

D. W. Daniel High School

Information Sheet

140 Blue and Gold Blvd., Central, SC 29630 (864) 397-2900

Course Title: **AP Environmental Science Information Sheet 2018-2019**

Room: 233

Teacher: Mr. Chuck Conrad

Teacher email: chuckconrad@pickens.k12.sc.us

Course Description:

The goal of the AP Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternate solutions for resolving and/or preventing them (College Board, Advanced Placement Program).

Scope & Sequence:

| | Approx. Weeks |
|---|---------------|
| Unit 1: Environmental Problems, History, Scientific Method, Matter and Flow of Energy | 3-4 |
| Unit 2: Air, Air Pollution, Climate Change, and Ozone | 4 |
| Unit 3: Evolution, Ecology, Biodiversity Mentoring with Clemson Graduate students and research begins | 5 |
| Mid-Term Review and Exam | 1 |
| Unit 4: Population Dynamics, Risk and Toxicology, Pesticides and Pest Control | 3-4 |
| Unit 5: Geology, Soil, Soil Pollution, Food Resources, Land Use | 4-5 |
| Unit 6: Aquatic Ecology, Water Resources, Water Quality | 5 |
| Unit 7: Energy, Energy Efficiency, Renewables, Solid Waste | 4 |
| AP Exam Review (exam is May 10, 2018) | 1-2 |

Year Schedule:

Planned Laboratory and Field Work (*subject to change per schedule/time allowed*)

Research Projects: Students are involved in multiple long-term projects.

Aquaponics (Fish and Food) Creation and Analysis

In this project students monitor and raise lettuce for human consumption. Students will learn basic food safety content and enhanced ideas related to nutrient recycling in an aquatic environment. Data will be collected to monitor and adjust water quality to meet food and fish standards.

River Evaluation

Students will begin testing water quality in the school and then move to a local creek one mile from the school. The goal is to measure the water quality and collect data for the following: physical, chemical and biological.

Service to the Greater Clemson Area

Students will design and manage an "Inflation Station" event on campus to encourage proper tire inflation for student vehicles. Student will make connections between fuel efficiencies and care for the environment, specifically air quality.

Note: Passing the APES exam affords the student either general science hours or general math hours for most colleges and universities! See each institution for specifics.

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First Semester Labs/Activities

- Lab: Biodiversity Hot Spots; practice math and statistical analysis
- Computer Lab: Ecological Footprint using various websites to measure each student's impact on their environment.
- Cycles of Matter using various websites and a Nitrogen atom board game.
- Activity: Basic Concepts and Tools – Using Math and Critical Thinking practice without calculators.
- Lab: Measuring Albedo: temperature differences with various outdoor surfaces.
- Lab: Vehicle CO₂ and Particulate Collection: measures carbon dioxide and particles in cars.
- Lab: Testing for Ground Level Ozone: measures ozone levels based on humidity.
- Lab: Acid Review and Acid Rain Effects: acid strengths on different materials.
- Aquaponics
- Video: El Nino
- Video & Article: *Inconvenient Truth* clips
- Class Project: Eco-column – run for 1 month
- Activity: Simulation of Natural Selection (beans): students use different tools and various colors/shapes of beans to see effects of natural selection on a population.
- Lab: Lethal Dose Lab w/tea or nicotine: calculate the LD₅₀ for an organism.
- Lab: Interspecific and Intraspecific Competition: seeds will model competition between different species of plants.
- Project: Endangered/Alien Species Project: basic research and presentation to class.

Second Semester Labs/Activities

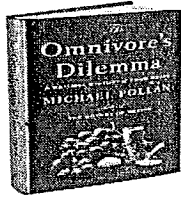
- Lab: Doubling: showing population doubling factors
- Lab: Something Fishy: tragedy of the commons using fish crackers.
- Lab: Histograms
- Video: World in The Balance
- Lab: VirusTown: using vials to show spread of disease in a population.
- Video: Ebola
- Speaker: Hugh Spitler, Health professor from Clemson
- Field/Lab: Chemical Testing Water Quality/ Aquatic Sampling practice
- Lab: Personal Energy Consumption survey
- Speaker: Dr. Mark Thies, Chemical Engineering Professor from Clemson on renewable fuels
- Lab: Irradiated Seeds: measuring growth of seeds with different radiation exposure limits.
- Project: How to Market Energy in an Energy – Challenged Age
- Video: Minutes to Meltdown – Nova
- Speaker: Nuclear regulations and safety, Oconee Nuclear Power Plant

Assessments

Students will be assessed in various ways:

- Unit tests consisting of multiple choice and FRQ formats
- Vocabulary and content-based questions for each chapter
- Lab reports, formal and informal
- Projects

Due Date: First Day of the course! Late Penalties apply if not turned in on Day 1



AP Environmental Science
Summer Assignment 2018-2019



"Earth provides enough to satisfy every man's needs, but not every man's greed." — Mahatma Gandhi

The purpose of this summer assignment is to prepare you for class in a few ways. First, you will read about many of the changes that have occurred in farming and food production over the last 100 years of human history. Think about the impact these changes have on our environment. Remember: many people in the world want to eat like Americans. Also, you will research a few of the important laws and treaties that have been made to protect the environment.

Note: All work should be HAND WRITTEN and turned in on the first day of class. DO NOT TYPE, please write neatly, and do your own work!

Assignment #1: 50 points

Read *The Omnivore's Dilemma* by Michael Pollan and answer the following questions:

Adapted from Penguin Group USA

cost \$5-10 on Amazon.com or see Pickens County Library

Introduction

1. What does Pollan mean by the term "national eating disorder"?
2. Do you agree that America has one? Why?
3. What does it mean to be an omnivore?
4. What is the "omnivore's dilemma"? Why is it harder for humans to figure out what to eat than it is for a koala?

Chapter 1:

1. What does Pollan see as the difference, roughly speaking, between the foods in the produce and meat departments and the food in the rest of the supermarket?
2. What connection does a piece of salmon or beef have with a cornfield? How about a Twinkie? Or a trash bag?
3. What's the difference between carbon 12 and carbon 13 — and how do these different carbon types help scientists determine how much corn there is in your diet?

Chapter 2:

1. How has corn "pushed animals and their feed crops off the land"?
2. How did America's farm policy change in the 1970s? What effect did this have on how much corn America's farmers produced — and why?

Chapter 3:

1. How does Pollan think corn can "contribute to obesity and to hunger both"?

Chapter 4:

1. What did Pollan hope to learn by buying his own steer?
2. What is a CAFO? How did corn contribute to their growth? How have CAFOs enabled Americans to eat more meat? What "two new problems" are created by animal feedlots?
3. If cows evolved to survive on grass, why are we feeding them corn?

Chapter 5:

1. What is high fructose corn syrup? How long has it been around?
2. What are the three stages of food processing as Pollan describes them?

Chapter 6:

1. What does Pollan suggest is the underlying cause behind America's obesity epidemic?
2. What is Type 2 diabetes? Why would a diet high in refined starches and sugars potentially cause the disease?

Chapter 7:

1. Why does Pollan claim that the industrial eater has become "corn's koala"?
2. What are some of the negative consequences of producing so much corn? What are some of the positive effects?

Chapter 8:

1. What immediate differences do you see between Naylor's farm and Salatin's?
2. Give an example of each of the contrasts Pollan sets out in his list on page 130.
3. Why does Salatin consider "industrial organic" to be a contradiction in terms?

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Chapter 10:

1. How does grazing ruminants “build new soil from the bottom up”?
2. What are some of the problems that occur when land is “overgrazed”?

Chapter 11:

1. What does Salatin mean when he says that “In nature you’ll always find birds following herbivores”? (211) How does he use this natural tendency for his benefit?
2. Why does Salatin wait three or four days before allowing his chickens onto the pastures after the cows?
3. How do the lives of Salatin’s pigs differ from those that live in factory farms?
4. Given all of its benefits, why do you think so few farmers choose to farm like Salatin?

Chapter 12:

1. What does Salatin see as the problem with current food-safety regulations?
2. Do you agree with him? Do you think that you personally could kill a chicken? Why or why not?

Chapter 13:

1. Salatin asks Pollan, “Don’t you find it odd that people will put more work into choosing their mechanic or house contractor than they will into choosing the person who grows their food?” Do you agree with him that it’s strange? Why or why not?

Chapter 14:

1. How does Pollan think this meal might be nutritionally different from a meal grown on a conventional farm?
2. What are omega 3 fatty acids? What are omega 6 fatty acids? Why does Pollan think they’re important?

Chapter 15:

1. Why does Pollan say that the hunter-gatherer food chain is no longer able to support us?
2. Do you think he’s right? How close do you think it would be possible for Americans to return to that food chain?

Chapter 16:

1. Why does Pollan say that America’s lack of food traditions suits the food industry just fine?
2. What does he think are some of the dangers of changing our eating habits so rapidly, so many times?

Chapter 17:

1. Why do you think the meat company didn’t let Pollan see his steer get slaughtered?
2. What is life like for the modern laying hen? (317) Why would Pollan claim that it’s worse than a feedlot cow?

Chapter 18:

1. After his initial hunting trip, why does Pollan feel the need to go hunting again?
2. What is Pollan’s initial emotional reaction to killing the pig? Why is he surprised?

Chapter 19: SKIP THIS CHAPTER

Chapter 20:

1. How does Pollan describe the difference between the sources of calories in most of our normal food and the sources of calories in the meal that he has hunted and foraged?
2. Has reading this book had any effect on the way YOU think about food, or what you choose to eat? Be specific?

Assignment #2: 50 points ENVIRONMENTAL LEGISLATION

Create a blank table (see below for an example) with space for the 15 laws and/or treaties. Hand-write the answers in your table and turn in on Day 1. *We will have a quiz over these laws the first week of school.*

| Law Name | Draft Year | Amend. Year | Inter. or USA | Describe the Law/Treaty | Environmental Issue Affected | Gov/World Agency |
|----------|------------|-------------|---------------|-------------------------|------------------------------|------------------|
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|-----------------|-------------------|----------------------------|-------|------------------------|
| Clean Air Act | Kyoto Protocol | General Mining Act of 1872 | CITES | CAFE |
| Clean Water Act | Montreal Protocol | Wilderness Act | RCRA | SDWA |
| CERCLA | OSHA | Paris Agreement | ESA | Oil Pollution Act 1990 |