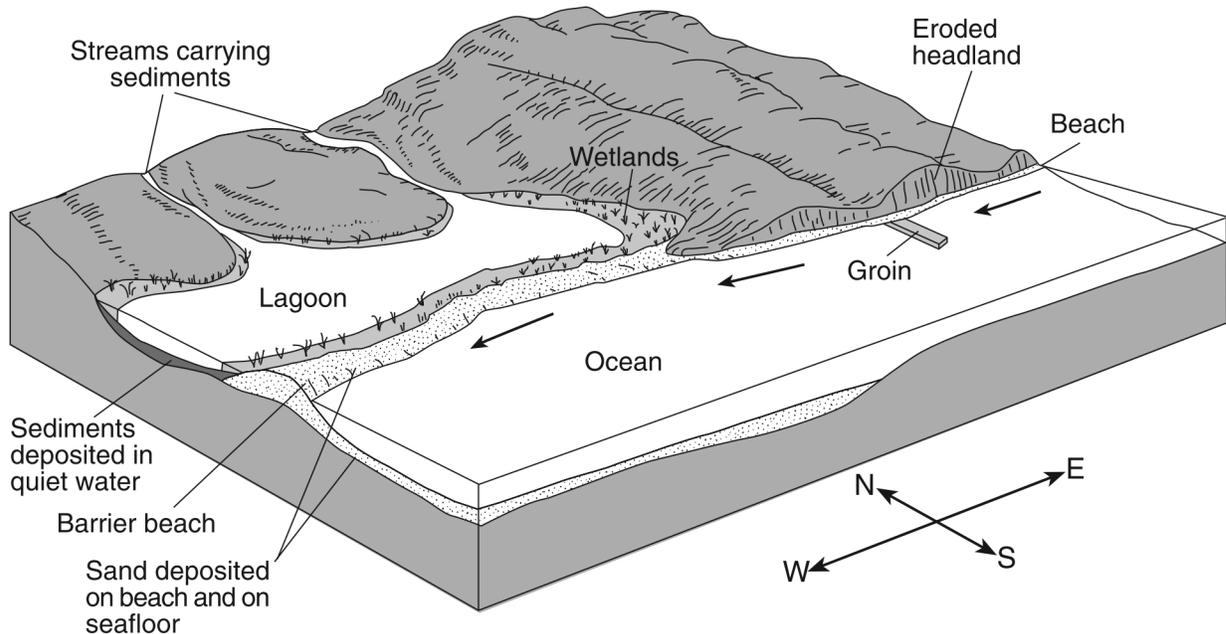
12. The accompanying cross section illustrates the general sorting of sediment by a river as it flows from a mountain to a plain.



(Not drawn to scale)

Which factor most likely caused the sediment to be sorted in the pattern shown?

- (1) velocity of the river water
 (2) hardness of the surface bedrock
 (3) mineral composition of the sediment
 (4) temperature of the water
13. Base your answer(s) to the following question(s) on the diagram below. The arrows show the direction in which sediment is being transported along the shoreline. A barrier beach has formed, creating a lagoon (a shallow body of water in which sediments are being deposited). The eroded headlands are composed of diorite bedrock. A groin has recently been constructed. Groins are wall-like structures built into the water perpendicular to the shoreline to trap beach sand.



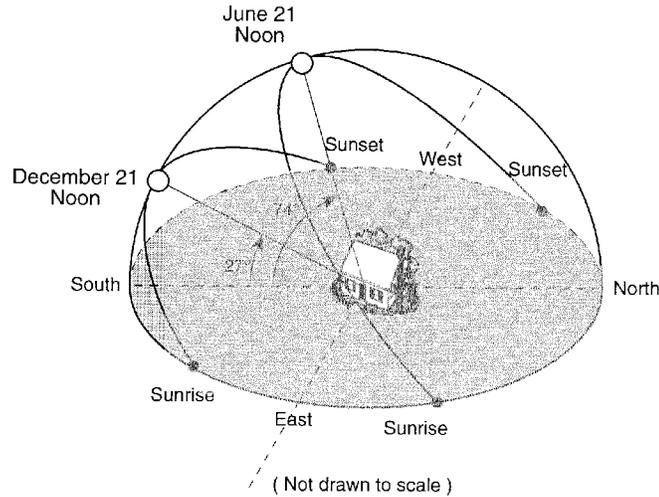
The groin structure will change the pattern of deposition along the shoreline, initially causing the beach to become

- (1) wider on the western side of the groin
 (2) wider on the eastern side of the groin
 (3) narrower on both sides of the groin
 (4) wider on both sides of the groin

14. A student read in a newspaper that the maximum length of the daylight period for the year in Syracuse, New York, had just been reached. What was the date of this newspaper?

- (1) March 22 (2) June 22 (3) September 22 (4) December 22

15. Base your answer(s) to the following question(s) on the *Earth Science Reference Tables*, the diagram below, and your knowledge of Earth science. The diagram represents the Sun's apparent path in relation to a house on June 21 and on December 21.



For the roof of this house, which color would absorb the most insolation and also reradiate the most energy?

- (1) white (2) green (3) grey (4) black

16. On which day of the year does New York State have the *fewest* hours of daylight?

- (1) April 21 (2) June 21 (3) October 21 (4) December 21

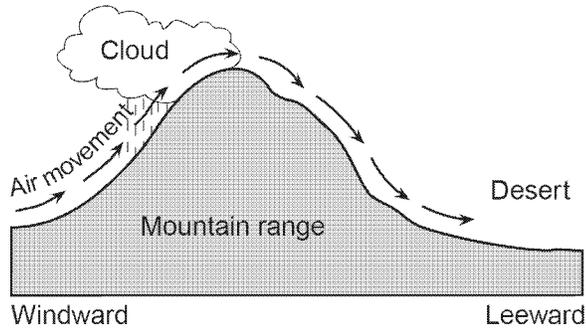
17. Which atmospheric conditions are necessary for condensation?

- (1) saturated air and dewpoint temperature much lower than air temperature
(2) unsaturated air and dewpoint temperature much higher than air temperature
(3) saturated air and equal dewpoint and air temperatures
(4) unsaturated air and equal dewpoint and air temperatures

18. The primary cause of surface ocean currents is

- (1) atmospheric winds (2) atmospheric precipitation
(3) ocean water evaporation (4) ocean floor earthquakes

25. A desert often forms on the leeward side of a mountain range, as shown in the accompanying cross section.



After most of the moisture is removed from the air on the windward side, deserts form on the leeward side because the sinking air

- (1) compresses and warms
- (2) compresses and cools
- (3) expands and warms
- (4) expands and cools

26. An air mass classified as mP usually forms over which type of Earth surface?

- (1) warm land
- (2) warm ocean
- (3) cool land
- (4) cool ocean

27. 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

28. Mt. Marcy often has the coldest nighttime temperatures in New York State because of its

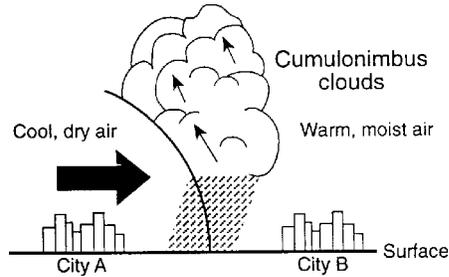
- (1) latitude and planetary winds
- (2) latitude and elevation
- (3) longitude and planetary winds
- (4) longitude and elevation

29. Which two gases in Earth's atmosphere are believed by scientists to be greenhouse gases that are major contributors to global warming?

- (1) carbon dioxide and methane
- (2) oxygen and nitrogen
- (3) hydrogen and helium
- (4) ozone and chlorine

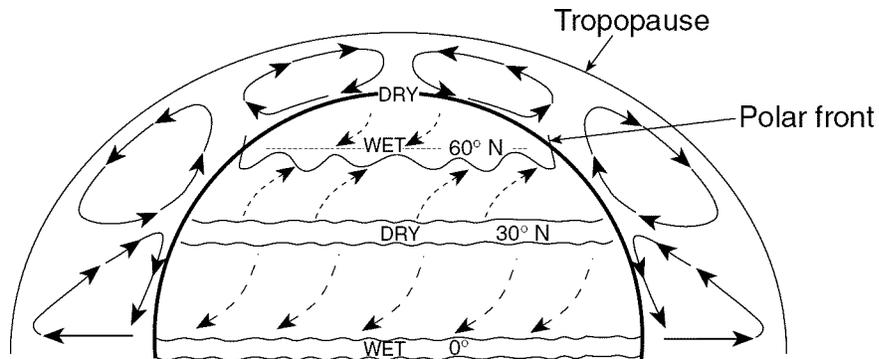
30. A parcel of air has a dry-bulb temperature of 16°C and a wet-bulb temperature of 10°C . What are the dewpoint and relative humidity of the air?
- (1) -5°C dewpoint and 33% relative humidity (2) -5°C dewpoint and 45% relative humidity
 (3) 4°C dewpoint and 33% relative humidity (4) 4°C dewpoint and 45% relative humidity

31. 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?

- (1) warm front (2) cold front (3) occluded front (4) stationary front
32. A low-pressure system near Utica, New York, causes heavy precipitation. If this system followed the usual track, which city most likely had the same weather conditions a few hours earlier?
- (1) Syracuse (2) Kingston (3) Albany (4) Plattsburgh
33. Base your answer(s) to the following question(s) on the diagram below, which represents the planetary wind and moisture belts in Earth's Northern Hemisphere.



(Not drawn to scale)

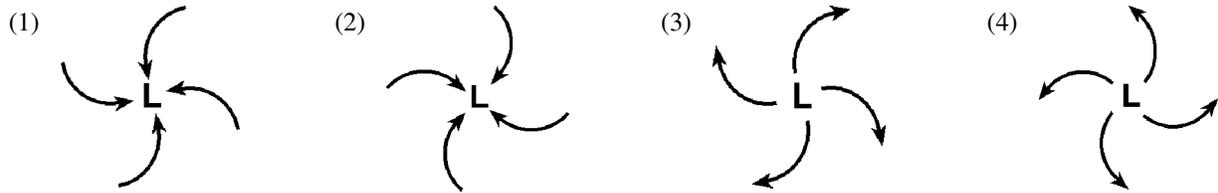
The climate at 90° North latitude is dry because the air at that location is usually

- (1) warm and rising (2) warm and sinking (3) cool and rising (4) cool and sinking
34. The paths of the surface planetary winds are curved due to Earth's
- (1) revolution (2) rotation (3) circumference (4) size

35. The tropopause is approximately how far above sea level?

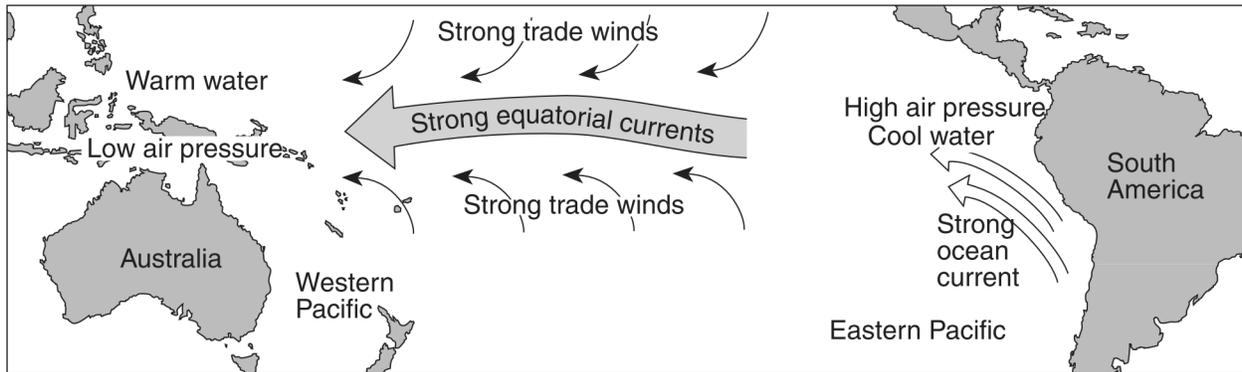
- (1) 12 mi (2) 12 km (3) 60 mi (4) 60 km

36. Which map view best shows the movement of surface air around a low-pressure system in the Northern Hemisphere?

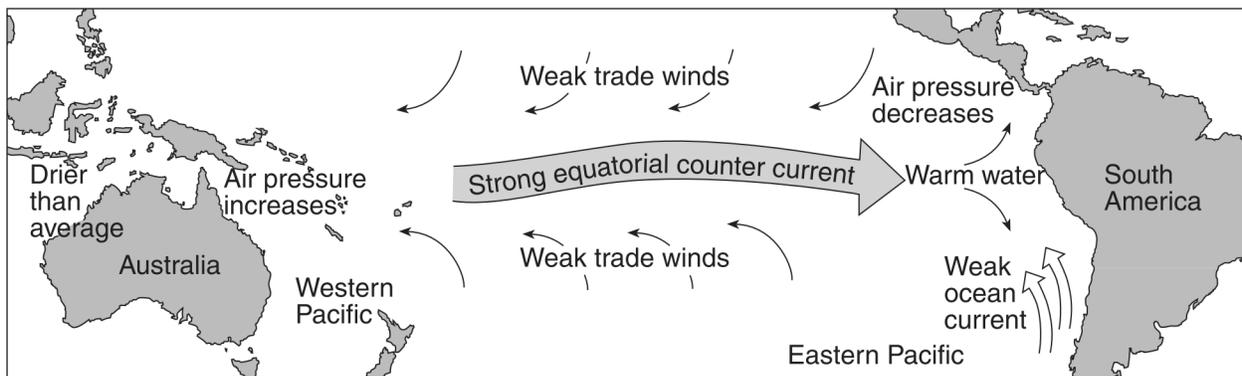


Base your answer(s) to question(s) on the maps and the passage below. The maps show differences in trade wind strength, ocean current direction, and water temperature associated with air-pressure changes from normal climate conditions to El Niño conditions.

Normal Climate Conditions

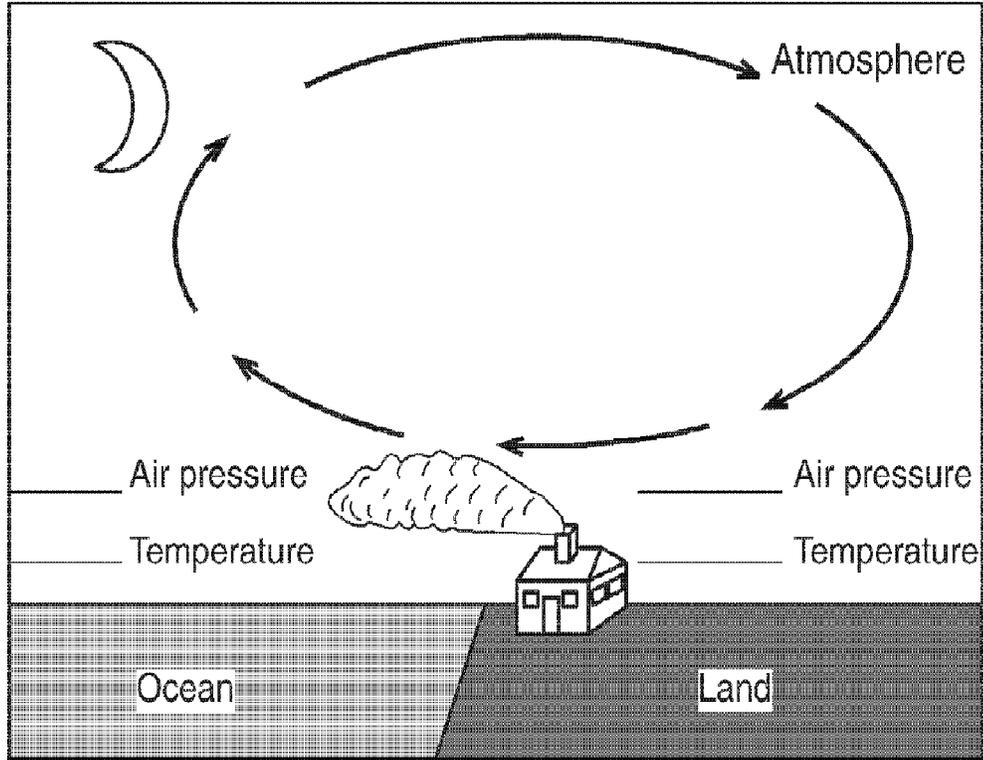


El Niño Conditions



El Niño conditions occur with a buildup of warm water in the equatorial Pacific Ocean off the coast of South America. The immediate cause of this buildup is a change in air pressure that weakens the southern trade winds. These are the planetary winds that move air from 30° S to the equator. Normally, these strong, steady winds, with the help of their counterparts in the Northern Hemisphere, push equatorial water westward away from South America. But, at intervals of two to seven years, these winds weaken, causing the westward water flow to reverse. This results in an accumulation of unusually warm water on the east side of the equatorial Pacific Ocean. This warm water not only changes the characteristics of the air above it, but also is thought to be the cause of weather changes around the world. El Niño conditions may last only a few months, but often last a year or two.

39. Base your answer(s) to the following question(s) on the cross section provided, which represents a house at an ocean shoreline at night. Smoke from the chimney is blowing out to sea.



Label the *two* lines provided on the cross section to show where air pressure is relatively “high” and where it is relatively “low.”

40. Base your answer(s) to the following question(s) on the magazine article and diagram below.

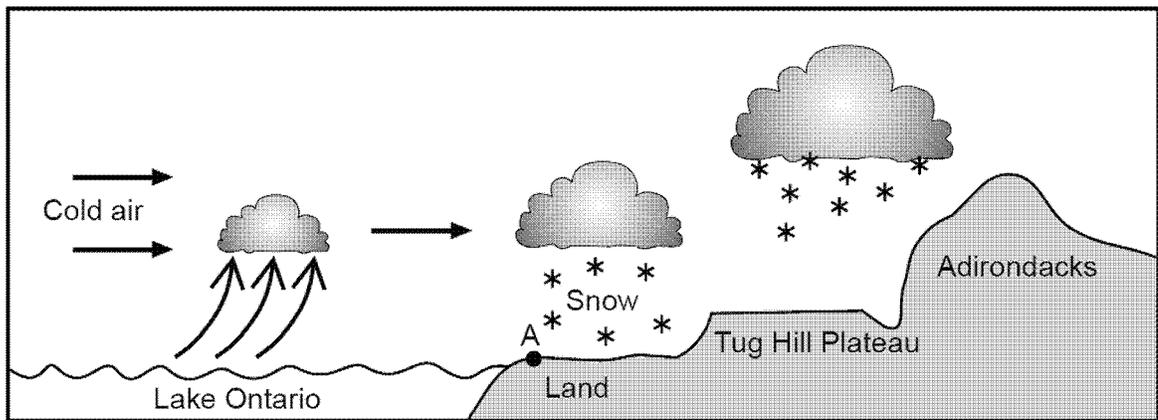
Lake-Effect Snow

During the cold months of the year, the words “lake effect” are very much a part of the weather picture in many locations in New York State. Snow created by the lake effect may represent more than half the season’s snowfall in some areas.

In order for heavy lake-effect snow to develop, the temperature of the water at the surface of the lake must be higher than the temperature of the air flowing over the water. The higher the water temperature and the lower the air temperature, the greater the potential for lake-effect snow.

A lake-effect storm begins when air flowing across the lake is warmed as it comes in close contact with the water. The warmed air rises and takes moisture along with it. This moisture, which is water vapor from the lake, is turned into clouds as it encounters much colder air above. When the clouds reach the shore of the lake, they deposit their snow on nearby land. A typical lake-effect storm is illustrated in the diagram below. The area most likely to receive snow from a lake is called a “snowbelt”. Lake Ontario’s snowbelt includes the counties along the eastern and southeastern ends of the lake. Because the lake runs lengthwise from west to east, the prevailing westerly winds are able to gather the maximum amount of moisture as they flow across the entire length of the lake. There can be lake-effect snowfall anywhere around the lake, but the heaviest and most frequent snowfalls occur near the eastern shore.

In parts of the snowbelt, the lake effect combines with a phenomenon known as orographic lifting to produce some very heavy snowfalls. After cold air has streamed over the length of Lake Ontario, it moves inland and is forced to climb the slopes of the Tug Hill Plateau and the Adirondack Mountains, resulting in very heavy snowfall.



State the relationship that must exist between water temperature and air temperature for lake-effect snow to develop.

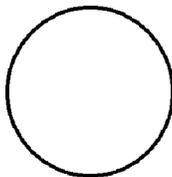
41. State why locations east and southeast of Lake Ontario are more likely to receive lake-effect snow than are locations west of the lake.
42. State the name of the New York State landscape region that includes location A shown in the diagram.
43. State why very heavy snowfall occurs in the Tug Hill Plateau region.

44. The accompanying weather data was collected at Boonville, New York.

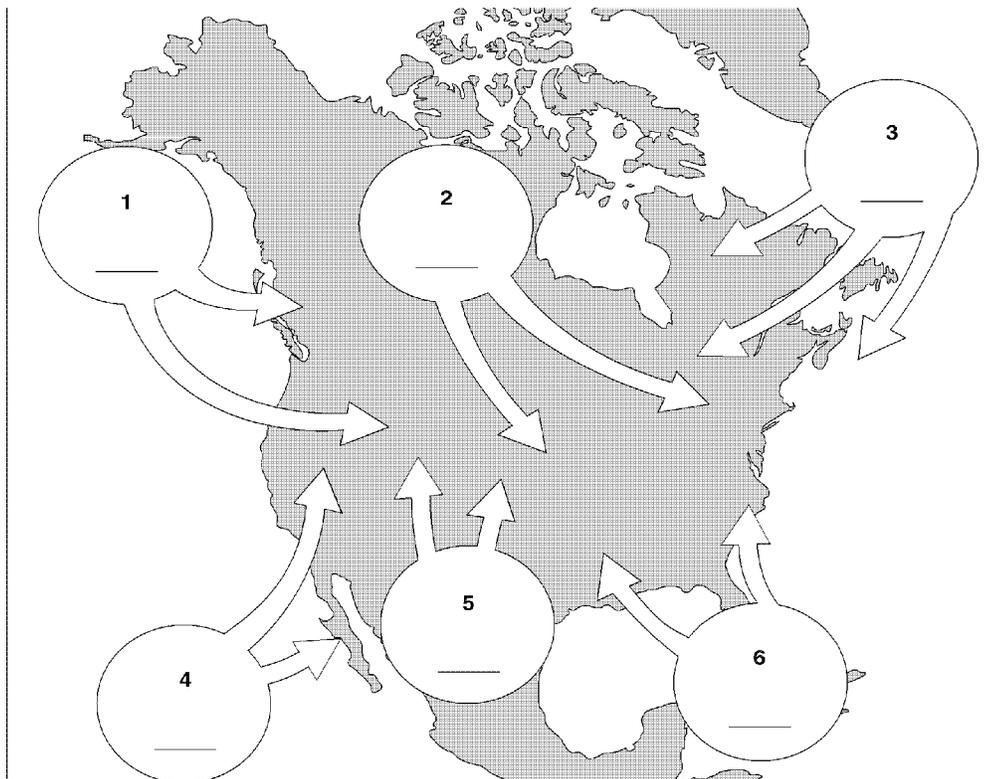
Air temperature	65° F
Dewpoint	64° F
Visibility	2 miles
Present weather	drizzle
Wind direction	from the west
Wind speed	5 knots
Amount of cloud cover	100%
Barometric pressure	996.2 millibars

On the station model below, using the proper format, record:

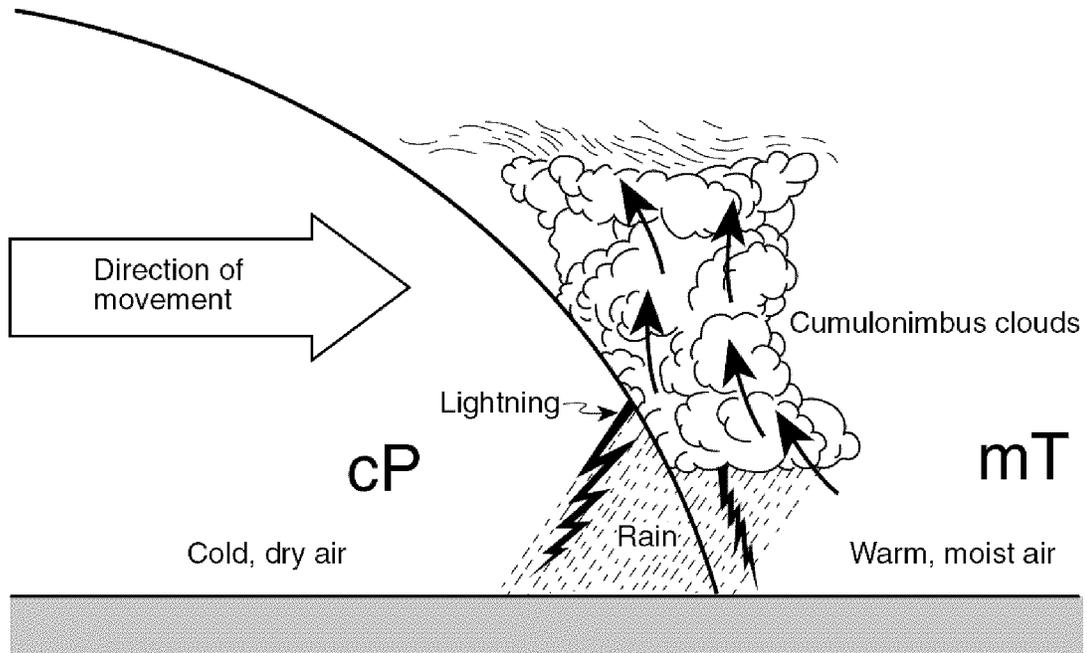
- a) the amount of cloud cover
- b) the barometric pressure
- c) the symbol for the present weather



45. The map provided shows six source regions for different air masses that affect the weather of North America. The directions of movement of the air masses are shown. Using the standard two-letter air-mass symbols from the Earth Science Reference Tables, label the air masses by writing the correct symbol in each circle on the map.



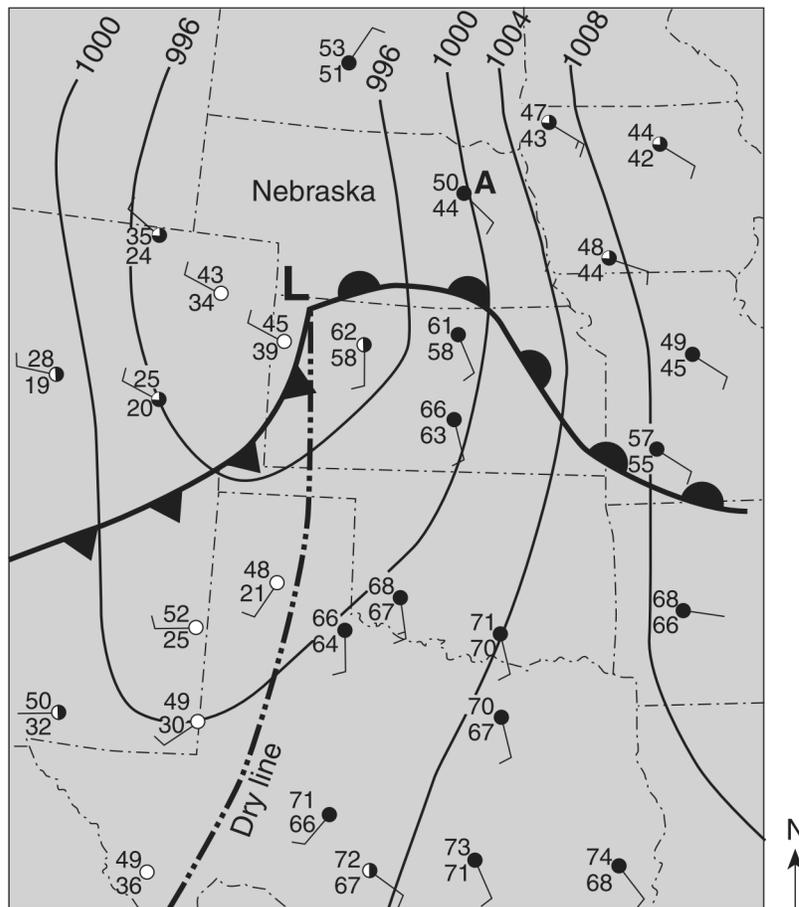
46. Base your answer(s) to the following question(s) on the cross section below, which shows a typical cold front moving over New York State in early summer.



Explain why the warm, moist air is rising at the frontal boundary.

47. State *one* process that causes clouds to form in this rising air.
48. Central Canada was the geographic source region for the cP air mass shown in the cross section. Identify the most likely geographic source region for the mT air mass shown in the cross section.

49. Base your answer(s) to the following question(s) on the information and weather map below. The weather map shows the center of a low-pressure system. The symbol  represents the dry line which separates cT and mT air masses. Isobars are drawn at intervals of 4 millibars. Letter A indicates a weather station model.



The atmospheric conditions in eastern Nebraska are represented on the map by a station model labeled A. Fill in the correct information for each weather variable, based on station model A.

Air temperature: _____ °F

Dewpoint: _____ °F

Wind direction from: _____

Wind speed: _____ knots

Cloud cover: _____ %

50. Base your answer(s) to the following question(s) on the weather map below, which shows two fronts associated with a low-pressure system.

On the weather map below, write the air-mass symbols to indicate the most likely locations of the continental polar air mass and maritime tropical air mass that have formed this low-pressure system.

