**(AP) ENVIRONMENTAL SCIENCE 2022-23 October 18, 2022**

**Today’s Agenda (Day 38)**

1. Housekeeping Items

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1. Homework Check:

🡪 Chapter 5 Vocabulary

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1. Class Activity:

🡪 DAY 4: Chapter 4 PPT Review

1. **Section 4.4 – The Structure of Matter**
2. **Section 4.5 – Energy Principles**
3. **Section 4.6 – Environmental Implications of Energy Flow**

🡪WEDNESDAY: Mock SLC

🡪THURSDAY: Chapter 4 Test

HOMEWORK:

* READ: Chapter 4 – Interrelated Scientific Principles: Matter, Energy, and Environment
* READ: Chapter 5 – Interaction: Environments & Organisms
* COMPLETE: Chapter 5 Reading Guide
* **STUDY**: Chapter 4 Test, Chapter 5 Vocabulary Quiz and Test

CHAPTER 5 – Interaction: Environments & Organisms

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| Abiotic factors | Biogeochemical cycles | Biomass | Biotic factors | Carbon cycle | Carnivores |
| Coevolution | Commensalism | Community | Competition | Competitive exclusion principle | Consumers |
| Decomposers | Denitrifying bacteria | Ecology | Ecosystem | Ectoparasites | Endoparasites |
| Environment | Evolution | Extinction | Food chain | Food web | Free-living nitrogen-fixing bacteria |
| Genes | Habitat | Herbivores | Host | Interspecific competition | Intraspecific competition |
| Keystone species | Limiting factor | Mutualism | Mycorrhizae | Natural selection | Niche |
| Nitrifying bacteria | Nitrogen cycle | Nitrogen-fixing bacteria | Omnivores | Parasite | Parasitism |
| Phosphorus cycle | Phytoplankton | Polyploidy | Population | Predation | Predator |
| Prey | Primary consumers | Producers | Range of tolerance | Secondary consumers | Speciation |
| Species | Symbiosis | Symbiotic nitrogen-fixing bacteria | Trophic level |  |  |

REMINDERS

* **TEST:** **Ch 4 🡪 Oct. 20**
* Chapter 5 Reading Guide – Oct. 24
* **QUIZ: Ch 5 Vocabulary 🡪 October 25**
* **TEST: Ch 5 🡪 Oct. 27**

**(AP) ENVIRONMENTAL SCIENCE 2022-23 READING GUIDE**

**CHAPTER 4**

REVIEW QUESTIONS

1. How do scientific disciplines differ from nonscientific disciplines?

2. What is a hypothesis? Why is it an important part of the way scientists think?

3. Why are events that happen only once difficult to analyze from a scientific point of view?

4. What is the scientific method, and what processes does it involve?

5. How are the second law of thermodynamics and pollution related?

6. Diagram an atom of oxygen and label its parts.

7. What happens to atoms during a chemical reaction?

8. State the first and second laws of thermodynamics.

9. How do solids, liquids, and gases differ from one another at the molecular level?

10. List five kinds of energy.

11. Are all kinds of energy equal in their capacity to bring about changes? Why or why not?

CRITICAL THINKING QUESTIONS [for APES students only]

1. You observe that a high percentage of frogs, which are especially sensitive to environmental poisons, in small ponds in your agricultural region have birth defects. Suspecting agricultural chemicals present in runoff to be the culprit, state the hypothesis in your own words. Next, devise an experiment that might help you support or reject your hypothesis.

2. Given the experiment you proposed in Critical Thinking Question 1, imagine some results that would support that hypothesis. Now imagine you are a different scientist, one who is very skeptical of the initial hypothesis. How convincing do you find these data? What other possible explanations (hypotheses) might there be to explain the results? Devise a different experiment to test this new hypothesis.

3. Increasingly, environmental issues such as global climate change are moving to the forefront of world concern. What role should science play in public policy decisions? How should we decide between competing scientific explanations about an environmental concern such as global climate change? What might be some of the criteria for deciding what is “good science” and what is “bad science”?

4. How important are the first and second laws of thermodynamics to explaining environmental issues? Using the concepts in these laws of thermodynamics, try to explain a particular environmental issue. How does an understanding of thermodynamics change your conceptual framework regarding this issue?

5. The text points out that incandescent lightbulbs are only 5–10 percent efficient at using energy to accomplish their task, while new, initially more expensive, compact fluorescent lighting uses significantly less electricity to provide the same quantity of light. Examine the contextual framework of those who advocate for new lighting methods and the contextual framework of those who continue to design and build using the old methods. What are the major differences in perspective? What could you suggest being done to help bring these different perspectives closer together?

6. Some scientists argue that living organisms constantly battle against the principles of the second law of thermodynamics using the principles of the first law of thermodynamics. What might they mean by this? Do you think this is accurate? What might be some of the implications of this for living organisms?

**(AP) ENVIRONMENTAL SCIENCE 2022-23 READING GUIDE**

**CHAPTER 5**

REVIEW QUESTIONS

1. List three abiotic and three biotic factors of your environment.

2. Describe a primary limiting factor for reptiles.

3. How is an organism’s niche different from its habitat?

4. Describe, in detail, the niche of a human.

5. How are the concepts of population and species similar?

6. Describe how genetic differences, number of offspring, and death are related to the concept of natural selection.

7. How is natural selection related to the concept of niche?

8. What is speciation and why does it occur?

9. Why does extinction occur?

10. Give an example of coevolution.

11. List five predators and their prey organisms.

12. Describe the difference between interspecific and intraspecific competition.

13. What do parasitism, mutualism, and commensalism have in common? How are they different?

14. How do the concepts of ecosystem and community differ?

15. What roles do producers, consumers, and decomposers fulfill in an ecosystem?

16. Give examples of organisms that are herbivores, carnivores, and omnivores.

17. What distinguishes a keystone species from other species in an ecosystem?

18. How is the concept of trophic levels related to energy flow in an ecosystem?

19. Describe a food chain and a food web.

20. Describe how each of the following is involved in the carbon cycle: carbon dioxide, producer, organic compounds, consumer, respiration, and decomposer.

21. List three changes to the carbon cycle caused by human activity.

22. Describe how each of the following is involved in the nitrogen cycle: atmospheric nitrogen, nitrogen-fixing bacteria, nitrifying bacteria, denitrifying bacteria, producer, protein, consumer, and decomposer.

23. List three ways humans have altered the nitrogen cycle.

24. Describe how each of the following is involved in the phosphorus cycle: phosphorus in rock, producer, consumer, animal waste, respiration, and decomposer.

CRITICAL THINKING QUESTIONS [for APES students only]

1. Many people in the world have very little protein in their diet. They are often able to grow crops to feed themselves but do not raise cattle or other sources of meat. Describe why these people are not likely to use some of the crops they raise to feed to cattle.

2. Some people predict that the available sources of phosphorus from mines will be exhausted in the next 50 years. Describe what changes are likely to occur in ecosystems if phosphorus is not available.

3. Polar bears hunt seals from ice and have been placed on the endangered species list due to warming temperatures. Why has the habitat of the polar bear changed?