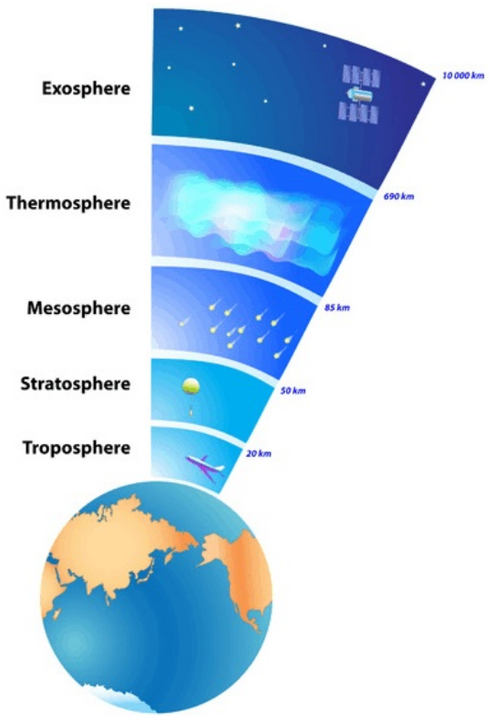
Science 1206
Unit 2: Weather Dynamics
Worksheet 9: Layers of the Atmosphere

The atmosphere has a definite impact upon weather patterns and changes. At one time the atmosphere was once considered to be nothing more than a column of air that extends to an altitude about 500 km above the earth's surface. Today, it is known that the atmosphere is divided into various horizontal regions or layers, each having it own characteristics. The atmospheric layers tend to be thicker over the equator than they are above the poles. This is due in part to the temperature differences, and also the gravitational pull of the Sun and Moon



NAME	ALTITUDE	DESCRIPTION OF LAYER
Troposphere	**0- 16 km**	• Layer closest to the Earth's surface. • Most of our weather occurs in this layer. • The upper part of this layer is colder than the lower part • This layer contains half of Earth's atmosphere.
Stratosphere	**16km-50 km**	• This layer contains high concentrations of ozone. • Ozone protects the Earth from harmful doses of ultraviolet given off by the sun • The ozone also cause the stratosphere to be warmer • Tropopause refers to transition Layer between the troposphere and stratosphere • No weather occurs here • Jet aircraft fly here because it is very stable.
Mesosphere	**50km-80km**	• This layer has low concentrations of gases • Most meteors burn up in the mesosphere. • The mesopause is the coldest part of the atmosphere.
Thermosphere	**80km-500 km**	• It is in this layer that X-rays (from the sun) are absorbed. This absorption by the few air molecules in this layer gives the molecules energy producing higher temperatures. • The sun's radiation cause the particles in this layer to become electrically charged to produce the northern and southern lights.
Exosphere	**500 km - 1000km**	• thin outer part of our atmosphere • There are very few particles (mainly hydrogen) in this layer • The upper part of this layer is the beginning of true space. • Some manmade satellites orbit the Earth within this layer. • Different regions of this layer make long distance communication possible.

PART A: MULTIPLE CHOICE [8]

Instructions: Shade the letter of the correct answer on the computer scorable answer sheet provided

1. The earth's atmosphere is divided into layers based on the vertical profile of:

   (A) Air density
   (B) Air temperature
   (C) Air pressure
   (D) Wind speed

2. Which atmospheric layer is closest to the Earth's surface?

   (A) Stratosphere
   (B) Tropopause
   (C) Mesosphere
   (D) Troposphere

3. Which atmospheric layer represents the edge of space?

   (A) Exosphere
   (B) Mesosphere
   (C) Stratosphere
   (D) Troposphere

4. Which atmospheric layer contains the ozone layer?

   (A) Exosphere
   (B) Mesosphere
   (C) Stratosphere
   (D) Troposphere

5. What statement best describes the relationship between temperature and altitude?

   (A) As altitude increases, temperature decreases up to about 11 km.
   (B) Temperatures above the troposphere are always below freezing.
   (C) The thermosphere is by far the coldest atmospheric layer
   (D) The hottest point on earth is always at the Earth's surface

6. Which is atmospheric layer is considered the weather layer?

   (A) Exosphere
   (B) Mesosphere
   (C) Stratosphere
   (D) Troposphere

7. The hottest atmospheric layer is the:

   (A) Mesosphere
   (B) Stratosphere
   (C) Thermosphere
   (D) Troposphere

8. The atmospheric layer in which we live is called the:

   (A) Exosphere
   (B) Stratosphere
   (C) Troposphere
   (D) Thermosphere

PART B: WRITTEN RESPONSE **[5]**

Choose the layer in Column B that best matches the description in Column A, and write your answer in the space provided. Then, use the directions below to label the diagram of the Earth's atmosphere on the next page.

Column A	Column B
9. ____ the layer of the Earth's atmosphere that you live in 10. ____ the coldest layer of the Earth's atmosphere; lies directly below the uppermost layer 11.____the uppermost layer of the atmosphere 12. ____the layer that contains most of the atmosphere's ozone; above the layer that you live in 13. ____ It is in this layer that X-rays (from the sun) are absorbed	a. Troposphere b. Stratosphere c. Mesosphere d. Thermosphere e. Exosphere

2. Use the diagram below to complete the following: **[7]**

A) Label the four layers of the atmosphere on the diagram

B) The ozone layer is in the upper part of the atmospheric layer that contains most of the atmosphere's ozone. Use the symbol for ozone to draw in the ozone layer on the diagram.

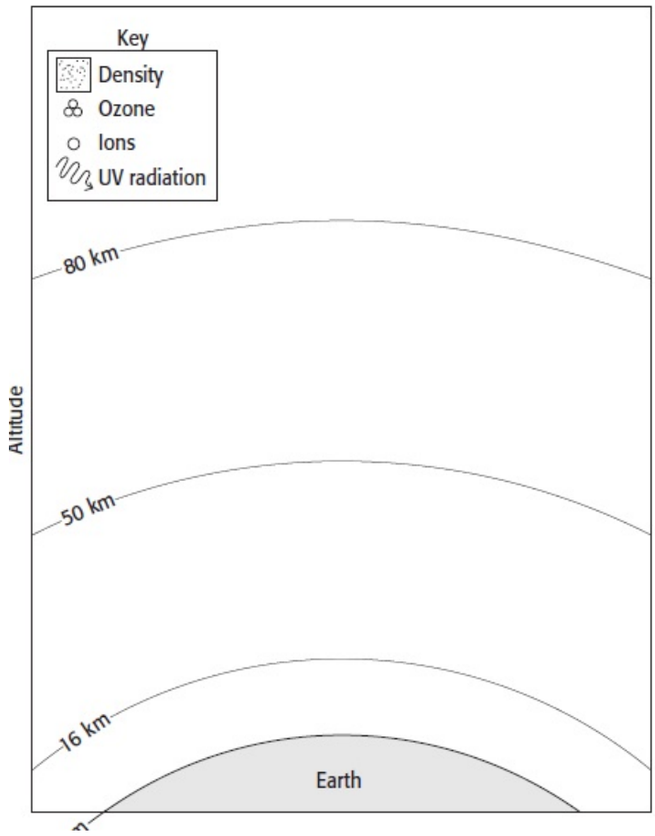
C) The ozone layer is important because it absorbs ultraviolet radiation. Draw a wavy line coming from space to represent the UV radiation that is absorbed by the ozone layer.

D) The thermosphere contains ions, which are electrically charged particles. When nitrogen and oxygen atoms absorb solar energy, they become ions. Draw the ions in the thermosphere. Remember that the thermosphere is very thin. There are almost no ions near the top of the thermosphere.

E) The troposphere is the densest layer of the atmosphere. It is much denser than the other layers. Shade this layer heavily to indicate how dense it is.

F) The stratosphere is very thin. Shade this layer lightly.

G) The mesosphere is even less dense than the stratosphere. Shade this layer very light.



3. Which atmospheric layer do you expect you must learn more about before you understand weather systems. Why? [2]

4. Explain why the temperature of the stratosphere is higher than the temperature of the tropopause? [1]