

# Weather Facts

## Air Pressure

Air pressure is the force exerted on you by the weight of tiny particles of air. These air molecules are invisible, but they still have weight and take up space. Changes in temperature affect how many molecules are packed into the atmosphere.

Warm weather brings **low-pressure systems**:

Warm air expands so there are fewer air molecules in the atmosphere. Low-pressure systems usually bring cloudy and rainy days.

How low-pressure systems create **clouds and rain**:

- In the Northern Hemisphere, a low-pressure system forces winds to spiral counterclockwise. Air is forced toward the center of this spiral and has nowhere to go but up.
- As the air rises, it cools (because the atmosphere gets colder as altitude increases).
- Cold air can't hold as much water vapor as warm air, so the water condenses or comes together, to form clouds.
- When the water droplets join together and get too heavy, they may fall as rain or snow (which meteorologists call "precipitation").

Cool weather brings **high-pressure systems**:

Cooler air contracts, which means air molecules become smaller and take up less space (so more of them can be packed into the atmosphere). High-pressure systems usually bring sunny days.

How high-pressure systems create **clear skies**:

- In the Northern Hemisphere, high-pressure system winds spiral clockwise, moving from the center outward.
- To replace the air that flows out of the storm's center, more air is sucked down from up higher in the atmosphere.
- This air warms up as it is pulled down. The warm air expands, and any clouds or precipitation that had formed disappear.

Meteorologists measure air pressure with a **barometer**.

## Temperature

The sun is the big force affecting how hot or cold it is, but other factors also impact overall temperature:

- Clouds

When clouds are present, they reflect away much of the sun's energy, keeping the temperature cooler. When there are no clouds, the sun's heat is able to come through and heat the earth. This produces warmer temperatures.

- Land and Water

Land warms and cools faster than oceans or lakes (it takes five times more heat to warm one gram of water compared one gram of soil). So in the summer, daytime temperatures near the ocean are cooler than temperatures inland. At nighttime, because the ocean's temperature doesn't change very quickly, coastal temperatures are warmer.

Temperature is measured with a **thermometer**.

## Winds

Wind is, basically, the movement of air from one part of the atmosphere to another. These are important things to keep in mind about the moving winds:

- High to Low

The wind moves because there are differences in air pressure between two points and the wind works to balance the pressures. High-pressure areas have more air than low-pressure areas, so the winds blow from high-pressure to low-pressure to equalize the amount of air.

- Predicting Weather

Winds tend to carry weather with them. So by looking at what the weather is like in the area where the wind is blowing from, you can get an idea of what the weather will be like in the area the winds are traveling to.

- Jet Streams

How the wind is blowing at the earth's surface is often different than the how it is blowing in the upper levels in the atmosphere. These upper-level winds are called "jet streams." Jet streams usually move weather systems around. In the U.S., they blow most weather systems from west to east.



Wind speed is measured with an **anemometer**. Wind direction is measured with a **wind vane**.

## **Humidity**

Ever hear someone say, “It’s not the heat; it’s the humidity”? They’re referring to the amount of moisture, or invisible water vapor, in the air. Humidity is important for making weather predictions since all clouds, and the rain and snow they bring, come from water vapor. Some important facts to remember:

- **Relative Humidity**

Meteorologists usually define moisture in terms of “relative humidity.” Relative humidity is the percentage of water vapor in the air relative to the maximum amount that could be present (before the vapor turns into liquid water).

- **High Humidity**

When the air reaches 100 percent relative humidity, you have liquid water — which means it is raining or snowing. The warmer the air is, the more water vapor it is able to hold. It can actually rain or snow more from warm, moist air than from cold, moist air.

- **Low Humidity**

When no water vapor is present, the relative humidity is 0 percent. It never gets this low on Earth. Even in the planet’s deserts, the relative humidity is always at least 1 percent.