

D5. Atmospheric Pressure, Temperature, and Weather Data











Understanding Atmospheric Pressure, Temperature, & Weather Data

Pressure & Temperature

Our Earth's atmosphere is a dynamic and complex system, constantly changing and affecting our weather and climate. Two fundamental properties of the atmosphere, pressure, and temperature, play crucial roles in shaping our weather patterns and can be measured to provide valuable insights into atmospheric conditions.

What does each weather instrument measure?

• Drag each picture into the correct column, and some may have more than one picture!

Measures Temperature	Measures Wind Speed or Direction	Measures Air Pressure	Measures Humidity	Measures Precipitation
 Thermometer	 Wind Vane			 Rain Gauge
 Digital Thermometer	 Hygrometer	 Psychrometer		
	 Thermometer	 Anemometer	 Barometer	 Hygrometer

Air Exerts Pressure

Air is made up of countless tiny particles, including molecules of nitrogen, oxygen, and other gases. These particles exert a force on the surfaces they come into contact with, creating what we call atmospheric pressure. Atmospheric pressure varies with altitude and weather conditions. For instance, atmospheric pressure is higher at sea level and lower at higher altitudes. Changes in pressure can indicate approaching weather systems or changing weather conditions.

Moisture in Air -> Humidity

The amount of moisture or water vapor present in the air is known as humidity. Humidity levels can vary greatly from one location to another and from one time of day to another. High humidity levels make the air feel muggy and can contribute to discomfort during hot weather. Low humidity levels can make the air feel dry and can lead to issues like skin dryness and dehydration.

Temperature Decreases as Altitude Increases:

Temperature is another critical component of our atmosphere. It measures how hot or cold the air is. As you ascend in altitude, such as climbing a mountain, the temperature generally decreases. This temperature variation with altitude is responsible for the various layers of the atmosphere, each with its distinct characteristics.

Weather Data

To understand and predict weather patterns, meteorologists gather various types of data. Here are some key elements of weather data:

Barometric Pressure

Barometric pressure, often referred to as atmospheric pressure, is the measure of the weight of the air above a specific location. High-pressure systems typically bring clear skies and fair weather, while low-pressure systems are associated with cloudy skies, precipitation, and sometimes storms.

Temperature

Temperature measurements help us understand how hot or cold the air is at a specific location and time. Monitoring temperature changes over time is essential for weather forecasting.

Wind Speed & Direction

Wind speed and direction provide valuable information about air movement. Wind patterns can help predict weather changes and are critical for understanding atmospheric circulation.

Humidity

Humidity levels in the air can influence weather conditions. High humidity often leads to the formation of clouds and precipitation, while low humidity can result in dry and clear conditions.

Dew Point

Dew point is the temperature at which air becomes saturated with moisture, leading to the formation of dew or frost. It is a crucial parameter for predicting the likelihood of fog, frost, or dew formation.

1. What causes atmospheric pressure?
 - a) The weight of the Earth's core
 - b) The weight of the air above a specific location
 - c) The rotation of the Earth
 - d) The presence of clouds
2. How does atmospheric pressure change with altitude?
 - a) It increases with altitude.
 - b) It remains constant at all altitudes.
 - c) It decreases with altitude.
 - d) It is unrelated to altitude.
3. What is the term for the amount of moisture or water vapor present in the air?
 - a) Temperature
 - b) Air pressure
 - c) Humidity
 - d) Wind speed
4. What does a rain gauge measure?
 - a) Precipitation
 - b) Condensation
 - c) Temperature
 - d) Air pressure
5. What does high barometric pressure typically indicate for the weather?
 - a) Clear skies and fair weather
 - b) Stormy conditions
 - c) High winds
 - d) High humidity
6. Which weather parameter helps meteorologists understand air movement?
 - a) Temperature
 - b) Humidity
 - c) Wind speed and direction
 - d) Dew point

7. What is the dew point?
- a) The temperature at which air becomes saturated with moisture
 - b) The highest temperature recorded in a day
 - c) The temperature at which water boils
 - d) The temperature at which ice melts
8. What can low humidity levels in the air lead to?
- a) Cloud formation
 - b) Skin dryness
 - c) Rainfall
 - d) Strong winds
9. Which layer of the atmosphere is closest to the Earth's surface and contains most of our weather?
- a) Stratosphere
 - b) Troposphere
 - c) Mesosphere
 - d) Thermosphere
10. What does the presence of low-pressure systems often bring in terms of weather?
- a) Clear skies
 - b) Dry conditions
 - c) Stormy and cloudy weather
 - d) High humidity

ANSWERS & EXPLANATIONS

1. b) The weight of the air above a specific location
Atmospheric pressure is caused by the weight of the air above a specific location.
2. c) It decreases with altitude
Atmospheric pressure generally decreases with increasing altitude.
3. c) Humidity
The term for the amount of moisture or water vapor present in the air is humidity.
4. a) Precipitation
A rain gauge measures precipitation.
5. a) Clear skies and fair weather
High barometric pressure is typically associated with clear skies and fair weather.
6. c) Wind speed and direction
Wind speed and direction help meteorologists understand air movement.
7. a) The temperature at which air becomes saturated with moisture
Dew point is the temperature at which air becomes saturated with moisture, leading to dew or frost formation.
8. b) Skin dryness
Low humidity levels in the air can lead to issues like skin dryness.
9. b) Troposphere
The troposphere is closest to the Earth's surface and contains most of our weather.
10. c) Stormy and cloudy weather
Low-pressure systems are often associated with stormy and cloudy weather.