

ES11D Air Layers

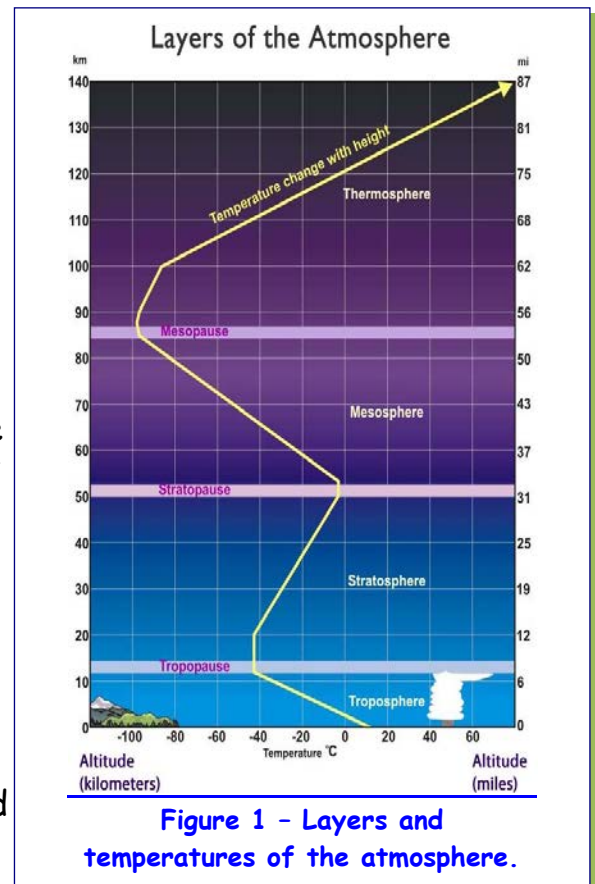
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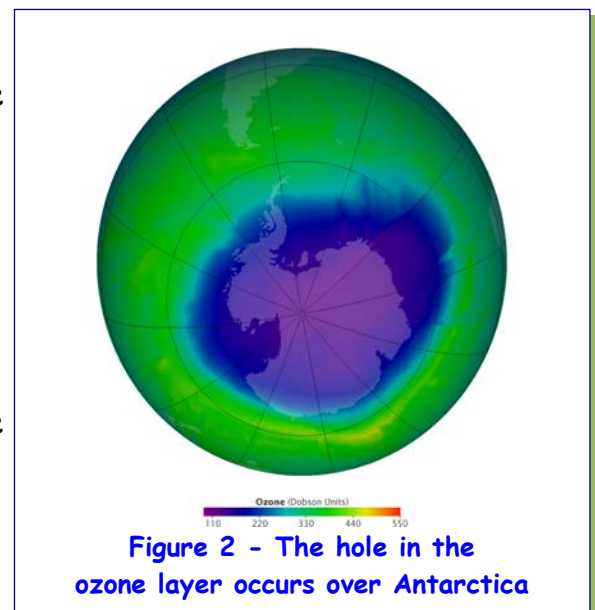
Did you know?

- 1 As you go up a mountain, the temperature of the air goes down. As you go even higher into the atmosphere - much higher, it starts to go up (see Fig. 1)!
- 2 The Earth's atmosphere is made of several separate layers of air to keep it warm and protected. Each layer is different. It is like the way you dress for a cold day. You have a layer of clothing nearest your body that you are in contact with. Over that, jeans and a shirt, a sweater, and topping it all off is a thick outer coat. Now you are protected from the cold.
- 3 The main difference in the layers of the atmosphere is the temperature of the gasses and the amount or density of them. Some layers are made of different gas mixtures than others.



So, why is it important to me?

- 4 All the weather happens in the lower layer of the atmosphere, the troposphere. Planes are designed to fly above the weather, in the stratosphere.
- 5 We are protected by a thin layer of gas, the ozone layer that exists in the stratosphere. If this is harmed, we could be in for a lot of trouble from Ultra Violet (UV) radiation from the Sun (see Fig 2).



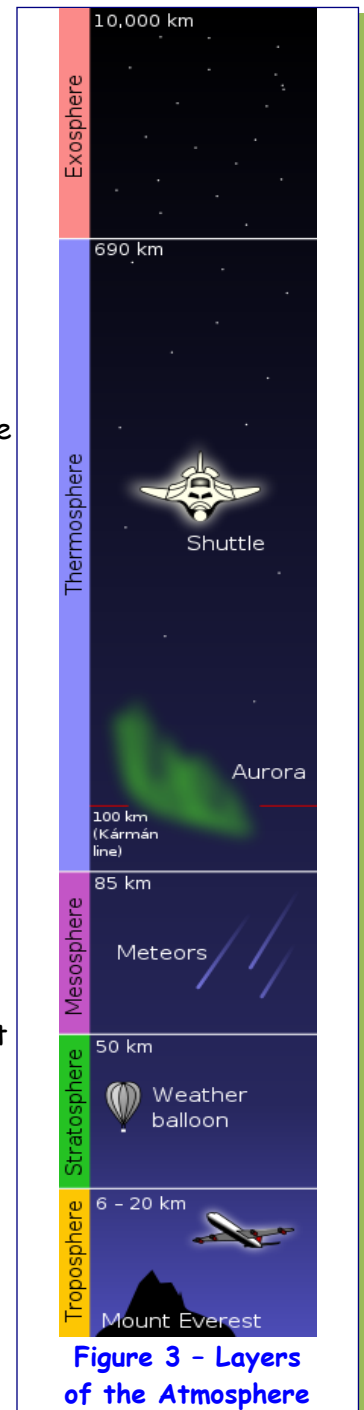
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What are the big ideas I need to know?

- 6 Layers of the atmosphere are separated by temperature. Each layer has several things that make it different from the other layers (see Fig 3).
- 7 (425 - ??? Miles) The [exosphere](#) is the top layer of the atmosphere. This layer goes on forever and is really what we call "space". Remember that "exo" means outside - this is the place outside of our atmosphere. Here is where satellites orbit and there is such a small amount of air that it's really too small to measure. Space is a vacuum with almost nothing in it.
- 8 (50 - 425 Miles) The [thermosphere](#) is the layer of the atmosphere, before you get into the exosphere of space. The **thermosphere** is the layer above the mesosphere. It rises to 600 kilometers (372 miles) above the surface. The International Space Station orbits Earth in this layer.
- 9 (30 - 50 Miles) The [mesosphere](#) is where meteors burn as they fall through, rubbing against the gas molecules. This causes friction. The friction makes the meteors get very hot. When you see a streak in the night sky, a "shooting star", it is usually a meteor burning up completely in this layer.
- 10 (7 - 30 Miles) The stratosphere is the layer above the troposphere. It rises to about 50 kilometers (31 miles) above the surface. Air temperature in this layer increases with altitude. The stratosphere gets most of its heat from the sun. Therefore, it's warmer closer to the sun. The air at the bottom of the stratosphere is very cold. The cold air is dense, so it doesn't rise. As a result, there is little mixing of air in this layer.
- 11 (0-7 Miles) The [troposphere](#) is the lowest layer of the atmosphere. Its temperature decreases with altitude. This layer gets some of its heat directly from the sun. The troposphere's main source of heat is Earth. When Earth's surface is heated by the sun, it radiates some of heat back into the air. That makes the temperature higher near the surface than at higher altitudes. This is the shortest layer of the atmosphere. It rises to only about 12 kilometers (7 miles) above the surface. Even so, this layer holds about 75 percent of all the gas molecules in the atmosphere. That's because the air is densest in this layer.



What about?

- 12 The ionosphere bounces radio waves back to Earth and is the lowest layer of the thermosphere. It is here that the aurora borealis, the Northern Lights, are seen.