

AP Environmental Science: Summer Assignment and Summer Reading - 2017

Ms. Fogarty

Keep an eye on SIS over the summer to see if you have been scheduled into this course. You are definitely on the list for the course, but lots of scheduling conflicts arise over the summer. Mr. Rodriguez says the schedule will be final in late July or early August.

AP Environmental Science is a college level course combining content from earth science, biology, chemistry, physics, math, and social studies. There are two different types of environmental classes: environmental studies and environmental science. This is an environmental **SCIENCE** course, and so will be based on data. Because this is an AP course, it is expected that you begin the course with a good understanding of basic scientific and mathematical concepts and skills. One goal of this summer assignment is to help you brush up on these skills and concepts. Over the summer, review the scientific concepts below as well as the mathematical calculations on the following pages; we will be building upon and referencing them throughout the school year. If you find Section B difficult, come back to school with questions on this section and be prepared to stay after school to get help with it.

Section A. Vocabulary

You should be familiar with the following terms/concepts from Biology, Chemistry, and Earth Science. Juniors, do not despair, you will learn the chemistry concepts you need as we go along.

Examine the concepts/terms below and become familiar with them. Provide a simple hand written definition of each term listed.

1. Organic vs. Inorganic
2. Natural vs. Synthetic
3. Kinetic vs. Potential Energy
4. Radioactive decay
5. Half life
6. Law of Conservation of Matter
7. 1st Law of Thermodynamics
8. 2nd Law of Thermodynamics
9. Entropy
10. Organism
11. Species
12. Population
13. Community
14. Chromosome
15. Gene pool
16. Natural selection
17. Biodiversity
18. Extinction
19. Plate Tectonics
20. Electromagnetic Spectrum
21. Ecosystem

22. Producers/Autotrophs
23. Consumers/Heterotrophs
24. Decomposers
25. Photosynthesis (reactants and products)
26. Cellular respiration (reactants and products)
27. Aerobic vs. Anaerobic
28. Adaptation
29. Mutation
30. Gene
31. Trait
32. Natural Selection
33. Biodiversity
34. Erosion
35. Climate Change
36. Metabolism
37. Rocks vs. Minerals
38. Climate vs. Weather
39. Elements
40. Compounds
41. Ions
42. Weathering

Write the full name of each of these chemical abbreviations:

43. CO_2
44. CO
45. $\text{C}_6\text{H}_{12}\text{O}_6$
46. CH_4
47. H_2
48. H_2O
49. N_2
50. NO_x
51. NO_3^-
52. NH_3
53. O_2
54. U
55. O_3
56. P
57. PO_4^{3-}
58. S
59. SO_2
60. Cl
61. K
62. NaCl
63. Pb
64. Hg
65. Rn

Section B. Math Review

You should also be prepared to perform mathematical calculation **WITHOUT USING A CALCULATOR**. You won't be allowed to use one on the AP Environmental Science Examination, so unless we are crunching data from a lab, we won't be using one in class, either. Sometimes these calculations are fairly simple and you can complete the problems in your head. However, the AP Environmental Science exam requires that you **SHOW ALL WORK** for credit for the calculations on the free-response questions. This worksheet is designed to assess your skills for the type of calculations you will encounter on the exam.

Complete the following problems on a separate piece of paper. The problems are separated into sections that represent the various types of problems and operations you need to master. For each problem, show every step of your work and indicate the cancellation of all units. I encourage you to use dimensional analysis and to refrain from using a calculator to solve these problems because you will not be using a calculator in class.

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Scientific Notation

Write the following numbers in scientific notation:

- 1) One million
- 2) Forty eight thousand
- 3) 5878300
- 4) Six hundred
- 5) 0.015
- 6) 3950
- 7) 3 one thousandths
- 8) 0.2220
- 9) 1267
- 10) 0.0005

Convert the following to regular notation:

- 1) 2.45×10^4
- 2) 9.1×10^2
- 3) 7.5469×10^4
- 4) 1.970×10^5
- 5) 8×10^1
- 6) 8.556×10^1
- 7) 1.23456×10^7
- 8) 5.000×10^3
- 9) 9.444×10^2
- 10) 6.08×10^3

Use Scientific Notation (and only Scientific Notation – Not a calculator) to solve the following problems:

- 1) $(6.235 \times 10^{-8}) \times (6.7 \times 10^2) =$
- 2) $(2.456 \times 10^4) \div (1.436 \times 10^{13}) =$
- 3) $(2.34 \times 10^{-6}) \times (3.3 \times 10^4) =$
- 4) $(1.45 \times 10^6) \times (2.30 \times 10^{-3}) =$
- 5) $(9.81 \times 10^{12}) \times (4.02 \times 10^3) =$

Dimensional Analysis

- 1) 8,640 mm = ? cm
- 2) 175 lbs = ? kg
- 3) 33.2 kg/L = ? kg/mL
- 4) 3.8 Km/sec = ? miles /year
- 5) A 100 square mile area of National Park is how many acres? How many hectares?
- 6) A factory using four million BTUs of energy each month is using how many kilowatt-hours of energy?
- 7) Twelve hundred metric tons of solid waste is how many kilograms?

- 8) The total amount of freshwater on earth is estimated to be $3.73 \times 10^8 \text{ km}^3$. What is the volume in cubic meters? In liters?
- 9) Traveling at 70 miles/hour, how many minutes will it take to drive 175 miles to San Antonio?

Percentages

- 1) If 35% of a natural area is to be developed, leaving 500 acres untouched, how many acres are to be developed?
- 2) If the concentration of mercury in a water supply changes from 65 ppm to 7 ppm in a ten-year period, what is the percentage change of the mercury concentration?
- 3) Fifteen million is what percentage of the U.S. population of 300 million?
- 4) What is 20% of a \$34.80 bill so you can give a good tip?
- 5) Calculate the percentage growth rate for a country with a population of 6 million in a year in which it had 100,000 births, 70,000 deaths, 30,000 immigrants, and 50,000 emigrants.

Energy Problems

- 1) How much energy is required to raise the temperature of 1000 gallons of water by 25°F ?
- 2) By how many degrees Fahrenheit can the temperature of one metric ton of water be raised with the addition of 110 thousand BTUs of heat?
- 3) How much energy, in kJ, does a 75 Watt light bulb use when it is turned on for 25 minutes

Section C. Book Review

Another concern is that the scope of this class is much larger than any other class. Because the class does incorporate subject matter from so many different fields, it can be difficult for a person to develop a good feel for the class. In many courses, we only need to focus on one or two things (think: physics; chemistry; calculus; etc.). In AP Environmental Science, we not only need to focus on numerous different topics, we also need to see how one thing can connect to and affect other things. To start seeing examples of this interconnectedness, you need to read **one** of the following books.

- 1) A Sand County Almanac by Aldo Leopold
- 2) The Omnivore's Dilemma by Michael Pollen
- 3) When the Rivers Run Dry by Fred Pearce
- 4) Guns, Germs, and Steel by Jared Diamond

- 5) Collapse: How Societies Choose to Fail or Succeed by Jared Diamond

AND write a 2-3 page critical book review (double spaced, typed 12 font and 1 inch margins). Keep in mind that A BOOK REVIEW IS NOT A SUMMARY OF THE BOOK.

Here is what your book review should include:

- 1) Your review should identify the author's purpose for writing the book. In other words, what is (are) the environmental issue(s) of the book? What set of questions about the environment is the author trying to answer? **USE SPECIFIC EXAMPLES FROM THE BOOK!!!!!!**
- 2) Who is the audience for the book (scientists, governmental officials, economists, and the general public)? Support your answer by **using SPECIFIC EXAMPLES FROM THE BOOK.**
- 3) Keep in mind that the author is making an argument about an environmental issue. After identifying the argument and the way it is presented, your job, as the reviewer, is to give an opinion of the book. Your review can be based on the following questions:
 - a. Whose point of view is the author supporting? Whose point of view does the author reject?
 - b. Do you believe the author's argument is convincing? Why or why not?
 - c. Has the author, in your opinion, based his or her argument on sufficient scientific evidence? Why or why not? **USE SPECIFIC EXAMPLES FROM THE BOOK!**
- 4) Finally, your critical review should provide the reader with an evaluation of the book as a whole. How strongly would you recommend the book to other readers?
- 5) This is to be written as a narrative and not simply answers to bulleted questions. Make sure that you cover the items above, but the paper should flow seamlessly from section to section with proper transitions.

Please cite all quotes by putting the appropriate page number in parentheses and include a bibliography page. Quotations should not make up the bulk of your paper.

This paper has to be typed because it will be uploaded into Turn-It-In.com to be graded. I will give you instructions on where to upload it on the first day we meet in September. It will be due on Friday of the second week of school