

INTRODUCTION:

The **exosphere** is the outer most layer of the Earth's atmosphere. Light widely spaced gases such as helium and hydrogen are found in this layer. Beyond this layer is outer space but there is no clear boundary between the atmosphere and space.

In the next closest layer, the **thermosphere** (80-100 km), temperatures are very hot because of exposure to the sun's radiation. Because the molecules and atoms making up this layer are so sparse and widely spaced, there is little heat. The ionosphere is within the thermosphere and consists of electrically charged particles. Radio waves can bounce off this ionosphere and the Aurora Borealis (Northern Lights) also originate here.

The next closest layer is the **mesosphere** (50-80 km) and has the lowest temperatures in the atmosphere. It is cold because unlike the next layer below, the stratosphere, it contains no ozone.

The layer second closest to the earth's surface is the **stratosphere** and is about 30 km thick. In this layer the temperature of the air is coldest at the bottom and warmest at the top. Thus, the stratosphere is calm compared to the stormy troposphere below. The stratosphere contains a special form of oxygen called ozone. Ozone absorbs much of the sun's ultraviolet light preventing most UV rays from reaching the Earth's surface.

The boundary between the stratosphere and troposphere is called the **tropopause**.

The **troposphere** is the lowest layer of the atmosphere and where we live. The higher the elevation in the troposphere, the colder the temperature, The troposphere extends to about 8 kilometers high over the cold polar regions and to about 20 km over the warm regions near the Equator. Winds occur in the troposphere and most water vapor in the atmosphere is found here. This water vapor forms clouds and as a result rain, snow, and ice form in this layer with all weather occurring in the troposphere. The Jet Stream is usually located near the top of the troposphere.

Cross-Section

Thus, the atmosphere is made up of five layers. From the reading above, draw and label the 5 atmospheric layers as a cross-section. Include the name and height of each layer and the most significant feature of each layer.

OUTER SPACE

EARTH'S SURFACE

DEFINITIONS:

Using the reading above, answer the following questions.

1. In which layer does weather occur?
2. What is the tropopause?
3. What layer of the atmosphere has ozone?

4. What is an ion?

Graph Interpretation:

5. Observe the graph provided. Notice that the graph plots temperature of the atmosphere on the horizontal axis and height of the atmosphere on the vertical axis.

6. On your graph, draw a dotted line at the following elevations.
20 km, 50 km, 80 km, and 100 km

7. What is happening to the temperature at each one of these dotted lines?

8. Write the names of the layers in the appropriate place on your graph

- TROPOSPHERE (0-20 KM)
- STRATOSPHERE (20-50 KM)
- MESOSPHERE (50-80 KM)
- THERMOSPHERE (80 KM -100km)
- EXOSPHERE (100 km and beyond)

9. Using the graph, explain why the troposphere has air which is active (wind) and is almost constantly in motion.

10. Again using the graph, explain why the stratosphere has air which is calm (no wind) and is almost never in motion.

Match the description with the layer in which it belongs.

11. (a) Closest layer to the earth _____
- (b) Has rain clouds _____
- (c) A fairly calm region _____
- (d) The layer where we live _____
- (e) Has a great deal of ozone _____
- (f) Has the coldest temperatures _____
- (g) Has a layer of ions _____
- (h) Reflects radio waves _____
- (i) Has the hottest temperatures _____
- (j) Contains all atmospheric storms _____

(k) The Jet Stream is at the top of this layer _____