Wind

What is wind?

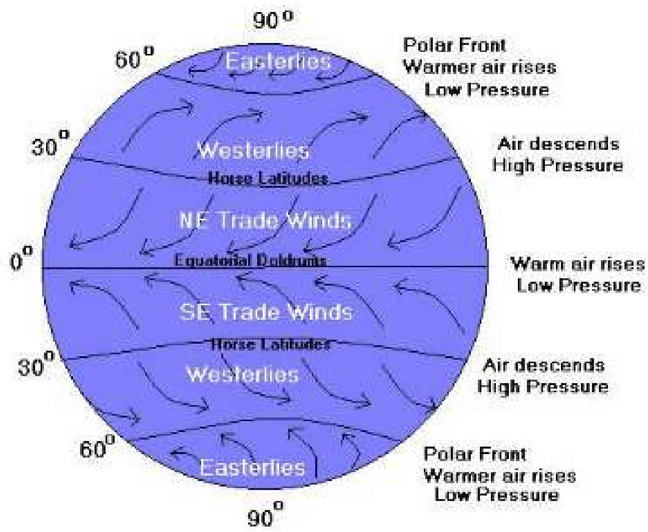
Wind is air in motion. It is produced by the uneven heating of the earth's surface by the sun. Since the earth's surface is made of various land and water formations, it absorbs the sun's radiation unevenly. Two factors are necessary to specify wind: speed and direction.

What causes the wind to blow?

As the sun warms the Earth's surface, the atmosphere warms too. Some parts of the Earth receive direct rays from the sun all year and are always warm. Other places receive indirect rays, so the climate is colder. Warm air, which weighs less than cold air, rises. Then cool air moves in and replaces the rising warm air. This movement of air is what makes the wind blow.

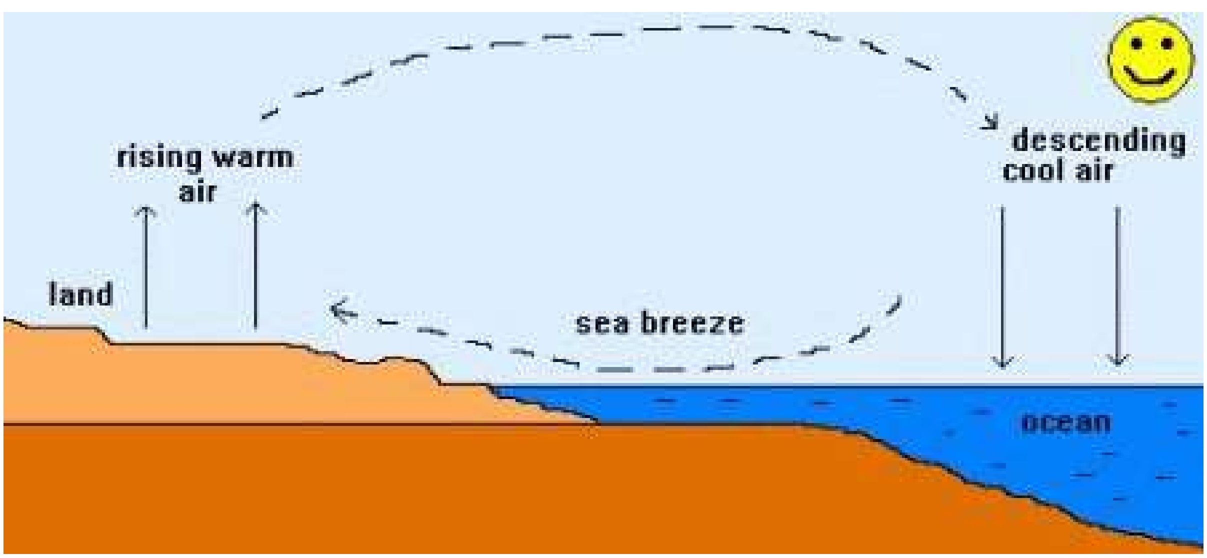
What are the global wind patterns?

The equator receives the Sun's direct rays. Here, air is heated and rises, leaving low pressure areas behind. Moving to about thirty degrees north and south of the equator, the warm air from the equator begins to cool and sink. Between thirty degrees latitude and the equator, most of the cooling sinking air moves back to the equator. The rest of the air flows toward the poles.



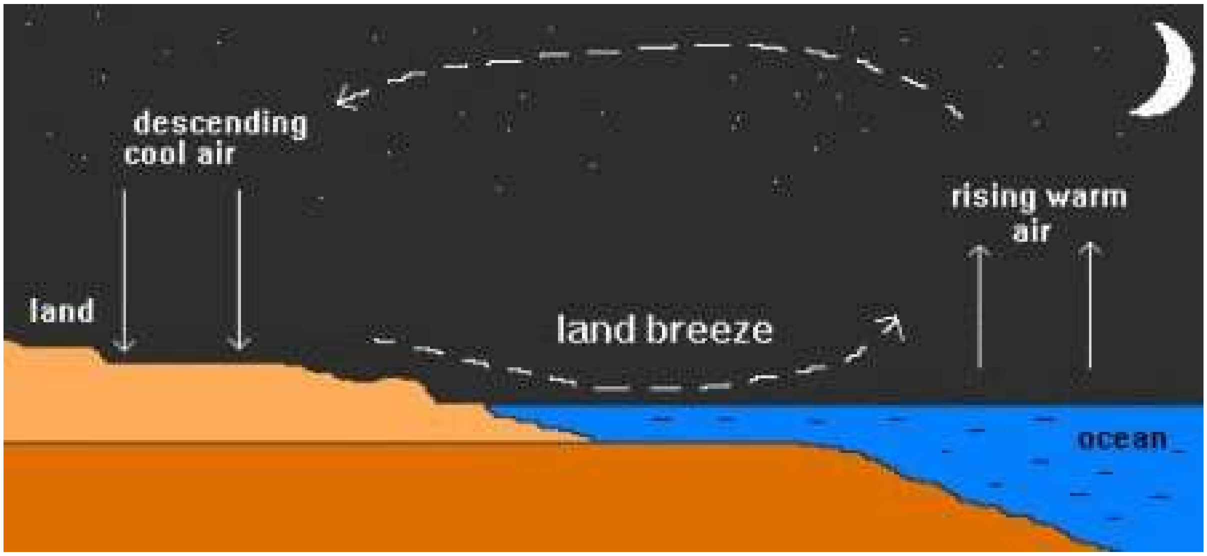
What is a sea breeze?

On a warm summer day along the coast, this differential heating of land and sea leads to the development of local winds called sea breezes. As air above the land surface is heated by radiation from the Sun, it expands and begins to rise, being lighter than the surrounding air. To replace the rising air, cooler air is drawn in from above the surface of the sea. This is the sea breeze, and can offer a pleasant cooling influence on hot summer afternoons.



What is a land breeze?

A land breeze occurs at night when the land cools faster than the sea. In this case, it is air above the warmer surface water that is heated and rises, pulling in air from the cooler land surface.

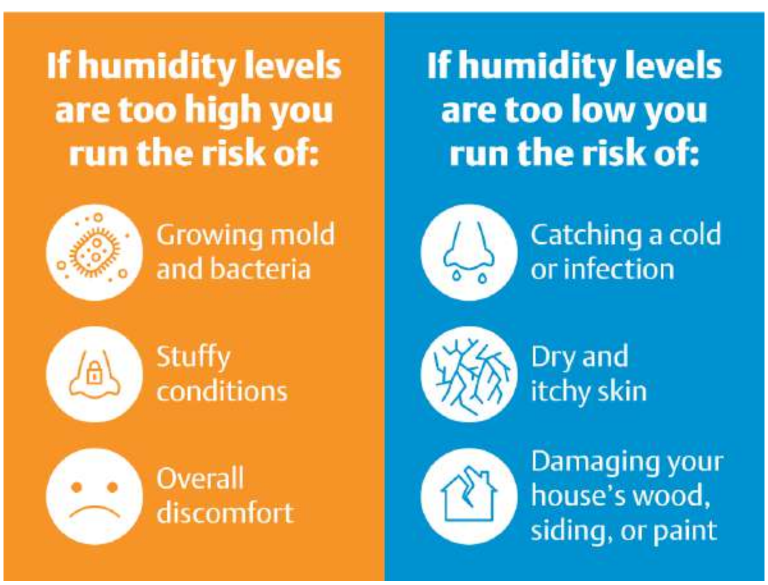


Wet Bulb vs. Dry Bulb: Data Measurement, Collection and Calculations

- First, cover the entire blue bottom (the bulb) of one thermometer with cotton ball and secure it using string.
  - After the cotton ball is secure, dunk the cotton ball in the beaker filled with room temperature water
- To collect accurate temperatures, spin both thermometers for 60 seconds.
- Record your values in the table on your sheet.
- Calculate the differences between the temperatures taken with different instruments.
  - Refer to the relative humidity chart to determine the percentage of relative humidity.

Relative Humidity (%)

Dry-Bulb Temperature (°C)	Difference Between Wet-Bulb and Dry-Bulb Temperatures (C°)															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
−20	100	28														
−18	100	40														
−16	100	48														
−14	100	55	11													
−12	100	61	23													
−10	100	66	33													
−8	100	71	41	13												
−6	100	73	48	20												
−4	100	77	54	32	11											
−2	100	79	58	37	20	1										
0	100	81	63	45	28	11										
2	100	83	67	51	36	20	6									
4	100	85	70	56	42	27	14									
6	100	86	72	59	46	35	22	10								
8	100	87	74	62	51	39	28	17	6							
10	100	88	76	65	54	43	33	24	13	4						
12	100	88	78	67	57	48	38	28	19	10	2					
14	100	89	79	69	60	50	41	33	25	16	8	1				
16	100	90	80	71	62	54	45	37	29	21	14	7	1			
18	100	91	81	72	64	56	48	40	33	26	19	12	6			
20	100	91	82	74	66	58	51	44	36	30	23	17	11	5		
22	100	92	83	75	68	60	53	46	40	33	27	21	15	10	4	
24	100	92	84	76	69	62	55	49	42	36	30	25	20	14	9	4
26	100	92	85	77	70	64	57	51	45	39	34	28	23	18	13	9
28	100	93	86	78	71	65	59	53	47	42	36	31	26	21	17	12
30	100	93	86	79	72	66	61	55	49	44	39	34	29	25	20	16



Humidity is the amount of water vapor in the air. Too much or too little humidity can be dangerous. For example, high humidity combined with hot temperatures is a combination that can be a health risk, especially for the very young and the very old.

Humidity plays an important role in our daily weather. Without water vapor in the air, our weather might be like the weather on Mars. Could you imagine life without clouds, rain, snow, thunder, or lightning?

When you hear weather forecasters talk about humidity, you may hear them talk about two different terms: absolute humidity and relative humidity. Absolute humidity is the amount of water vapor divided by the amount of dry air in a certain volume of air at a particular temperature. The hotter the air is, the more water vapor it can hold.

Relative humidity is the ratio of the current absolute humidity to the highest possible absolute humidity, which will depend upon the current air temperature. Relative humidity is the term weather forecasters use most often.

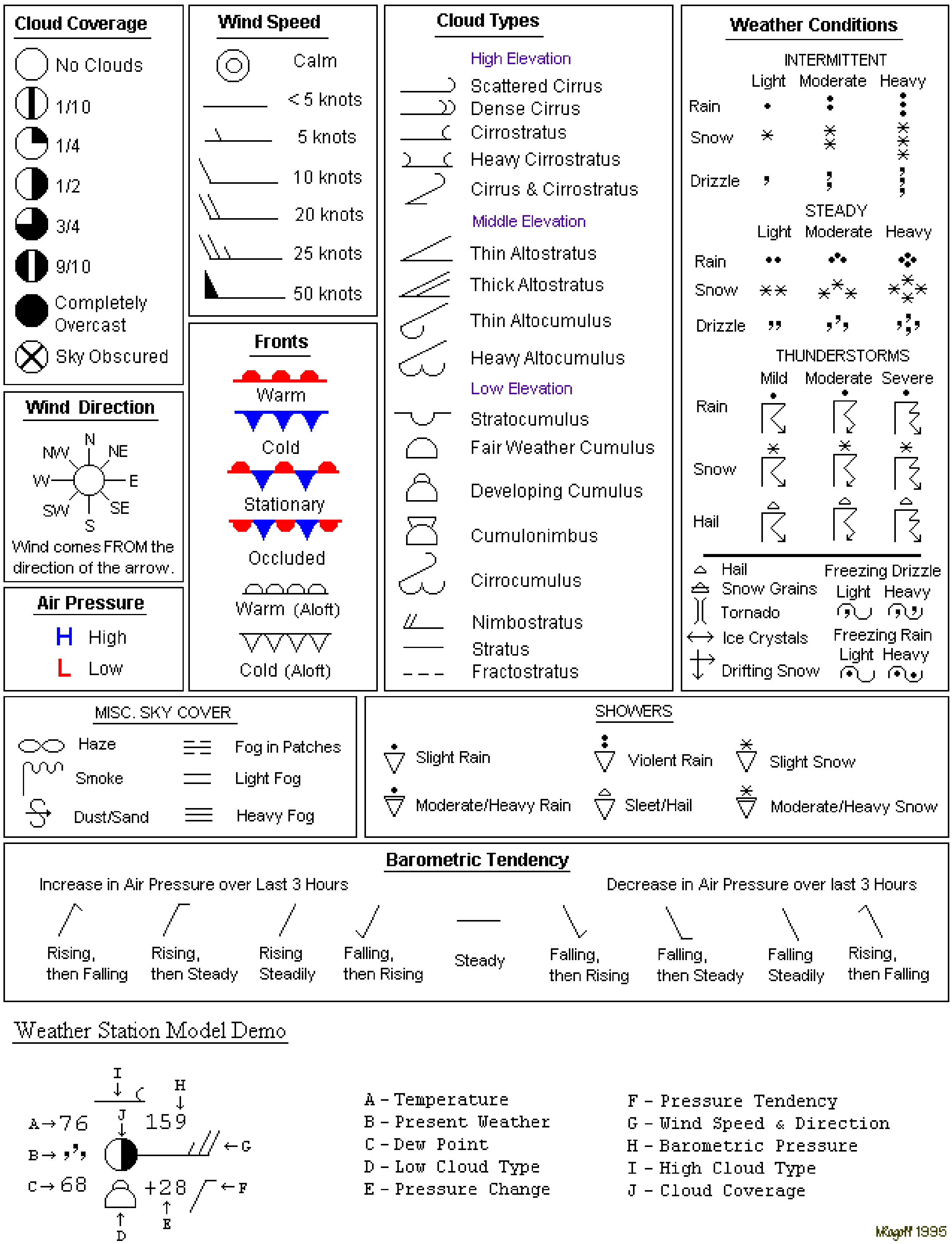
A relative humidity of 100% means that the air can't hold any more water vapor. It's totally saturated. When this occurs, it can rain. In fact, the relative humidity must be 100% where clouds are forming for it to rain. However, at ground level where the rain lands, the relative humidity can be less than 100%.

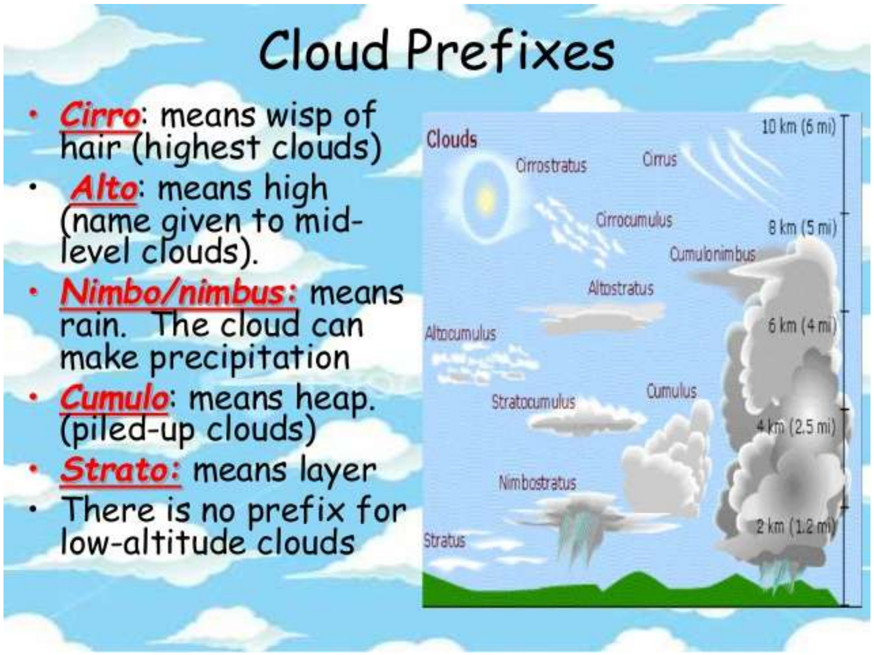
So how does humidity affect us on a hot day? Humans are sensitive to changes in humidity, because our skin uses the air around us to get rid of moisture in the form of sweat. If the relative humidity is very high, the air is already saturated with water vapor and our sweat won't evaporate. When this happens, we feel hotter than the actual temperature.

Likewise, very low humidity can make us feel cooler than the actual temperature. This happens because the dry air helps sweat evaporate more quickly than usual.

Department of Environmental Protection

Weather Station Symbols





Cumulus Congestus & Cumulonimbus Clouds

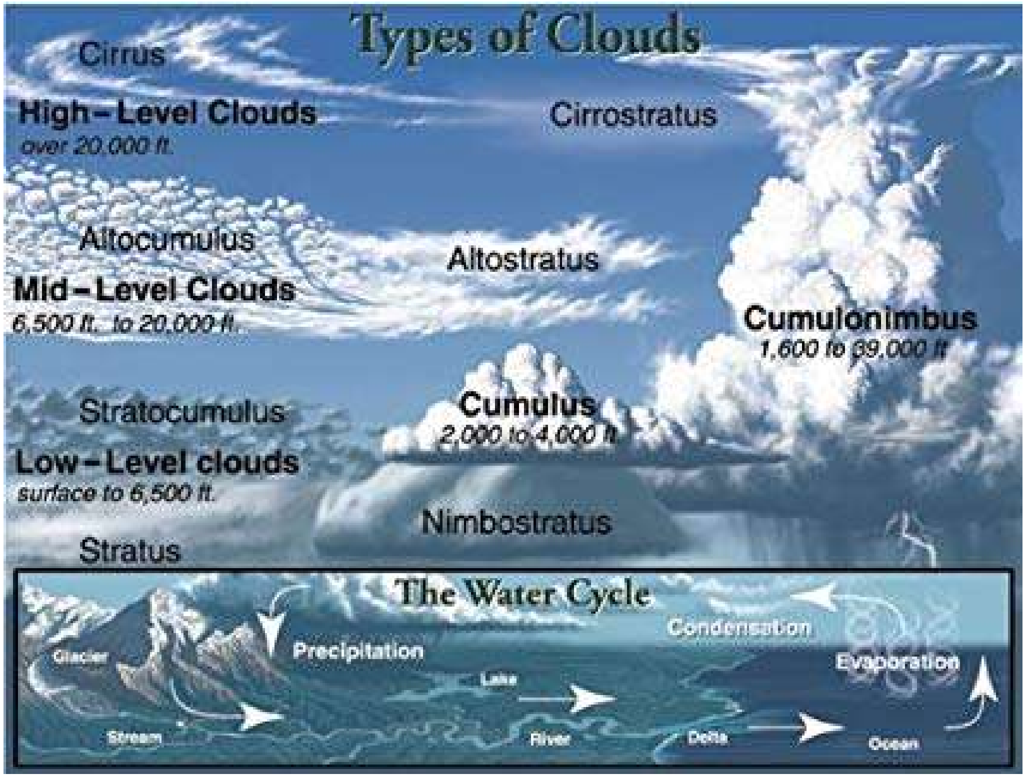
When the atmosphere is unstable enough to allow for significant vertical growth of a cumulus cloud, precipitation may result. Towering cumulus, or cumulus congestus, may generate rain; they may also develop into the even larger, more energetic cumulonimbus. Cumulonimbus clouds, sometimes called "thunderheads," are associated with **thunderstorms, lightning and intense, heavy rains as well as hail.** Cumulonimbus clouds grow vertically and commonly adopt an anvil shape, with a low, dark base often only 1,000 feet above ground and tops reaching up to 50,000 feet into the atmosphere.

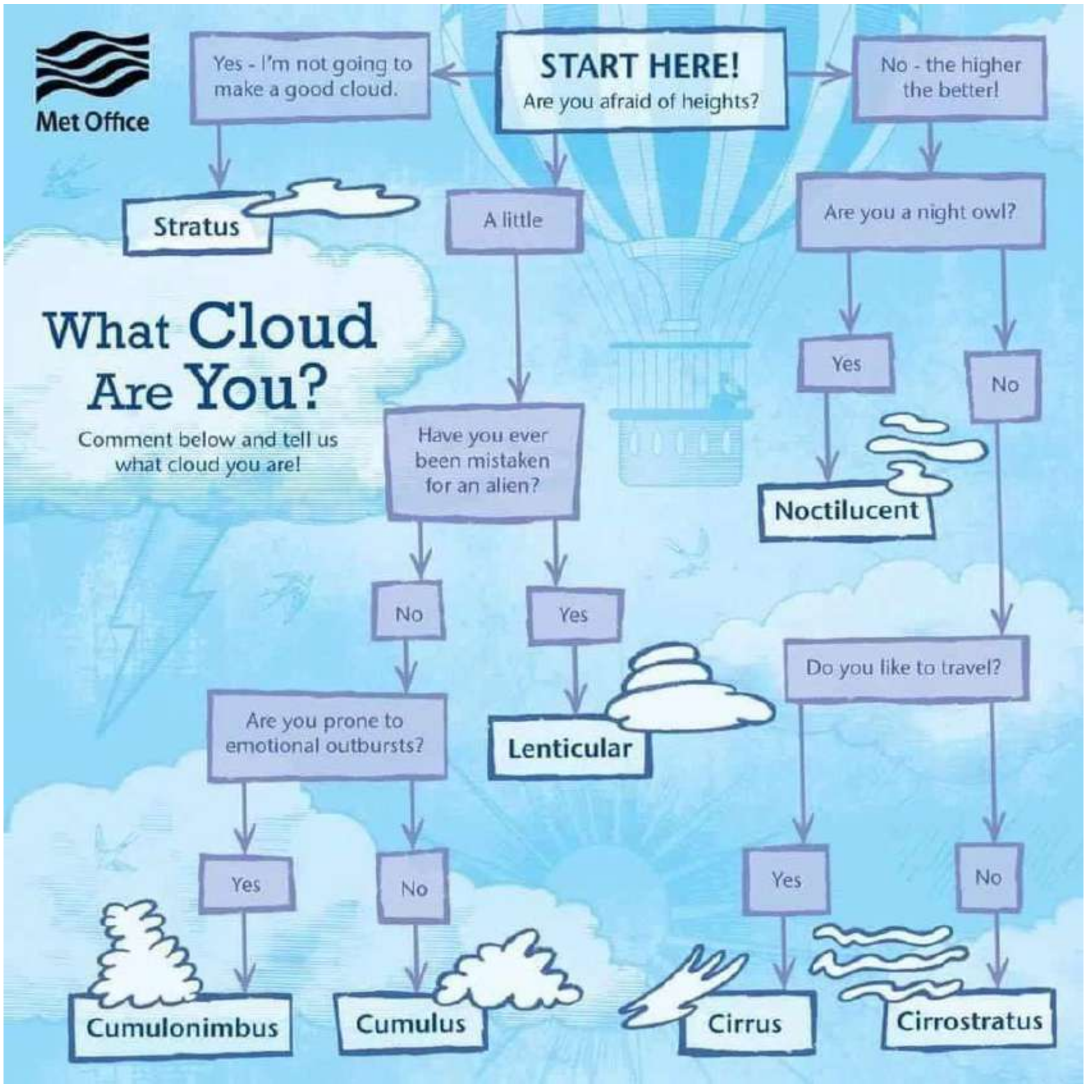
Cumulonimbus clouds carry a mass of unstable air and often produce unpredictable high winds and downdrafts. These clouds are capable of generating violent supercell storms, tornadoes and dangerous wind-shear conditions.

Nimbostratus Clouds

When you look to the sky on a rainy day and see nothing but a dense blanket of low, gray, featureless clouds, you are looking at nimbostratus. These clouds form at low or middle altitudes and block sunlight. In contrast with the intense, short-lived rains associated with unstable cumulonimbus clouds, nimbostratus clouds typically produce **light or moderate rainfall of longer duration.**

Because nimbostratus clouds form with their bases below 6,500 feet, they normally contain water droplets, but can contain snow or ice if temperatures are low enough.


Types of Clouds
Cirrus
High-Level Clouds
over 20,000 ft.
Cirrostratus
Altocumulus
Altostratus
Mid-Level Clouds
6,500 ft. to 20,000 ft.
Cumulonimbus
1,600 to 39,000 ft
Stratocumulus
Cumulus
2,000 to 4,000 ft
Low-Level clouds
surface to 6,500 ft.
Nimbostratus
Stratus
The Water Cycle
Condensation
Precipitation
Glacier
Evaporation
Lake
Stream
River
Delta
Ocean


Met Office
START HERE!
Are you afraid of heights?
Yes - I'm not going to make a good cloud.
No - the higher the better!
Stratus
A little
Are you a night owl?
What Cloud Are You?
Comment below and tell us what cloud you are!
Have you ever been mistaken for an alien?
Yes
No
Noctilucent
No
Yes
Do you like to travel?
Are you prone to emotional outbursts?
Lenticular
Yes
No
Yes
No
Cumulonimbus
Cumulus
Cirrus
Cirrostratus