



## **Weather: Notes**

### **In this lesson...**

- Weather
- Atmosphere
- Climate
- Natural Disasters
- Greenhouse Effect
- Weathering
- Water Cycle

### **Weather:**

- The **state of the atmosphere**
- Describes the **temperature (hot or cold), humidity (wet or dry), or current water state of the atmosphere**
- Takes **place in the troposphere**



## Atmosphere:

- **5 layers of the atmosphere:**

- Troposphere

- Around **10 km/6 mi above the ground** (Earth)
- It contains nearly all of the water vapor in the atmosphere: why all the clouds are there
- Tropopause (top of troposphere): temperature stops decreasing from -60°F / -15°C

- Stratosphere

- Begins above the troposphere and extends **50 km/31 miles above the ground** (Earth)
- Temperature goes up from what it was in the troposphere and stops as it reaches freezing point (starts increasing from -60°F / -15°C)
- Fairly calm section of the atmosphere
  - Not a lot of convectional air movement
  - Causes pollutants to remain in this region for a while, but...
  - The ozone layer is here and it helps protect us from the sun

- Mesosphere

- Begins above the stratosphere and extends **85 km/53 mi above the ground** (Earth)
- We don't know a lot about it because it is too high for aircrafts/weather balloons.
- Satellites aren't helpful either because they can only see the mesosphere from above the atmosphere.
- Meteors that would, without the mesosphere, hit the earth, are usually vaporized here, give it a higher concentration of metals.

- Thermosphere

- Begins above the mesosphere and extends **500-1000 km/311-621 mi above the ground** (Earth)
- Part of the atmosphere where space is considered to have begun
- Has extreme temperatures
- Most satellites are present here
- Home to the Aurora Borealis

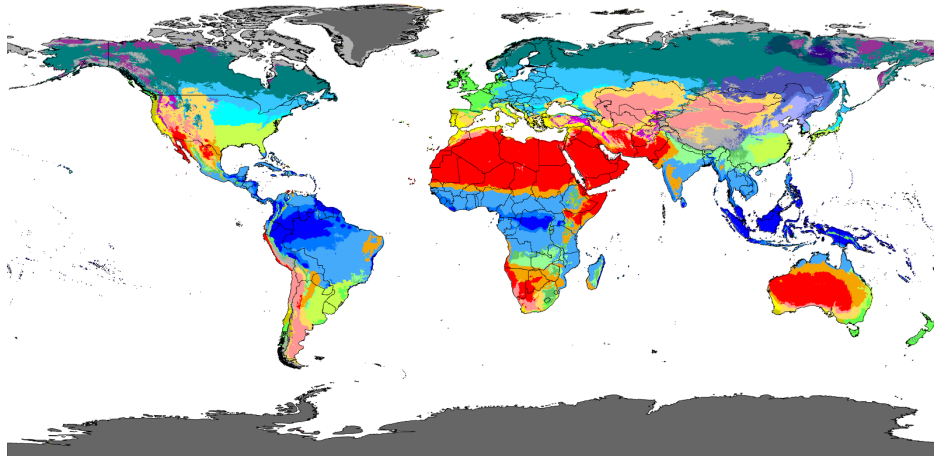
- Exosphere

- **Almost identical to space**
- Not a lot going on
- International Space Station orbit below the exosphere
- Some scientists **consider it not a part of the atmosphere**

## Climate:

- **5 main climate types**
  - Tropical
    - **Hot and humid**
    - Average temperatures are greater than **64°F / 18°C year round**
    - Over 59 inches of precipitation per year
  - Dry
    - **Moisture evaporates quickly**
    - Very little precipitation
  - Temperate
    - **Summers are warm and humid**
    - Have thunderstorms and mild winters
  - Continental
    - **Warm to cool summers**
    - Very cold winters
    - During the winters, there could be snowstorms, strong winds, and very cold temperatures
    - **Can go below -22°F / -30°C**
  - Polar
    - **Very cold**
    - In the summer, **temperatures don't rise above 50°F / 10°C**

Köppen-Geiger climate classification map (1980–2016)



Source: Beck et al.: Present and future Köppen-Geiger climate classification maps at 1-km resolution, Scientific Data 5:180214, doi:10.1038/sdata.2018.214 (2018)

*Climate map (derived from wikipedia commons)*

- **The climates of the Earth resemble a rainbow**
  - The rainbow begins at the equator with tropical climate, then goes to dry, then temperate, continental, and polar.

## Natural Disasters:

- **10 main natural disasters:**
  - Earthquakes - Unusual movement in the Earth's crust: the causes the ground to shake
  - Landslides/Mudslides - Parts of mountains collapsing/ Water accumulates in the ground and mixes with dirt of a slope
  - Volcanoes - Magma in the Earth's crust explodes
  - Extreme Heat - Temperatures rise above 130°F / 54°C
  - Lightning - Sparks of electricity in the atmosphere
  - Wildfires - Small sparks of electricity, or the sun causing a fire to spread rapidly
  - Floods - Extreme accumulation of water
  - Tornadoes - Warm, human air hits cold, dry air
  - Winter Weather - Blizzard, snow
  - Hurricanes - Extreme thunderstorm
  - Tsunamis - Extreme tidal waves

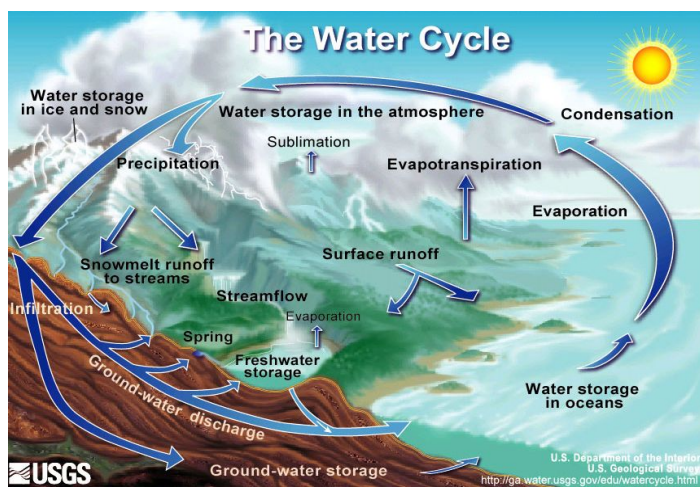
## Greenhouse Effect:

- The sun's heat gets trapped in the lower part of the earth's atmosphere which warms the planet above what it would be
  - Global Warming

## Weathering:

- The weather breaks down things on the Earth by the atmosphere and water
  - Rocks, soil, minerals, wood, and artificial materials

## Water Cycle:



*The water cycle (Derived from Wikimedia Commons)*