The Science of Snow

Winter is around the corner and with it is the possibility of snow. Before running out to grab enough salt to break your back, have a read on how snow, and other types of precipitation, is formed.

PRACTICAL SCIENCE WITH PHIL FREDA

I know what you're thinking. You must be thinking that I am nuts.

One week I'm talking about global warming and the next snow.

Well if you remember from my global warming article, climate change doesn't necessarily mean increased temperatures at all times or in all locations.

Weather can get progressively "weirder" over time. Kind of like that freak snowstorm we received near Halloween this year, followed by unseasonably warm temperatures.

I guess it not easy to tell what is in our weather future but have you ever stopped to think how snow and other winter weather forms?

Let it Snow

According to CloudsRus.com, snow forms if the air in a cloud is below freezing.

Water vapor that is trapped in the cloud begins to cool and form tiny ice crystals. These crystals then begin to clump together to form snowflakes.

Snow formation doesn't necessarily have to happen in the colder months. If it is cold enough in the clouds, snow will form.

Falling snow only occurs if the temperature of the air on the way down is cold enough.

If the temperatures closer to the Earth's surface are warmer, the snow will melt and become rain.

If temperatures are freezing or below, there is a good chance that snow will fall.

No Two Alike

Snowflakes come in many different forms. Like us humans, no two snowflakes are exactly alike.

According to CloudsRus.com, there is one thing that all snowflakes have in common: they are all actually six-sided objects.

If looking under a microscope, all of the snowflakes will be various different shapes, but all of them will be hexagons.

The shape of snowflakes depends a lot on temperature.

If it is very cold, the air is extremely dry. This results in snowflakes that may look like needles or columns under a microscope.

If the temperature is at or near freezing however, the air will contain much more moisture, leaving us with excellent snowball-making snow.

Too Cold to Snow?

Have you ever heard someone say that it is too cold to snow?

According to CloudsRus.com, there is some validity to this.

When it is very cold, the air lacks moisture, which is necessary to produce precipitation. The heaviest snowfalls occur when the temperature is at the freezing point.

Ever wonder why snow takes so long to melt away?

In addition to the chilly temperatures, snow is white. Light colors reflect sunlight and do not absorb it.

This leads to the snow not warming up very well and therefore, not melting away.

Sleet and Freezing Rain

Astoundingly, there actually is a difference between these two forms of precipitation.

According to Weatherdudes.com, sleet occurs when rain falls through a freezing layer of air before hitting the ground.

While in this cold layer, the liquid water freezes into small ice pellets.

Freezing rain, on the other hand, is rain that falls as liquid but freezes after hitting the ground due to cold temperatures on the Earth's surface.

If the upper atmosphere is not cold enough for snow to form, rain forms in its stead.

If the surface conditions on the ground are colder than the upper atmosphere, there is a good chance that freezing rain will form.

According to Weatherdudes.com, freezing rain is the most hazardous form of precipitation in the winter.

Things like black ice and power outages in the winter are almost always caused by freezing rain.

Power outages occur because of the ice that accumulates on wires and trees due to freezing rain. The added mass makes them heavy and prone to fall.

Hail No!

Hail is not necessarily winter weather at all.

It usually forms in areas with warm summers like the American Prairies, according to CloudsRus.com.

According to the site, hail consists of frozen raindrops that are more than 5 mm thick and forms when these chunks are tossed up by winds inside huge cumulonimbus clouds.

As the hailstones are continuously bounced up and down the cloud by wind, more ice builds up in layers around them.

If a hailstone is cut in half, layers can be seen that are very similar to the layers found in an onion or the rings found in trees.

The clear ice layers in a hailstone forms in the warmer, lower parts of the cloud and the opaque, icy layers form in the colder, higher parts of the cloud.

Just like in dendrochronology (dating using tree rings), by looking at the layers of a hailstone, it is possible to tell how many times the hailstone was blown up and down the cloud.

Hailstones can sometimes be the size of golf balls and can cause massive damage to crops, houses, cars and even people.

According to National Geographic, a hailstone was recovered in June 2003 that had a circumference of 18.75 inches!

I admit, winter weather usually gives me the blues, but after doing research for this article, I realized that the mechanisms governing the formation of various types of precipitation is very interesting.

Think about it!

Editor's Note: According to the Weather Channel's website, it doesn't look like we're in for a White Christmas this year - but, you never know!