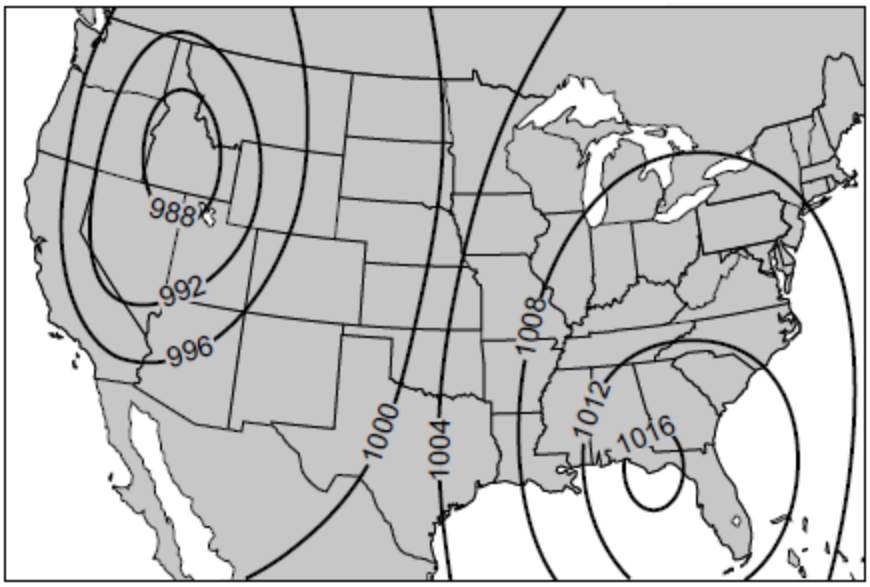
Name

Free Response Homework:
Air Masses, Fronts and Station Models

1. Base your answer to the following question on the map below and on your knowledge of Earth science. The weather map shows isobars, recorded in millibars (mb).

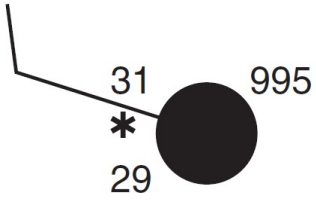


The table below lists some weather conditions for another location on this map.

Temperature (°F)	**Dewpoint** (°F)	**Precipitation** (inches in past 6 hours)	**Present Weather**
76	74	0.85	Rain showers

On the weather station model, using the proper format, record the weather conditions listed in the table.

Base your answers to questions **2** through **4** on the weather station model below and on your knowledge of Earth science. The model shows atmospheric conditions at Oswego, New York.



2. Convert the coded air pressure shown on the station model into the actual millibars of air pressure.

3. Explain how the data on the station model indicate a high relative humidity.

4. Fill in the correct information for *each* weather variable listed for this station model.

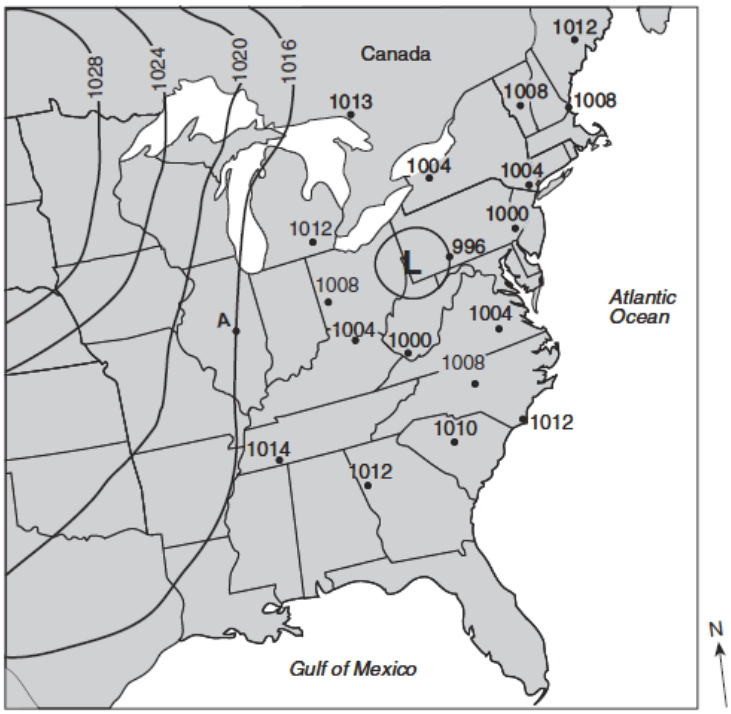
   Air temperature: _____ °F

   Dewpoint: _____ °F

   Wind speed: _____ knots

   Cloud cover: _____ %

Base your answers to questions **5** and **6** on the weather map below and on your knowledge of Earth science. The weather map shows atmospheric pressures, recorded in millibars (mb), at locations around a low-pressure center (**L**) in the eastern United States. Isobars indicate air pressures in the western portion of the mapped area. Point *A* represents a location on Earth's surface.



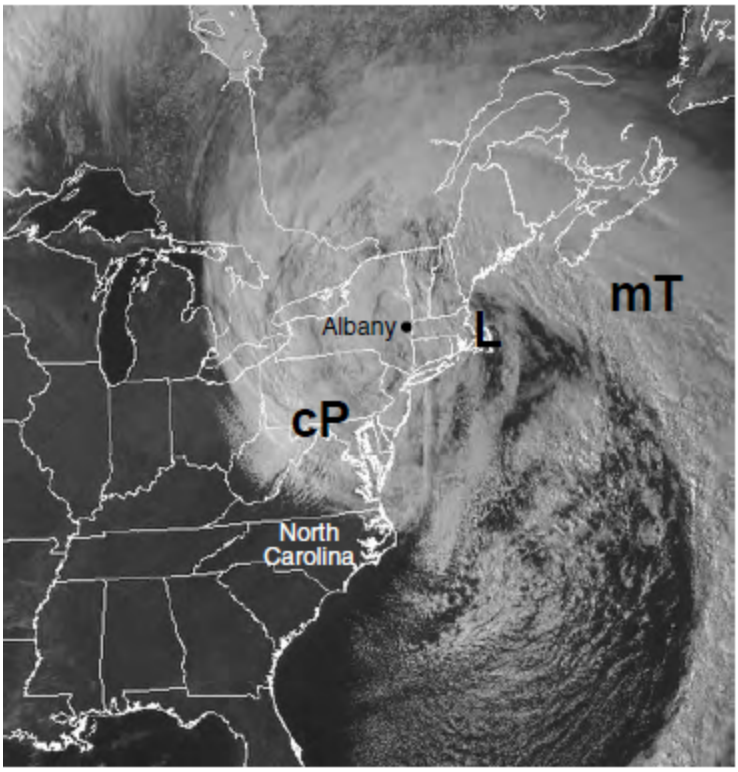
5. On the weather map above, draw the 1012 millibar and 1008 millibar isobars. Extend the isobars to the east coast of the United States.

6. Identify the weather instrument that was used to measure the air pressures recorded on the map.

Base your answers to questions **7** through **11** on the passage below 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.



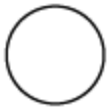
7. Identify *one* weather instrument that was most likely used to determine the dew point at Albany, New York.

8. The table below shows weather conditions recorded in Albany, New York, at the time that the satellite image was taken.

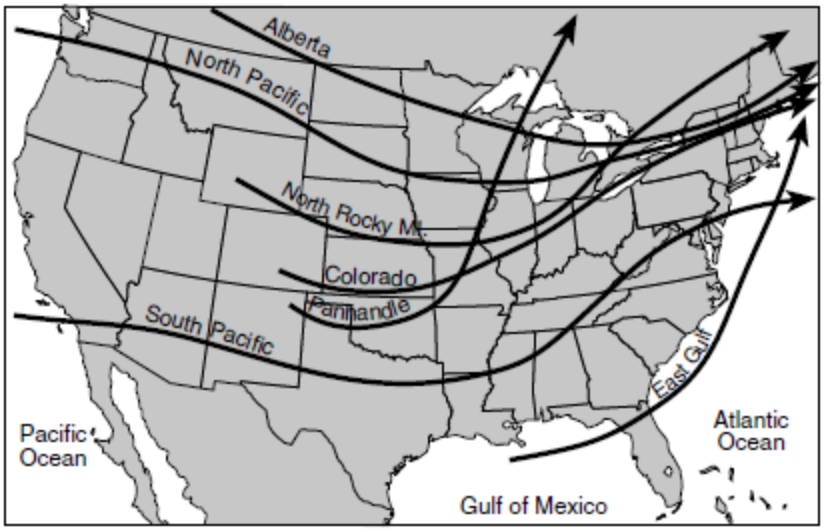
Weather Conditions

Dewpoint	22°F
Barometric Pressure	988.0 mb
Cloud Cover	100%
Present Weather	Snow

On the station model, use the correct symbols and proper format to indicate the four conditions in the table.



9. The map below shows some of the principal storm tracks across the United States and the names of these storm tracks.

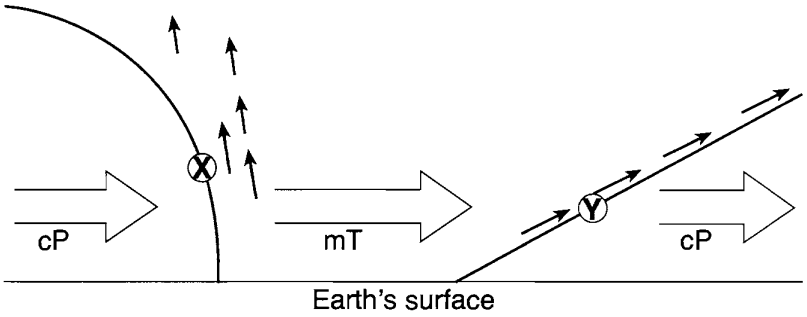


Identify the name of the storm track that this nor'easter most closely followed.

10. 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.

11. Describe *two* characteristics of the circulation pattern of the surface winds around the center of the low pressure area represented on the map.

Base your answers to questions **12** through **14** on the cross section below, which shows two weather fronts moving across New York State. Lines *X* and *Y* represent frontal boundaries. The large arrows show the general direction the air masses are moving. The smaller arrows show the general direction warm, moist air is moving over the frontal boundaries.

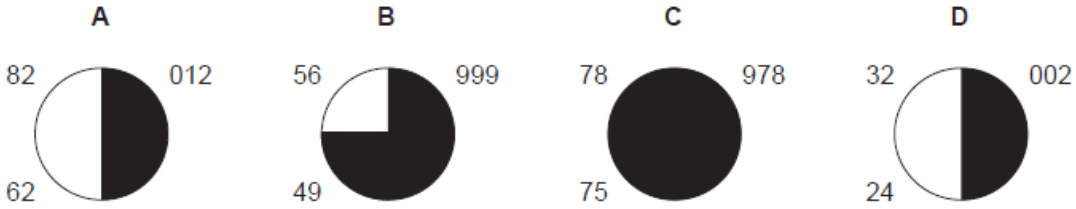


12. Which type of front forms when front *X* catches and overtakes front *Y*?

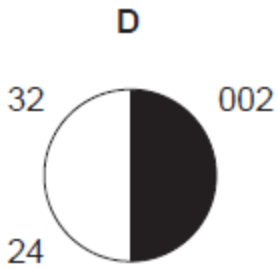
13. Explain why the warm, moist air rises over the frontal boundaries.

14. Which type of front is represented by letter *X*?

Base your answers to questions **15** through **18** on the four weather station models, A, *B,* C, and D, below.



15. On station model *D* below,draw the proper symbol to indicate a 25-knot wind coming from the west.



16. What evidence indicates that station *C* has the highest relative humidity?

17. Convert the air temperature at station *A* into degrees Celsius.

18. List the letters of the four station models, in order, from the station with the highest air-pressure reading to the station with the lowest air-pressure reading.

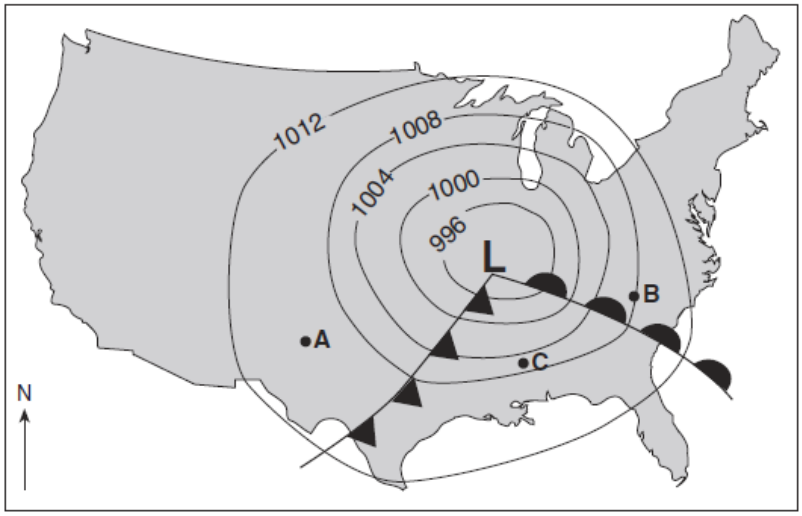
Highest air-pressure station: _____

_____

_____

Lowest air-pressure station: _____

Base your answers to questions **19** through **21** 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.

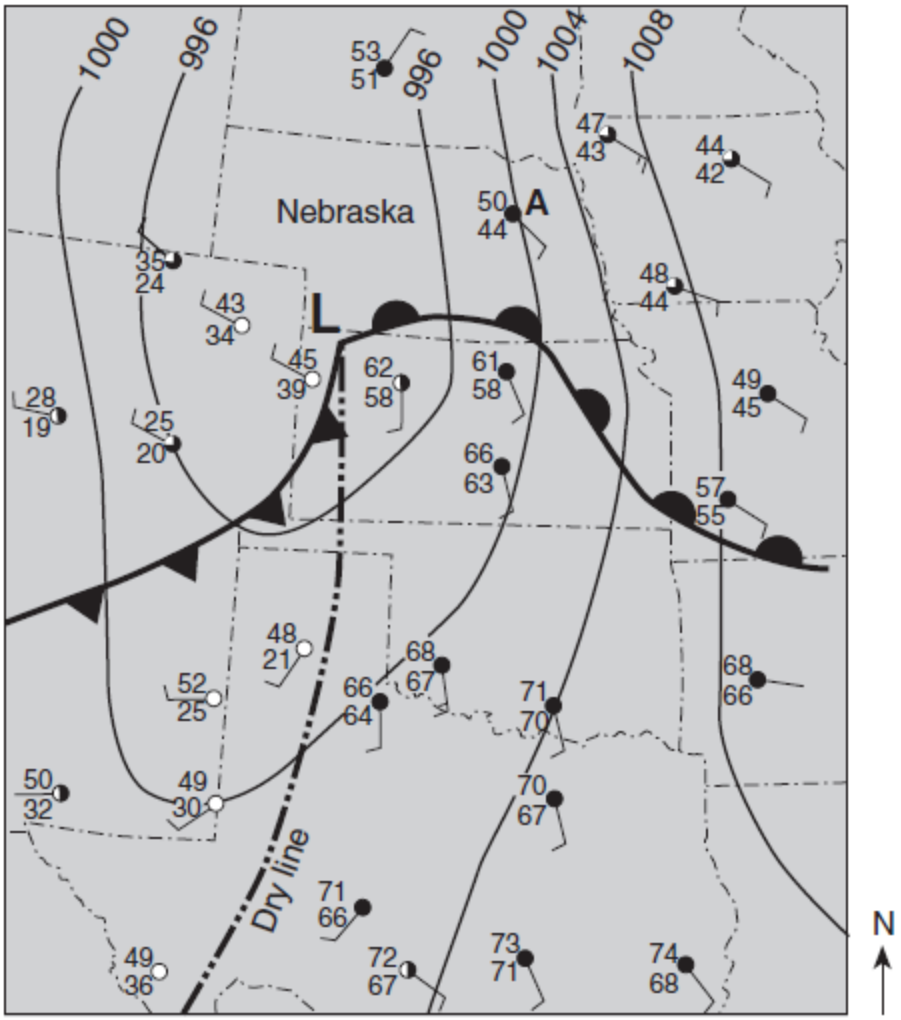


19. What evidence shown on the weather map indicates that point C is experiencing greater wind speeds than point A?

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

21. 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.

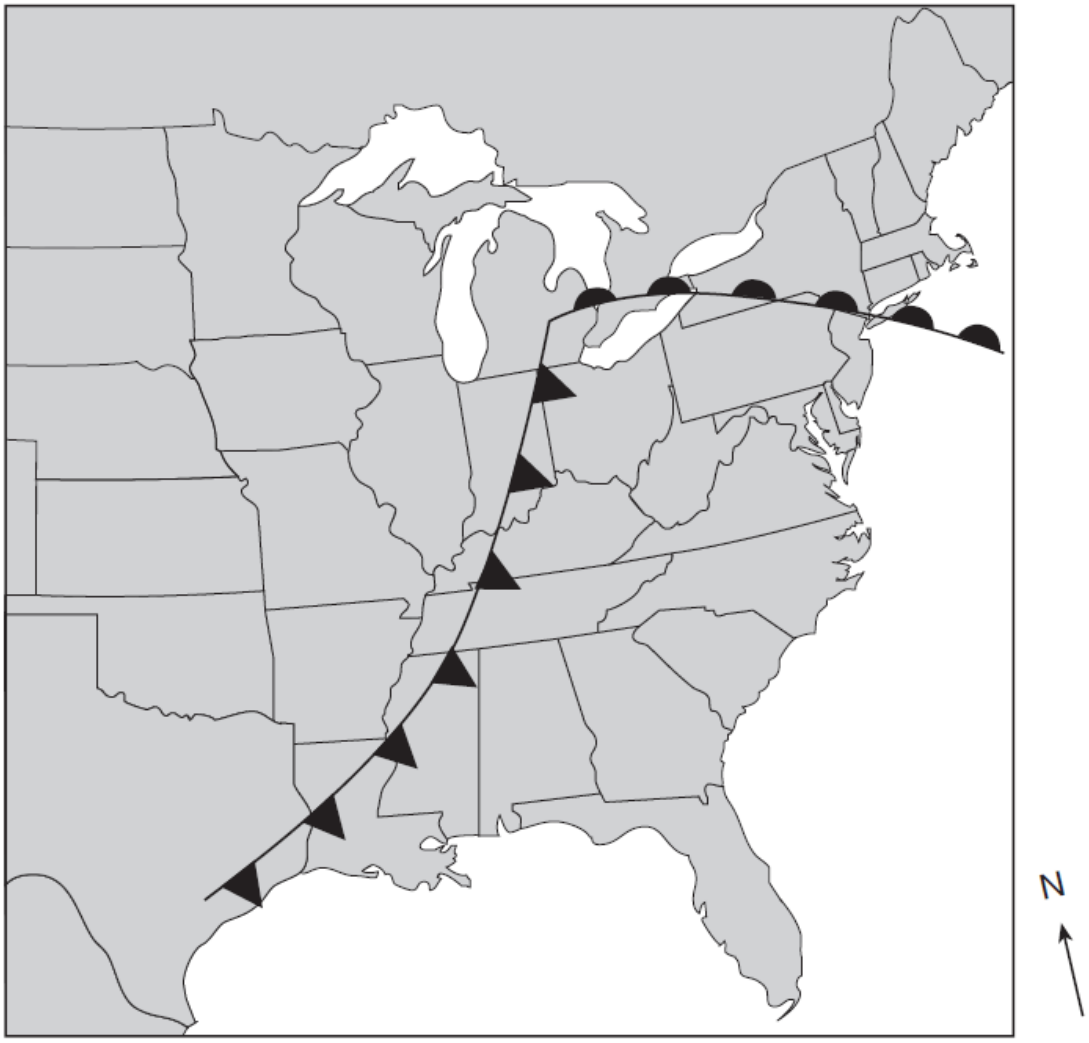
Base your answers to questions **22** and **23** on the information and weather map below. The weather map shows the center of a low-pressure system. The dashed line represents the dry line which separates cT and mT air masses. Isobars are drawn at intervals of 4 millibars. Letter *A indicates a weather station model.*



22. 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.

23. 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 **24** through **26** on the weather map below, which shows two fronts associated with a low-pressure system.



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

25. 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.

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