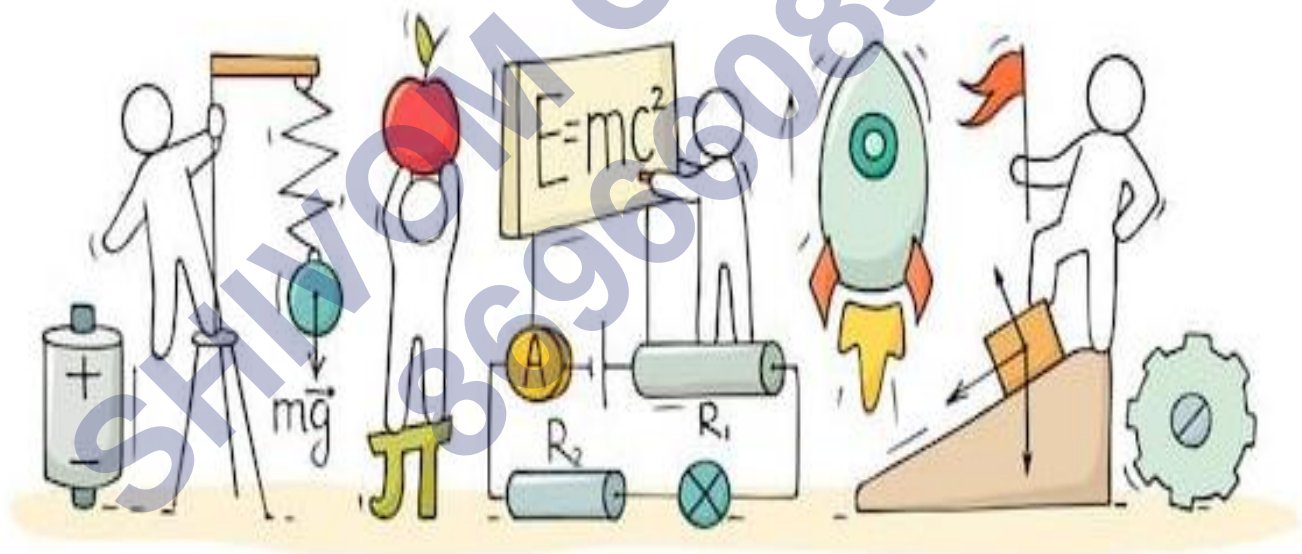


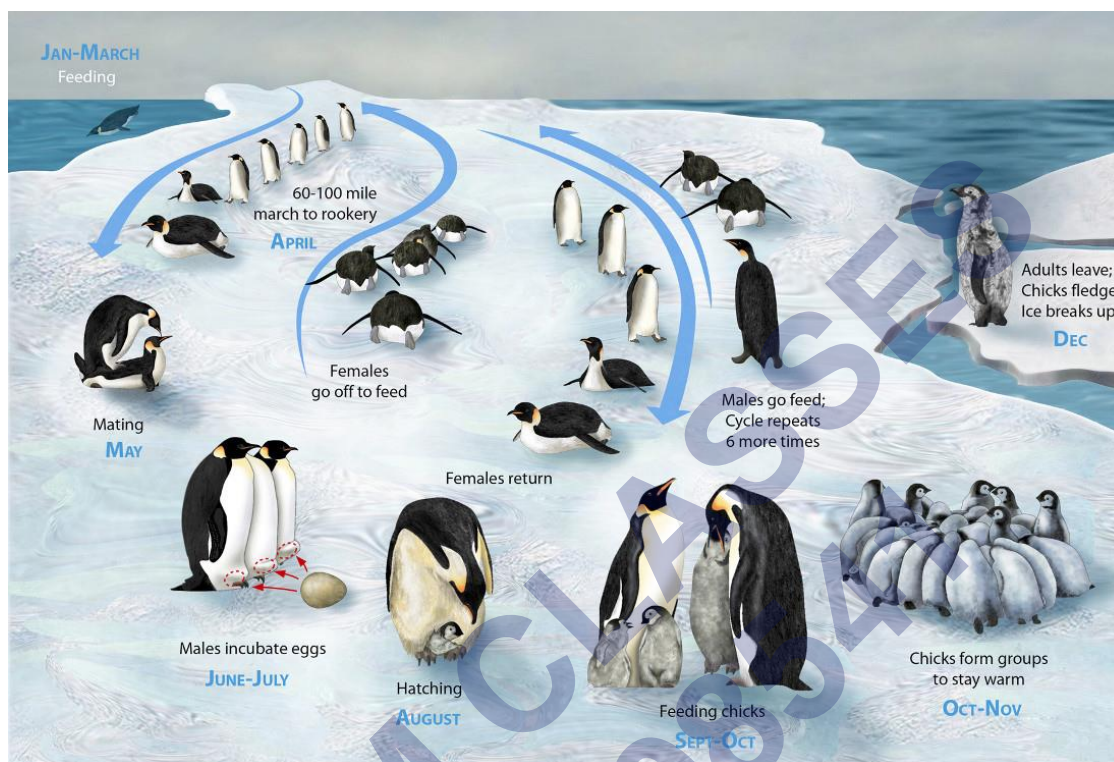
SCIENCE

CHAPTER-7: WEATHER CLIMATE AND ADAPTATIONS OF ANIMALS TO CLIMATE



Weather, Climate and Adaptations of Animals to Climate

Weather



- The **weather** of a place is the day-to-day conditions of the atmosphere with respect to the temperature, humidity, rainfall, wind speed etc. at that place.
- It provides brief information about the temperature, humidity and rainfall during the past 24 hours and predicts the weather for the day.
- Temperature, humidity and other factors are called the **elements of weather**.
- The degree of hotness or coldness of a body or environment is termed as **temperature**.
- **Humidity** is the measure of water vapour or moisture in the air.
- It is a report prepared by the Meteorological Department of the Government by collecting information on temperature, wind, etc.
- Humidity: it is a measure of the moisture in air.
- Rain gauge: It is a cylindrical instrument with a funnel to collect rainwater, to measure amount of rainfall.
- The temperature, rainfall, humidity is constantly changing from days to weeks.

- Weather: it is a state of atmosphere at a given place with respect to the temperature, humidity, rainfall, wind speed etc.
- The weather reports record the maximum and minimum temperature every day using the maximum and minimum thermometer.
- The maximum temperature can be recorded in the afternoon and minimum temperature is usually recorded early morning
- Changes in the weather are caused by the sun as it is the primary source of energy to all living creatures.
- In winters the nights are longer and days are shorter in winter.

Climate

- The average weather pattern over a long period of time, suppose 25 years, is called the **climate** of that place.
- The scientific study of weather is called **meteorology**, and the specialists who study and forecast the weather every day are known as **meteorologists**.
- There are four major types of climates in the world:

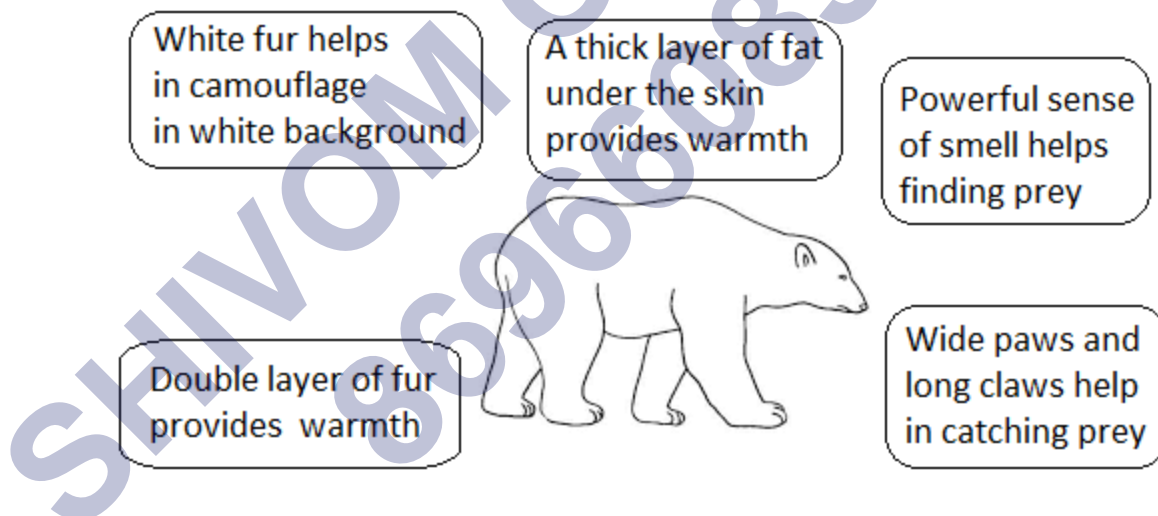
CLIMATE AND ADAPTATION:

- Change in climate lead to adaption in animal and results in evolution.
- Climate also has an effect on the soil.
- The polar region has is located near the north and south pole whereas the tropical rainforest is located near the equator.

1. The polar regions:

- The poles have extremely cold climate throughout the year and is snow clad at most of the time in the year.
- In winters, the temperature can drop down to below -37°C .
- Animals living in poles have adapted to these extreme conditions.
- Polar bears have white fur to camouflage with snow. It helps them in catching preys as well as protects them from predators.
- The 2 layers of fur and fat under the skin also protects them from extreme cold climate.

- On a warm day, physical activity can lead to overheating in polar bears. The temperature can be brought down by swimming in water.
- The paws are modified to be wide and large which helps to swim and walk in snow.
- They have well developed sense of smell which help them catch its prey
- Penguin is also a white animal which gets a benefit of the snow to hide from the predators.
- Penguins also have a thick skin to protect them from cold climate.
- Penguins have streamlined body and webbed feet to swim.
- The birds cannot tolerate this cold climate so they migrate to warmer region.
- The migratory birds travel a long distance and use landmarks, earth's magnetic field to judge the direction of travel.
- Many fishes and insects also migrate in different season.



2. The tropical rainforests:

- these forests are located near the equator due to this reason the climate in these forests is generally quite hot even during the colder months.
- In summers the temperature can get higher than 40°C, at the same time there is good rainfall in these areas.
- The length of day and night is almost same throughout the year.
- In India these forests are found in Western Ghats and Assam, whereas this forest is also

found in Southeast Asia, Central America and Central Africa.

- Large Diversity of flora and fauna is found in the rain forest. There is competition for food and shelter
- Animals are well adapted for living on trees e.g., Red-eyed frog has adapted sticky pads on feet which aid in climbing trees.
- The monkeys have adapted long tails to maintain balance on trees.
- Toucan is a bird which have a modified beak which is long, large beak which helps the bird to feed on fruits.
- Other adaptations include sensitive hearing and thick skin in animals like lions and tigers, sharp eyesight, and a skin color which helps them to camouflage by blending with the surroundings.



Elephants:

- Elephants have adapted to Indian tropical rainforest.
- The trunk is used as a nose and has sense of smell and collecting food.
- The tusks are modified teeth which help them in feeding on tree barks.
- The large ears are of the elephant helps it hear even minimal sounds in the surroundings.
- The rainforest has a hot and humid climate
- The large ears help in maintaining the body temperature.



Adaptations in Animals

Animals	Adaptation
<u>Polar bears</u>	<ul style="list-style-type: none"> • Polar bears have two thick layers of fur and a layer of fat under their skin, thereby protecting them from cold. • They have wide and large paws which not only help them to swim well but also walk with ease in the snow. • They can close their nostrils and remain under water for a long time. • They also have a strong sense of smell which helps them to hunt.
<u>Penguins</u>	<ul style="list-style-type: none"> • Penguins have thick skin and a lot of fat for protection against the cold. • They move in groups which helps to keep their body warm. • Their streamlined bodies and webbed feet make them good swimmers.
<u>Siberian cranes</u>	<ul style="list-style-type: none"> • Siberian cranes come from Siberia to warm places such as Bharatpur in Rajasthan and Sultanpur in Haryana to escape cold winters.
<u>Reindeers</u>	<ul style="list-style-type: none"> • Reindeers migrate to warmer regions in the south where sufficient food is available. • They return to their original habitat in North America after a few months when the snow there starts melting.

Migration

The process in which a bird (or other animal) moves from one place to another in one season and returns again in a different season is called migration. Migration of birds (or other animals) is an adaptation to escape the harsh and cold conditions of their normal habitat in winter so as to survive.

When the winter sets in cold regions of the earth, the climate becomes extremely cold. The birds which normally live in these regions migrate (fly off) to far flung warmer places to escape the extremely cold winter climate and survive. And when the winter season is over, these birds fly back to their original habitats in the cold regions.

The birds which migrate from very cold regions to warmer regions in winter and go back after the winter is over, are called migratory birds. One of the most common migratory bird which comes to India every year for a few months is the Siberian crane. When winter sets in Siberia, and it gets extremely cold, the Siberian crane flies thousands of kilometres and comes to warmer places in India such as Bharatpur in Rajasthan, Sultanpur. The Siberian cranes fly back to Siberia when the winter ends there and climate becomes favourable.

The migratory birds usually fly high up in the sky where the wind flow is helpful and low temperature aids in dispersing the heat generated by the constant working of their flight muscles in flapping the wings.

Reindeer is a mammal which migrates. Reindeers live in herds in the cold, northern regions of North America where they feed on grass and shrubs in the summer. During winter, when the snowfall occurs, all the grass and shrubs get buried in snow and reindeers do not get any food. Due to this, reindeers migrate to the warmer regions in the south where they get sufficient food. They return to the original habitat in the north after a few months when the snow starts melting.

Adaptations in Toucan



Toucan

The animal which is adapted to get food from the fruits attached at the ends of even very thin branches is 'toucan. Toucan is a colourful bird with a strange looking beak. Toucan's beak is long and large. It has brightly coloured feathers. It spend most of the time in the holes of big trees. Toucan eats fruits of the trees.

- 1) Long and large beak: The long and large beak helps a toucan to reach the fruits attached to the ends of even thin branches of trees which are too weak to support its weight. Thus, long and large beak is an adaptation in toucan for getting the otherwise unreachable fruits at the ends of very thin branches of trees. The large beak also helps in the temporary storage of fruits being collected by toucan
- 2) The feet of toucan are adapted for grasping the branches of trees firmly. The toucan has four toes (with claws) on each foot. Two toes pointing forward and two toes pointing backward. This arrangement of toes helps the toucan to get a firm grip on the branches of trees.
- 3) Toucan has the ability to change the colour of its feathers in order to blend (or mix up) with the surroundings. Due to this adaptation, toucan is not noticed easily by the predators and hence remains safe.

Adaptations in Monkey



- 1) Monkeys are expert climbers. The hands and feet of monkeys are adapted in such a way that they can easily hold on to branches of trees.
- 2) Monkeys have long and strong gripping tails which they use for grasping branches of trees.
- 3) Monkeys have very good eyesight: The very good eyesight helps the monkeys in leaping between the branches to escape from their predators.

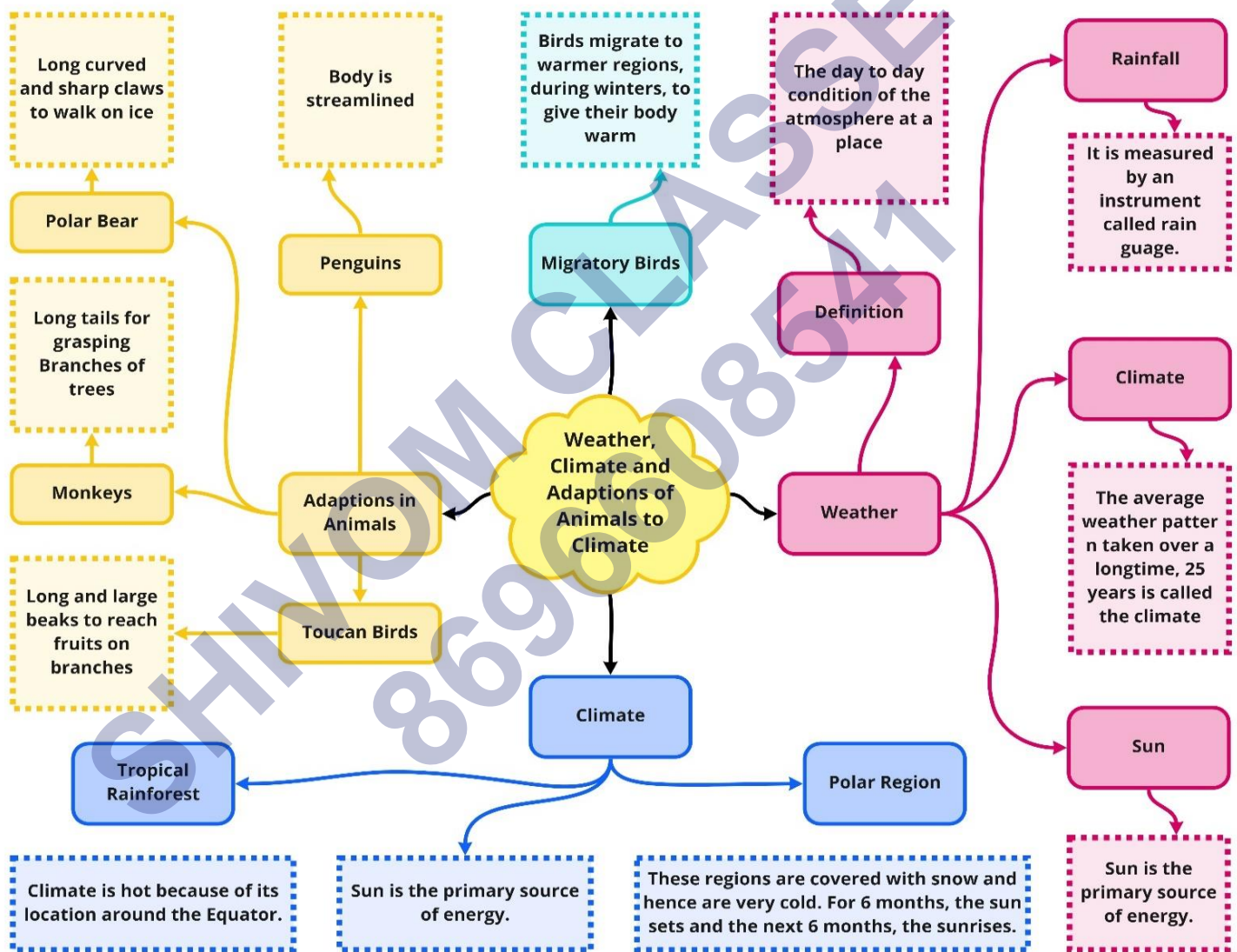
Adaptations in Lion-Tailed Macaque



The lion-tailed macaque is a kind of medium sized monkey with a long face and cheek pouches for holding food while it is being collected. The most outstanding feature of lion-tailed macaque is its silver-white 'mane' which surrounds its head from the cheeks down to its chin. The mane of lion-tailed macaque appears to be like a beard, so the lion-tailed macaque is also called beard ape. The lion-tailed macaques live in the rainforests of Western Ghats in India. The lion-tailed macaques spend most of the time feeding in the upper canopy of trees in the rainforests

- 1) The lion-tailed macaque is a good climber and spends most of its time high up in trees. The hand and feet of lion-tailed macaque are adapted to hold on to the branches of trees firmly.
- 2) The lion-tailed macaque has very good eyesight which helps it in leaping between the branches. This adaptation is useful in moving from one tree to another in search of food and also to escape from predators.
- 3) The lion-tailed macaque feeds mainly on fruits on the trees. It also eats seeds, leaves stems, flowers, and buds. The lion-tailed macaque also searches for insects under the bark of trees and eats them. Since lion-tailed macaque gets sufficient food on the trees, it rarely comes down on the ground.

Class : 7th Science
Chapter-7: Weather, Climate and Adaptions of Animals to Climate



Important Questions

➤ Multiple Choice Questions:

Question 1. Which of the following is the climate found in Kerala?

- (a) Very hot and wet
- (b) Wet
- (c) Hot and dry
- (d) Moderately hot and moderately dry

Question 2. Maximum temperature of the day occurs generally

- (a) in the afternoon
- (b) when the sun rises
- (c) when the sun sets
- (d) in the evening

Question 3. Nights in deserts are much cooler because

- (a) humidity becomes high
- (b) sand cools down faster
- (c) wind blows vigorously
- (d) it rains at night

Question 4. The annual record of long-term average temperature and rainfall at a particular place is known as

- (a) climate
- (b) climate chart
- (c) weather
- (d) weather forecasting

Question 5. Elements of weather are

- (a) temperature
- (b) humidity
- (c) rainfall
- (d) all of these

Question 6. Weather forecasting helps in

- (a) preparing for bad weather

- (b) planning of daily activities
- (c) planning for farming
- (d) all of these

Question 7. The humidity of a place refers to

- (a) the rainfall
- (b) the amount of water vapour in the air
- (c) the snowfall
- (d) all of the above

Question 8. Penguins are adapted to live in

- (a) desert climate
- (b) equatorial region
- (c) polar region
- (d) rainforests

Question 9. Which of the following part of India has hot and dry climate?

- (a) Kashmir
- (b) Rajasthan
- (c) Kerala
- (d) North-east region

Question 10. Which of the following statement is incorrect for penguins?

- (a) They huddle together
- (b) They cannot swim
- (c) They have webbed feet
- (d) They have streamlined body

Question 11. Generally nocturnal, large padded feet, less sweating, mechanism to conserve water, etc. are adaptive features of animals living in

- (a) polar regions
- (b) tropical regions
- (c) desert regions
- (d) equatorial region

Question 12. The average weather pattern taken over a long time, say 25 years is known as

- (a) climate

- (b) adaptation
- (c) humidity
- (d) weather

Question 13. The coldest region on the earth is the

- (a) polar region
- (b) tropical region
- (c) temperate region
- (d) coastal region

Question 14. The hump of the camel is a reservoir of

- (a) fatty tissue
- (b) water
- (c) milk
- (d) all of the above

Question 15. Which one of the following is not the part of daily weather report?

- (a) Pressure
- (b) Temperature
- (c) Rainfall
- (d) Humidity

➤ **Fill In the Blanks:**

1. Elephant uses its as a nose.
2. Penguin live in regions.
3. Tusks of the elephant are the
4. The average taken over a long time is called the climate of the place.
5. The axis about which the earth rotates is
6. Red eyed frogs lives on

➤ **True or False:**

1. All the changes in the weather are driven by the moon.
2. The polar regions are very cold throughout the year.
3. Tusks of the elephant are the modified teeth.
4. Migration is only shown by the birds living in cold places.

5. Typical desert climate is found in Rajasthan.
6. Maximum and minimum temperature in a day are recorded by special thermometers called maximum and minimum thermometers.

➤ Very Short Question:

1. Name the two elements of weather.
2. What is humidity?
3. Who prepares daily weather report?
4. Name an instrument used to measure rainfall.
5. Do all the seven days have same maximum and minimum temperatures, humidity and rainfall?
6. What is the use of maximum and minimum thermometer?
7. Days are shorter in winter or in summer?
8. What kind of places experiences hot and dry climate?
9. Name the place in India having wet climate.
10. Name some countries having tropical rain forest.

➤ Short Questions:

1. What do you mean by climate of a place?
2. Name the elements determining weather of a place.
3. Differentiate between meteorology and meteorologists.
4. Explain how latitude affects Indian climate.
5. Explain how altitude affects Indian climate.
6. Explain how climate of a place is affected by distance from the sea.
7. Explain how climate of a place is affected by ocean current.
8. How wind affect climate of a place?

➤ Long Questions:

1. Explain weather of a place.
2. How does an elephant living in tropical rain forest adapt itself?
3. Write a short note on the characteristics of Beard ape?
4. How polar bear is adopted in the polar climatic condition.
5. What is the advantage of having a long sense of smell of polar bear?

✓ Answer Key-

➤ Multiple Choice Answers:

1. (a) Very hot and wet
2. (a) in the afternoon
3. (b) sand cools down faster
4. (b) climate chart
5. (d) all of these
6. (d) all of these
7. (b) the amount of water vapour in the air
8. (c) polar region
9. (b) Rajasthan
10. (b) They cannot swim
11. (c) desert regions
12. (a) climate
13. (a) polar region
14. (a) fatty tissue
15. (a) Pressure

➤ Fill In the Blanks:

1. trunk
2. polar
3. modified teeth
4. weather
5. tilted
6. trees

➤ True or False:

1. False
2. True
3. True
4. False
5. True

6. True

➤ Very Short Answers:

1. Answer: Temperature, humidity etc.
2. Answer: Humidity is the measure of the moisture in air.
3. Answer: Meteorological department of the government.
4. Answer: Rain gauge.
5. Answer: No
6. Answer: To measure weather temperature.
7. Answer: Winter
8. Answer: Places that receive very little rainfall like desert regions.
9. Answer: North eastern part of India has wet climate.
10. Answer: India, Malaysia, Indonesia, Brazil etc.

➤ Short Answer:

1. Answer: Climate is the average weather conditions – temperature, pressure, precipitation and humidity – expected for a certain place. Climate is based on the average weather experienced over 30 years or more.
2. Answer: Temperature, air pressure, wind speed, humidity and rainfall are the essential elements determining weather of a place.
3. Answer: Meteorology is the science of monitoring and studying the atmosphere and predicting its weather and climate whereas Meteorologists are the People who study the weather and climate
4. Answer: Due to the curvature of the Earth, the amount of solar energy received is different according to the latitudes and thus it affects India's climatic condition.
5. Answer: As we go higher, temperature generally decreases (From equator to poles) as the atmosphere becomes less dense, and thus it affects India's climatic condition.
6. Answer: The sea has a moderating effect on the climate. As distance from sea increases, this effect decreases and places experience extreme weather conditions and thus it affects India's climatic condition.
7. Answer: Ocean currents affect the climate of the coastal areas with the onshore winds.
8. Answer: If the temperature of the wind is cold/hot coming from a particular place the place it should go to could have the opposite temperature of the place that the wind is coming from.

➤ Long Answer:

1. Answer: Weather describes the condition of the atmosphere. It might be sunny, hot, windy or cloudy, raining or snowing. The weather depends on the temperature, precipitation, humidity and atmospheric pressure of the part of atmosphere (air) closest to the surface of the earth. The weather is constantly changing as temperature and humidity change in the atmosphere.
2. Answer: It has adapted to the conditions of rainforests in many remarkable ways. It uses its trunk as a nose because of which it has a strong sense of smell. The trunk is also used by it for picking up food. Moreover, its tusks are modified teeth. These can tear the bark of trees that elephant loves to eat. So, the elephant is able to handle the competition for food rather well. Large ears of the elephant help it to hear even very soft sounds. They also help the elephant to keep cool in the hot and humid climate of the rainforest.
3. Answer: The lion-tailed macaque (also called Beard ape) lives in the rainforests of Western Ghats. Its most outstanding feature is the silver-white mane, which surrounds the head from the cheeks down to its chin. It is a good climber and spends a major part of its life on the tree. It feeds mainly on fruits. It also eats seeds, young leaves, stems, flowers and buds. This beard ape also searches for insects under the bark of the trees. Since it is able to get sufficient food on the trees, it rarely comes down on the ground.
4. Answer: A polar bear has following adaptation features:
 - They have white fur so that they are not easily visible in the snowy white background which helps it to protect them from their predators. It also helps them in catching their prey.
 - They have two thick layers of fur to protect them from extreme cold.
 - They also have layer of fat under their skin.
 - The polar bear goes for swimming for physical activities on warm days necessary for cooling.
 - Its paws are wide and large, which help it not only to swim well but also to walk with ease in the snow.
 - Polar bears can remain under water for long durations.
 - It has a strong sense of smell so that it can catch its prey for food.
5. Answer: The major types of animals living in the rainforests are monkeys, apes, gorillas, lions, tigers, elephants, leopards, lizards, snakes, birds and insects. The climatic conditions in rainforests are highly suitable for supporting an enormous number and variety of animals. As there is competition for food, some animals are adapted to get food, which is not easily reachable.