The atmosphere - a thin layer of gas that surrounds the Earth

It starts at the Earth's surface and reaches up to 500 km

1. **Composition**:
    - 78% nitrogen - we can't use it (remember the nitrogen cycle)
    - 21% oxygen - vital for life
    - 0.9% argon and other noble gases
    - **0.04%** carbon dioxide - greenhouse gas
    - **0.4% to 1%** water vapour [depending where you measure]- also a greenhouse gas

2. **Greenhouse Gases** like water vapour and carbon dioxide trap infrared radiation (heat) which keep our planet warm. If you look at the percentages, you see that you don't need much to keep warm.

3. Characteristics of the **<u>layers of the atmosphere</u>**

    a. **Troposphere** [0 to 20 km]

- All the weather occurs in this region

    b. **Stratosphere** [20 to 50 km]

- The "Ozone layer" is found here - it protects us against high energy ultraviolet radation (UV rays)
- Without the ozone layer everyone would end up with sunburns and skin cancer
- Intercontinental airplanes fly here - no turbulence

    c. **Mesosphere** [50 to 85 km]

- In this layer the density of the atmosphere causes small rocks from space entering our atmosphere to burn up from the friction of the air particles
- Better known as meteors or shooting stars

    d. **Thermosphere** [85 to 500 km]

- Very hot layer due to the amount of high-energy radiation being absorbed like X-rays and gamma rays

e. **Ionosphere** [in between mesosphere and thermosphere]

- Charged particles from the Sun (solar wind) are deflected from the magnetic field of the Earth and end up in this layer collecting at the North and South Pole
- This causes the Northern Lights or Aurora Borealis

f. **Exosphere** [greater than 500 km]

- Very little air particles are here and the density is very low
- We often call this layer the edge of space

4. **Pressure** - the weight of the atmosphere above you

- as you travel higher into the atmosphere…
  - the pressure gets lower
  - the density of the air gets lower

5. **Temperature** - related to number of particles and radiation

- Warm near the ground and gets colder the higher you go
- The thermosphere is hot because of solar radiation not blocked by atmosphere

6. **Water solubility** - the amount of “humidity” in the air

- When the temperature is warm, air can hold more water vapour
- As the temperature decreases the air can’t hold as much water vapour and clouds or fog begins to form