**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_**

**Geology Ch 18 & 19 Guided Notes**

**Moisture, Clouds, and Precipitation & Air Pressure and Wind**

**18.1 Water in the Atmosphere**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is any form of \_\_\_\_\_\_\_\_ that falls from a \_\_\_\_\_\_\_\_\_
* When it comes to understanding atmospheric processes, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the most important gas in the atmosphere

Changes of State

* Solid to Liquid
  + The process of changing state, such as \_\_\_\_\_\_\_\_\_\_ ice, requires that \_\_\_\_\_ be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the form of \_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: is the energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ during a change in state
* Liquid to Gas
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: is the process of changing a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: is the process where a \_\_\_\_\_\_\_, like water vapor, changes into a \_\_\_\_\_\_\_\_\_\_\_\_\_\_, like water
* Solid to Gas
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the conversion of a solid \_\_\_\_\_\_\_\_\_\_\_ to a gas without passing through the liquid state
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: is the conversion of a \_\_\_\_\_\_\_\_\_\_ directly to a \_\_\_\_\_\_\_\_\_\_\_\_



Humidity

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a general term for the amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the air
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Air is saturated when it contains the \_\_\_\_\_\_\_\_\_\_\_\_\_ amount of water vapor that it can hold at any given \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + When saturated, \_\_\_\_\_\_\_air contains \_\_\_\_\_\_\_\_\_\_ water vapor than \_\_\_\_\_\_\_ saturated air

Relative Humidity

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a \_\_\_\_\_\_\_ of the air’s actual water vapor content compared with the amount of water vapor air \_\_\_\_\_\_\_\_\_\_\_\_ at that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* To summarize, when the water vapor content of air remains \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_ air temperature causes an \_\_\_\_\_\_\_\_\_\_ in relative humidity, and raising air temperature cause a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dew Point: is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to which a parcel of air would need to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to reach \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Measuring Humidity

* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an instrument to measure \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a hygrometer with dry and wet bulb \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of water from the wet bulb makes air temperature appear \_\_\_\_\_\_\_\_ than the dry bulb’s measurement. The two temperatures are compared to determine the relative humidity.

**18.2 Cloud Formation**

Adiabatic Temperature Changes

* When air is allowed to \_\_\_\_\_\_\_\_\_\_\_, it \_\_\_\_\_\_\_\_\_, and when it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (squeezed together), it \_\_\_\_\_\_\_\_\_\_\_\_\_

Expansion and Cooling

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the rate of cooling or heating that applies only to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ air
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the rate of adiabatic temperature change in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ air

***Cloud Formation***

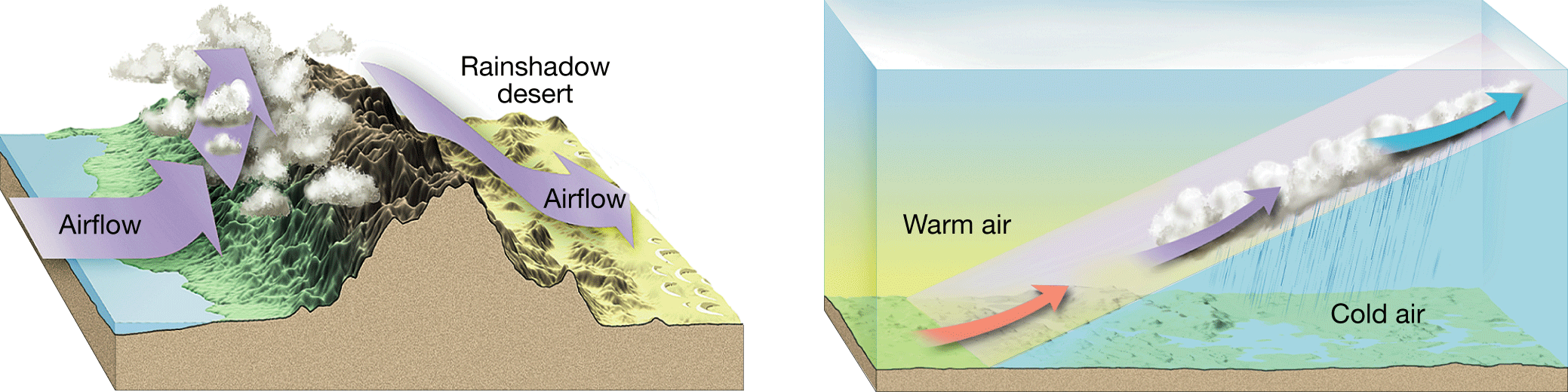
* There are \_\_\_\_\_ mechanism that cause air to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Orographic Lifting

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ act as barriers to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, forcing the air to ascend
  + The air cools \_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ may result

Frontal Wedging

* A \_\_\_\_\_\_\_\_\_\_ is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ between two adjoining \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ having contrasting characteristics

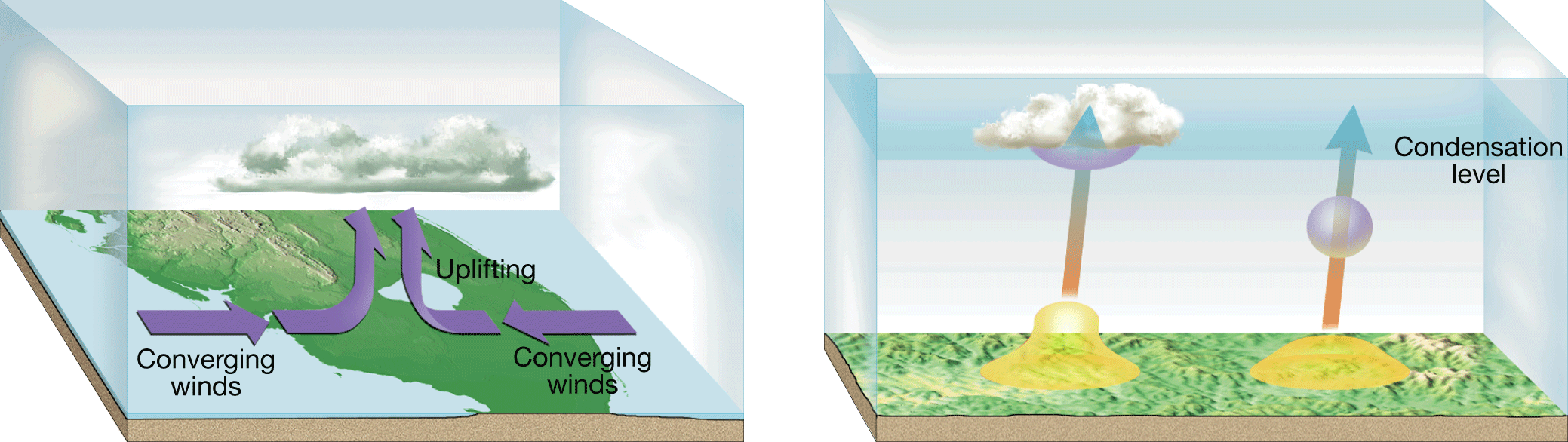


Convergence

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is when air flows\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Localized Convective Lifting

* Localized \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lifting occurs where \_\_\_\_\_\_\_\_\_\_\_\_surface heating causes pockets of air to rise because of their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Density Differences

* \_\_\_\_\_\_\_\_\_\_ air tends to remain it its \_\_\_\_\_\_\_\_\_\_\_\_ position, while \_\_\_\_\_\_\_\_\_\_ air tends to rise

Stability Measurements

* Air stability is determined by measuring the temperature of the atmosphere at \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + The rate of change of air temperature with height is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Degrees of Stability

* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs in a layer of limited depth in the atmosphere where the temperature \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ rather than \_\_\_\_\_\_\_\_\_\_\_\_\_\_ with height

Stability and Daily Weather

* When stable air is forced \_\_\_\_\_\_\_\_\_ the Earth’s surface, the clouds that form are widespread and have little \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ compared to their horizontal direction

Conditions for Condensation to Occur

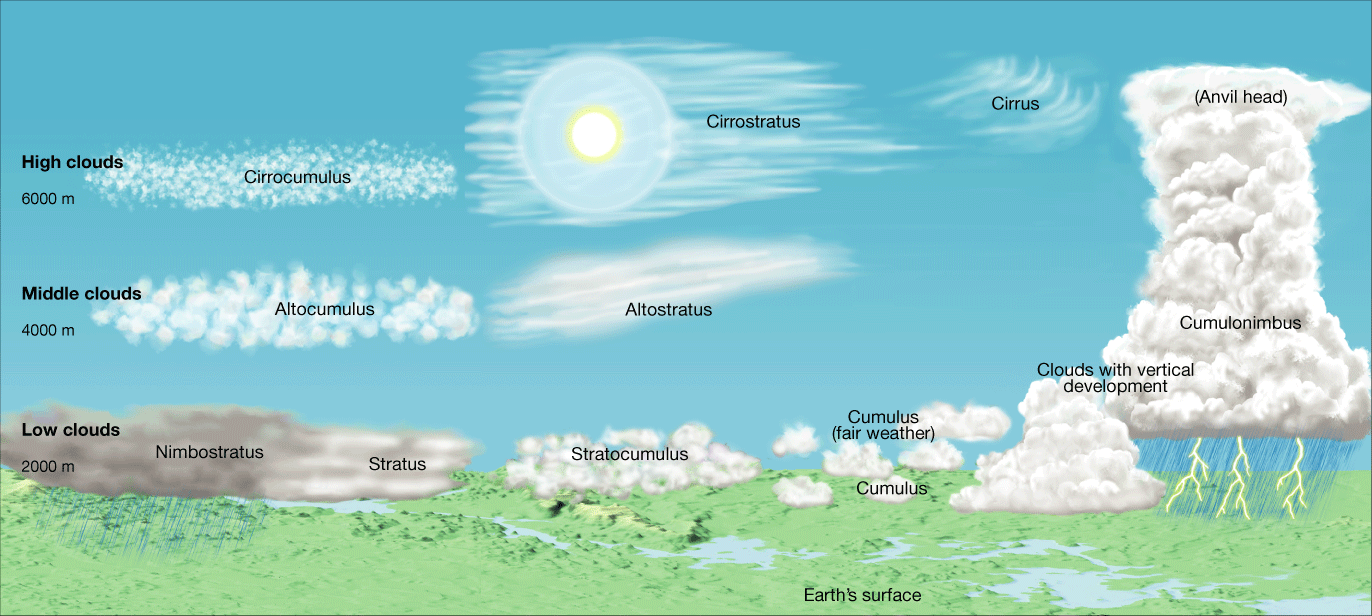
* For any form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to occur, the air must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Types of Surfaces
  + Generally, there must be a surface for water vapor to condense on
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are tiny bits of particulate matter that serve as \_\_\_\_\_\_\_\_\_\_ on which water vapor condenses when condensation occurs in the air

**18.3 Cloud Types and Precipitation**

* Clouds are classified on the basis of their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_(cirrus=curl of hair) are clouds that are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(cumulus=a pile) are clouds that consist of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(stratus=a layer) are clouds best described as \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* High Clouds
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Middle Clouds
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are composed of \_\_\_\_\_\_\_\_\_\_\_\_ masses that differ from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ clouds in that altocumulus clouds are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ clouds create a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ covering the sky with the sun or moon visible as bright spot
* Low Clouds
  + \_\_\_\_\_\_\_\_\_\_\_\_\_ clouds are best described as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that cover \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have a \_\_\_\_\_\_\_\_\_\_\_\_\_\_bottom that appear as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ clouds are the main \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ makers

Fog

* \_\_\_\_\_\_ is defined as a \_\_\_\_\_\_\_\_\_ with its base at or very near the \_\_\_\_\_\_\_\_\_\_\_
* Fog caused by cooling
  + As the air cools, it becomes \_\_\_\_\_\_\_\_\_\_\_\_ and drains into low areas such as \_\_\_\_\_\_\_\_\_\_\_\_\_, where \_\_\_\_\_\_\_\_\_ fog accumulations may occur
* Fog Caused by evaporation
  + When cool air moves over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, enough \_\_\_\_\_\_\_\_\_\_\_\_ may evaporate from the water surface to produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



Precipitation

* For precipitation to form,\_\_\_\_\_\_\_\_\_ droplets must grow in \_\_\_\_\_\_\_\_ by roughly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Cold cloud precipitation
  + The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a theory that relates the \_\_\_\_\_\_\_\_\_\_ of precipitation to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of ice and liquid water
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the condition of water droplets that remain in the \_\_\_\_\_\_\_\_ state at temperatures well below \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ air is the condition of air that is \_\_\_\_\_\_\_\_ concentrated than is normally possible under given \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ conditions
* Warm cloud Precipitation
  + The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a theory of \_\_\_\_\_\_\_\_\_\_\_\_\_ formation in \_\_\_\_\_\_\_ clouds (above \_\_\_\_\_) in which large cloud droplets \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ together with smaller droplets to form a raindrop

The type of precipitation that reaches earth’s surface depends on the temperature profile in the lower few kilometers of the atmosphere

* Rain means drops of water at least \_\_\_\_\_\_in diameter; snow is made of crystals with \_\_\_ sides
* \_\_\_\_\_\_\_\_\_\_\_\_ is the fall of clear-to-translucent ice
* \_\_\_\_\_\_\_\_\_ is produced by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ clouds
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ begin as small ice pellets that grow by collecting \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ water droplets as they fall through a cloud

**Chapter 19-Air Pressure and Wind**

**19.1 Understanding Air Pressure**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the pressure exerted by the \_\_\_\_\_\_\_\_\_\_ of air
* Air pressure is exerted in \_\_\_\_\_\_\_ directions. The air pressure pushing \_\_\_\_\_\_\_ on an object exactly \_\_\_\_\_\_\_\_\_\_\_\_ the air pressure pushing \_\_\_\_\_ on the object
* A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a device used for measuring air pressure
* When air pressure \_\_\_\_\_\_\_\_\_\_\_\_\_\_, the mercury in the tube \_\_\_\_\_\_. When air pressure \_\_\_\_\_\_\_\_\_\_\_, so does the \_\_\_\_\_\_\_ of the mercury column

Wind

* \_\_\_\_\_\_\_ is the result of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ differences in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Air flows from areas of \_\_\_\_\_\_\_\_\_\_\_\_ pressure to areas of \_\_\_\_\_\_\_\_\_\_ pressure
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of Earth’s surface generates pressure differences. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the ultimate energy source for most wind
* Three factors combine to control wind: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pressure Differences

* A pressure \_\_\_\_\_\_\_\_\_\_\_ is the amount of pressure change occurring over a given \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Closely spaced \_\_\_\_\_\_\_\_\_\_\_\_\_\_, lines on a map that connect places of \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, indicate a \_\_\_\_\_\_\_\_\_\_pressure gradient and \_\_\_\_\_\_ winds. Widely spaced isobars indicate a \_\_\_\_\_\_\_pressure gradient and \_\_\_\_\_\_\_\_ winds

Coriolis Effect

* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_describes how \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ affects \_\_\_\_\_\_\_\_\_\_objects. In the \_\_\_\_\_\_\_\_\_\_\_\_ Hemisphere, all free-moving objects or fluids, including the wind, are deflected to the \_\_\_\_\_\_\_\_\_\_ of their path of motion. In the \_\_\_\_\_\_\_\_\_\_ Hemisphere, they are deflected to the \_\_\_\_\_\_\_\_\_\_\_\_\_

Friction

* \_\_\_\_\_\_\_\_\_\_ acts to \_\_\_\_\_\_\_\_ air movement, which \_\_\_\_\_\_\_\_\_\_\_ wind \_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_ are \_\_\_\_\_\_-moving rivers of air that travel between \_\_\_\_\_\_\_\_\_\_\_\_\_\_ kilometers per hour in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ direction

**19.2 Pressure Centers and Winds**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are centers of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are centers of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* In cyclones, the pressure \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the outer isobars toward the center. In anticyclones, the values of the isobars \_\_\_\_\_\_\_\_\_\_\_\_\_ from the outside toward the center

Cyclonic and Anticyclonic Winds

* When the pressure gradient and the Coriolis effect are applied to pressure centers in the \_\_\_\_\_\_\_\_\_\_\_\_\_Hemisphere, winds blow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ around a \_\_\_\_\_\_. Around a \_\_\_\_\_\_\_\_, they blow \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* In either hemisphere, \_\_\_\_\_\_\_\_\_\_\_\_\_\_ causes a net flow of air \_\_\_\_\_\_\_\_\_\_\_\_\_around a \_\_\_\_\_\_\_\_\_\_ and a net flow of air \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_around an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Weather and Air Pressure

* \_\_\_\_\_\_\_\_\_\_\_\_\_ air is associated with \_\_\_\_\_\_\_\_\_ formation and precipitation, whereas \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ air produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_ skies.

Weather Forecasting

* Weather reports emphasize the locations and possible paths of cyclones and anticyclones.
* ­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_pressure centers can produce bad weather in any season.

Global Winds

* The atmosphere balances these differences by acting as a giant heat-transfer system. This system moves \_\_\_\_\_\_\_\_air toward \_\_\_\_\_\_ latitudes and \_\_\_\_\_\_\_\_air toward the \_\_\_\_\_\_\_\_\_\_\_\_.
* Non-Rotating Earth Model
  + On a hypothetical non-rotating planet with a smooth surface of either all land or all water, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ produced cells would form.

Rotating Earth Model

* If the effect of rotation were added to the global circulation model, the two-cell convection system would break down into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_cells.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are \_\_\_\_\_ belts of winds that blow almost constantly from \_\_\_\_\_\_\_\_\_\_\_\_ directions and are located on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sides of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_**are the dominant \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ motion of the atmosphere that characterizes the regions on the poleward side of the subtropical highs.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are winds that blow from the polar high toward the subpolar low. These winds are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like the trade winds.
* A **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is a \_\_\_\_\_\_\_\_\_ frontal zone \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ air masses of \_\_\_\_\_\_\_\_\_ origin from \_\_\_\_\_\_\_\_\_\_\_air masses of \_\_\_\_\_\_\_\_\_\_ origin.

Influence of Continents

* The only truly continuous pressure belt is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hemisphere. In the Northern Hemisphere, where land masses break up the ocean surface, large seasonal temperature differences disrupt the pressure pattern.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_** are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ associated with \_\_\_\_\_\_ continents, especially Asia. In winter, the wind blows from land to sea. In summer, the wind blows from sea to land.

**19.3 Regional Wind Systems**

Local Winds

* The local winds are caused either by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_effects or by variations in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, land and water, in the immediate area
* Land and Sea Breezes
  + In coastal areas during the warm summer months, the land surface is heated more intensely during the daylight hours than an adjacent body of water is heated. As a result, the air \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Valley and Mountain Breezes
  + In mountainous regions during daylight hours, the air along the slopes of the mountains is heated more intensely than the air at the same elevation over the valley floor. Because this \_\_\_\_\_\_\_\_ air on the mountain slopes is \_\_\_\_\_ dense, it glides up along the slope and generates a \_\_\_\_\_\_\_\_breeze. After sunset the pattern may reverse.

How Wind is Measured

* Wind direction
  + The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the wind that blows more often from one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than from any other
  + In the US, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ consistently move weather from \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ across the continent
* Wind speed
  + An \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is an instrument that resembles a cup and its commonly used to measure wind \_\_\_\_\_\_\_\_\_\_\_

El Niño

* \_\_\_\_\_\_\_\_\_\_\_\_\_ is the name given to the periodic \_\_\_\_\_\_\_\_\_\_ of the \_\_\_\_\_\_\_\_ that occurs in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* At irregular intervals of \_\_\_\_\_\_\_ years, these warm countercurrents become unusually strong and replace normally \_\_\_\_\_\_ offshore waters with \_\_\_\_\_\_ equatorial waters
* A major El Niño episode can cause \_\_\_\_\_\_\_\_\_weather in many parts of the world

La Niña

* Research have come to recognize that when surface temperatures in the \_\_\_\_\_\_\_\_\_\_ Pacific are \_\_\_\_\_\_\_\_\_\_\_ than average, a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ event is triggered that has a distinctive set of weather patterns