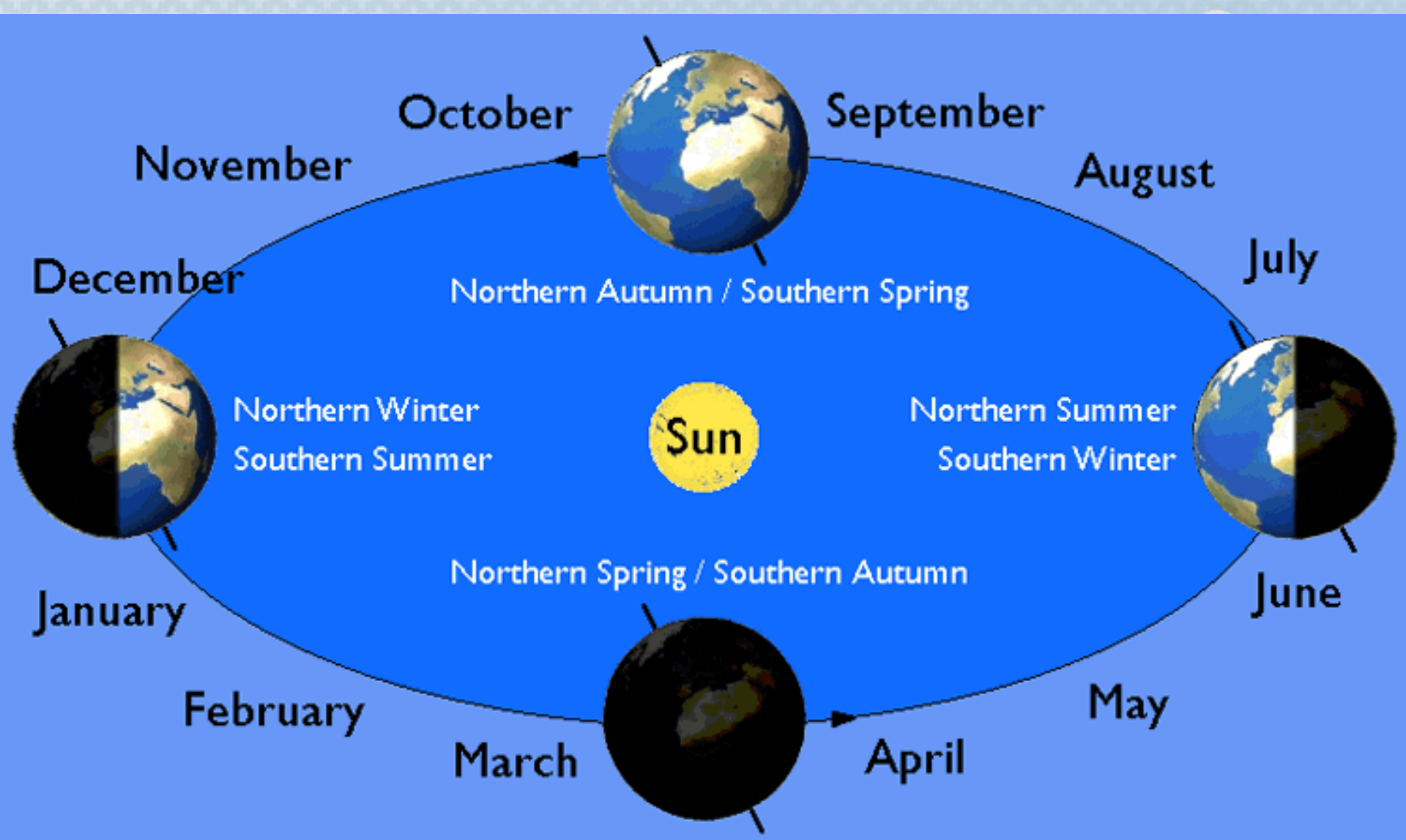
Bell Ringer

1. What feature of Earth is key to having seasons?
2. Why is the equator warmer than the poles?
3. What shape is Earth's orbit around the Sun? Does this affect seasons?


October
September
November
August
December
July
Northern Autumn / Southern Spring
Northern Winter
Southern Summer
Sun
Northern Summer
Southern Winter
Northern Spring / Southern Autumn
January
June
February
May
March
April

Seasons WS

- Answer questions:
  - 1
  - 2
  - 4
  - 8
  - 9

Our Atmosphere

Overview

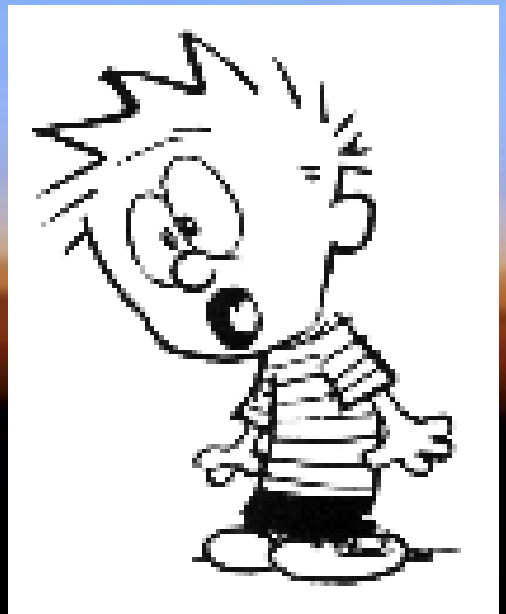
- What is the atmosphere?
- What are its origins?
- What are its layers like?

Atmosphere

- **A mixture of gasses that surrounds a planet.**

Origin of the Atmosphere

- **The early atmosphere was poisonous and had very little oxygen.**



Outgassing

- Water vapor (H_2O), carbon dioxide (CO_2), and nitrogen (N_2) were vented from volcanic eruptions over hundreds of millions of years to form the early atmosphere.

Modern Effects of Outgassing

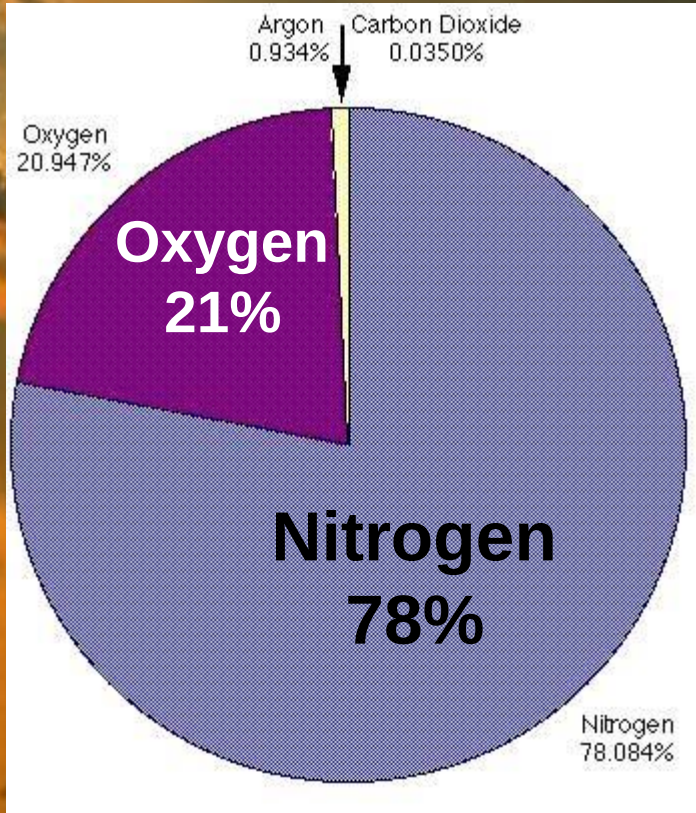
- Volcanic eruptions put ash and gases into the atmosphere. Ash can block out the sun and lower global temperatures. Gasses like CO_2 can increase global temperatures by the greenhouse effect.

Life Changes the Air

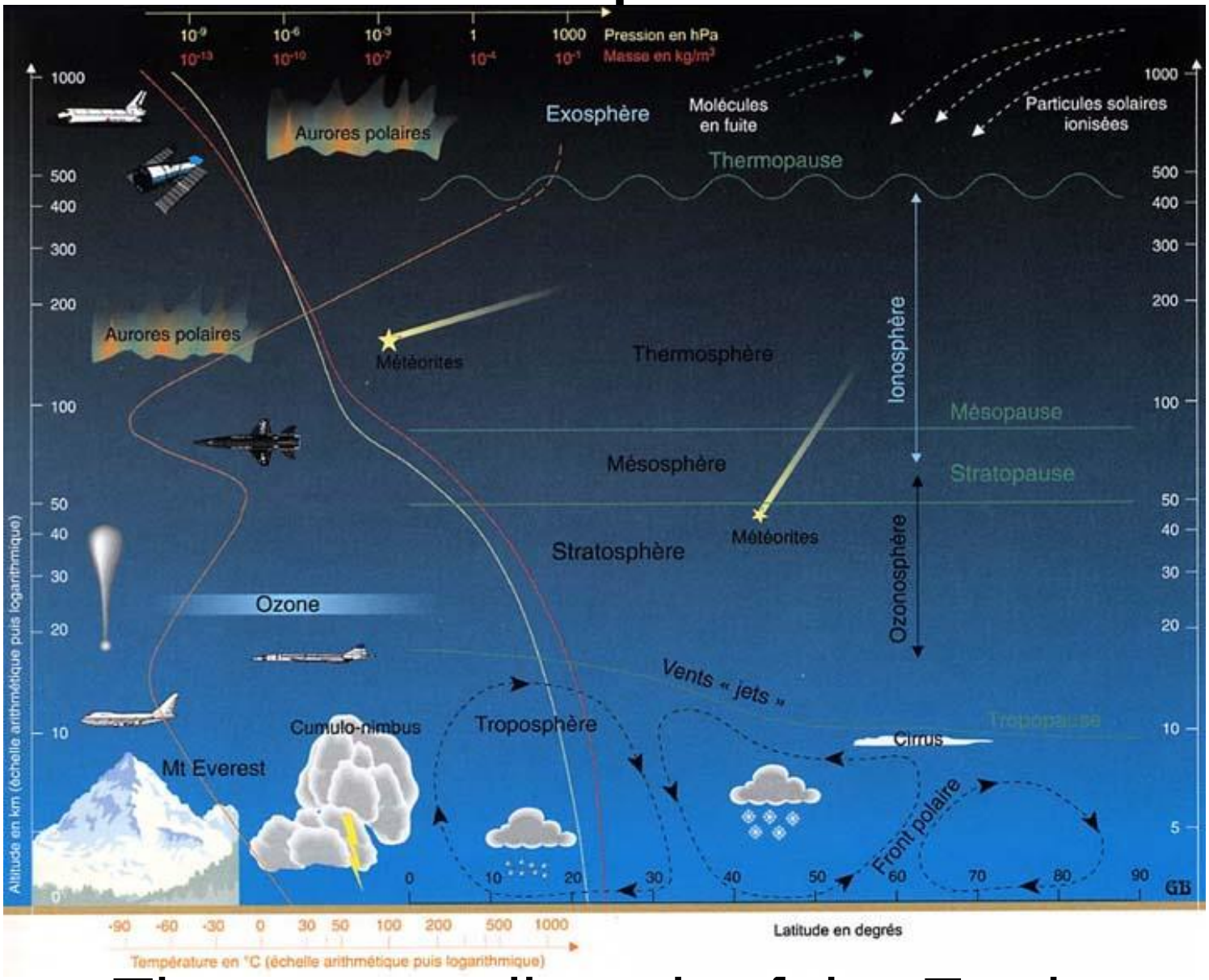
- 3.5 billion years ago microscopic plants in the ancient oceans started putting oxygen into the atmosphere through photosynthesis

Composition Today

- The two main gasses that make up Earth's atmosphere today are Nitrogen and Oxygen.
- 78% Nitrogen (N_2)
- 21% Oxygen (O_2)



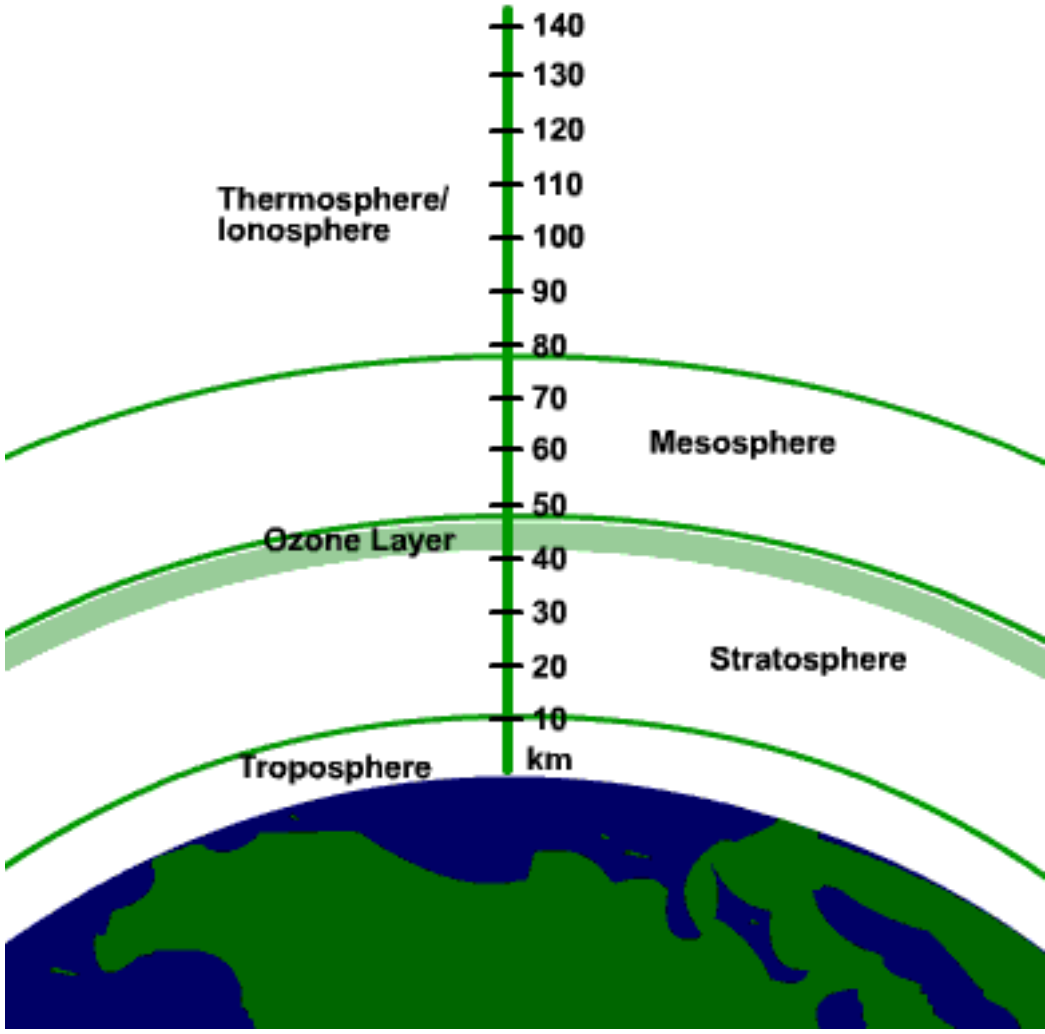
Atmosphere



The surrounding air of the Earth

Layers of the atmosphere

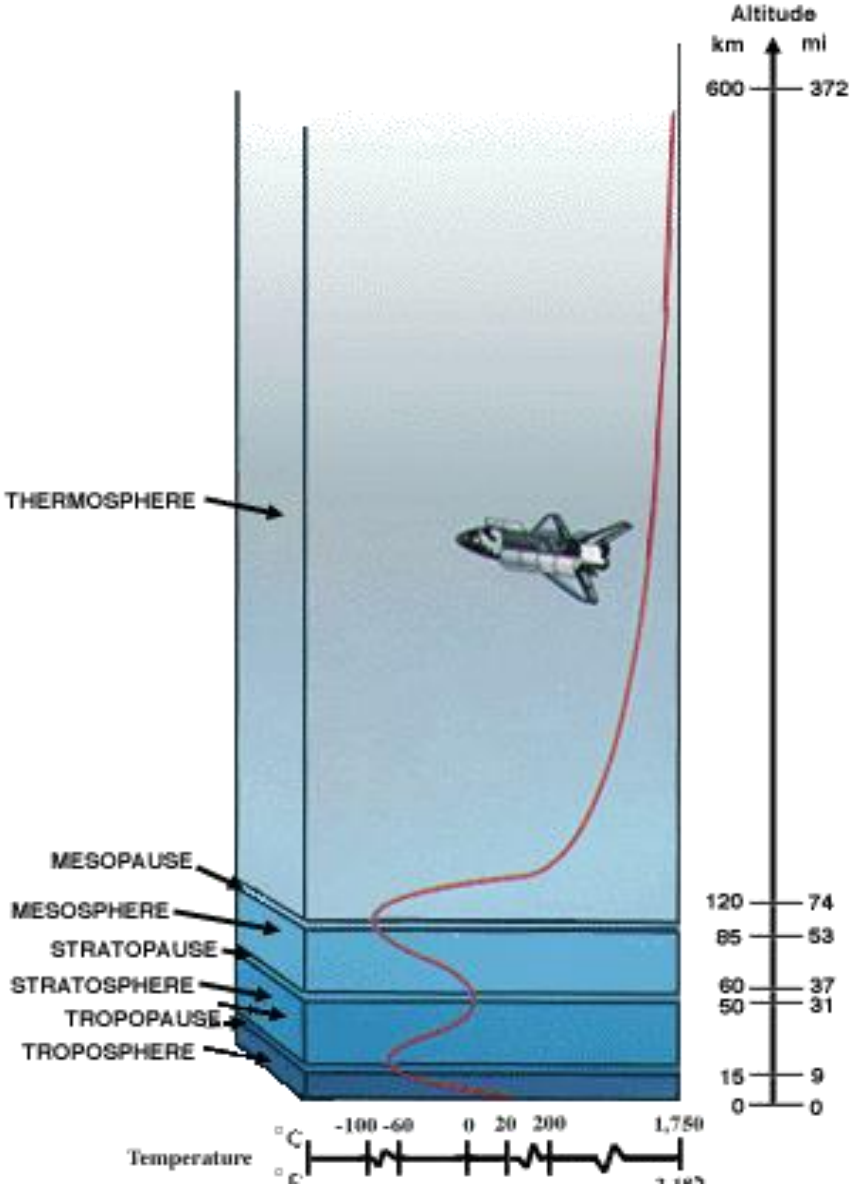
- There are 4 layers in the atmosphere
- They are the troposphere, mesosphere, thermosphere, and stratosphere



Layers

- The envelope of gas surrounding the Earth changes from the ground up.
- Four distinct layers have been identified using thermal characteristics (temperature changes), chemical composition, movement, and density.

Troposphere



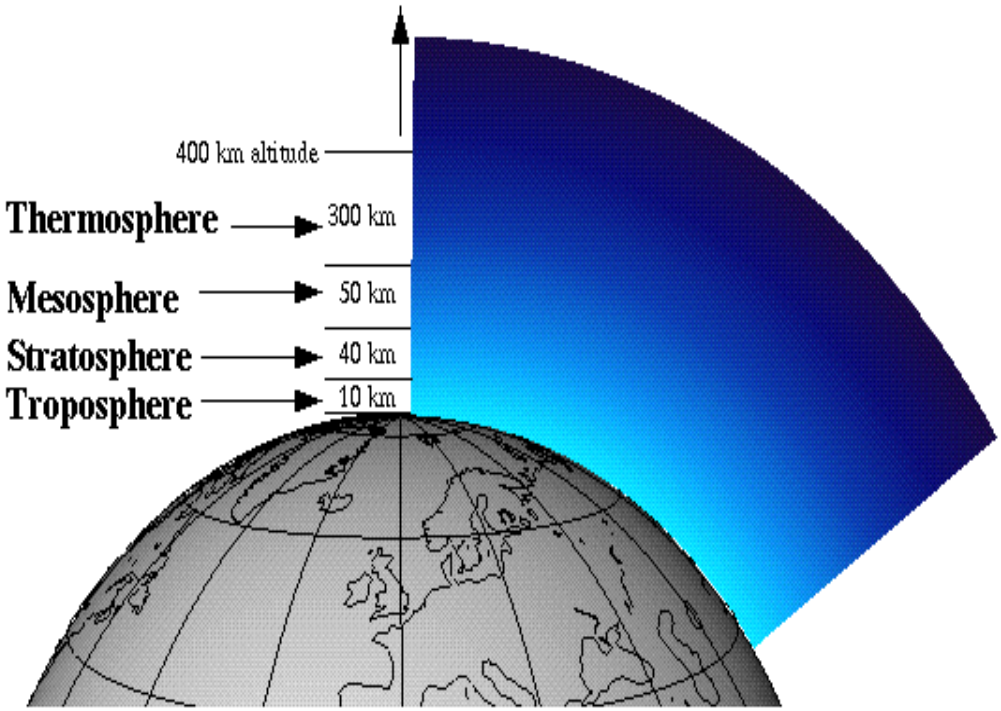
- <u>This is the layer that is closest to the surface of the earth</u>
- It's elevation ranges from 0 to 10 km

Troposphere

- This part of the atmosphere is the most dense.
- As you climb higher in this layer, the temperature drops from about 17 to -52 degrees Celsius.
- Almost all weather is in this region.

Stratosphere

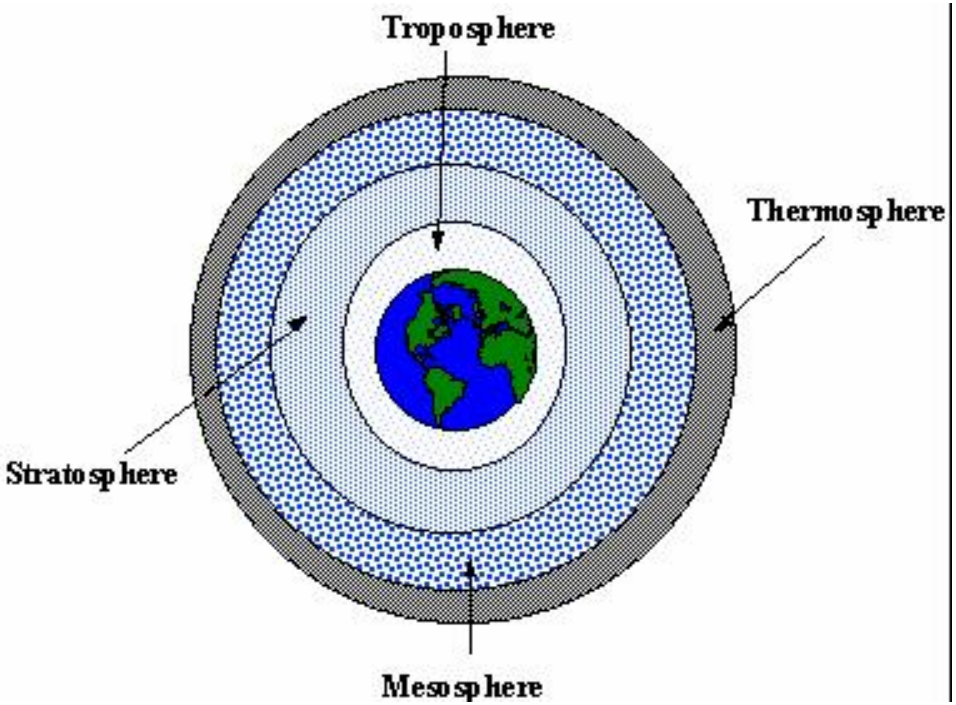
- This layer sits on top of the troposphere
- It's elevation ranges from 10 km to around 25 km
- This layer contains the ozone layer, which protects us from harmful sunlight



Stratosphere

- Compared to the troposphere, this part of the atmosphere is dry and less dense.
- The temperature in this region increases gradually to -3 degrees Celsius, due to the absorption of ultraviolet radiation.
- The ozone layer, which absorbs and scatters the solar ultraviolet radiation, is in this layer.
- Ninety-nine percent of "air" is located in the troposphere and stratosphere.

Mesosphere



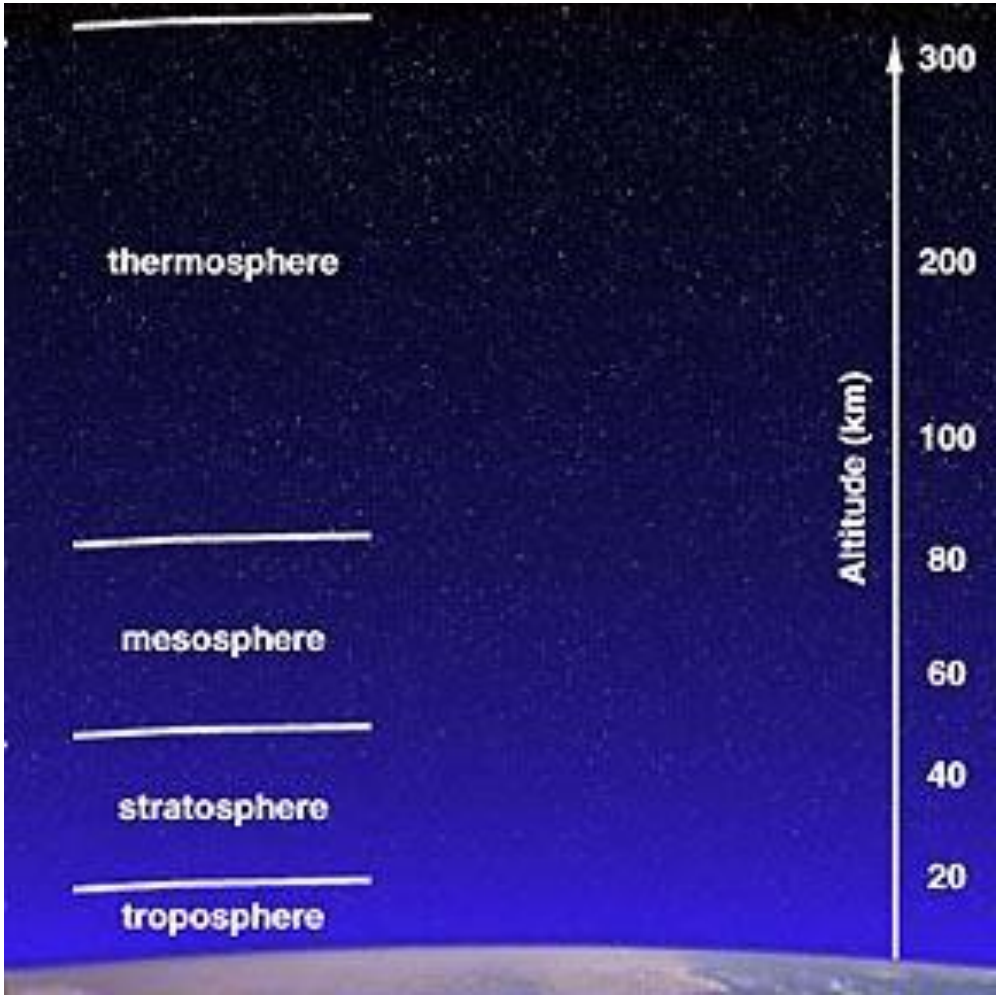
- <u>This layer is above the stratosphere</u>
- It's elevation ranges from 25 to 100 km

Mesosphere

- In this region, the temperatures again fall as low as -93 degrees Celsius as you increase in altitude.
- The chemicals are in an excited state, as they absorb energy from the Sun.

Thermosphere

- This is the highest layer of the atmosphere
- It's height ranges from 100 to 400 km
- This is where most small meteorites burn up and is also the location in the atmosphere that the northern lights occur (aurora borealis)



Thermosphere

- The thermosphere starts just above the mesosphere and extends to 600 kilometers (372 miles) high.
- Temperatures in this region can go as high as 1,727 degrees Celsius (but there aren't very many molecules)

Beyond the Atmosphere

- The **exosphere** starts at the top to the thermosphere and continues until it merges with space.
- In this region of the atmosphere, Hydrogen and Helium are the prime components and are only present at extremely low densities.

Planet Earth

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