

A Zone of Convergence

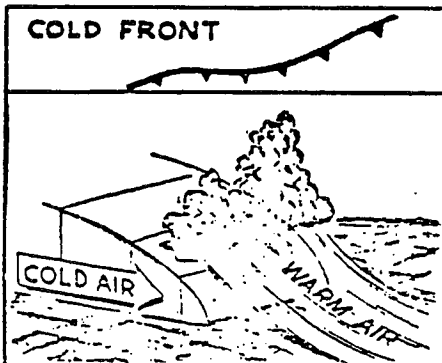
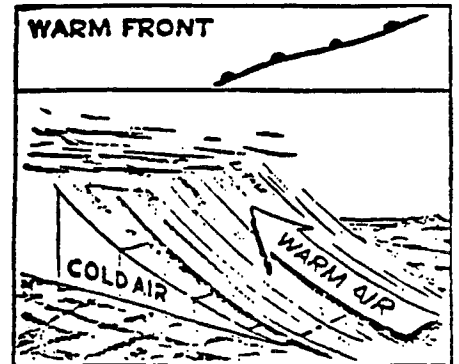
Low pressure systems, also known as cyclones, are zones of convergence. At the center of a cyclone, relatively warm, moist air is rising. This happens because warm and moist air is low in density. As the lighter air at the center of the cyclone rises, different air masses are pulled into the low pressure system. The boundaries (interfaces) between different bodies of air are known as fronts.

Most weather changes are associated with the passage of fronts.

1. A cyclone is a zone of _____, meaning that air is drawn into the low pressure system.
2. What air motion causes cloud formation, and also causes the winds to converge into cyclones? _____
3. A front is _____.
4. When water vapor is added to the air, the density of the air _____.
5. Low pressure systems make fronts. Why don't fronts form in anticyclones (high pressure systems)? _____

There are four types of frontal surfaces. Each one brings its own characteristic kind of weather.

Warm fronts are usually preceded by thickening clouds over a period of several days. Cirrus clouds commonly lower and change to stratus clouds. As the front moves closer, steady rain and fog are common. The passage of the front is marked by a change to warmer, but hazy weather. Warm fronts often bring maritime, tropical air masses.



Cold fronts generally bring cool, crisp, and dry weather. They pass quickly, sometimes within an hour or two. A few, puffy cumulus clouds rapidly build to great heights as a cold front approaches. Precipitation is intense, but brief. Summer cold fronts often bring thunderstorms. As the front passes, the temperature goes down, while air pressure suddenly increases, due to the fact that the cool dry air following the cold front is relatively dense.

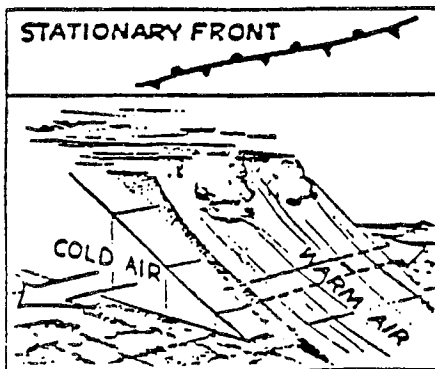
Although fronts may pass quickly, they are not the sharp surfaces you might conclude from looking at a weather map. And warm fronts are usually more diffuse (spread out) than cold fronts. The severity of frontal weather depends upon the strength of the low pressure system. Thunderstorms and tornadoes are often associated with cold fronts. But a weak front may just cause cloudy weather without precipitation.

6. Complete the table below based upon the text you have read so far.

	Warm Front	Cold Front
Relative Speed		
Temperature Change		
Precipitation		
Barometric Pressure		
Air Mass Brought In		

7. Why do warm fronts travel slower than cold fronts? _____

8. The intensity of fronts depends upon _____



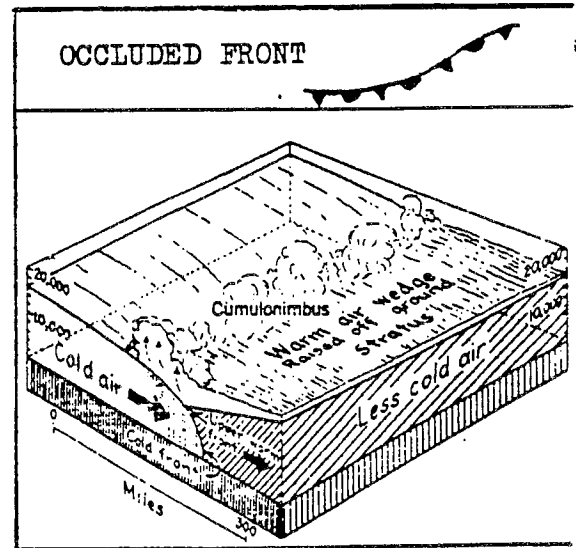
A Stationary Front

An **occluded** front is produced when a fast moving cold front overtakes a warm front. Along the occluded front, the warm, moist air mass is pushed completely above the ground.

Along an occluded front, warm and cold air meet aloft as the warm air is pushed up by the denser, cooler air. The weather near an occluded front is usually cloudy or rainy for a relatively long period of time.

Some fronts don't move. Along opposite sides of a **stationary** front, warm and cold air are blowing in different directions. And, there is very little mixing of the air masses along the front.

The polar front, that separates the polar zone of easterly winds from the mid-latitude westerlies is often a stationary front.



An Occluded Front

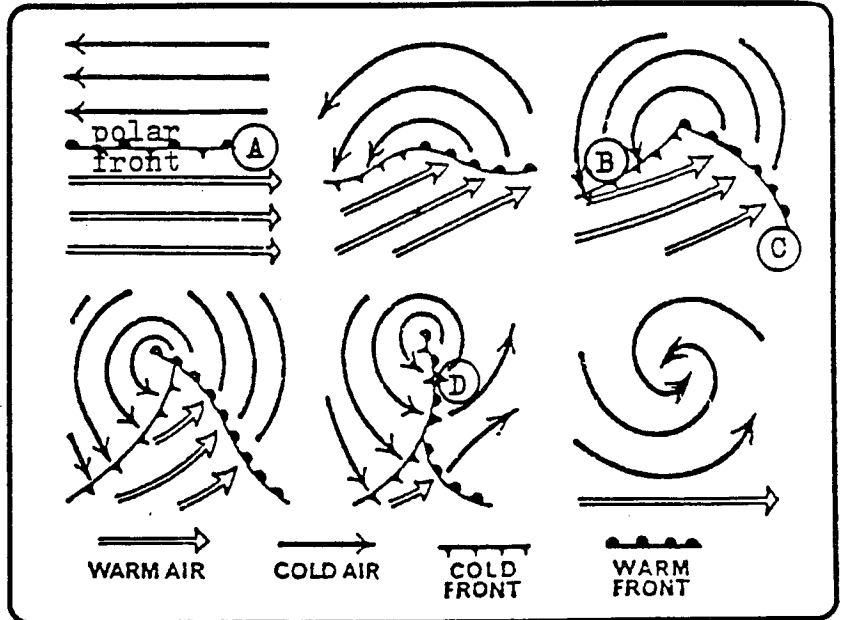
9. When warm air is pushed up by cooler air coming in from both sides, the result is an _____
10. A front that stays in the same place is a _____ front.
11. The polar winds are separated from the mid-latitudes westerlies by the _____ front.
12. Why do cold fronts move faster than warm fronts? _____

This diagram shows how eddies (swirls) develop in the polar front.

The eddy produces a cyclone, and this zone of convergence draws in different air masses. The boundaries between these air masses are weather fronts.

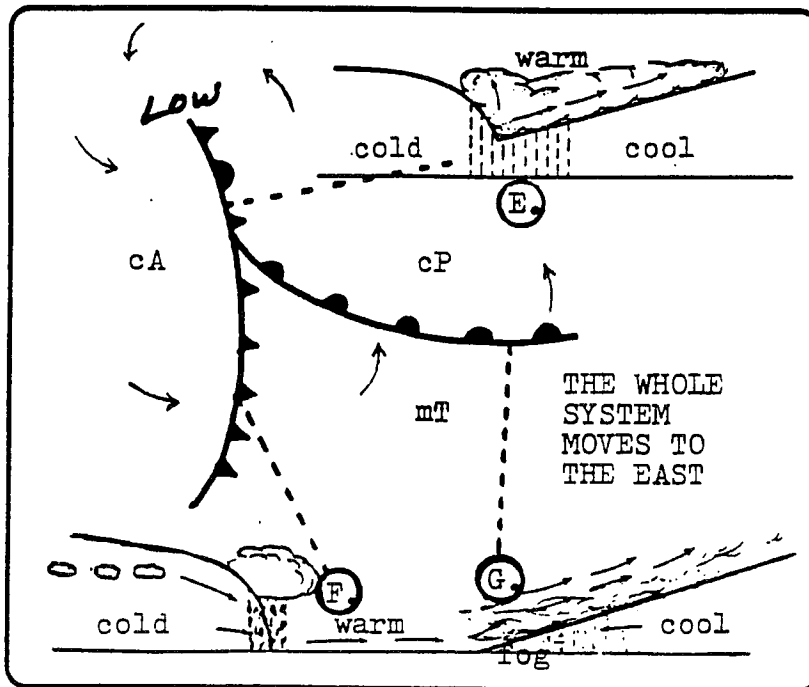
Label the types of fronts shown in this diagram:

- A. _____
- B. _____
- C. _____
- D. _____



The Life Cycle of a Cyclone and Associated Weather Fronts

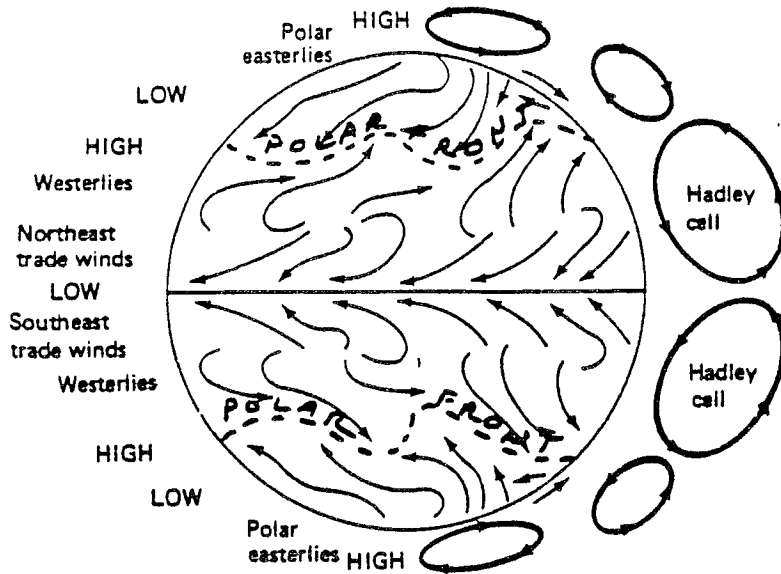
In the final stage, the cyclone has filled in with cold air and a new stationary front is forming to the south.



This set of diagrams shows a mature cyclone. The first diagram is a map view of the low pressure system (cyclone). The three cross sectional views show three types of fronts found in a mature cyclone. Name them.

- E. _____
- F. _____
- G. _____

13. How is an occluded front created?



This diagram shows the generalized circulation pattern of the Earth. Notice that the polar front has been labeled.

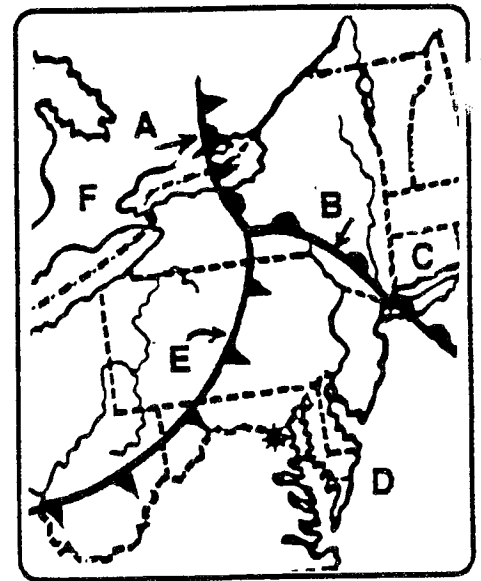
In winter, the polar front moves south, bringing us the cold, crisp conditions of winter. Winter thaws occur when the polar front temporarily moves back to the north.

In the summer, the polar front moves well to the north, and it is seldom a factor in our summer weather.

14. If the polar front moves south, it is a _____ front.

Answer the following by matching each item with the correct letter from the map below.

- 15. The cold front. _____
- 16. The center of the warm air mass. _____
- 17. Location soon to get much warmer. _____
- 18. Front with the whole warm air mass pushed aloft. _____
- 19. Location with cool, crisp weather. _____
- 20. The warm front. _____
- 21. The occluded front. _____
- 22. A part of the polar front. _____ & _____
- 23. The warmest, most moist location. _____
- 24. The front that is slowly pushing back the cold air. _____
- 25. What movement of an important front brings us our cold winter weather?



A Weather System in the Mid-Atlantic States

26. A boundary between different air masses is known as a _____.