

SC 4.6 Weather Study Guide

ESSENTIAL VOCABULARY

weather	conditions	phenomena	temperature
pressure	wind speed	humidity	meteorology
cold front	warm front	moisture	precipitation
sleet	hail	humidity	water vapor
thermometer	barometer	anemometer	rain gauge
high pressure	low pressure	thunderstorm	hurricane
tornado	cirrus clouds	cumulus clouds	stratus clouds

Weather consists of all the conditions surrounding Earth. Weather can be described by measuring several factors:

- **Air Temperature:** amount of heat in the atmosphere
- **Air Pressure:** the force of air pushing on an area of Earth; air pressure is affected by the temperature of the air
- **Wind Speed:** movement of air over Earth's surface
- **Precipitation:** forms of moisture that fall to Earth's surface, such as rain, snow, sleet, and hail
- **Humidity:** amount of water vapor in the air

Meteorologists (scientists who study the weather) use different instruments to measure current conditions. These tools help meteorologists gather the data they need to predict weather patterns.

- A thermometer measures the temperature of the air
- A barometer measures air pressure
- An anemometer measures wind speed



- A rain gauge measures precipitation



- A weather vane or wind vane measures wind direction.



- A hygrometer measures the amount of humidity in the air.



As the sun's energy strikes Earth, differences in temperature, humidity, and pressure are created. The unequal heating of air results in air masses with different densities, or thickness.

The boundary between air masses of different temperature and humidity is called a front.

A cold front is a mass of cold air that pushes underneath a warm mass; a warm front is a mass of warm air that pushes over a cold mass.

Storms occur along fronts, due to differences in air masses.

Thunderstorms occur when warm air rises and cools rapidly, often along a cold front. The water vapor in the rising air condenses into huge, dark, clouds called "thunderheads."

Hurricanes bring high winds and heavy rain. They form in warm, moist air masses, above warm ocean waters.

Tornadoes are sometimes called "twisters." They are columns of dark, spinning, twisting air that begins when air masses with big temperature differences meet.

Clouds can indicate weather conditions:

- **Cirrus:** feathery and fibrous clouds. They are associated with fair weather. Cirrus clouds often indicate that rain or snow will fall within several hours.



- **Cumulus:** white and fluffy with flat bottoms. They are usually indicators of fair weather.



- **Cumulonimbus:** when cumulus clouds get larger and darker at the bottom, they are called cumulonimbus clouds (thunderheads) and produce thunderstorms.



- **Stratus:** smooth, gray clouds that cover the whole sky (block out direct sunlight). Light rain and drizzle are usually associated with stratus clouds.



Q: How do clouds form?

Clouds form when air is cooled below its condensation temperature (dew point). The water vapor in the air condenses around tiny dust or salt particles suspended in the air, forming liquid water droplets, or if the temperature is cold enough, ice crystals. The key to forming clouds is to get air moving upwards. When air moves upwards, it expands and cools, and if the air is lifted high enough, it will cool to its dew point and form clouds.