

CHAPTER 03**Rain Where Does it Come From**

Kids, have you observed the clouds like this in the sky any time? Think now!

Fair and white, grey and black,

The clouds arrive in a magic pack.

Elephants and horses, Dogs and fawns.

Sometimes they look,

Like a pair of swans.

In moments they come, In moments they go.

Sometimes they freeze, and for weeks they stay,

And sometimes they disappear,

For many a day.

Sometimes they pour, Sometimes they thunder.

Spreading the colors,

In a rainbow of wonder.

And sometimes they hail,

Pelting the ground.

Breaking the glass,

In ringing chimes.

Have you ever seen these things in the clouds?

- What all do the clouds do?
- Have you ever seen a rainbow? When can you see a rainbow?
- What happens when it rains?
- What is the relation between rains and clouds?
- RAIN – Where does it come from?

When it rains, making paper boats and floating them on water is really fun. Isn't it?

Clouds are made up of tiny water droplets. When these droplets grow, they eventually become too heavy to stay suspended in the sky and fall to the ground as rain.

Some droplets fall through the cloud and coalesce into raindrops on their way down. As more and more droplets join together they become too heavy and fall from the cloud as rain.

Warm air can hold more moisture than cool air. When the warmer air is cooled and the moisture condenses, it often rains more heavily.



Rain is liquid precipitation: water falling from the sky.

Raindrops fall to Earth when clouds become saturated or filled with water droplets. Millions of water droplets bump into each other as they gather in a cloud. When a small water droplet bumps into a bigger one, it condenses or combines with the larger one. As this continues to happen, the droplet gets heavier and heavier. When the water droplet becomes too heavy to continue floating around in the cloud, it falls to the ground.

Human life depends on rain. Rain is the source of freshwater for many cultures where rivers, lakes are not easily accessible. Rain makes modern life possible by providing water for agriculture,

industry, hygiene and electrical energy. Government groups and individuals collect rain for personal and public use. Water is one of the most valuable resources on Earth. Rainwater fills reservoirs that supply drinking water, provide a habitat for fish to live, and nourishes the soil with water necessary for vegetation. For growing crops during the farming season, helps people and animals for harvesting and consumption purposes respectively. It is believed that all the sources of water, rain are the best for use in our homes and also generates tropical humidity.

What is a rainbow?

Rainbows occur when the sun shines through water droplets in the air. These water droplets bend the sunlight and separate it into seven colors. These colors are red, orange, yellow, green, blue, indigo and violet.

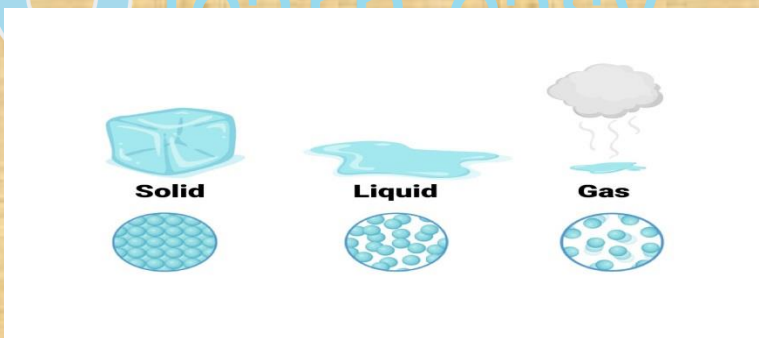
Snow, Sleet and Hail:

Snow crystals form when water droplets in clouds become very cold. The snow crystals fall from the cloud forming snowflakes. The air below must be freezing or the snowflake will melt and turn to rain. Sleet is a mixture of snow and rain. It is not light and fluffy like a snowflake. Hail is hard frozen rain. It is

usually the size of a pea, but sometimes grows as large as a golf ball! Hail can fall from the sky at any time of the year, not just during winter.



Water exist in three forms - Pure water is tasteless, odorless and colorless. Water can occur in three states: **solid** (ice), **liquid** or **gas** (vapor).



Solid water – ice is frozen water. When water freezes, its molecules move farther apart, making ice less dense than water. This means that ice will be lighter than the same volume of water and so ice will float in water. Water freezes at 0° Celsius, 32° Fahrenheit.

Liquid water is wet and fluid. This is the form of water with which we are most familiar. We use liquid water in many ways, including washing and drinking.

Water as a gas – vapor is always present in the air around us though you cannot see it. When you boil water, the water changes from a liquid to a gas or water vapor. As some of the water vapor cools, we see it as a small cloud called steam. This cloud of steam is a mini version of the clouds we see in the sky. At sea level, steam is formed at 100° Celsius, 212° Fahrenheit.

The Water Cycle

The Water Cycle is the journey water takes as it circulates from the land to the sky and back again. The water vapor attaches to small bits of dust in the air. It forms raindrops in warm temperatures. In cold temperatures, it freezes and forms snow or hail.

When you are thirsty, you like to drink ice water than normal water. But as you're drinking, do you realize you are experiencing two very different forms of water – ice and liquid water.

If you suddenly catch a cold, your parent may give you steam inhalation. So steam is a third form of water and these three states are interchangeable. How?

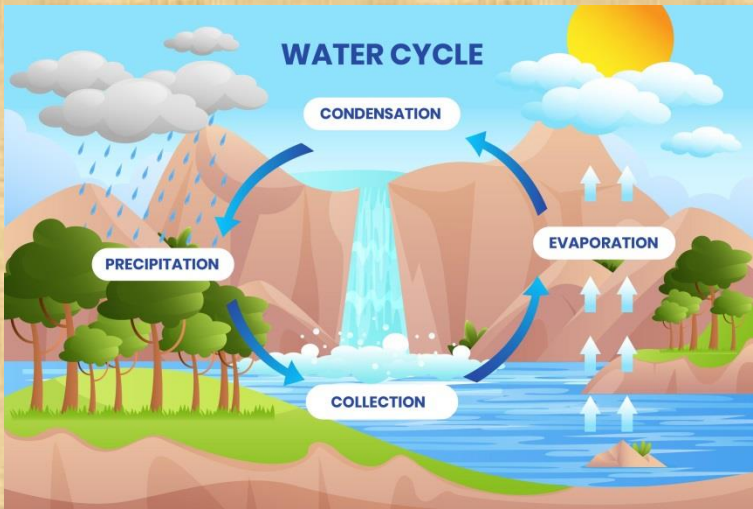
When you pour the water in ice cube trays and kept in fridge, after a while liquid water cools down and form as an ice cube – solid form of water. When ice is heated it converts into water and if water is heated it turns into water vapor. Similarly, when water vapor is cooled we can get back water. If water is cooled further we will get ice.

It occurs in nature too. For instance, you hang up a wet towel and when you come back, it is dry. You set out a bowl of water and when you see again, the water level in the bowl has dropped even though Tommy has been nowhere near the bowl.

Where did the missing water go?

It evaporated. That means some of the liquid water in the towel or bowl changed into an invisible gas called water vapor and drifted away into the atmosphere. Evaporated contains the word “vapor”.

The same thing is constantly happening with oceans, lakes, rivers, swamps, swimming pools and everywhere water is in contact with air.



The process of evaporation followed by condensation causes the formation of clouds. Water present on the Earth's surface gets evaporated due to sunlight and then rises up in the atmosphere. On reaching a certain height, water vapor present in air condenses to form tiny droplets of water. These water droplets collect to form clouds that float in air.

Activity-1:

Clouds in kitchen - Take a vessel filled with water. Keep it on a stove and heat it slowly. Observe for some time. Now cover the vessel with a plate. Remove the plate after a couple of minutes.

Do you see any changes on the inner surface of the plate?

Pour some cool water on the plate and observe what happens?

What similarities do you find between evaporation of water

from surface of water bodies and evaporation of water from a bowl heated in the kitchen?

From both cases discussed above, we know that water vapor helps to form clouds.

Activity-2:

To understand condensation, take some water in a glass. Add some pieces of ice to it. Observe for few minutes.

- What changes do you observe on the outer surface of the glass?

You would observe formation of small drops of water on the outer surface of the glass.

- Why are these drops formed? Do drops form if there is no ice in the glass?

Ice-cold water in the glass cools its surface. Air around the glass contains water vapor which is warmer than the surface of the glass. Due to the cold glass, air close to its surface will also

become cooler. This changes the water vapor in the air around the surface of the glass into water and forms small drops on the outer surface of glass.

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