Weather, Climate and Adaptations of Animals to Climate

Weather

You must have seen people planning their outings based on the expected weather conditions? What is weather? How is it determined? Let us find out.

You must have read the weather section in the newspaper. It gives the detailed weather report of the day. It includes information regarding temperature, humidity, and rainfall for the day. If you study the weather report for an entire week, you will find that temperature and humidity vary on all days.

The day-to-day atmospheric conditions of a particular place with respect to factors such as rainfall, humidity, temperature, wind speed etc. is called the weather of that place.

Factors such as temperature, humidity, rainfall, wind speed etc, which determine the weather of a particular place, are known as the **elements of weather**.

Do you know what these elements of weather are?

(i) Humidity: The amount of moisture present in air

(ii) Temperature: The degree of hotness or coldness of an environment

(iii) Rainfall: The quantity of rain in a given period of time

(iv) Wind speed: The speed of wind blowing over a place in km per hour

Weather is a complex phenomenon. It can change considerably within days. In fact, on some days, the mornings are sunny, while it starts raining by afternoon. Thus, it is very difficult to predict weather.

Climate

When you look at the weather records of a number of places for a given period of time, let us say 25 years, you will notice that while some places experienced cold weather conditions, others experienced hot weather conditions during the specified time period.

The average weather condition of a place taken over a long period of time is called the climate of that place.

If a place experiences high temperature for most of the days, then we say that this place has a hot climate, and if a place experiences cold temperature for most of the days, then we say that this place has a cold climate.

Let us read about the various types of climates.

- **Tropical climate:** This climate is characterized by high temperature with the average temperature being 18°C.
- **Dry climate:** This climate is characterised by the presence of very low precipitation throughout the year.
- **Temperate climate:** This climate is characterized by average temperature of 10°C in summer. The average temperature in winter lies between -3°C and 18°C.
- **Continental climate:** This climate is characterized by average temperature of above 10°C in summer. The average temperature in winter lies below 3°C.

Role of Climate

Climate impacts the living world to a large extent as it influences the basic needs of humans like food, shelter and clothing. For an agrarian country like India, the occupation of people depends on the climate.

During construction of bridges, buildings etc. various climatic factors are taken into consideration.

Climate also affects the health of people as climatic conditions impact the weather conditions.

Analysing Weather And Climate

Analysing weather

Let us understand the concept of weather using the given table that lists the maximum temperatures recorded in Shillong (Meghalaya) between 3rd August 2006 and 9th August 2006.

Date	Maximum temperature in °C
3-8-06	26.0
4-8-06	23.5
5-8-06	25.0
6-8-06	22.0
7-8-06	25.5
8-8-06	23.3
9-8-06	24.4

As you can observe in the given table, the maximum temperature of Shillong varies throughout the week, indicating that the weather of a region is not constant and is difficult to predict.

Do you know how the maximum and minimum temperatures are determined?

The maximum temperature is measured in the afternoon using a **maximum thermometer**, whereas the minimum temperature is measured early in the morning using a **minimum thermometer**.

Analysing climate

Let us look at the two tables given below to find out how the climate of a place is determined.

Srinagar (Jammu and Kashmir)

Month	Mean temperature in °C		Average monthly precipitation
	Average high	Average low	
January	6.66	–2.22	1.90
February	7.77	–1.11	2.70
March	13.88	3.3	4.8
April	20.00	7.77	3.40
May	24.44	10.55	2.70
June	29.4	14.44	1.50
July	30	17.7	2.40
August	29.4	17.2	3.00
September	27.2	11.6	1.10

October	22.22	5.5	1.30
November	15	0.55	1.10
December	7.77	–1.66	2.10

Thiruvananthapuram (Kerala)

Month	Mean temperature in °C		Average monthly precipitation
	Average high	Average low	
January	32.0	22.2	0.89
February	32.0	23.0	0.96
March	33.0	24.1	1.59
April	33.0	25	4.62
May	32.0	25	9.07

June	30.0	24	12.62
July	29.2	23.1	8.92
August	29.4	23.2	5.43
September	30.0	23.3	6.87
October	30.0	23.3	11.09
November	30.3	23.1	7.26
December	31.0	22.6	2.59

By looking at the given data, we can say that the climate of Jammu and Kashmir is moderately hot and wet for most of the year, while the climate of Kerala is extremely hot and wet.

Similarly, let us look at the weather records of Bikaner in Rajasthan and Shillong in Meghalaya.

Bikaner (Rajasthan)

Month	**Mean temperature in °C**	**Average monthly precipitation**

	Average high	Average low	
January	22.7	5.5	0.20
February	5	8.3	0.30
March	31.6	15	0.40
April	37.7	21.6	0.30
May	41.6	26.6	1.20
June	41.1	28.3	1.80
July	37.7	27.2	4.20
August	36.1	26.6	2.80
September	36.6	24.4	1.30
October	36.1	18.8	0.20

November	30.5	11.6	0.10
December	25	6.6	0.00

Shillong (Meghalaya)

Month	Mean temperature in °C		Average monthly precipitation
	Average high	Average low	
January	14.4	5.3	0.55
February	17.8	8.1	1.14
March	21.8	12.4	2.20
April	24.5	14.9	5.74
May	24.2	16.1	11.61
June	23.6	16.7	18.76

July	23.8	17.7	14.1
August	23.7	17.5	13.50
September	24.1	17.3	11.88
October	22.3	14.3	7.4
November	19.3	10.5	1.49
December	16.7	7.5	0.23

By looking at the given data, we can say that the climate of Rajasthan is very hot and dry with very little rainfall, while the climate of Shillong is wet and cold with high rainfall for most of the year.

Climate of your city

Collect the weather data of your city and determine its climate. Also, collect the weather data of some other city in India and compare it with the weather data of your city. **How is the climate of your city different from that of the other city?**

Some Interesting Facts:

- **Mawsynram in Meghalaya receives the maximum amount of rainfall in the world!**
- **Atacama Desert in Chile (South America) is the driest place on Earth.**

Adaptations In Animals

A variety of animals live in different climatic conditions. **How do these animals survive in such varied climates?**

Different animals possess different features that help them survive in the climate of their respective habitats. *The special features and habits that help an animal survive in its environment are known as **adaptations**.*

Let us explore the different types of adaptations observed in animals living in different regions.

Animal adaptations in Polar Region

Polar Regions are snow-covered regions having an extremely cold climate throughout the year. The sun does not set in this region for six months during summer, while it does not rise during the six months of winter. The temperature can drop to –37°C in this region. **How do animals living in this region survive? What types of adaptations are observed in these animals?** Let us study the adaptations of each animal in detail.

Adaptations in polar bear

- Polar bears have a white fur, which allows them to blend in with their surroundings. It also helps them in catching their prey.
- They have two thick layers of fur, which protect them from the extreme cold of the Polar Region.
- They have a layer of fat under their skin, which keeps them well insulated. They move slowly and rest often while moving from one place to another to avoid overheating their bodies.
- On warm days, they keep themselves cool by swimming. Their paws are wide and large, which helps them in swimming. Their paws also help them walk on snow.

- They have the ability to close their nostrils while swimming underwater. This helps them stay under water for a longer period of time.
- They have a strong sense of smell, which helps them locate their prey easily.

Adaptations in penguin

- They have a thick layer of fat under their skin to keep them warm.
- They sometimes huddle together to protect themselves from cold.
- They have a streamlined body with webbed feet. These are the features that help them swim. They are excellent swimmers.

Adaptations in other animals

Many other animals such as fishes, musk oxen, reindeers, foxes, seals, whales, and birds live in the Polar Region. They survive the extreme climate of this region by adapting in several ways. For example, the birds in the Polar Region migrate to warmer regions during winter.

Some interesting facts:

Polar bears are the largest bears in the world. An adult polar bear weighs between 295–498 kg.
Polar bears eat a seal's skin, fat, and internal organs. However, they do not eat its meat.
Did you know that the male penguin takes care of the egg until the egg hatches?

Animal adaptations in tropical rainforests

Tropical rainforests are located near the equator and have a hot climate. The temperature in this region can cross 40°C during summer, whereas in winter, the temperature is around 15°C. This region receives plenty of rainfall. This is an important factor because of which this region can support a large number of plants and animals. Animals such as monkeys, apes, gorillas, lions, tigers, elephants,

leopards, lizards, snakes, insects and birds live in this region. **How are these animals adapted to live in tropical rainforests?**

Adaptations in tropical rainforests

Since a large number of animals live in tropical rainforests, there is an intense competition for food and shelter among them. This has lead to different adaptations.

Several animals in the rainforests are **adapted to live on trees.**

The red-eyed frog has sticky pads on its feet, which help it in climbing trees.

Monkeys have long tails and well-developed hands and feet for grasping branches.

Animals are also **adapted to reduce competition for food**. Some animals feed on food that is not easily accessible. For example, the Toucan bird has a long and large beak. This beak helps it reach fruits that are present on the slender branches of trees.

Many animals are **adapted to escape their predators and locate their prey**.

Animals have sensitive hearing, sharp eyes, thick skin, and camouflaging skin colour. These adaptations help them blend into their environment and protect them from their predators. For example, lions and tigers have sensitive hearing to locate their prey and camouflaging skin colour to merge in their environment.

Let us now read about some other animals and their adaptations.

- **Lion-tailed macaque**

  The lion-tailed macaque has a silver-white mane that surrounds its head and runs from its cheek to its chin. It lives in the rainforests of Western Ghats. It is a good climber and spends most of its time on trees. It gathers food such as fruits, seeds, young leaves, stem, flowers, buds and insects from trees.

- **Elephant**

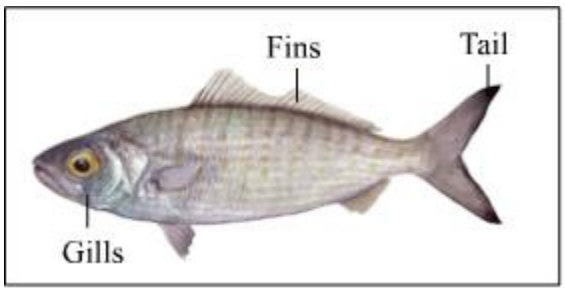
  Elephants are the largest mammal on land. They are commonly found in Indian rainforests. They have long trunks that help them in picking up food items. Their trunks also provide them with a strong sense of smell.

  An elephant’s tusk is its modified teeth. It helps it to tear the bark of a tree. The large ears of an elephant provide it with an excellent sense of hearing and also keep its body cool during the hot and humid climate of this region.

Some interesting facts:

Did you know that elephants can live up to 70 years of age?
Did you know that a lion-tailed macaque first stores food in its pouch and eats it later?

Animals are also **adapted to live underwater.** Aquatic animals like fish have gills that help them to breathe underwater. Both fins and tail help them in swimming along with their streamline body that reduces the friction.
Find out how do dolphins and whales breathe as they do not have gills.



Why do ducks have webbed feet?
Animals like duck live on land and also in water have webbed feet that help them to paddle through the water. They also have a flat beak to catch their food.

How do animals living on land survive?

Carnivores like tiger and lion have highly developed sense organs. Their sharp and pointed teeth and padded claws help them to stalk and capture their prey and also protect them from any danger.
Animals like deer have a wide-angle vision as their eyes are below the forehead, on either side of the head. They are capable of running at a speed of around 30km/s due to their strong muscles in the legs. Also, they have a natural color that merges with the surroundings.

Animals like camel are **adapted to live in the desert**. To prevent water loss, desert animals have thick skin. The hump stores food and energy for a number of days. They have thick eyelashes and stretchy nostrils to prevent sand from entering inside. Animals like rattlesnakes and kangaroo rat avoid the excessive heat by remaining in the shade or underground burrows during the day.

Have you ever wondered why some animals have short beak while some have long beaks?

Birds like parrots have short beaks that help them to open nutshells and seeds while birds like kingfisher toucan have long pointed beaks for hunting fishes, snails and bugs etc. Also, there are animals like frog has a long sticky tongue to catch their prey as they cannot move fast.
Find other adaptations for food in animals.

Why do some animals cannot be spotted easily in the surroundings?

Animals like chameleon and leaf insects tend to change their skin tone according to the surroundings such that it becomes difficult to spot them and in way they protect themselves from their enemies.