

REGENTS WEATHER REVIEW

Vocabulary:

air mass air pressure gradient anemometer barometric pressure atmospheric transparency barometer cold front cyclone dew point front humidity	isobar jet stream monsoon occluded front planetary wind belt psychrometer relative humidity stationary front warm front water vapor
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REVIEW REFERENCE TABLE PAGES 12-14.

Central concepts:

Weather: present atmospheric conditions

Climate: weather conditions of an area over a long period of time: includes averages and extremes

Atmosphere warms by:

- reradiated heat from Earth surfaces (long wave, infrared radiation)
- absorption of insolation by aerosols and gases
- Earth surfaces in touch with atmosphere transfer heat by conduction
- condensation/sublimation of water vapor releases heat into the atmosphere
- heat from friction of Earth's surfaces against atmosphere as Earth rotates

Convection transfers heat within the atmosphere.

All weather occurs in the troposphere.

As air density increases, air pressure increases (more molecules to press on surfaces).

As air temperature increases, air density decreases, causing air to rise and exert less pressure on Earth surfaces.

As air temperature decreases, air density increases, causing it to sink and exert more pressure on Earth surfaces.

Adding water vapor to air decreases density, because a smaller molecule (water vapor) displaces larger molecules (oxygen, nitrogen).

Wind is created by differences in air pressure. Winds blow from areas of higher pressure to areas of lower pressure.

Wind speed depends on gradient. Greater change in pressure over distance creates faster winds. This is indicated by how close the isobars are on a weather map. Closer isobars = faster winds, higher gradient.

Wind direction: wind is named by where it's coming from, not where it's going to. A wind blowing from the north to the south is a north wind.

Planetary winds and pressure belts (reference table): planetary winds blow from high pressure areas to low and are deflected by the Coriolis effect. The reference table shows planetary winds during the **Equinoxes** (direct rays at Equator).

Surface ocean currents are affected by planetary winds that push on the water's surface, transferring kinetic energy to the water. They are affected by land masses, which can block currents, and by Coriolis.

Water vapor enters the atmosphere by evaporation. Evaporation increases with increased temperature, increased surface area, increased wind speed (which pushes less saturated air into an area). Evaporation decreases with an increase in saturation.

Relative humidity: the amount of water vapor in the air compared to the amount of water vapor air can hold at a specific temperature. Expressed as a percent.

As temperature decreases, relative humidity increases. Inverse relationship.

Dew point: the temperature at which air is saturated (100% relative humidity)

RH and DP are measured using a sling psychrometer.

As dew point and air temperatures get closer together, relative humidity increases.

As air warms, relative humidity decreases, because warmer air can hold more water vapor than cooler air.

Cloud formation: air rises, expands due to decreasing air pressure, and cools adiabatically. When air temperature cools past dew point, water vapor condenses on dust particles, ice crystals, aerosols (condensation nuclei) and releases 2260 joules of heat energy.

Air masses: mP, mT, cT, cP. m = maritime; c = continental; T = tropic, P = polar. Air masses classified by their temperature and moisture content. Continental = dry; maritime = moist. Polar = cooler, tropic = warmer.

Where two different air masses meet on the ground is a **FRONT**. Fronts are named by the moving air mass: cooler air mass moving = cold front.

Cold front = cooler, more dense air, moves under warmer, less dense air.
Warm front: warmer air moves up and over cooler air.

At all fronts, pressure decreases because air is rising.

Fronts: cold, warm, stationary, occluded.

Precipitation:--

Cold front: brief, heavy, scattered, all along both sides of the front; warm front: long duration, lighter precipitation, occurring ahead of warm front. Occluded = weather like cold front; stationary = weather like a warm front

Pressure systems: low pressure (cyclone) = winds blow inward and counterclockwise; high pressure system (anticyclone)= winds blow outward and clockwise. Low pressure systems bring unpleasant weather (air rises, creates clouds); high pressure systems bring clear skies (air sinks, no clouds can form).

Track of air masses, fronts, storms: in US, from southwest to northeast.

Hurricanes: danger = flooding, strong winds. Evacuate to a safer area; have emergency supplies on hand: medicine, food, flashlights, water, etc.

Tornado: danger = damage from flying debris. Seek shelter in a strong building in the strongest room at the lowest level.