Weather, Water and Air

Air and Weather

We know that air is necessary for all living things on the earth. We cannot see air but it is present all around us. The earth is surrounded by a thick blanket of air which is called **atmosphere**.

When the condition of the atmosphere changes at a particular place, it also changes the **weather** of that place. Weather is the day to day condition of a place. It changes from day to day, and sometimes from hour to hour. It can be sunny, cloudy, windy or rainy. When the weather remains similar for a few months in a year, we call it a **season**.

During the summer season, it is very hot. After the summer season comes the rainy season. In most parts of India it rains almost every day during the rainy season. This is followed by the winter season. In some parts of India it becomes very cold. But in some other parts it is not very cold. In several parts of South India, people do not need woollen clothes in winters.

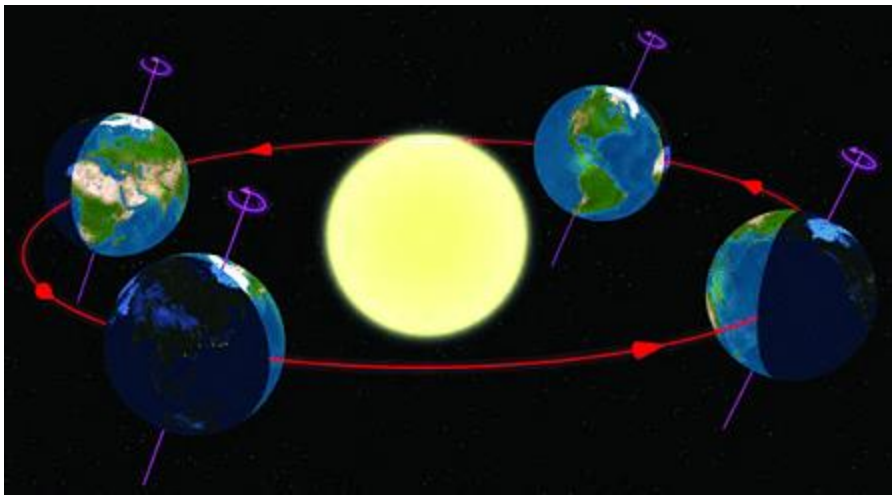
Summer

Rainy

Winter

What Changes Weather?

What causes these weather changes? They are caused mainly by the sun. Because of the rotation of the earth, and the revolution of the earth round the sun, different areas on the earth get heated differently. An area which faces the sun directly is heated more than the area which is at the back and not receiving sunrays directly.



Revolution of earth

This unequal heating of the earth's surface causes the weather changes and the seasons. Let us see how this happens.

Sun Causes the Wind and Rain

When the sun shines brightly, it heats up the ground. The air above the ground also becomes hot. Hot air is lighter than cold air. The hot air, therefore, rises up. Cold air from the surrounding areas rushes to take its place. This causes the wind to blow. The heat of the sun changes water into water vapour. The water vapour upon cooling forms clouds. When the clouds become very heavy, they fall back on earth as rain.

How wind blows

Sun Causes Land and Sea Breezes

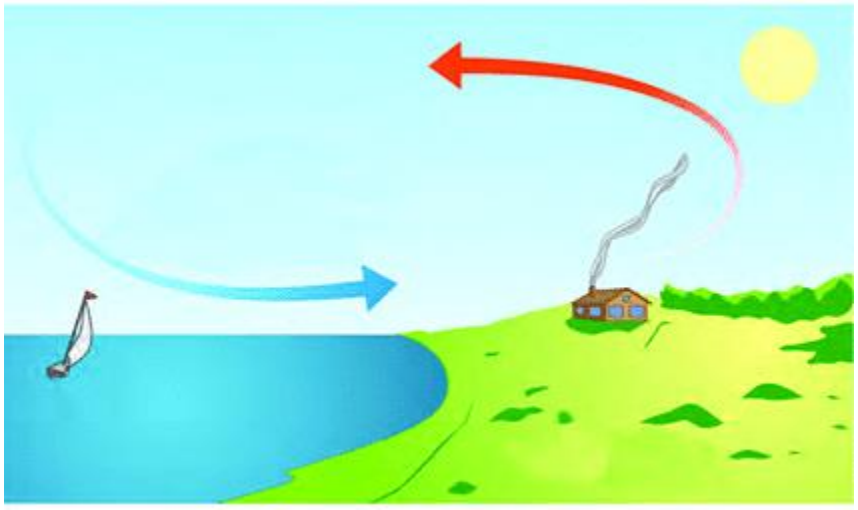
If you have gone to the seaside you will know that during the day, wind blows from the sea to the land. At night, the wind blows from the land to the sea. Let us see why this happens.

Sea Breeze

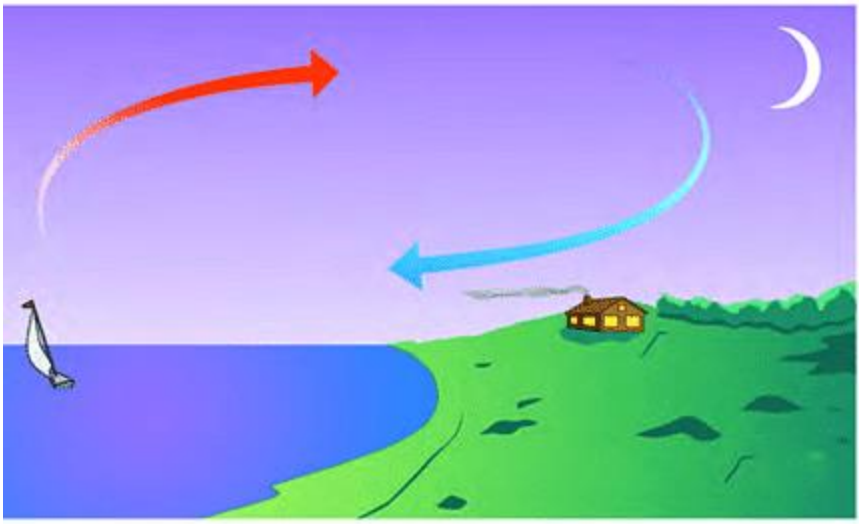
During the day, the land gets heated by the sun much quicker than water in the seas. As the land becomes warmer, it heats the air in the atmosphere above it. This causes the air to become lighter and rise, creating a void or empty space just above the land. Water heats up at a much slower pace. The air above sea takes longer to get heated up and is still cooler in comparison to the air above the land. This cooler and heavier air above the sea rushes towards the void created by the hot air above the land. This phenomena causes a breeze to blow from the sea towards the land. This is known as **sea breeze**.

Land Breeze

At night, the land cools down much faster than the sea. As the land becomes cooler, air above it also becomes cooler quickly. Since the sea is warmer than the land, the air above the sea also remains warmer. This warm air rises and now the cooler and heavier air above the land rushes towards the sea. This causes breeze to blow from land towards the sea. This is referred to as **land breeze**.



Sea breeze



Land breeze

Water

Around 71% of the earth's surface is covered with water. Water is found in rivers, seas, ponds, lakes and oceans. It is also present in the form of ice and glaciers. Water is also found underground. It is also present in the air. Water changes from one state to another due to heating and cooling.

Evaporation

The water in the puddles usually disappears in a day's time. Where does it go? The sun heats the water on the surface of the earth and changes it into water vapour. The process of change of water into water vapour is called **evaporation**.
The sun evaporates water from oceans, lakes, rivers, ponds and soil. Plants also give out water vapour from its leaves.
Human beings also release water vapour into the air. The water from the pores in the human skin escapes and converts into vapour in the air. This is the reason why we feel very thirsty in summers.

Thus, plants and human beings are also the sources of evaporation. The water is present in the air in the form of tiny droplets called **moisture**.

Factors Affecting Evaporation

Evaporation depends on many other things.

Temperature: The high temperature makes clothes dry faster in the sun than in shade.

Exposed area: The larger exposed area speeds up the evaporation. The clothes that are spread out dry faster than the ones that are folded.

Wind: Blowing wind helps things to dry faster.

Moisture: When there is less moisture in the air, clothes dry faster in summer. They take more time to dry in the rainy season when there is more moisture in the air.

Condensation

The process of changing water vapour into water due to cooling is called **condensation**.

Water condenses and returns to the ground in several ways. If you take a look at the plants and flowers in cold mornings, you will see tiny drops of water on them. This is **dew**. It is formed when the temperature is low and water vapour condenses on cool objects in the form of droplets.

Dew

Frost is formed in very cold places where the temperature at ground level is lower than 0 degree and the dew turns into ice. It causes damage to crops.

Frost

Fog and **mist** are formed when small droplets of water suspend in the air. Fog is denser than mist. When the visibility is less than 1 km we call it 'fog', but when the visibility is greater than 1 km we call it 'mist'.

Fog

Mist

Snow

Humid Weather

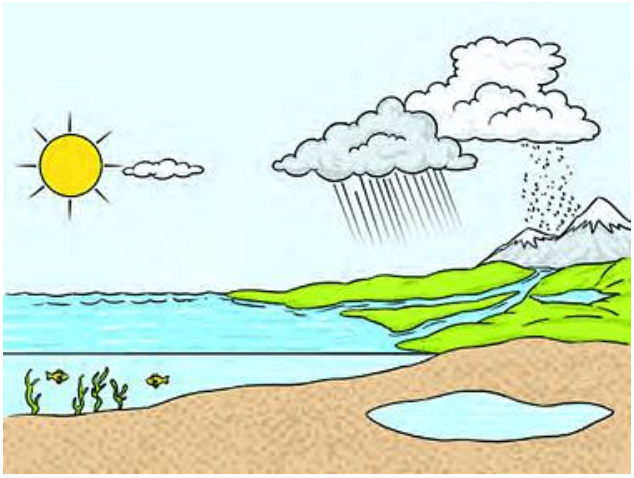
In the hot weather you sweat a lot. When this sweat evaporates it makes you feel cool. When you sit under the fan, your sweat evaporates faster and you feel cooler. But if there is already a lot of water vapour in the air, the sweat cannot evaporate quickly. Such weather is called **humid weather**.

Why do you feel very uncomfortable on a hot day during the rainy season? Because during rainy season, it is very humid. Your sweat cannot evaporate quickly even under a fan, and you feel hot and uncomfortable.

Water Cycle

The water present on the earth keeps on moving between lakes, rivers, oceans and the atmosphere. It is known as **water cycle**.

In nature, the process of evaporation and condensation happens continuously resulting in the water cycle. Let us now understand the water cycle in detail.



Water cycle

- The sun heats the water.
  The water **evaporates** and rises into the air.
- The water vapour cools and **condenses** to become droplets, which form clouds.
- When enough water condenses, the drops become heavy and fall to the ground as rain and snow. It is also known as **precipitation**.
- Some rain seeps into the soil to form groundwater. The rest flows through rivers back into the ocean.