

Weather, Climate and Adaptations of Animals to Climate

Lesson at a Glance

- **Weather:** The day-to-day condition of the atmosphere at a place with respect to the temperature, humidity, rainfall, wind-speed, etc. is called *weather* at that place.
- The weather of a place changes day after day and week after week. The weather is such a complex phenomenon that it can vary over very short periods of time, say hour to hour.
- The maximum temperature of the day occurs generally in the afternoon while the minimum temperature occurs in the early morning.
- The times of sunrise and sunset also change throughout the year.
- All the changes in the weather are driven by the sun because the sun is the primary source of energy that causes changes in the weather.
- The average weather pattern taken over a long time, say 25 years, is called the *climate* of the place.
- **Elements of the Weather:** The temperature, humidity, rainfall, wind speed and other factors are called *the elements of the weather*.
- **Rain Gauge:** It is an instrument used to measure rainfall. It consists of a measuring cylinder with a funnel on top to collect rainwater.
- **Weather Report:** The *weather reports* are prepared by the Meteorological Department of the Government. This department collects data on temperature, humidity, wind-speed, rainfall, etc., and makes the weather report.
- To record the maximum and minimum temperatures during a day, there are special thermometers, called *maximum and minimum thermometers*.

- The region, for example, Rajasthan (Western region of India) has high temperature during most part of the year. The winter lasts only for a few months, the temperature is quite low. This type of regions receive very little rainfall. Such type of climate is the typical desert climate—hot and dry.
- The states of the north-eastern India receive rain for a major part of the year. So, people call the climate of the north-east is wet.

• Climate of different regions of India:

Region of India	Climate
(i) Northern region of Himalayas	(i) Cold and moderately wet.
(ii) Plains	(ii) Moderately hot and moderately wet.
(iii) South region	(iii) Very hot and moderately wet
(iv) Western region (e.g., Rajasthan)	(iv) Hot and dry
(v) North-eastern India	(v) Wet

- Features and habits that help animals to adapt to their surroundings are the results of the evolution process and are called *adaptation*.
- **The Tropical Region:** The region which has generally a hot climate because of its location around the equator, is called *tropical region*. *The region gets plenty of rainfall*. During hot summers temperature may be close to 40°C. During cold days temperature remains about 15°C.
- The polar regions are very cold throughout the year. The sun does not set for six months in a year at the poles while for the other six months the sun does not rise.
- Animals that live in the polar regions are adapted to the extremely cold climate. To survive in extreme climate, they have adaptations such as—White fur, strong sense of smell, a layer of fat under the skin, wide and large paws for swimming and walking.
- **Migration** is another means to escape the harsh, climatic conditions.

- Due to favourable conditions tropical rain forests support huge populations of plants and animals.
- Animals have the following adaptations to live in tropical rain forests. They eat different kinds of food to overcome the competition for food and shelter, living on the trees, development of strong tails, long and large beaks, bright colours, sharp patterns, loud voice, diet of fruits, sensitive hearing, sharp eyesight, thick skin, ability to camouflage in order to protect themselves from predators, etc.

TEXTBOOK QUESTIONS SOLVED

Q.1. Name the elements that determine the weather of a place.

Ans. The temperature, humidity, rainfall, wind-speed, etc. are called the elements that determine the weather of a place.

Q.2. When are the maximum and minimum temperature likely to occur during the day?

Ans. The maximum temperature of the day occurs generally in the afternoon and the minimum temperature occurs in the early morning.

Q.3. Fill in the blanks:

- The average weather taken over a long time is called _____.
- A place receives very little rainfall and the temperature is high throughout the year, the climate of that place will be _____ and _____.
- The two regions of the earth with extreme climatic conditions are _____ and _____.

Ans. (i) climate of the place (ii) hot, dry
(iii) polar, tropical regions

Q.4. Indicate the type of climate of the following areas:

- Jammu and Kashmir: _____
- Kerala: _____
- Rajasthan: _____
- North-east India: _____

Ans. (a) Jammu and Kashmir—moderately hot and moderately wet climate.

- Kerala—very hot and wet climate.
- Rajasthan—hot and dry climate.
- North-east India—The north eastern India receives rain for a major part of the year, hence wet climate.

Q.5. Which of the two changes frequently, weather or climate?

Ans. Weather.

Q.6. Followings are some of the characteristics of animals:

- | | |
|---------------------------|------------------------------|
| (i) Diets heavy on fruits | (ii) White fur |
| (iii) Need to migrate | (iv) Loud voice |
| (v) Sticky pads on feet | (vi) Layer of fat under skin |
| (vii) Wide and large paws | (viii) Bright colours |
| (ix) Strong tails | (x) Long and large beak |

For each characteristic indicate whether it is adaptation for tropical rainforests or polar regions. Do you think that some of these characteristics can be adapted for both regions?

Ans.	Characteristics of animals	Adaption for
(i)	Diets heavy on fruits	— tropical rainforests
(ii)	White fur	— polar regions
(iii)	Need to migrate	— polar regions
(iv)	Loud voice	— tropical rainforests
(v)	Sticky pads on feet	— tropical rainforests
(vi)	Layer of fat under skin	— polar regions
(vii)	Wide and large paws	— polar regions
(viii)	Bright colours	— tropical rainforests
(ix)	Strong tails	— tropical rainforests
(x)	Long and large beak	— tropical rainforests

Q.7. The tropical rainforests has a large population of animals. Explain why it is so.

Ans. Because of continuous warmth and rain, the tropical region supports an enormous number and a wide variety of animals.

Q.8. Explain with examples, why we find animals of certain kind living in particular climatic conditions.

Ans. Animals are adapted to survive in the conditions in which they live. Features and habits which help them

to adapt to their surroundings are the result of evolution. So, to survive in a particular type of climate the animals must have certain adapted features. This is the reason we find animals of certain kind living in particular climatic conditions. For example, animals in the polar region are adapted to the extremely cold climate. They have special characteristics, such as white fur, strong sense of smell, a layer of fat under the skin, wide and large paws for swimming and walking in snow etc.

Q.9. How do elephants living in the tropical rainforests adapt themselves?

Ans. The elephant has adapted to the conditions of rainforest in many remarkable ways. It has a trunk that it uses as a nose because of this it has a strong sense of smell. The trunk is also used by it for picking up food. Its tusks are modified teeth. These can tear the bark of trees that an elephant loves to eat. So, the elephant is able to handle the competition for food very 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 humid climate of the rainforest.

Choose the correct option which answers the following question:

Q.10. A carnivore with stripes on its body moves very fast while catching its prey. It is likely to be found in:

- (i) polar regions (ii) deserts
(iii) oceans (iv) tropical rainforests

Ans. (iv) tropical rainforests

Q.11. Which features adapt polar bears to live in extremely cold climate?

- (i) A white fur, fat below skin, keen sense of smell.
(ii) Thin skin, large eyes, a white fur.
(iii) A long tail, strong claws, white large paws.
(iv) White body, paws for swimming, gills for respiration.

Ans. (i) A white fur, fat below skin, keen sense of smell.

Q.12. Which option best describes a tropical region?

- (i) hot and humid
(ii) moderate temperature, heavy rainfall
(iii) cold and humid
(iv) hot and dry

Ans. (i) Hot and humid

EXTENDED LEARNING — ACTIVITIES AND PROJECTS

Q.1. Collect weather reports of seven successive days in the winter months (preferably December). Collect similar reports for the summer months (preferably June). Now prepare a table for sunrise and sunset times as follows:

Table

June			December		
Date	Sunrise	Sunset	Date	Sunrise	Sunset

Try to answer the following questions:

- (i) Is there any difference in the time of sunrise during summer and winter?
(ii) When do you find that the sun rises earlier?
(iii) Do you also find any difference in the time of sunset during the month of June and December?
(iv) When are the days longer?
(v) When are the nights longer?
(vi) Why are the days sometimes longer and sometimes shorter?
(vii) Plot the length of the day against the days chosen in June and December.

Ans. Students should prepare a table for sunrise and sunset times as shown. On the basis of your observations and interpretations answer the questions.

- (i) Yes, in summer sun rises earlier than in winters.
(ii) Sun rises earlier in summer.

- (iii) Yes, there is difference in the time of sunset during the months of June and December. The sun sets late in the month of June and early in the month of December.
- (iv) Days are longer in summer (in the month of June).
- (v) Nights are longer in winter (in the month of December).
- (vi) The earth revolves round the sun on an elliptical orbit. Seasons change with the change in the position of the earth around the sun. We live in Northern hemisphere of the earth which remains tilted towards the sun in summers. A large portion of the earth gets light from the sun. This causes longer days and shorter nights.

In winters, the Southern hemisphere of the Earth tilts towards the sun. Hence, Northern hemisphere gets light for shorter duration causing shorter days and longer nights.

- (vii) Plot the graph as directed.

Q.2. Collect information about the Indian Meteorological Department. If possible, visit its website: <http://www.ind.gov.in>. Write a brief report about the things this department does.

Ans. Meteorological Department: The study of the processes and phenomena of the atmosphere, especially as a means of forecasting the weather is called meteorology. The department which takes care of these things is called meteorological department.

Functions of Meteorological Department: Some of the functions of the meteorological department are to study the natural processes and phenomena such as:

- (i) increase or decrease of air pressure in defined regions.
- (ii) formation of clouds.
- (iii) seismic changes that may cause earthquakes.
- (iv) study of changes in the atmosphere that may cause storms, hurricanes etc.

- (v) variation of atmospheric temperature, humidity, wind velocity etc.
- (vi) time of sunrise and sunset, maximum and minimum temperature of the previous.

Thus, meteorological department constantly keeps a watch on the various processes and phenomena that happen in the atmosphere. On the basis of the study and observation they predict about things such as:

- (i) What would be the weather tomorrow.
- (ii) When monsoon is expected.
- (iii) To study when cyclone, hurricane, tornado etc. are expected.