

Weather Vocabulary

(Conceptual)

Terms	Definitions
General	
meteorologist	scientist who studies weather
weather forecast	a prediction of future atmospheric conditions
weather	state of the atmosphere at any given time and place with respect to wind, temperature, cloudiness, moisture, and pressure (daily or hourly conditions)
climate	the weather conditions of a certain place or season, averaged over years, decades, or centuries
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
sea level	the height or level of the sea surface at any given time
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).
air mass	a large region of the atmosphere where the air has similar properties throughout, such as temperature, humidity, and air pressure.
weather system	all the parts of weather
weather map	a picture of part of the Earth that uses symbols to show weather data, conditions, and systems
Weather Data	
temperature	degrees warm or cold; influenced by cloud cover
wind	horizontally moving air
wind speed	the rate of the motion of the air on a unit of time
wind direction	the direction from which the wind is blowing
air pressure	the weight of air pressing down on earth
humidity	the amount of water vapor in the air
precipitation	form of water that falls from a cloud to the Earth; a water cycle process; rain, sleet, hail, snow
rain	liquid precipitation in the form of water drops that falls from clouds
sleet	Solid precipitation in the form of ice pellets form when raindrops, originating in warmer air aloft, freeze as they fall through subfreezing air near the surface of the Earth.
snow	Precipitation that is composed of white ice crystals falling from clouds. Snow may stick together to form snowflakes, which have a hexagonal or six-sided shape.
hail	Precipitation in the form of balls or irregular lumps of ice
Weather Instruments	
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 (points into the wind)
rain gauge	instrument used to measure amount of rain over a specific period of time (recorded in hundredths of inches, or 0.01")
hygrometer	instrument used to measure humidity
barometer	instrument used to measure air pressure
Earth-Sun Relationship	
Sun	a star ~93,000,000 miles away from the Earth; the center of our Solar System; the driving force of weather; nothing lives without the Sun
rotation	spin; the Earth rotates counter-clockwise on its axis (1 rotation ≈ 23 hours, 56 minutes ≈ 1 day)
revolution	orbit; the Earth revolves counter-clockwise around the Sun in an elliptical (oval) orbit (1 revolution ≈ 365.25 days ≈ 1 year)
latitude	the distance north or south of the Equator
longitude	the distance west or east of the Prime Meridian
angle of insolation	angle the sunlight hits the Earth (more intensity = warmer); also called angle of incidence
direct energy	Sun rays that strike the Earth in a straight line (most direct, intense rays = Equator)

indirect energy	Sun rays that strike the Earth at an angle (most indirect, least intense rays = north & south pole)
Earth's axis	imaginary, vertical line through the middle of the Earth; Earth rotates around it
Earth's tilt	Earth is tilted on its axis at $\approx 23.5^\circ$. Earth's tilt is the reason for the seasons.
Coriolis effect	A force that deflects moving objects to one side because of the Earth's rotation. The object is still going straight but the Earth moves underneath it, making it look like it is moving to one side. In the Northern Hemisphere, the Coriolis Effect deflects objects to the right. In the Southern hemisphere, the Coriolis Effect deflects objects to the left.

Water Cycle

evaporation	changing from liquid to water vapor; a water cycle process
condensation	changing from water vapor becomes liquid; a water cycle process
precipitation	form of water that falls from a cloud to the Earth; a water cycle process; rain, sleet, hail, snow
collection	when precipitation accumulates in a body of water, in the ground, or as runoff to a body of water; a water cycle process
runoff	excess water that the ground cannot absorb; a water cycle process
transpiration	plants give off water through stomata in leaves; water evaporating from plant leaves; a water cycle process

Clouds

cloud	A visible collection of tiny water droplets or, at colder temperatures, ice crystals floating in the air above the surface. Clouds are classified by their different shapes and altitudes. Clouds can form at ground level, which is fog, at great heights in the atmosphere, and everywhere in between. Clouds offer important clues to understanding and forecasting the weather.
stratus	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
nimbostratus	blanket-like cloud that produces rain and snow;
cumulus	middle level clouds (6,500-18,000 feet); means "heap" or "pile;" look puffy, like cotton; grow vertically from a flat base to rounded towers; results in fair weather
cumulonimbus	tall cumulus clouds (grow vertically up to 50,000 feet tall); look like an anvil; results in heavy precipitation, especially thunderstorms; nimbus = rain
cirrus	high level clouds; (above 18,000 feet); means "curl of hair;" look thin and wispy, like feathers; composed of ice crystals (high altitude = cold temperatures)
nimbus	a rain cloud; may be used as a prefix or suffix for rain clouds, such as cumulonimbus

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
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)
gust	a brief sudden increase in wind speed
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 wind	a wind that usually blows from one direction (west to east, for example)
prevailing westerlies	winds that occur between 30° and 60° in both hemispheres; blow from west to the east; blow towards the poles; global winds
prevailing easterlies	winds that occur between 60° and 90° in both hemispheres; blow from east to west; blow away from the poles; global winds
wind chill	It's the 'feels like' temperature on a cold day when you factor in the winds.
jet stream	A strong wind found 6-9 miles up in the troposphere. A jet stream can reach speeds of ~ 50 -200 mph. Jet streams steer the movement of surface air masses and weather systems. Above North America, the jet stream moves weather from west to east. It can change locations depending on global conditions.
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 <i>convection current</i>)
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 <i>convection current</i>)
Air Pressure	
air (barometric) pressure	The weight of air pressing down on earth. Air pressure can change from place to place, and this causes air to move, flowing from areas of high pressure toward areas of low pressure. It's the same as barometric pressure.
density	the measure of how tightly packed the matter in an object is (hot air & low pressure = less dense, cool air & high pressure = more dense)
H igh 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.
L ow pressure system	A whirling mass of warm, moist air. Because warm air 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.
Fronts	
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.
occluded front	A combination of two fronts that form when a cold front overtakes a warm front
Rain Shadow Effect	
rain shadow	lack of precipitation on the leeward side of the mountain
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
Thermal Energy	
kinetic energy	moving energy; motion (hot air mass has fast moving molecules and much kinetic energy)
potential energy	stored energy; energy of position (heavy water droplets in a cloud have the potential to fall)
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)
radiation	transfer of thermal energy by electromagnetic waves through places with or without matter (examples: light bulb, campfire, fireplace, microwave, Sunlight traveling through space)
convection	transfer of thermal energy by liquids or gases (examples by liquids: hot at surface of a swimming pool, cup of soup, boiling water on stove) (examples by gases: hot air balloon, lower floors being cooler than top floors in a building)
convection current	a continual cycle of heat rising, cooling, sinking, and moving to replace 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 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	matter through which energy flows easily (A metal pot was a good conductor of heat).
insulator	matter through which energy does not flow easily (The cooking mitt insulated her hand).
equilibrium (heat)	the balance between heat loss and heat gain (The hot bathwater cooled to room temperature).
greenhouse effect	the heating effect of the Earth's atmosphere; The atmosphere acts like a greenhouse because sunlight freely passes through it and warms the surface, but the Earth's re-radiated heat is slowed in its escape from the planet back into space.
Ocean Currents	
current	a horizontal movement of water, such as the Gulf Stream off the east coast of North America, or air, such as the jet stream

Gulf Stream	a warm swift current in the Atlantic Ocean that flows from the Gulf of Mexico along the eastern coast of the United States and then northeast toward Europe.
North Equatorial current	ocean current near the Equator that flows east-to-west in the northern hemisphere
South Equatorial Current	ocean current near the Equator that flows east-to-west in the southern hemisphere
Humboldt Current	ocean current that flows northward along the western coast of South America; brings cool water north to the Equator; also known as the Peru Current; the presence or lack of this current is a vital part of the El Nino pattern.
El Nino	The unusual warming of the surface waters of the eastern tropical Pacific Ocean. It causes changes in wind patterns that have major effects on weather all across the globe.
La Nina	A widespread cooling of the surface waters of the eastern tropical Pacific Ocean. It's the opposite of El Niño.

Severe Weather

drought	A period when a region has a lack of rainfall. Droughts can affect a fairly small area for a season or an entire continent for years. Too little rainfall can cause shortages in the water supply, destroy crops, and cause widespread hunger. Droughts also dry up soil, which then gets picked up by the wind and causes dust storms.
thunderstorm	A storm produced by cumulonimbus clouds, and it always has thunder and lightning. Rain, hail, and high winds may or may not occur
flood	It results from days of heavy rain, melting snows, or when rivers rise and go over their banks. The ground is saturated and can absorb no more precipitation.
flash flood	sudden flooding (that occurs without warning) after intense rains or overflowing bodies of water. In canyons and valleys, floodwaters flow faster than on flatter ground and can be quite destructive.
tsunami	A Japanese term for an unusually large ocean wave caused by undersea earthquake, landslide, or volcanic eruption. Only a few inches high in the open ocean, tsunamis steepen and rise in shallow water and can reach heights of 200 feet.
hurricane	Intense storms with swirling winds up to 150 miles per hour. They are ~300 miles across, and are ~1,000-5,000 times larger than tornadoes. Hurricanes are known by different names around the world. In Japan they are Typhoons, while Australians call them Willy-Willys. Hurricanes that affect NC form from winds off the West coast of Africa, and over warm, tropical waters, during the Hurricane Season of June-November. They are measured on the Saffir-Simpson Scale.
tornado	It begins as a funnel cloud with spinning columns of air that drop down from a severe thunderstorm. When they reach the ground they become tornadoes. Tornadoes are between 300 and 2,000 feet wide and travel at speeds of 20 to 45 miles per hour. They usually only last a few minutes, but their spinning winds, up to 300 miles per hour, can lift houses into the air and rip trees from the ground. Since 2007, tornadoes are measured on the Enhanced Fujita (EF) Scale.
tornado alley	The portion of the United States where tornadoes occur most frequently. Tornado alley is between the Plains area, from the Rocky Mountains to the Appalachian Mountains.
advisory	A forecast issued by the National Weather Service: conditions that require caution, but are not thought to be immediately life threatening; example: frost advisory
watch	A forecast issued by the National Weather Service: conditions are favorable for a specific type of weather to occur; example: thunderstorm watch
warning	A forecast issued by the National Weather Service: a specific type of weather is occurring right now; example: thunderstorm warning
freezing point	(at sea level) 32° F or 0° C; water changes from liquid to solid; salt slows the freezing process
boiling point	(at sea level) 212° F or 100° C; water changes from liquid to gas

Weather Map

isotherm	a line connecting equal points of temperature; the closer spaced each isotherm, the greater difference in temperature between two areas; similar to contour lines on a topographic map: the closer each contour line, the steeper the slope
isobar	a line connecting equal points of pressure; the closer spaced each isobar, the greater difference in pressure between two areas, the stronger wind speed; similar to contour lines on a topographic map: the closer each contour line, the steeper the slope