

Humidity, Dew Point, and Clouds

Humidity is the measure of the amount of water vapor in the air. Water vapor is the gaseous form of water. Hot air holds more water. As air heats up, the molecules spread apart. This creates more "room" in the air for the water vapor to fit into. Liquid water can evaporate and fill these spots. The more "full" the air is, the harder it is for the water to evaporate. You may have noticed this before. Have you ever been outside when it is humid out? Have you noticed how your sweat or wet clothing evaporates more slowly when it is humid?

Meteorologists, scientists that predict the weather, will often talk about **relative humidity**. Relative humidity is the percentage of water in the air compared to the maximum amount of water vapor the air can hold. I know that sounds confusing! Here is what that means: you take the amount of water vapor in the air and divide it by the total amount of water vapor that the air could hold. This gives you a percentage. When learning about relative humidity it is important that you understand that different temperatures allow the air to hold different amounts of water vapor. For example, warmer air can hold more water vapor than colder air. Each temperature of air has a maximum amount of water vapor it can hold. For example, let's pretend that a 1 m^3 cube of air that is 10 degrees Celcius can hold a maximum of 8 grams of water vapor. Let's pretend at this moment there are 4 g of water vapor in the air. To find the relative humidity, we would take the amount of water vapor (4 g) and divide it by the maximum amount it could hold (8 g). 4 divided by 8 is .5. That means the relative humidity is 50%. Relative humidity is measured with a **psychrometer**.

Clouds and Dew Point

How are clouds formed? Air has water vapor in it. As warm air rises, it cools. As the temperature drops, the air can hold less water vapor. As a result, the water vapor condenses and turns to liquid water. Now, the atmosphere has lots of little particles in it such as salt, dirt, and smoke. When water vapor condenses and turns to liquid water in the atmosphere, the liquid attaches itself to these particles of salt, dirt, and smoke. These particles are called **condensation nuclei**. Thus, a **cloud** is when water vapor becomes liquid water or ice crystals on condensation nuclei. Sometimes clouds form on the ground, these clouds we refer to as **fog**!

The temperature at which condensation occurs is called the **dew point**. Every temperature of air can hold a specific amount of water vapor. If the air becomes full, any extra water vapor condenses as liquid water. If the dew point is below freezing, the water vapor will deposit as ice. (Oh yeah...deposition, a gas to a solid!)

Cloud Types (Base Types)

Cumulus- piled up, these clouds look like fluffy cotton balls! These are fair (or nice) weather clouds

Stratus - these clouds look like flat layers

Cirrus - wispy, looks like mare's tails

Cloud Prefixes/Suffixes

Alto - tall/high

Nimbus - rainy/stormy

You can combine these base words and prefixes to name clouds. For example:

Cumulonimbus - a piled up rain cloud, these are anvil shaped and are thunderstorm clouds

Nimbostratus - layered rain clouds, these are the clouds on overcast days when the entire sky looks like a rain cloud

Windward and Leeward Sides of Mountains

All of these weather elements that we have read about so far in the weather unit create patterns of weather on our planet. For example, there are very specific weather patterns on each side of a mountain. The windward side of a mountain (the side that the wind comes FROM) typically has lots of storms and has lots of precipitation. The leeward side of a mountain (the side that the wind is blowing TOWARDS) often has dry air and can be a desert. Here's why....wind blows towards a mountain. As the air runs into the mountain, it is pushed up. As the air rises, it cools. As the air cools, the air reaches it's dew point and the water vapor condenses forming clouds and precipitation. As the wind continues to blow over the mountain and the clouds lose precipitation, the air becomes dryer. This creates dry, deserts. (If any of you have every read the book *Holes*, they totally reference this pattern!)

