

LAYERS of the ATMOSPHERE - NOTES

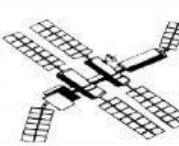
Do you ever look at the sky and into space and wonder what it's made of? There is a whole world of science surrounding our Earth to help us survive and thrive. Our Earth is **surrounded by a mixture of gases** called the **atmosphere**. The Earth's atmosphere reaches from the Earth's surface to more than 600 kilometers (that's approximately 370 miles) into space!

Earth's atmosphere is made up of gases that are important to living things. Gases that make up the Earth's atmosphere (like oxygen and carbon dioxide) are **not** harmful to living things in fact, they support and protect the living things on Earth!

- ❖ Our atmosphere is made up of **78% Nitrogen, 21% Oxygen, and 1% other gasses** such as **hydrogen, methane, helium, argon, and carbon dioxide**. Humans and animals take in oxygen to breathe while some bacteria can change nitrogen into a substance plants can use to build proteins. Higher in the atmosphere, a form of oxygen called **ozone** works as a shield for living things, protecting them from a lot of the harmful radiation given off by the sun. As you travel farther from the Earth, air temperature and air pressure both change. Our atmosphere has been organized by scientists into five layers with various properties. **As altitude (distance from Earth) increases, air pressure decreases**, but temperatures vary.

The layer **closest** to the Earth (**0-16km or 0-9 miles** from the surface) is called the **troposphere**. This is where all weather happens and is where more than half of the air in the total atmosphere is. As altitude increases in this layer, temperature drops. The **stratosphere** (**16-50km or 9-31 miles** from Earth's surface) is where most airplanes fly and is where the protective ozone layer lies. Temperature increases with altitude in this layer. The third layer from the surface is called the **mesosphere** (**50-90km or 31-55 miles** from Earth). In the mesosphere, temperatures drop resulting in this being the coldest layer of the atmosphere. This is also where meteors burn up and radio waves are reflected to Earth. The farthest two layers from the Earth's surface are the **thermosphere** and the **exosphere**. The **thermosphere** (**90-300km or 55-186 miles** from the surface) is the hottest layer of the atmosphere as temperature increases with altitude. Beautiful curtains of light called auroras occur in this layer. Finally, the **exosphere** (**300-600km or 186-372 miles** from the surface) is the outermost layer of the atmosphere where temperature increases with altitude. This is the layer where satellites orbit the planets. Each layer of our atmosphere serves a specific and important purpose in maintaining life on Earth. The next time you look into the sky, you should appreciate the complexity and protection Earth's atmosphere provides.

 **LIVEWORKSHEETS**

TROPOSPHERE LAYER	STRATOSPHERE LAYER	MESOSPHERE LAYER	THERMOSPHERE LAYER	EXOSPHERE LAYER
				
This layer extends from 0 km to 16 km or 0 - 9 miles .	This layer extends from 16 km to 50 km or 9 - 31 miles .	This layer extends from 50 km to 90 km or 31 - 51 miles .	This layer extends from 90 km to 300 km or 55 - 186 miles .	This layer extends from 300 km to more than 600 km or 186 - 372 miles .
ALL weather happens in this layer.	Jets cruise near the bottom of this layer.	Meteors or “shooting stars” burn up at this layer.	The auroras “shimmering curtains of light” happen here.	Many satellites orbit at this layer.
Air pressure is the highest at this layer.	The Ozone (O₃) layer is located in this layer.	This is the coldest layer of the atmosphere.	This is the hottest layer of the atmosphere.	Air pressure is lowest at this layer.
This layer contains 99% of the Earth’s water vapor .	Weather balloons are flown to this layer.	This is the hardest layer to study since planes cannot fly high enough and shuttles cannot fly low enough.	The space shuttle orbits at this layer.	It is sometimes considered part of our outer space .