

Weather Systems Vocabulary

General Weather Terms:

weather	state of the atmosphere at a given time and place with respect to wind, temperature, cloudiness, moisture, and pressure; daily or hourly conditions
climate	weather over a long period of time (10 years, 50 years, 100 years, etc.)
climate zones	divisions of the Earth's climates into general zones according to average temperatures and average rainfall. The three major climate zones on the Earth are the polar, temperate, and tropical zones .
meteorologist	scientist who studies weather
Sun	the driving force of weather
temperature	degrees warm or cold; influenced by cloud cover
Humidity	the amount of water vapor in the air.
data	information (plural; singular = datum)
hemisphere	half of a sphere; the Earth has four hemispheres: northern, southern, eastern, western
equator	Imaginary, horizontal line around the middle of the Earth
latitude	the distance north or south of the Equator
longitude	the distance west or east of the Prime Meridian
angle of incidence or Angle of Insolation	angle the sunlight hits the Earth (more intensity = warmer)
direct sunlight	Sun rays that strike the Earth in a straight line (most direct, intense rays = Equator)
indirect sunlight	Sun rays that strike the Earth at an angle
Earth's axis	Imaginary, vertical line through the middle of the Earth; Earth rotates around it; Earth is tilted on its axis at $\approx 23.5^\circ$.
rotation	spin; the Earth rotates counter-clockwise on its axis (1 rotation \approx 1 day) Earth's rotation causes night and day
revolution	orbit; the Earth revolves counter-clockwise around the Sun in an elliptical orbit (1 revolution \approx 365.25 days \approx 1 year)
Orbit	Earth's path around the sun
tilt of the Earth	The Tilt of the Earth's Axis causes different seasons
sea level	where the ocean meets the land; zero elevation
elevation	the height of a place above sea level (Mount Everest has an elevation of 29,029 feet).
altitude	the vertical elevation of an object; the distance above sea level or above Earth's surface (The airplane was flying at an altitude of 30,000 feet).

Weather Instruments/Tools:

thermometer	instrument used to measure temperature (in degrees Fahrenheit or Celsius)
anemometer	instrument used to measure wind speed (in miles per hour or mph)
wind vane	instrument used to measure wind direction
rain gauge	instrument used to measure amount of rain over a specific period of time
barometer	instrument used to measure air pressure
Hygrometer	Instrument used to measure humidity

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Water Cycle:

water cycle	the change and movement of the Earth's water from liquid to vapor to solid and back again; the water cycle is powered by the sun
precipitation	form of water that falls from the cloud to the Earth; a Water Cycle Process
run-off	when excess water that the ground cannot absorb travels over the soil surface to the nearest stream or channel; a Water Cycle Process
infiltration	The process by which water on the ground surface enters the soil
groundwater	water that infiltrates, collects, and exists for long periods of time below the Earth's surface
collection	when precipitation accumulates in a body of water, in the ground, or as runoff to a body of water; a water cycle process
evaporation	occurs when the sun heats water up and it becomes vapor in the air; a Water Cycle Process
transpiration	when water is discharged as vapor into the atmosphere as a result of evaporation from the soil, plants, and animals (sweating or exhaling moisture into the atmosphere); a Water Cycle Process
water vapor	water in a gas state
condensation	occurs when water vapor cools and collects into liquid form; this occurs on the side of a cold glass and in the air when clouds form; a Water Cycle Process

Wind:

wind	horizontally moving air; caused by uneven heating of the Earth's surface, which creates warm and cool air masses, resulting in differences in air pressure from place to place; moves from high pressure area to low pressure area, like when deflating a balloon;
wind speed	changes as air pressure changes
wind direction	reported by the direction from which wind originates; prevailing westerly winds blow from the west to the east
local wind	moves across small distances close to Earth's surface; unpredictable; changes frequently with air pressure fluctuation (examples include: sea breeze, land breeze, Chinook, Santa Ana, etc.)
global wind	moves great distances over the globe; predictable and stable; also called atmospheric circulations (examples include: Polar Easterlies, Prevailing Westerlies, and Trade Winds)
Trade Winds	winds that occur between 30° N and 30° S; blow from east to west; blow continuously toward the Equator; global winds
Prevailing Westerlies	winds that occur between 30° and 60° in both hemispheres; blow from west to the east; blow towards the poles; global winds
Polar Easterlies	winds that occur between 60° and 90° in both hemispheres; blow from east to west; blow away from the poles; global winds
sea breeze	a convection current where air flows from sea to land during the daytime; a local wind (land heats up and cools down faster than water; see convection current)
land breeze	a convection current where air flows from land to sea during the nighttime; a local wind (land heats up and cools down faster than water; see convection current)
windward	side of the mountain facing the wind; evaporating (heated) air is pushed up by the mountain, it cools, condenses, and precipitates frequently; vegetation is dense; sometimes called wayward
leeward	side of the mountain not facing the wind; cooled air sinks; air is dry because it has already condensed and precipitated on the windward side; vegetation is sparse; deserts are found on the leeward side of mountains

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Clouds/Precipitation:

cloud	a large collection of tiny water droplets or ice crystals in the atmosphere; classified by shape and altitude; formation depends on air mass movement; usually form at frontal boundaries and in low pressure areas
cloud cover	fraction of the sky covered by clouds; cloudy, partly cloudy, partly Sunny
hurricane	a violent, tropical, whirling, low pressure system, having wind speeds of or in excess of 72 miles per hour
Stratus Clouds	low level clouds (up to 6,500 feet); means "to spread out" looks like layers or blankets that cover the sky; result in overcast weather and sometimes produce precipitation; fog is a stratus cloud at ground level
Cirrus Clouds	Thin, wispy clouds blown by high winds into long streamers. They are considered "high clouds" forming above 6000 m (20,000 ft). They usually move across the sky from west to east. They generally mean fair to pleasant weather.
Cumulus Clouds	These are puffy clouds that sometimes look like pieces of floating cotton. The base of each cloud is often flat lower to the ground. The top of the cloud has rounded towers.
Cumulonimbus Clouds	Thunderstorm clouds – Precipitating Cumulus clouds
Nimbus Clouds	A Rain Cloud (Nimbo=precipitating cloud)
Nimbostratus Clouds	Precipitating Stratus Clouds; low gray rain clouds (Nimbus + Stratus=rain plus low clouds)

Fronts/Air Pressure/Air Masses:

Air (Barometric) pressure	the weight of the air above the surface of the Earth, applies pressure on objects; high barometric pressure brings clear skies; low barometric pressure brings lots of clouds and precipitation; "When pressure is high, the rivers are dry. When pressure is low, the rivers will flow."
density	the measure of how tightly packed the matter in an object is (hot air = less dense, cool air = more dense)
atmosphere	A layer of gases surrounding a planet. The Earth's atmosphere is divided into five layers: exosphere, thermosphere, mesosphere, stratosphere, and troposphere.
troposphere	layer of the atmosphere ~0-11 miles up; we live here; almost all of weather occurs here
air mass	A large region of the atmosphere where the air has similar properties throughout, such as temperature, humidity, and air pressure.
High pressure system	A whirling mass of cool, dry air. Because cool air is heavy and denser than warm air, it sinks. High pressure brings fair weather, sunny skies, light winds, and stable weather. High pressure systems rotate clockwise.
Low pressure system	A whirling mass of warm, moist air. Because warm is lighter and less dense than cool air, it rises, and then cooler air flows in underneath. Low pressure systems bring storms, strong winds, and changing, unstable weather. Low pressure systems rotate counter-clockwise.
front	A boundary between two air masses, resulting in stormy weather. A front is usually a line of separation between warm and cold air masses.
cold front	A boundary between two air masses (one cold and the other warm) moving so that the colder air replaces the warmer air.
warm front	A boundary between two air masses (one cold and the other warm) moving so that the warmer air replaces the colder air.
stationary front	A boundary between two air masses that more or less doesn't move, but some stationary fronts can wobble back and forth for several hundred miles a day.

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Gulf Stream/Jet Stream/Currents

jet stream	Gas Convection current in the upper atmosphere, located above North America; has powerful influence over weather conditions; flows from west to east; meandering - changes location depending on global conditions
Gulf Stream	The Gulf stream is a warm water convection current in the Atlantic ocean that moves from the south of Florida up the eastern seaboard and then across the Atlantic. The Gulf stream moderates weather along the eastern seaboard, warming the air and land there during cooler months; it influences weather in the Southeast, including North Carolina. Cities along the coast, such as Wilmington, NC, and Kitty Hawk, NC, will generally be a few degrees warmer in winter when compared to inland cities such as Raleigh, NC, and Greensboro, NC
Convection Current	A continual cycle of heat rising, cooling, sinking, and replacing rising heat. (examples by liquids: gulf stream, El Nino/La Nina) (examples by gases: jet stream, sea breeze, land breeze Land and water heat the air above through convection currents. Because land and water absorb and release (transfer) heat at different rates , the air temperature above land and water varies at all times. Therefore, geographical areas closer to bodies of water remain slightly warmer in the winter and cooler in the summer--because the air above the water takes longer to cool down in the winter and heat up in the summer than the air above the land.
Land Breeze	A gas Convection Current where air flows from LAND to SEA during the nighttime; (land heats up and cools down faster than water so wind blows from land to sea) LAND WILL BE COOLER THAN WATER AT NIGHT
Sea Breeze	A gas Convection Current where air flows from SEA to LAND during the daytime; (land heats up and cools down faster than water so wind blows from sea to land) LAND WILL BE WARMER THAN WATER DURING DAY
El Nino/La Nina	Liquid Convection Currents that affect weather in the United States
Ocean Currents	Currents are movements of ocean water in a continuous flow, created largely by surface winds (and also partly by temperature, salinity in the water, gravity, and the Earth's rotation) Weather patterns are driven largely by Ocean Currents. Ocean currents act much like a conveyer belt, transporting warm water and precipitation from the equator toward the poles and cold water from the poles back to the tropics. Thus, currents regulate global climate. Without currents, regional temperatures would be more extreme—super hot at the equator and frigid toward the poles—and much less of Earth's land would be habitable.

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Heat Transfer (Conduction, Convection, Radiation):

heat	energy that exists in matter
Temperature	Measurement of heat; high temperature indicates more thermal energy
radiation	transfer of thermal energy (heat) by electromagnetic waves through places with or without matter (examples: light bulb, campfire, fireplace, microwave, Sunlight traveling through space)
convection	transfer of thermal energy (heat) by liquids or gases (examples by liquids: hotter at surface of a swimming pool, cup of soup, or boiling water on stove) (examples by gases: hot air balloon, lower floors being cooler than top floors in a building) WARM AIR RISES
convection current	a continual cycle of heat rising, cooling, sinking, and replacing rising heat. (examples by liquids: gulf stream, El Nino/La Nina) (examples by gases: jet stream, sea breeze, land breeze)
conduction	transfer of thermal energy (heat) between things that are touching (examples of conduction: touching the handle of a hot metal pot, electrical circuit, ice in water) (examples of insulation: rubber surrounding electrical wires, insulation inside walls)
conductor	any object that allows heat (energy) to pass through easily; heats and cools quickly
insulator	any object that is difficult for heat (energy) to pass through; heats and cools slowly
potential energy	stored energy; energy of position
kinetic energy	energy of motion; moving energy
thermal energy	the total potential and kinetic energy of the particles in an object; (more kinetic energy of particles = more heat, less kinetic energy of particles = less heat)