

COLUMBUS STATE COMMUNITY COLLEGE
ESSH 1101 - Introduction to Environmental Science, Safety & Health

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Homework 4 – Biodiversity

Environmental Science, 16th Ed. by Tyler and Spoolman - Chapters 4, 7 & 8

1. In your own words provide a definition of the term biodiversity. Give some reasons why *you* personally value biodiversity.

- **Biodiversity literally means the variety of life.** On a personal level, **biodiversity is important to me because of the various activities I enjoy doing outdoors: camping, hunting, hiking, fishing, etc.** Without biodiversity, I wouldn't get to enjoy the sights, sounds, and smells of the variety available in a fully functioning ecosystem.

2. Is the reduction in the number of the *types of plants* for the below example a change in *species diversity*, *genetic diversity* or *ecosystem diversity*? (Select one of the three) Explain your answer.

A forest with very diverse vegetation is cut down and replaced with only corn.

- The above example is an **example of the removal of species diversity.** By **removing all but one variety of plant life for the cultivation of crops, the farmer has reduced the number of plant species to 1.** While this is not a sustainable ecosystem it is, however, necessary in order to feed a population nearing 380 million people.
3. Provide a definition of the term *species*. About how many species do scientists believe live on the Earth? (Identify your source of this information.)

- **A species is simply a group of similar individuals that are capable of interbreeding** within nature. Scientists have estimated that there are **approximately 8.7 million species on Earth** (allyouneedisbiology.wordpress.com).

4. Define the term *ecological niche*. Give some examples of your ecological niche as a human, and how you might impact ecosystems.

- **An ecological niche is how ecologists describe the role a species plays in an ecosystem.** As humans, our niche, or way of life, positively and negatively impacts the ecosystems we inhabit. This is due to the amount of resources required for survival (food, water), reproduction, space, predators, etc.

5. Distinguish between a *generalist* species and a *specialist* species. Give an example of each.
- **A generalist species has a broad niche.** Meaning a generalist can **live many places, eat a variety of foods, and tolerate a wide range of environmental conditions.** (Example: raccoon).
 - **A specialist species occupies a narrow niche.** Meaning a specialist **typically only inhabits one specific type of habitat, only eats a few specific types of food, and tolerates a narrow range of environmental factors.** (Example: panda)
6. What is the scientific theory of biological evolution through *natural selection*?
- The **scientific theory of biological evolution states that species change genetically over time.** Genetic traits that are favorable to a specific climate or ecosystem are passed on to future generations through a process called natural selection. **Natural selection is loosely associated with the idiom, only the strong survive. In this instance, 'strength', is a metaphor for those individuals within a species that adapted to their environment most effectively.**
7. Provide an example of how geographic isolation (through geography and/or geology) can affect biodiversity.
- Populations that once intermingled (Pangea) that are then separated due to natural events (shifts in tectonic plates) will begin adapting and mutating genetically over thousands of years as they adapt to their differing environments.
8. Define and distinguish between the *background extinction rate* and a *mass extinction*. Identify two ways that it is believed that humans are causing another mass extinction of species.
- The **background extinction rate is the low rate that the planet's species have slowly, but gradually, become extinct.** Mass extinction is when there is a significant rise in extinction rates, well about the background extinction rates.
 - Humans may well cause another mass extinction due to **over farming and the removal of rain forests.**
9. Give at least three major factors that determine the climate in a given area.
- **Factors that affect climate in a given region are:**
 - Solar energy
 - Earth's rotation
 - Global patterns of air and water movement
 - Greenhouse gasses
 - Earth's surface features (mountains, grasslands, deserts, oceans)

10. What is a *biome*? Explain why there are three major types of each of the major biomes (deserts, grasslands and forests.)

- A **biome is a large terrestrial region characterized by a certain type of climate and specific combinations of plant life.**
- The reason why there are **major types of each major biome is because each type contains differing characteristics such as rainfall and varying average temperatures.**

11. Why is biodiversity often so high in tropical rain forests as compared to desert environments?

- Biodiversity is higher in a rain forest as opposed to a desert because of the prevalence of generalist versus specialist species.

12. Distinguish between *marine life zones* and *freshwater life zones*, and give two examples of each.

- **Marine life zones are comprised of saltwater zones (oceans, coastal wetlands, bays, coral reefs, estuaries, shorelines, mangrove forests)**
- **Freshwater life zones contain lakes, streams, creeks, and inland wetlands.**

13. Explain why although *coral reefs* cover very little of the ocean, they are considered to be very important ecosystems.

- **Coral reefs are considered an important ecosystem** because of the **volume of biodiversity, shoreline protection, and provide food and spawning grounds.**

14. Distinguish between *oligotrophic* and *eutrophic lakes*. What is *cultural eutrophication*?

- Lakes with a small supply of nutrients are called **oligotrophic**.
- Lakes with a large supply of nutrients are called **eutrophic**.
- **Cultural eutrophication** is when humans manipulate the nutrients levels in a lake artificially in order to accelerate the lakes nutrient production.

15. What are four different human causes in the loss of species in natural areas?

- Human cause loss of species through:
 - Deforestation
 - Over farming
 - Filling in wetlands
 - Pollution

16. Why do introduced species often become pests (commonly referred to as *invasive species*), rapidly expanding their populations?

- Issues may arise when non-native species are introduced whereby species become invasive due to lack of predator, competitors couple with increased disease and pest resistance to parasites, viruses, bacteria, etc.