

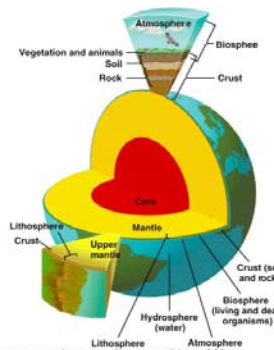
Ecological Integrity of Earth or “Ecosystem services” of the **Earth System**



- Those natural processes and systems that sustain life on earth
- Water, air, soil, species, ecosystems, energy & minerals

Earth’s Systems

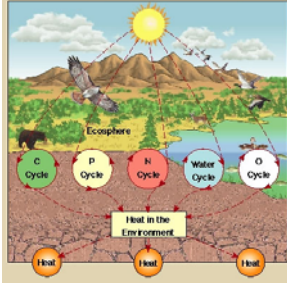
- Hydrosphere - “water surface”
- Atmosphere - air “gaseous layer”
- Lithosphere - “land or soil surface”
- Biosphere - “living” - species & ecosystems



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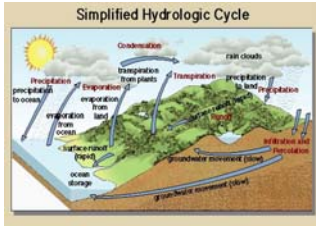
Biogeochemical Cycles

Element Cycling and Energy Flow



- Natural processes that cycle nutrients from nonliving environment to living organisms and back to environment
- Examples: C, O, N, P, S and Water Cycles

Hydrosphere



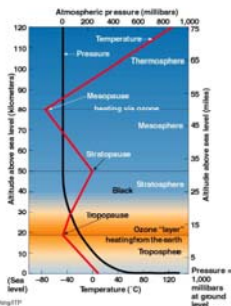
- Earth's water surface (70%)
- 97% is saltwater
- All organisms 50-95% water
- Human body - 70% water
- Collects, purifies & distributes "fixed" supply of water between organisms & their environment

Hydrosphere



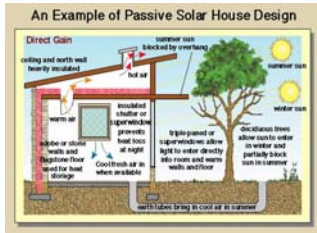
- California Water Project - one of world's largest watershed transfer projects
- Problem: 75% of the population lives South of where 75% of the rain falls
- So. Californians say they need more water - No. Californians say it will destroy S.F. Bay/Delta

Atmosphere



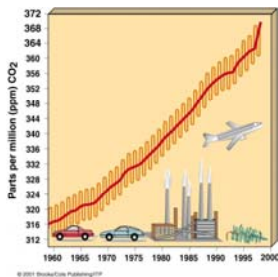
- Thin envelope of life-sustaining gases surrounds the Earth
- Troposphere "Greenhouse Effect"
- Stratosphere "Ozone Layer"

Greenhouse Effect



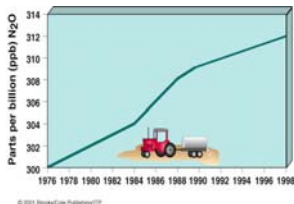
- Incoming visible light is converted to heat
- Heat is trapped
- Warms structure (or Earth)

Greenhouse Gases



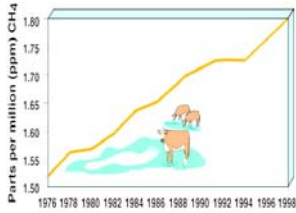
- Increases in concentrations of greenhouse gases
- Carbon dioxide is responsible for 50-60% of global warming
- Main source: burning of fossil fuels (70-75%)

Greenhouse Gases



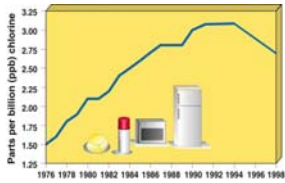
- Nitrous oxide can trap heat in the troposphere & deplete ozone in the stratosphere
- Released from burning nitrogen-rich fuels (coal), fertilizers, livestock wastes

Greenhouse Gases



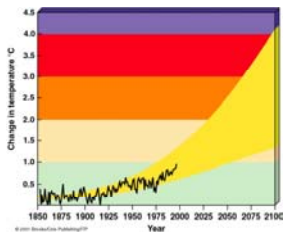
- Methane gas accounts for about 20% of overall warming effect
- Produced when anaerobic bacteria break down dead organic matter
- Biomass burning in tropics is significant source

Greenhouse Gases



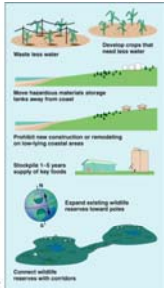
- CFC's contribute to global warming & also deplete ozone in the stratosphere
- Main sources are leaking air conditioners & refrigerators

Global Warming



- Curved yellow area shows global warming projected by various computer models
- Current models indicate that average global temperatures will rise by 1.8 to 6.3 degrees F (1 to 3.5 degrees C)

Global Climate Change



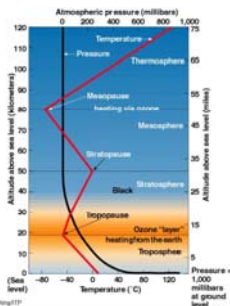
- Ways to prepare for global climate change:
 - Waste less water
 - Develop crops that need less water
 - Prohibit new construction on low-lying coastal areas
 - Stockpile 1-5 years of key foods
 - Expand existing wildlife reserves toward the poles

Discussion Question - Journal Entry #4

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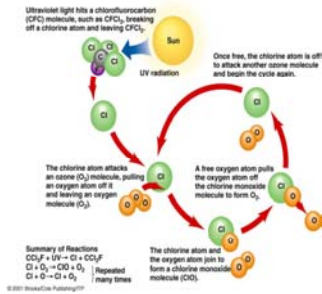
- Do you believe that global warming is a real threat?
- Why or why not?
- How do we reach consensus about this common property resource?
- Cite the sources from your textbook!
- **Journal Entry #4**

Stratosphere



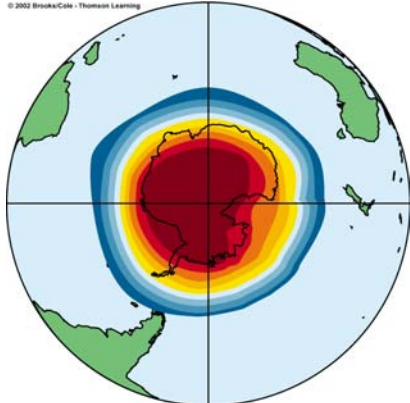
- Stratosphere “Ozone Layer”
- Protects Earth from harmful ultraviolet (u.v.) light

Stratosphere

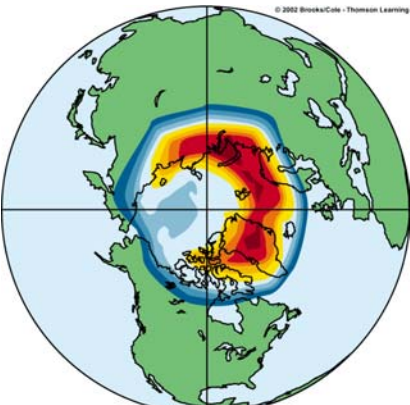


- Ozone molecules
- Ozone depletion by CFC's

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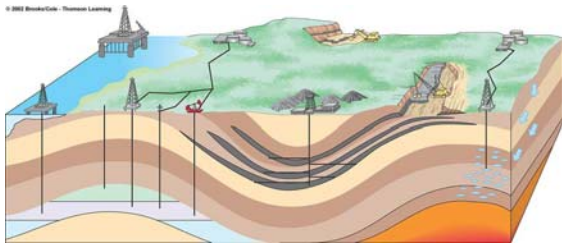


Lithosphere

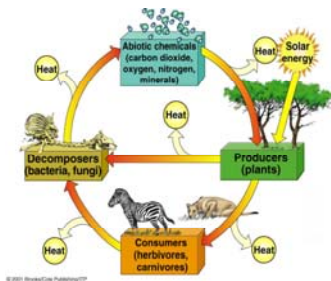
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- Covers 30% of Earth's surface
- Earth's crust and upper mantle
- Earth's soil surface & minerals
- Supports terrestrial ecosystems

Lithosphere



Biosphere

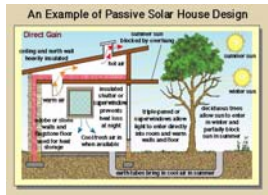


- That portion of Earth where life is found
- Parts of hydros, atmos & lithospheres!
- Ecosphere

Okay. . . . big deal!

Why is this so important in my life?

Why is this important in your life?



You use

- Water
- Air
- Soil
- Species
- Ecosystem services
- Energy
- Minerals

Every *DAY* of your life

Why do we make it so darn confusing then??

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- Exactly right!
- Let's try to bring some "order" to the study of our earth and natural resource use
- How do humans "organize" natural resources?
