

REMINDERS

- ❑ Atlas Extra Credit for Exam II: Available on the Course Home Page Blue Scantron sheet is due April 11
- ❑ **EXAM II – New Date is Tuesday, April 17**
- ❑ Study Guide is on the course home page

❖ Two required essays (10%) were due March 27. Late penalty now applies.

❖ Extra Credit: "Think Geographically"
 Essays from any five of Chapters 4-12 or the 3rd topic from required essay list plus 4 chapter essays.
 – Last day to submit is May 15 but it is best to do them as you finish reading a chapter.

BIOSPHERE: chapter 4
 EARTH RESOURCES: chapter 5

➤ Any essay may be submitted before the deadline.
 ➤ Don't wait for the night before to write them!!

GEOG 101 Part II
 People and their
 Physical Environment

16: Earth Habitat
 Biosphere

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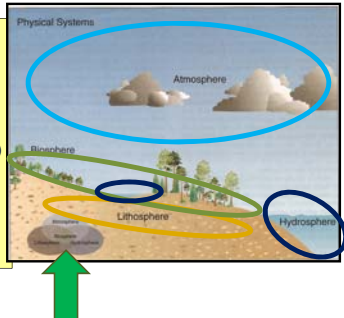
PART II: People and their
 Physical Environment

- ✓ I. Introduction to the Physical Environment
- ✓ II. Earth-Sun Relationship
- III. Earth Systems
 - ✓ A. The Hydrosphere: Oceans
 - ✓ B. The Atmosphere: Weather and Climate
 - ✓ C. The Lithosphere: Geologic Influences
 - IV. **Earth Habitat**
 - A. Biosphere
 - B. Natural Controls and Cycles
 - C. Human Impact
 - D. Natural Hazards

PHYSICAL SYSTEMS

The earth's physical environment is composed of the:

1. Atmosphere (air)
2. Hydrosphere (water)
3. Lithosphere (land)
4. Biosphere (life)

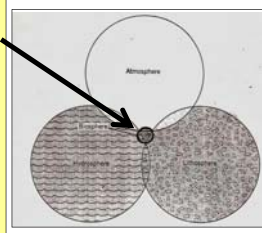


BIOSPHERE

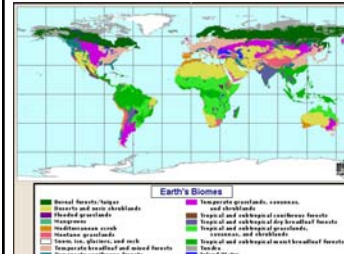
The BIOSPHERE is at the interface of air, land and water. It is **SUN** dependent.

 All lifeform characteristics are a result of variations in the components of the biosphere: temperature, moisture, elevation, slope angle.

 Plants are most sensitive to change because they cannot relocate quickly.



BIOMES



❖ **BIOMES are zones of life.**
 As *ecoregions*, they are unique combinations of climate, flora, fauna and soils.

 They are composed of many ecosystems

BIOMES

Terrestrial biomes vary with temperature and moisture giving us unique plant and animal communities.

- Each species has characteristics that allow it to survive within its physical environment.
- The components of biomes have to be preserved, recycled and renewed to avoid reaching **carrying capacity** (maximum life support) and to maintain the **quality of habitat** (quality varies with conditions).

7

BIOMES

Simplified scheme of the major terrestrial biomes, arranged along gradients of increasing aridity at different latitudes, illustrating the dominant influence of moisture and temperature on the structure of plant communities.

8

Vegetation Sequence

GENERALIZED SEQUENCE OF VEGETATION FROM THE NORTH POLE TO THE EQUATOR
(on a hypothetical uniform surface, eliminating differences in elevation)

LATITUDE

9

Vegetation Sequence

GENERALIZED SEQUENCE OF VEGETATION FROM THE NORTH POLE TO THE EQUATOR
(on a hypothetical uniform surface, eliminating differences in elevation)

HOT and DRY

HOT and SEASONALLY WET

HOT and DRY

10

BIOMES

HOT WET

HOT WET

HOT with WET & DRY SEASONS

HOT WET

11

Soil Formation

Climate and Vegetation Altering Parent Material to Form Soil

Soil formation depends on temperature and moisture working on bedrock and organic material over time.

12

Climax Vegetation

BIOMES: zones of life that develop in a unique combination of temperature, moisture, soil and sunlight.

❖ **Climax vegetation is the best species for the existing conditions within the biome.**

- When **conditions change**, new species **better suited** for the conditions invade and a **new sequence** of plant growth begins.
- **When it stabilizes, climax vegetation is again attained.**

13

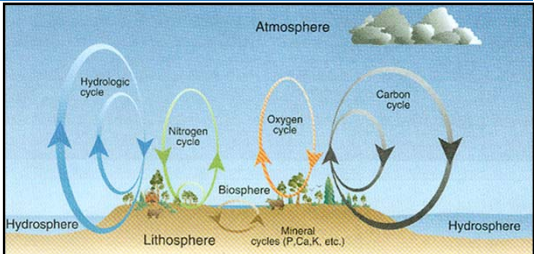
NATURAL CONTROLS and CYCLES

- ✓ **A. Temperature Controls:** **rotation** (day and night), **revolution** (the seasons), **cloud cover**, and **ocean circulation** (surface, deep sea).
- ✓ **B. Geologic Cycle:** plate tectonics, rock cycle, building and gradational forces
- **C. Biochemical Cycles**
 1. Hydrologic (water) cycle
 2. Carbon-Oxygen cycle
 3. Nutrient cycle

All these controls and cycles are interrelated.

14

BIOCHEMICAL CYCLES

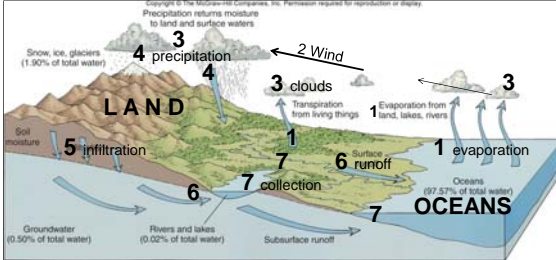


Biochemical cycles transfer matter between the atmosphere, hydrosphere, and lithosphere.
The cycles shown here are diagrammatic and therefore simplified.

<https://www.youtube.com/watch?v=d70DvBnas> 5 min carbon cycle

15


HYDROLOGIC (water) CYCLE



88% of evaporation is from the oceans.
WATER ON LAND: 77% frozen; 22% underground; 1% surface of which only 0.6% is in lakes and rivers.

16

HYDROLOGIC (water) CYCLE

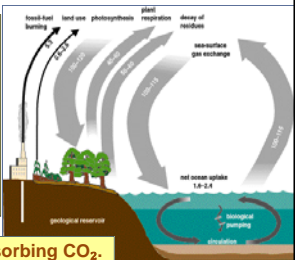


1. **Evaporation process** removes water molecules from oceans, lakes, land and biota leaving behind salts and pollutants.
2. **Wind** moves atmospheric moisture around the globe.
3. **Clouds** are created at the **condensation** point.
4. **Precipitation** occurs after saturation is reached; returns water to the earth's surface where it is collected and stored.
5. **Infiltration** soaks it into the ground (percolation).
6. **Runoff** is when water flows over the land.
7. **Water returns** to the oceans, lakes, land and biota to begin the cycle again when it is discharged.

<https://www.youtube.com/watch?v=al-do-HGulk> 6 min Water Cycle video

17

CARBON-OXYGEN CYCLE



Carbon dioxide (CO₂) is created by respiration, decay and combustion which uses oxygen (O₂) in the process.

❖ **Photosynthesis:** removes CO₂ and creates O₂.

- **Oceans play a great role in absorbing CO₂.** Algae and marine life absorb it to create shells and eventually carbonate rocks.
- **Human production of CO₂ is faster than plants and the oceans can absorb it.**

18

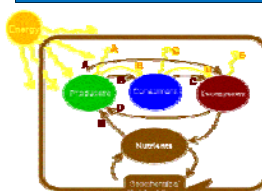
CARBON-OXYGEN CYCLE

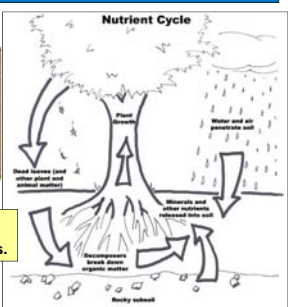
NEGATIVE Variables of Human Impact

1. **Deforestation** (decreases absorption of CO₂)
2. **Burning of fossil fuels** (adds more CO₂)
3. **Urbanization** (decreases absorption; adds more CO₂)
4. **Pollution of the ocean surface** (decreases absorption of CO₂)
5. **Global warming** (melting of permafrost/ice pack releases stored CO₂ and other greenhouse gasses)

19

NUTRIENT CYCLE





Water and temperature dependent.
Too dry or too cold slows the process.

20




NUTRIENT CYCLE

The nutrient cycle adds fertility to the soil.

❖ **Nitrogen fixation** (*making nitrogen usable*) **is an important component of the cycle.**

There are 3 aspects of the cycle:

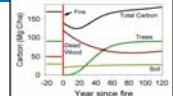
1. **DECOMPOSITION** (rotting organic material; mixes with inorganic material to give a balanced soil)
2. **FIRE** (ash from burnt vegetation; vaporized nutrients released into atmosphere mix with rainwater. NOTE: ash is naturally alkaline and counteracts a higher acidic pH levels in a soil.)
3. **FLOODING** (seasonal flooding leaves behind a layer of nutrients from upstream areas; supplements local nutrients)

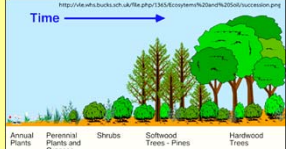




21

Benefits of a Forest Fire

- Nutrient release to soil, esp. when mixed with rainwater.
- Regrowth of remnant roots and seeds
- Allows expansion of neighboring ecosystems (climax vegetation sequence begins)
- Rapid restoration of energy flow and nutrient cycling (exposure to sunlight; thinner atmosphere/lithosphere interface; better water absorption)





Also,

- Reduces chance of catastrophic fire
- Controls insect pests
- Controls plants diseases
- Adds to biodiversity (flora and fauna)

22

NUTRIENT CYCLE: Human impact

The nutrient cycle has been affected by:

- **Land alternation**; cutting forests, plowing grasslands, urbanization, suburbanization
- **Dousing forest/grassland fires**
- **Stream alteration**; dam building, dredging
- **Land pollution**; landfills, mining waste
- **Misuse of artificial fertilizers/herbicides**

23

NEXT

Natural Hazards and Human Impact

24