

Weather, Climate and adaptation of animals to climate

Learning Objectives

1. Weather and climate
2. Factors affecting the climate of the Earth
3. Adaptations of animals to different climates

INTRODUCTION.

The day-to-day conditions of the atmosphere at a place with respect to elements like temperature, humidity, rainfall, wind speed, etc. is called the weather of that place. The atmosphere is all around us—we cannot see it, but it keeps us warm. The sun is responsible for all the changes in the weather. The distance between the sun and us is very large. The sun is the chief source of light and heat for the earth. It is also the Primary source of energy, and causes changes in the weather.

The energy is absorbed and reflected by the earth's surface. The oceans and the atmosphere play an important role in determining the weather at anyplace. Also, gases like carbon dioxide, methane and water vapor play a role in determining the weather. The weather in coastal areas is very different than that in a desert or hilly areas the maximum temperature of the day is recorded during the afternoon, while the minimum temperature is recorded early in the morning.

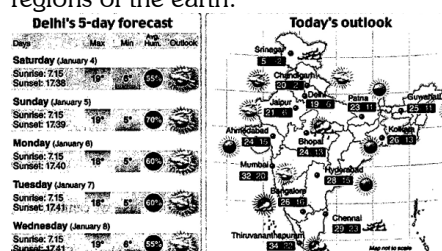
Meteorologists record the weather every day. The records of the weather are preserved for several decades. These records help us determine the pattern of the weather at a place. The average weather pattern taken over a long time, say, 25 years, is called the climate of the place. The mean temperature for a given month is found in two steps. First, we find the average of the temperatures recorded during the month. Next, we calculate the average of such temperatures over many years. The result is the mean temperature.

Do you know?

- The highest temperature ever recorded in Antarctica is 14.6°C recorded in 1947.
- USA has more tornadoes than any other country in the world averaging around 1200 a year.
- The most rainfall recorded in one year is 25.4 meters in Cherrapunji, India.
- the hottest temperature ever recorded on Earth is 57.8°C in Al Aziziyah in Libya.

Role of the Meteorological Department of a Country: The Meteorological department collects data on temperature, wind, etc., and prepares various kinds of weather reports.

- It also makes the weather prediction.
- It provides services to aviation sector like fog information.
- It issues various national and zonal alerts like cyclone, tsunami information etc.
- It studies and identifies seismic activities and provides earthquake reports.
- It helps farmers and agriculture sector by providing monsoon and rainfall reports.
- The department also use Satellite data to map patterns of heating and cooling of various regions of the earth.



- Each and every living organism has its specific surrounding medium of environment with which it continuously interacts and remains fully adapted.

Do you know?

Antarctica is the driest continent on Earth.

Climate and Adaptation

Different parts of the earth have different types of climate. The sun is responsible for this difference in climatic conditions.

Five major types of climates are recognized, based on the annual and monthly averages of temperature and precipitation.

- **Moist Tropical Climates** are known for their high temperatures and large amount of rain around the year.
- **Dry Climates** are characterized by little rain and a high daily temperature range.
- In **Humid Middle Latitude Climates**, land or water differences play a key part. These climates have warm, dry summers, and cool, wet winters.

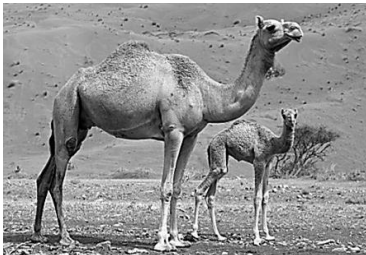
- Continental Climate is characterized by winter temperatures low enough to support a fixed period of snow cover every year, a relatively moderate precipitation occurring mostly in summer, and an even distribution of precipitation.

- Polar areas have cold climates as they are covered by ice almost all the year round. Most areas are covered by glaciers or by a semi-permanent layer of ice.

Climate has an intense effect on all living organisms. Animals adapt themselves to survive various conditions in which they live. Animals that live in extreme climates acquire some special features to protect themselves from it. For example, the camel has a hump to store food in the form of fat, and hooves to tread on the desert sand with ease.

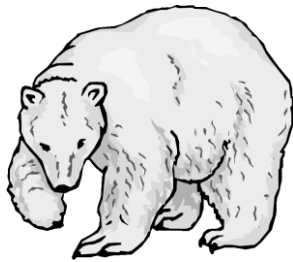
The polar region

The temperature in the polar areas may go down to minus 37 degrees centigrade during winters. Animals like polar bears, penguins, and many types of fish, musk oxen, reindeer, foxes, seals, whales and birds are found in the Polar Regions.



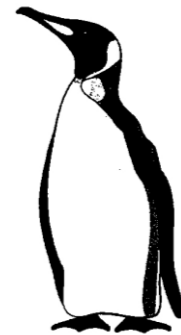
Polar bears, for example, protect themselves with the thick fur on their bodies.

- They have two layers of fur for protection from the extreme climate.
- They also have a layer of fat under the skin, and are very well insulated. In fact, they often take rest to avoid getting overheated.
- The polar bear often goes for a swim to cool off on warm days. Its wide and large paws are useful for swimming as well as for walking on the snow.



Polar bear

The bodies of penguins are white, and merge into the background. They have a thick layer of skin and move around in groups to keep warm. Their streamlined bodies and webbed feet make penguins' swift swimmers. Water retains its warmth under the icy layer. Fish go deeper in the water to stay warm. Birds have to stay warm to survive. Hence, at the onset of winter, these birds migrate to warmer areas. They come back again in the summer. Siberian cranes migrate to far-off places like Bharatpur in Rajasthan, Sultanpur in Haryana and also to some wetlands of north-eastern India. They fly here all the way from Siberia. Birds travel thousands of kilometers to migrate. During the day, the sun guides them, and the stars do so in the night.



Penguin

The tropical region

Animals adapt themselves to hot climate in the tropical regions, where the average temperature is higher than 15 degrees centigrade. At the peak of summer, the temperature may cross 40 degrees centigrade. Throughout the year, day and night are equal in duration. These regions receive abundant rainfall. A significant feature about this region is the tropical forest. A wide variety of plants and animals are found in these regions due to the continuous warmth and rain. The major types of animals living in this type of rainforests are monkeys, apes, gorillas, lions, tigers, elephants, leopards, lizards, snakes, birds and insects.



Migratory Bird

- Most tropical animals have sensitive hearing, sharp eyesight and thick skin. They also have skin colour that helps them to disguise and protect themselves from predators.

- All animals have some special feature, like good eyesight, sharp claws, long beaks, sensitive hearing or long trunks, to protect themselves.

The toucan has a long, large beak. This helps it reach the fruits on branches that are otherwise too weak to support its weight. The elephant has such large ears and tusks.

- The tusks are modified teeth and are used to tear the bark of trees for food.

- The large ears help it hear even very soft sounds. They also keep it cool in this hot and humid climate.



Toucan

- Most monkeys have grey-brown fur covering their body except the face, palms and soles. Long tailed Macaque is common in Western Ghats of India. It has silvery fur surrounding its face from head to neck. It is also called beard ape.



Red eyed Frog

- Many varieties of frogs are found in tropical regions. There is stiff competition for food and shelter as they are large in number. The region has 15 varieties of frogs. Out of which common frog, green frog with bulging red eyes (Red eyed frog) tree frog and croakers are found in abundance.



Elephant

INTERESTING FACTS

- The surroundings or the localities in which a variety of plants and animals occur in nature is called habitat. The word habitat means living or dwelling place. Habitat of an organism is a part of the total environment of the region and it must offer the resident organism food, shelter and climatic conditions that are well suited for the organism to survive, reproduce and flourish.

- The term microhabitat is defined as a small region or area within a given habitat with special features that suit some organisms better than others. The term microhabitat is used for a smaller and immediate habitat of an organism.

- Temperature is one of the essential and changeable environmental factors. It penetrates into every region of the biosphere and profoundly influences all forms of life by increasing or decreasing some of the vital activities of the organism. It is frequently a limiting factor for the growth or distribution of animals and plants.



Monkey Macaque

- The amount of water vapour present in the atmosphere also affects the climate of a place. It can be measured by a Hygrometer. Humidity is greatly affected by intensity of solar radiation, temperature, altitude, wind exposure, cover and water status of soil.

- Air in motion is called wind. Wind velocity can be measured by an Anemometer. It is an important ecological factor of the atmosphere affecting variously the plant life on flat plains, along sea coasts and at high altitudes in mountains.

- Rainfall is a source for ground water and relative humidity. The amount of rainfall greatly affects the vegetation as well as animal population of a particular region.

- The gases present in the atmosphere are chiefly oxygen, carbon dioxide and nitrogen which greatly influence the living organisms.

Do you know?

The term ecology is derived from two Greek words (oikos- means 'house' or place to live and logos means 'a discussion or study'). Literally, ecology is the study of organism 'at home' in their native environment. The term was first

introduced by Riter in 1868, but was fully defined by Ernest Haeckel in 1869

KEY WORDS

- Adaptation - Changes acquired in habits and features that help animals to be able to live in their surroundings.
- Migration - Birds and some other animals move from place to place during adverse climates.

- Camouflage - Concealing by merging with the surroundings.
- Tropical region - Area between Tropic of cancer and tropic of Capricorns.

Do you know?

Elephants have the largest brain nearly 11 pounds on average.

CONCEPT MAP

