



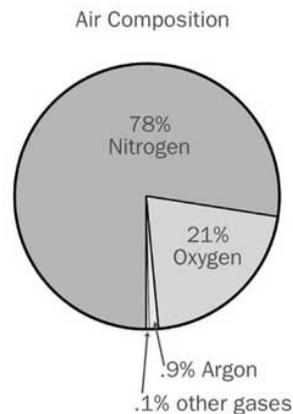
Atmosphere & Weather Unit Review

Structure of the Atmosphere

Main Ideas:

- The atmosphere is made up of a mixture of gases.
- The atmosphere has 4 different layers: troposphere, stratosphere, mesosphere, and thermosphere.
- As altitude increases (going higher), air pressure decreases.
- Our weather is caused by changes in Humidity, Wind, Temperature and Air Pressure.
- When air masses collide they form weather fronts (warm fronts, cold fronts, stationary fronts, and occluded fronts).
- We use technology to predict weather and protect ourselves from weather hazards (tornados, hurricanes, thunderstorms).
- We measure ozone and particulate matter to track and predict Air Quality .

Earth's **atmosphere** is made up of a mixture of gases: **nitrogen, oxygen, argon,** and other gases.



Earth's atmosphere makes conditions on Earth suitable for living things— it contains oxygen for living things, it traps heat from the sun, and protects us from meteoroids.

Air has mass— the weight of air pushing down on us is air pressure. A barometer is the instrument we use to measure air pressure.

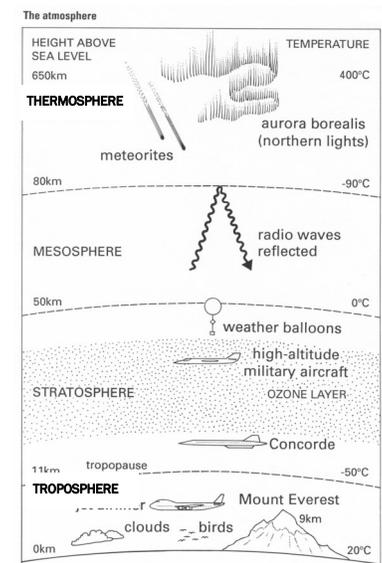
Air pressure decreases as altitude increases. The higher you go, the less air is above you to weigh down on you. (Air is "thinner" on top of a mountain).

The atmosphere has 4 main layers that are classified by changes in temperature.

- 1) **Troposphere**— is the lowest level closest to earth. This is where weather occurs.
- 2) **Stratosphere**— is the second layer, which contains the ozone layer. Some planes fly in the stratosphere.
- 3) **Mesosphere**— This layer

protects Earth from meteorites.

4) **Thermosphere**—The outermost layer that fades into space. Satellites can be found here.



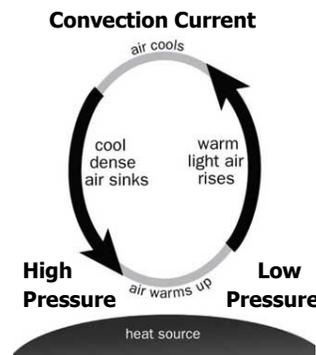
Weather Factors: Temperature, Wind, Humidity

The sun provides all of the energy that fuels Earth's weather. Some of the sun's energy is absorbed or reflected by the atmosphere before it reaches the surface and warms our Earth.

Air temperature is measured with a thermometer.

Convection currents help transfer heat around the troposphere. When air is heated, it becomes less dense and rises causing an area of low pressure. When the warm air rises away from the heat source, it cools and becomes more dense. This

cool air sinks, creating an area of high pressure.



low pressure, it creates wind. Wind is measured with an anemometer.

The amount of WATER VAPOUR in the atmosphere is humidity. It is measured with a sling psychrometer or a hygrometer. When the temperature falls below the DEW POINT the water vapour condenses into liquid or ice, we can see it as precipitation (rain, snow, etc) or clouds. There are 3 main types of clouds:

- Cumulus (fluffy, puffy)
- Cirrus (wispy, feathery)
- Stratus (flat, thick layer)

Check textbook for more information:

Chapter 2: The Atmosphere	p.44-85
Chapter 3: Weather Factors	p.86-127
Chapter 4: Weather Patterns	p.128-163

Winds are caused by differences in air pressure. When air moves from high pressure to

ATMOSPHERE & WEATHER UNIT REVIEW

Weather Patterns

A huge body of air that has the same temperature, moisture, and air pressure is called an **air mass**. Air masses are classified by moisture and temperature.

Dry = continental Moist = maritime

Warm = tropical Cold = polar

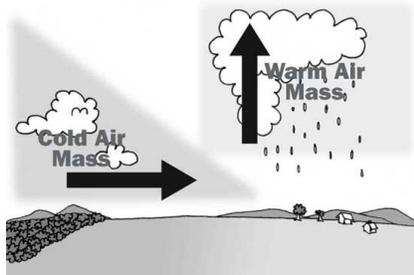
Air masses influence weather—when air masses collide they don't mix easily, but form a **front**. Clouds and precipitation usually form at a front. There are four different types of fronts:

- 1) **Warm Front**— A fast-moving warm air mass runs over a cold air mass.
- 2) **Cold Front**— A cold air mass runs into a warm air mass pushing it up.
- 3) **Stationary Front**—Warm and cold

air masses meet, but don't move.

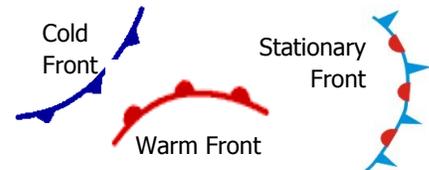
- 4) **Occluded Front**—A warm air mass is caught between 2 cool air masses.

COLD FRONT



Meteorologists use maps, charts, satellites, weather tools, and computers to analyze weather data and forecast weather.

Weather maps show areas of **Low Pressure** (L—warm, stormy weather) and **High Pressure** (H—cool, clear weather) and weather fronts. They also may show temperature, air pressure and precipitation.



Weather Hazards: Thunderstorms, Tornadoes, Hurricanes

Thunderstorms are brief, severe storms that usually form on hot, humid afternoons. They are accompanied by heavy rain & flash flooding (possibly hail), and frequent thunder and lightning. They form in large cumulonimbus clouds.

During thunderstorms, avoid places where lightning may strike. Also, avoid objects that can conduct electricity, such as metal objects or bodies of water.



Tornadoes are brief, intense storms with high winds—a rapidly, whirling funnel cloud that touches the ground. They also develop in cumulonimbus clouds—under the same conditions that cause thunderstorms.

Tornadoes occur most often in "Tornado Alley" - in the Great Plains, where cold, dry air from Canada meets, warm, humid air from the Gulf of Mexico.

The safest place to be during a tornado is in a storm shelter or the basement of a well-built building.

Hurricanes are tropical cyclones that form over the warm ocean water in the late summer and fall. They begin in the Atlantic Ocean as a low-pressure area.

If you hear a hurricane warning and are told to evacuate, leave the area immediately. The danger from hurricanes comes from severe flooding (storm surge) and wind damage. Better weather technology (satellites) lets us more accurately predict the path of these storms to give more people advance warning.



Air Quality

Some **air pollution** occurs naturally. But many types of air pollution are the result of human activities, especially the **burning of fossil fuels**.

We use the Air Quality Index (**AQI**) to measure daily air quality. It monitors several different pollutants including ground level **ozone and particulate matter**. The AQI indicates where air quality is good (green) which poses no

health risk, or poor (red/purple) which poses a significant health risk.



The AQI is the highest on hot summer days with little wind, when pollutants

build up near the ground and chemically react in the presence of sunlight to form dangerous ground-level ozone (smog).

The United States government and state governments have passed a number of laws and regulations to reduce air pollution. Your family can help reduce air pollution by using fewer fossil fuels—riding bikes, walking, or taking public transportation instead of driving cars.