EARTH'S ATMOSPHERE

GENERAL INFORMATION -

.................................................................

EXOSPHERE -

IONOSPHERE -

THERMOSPHERE -

MESOSPHERE -

STRATOPAUSE -

STRATOSPHERE -

TROPOPAUSE -

TROPOSPHERE -
THE AIR UP THERE

Zak and Zeke want to explore Earth’s atmosphere. They think their amazing balloon can take them high enough to learn all about the atmosphere. Are they right? Here are some things they’ll need to learn before they get too far.

1. Label the layers of the atmosphere: troposphere, thermosphere, stratosphere, mesosphere.
2. Also label: tropopause, exosphere, ionosphere.
3. Tell what layer or feature is described in each phrase below. Write TR for troposphere, TH for thermosphere, M for mesosphere, S for stratosphere, I for ionosphere, EX for exosphere, and TPP for tropopause.

   a. contains dust, water vapor, and 75% of all gases
   b. extends from 10–20 km above Earth
   c. layer with coldest temperatures: –100°C
   d. layer extends 85 km above Earth into space
   e. temperature decreases with increasing height
   f. the ozone layer is in this layer
   g. contains the Van Allen Belts of radiation
   h. layer where all weather occurs
   i. ceiling to the weather zone
   j. extends from 15 or 20 km to 50 km above Earth
   k. temperatures increase in this layer
   l. begins at about 500 km above Earth
   m. top portion of troposphere
   n. layer has 2 parts
   o. lower part has temperatures –50°C; upper temperatures are 0°C
   p. jet streams are just below this
   q. extends 50–85 km above Earth’s surface
   r. filled with electronically charged particles

4. What is in the air that makes up Earth’s atmosphere?

5. What is so important about ozone?

6. What is atmospheric pressure?

7. Why does air pressure vary?

8. Will Zak & Zeke get above the troposphere?

Name
Directions: Read and answer the questions below.

Greenhouse gases are in the earth's atmosphere.

Some solar radiation is absorbed by these greenhouse gases; some reaches the earth and is absorbed by its surfaces. In both cases, light is absorbed as heat.

Earth's surfaces, warmed both by solar radiation and by warmth from deep within the earth, radiate heat into the atmosphere, where some is absorbed and some passes out into deep space. The enhanced greenhouse effect occurs when more heat is absorbed by the atmosphere, due to increased greenhouse gases, than can pass by convection into space in a normal manner.

Many of the greenhouse gases are naturally occurring, which is the cause of natural global warming. Without naturally occurring greenhouse gases, the earth's surface temperature would average 33 degrees Celsius cooler.

When we burn fossil fuels and manufacture other products, we release gases into the atmosphere, which are greenhouse gases.

Over the past 250 years, carbon dioxide levels have increased by 25%.

In the past 15 to 20 years, there has been an overall rise in temperatures.

1. According to the reading what two things happen to solar radiation?
2. What is light from the sun absorbed as?

3. According to the reading what causes the greenhouse effect?

4. Approximately how much cooler would Earth be without the Greenhouse Effect?

5. What has happened over the last 250 years? 15 years? Why is this a concern?
MAKING PREDICTIONS FROM GRAPHS

Scientists use graphs to help them "picture" data. It is generally easier to see patterns in a graph than in a list of numbers. When a pattern is discovered, it can often be used in predicting future events.

The data in Table 1 are measurements of carbon dioxide (CO2) amounts in the earth's atmosphere. The measurements were made at an observatory in Hawaii. Notice that each CO2 measurement is given in "parts per million." In this way, the numbers tell you the number of CO2 molecules in each 1 million molecules of the atmosphere. For example, the data 300 means that 300 out of every one million molecules in the air are CO2 molecules. Although these may sound like small amounts, this can greatly affect the atmosphere. Carbon dioxide is an extremely important compound in the atmosphere as it does not allow heat to escape earth easily. A small increase in carbon dioxide could keep the earth warmer than it would be otherwise.

PART A

Plot the data on the graph in Figure 1. Then connect each point to a smooth line. After studying the graph, answer the following questions based on the graphed data.

Questions
1. Is the amount of CO2 in the atmosphere increasing or decreasing?
   How can you tell?

2. What would your graph look like if the carbon dioxide level were not changing at all?

3. Is the carbon dioxide changing by the same amount each year?
   How can you tell?

4. Use your graph to predict the CO2 amount for 1990.

   For 1995.

5. Scientists have predicted that the CO2 level will be at 373 parts per million by the year 2000. Do you agree with that prediction?
### Table 1. Atmospheric Carbon Dioxide Measurements

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*parts per one million molecules of atmosphere

**Figure 1.** The measurement of carbon dioxide in the atmosphere since the 1860s.