

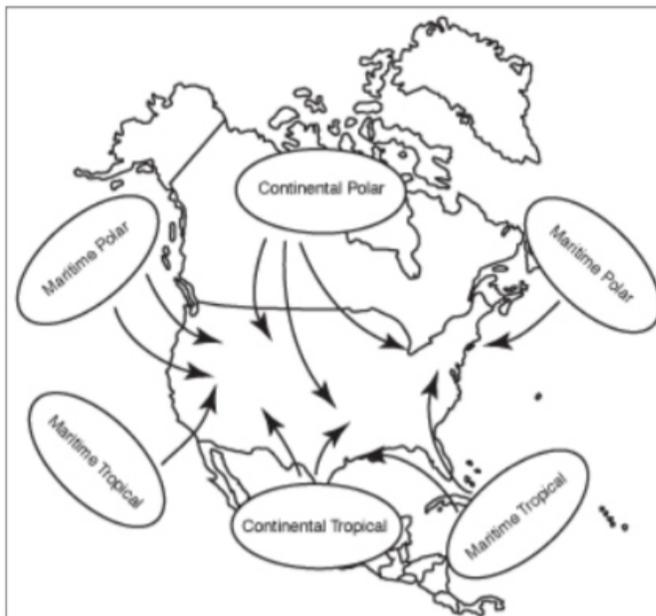
Science 1206
Unit 2: Weather Dynamics
Worksheet 8: North American Weather Systems



Air Mass is a large body of air which the temperature and moisture content at a specific attitude are fairly uniform.

THE 6 NORTH AMERICAN AIR MASSES

Air Masses	Temperature	Moisture Content	Where they form	Direction they move
Maritime Polar (West Coast)	Cool	moist	Over North Pacific Ocean	Northwest to southeast
Maritime Polar (East Coast)	Cool	moist	Over North Atlantic Ocean	Northeast to southwest
Continental Polar	Cold	dry	Over mid-polar Regions of N.A.	North to south
Maritime Tropical (West Coast)	warm	moist	Over South Pacific Ocean	Southwest to northeast
Maritime Tropical (East Coast)	warm	moist	Over South Atlantic Ocean	Southeast to northwest
Continental Tropical	warm	dry	Over mid-southern U.S. & northern Mexico	South to north



Front: the leading edge of a moving air mass; air masses with difference properties don't blend easy, so a boundary, or front, develops as they meet.

Four types of Fronts:

- 1) **Cold front:** the leading edge of a cold air mass
- 2) **Warm front:** the leading edge of a warm air mass
- 3) **Occluded front:** forms when a cold front catches up with a warm front; the warm air is lifted above the earth's surface and is cut off (occluded) from the cooler air below.
- 4) **Stationary front:** occurs when the boundary between warm and cold air masses remains still for some time.

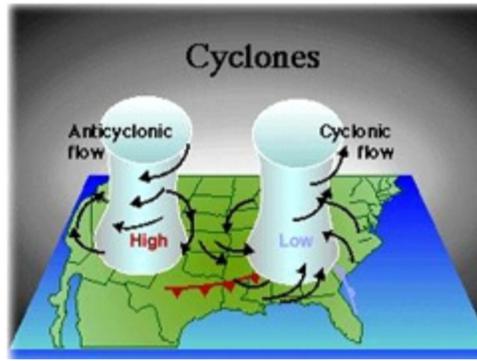
Low Pressure System is a region where the atmospheric pressure is lower than that of surrounding locations. It tends to bring cloudy skies and stormy weather. It may be referred to as a low pressure trough or simply trough

Formation of a Low Pressure System:

- 1) A front forms between a cold air mass and a warm air mass
- 2) Fast-flowing air in the jet stream pulls air up out of both air masses, creating a low-pressure system near the ground.
- 3) The low-pressure area pulls in air near the surface
- 4) The rising air swirls in a counter-clockwise direction (Coriolis effect)
- 5) The warm front rises over the cold air mass, carrying moisture with it and the cold front pushes under the warm air mass, causing warm, moist air to rise steeply
- 6) A region of precipitation forms in front of the warm front as the jet stream continues to pull air away. Cumulonimbus clouds form and bring precipitation
- 7) An occluded front forms as the warm front is caught by the cold front, cutting it off from the cooler air below (in the low-pressure system)
- 8) The storm ends as upper air flow no longer pulls air away from the low-pressure area and a stationary front forms

High pressure system is a region where the atmospheric pressure is higher than that of surrounding locations . It is a whirling mass of cool, dry air that generally brings fair weather and light winds.

Cyclogenesis: the process of forming a cyclone



Cyclone: a low-pressure system that rotates counterclockwise (in the Northern Hemisphere) and usually brings cloudy, stormy weather

Anticyclone: a high-pressure system that rotates clockwise (in the Northern Hemisphere) and usually brings clear skies

PART A: Multiple Choice

1. What causes changes in weather?

- ✓ (A) Air masses interact.
- (B) The air gets more humid.
- (C) Water evaporates.
- (D) Clouds form.

2. A continental polar air mass forms in

- (A) the Pacific Ocean.
- ✓ (B) northern Canada.
- (C) the Gulf of Mexico.
- (D) the desert Southwest.

3. Which set of conditions would you find in a maritime polar air mass?

- (A) warm and moist
- (B) warm and dry
- ✓ (C) cool and moist
- (D) cool and dry

4. Which of the following air masses has the greatest influence on Atlantic Canada's weather in the winter months?

- (A) continental tropical air masses
- (B) maritime tropical air masses
- (C) continental polar air masses
- ✓ (D) maritime polar air masses

5. Which of the following air masses has the greatest influence on Central Canada's weather in the winter months?

- (A) continental tropical air masses
- (B) maritime tropical air masses
- ✓ (C) continental polar air masses
- (D) maritime polar air masses

6. Which set of conditions would you find in a continental polar air mass?
- (A) warm and moist
 - (B) warm and dry
 - (C) cool and moist
 - ✓ (D) cool and dry
7. A maritime polar air mass that forms over the North Pacific Ocean brings what kind of weather to the Pacific Coast?
- (A) warm
 - (B) dry
 - ✓ (C) wet
 - (D) extremely cold
8. For the northern hemisphere, which statement best describes a low-pressure system?
- (A) rotates in a clockwise direction and brings clear skies and calm winds
 - (B) rotates in a counterclockwise direction and brings clear skies and calm winds
 - ✓ (C) rotates in a counterclockwise direction and brings cloudy, stormy weather
 - (D) rotates in a clockwise direction and brings cloudy, stormy weather
9. For the northern hemisphere, which statement best describes a high-pressure system?
- ✓ (A) rotates in a clockwise direction and brings clear skies and calm winds
 - (B) rotates in a counterclockwise direction and brings clear skies and calm winds
 - (C) rotates in a counterclockwise direction and brings cloudy, stormy weather
 - (D) rotates in a clockwise direction and brings cloudy, stormy weather
10. Which type of front occurs when warm and cold fronts meet but remain fairly motionless for several hours if not days?
- (A) warm front
 - (B) cold front
 - (C) occluded front
 - ✓ (D) stationary front
11. What kind of weather would an occluded front likely bring?
- ✓ (A) sunny and warm
 - (B) much precipitation
 - (C) thunderstorms
 - (D) cold and dry
12. What is an area in which two or more air masses meet?
- ✓ (A) front
 - (B) air mass
 - (C) tornado
 - (D) storm surge
13. What sort of weather does A low pressure system bring?
- ✓ (A) wet and dry
 - (B) wet and windy
 - (C) dry and sunny
 - (D) cold and dry
14. Changes in weather are caused by the interaction of
- (A) cyclones.
 - (B) anticyclones.
 - (C) fronts.
 - ✓ (D) air masses

15. How does a warm front form?
- (A) Warm air becomes caught between cold air masses.
 - (B) Two air masses meet and stay separated.
 - ✓ (C) Warm air moves over cold air and replaces it.
 - (D) Cold air moves under warm air and pushes it up.
16. Where does a cold front form?
- ✓ (A) where cold air moves under warm air
 - (B) where warm air moves over cold air
 - (C) where two air masses remain separated
 - (D) where warm air masses move quickly
17. Which of the following statements describes an anticyclone?
- (A) It is an area of low pressure.
 - ✓ (B) It is an area of high pressure.
 - (C) It has air masses that meet and rise.
 - (D) It moves in the direction of Earth's rotation
18. What kind of air pressure is in a cyclone?
- (A) very dense
 - (B) higher than surrounding areas
 - (C) sinking and then rising
 - ✓ (D) lower than surrounding areas
19. How do winds behave in a cyclone?
- ✓ (A) They spiral toward the center.
 - (B) They spiral out toward low pressure areas.
 - (C) They are very calm.
 - (D) They travel in two different directions.
20. Which of the following statements describes an anticyclone?
- (A) It is an area of low pressure.
 - ✓ (B) It is an area of high pressure.
 - (C) It has air masses that meet and rise.
 - (D) It moves in the direction of the Earth's rotation.
21. What kind of weather would an anticyclone likely bring?
- (A) stormy
 - (B) cool and wet
 - ✓ (C) dry and clear
 - (D) changeable
22. Meteorologists track cyclones and anticyclones because they
- (A) are dangerous forms of severe weather.
 - ✓ (B) help predict stormy or clear weather.
 - (C) help forecast weather weeks in the future.
 - (D) give more accurate facts than fronts.