

Mr. Galloway Life Science 7th Grade – Notes: Ch’s 22-24 Biblical Ecology I [See the PowerPoint Presentation with Diagrams, etc, online – soulcare.org]

Chapters 22-24

- Ch 22 – Populations and Communities
 - Ch 23 – Ecosystems and Biomes
 - Ch 24 – Living Resources
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Garden of Eden

- Genesis 1-2
- Peaceful harmony
- Vegetarian “nephesh” animals and man
- NOT the “Wild Kingdom”
- Man responsible to manage GOD’S Garden

God’s Ecological Design

- [Gen 1:26](#) And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth.
- [Gen 1:27](#) So God created man in his [own] image, in the image of God created he him; male and female created he them.

God’s Ecological Purpose for Man

- [Gen 1:28](#) And God blessed them, and God said unto them, Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth.
- [Gen 1:29](#) And God said, Behold, I have given you every herb bearing seed, which [is] upon the face of all the earth, and every tree, in the which [is] the fruit of a tree yielding seed; to you it shall be for meat.
- [Gen 1:30](#) And to every beast of the earth, and to every fowl of the air, and to every thing that creepeth upon the earth, wherein [there is] life, [I have given] every green herb for meat: and it was so.
- [Gen 1:31](#) And God saw every thing that he had made, and, behold, [it was] very good. And the evening and the morning were the sixth day.
- [Gen 2:7](#) And the LORD God formed man [of] the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul.
- [Gen 2:8](#) And the LORD God planted a garden eastward in Eden; and there he put the man whom he had formed.
- [Gen 2:9](#) And out of the ground made the LORD God to grow every tree that is pleasant to the sight, and good for food; the tree of life also in the midst of the garden, and the tree of knowledge of good and evil.
- [Gen 2:15](#) And the LORD God took the man, and put him into the garden of Eden to dress it and to keep it.
- [Gen 2:16](#) And the LORD God commanded the man, saying, Of every tree of the garden thou mayest freely eat:
- [Gen 2:17](#) But of the tree of the knowledge of good and evil, thou shalt not eat of it: for in the day that thou eatest thereof thou shalt surely die.

Environmental Disaster Due to Man's Sin:

- **Gen 3:17** And unto Adam he said, Because thou hast hearkened unto the voice of thy wife, and hast eaten of the tree, of which I commanded thee, saying, Thou shalt not eat of it: cursed [is] the ground for thy sake; in sorrow shalt thou eat [of] it all the days of thy life;
- **Gen 3:18** Thorns also and thistles shall it bring forth to thee; and thou shalt eat the herb of the field;
- **Gen 3:19** In the sweat of thy face shalt thou eat bread, till thou return unto the ground; for out of it wast thou taken: for dust thou [art], and unto dust shalt thou return.

Ecology is the study of:

- **how living things interact**
 - **with one another**
 - **and with their environment.**
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Ch 22 Populations & Communities

- **22.1 Living Things and the Environment**
- **22.2 Studying Populations**
- **22.3 Interactions Among Living Things**

22.1 Living Things and the Environment

• **Abiotic Factors**

- These are the nonliving parts of an ecosystem.
- (Water, Sunlight, Oxygen, Temperature, Soil)

• **Biotic Factors**

- These are the living parts of an ecosystem.

• **Habitats**

- Habitat is the place where an organism lives.
- It provides the things the creature needs.

• **Populations**

- A population is all the members of one species in a particular area.
- In 1900 in Texas, there was a prairie dog town covering twice the size of Dallas.
- Its population was over 400 million prairie dogs.

• **Communities**

- A community is all the different populations that live together in an area.

Levels of Organization in an Ecosystem

- **Organism**
- **Population**
- **Community**
- **Ecosystem:**
 - **An ecosystem includes all the communities in a specific area.**

22.2 Studying Populations:

- Determining Population Size:

- Direct Observation (*Count the actual animals*)
- Indirect Observation (*tracks, nests, droppings, ...*)
- Sampling (*Estimate using large, random sample*)
- Capture, Mark, Recapture (*Calculate % marked*)

- Population Density =

- Number of Individuals ÷ Unit Area
- Example: 50 Anole Lizards in a 10 m² area.
- Density = $50 \div 10 = 5$ anoles / m²

- Changes in Population Size:

- Changes occur when members enter or leave.
- Births, deaths, Immigration, Emigration, etc.
- Birth Rate** = number of births over a certain time.
- Death Rate** = # of deaths over a certain time.
- “**Population Statement**” indicates whether pop. is increasing or decreasing based on births vs. deaths
- Immigration** = moving into a population
- Emigration** = moving out of a population

Factors Limiting Pop. Increase

- Food
- Space
- Weather
- Predators
- Disease
- Pollution
- . . . What else?

22.3 Interactions Among Living Things

- Adapting to the Environment
 - Suited (fit) to specific environments
 - Niche = how the organism makes its living
- The niche is the creature’s role or profession
- Three Major Types of Interactions:
 - Competition
 - Predation
 - Symbiosis

Competition

- Occurs between two organisms that occupy the same “habitat”.
- It is their struggle to survive in a “habitat” with limited resources, such as food, water, and shelter.
- Example = Red-Tailed Hawk and Elf Owl
 - They reduce competition by the hawk being active during the day, and the owl during the night.

Predation

- Predation is an interaction when one creature hunts and kills another for food.
- The killer is called the PREDATOR
- The creature killed is called PREY
- Populations of both predators and prey can adapt as they struggle in this fallen world.
 - Predators develop longer teeth, strategies, etc
 - Prey develop camouflage and other defenses
 - Predation affects population size.

Symbiosis

- It is a close relationship between two species.
- Three types of symbiotic relationships:
 - **Mutualism** is when BOTH species benefit.
(Flowers give bees food / Bees spread pollen)
 - **Commensalism** is when ONE BENEFITS , and the other is neither harmed nor helped.
(Red-tailed hawk gets a nest from Saguaro Cactus)
 - **Parasitism** is when ONE BENEFITS and the other, the **HOST** is HARMED.
(Fleas, ticks, worms steal from host’s bodies.)

Ch 23 Ecosystems and Biomes

- **23.1 Energy Flow in Ecosystems**
- **23.2 Cycles of Matter**
- **23.3 Biogeography**
- **23.4 Earth’s Biomes**
- **23.5 Succession**

23.1 Energy Flow: Energy ROLES

- Producers – autotrophs that use photosynthesis to make their own food.
- Consumers – gets energy by eating other organisms (plants or animals)
 - Herbivore: eats only plants
 - Carnivore: eats other animals
 - Scavenger: eats dead animal bodies
 - Omnivore: eats both plants and animals
- Decomposers – Bacteria and fungi because they break down waste and dead tissues

Food Chains and Food Webs

- **Food Chain** = a series of events in which one organism eats another to get energy.
- **Food Web** = many overlapping food chains.
 - **Interconnected**
 - **Interdependent**
- **Energy Pyramid** = diagram showing the amount of energy that moves from one feeding level to another in a food web.
 - The **most** energy is available at the bottom (the producer level), with energy **decreasing** as you go up the pyramid levels.

23.2 Cycles of Matter

- **Recycling Matter** – a natural, necessary process
- **The Water Cycle**
 - Evaporation
 - Condensation
 - Precipitation
- **The Carbon and Oxygen Cycles**
 - Producers use C from CO₂ to make organic compounds.
- **The Nitrogen Cycle**
 - Air = 78 % “free” (loose) nitrogen gas
 - Nitrogen Fixation** is done by bacteria. Some live in **nodules** on roots of plants

Biogeography

- **Continental Drift** (Dr. Baumgardner – Creation)
 - Continents are huge flat blocks of rock floating on “lava”.
- **Means of Dispersal** of Organisms
 - Wind, Water, and Other Living Things
- **Limits to Dispersal**
 - Climate
 - Physical Barriers
 - Competition

23.4 Earth’s Biomes

- A “Biome” is a group of ecosystems with similar climates and organisms.
- Climate is the main thing that determines what type of a biome it is.

BIOMES:

- Rain Forest:** wet, warm,
- Desert:** dry, usually hot unless high altitude
- Grasslands:** enough rain for grass, but not trees
- Deciduous Forest:** trees shed leaves each winter
- Boreal Forest:** conifer (evergreen) trees
- Tundra:** dry, very cold, far northern areas
- Mountains & Ice:** do not fit into other categories
- Freshwater:** ponds, lakes, rivers, streams, bayous
- Marine:** salt water, including estuaries where freshwater rivers empty into the ocean.

23.5 Succession

- **Succession** is a series of predictable changes that occur in a community over time.
- **Primary Succession** = occurs in an area where no ecosystem previously existed.
 - New volcanic island
- **Secondary Succession** = occurs after a disturbance in an existing ecosystem.
 - Fires, hurricanes, etc.

Ch 24 Living Resources

- “Environmental Science” is the study of the natural processes that occur in the environment and how HUMANS can affect them.
- **Types of Problems:**
 - Resource Use
 - Population Growth
 - Pollution
- **Approaches to Solving Problems**
 - Many efforts to solve problems have created bigger ones
- **Weighing Costs and Benefits**
 - Values: (scenic, economic, recreational, etc.)

Example of Approaches: Two Logging Methods

Fisheries

- Louisiana’s economy depends on its fisheries.
- A fishery is an area with a large population of valuable ocean organism.
- This could also include freshwater organisms.
 - Oysters
 - Fish
 - Crawfish

Biodiversity

- Biodiversity is the number of different species.
- Value of Biodiversity
 - Economic Value (Money)
 - Ecosystem Value (Interconnected species)
- Factors Affecting Biodiversity
 - Area
 - Climate
 - Different Niches

Gene Pool Diversity

- Traits in a population should be preserved.
- Mutations must not become concentrated.
- Extinction should be avoided.
 - Causes of Extinction
 - Habitat Destruction
 - Poaching
 - Pollution
 - Exotic Species Invasion

Protecting Biodiversity

- Captive Breeding
- Laws and Treaties
- Habitat Preservation