

Name: _____ Date: _____

UNIT ONE (partII)

Weather Forecasting

*Dedicated to: _____

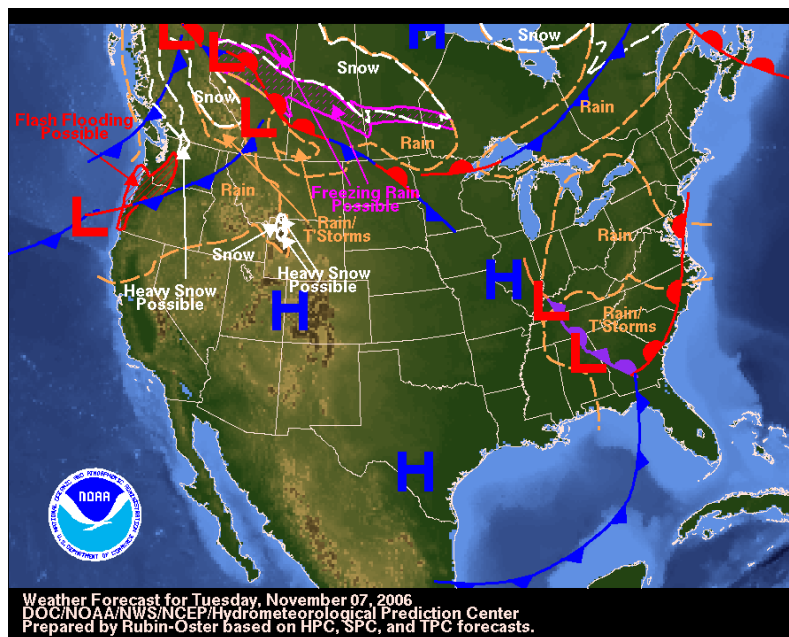
ABSTRACT AND RATIONALE

The USA has the world's wildest weather. A normal year brings hurricanes, blizzard, desert dryness and world's most numerous and strongest tornadoes. Dangerous weather hits other countries, of course, but no other nation copes with all the kinds of bad weather in nature's arsenal. As our society advances, understanding weather and weather forecasts are as important as ever.

TASK STATEMENT/PROBLEM BASED LEARNING/REAL WORLD PROBLEM:

At the end of unit one, each group will be given a weather map. You are going to help your group members create a weather forecasting questionnaire for other groups to analyze about your weather map. Questions must include descriptions and explanations of the weather conditions and predictions for the upcoming week. Moreover, questions should not only be about a particular area of the US, rather 3 different zones of your choice. You may use different resources such as a radar map, an isobar map to help you create an accurate forecast. Your forecast could be in writing or a podcast format.

Guiding Question: How does a weather map reveals information about the weather conditions?



Air mass Notes

1. Define Air mass

Air Masses



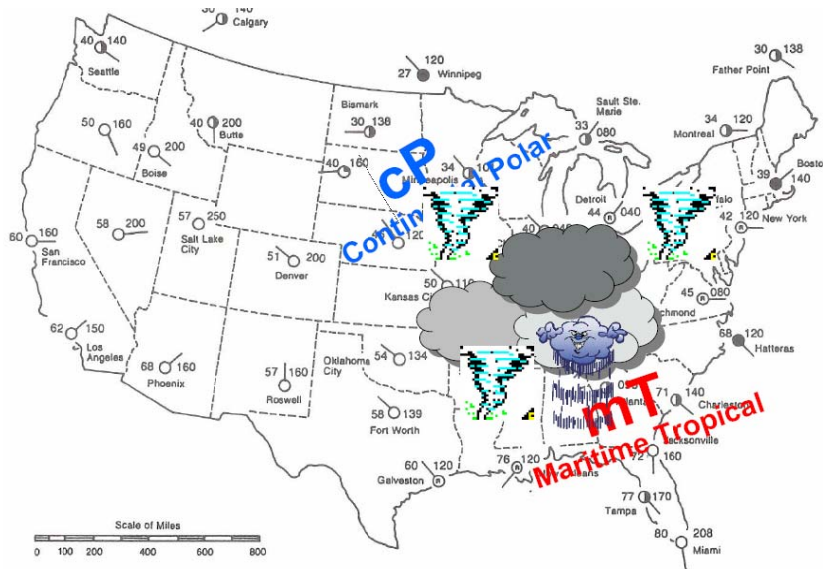
First Letter	Name	Characteristic	Second Letter	Name	Characteristic

2. Define Source Region

3. What's important about the source region of each air mass?



4. What happens when mT and cP air masses meet?

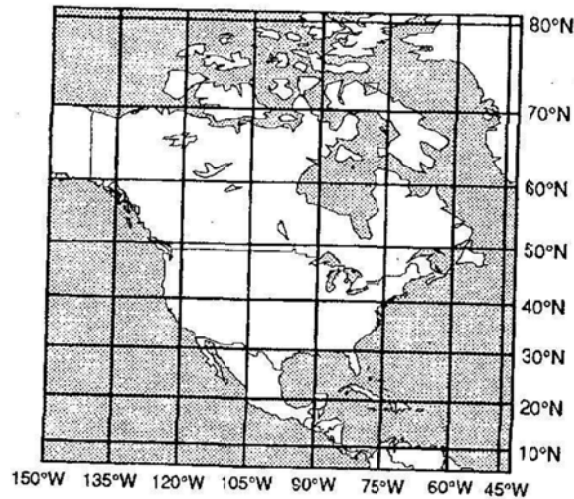


Air mass Homework

Based on your knowledge of air mass characteristics, answer the review questions below

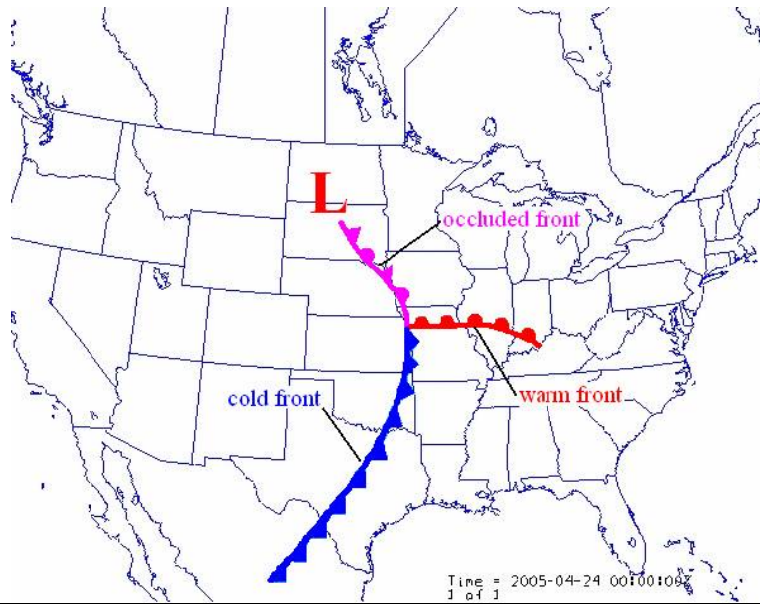
1. The properties of an air mass depend mainly on the _____
2. What type of air mass would originate over the North Pacific Ocean? _____
3. Which abbreviation of air mass indicates a warm air that contains large amounts of water vapor?

An air mass originates with its center located at 25°N and 90°W.



4. The air mass at that located would be classified as _____ the source region is _____
5. An Earth Science student observed the following weather conditions in Richmond, Virginia, for 2 days: The **first day was warm and humid**. The **second day** the temperature was 15 degrees **cooler**, the **relative humidity had decreased**. Which type of air mass mostly likely had moved into the area?

Notes on Fronts



Cold Front Profile

Notes

Warm Front Profile

Notes

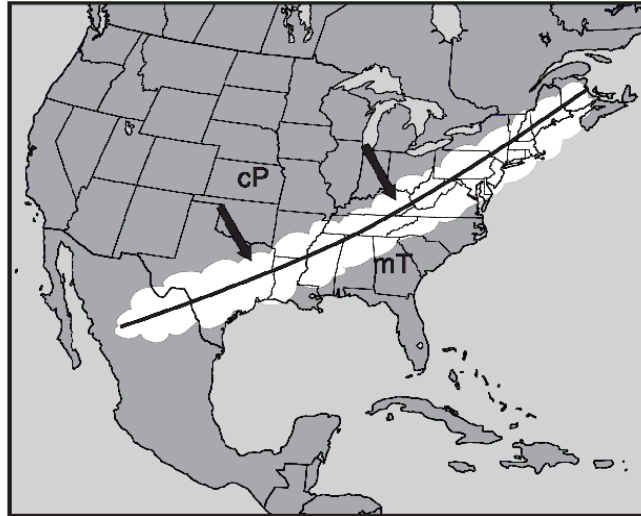
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Occluded Front Profile

Notes

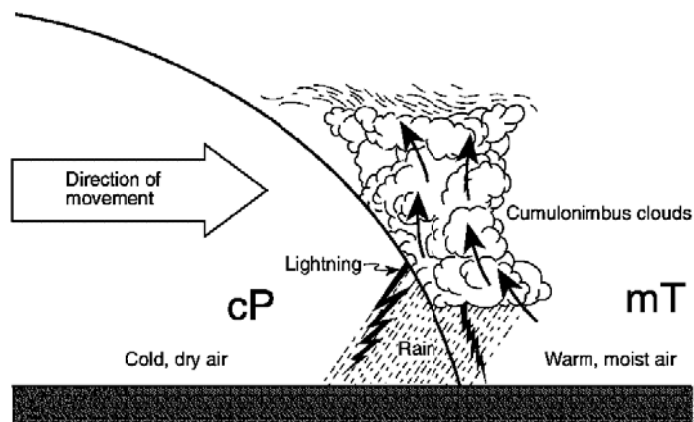
Development of a storm or an occluded front (Map View)

The weather map shows a large white band toward the southeast. The line shown in the middle of the white cloud band is the frontal boundary between cP and mT air mass. Two large arrows show the direction where the front is moving



1. Draw the correction **front** on the white area of the map above.

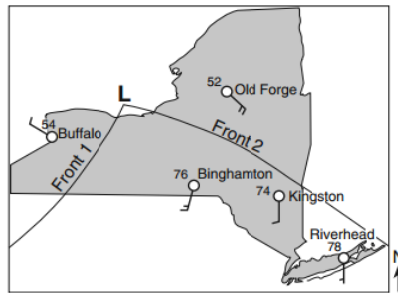
The image below shows a profile of a **cold front**.



2. Explain why the warm moist air is rising at the frontal boundary.
3. State one process that causes clouds to form in this rising air

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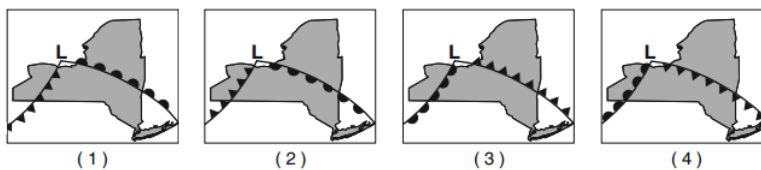
Base your answers to questions 4 and 5 on the weather map below, which represents a low-pressure system over New York State. The L on the map represents the center of the low-pressure system. Two fronts extend from the center of the low, and are labeled front 1 and front 2. Cloud cover has been omitted from the station models.



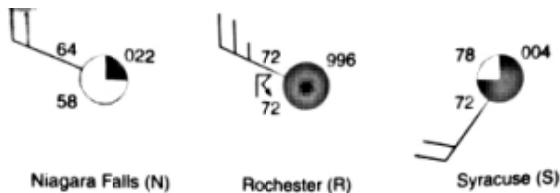
4. The arrows on which map best represent the surface wind pattern around this low-pressure center?



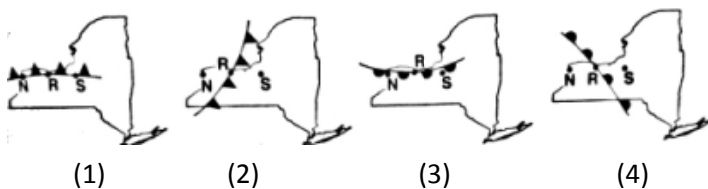
5. Which map best represents the type of fronts and direction of movement of these fronts in relation to the low-pressure center?



6. Weather station models for three NYS cities on the same day at the same time are shown below.

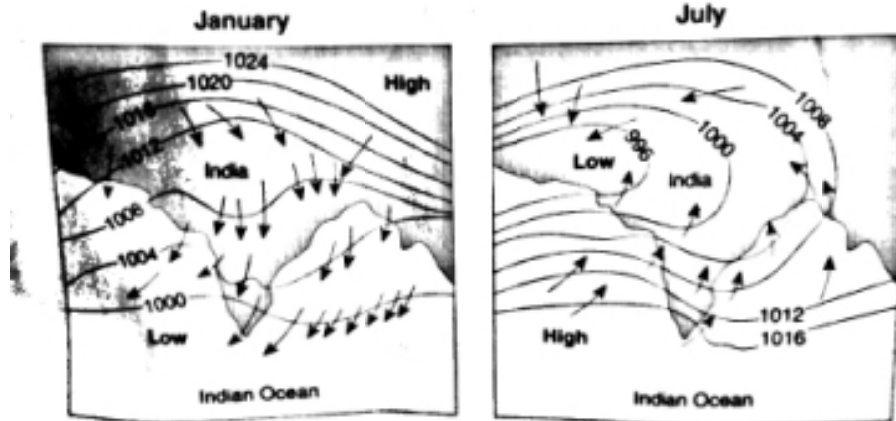


Which map shows the front that was most likely passing through Rochester at that time?



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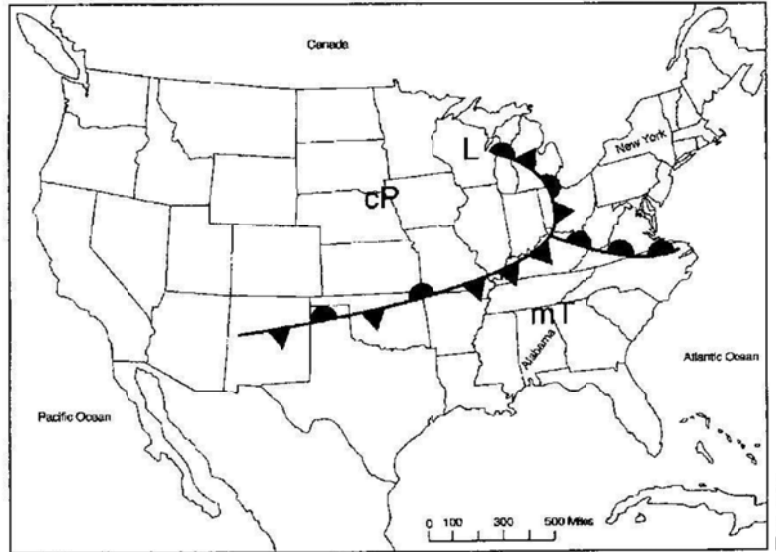
7. Arrows on the maps below show differences in the direction of winds in the region of India and Indian Ocean during January and July. Isobar values are recorded in millibars.



Heavy monsoon rains usually occur in India during

- (1) January, when winds blow from the land
- (2) January, when winds blow toward high pressure
- (3) July, when winds blow from the ocean
- (4) July, when winds blow toward high pressure

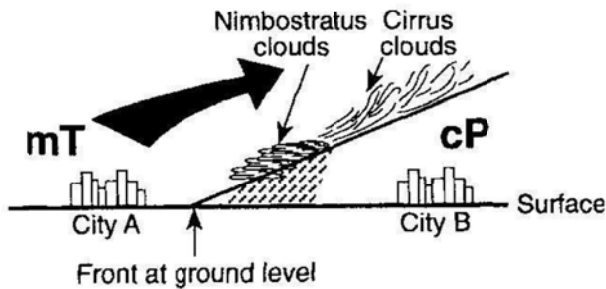
1. Base your answer to the following question on the weather map below, which shows a weather system that is affecting part of the United States.



What is the total number of different kinds of weather fronts shown on this weather map?

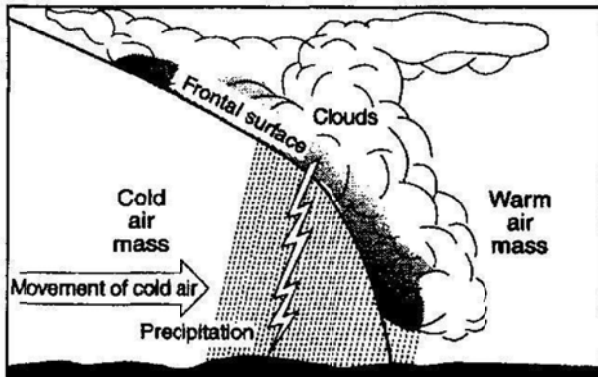
- (1) 1 (2) 2 (3) 3 (4) 4
-
2. Weather along most fronts is usually cloudy with precipitation because the warm air along most fronts is usually
- (1) sinking and cooling, causing water to evaporate
 - (2) sinking and warming, causing water to evaporate
 - (3) rising and cooling, causing water vapor to condense
 - (4) rising and warming, causing water vapor to condense
3. When a person leaves the ocean after swimming on a windy day, the person usually feels cold because
- (1) water evaporates from the skin
 - (2) water condenses on the skin
 - (3) salt is absorbed through the skin
 - (4) radiation is absorbed through the skin
4. The diagram below represents a cross-sectional view of airmasses associated with a low-pressure system. The cold frontal interface is moving faster than the warm frontal interface. What usually happens to the warm air that is between the two frontal surfaces?
-
- (1) The warm air is forced over both frontal interfaces.
 - (2) The warm air is forced under both frontal interfaces.
 - (3) The warm air is forced over the cold frontal interface but under the warm frontal interface.
 - (4) The warm air is forced under the cold frontal interface but over the warm frontal interface.

5. Base your answer to the following question on the diagram below, which shows the frontal boundary between mT and cP air masses.



If the front at ground level is moving toward city B, which type of weather front is shown?

- (1) cold front (3) occluded front
(2) warm front (4) stationary front
6. The diagram below shows a cross section of a cold front.



The cloud formation and precipitation shown in the cross section are caused by the

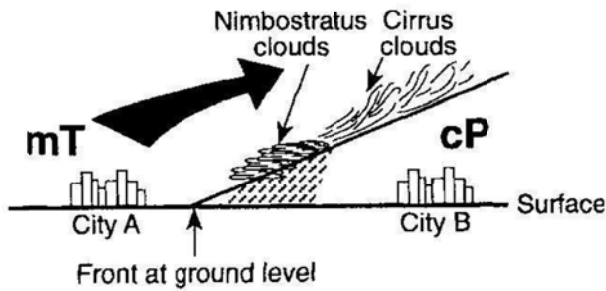
- (1) rising of cold, moist air
(2) sinking of cold, moist air
(3) rising of warm, moist air
(4) sinking of warm, moist air

- Base your answers to questions 7 through 9 on the weather map of North America below. The map shows the location of a front and the air mass influencing its movement.



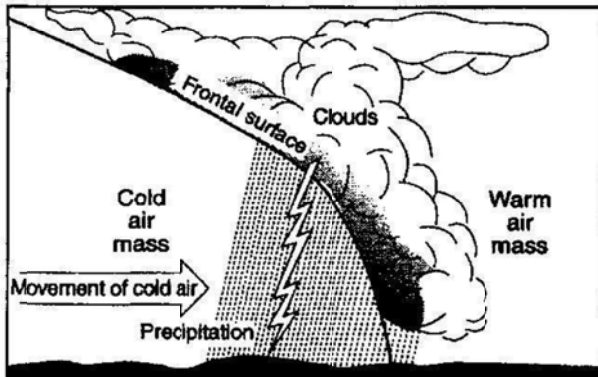
7. Which region is the probable source of the air mass labeled cP on the map?
- (1) central Canada
(2) southwestern United States
(3) North Atlantic Ocean
(4) Gulf of Mexico
8. Which type of front and frontal movement is shown on the weather map?
- (1) cold front moving northwestward
(2) cold front moving southeastward
(3) warm front moving northwestward
(4) warm front moving southeastward
9. The cP air mass is identified on the basis of its temperature and
- (1) wind direction (3) moisture content
(2) cloud cover (4) windspeed

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Rubric for Weather Forecasting/Learning objectives and Key vocabulary

INDICATORS	JUST STARTING Novice	GETTING THERE Apprentice	YOU'VE MADE IT Practitioner	ABOVE AND BEYOND Expert
Air mass/Fronts	<p>Successfully identify <u>air masses</u> and their <u>source regions</u> from a weather map</p> <p>Successfully identify <u>fronts</u> from a weather map</p>	<p>Identify the weather conditions prior, during and after the passage of a <u>frontal system</u></p> <p>Successfully identify all types of fronts from a map view and a <u>side view/profile</u></p> <p>Identify the general direction the frontal system across the US. Identify the general direction of each front within the system</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Explain how the different movement of air masses create weather <input type="checkbox"/> Identify and explain the type of weather from different pressure systems <input type="checkbox"/> Explain the <u>arrival, passage and current</u> weather condition from frontal systems. <input type="checkbox"/> Explain why frontal system is associated with low pressure <input type="checkbox"/> Identify the types of air masses located around a frontal system <input type="checkbox"/> Identify areas of precipitation on a weather map <input type="checkbox"/> Draw wind patterns around a frontal system 	<p align="center"><i>Practitioner Plus</i></p> <p>Thoroughly analyze, explain and predict weather from <u>histographs</u>, and variety of weather maps.</p> <p>Successfully calculate the speed of frontal system and when it will get to certain parts of the US</p>
Forecast summary	<p>Describe the weather conditions in parts of the US using vocabulary terms from the unit. >70% of the vocabularies are used accurately</p>	<p>Describe weather conditions for all three parts of the US but does not thoroughly explain the science behind the conditions</p> <p>Predict the upcoming weather but does not explain the predictions</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Explain the connections between different weather variables <input type="checkbox"/> Evaluates why certain weather are produced from the evidence shown <input type="checkbox"/> Predict the weather by making connections to the content knowledge learned (relationship or cause and effect of weather variables, airmasses and fronts 	<p align="center"><i>Practitioner Plus</i></p> <p>Think outside the box and creatively summarize beyond the requirement (i.e)</p> <ul style="list-style-type: none"> -Compare to historical data -Weather news etc -Other factors such as ozone level, heat index etc.