

Unit 7 - Chapter 17.1

Atmosphere Characteristics

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Weather vs. Climate

- **Weather** — **State** of atmosphere at a **given** time and place
 - Constantly **changing**
- **Climate** — Weather **patterns** collected over many **years**
 - Describes a **place** or **region**

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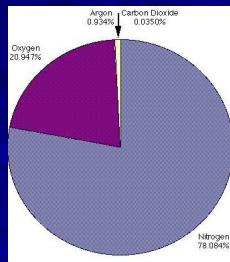
Weather vs. Climate



Composition

• Mixture of Gases:

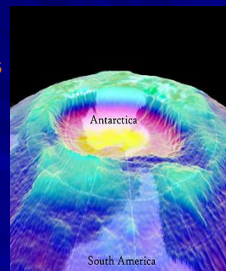
- Nitrogen (N₂) — **78%**
- Oxygen (O₂) — **21%**
- Argon (Ar) — **0.934%**
- Carbon Dioxide (CO₂) — **0.0350%**



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Variable Components

- **Water Vapor:**
 - Source of all **clouds** and **precipitation**
- **Ozone (O₃):**
 - Absorbs **ultraviolet (UV)** radiation from **Sun** to make planet habitable

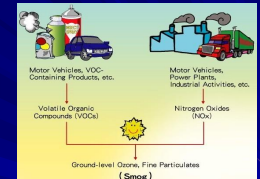


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Primary Pollutants

• **What are they?**

- Carbon Monoxides
- Nitrogen Oxides
- Volatile Organics
- Sulfur Oxides



• **Where do they come from?**

- Transportation
- Industrial Processes
- Solid Waste

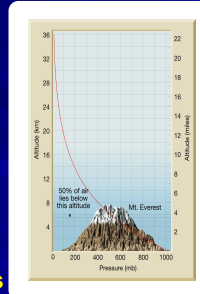
Secondary Pollutants

- Pollutants that enter **air, water, and soil indirectly**
- **Cannot** see them being **deposited**
- **#1** secondary pollutant is **AGRICULTURE**



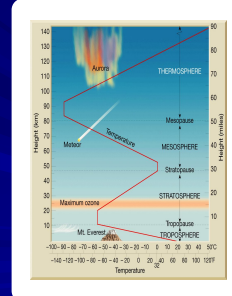
Pressure/Temp Changes

- ◆ **Pressure Changes:**
 - **Increase** altitude = Pressure **decreases**
 - Therefore, **less** air in **higher** altitude
- ◆ **Temperature Changes:**
 - **Increase** altitude = Temperature **decreases**

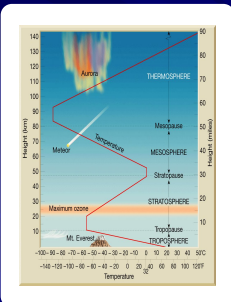


Layers of Atmosphere

- **Troposphere:**
 - **Increase** altitude = Temp **decreases**
 - Most **weather** and **air pollution** take place here
 - **Tropopause** – **Upper limit**



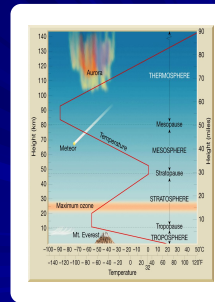
Layers of Atmosphere



- ◆ **Stratosphere:**
 - Temp remains **constant**, then slowly **increases** with altitude
 - Layer of **concentrated ozone**
 - **Heated** because ozone absorbs **UV radiation**

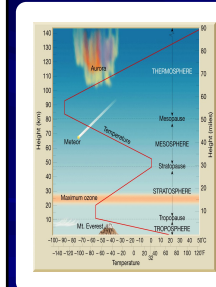
Layers of Atmosphere

- **Mesosphere:**
 - **Increase** altitude = Temp **decreases**
 - **Mesopause** – **Upper limit**
 - Home to **comets** and **meteor** showers



Layers of Atmosphere

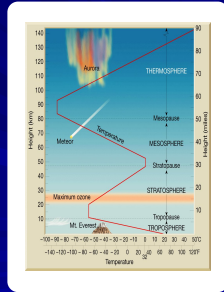
- **Thermosphere:**
 - **Increase** altitude, temp **increases**
 - **Exosphere** = **Upper limit**
 - Home to **Auroras** – “Northern Lights”



Layers of Atmosphere

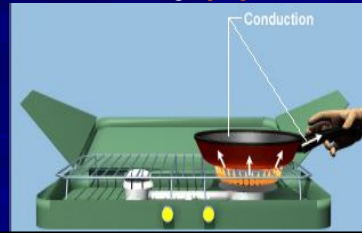
• Exosphere:

- **Outermost** layer
- Contains **light** gases
• **helium & hydrogen**
- No clear boundary between **atmosphere** and **outer space**

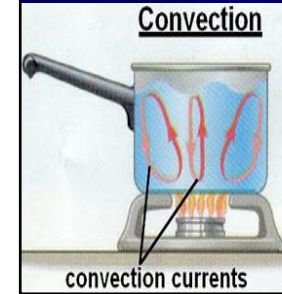


Temperature Effects CONDUCTION

– Heat transfer through *physical contact*



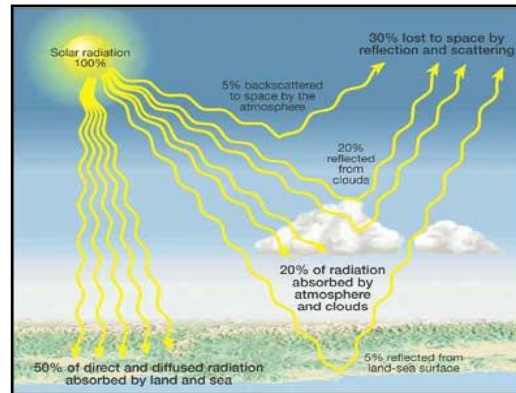
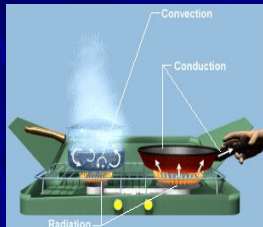
CONVECTION



– Heat transfer by *circulation* of currents through **water, air, & magma**

RADIATION

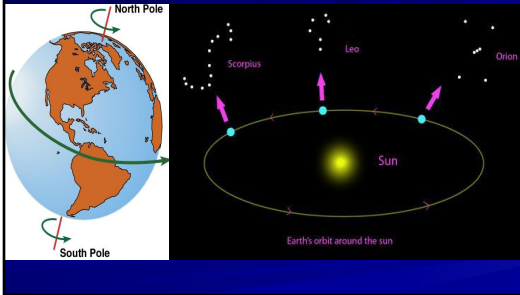
- Heat transfer that travels in *all directions*
- Earth receives energy from Sun through *space*



Earth-Sun Relationship

- Energy that drives Earth's **weather** and **climate** comes from the **Sun**
- **Rotation:**
 - Spins on **axis** at **23.5°**
- **Revolution:**
 - Earth's **elliptical** orbit around **Sun**
- Earth has **two** principal motions:
 - **Rotation**
 - **Revolution**

Earth-Sun Relationship



Earth's Orientation

- **Seasonal Changes:**
 - Earth's position relative to Sun changes as it travels along its orbit
- **Earth's Axis:**
 - Remains pointed toward **North Star** as it orbits around **Sun**
 - Therefore, position of axis to Sun's **rays** is constantly changing

Earth-Sun Relationship

