

ENVIRONMENTAL SCIENCE AP 2017-2018

CITRUS VALLEY HIGH SCHOOL

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SUMMER ASSIGNMENT —

First, **thank you** for enrolling in Environmental Science AP.

-If you are interested in Environmental Science, -if you want to be in this course (and I obviously hope that you do), -and if you are willing to devote some time to the course, -you **will** be very successful. Interest and a desire to be in the course are clearly the two most important “prerequisites” for Environmental Science AP.

While it is my hope that one of your primary summer assignments is to **relax and enjoy the simple things of summer**, you **do** have a small summer assignment in this course that is intended to get you thinking about some of the “Big Ideas” and major themes in Environmental Science. You really do not need to do any more than the tasks I’ve listed below. Feel free to email me if you have questions.

- 1. Go to the school library to check out the textbook “Environmental Science, A Study of Interrelationships,” 12th Ed, by Enger & Smith.** Please cover it and write your name inside.
- 2. Print this entire packet at home and bring it to class on the first day of school and on the days following as instructed.**
- 3. Read Chapters 1 and 4 in the textbook. There will be a test on these chapters the first week of school.** Create Chapter outlines for these two chapters. Include the vocabulary words for each chapter in your outlines, and highlight the vocabulary. I have included study outlines on pages 3 through 18 in this packet. Answering the questions in the outlines will help focus your thinking and improve your understanding of the material. (I have also included a list of the key themes in Chapters 2 & 3. You are not required to read these chapters over the summer, but they will be the next chapters that we explore in the fall.)

Note: This section also includes fundamental science concepts, processes, and terms related to science, energy, and matter. While many of these may be review for you, we'll make sure that we are fine with these, along with the rest of the topic/chapter material.)

4. Create a folder for current events that you will keep the entire year and turn in at each semester end. Find four current events before school starts. **Attach a copy of the article and include a summary with the following:**

- Title of article (in case it gets separated)
- Author of the article
- **Describe the environmental issue and its implications** (what current or future problems are people facing caused by this issue – what is the effect)
- Who is it affected most?
- What ecosystems are affected?
- What environmental (governmental/international) regulations or agreements are being violated or protected?
- What solution is proposed?
- What is your opinion? (please make this a well thought out statement - do not simply state that the solution proposed is a very good idea, or that more people should be concerned)
 - **Be very detailed. If you can ask, who, what, how, and there is an answer to that, then you have not written enough.**
 - **These are designed to help you with the FRQs you will be answering both in class and on the APES exam. Since we have no idea what subject area they will pull from for the APES exam, it is important to do this, and to understand all the aspects of these topics.**

5. Create a Short Environmental Art (visual art) Booklet:

-To be handed in at the beginning of our first class meeting/ first day of school.

Your task here is to use both your right and left cerebral hemispheres. Use photography (you must take the photos) or sketching to create one image for **EACH** of the following **SEVEN** major Environmental Science course themes to illustrate/represent the concept:

1. **People and Nature** are intimately connected; human survival depends on the environment.
2. **Sustainability:** Human survival and human-built systems (e.g., an urban area), like natural systems, depend on sustainable systems.
3. **Human population growth** is generally considered to be a (“the”) fundamental environmental issue/topic/challenge.
4. **Humans alter natural systems:** Humans have had an impact on the environment for millions of years.
5. **Urban environments:** Approximately 50% of the global population lives in cities, and it is projected that about 65% of the global population will live in cities by the year 2025.
6. **Science and Values:** Solutions to environmental challenges typically involve making value judgments based on scientific knowledge. Environmental problems or challenges have a cultural and social context, and understanding the role of cultural, social, and economic factors is vital to the development of solutions.
7. **The “Precautionary Principle”:** This principle implies that there is a social responsibility to protect the public from exposure to harm when scientific investigation has found a plausible risk, even though an exhaustive body of scientific evidence may not exist at the time that a decision is made/could be made.

Display your seven photographs/sketches in a booklet that you will title *Environmental Science AP Course Theme Booklet*. It should not exceed 8 ½ x 11 inches in size (it *may* be smaller), and there should be one photo/sketch per page. Please title each photo/sketch with the theme topic name/description.

6. **In order to prepare for the APES exam, and the APES final, you will be required to turn in, at the end of each semester, 150 flash cards (300 total - 150 from each semester). It is in your best interest to start these cards as you review each chapter, starting with the two you will do this summer.**

Chapter Study Outlines

Chapter 1	
Part I	Page 3
Part II	Page 4
Chapter 4	
Part I	Page 5
Part II	Page 5
Part IV	Page 5
Part V	Page 6
Part VI	Page 6
Chapter 2 & 3	Page 6 & 7

Chapter 1: Environmental Interrelationships

While doing your outlines, make sure you include the following vocab words, and highlight them, as well as the Essential Knowledge from the chapters:

Vocab Ch. 1: Ecosystem, Environment, Environmental Science, Science, Wilderness

Essential Knowledge:

Part I: The Nature of Environmental Science:

- a. Interrelatedness Is A Core Concept
 - b. An Ecosystem Approach
 - c. Political And Economic Issues
 - d. The Global Nature of Environmental Concerns
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1. Describe why finding solutions to environmental problems is so difficult. Do you think it has always been this complicated?
 2. Describe what is meant by ecosystem approach to environmental problem solving. Is this the right approach?
 3. Describe how environmental conflicts are resolved?
 4. How do you weigh in on the issue of jobs or the environment? What limits do you set on economic growth? Environmental protection?
 5. Imagine you are an environmentalist in your area who is interested in local environmental issues. What kinds of issues might these be?
 6. Look at the issue of global warming from several different disciplinary perspectives – economics, climatology, sociology, political science, agronomy. What might be

some questions that each discipline could contribute to our understanding of global warming?

7. Identify five different “natural sciences” which are generally considered to be a part of environmental science.

Part II: Regional Environmental Concerns:

- a. The Wilderness North
- b. The Agricultural Middle
- c. The Dry West
- d. The Forested West
- e. The Great Lakes and Industrial Northeast
- f. The Diverse South

1. List two key environmental issues for each of the following regions: the wilderness North, the agricultural middle, the forested West, the dry West, the Great Lakes and industrial Northeast, and the South. How are the issues changing?
2. You are the superintendent of Yellowstone National Park and want to move to an ecosystem approach to managing the park. How might an ecosystem approach change the current park? How would you present your ideas to surrounding landowners?
3. Imagine you lived in the urban East and that you were an advocate of wilderness preservation. What disagreements might you have with residents of the wilderness North, or the arid West? How would you justify your interest in wilderness preservation to these residents?
4. The governors of the Great Lakes states have signed an agreement that prohibits the export of water from the Great Lakes. They argue that the water is a valuable resource that is needed by the citizens of their states and that export would deprive the states’ citizens of the resource. Regions of the country that are water poor argue that the water in the Great Lakes is a resource that should be shared by all citizens of the country. Develop an argument that supports or refutes the governors’ stated policy.

Chapter 4: Interrelated Scientific Principles: Matter, Energy And Environment

While doing your outlines, make sure you include the following vocab words, and highlight them:

Vocab Ch. 4: acid, base, hypothesis, scientific method, respiration, catalyst, cause and effect relationship, compound, controlled experiment, element, endothermic, entropy, enzyme, exothermic, experiment, first law of thermodynamics, second law of thermodynamics, ion, isotope, kinetic molecular theory, law of conservation of mass, matter, mixture, molecule, pH, photosynthesis, scientific law, theory, variables

Essential Knowledge:

Part I: The Nature of Science:

- a. Basic Assumptions in Science
- b. Cause-And-Effect Relationships
- c. Elements of the Scientific Method

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. 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 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.

Part II: Limitations of Science

1. 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”?

Part III: Pseudoscience

Part IV: The Structure of Matter (you should have a good understanding of these)

- a. The Molecular Nature of Matter
- b. A Word About Water
- c. Acids, Bases, and pH
- d. Inorganic and Organic Matter
- e. Chemical Reactions
- f. Chemical Reactions in Living Things
- g. Chemistry and the Environment

1. What happens to atoms during a chemical reaction?
2. How do solids, liquids, and gases differ from one another at the molecular level?

Part V: Energy Principles (you should have a good understanding of these as they are on the AP exam)

- a. Kinds of Energy
- b. States of Matter
- c. First and Second Laws of Thermodynamics

1. List five kinds of energy.
2. Are all kinds of energy equal in their capacity to bring about changes? Why or why not?

Part VI: Environmental Implications of Energy Flow (you should have a good understanding of these as they are on the AP exam)

- a. Entropy Increases
- b. Energy Quality
- c. Biological Systems and Thermodynamics
- d. Pollution and Thermodynamics

1. How are the 1st and 2nd laws of thermodynamics and pollution related?
2. Using the first and second laws of thermodynamics, try to explain a particular environmental issue. How does an understanding of thermodynamics change your conceptual framework regarding this issue?

{Please note that Chapters 2 & 3 are **NOT** assigned reading over the summer, but they will be the third and fourth chapters that we explore in the fall.}

Chapter 2: Environmental Ethics

Concepts:

1. Some people believe that undeveloped resources should be used for the welfare of mankind and to not exploit the resource is wasteful; others believe that natural resources have an inherent value, which should not be destroyed.
2. There are three basic views of environmental ethics: development, preservation, and conservation.
3. There are three philosophical theories of applied ethics: anthropocentrism, biocentrism, and ecocentrism.
4. The prevailing societal attitude of developed nations has been one of economic growth and resource exploitation.

5. Industry is responsible for pollution because it consumes energy and resources, and produces waste.
6. Environmental justice refers to the impartiality that should guide human health and environmental decisions.
7. Be familiar with the following people and their contributions to environmental movement: Ralph Waldo Emerson, Henry David Thoreau, John Muir, Aldo Leopold, and Rachel Carson.
8. Be familiar with the reading: “Tragedy of the Commons” and the ethics of consumption.
9. Take your ecological footprint - <http://www.earthday.org/footprint-calculator>.
10. You might want to read *Sand County Almanac* by Aldo Leopold, and *Silent Spring* by Rachel Carson.

Chapter 3: Environmental Risk: Economics, Assessment, And Management

Concepts:

1. A risk assessment or calculation of probable harm to human health or the environment is used in the decision making process in addition to social, economic, and political concerns.
2. Cost-benefit analysis can be used to help assign economic value to natural resources or calculate environmental costs; however, it reduces all aspects of the issue into economic terms and there is often inconsistencies when translating ecology into economics.
3. The Tragedy of the Commons argues that when there is shared ownership of a resource individuals have a tendency to overharvest because they feel others will use all the resource. However, the idea of green economics is gaining in global popularity leading to a new economic transformation.
4. There are many market based approaches to encourage companies to address environmental issues. These include subsidies, grants, and liability protection, information programs, tradable emission permits, emission fees and taxes, deposit programs, performance bonds, and lifecycle analysis.
5. Sustainable development policies are increasing in importance worldwide and programs like debt-for-nature are helping developing nations to conserve valuable natural resources.

6. Be familiar with brownfield.
7. Read “Carbon Capture and Sequestration” by David Hawkins.
http://www.nrdc.org/globalwarming/glo_07030601.asp
8. Read “Carbon Capture & Storage: Blue-Sky Technology or Just Blowing Smoke”
by Charles Schmidt. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2072827/>