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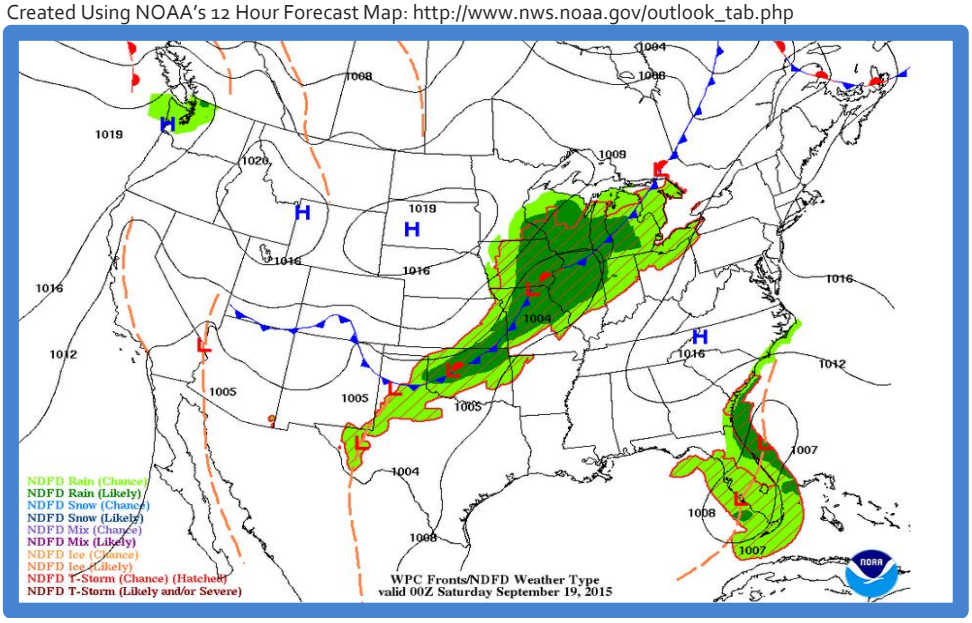
Cover Memo

A children's science magazine, like National Geographic Kids, contains this definition of weather fronts in an article on mid-latitude cyclones, cyclones that do not form in the tropics. The target audience of this magazine is children between the ages of 7 and 14 who are interested in science. The magazine is starting a new series called "Wild Weather," which will feature a different, fascinating weather phenomenon every month. Before delving into these interesting types of weather, the magazine's editors believe it is important to introduce its readers to weather fronts as it will help them understand the life cycle of mid-latitude cyclones, featured in this issue, and other types of weather. The illustrations that accompany the definition it are to appear on a pullout gatefold page, this is a page in a magazine that is really two pages and can be unfolded so that reader can see a three page spread. This definition of weather fronts falls between a Cblurb introducing the series and information about the mid-latitude cyclone.

Created Using NOAA's 12 Hour Forecast Map: http://www.nws.noaa.gov/outlook_tab.php



Wild Weather Fronts

BY ALEXA TSINTOLAS

Dark clouds start to form in the sky, and you begin to wonder if a thunderstorm is brewing. You hope not because you have a soccer game later today. So, you turn on the television to check the weather. The channel's meteorologist, a scientist who studies our planet's atmosphere and makes predictions about future weather, gestures to a blue line and a capital "L" and says, "Due to a cold front, we will be experiencing some rain later tonight. There is a chance of scattered thunderstorms." Unfortunately, your game might be cancelled.

Have you ever wondered what causes storms and the other types of weather we experience every day? Well, it has a lot to do with the weather fronts in our atmosphere like the cold front the meteorologist mentioned in his weather report. A weather front is a border between two air masses of differing density (Encyclopædia Britannica). Air density is the measure of how close together air molecules are. The density of air varies with temperature. Cold air is denser than warm air because cold air molecules are closer together than warm air molecules. There are three other kinds of weather fronts in addition to cold fronts: warm fronts, stationary fronts, and occluded fronts.

Cold Fronts

A cold front is a weather front that replaces warm air with cold air. Since cold air is denser than warm air, when cold air meets warm air, it pushes the warm air up just like a snow plow pushes up snow to clear a road. Once the warm air has been lifted, the cold air is able to take its place. With the arrival of a cold front, wind speeds increase and temperatures decrease (Gardiner).

Cold fronts travel at speeds of 35-40 miles per hour (Encyclopædia Britannica). Additionally, cumulus clouds, which look like fluffy cotton balls, often form when a cold front arrives. If there is enough moisture in the air, rain, thunderstorms, and snow may occur (Gardiner).

Cold fronts are high pressure air masses that move to areas of low pressure. Air pressure is the weight of the air in the atmosphere pushing down on the Earth's surface. Dense air causes high air pressure because there are more air molecules pushing down on the ground. Air travels from areas of high pressure to low pressure creating wind.

Weather maps show cold fronts as blue lines with triangles on one side. The tips of the triangles point in the direction the cold front is traveling.

Warm Fronts

A warm front is the opposite of a cold front as warm fronts replace cold air with warm air bringing higher temperatures. Warm fronts move at half the speed of cold fronts. Since warm fronts are not as fast as and are less dense than cold fronts, they can't push the cold air in front of them out of the way. Instead they glide on top of the cold fronts as the cold fronts pass through (Rao).

Warm fronts are low pressure air masses due to their low densities that move to cold areas where the pressure is higher. Ahead of a warm front, cirrus clouds, wispy clouds high in the atmosphere, and altostratus clouds, clouds in the middle of the atmosphere that cover the entire sky, may form. As a warm front passes, the clouds come closer to the ground and produce precipitate in the form of rain or snow (Gardiner).

On a weather map, a warm front is a red line with semi-circles on one side. The side with the semi-circles shows the direction in which the warm front is moving.

Stationary Fronts

When a cold front and a warm front meet and neither front is strong enough to move the other, a stationary front forms. Winds blowing parallel, in the same direction, to the warm and cold fronts prevent either front from overpowering the other. If the winds begin to blow perpendicular, in the opposite direction, to the stationary front, either a cold front or a warm front may result (Gardiner).

Stationary fronts can last for many days. The weather along a stationary front consists of stratus clouds that cover the sky (Rao). If there is moisture in the air, precipitation may occur.

A weather map illustrates a stationary front with a line with red semi-circles on one side and blue triangles on the other. The side with the red semi-circles represents the direction the warm front wants to go. The side with the blue triangles shows the direction the cold front wants to move in.

Occluded Fronts

Since cold fronts move faster than warm fronts, sometimes the cold fronts overtake the warm fronts quickly producing occluded fronts or occlusions (Gardiner). Imagine the formation of an occluded front as a race between a cold front and a warm front in which the cold front catches up to the warm front from behind and moves ahead of the warm front. These fronts occur when a storm has reached its peak intensity and is about to break apart. There are two types of occlusions: cold occlusions and warm occlusions.

Cold Occlusions

A cold occlusion is when "cold air advances and replaces a warm front. The coldest air approaches very quickly and lifts the warm air as well as the cooler air ahead of the warm front" (Cold Occlusions). As a result, storm clouds called nimbus clouds are formed and precipitation may occur.

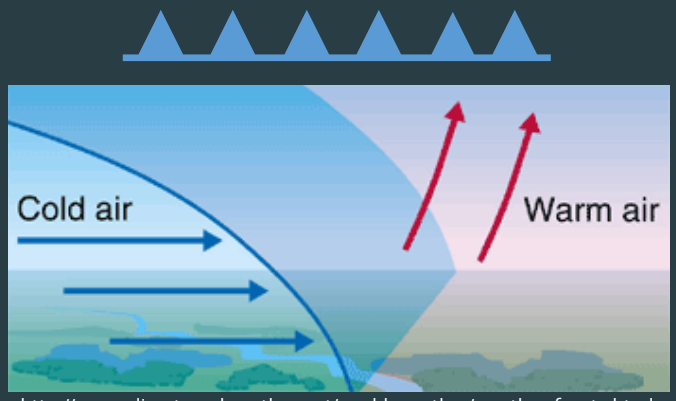
Warm Occlusions

Similar to a cold occlusion, a cold front overtakes a warm front and the cool air in front of the warm front. However, the cold air moving in is not as cold as that of a cold occluded front (Warm Occlusions). Nimbus clouds develop and precipitate with the arrival of a warm occluded front.

Both warm and cold occlusions are shown on a weather map as purple line with alternating purple semi-circles and triangles on the same side of the line. The direction of the warm and cold fronts involved is shown by the direction the shapes point in.

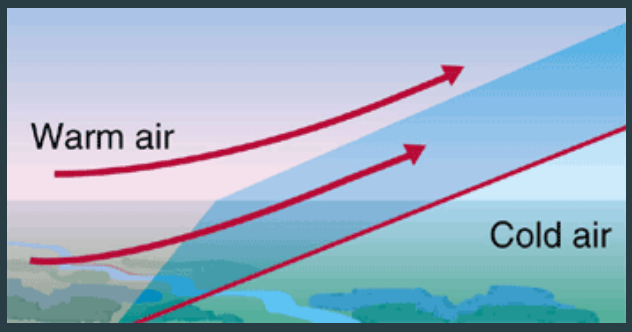
Congratulations, you are now well on your way to becoming a meteorologist! Let's get started with our first Wild Weather topic, the mid-latitude cyclone.

Cold Fronts



http://www.climateandweather.net/world-weather/weather-fronts.html

Warm Fronts



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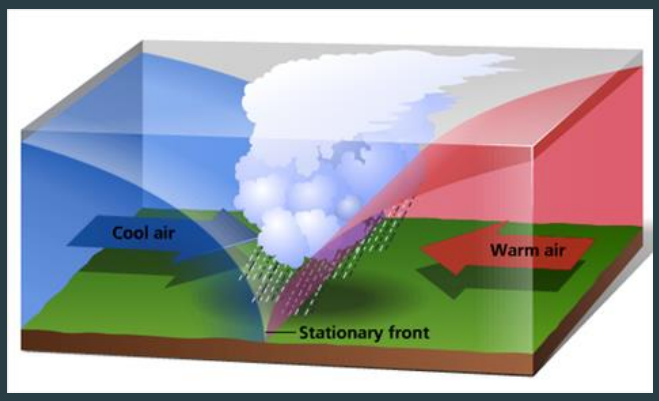
Stationary Fronts



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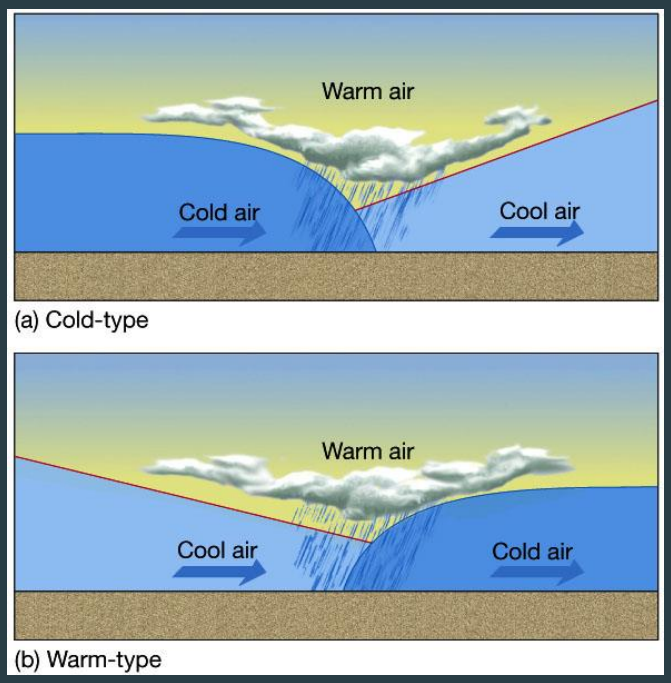
Occluded Fronts



www.ux1.eiu.edu/~cfjps/1400/

Check out the weather map at the beginning of the article and see if you can spot some of these weather fronts. What is the weather like where you live?

Works Cited

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