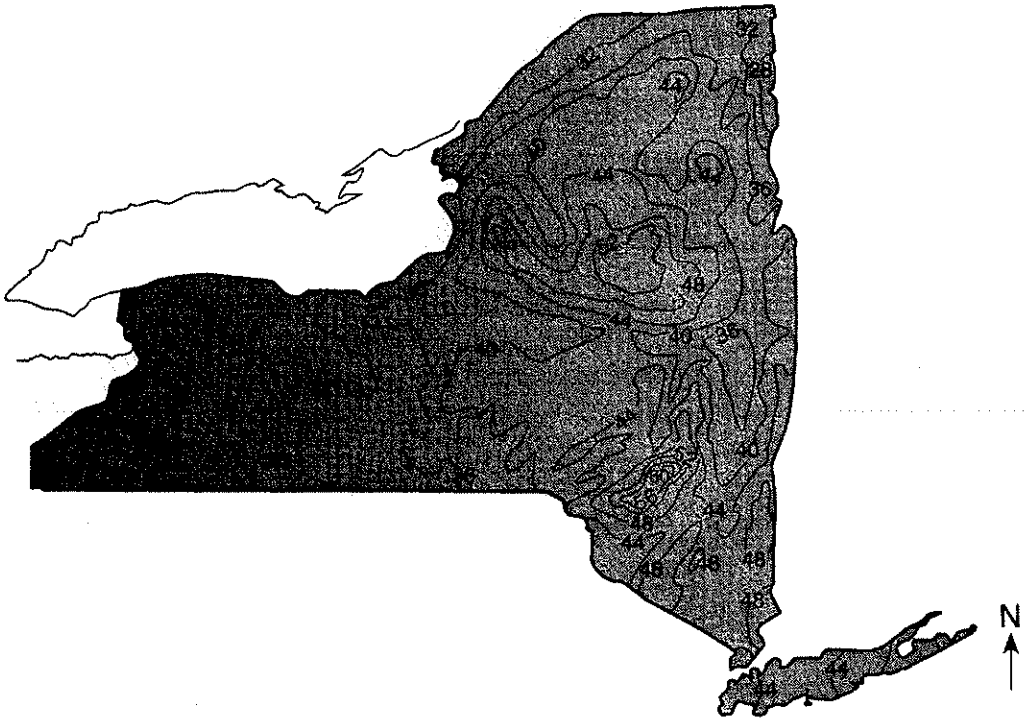
Base your answers to questions **1** through **4** on on the passage and map below. The map shows the average yearly precipitation in New York State measured in inches.

Landscapes and Precipitation

Moisture from the Gulf of Mexico and the Atlantic Ocean is carried to New York State by storm systems and air currents. Rain and snowfall amounts vary by region. Heavy snow belts are located near Lake Erie and Lake Ontario as well as in the plateau regions of eastern and northern New York State. Long Island and New York City usually experience lighter snowfalls. Snowfall amounts are converted to inches of water to determine yearly precipitation.

Average Yearly Precipitation in Inches



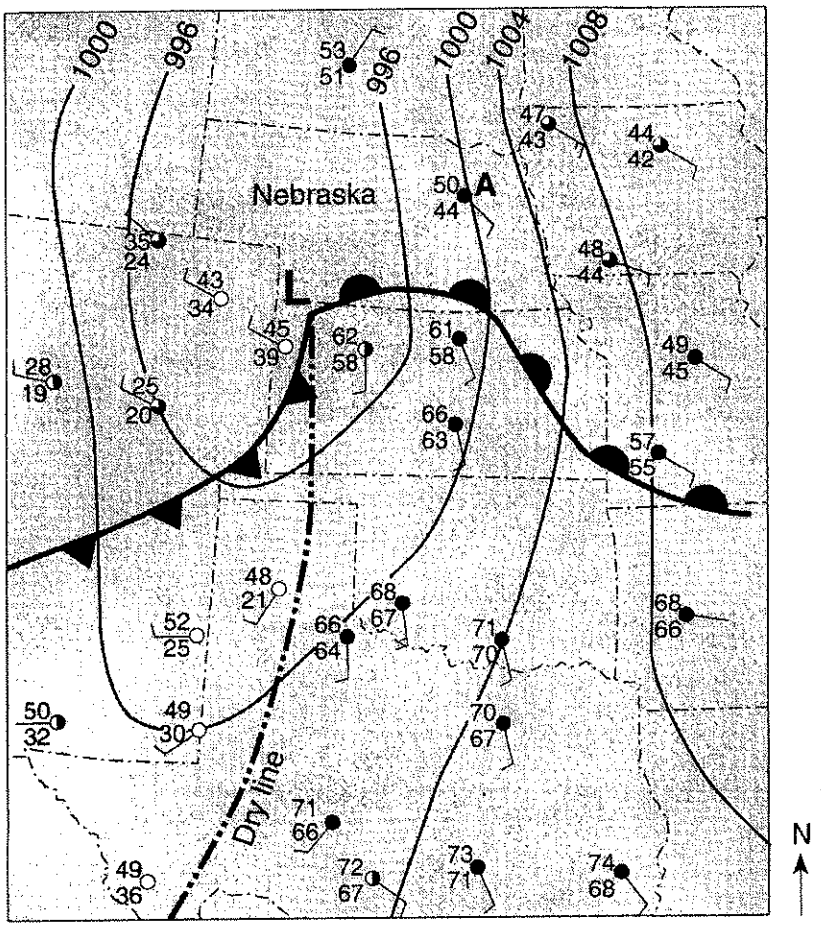
1. Identify *two* bodies of water that are major sources of moisture for the precipitation that occurs in New York State.

2. Identify the New York State landscape region that has the greatest average yearly amount of precipitation.

3. Identify *one* process that occurs in rising air that produces clouds from water vapor.

4. Describe *two* actions that could be taken to prepare for a forecasted severe snow event.

Base your answers to questions **6** through **9** on the information and weather map below. The weather map shows the center of a low-pressure system. The dashed line 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.



6. The atmospheric conditions in eastern Nebraska are represented on the map by a station model labeled *A*. Below, 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: _____ %

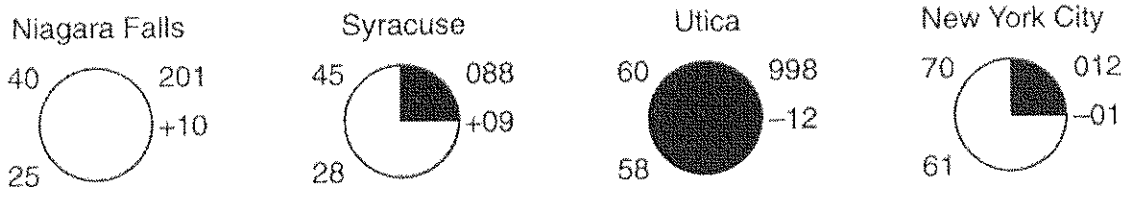
7. Compared to the temperature and humidity of the air on the east side of the dry line, describe the temperature and humidity of the air on the west side.

8. Explain why the warm air is rising along the warm front.

9. In what compass direction will the center of this low-pressure system most likely move if it follows a normal storm track?

_____

Base your answers to questions **10** and **11** on the information on the four station models shown below. The weather data were collected at Niagara Falls, Syracuse, Utica, and New York City at the same time.

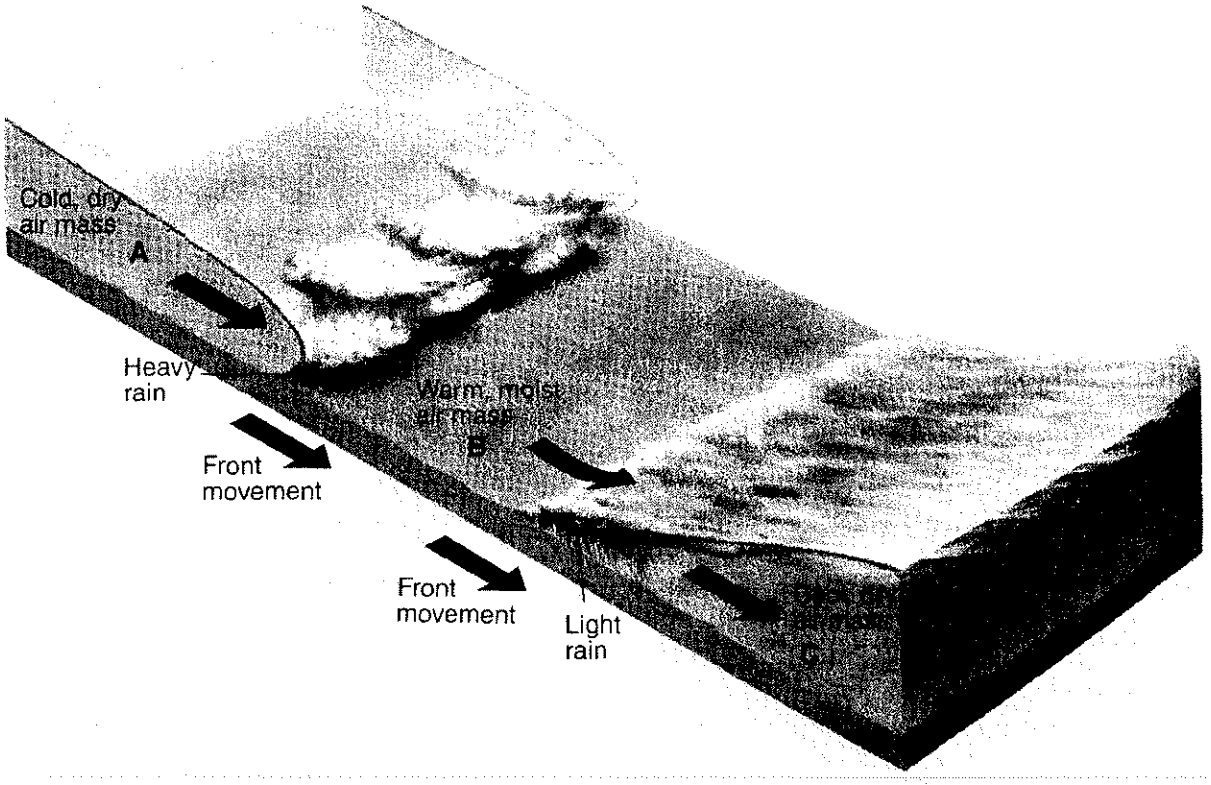


10. What was the air pressure in Niagara Falls?

11. New York City was experiencing a wind blowing from the south at 10 knots with hazy conditions limiting visibility to $\frac{3}{4}$ of a mile. On the station model below for New York City, place, in the proper location and format, the information below.
    - wind direction
    - wind speed
    - present weather
    - visibility

_____

Base your answers to questions **12** through **14** on the diagram below, which shows air masses, clouds, and rain associated with two fronts that are influencing weather conditions in New York State. Letters *A*, *B*, and *C* represent three air masses. The arrows show the direction of air and front movements.

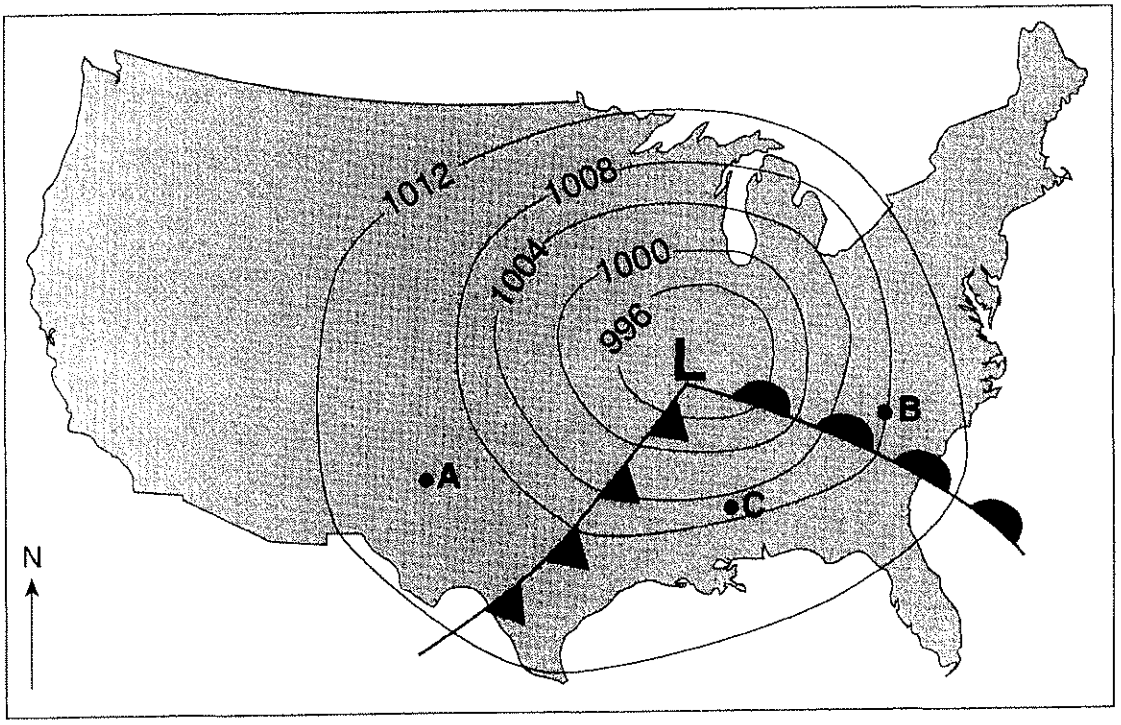


12. Identify the most likely geographic source region for air mass *B*.

13. Identify the type of front shown between air mass *B* and air mass *C*.

14. Identify *one* process that causes clouds to form in the air rising along the frontal surface between air mass *A* and air mass *B*.

Base your answers to questions **15** through **18** on on the weather map below, which shows a low-pressure system located over central United States. Points A, B, and C represent locations on Earth's surface. The isobars on the map show air pressures in millibars.



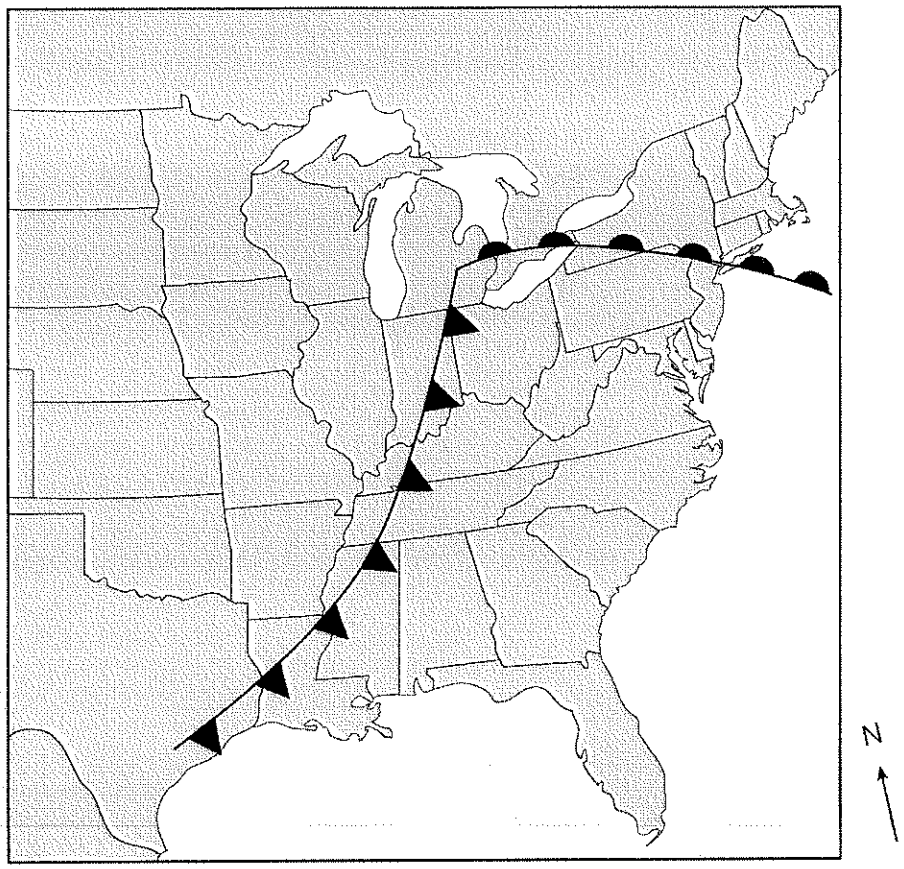
15. On the map above, draw an arrow, beginning at the **L**, to show the direction the low-pressure center will most likely move in the next two days.

16. What evidence shown on the map indicates that point B is most likely experiencing precipitation?

17. What is the two-letter symbol used on a weather map to indicate the warm, moist air mass that is over point C?

18. What evidence shown on the weather map indicates that point C is experiencing greater wind speeds than point A?

Base your answers to questions **19** through **22** on the weather map below, which shows two fronts associated with a low-pressure system.



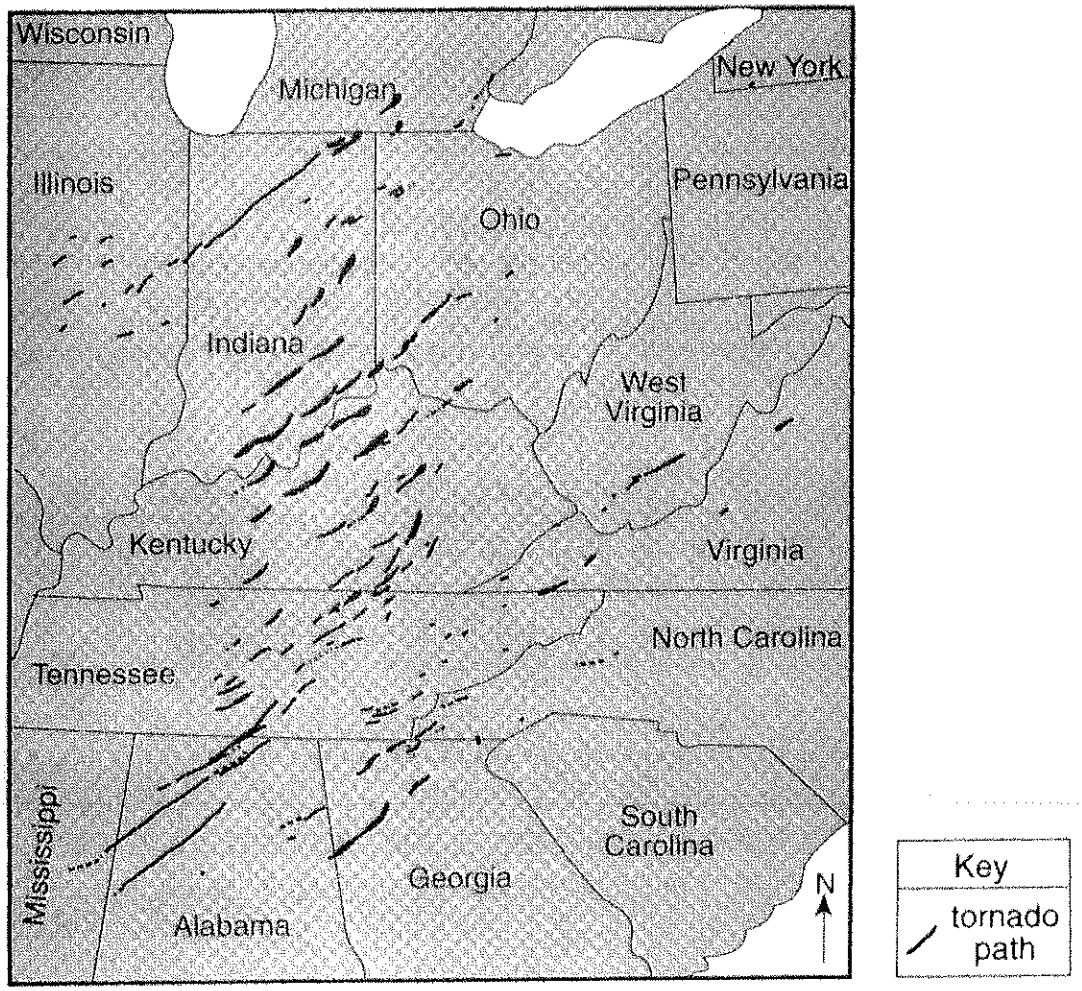
19. On the weather map above, write the letter **L** at the location of the center of the low-pressure system.

20. On the weather map above, 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.

21. On the weather map above, place an **X** where precipitation is most likely occurring.

22. Warm, moist air is rising along the two frontal surfaces. Describe how the water vapor in this rising air forms clouds. Include *dewpoint* and *condensation* in your answer.

Base your answers to questions **23** through **25** on the map below, which shows a portion of the United States where 148 tornadoes occurred during a 24-hour period in April 1974. The paths of the tornadoes are shown.



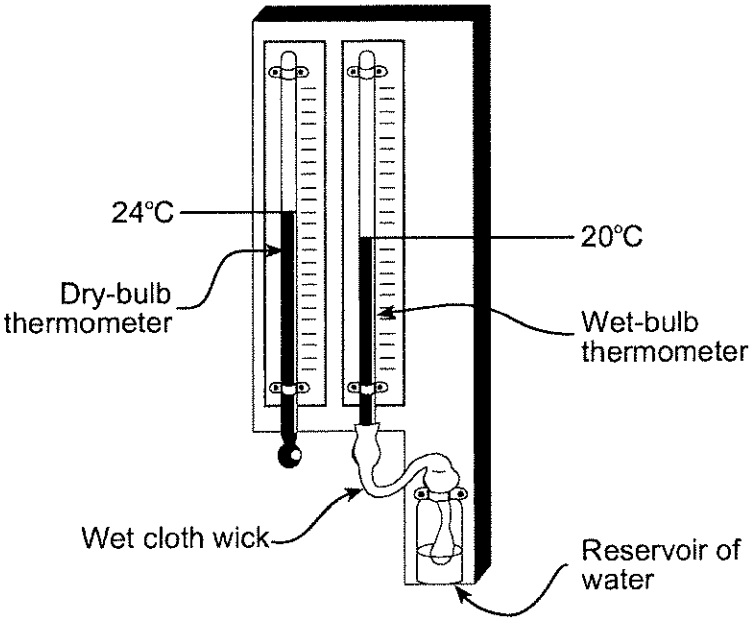
23. Explain why all the tornadoes moved toward the northeast.

24. Describe the air movement most likely found within these tornadoes.

25. A school receives a tornado warning. Describe one emergency action that a teacher and the students in a classroom should immediately take to protect themselves from injury.

_____

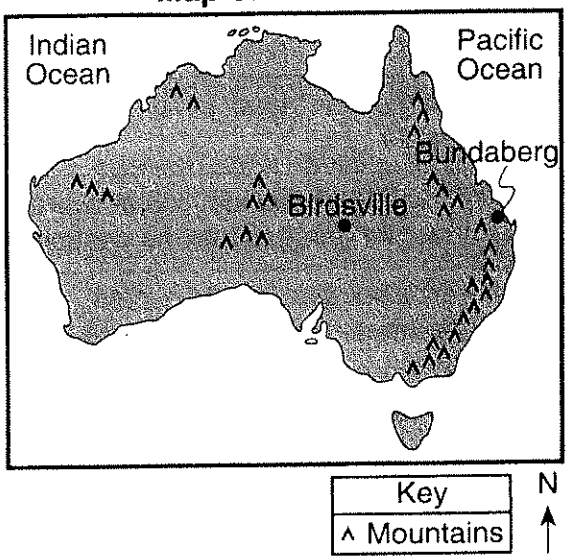
26. Base your answer to the following question on the diagram below, which shows a hygrometer located on a wall in a classroom. The hygrometer's temperature readings are used by the students to determine the relative humidity of the air in the classroom.



Describe how water evaporating from the wick attached to the wetbulb thermometer lowers the temperature reading of that thermometer.

Base your answers to questions **27** and **28** on the map and data tables below. The map shows the location of Birdsville and Bundaberg in Australia. Data table 1 shows the average monthly high temperatures for Birdsville. Data table 2 includes the latitude and longitude, elevation above sea level, and the average rainfall in January for Birdsville and Bundaberg.

Map of Australia



Data Table 1
Average Monthly High Temperatures for Birdsville, Australia

Month	Temperature (°C)
January	39
February	38
March	35
April	30.5
May	25
June	22
July	21
August	23.5
September	28
October	32.5
November	36
December	38

Data Table 2
Information about Two Australian Cities

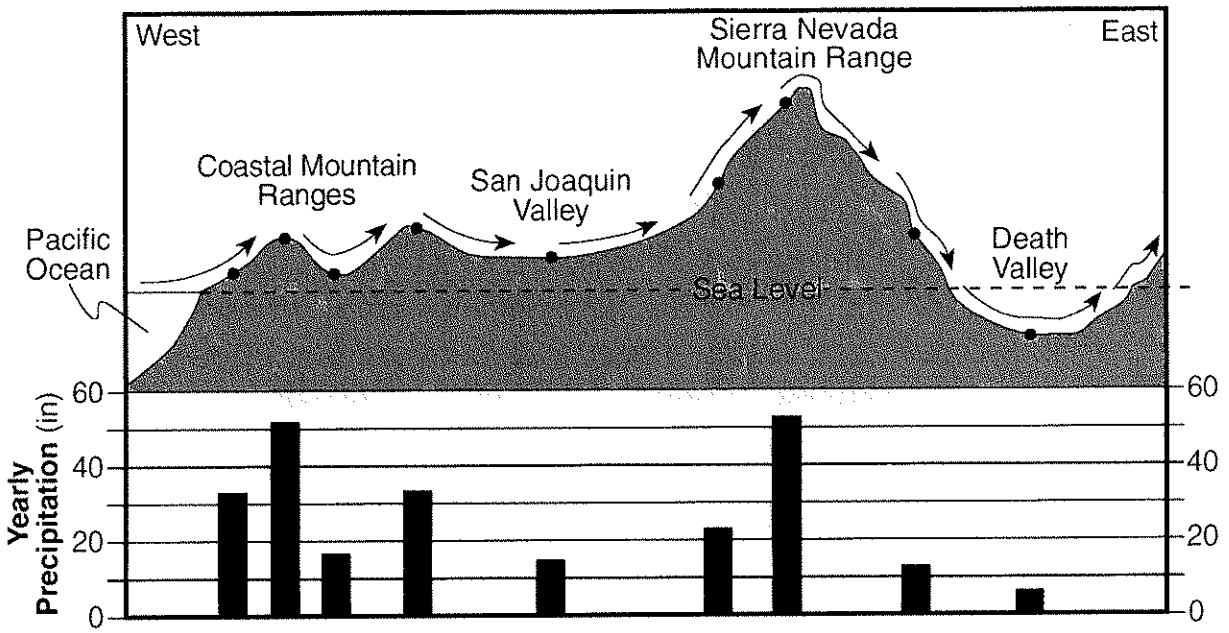
City	Latitude (° S)	Longitude (° E)	Elevation (m)	Average January Rainfall (mm)
Birdsville	25.9	139.4	47	25
Bundaberg	24.9	152.4	14	105

27. State one factor that could account for the difference between the average high temperatures recorded in December for Birdsville and Bundaberg.

28. State one reason for the difference in the average January rainfall for Birdsville and Bundaberg.

_____

29. Base your answer to the following question on the cross section and bar graph below. The cross section shows a portion of Earth's ernst along the western coast of the United States. The points show different locations on Earth's surface. The arrows show the prevailing wind direction. The bar below each point shows the yearly precipitation at that location.



Explain why the valleys have *lower* amounts of precipitation than points on the western slopes of the mountain ranges.

Base your answers to questions **30** and **31** on the magazine article and diagram below.

Lake-Effect Snow

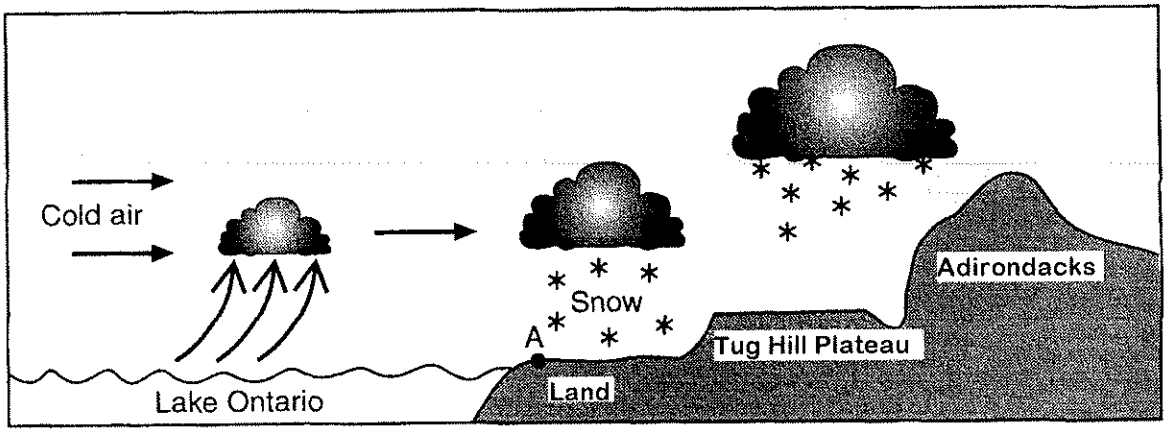
During the cold months of the year, the words "lake effect" are very much a part of the weather picture in many locations in New York State. Snow created by the lake effect may represent more than half the season's snowfall in some areas.

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.

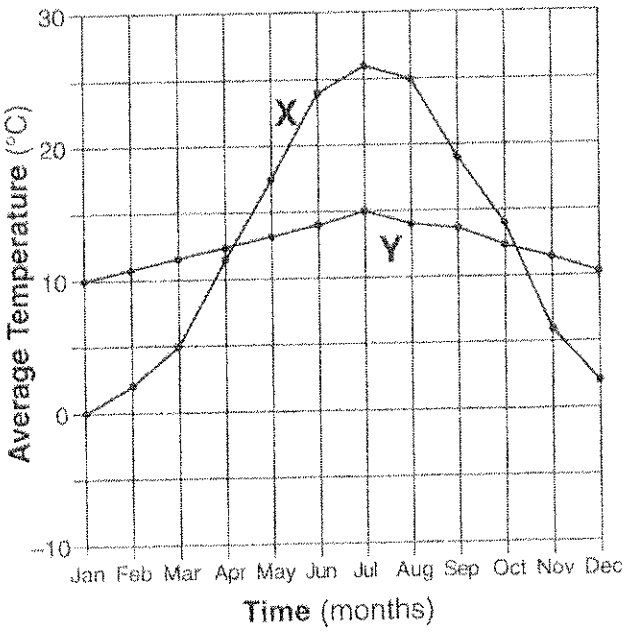


30. State the relationship that must exist between water temperature and air temperature for lake-effect snow to develop.

31. State why locations east and southeast of Lake Ontario are more likely to receive lake-effect snow than are locations west of the lake.

_____

32. Base your answer to the following question on the graph below, which shows the average monthly temperatures for a year for city X and city Y. Both cities are located at the same latitude.



Explain why city *X* has a greater difference between summer and winter temperatures than city *Y*.