

Humidity and Clouds

Humidity

- **Humidity** – a measure of the amount of water vapor in the air. Warm air can hold more water vapor than cold air.
- **Relative humidity** – the percentage of water vapor that is actually in the air compared to the maximum amount of water vapor the air can hold at a particular temperature.
- **Relative humidity is the most useful of the two measurements. This is what you see in the daily weather forecasts.**

Measuring Relative Humidity

Psychrometer – an instrument used to measure relative humidity. This instrument has two thermometers – a wet bulb and a dry bulb thermometer.



Determining Relative Humidity

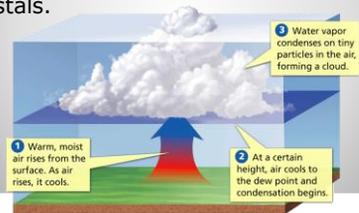
Dry-Bulb Reading (°C)	Difference Between Wet- and Dry-Bulb Readings (°C)				
	1	2	3	4	5
10	88	76	65	54	43
12	88	78	67	57	48
14	89	79	69	60	50
16	90	80	71	62	54
18	91	81	72	64	56
20	91	82	74	66	58
22	92	83	75	68	60

- Relative humidity is affected by temperature.
- First, find the dry-bulb temperature in the left column of the table. Then find the difference between the wet- and dry-bulb temperatures across the top of the table. The number in the table where these two readings intersect indicates the relative humidity in percent.



How Clouds Form

- Clouds form when warm, moist air rises and cools. Water vapor condenses on tiny particles to form liquid water or ice crystals.



Categorization

- Clouds can easily be broken into four categories. These categories are high clouds, middle clouds, low clouds and clouds with vertical growth.
- Clouds are also identified by shape. Cumulus refers to a "heap" of clouds. Stratus refers to clouds that cover a large area, like a blanket. And nimbus refers to the shape of "rain" because we all know what rain looks like

Prefixes & Suffix

Prefix	Meaning	Example
Alto-	Mid altitude	Altostratus
Cirro-	High altitude	Cirrostratus
Cumulo-	Heaped	Cumulonimbus
Nimbo-	Rain	Nimbostratus

Suffix	Meaning	Example
-nimbus	Rain	Cumulonimbus

Predicting Weather Using Clouds

<http://www.instructables.com/id/Predicting-Weather-with-Clouds/?ALLSTEPS>

High Clouds

- High clouds form at 16,000 - 43,000 feet. Basically, these are the clouds that you only encounter on the top of really high mountains or at the cruising altitude of a jet airplane. Due to the extreme conditions at which they form, they tend to be comprised primarily of ice crystals.
- High clouds do not block sunlight.

High clouds include:
Cirrus
Cirrostratus
Cirrocumulus



Cirrus

- Cirrus clouds are white wispy clouds that stretch across the sky. By all accounts, cirrus clouds indicate fair weather in the immediate future. However, they can also be an indication of a change in weather patterns within the next 24 hours (most likely a change of pressure fronts).

By watching their movement and the direction in which the streaks are pointed, you can get a sense of which direction the weather front is moving.



Cirrostratus

- Cirrostratus tend to be sheet-like and cover the whole sky. You can usually tend to see the sun or moon through them. Their presence usually indicates moist weather within the next 12 - 24 hours.



Cirrocumulus

- Cirrocumulus clouds tend to be large groupings of white streaks that are sometimes seemingly neatly aligned. In most climates these mean fair weather for the near future.

However, in the tropics, these clouds may indicate an approaching tropical storm or hurricane (depending on the season).



Middle Clouds

- Middle clouds form at 6,500 to 23,000 feet. They are comprised of water, and, if cold enough, ice.

Middle clouds often block sunlight, but not always.

Middle clouds consist of:
Altostratus
Alto cumulus

Altostratus

- Altostratus are grey and/or blue clouds that cover the whole sky. They tend to indicate a storm some time in the very near future since they usually precede inclement weather.



Alto cumulus

- Alto cumulus are grayish-white clouds blanketing the entire sky. They tend to look like large fluffy sheets in which there is a lot of contrast between light and dark. Sun does not pass through them. If you see them in the morning, prepare for a thunderstorm in the afternoon.



Low Clouds

- Low clouds form below 6,500 feet. These clouds are the ones that like to hang-around just above tall buildings. These clouds tend to contain water, but can also be comprised of snow if the weather gets cold enough.

Low clouds block sunlight and can bring precipitation and wind.

Low clouds include:
Stratus
Stratocumulus
Nimbostratus

- Stratus are low-lying solid clouds that are often formed when fog lifts off the ground. They obviously look like an elevated fog. Often they bring drizzle or light snow.



Stratus

- Stratocumulus are low-lying bumpy and grey clouds. They do not bring precipitation. They also do not cover the entire sky and tend to come in rows and patches.



Stratocumulus

- Nimbostratus is your standard rain cloud. It is a large flat sheet of grey cloud with a little bit of differentiation. If you see these, chances are it's raining outside.



Nimbostratus

Clouds That Can Grow!

- And last, but not least, are clouds with vertical growth which tend to have a base that hangs really low (5,000 feet) and a top that climbs really high (over 50,000 feet).

Clouds in this category include:
Cumulus
Cumulonimbus

- Cumulus clouds are your stereotypical white "cottonball" clouds. So long as the clouds remain low clumps floating across the sky, there will be fair weather. However, you need to keep an eye on these clouds because any vertical growth can indicate the start of a large storm.



Cumulus

Cumulonimbus

- Cumulonimbus are cumulus clouds that have grown vertically into an anvil-like shape. The anvil tends to point in the direction the storm is moving. These clouds bring most dangerous weather such as rain, lightning, hail and tornadoes.



Making Predictions



- First, determine if you can see the sun or moon through the clouds. If you can, then you are looking at high altitude clouds.
- If the clouds are thick, then there is a chance of poor weather a day or two in the future. To determine when the storm will arrive, observe whether or not the clouds appear to be moving. If they appear stationary, it is a slow moving front and probably won't arrive for over a day. If they appear to be moving, then the change in weather will be there faster. You can tell which way the storm is traveling by the direction the clouds are pointing.

Making Predictions



- If you can not see through the clouds, chances are that you are looking at middle or low altitude clouds.
- First, determine which of the two you are dealing with by observing shape, color and other more obvious give-aways.
- Are they covering the entire sky? Then they may be middle altitude clouds.
- Do they appear to be grey with a blue tint or fluffy white/grey clouds with a lot of contrast between light and dark? If yes, then these are middle altitude clouds and you should prepare for rain within half a day.

Making Predictions



- If you answered no to any of those questions, then check for low-altitude clouds.
- These tend to appear low and often engulf mountains and buildings. If it looks like an elevated fog, expect drizzle (if it isn't already).
- If it is rows of low, dark, lumpy clouds, then the weather is otherwise okay, but watch for further developments.
- If there is a low, dark, grey sheet, then it's probably raining. If it's not, quickly go get your umbrella.

Making Predictions

- If your clouds are low, fluffy, and white like cottonballs in the sky, then the weather is okay.
- However, keep an eye on these for any vertical growth of the cloud upwards into the sky (turning into anvil shapes). These clouds can unexpectedly change from fair weather indicators into violent thunderstorms.



- Write an acrostic poem using TWO of the THREE main cloud types. All statements **MUST** relate back to that type of cloud.

- Example: An acrostic poem using the word "Sun."
 - S**ometimes when we go to the beach, I will get sun burn.
 - U**sually if I put Sunblock on my skin, I will not burn.
 - N**oon is when I'm really prone to burning.

Get Creative!

Video and activity

- [Clouds and Patterns of Weather](#) – united streaming - 21:16
- [Weather Things: Clouds - Disc. Ed](#)
- [Cloud reading activity and questions](#)