Grade Eight Social Study

1.2.2 Structure of the Earth's Atmosphere

The earth's atmosphere is divided into four layers based on temperature variation. The four layers of the earth's atmosphere are: troposphere, stratosphere, mesosphere and thermosphere.

Troposphere: it is the lower portion of the atmosphere. It extends from sea level to 8/16 km. It contains three-fourth of the atmospheric mass. All kinds of weather changes take place only in this layer. It has uniform temperature that decreases when ever there is an increase of altitude. The top boundary is known as the tropopause, which is characterized by jet streams (high velocity winds).

Stratosphere: it extends from the tropopause up to about 50 km. Here, temperature is nearly constant upward to about 20 km. Then after, it increases owing to absorption of ultraviolet radiation by ozone. It has high concentration of ozone gases. Its upper limit is called the stratopause.

Mesosphere: it extends up from the stratopause to about 80/85 km. In the lower mesosphere, temperature changes slowly with an increase in altitude. However, it decreases to nearly–100oC at the top of the mesosphere. It is the coldest part of the atmosphere. Its upper surface is known as the mesopause. Also, it is the layer of the strongest winds whose velocity is nearly 300 km/hour. Most meteorites burn and disintegrate because of friction in this layer.

Thermosphere: it is the upper most layer of the atmosphere. This layer is of extremely low density. It is characterized by a direct relationship between temperature and altitude. Temperatures get up to 725°C - 1,225°C. The extreme outer fringe is believed to extend as far as 1000 km above the surface of the earth. Gradually, it is taken over by vacuum and very little heat can be absorbed, held or conducted. Thermosphere can be further subdivided into ionosphere and exosphere.

I. **Ionosphere** it extends from roughly 80 km to somewhere around 500 to 700 km above the earth's surface. It is a layer of electrically charged particles. These electrons and ions are useful for communication because they reflect radio waves.

II. **Exosphere:** it is the outermost fringe of the atmosphere. It lies beyond about 500-700 km and is characterized by increasing hydrogen and helium content.

Unit One Section 1.2.2

Worksheet One :

Section A

1. **How many main layers does Earth's atmosphere have based on temperature?**

a) Three b) Five c) Four d) Six

2. **Which is the lowest layer of the Earth's atmosphere?**

a) Mesosphere b) Troposphere

c) Stratosphere d) Thermosphere

3. **Where do all weather changes occur?**

a) Mesosphere b) Ionosphere

c) Troposphere d) Stratosphere

4. **What happens to temperature as altitude increases in the troposphere?**

a) It stays the same b) It increases

c) It decreases d) It freezes

5. What is the top boundary of the troposphere called?

a) Tropopause
b) Stratopause
c) Mesopause
d) Thermopause

6. What is the height range of the troposphere?

a) 0 to 50 km
b) 16 to 50 km
c) 8 to 16 km
d) 80 to 100 km

7. Which atmospheric layer contains the ozone layer?

a) Troposphere
b) Stratosphere
c) Thermosphere
d) Mesosphere

8. What happens to temperature in the upper part of the stratosphere?

a) It decreases
b) It freezes
c) It increases
d) It becomes constant

9. What is the upper boundary of the stratosphere called?

a) Mesopause
b) Thermopause
c) Stratopause
d) Tropopause

10. Which layer lies between the stratosphere and thermosphere?

a) Troposphere
b) Mesosphere
c) Ionosphere
d) Exosphere

11. What is the temperature like in the mesosphere's upper part?

a) Very hot
b) Nearly –100°C
c) Constant
d) Room temperature

12. What is the top boundary of the mesosphere called?

a) Stratopause
b) Thermopause
c) Mesopause
d) Tropopause

13. In which layer do most meteorites burn up?

a) Troposphere
b) Stratosphere
c) Mesosphere
d) Thermosphere

14. Which layer contains the fastest winds (up to 300 km/h)?

a) Troposphere
b) Mesosphere
c) Thermosphere
d) Ionosphere

15. Which is the hottest layer of the atmosphere?

a) Troposphere
b) Mesosphere
c) Thermosphere
d) Stratosphere

16. What happens to temperature in the thermosphere as altitude increases?

a) It decreases
b) It stays constant
c) It increases
d) It becomes zero

17. What is the density of air like in the thermosphere?

a) Very high
b) Extremely low
c) Same as surface
d) None

18. What is the ionosphere known for?

a) Oxygen production
b) Hosting birds
c) Reflecting radio waves
d) Forming clouds

19. What are the particles in the ionosphere?

a) Ozone molecules
b) Ice crystals
c) Electrically charged ions and electrons
d) Dust and pollen

20. Which layer is the outermost part of the Earth's atmosphere?

a) Ionosphere
b) Thermosphere
c) Exosphere
d) Mesosphere