

AP Environmental Science

Summer Assignment 2019

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This upcoming school year, you will be learning about different systems found in nature, and the human impact on the environment. Our course is to educate you about environmental issues that are important to our community, our country, and our world. If you have questions, please e-mail me.

What you need for class:

- Notebook** (any style) – for your daily note-taking
- APES Journal** – a *lined composition notebook*
- All Summer Assignments are due the first day of school**
- Sign in to our Schoology Class Room** (www.schoology.com)
 - Our AP Environmental class code is: **7W86-ZHS5-X9VKV**

Part 1: UNIT 1- INTRO: Pre-Discussion Report on “The Lessons of Easter Island”

Read the article: Jared Diamond. “Easter’s end.” *Discover* magazine, August 1995. 16(8): 62-69. Found on our schoology website in your summer assignment folder.

1) Type thoughtful responses to two (2) of the following questions. Responses should put ideas in your own words and should draw support both from the article and from your own knowledge and ideas.

a) The article describes the former abundance of trees and forests on Easter Island. Describe several factors that contributed to the extinction of trees on the island. What factors affected tree death rates? What factors affected tree “birth” rates (think about reproduction and germination of new seeds)? Imagine that you arrived on the island before the tree populations were extinct, but after the tree populations had started to decline. Suggest a management plan that could have helped the Easter Islanders save the tree populations from extinction. Be sure to consider both tree “birth” and tree death.

b) The article states that around 2,000 people were found living on Easter Island when European explorers first made contact with the island. However, the existence of the huge stone statues on the island suggests that the human population on Easter was once as high as 17,000. Describe how biotic and abiotic factors contributed to the crash of the human population on Easter Island. Imagine that you can turn back time and visit Easter Island a thousand years ago (after the Polynesian settlers had arrived, but before the peak of statue construction). Describe specific advice that you could give to the settlers that would help them avoid the population crash. Justify your advice.

c) Some authors liken the demise of the civilization on Easter Island with the overpopulation and resource destruction on the entire planet. Do you feel that this comparison is justified? Why or why not? What can we do to prevent a population crash of the entire human population? Describe how your suggestion relates to at least two of the following four ecological concepts: birth and death rates, carrying capacity, biotic and abiotic environment, biodiversity.

Part 2: The Lorax (original 1972 version) (25 minute video)

This movie is embedded in our schoology website (summer assignment folder) or follow this link: <https://www.youtube.com/watch?v=8Vo6ZOQuook>

Post-Video Questions Type and explain your answers to these questions with complete and original thoughts.

1. What is the Lorax? What is his role in the book?
2. Teddy Roosevelt and Gifford Pinchot had utilitarian conservation policies that stated that forests should be saved “not because they are beautiful or because they shelter wild creatures of the wilderness, but only to provide homes and jobs for people.” They supported sustainable-yield management practices. John Muir, however, (a geologist, author, and first president of the Sierra Club) opposed Pinchot’s ideas. His outlook, biocentric preservation, emphasizes the fundamental right of other organisms to exist and to pursue their own interests. Which character in the Lorax has similar views to Muir and why are these views so controversial today?
3. Rachel Carson, considered by many to be the “mother of environmentalism,” added a new set of concerns to the environmental agenda. She awakened the public to the threats of pollution and toxic chemicals. Discuss the different toxins that were produced in the production of the thneed.
4. Though the Once-ler polluted the area where he lived, environmentalists have now concluded that the new concern for our planet should be one of global environmentalism, because we are all interconnected and events that occur on the other side of the globe have profound and immediate effects on our lives. List three things that could have global effects in the production of the thneed.
5. In the last part of the Lorax, the Lorax uses the word “unless.” What does that mean and how can you, as an average citizen, make a difference in the environment?
6. Many economists argue that the solution to the Lorax’s dilemma is found in properly defining property rights. What does this mean and how would this solve the problem?

Part 3: *Ecological Footprint:* watch: <http://www.youtube.com/watch?v=EjyrAHzthTo>

Then, visit <http://www.footprintnetwork.org/en/index.php/GFN/page/calculators/> and calculate your ecological footprint using the "detailed" version. Try to be as honest and careful as possible when answering the questions. When you are done, please also answer the following questions.

1. In your own words, define ecological footprint?
2. How many Earth's would be required to supply everyone's needs if the entire human population lived like you? How does the figure you got compare to those found on the world-wide diagram below? Describe.
3. Using the pie chart given for your break down, which two portions made up the largest percentage of your footprint (mobility, shelter, food, etc), and was this what you expected? Why or why not?
4. How many productive acres are needed to support you? Which two types of land do you use the most?

Click on the "explore scenarios" box on your results page (bottom right-hand corner) which two suggestions are the most "doable"? Would you actually be willing to do them? Why or why not?



Part 4: Major Themes and Concept Definitions

Sadly, there have been many environmental catastrophes across the globe. The important thing is that we learn as much as we can about why they occurred so that we can prevent similar events from happening in the future. Briefly research **two** of the following case studies: Great Pacific Garbage Patch, Canada's Tar Sands, Greenland Glaciers, Love Canal NY, Flint Michigan, Aral Sea, Palm Oil in Indonesia, Colorado River, Cape Town South Africa (water shortage), Ogallala Aquifer, Chesapeake Bay MD, Minamata Disease – Japan. Please write a 1 page (double spaced) essay for two of the above case studies, answering: *What happened/What went wrong? What did we learn? How can it be prevented in the future? What were some of your thoughts as you learned about this?*

Part 5:

APES Scavenger Hunt

To successfully complete the scavenger hunt you must make a visual dictionary (with/without a partner or in a group of three) (PowerPoint) that includes **20** of the 40 listed environmental terms/ items/concepts listed below. You must have a photo of you (or your group) with each item and a definition of the term and explain how your photograph relates to the term. Not all items need to be literal: be creative, and have fun!

1. An example of biomass
2. Biodiversity
3. A keystone species
4. A sedimentary rock
5. A local superfund site
6. A symbiotic relationship
7. Inorganic fertilizer
8. A point source of pollution
9. A non-point source of pollution
10. A organically grown food
11. A GM food (not produce)
12. An indoor air pollutant
13. A renewable resource
14. A non-renewable resource
15. A farmers market
16. A local park
17. A pesticide
18. Coffee labeled: "fair trade", "organic", or "rainforest certified"
19. A monoculture
20. A r-strategist
21. A K-strategist
22. A source of natural pest control
23. A Photo-Voltaic cell
24. A carcinogen
25. An invasive species
26. Leaf litter
27. Evidence of habitat destruction
28. An ecotone
29. A deciduous tree
30. A conifer
31. A natural pollinator
32. Urban sprawl
33. Recycling
34. An item with excessive packaging
35. A source of phthalates
36. A local landfill, water treatment facility, or electricity station
37. Evidence of erosion
38. A method used to prevent erosion
39. An Indicator Species
40. An example of Energy Efficiency

Part 6:

Complete Unit 1 (Chapters 1 & 2) study guide questions by using the respective chapter power points on schoology.

3. We can use environmental indicators to study the health of the environment. Describe the importance of measuring each of the following:

Indicator	Why is it important to measure? <i>(Hint: What effect does it have on the environment?)</i>	Current Trend <i>(Increasing? Decreasing?)</i>
Biodiversity		
Food Production		
Global Temperatures		
Human Population Size		
Resource Depletion		

4. Explain three ways in which we can measure diversity in the environment.

Ecosystem Diversity	Species Diversity	Genetic Diversity

5. There are at least 2 million species on Earth, and species have been naturally evolving and going extinct for billions of years (in fact, over 99% of all species that ever existed are now extinct!). Given these facts, why do we care if human activity is driving other species extinct as we grow?

6. Give an example of something that is anthropogenic. Why does it fit the definition?

7. What two major human activities have had the greatest impact on the increase of greenhouse gases, and why?

8. What does sustainable development involve? How can we determine if an individual or society is living sustainably?

9. What does an ecological footprint measure and why is it important to talk about?

10. Contrast the following terms as they relate to science:

Hypothesis	Null Hypothesis	Theory

11. Why might the results of a controlled experiment differ from the results of a natural experiment when trying to answer a given question?

Chapter 2

Environmental Systems

CHAPTER LEARNING OBJECTIVES *After reading this chapter, you should be able to...*

Module 4: Systems and Matter

- describe how matter comprises atoms and molecules that move among different systems
- explain why water is an important component of most environmental systems
- discuss how matter is conserved in chemical and biological systems

Module 5: Energy, Flows, and Feedback

- distinguish among various forms of energy and understand how they are measured
- discuss the first and second laws of thermodynamics and explain how they influence environmental systems
- explain how scientists keep track of energy and matter inputs, outputs, & changes to environmental systems

Key Terms

half-life

radioactive decay

pH

conservation of matter (p. 40)

energy

kinetic energy

potential energy

first law of thermodynamics

energy efficiency

second law of

thermodynamics

closed system

inputs

outputs

open system

steady state

positive feedback loop

negative feedback loop

Chapter 2 – Guiding Questions

1. What is the difference between an atom, a molecule, and a compound?
2. What is half-life and why is it important to environmental science?
3. What is the “Law of Conservation of Matter”? How does it help explain the fact that nutrients (atoms, compounds, etc.) must be recycled on Earth?
4. Give an example of potential energy and of kinetic energy.

5. Explain the first and second laws of thermodynamics in your own words.

6. Engines burn gasoline in order to move the rest of the car. Explain how the 1st Law of Thermodynamics and the 2nd Law of Thermodynamics would apply to this statement.

7. Can the transformation of energy from one form to another ever be 100% efficient? Explain.

8. Earth is considered an open system for energy and a closed system for matter. Explain what this means.

9. Describe/explain a positive and negative feedback loop NOT listed in the textbook.
(you can draw a simplified diagram, but it needs to be obvious and well labelled)

Positive Feedback Loop	Negative Feedback Loop

10. Are positive feedbacks necessarily good things? Are negative feedbacks necessarily bad things? Explain.