

## AP Environmental Science Summer Assignment 2017

Welcome to Mrs. Nemeck's AP Environmental Science Class!! I look forward to meeting each of you!

Your summer assignment this year IS NOT a "summer reading". It is a comprehensive assignment, designed to give you a jumping off point for this course. This is an advanced science course that combines the disciplines of biology, chemistry, geology and physics to investigate global environmental issues. We will discover how the Earth's systems function together and how humans have affected our planet. We will also examine our personal consumption habits and learn ways to be responsible global citizens in the face of serious environmental issues.

Because this is a college level course, you will be responsible for learning a large amount of material on your own. I will help you as we go, but it will be **your responsibility** to take notes, read the textbook, study and learn your vocabulary! I also work on the assumption that you have a general science background that includes biology, chemistry, physics and algebra. The purpose of this project is to help you prepare for the APES content by getting organized, reviewing some background information, and getting familiar with some of the basic concepts of environmental science. Utilizing your background knowledge is "key", to your success in this course.

### General Guidelines:

- **Read the directions for each section carefully!**
- Each section should be clearly labeled.
- Each section of the project must be fully completed, neat and typed when specified.
- Each piece of the project should be bound together in some way.
- All research/information needs to be appropriately cited using APA format. A quick Google search will help you with formatting. (Please DO NOT tell me you couldn't find it)
- All work is to be completed on your own. You may not work with other students to complete this assignment. Plagiarism will NOT be tolerated.
- The checklist, provided at the end of this packet, should be completed and attached to the front of your work.

### THE ASSIGNMENT:

#### Section 1: Chemistry Review

Chemistry is a big part of environmental science. It is highly recommended that you take chemistry before registering for this course. In order to review some of the basic chemistry concepts you will need complete the following on a clean sheet of paper. This may be typed or hand written.

1. For each of the following, write out the chemical name that goes with the symbol:

CO <sub>2</sub>	CO	C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>	CH <sub>4</sub>	H <sub>2</sub>
N <sub>2</sub>	NO <sub>2</sub>	NO <sub>3</sub>	NH <sub>3</sub>	NH <sub>4</sub>
O <sub>2</sub>	O <sub>3</sub>	P	PO <sub>4</sub> <sup>3-</sup>	S
SO <sub>2</sub>	SO <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>	NaCl	Pb
U	Rn	Hg	Cl	H <sub>2</sub> O

**Section 2: Math Review**

The APES exam has a significant amount of math and **does not allow the use of calculators!** Most students find that with a little practice, the math is not difficult, but as many of us have not had practice with setting up and solving problems without a calculator in a long time, in the beginning it can be daunting.

**\*\*\*In this class, it will be assumed that you are able to solve math problems using the following skills.\*\*\***

**Percentage**

$$17\% = 17/100 = .17$$

- Remember that "percent" literally means divided by 100.
- Percentage is a measure of the part of the whole. Or part divided by whole.
- 15 million is what percentage of the US population?  $15 \text{ million} / 300 \text{ million} = .05 = 5\%$
- What is 20% of this \$15 bill so that I can give a good tip?  $\$15 \times .20 = \$15 \times 20/100 = \$3$

**Rates**

- percent change =  $(\text{final} - \text{initial})/\text{initial}$
- All of the above are ways to look at rates. The second equation is the easiest way to calculate a rate, especially from looking at a graph. Rates will often be written using the word "per" followed by a unit of time, such as cases per year, grams per minute or mile per hour. The word per means to divide, so miles per gallon is actually the number miles driven divided by one gallon.
- Rates are calculating how much an amount changes in a given amount of time.

**Scientific Notation**

$$\text{Thousand} = 10^3 = 1,000$$

$$\text{Million} = 10^6 = 1,000,000 \text{ (people in the US)}$$

$$\text{Billion} = 10^9 = 1,000,000,000 \text{ (people on Earth)}$$

$$\text{Trillion} = 10^{12} = 1,000,000,000,000 \text{ (National debt)}$$

- When using very large numbers, scientific method is often easiest to manipulate. For example, the US population is 300 million people or  $300 \times 10^6$  or  $3 \times 10^8$
- When adding or subtracting, exponents must be the same. Add the numbers in front of the ten and keep the exponent the same.
- When multiplying or dividing, multiply or divide the number in front of the ten and add the exponents if multiplying or subtract the exponents if dividing

$$\text{Ex. } 9 \times 10^6 / 3 \times 10^2 = (9/3) \times 10^{(6-2)} = 3 \times 10^4$$

**Dimensional Analysis**

You should be able to convert any unit into any other unit accurately if given the conversion factor.

*Example:* 24 miles/gallon = how many kilometers/liter?

$$\frac{24 \text{ mi}}{1 \text{ gal}} \times \frac{1.6093 \text{ km}}{1 \text{ mi}} \times \frac{3.7854 \text{ gal}}{1 \text{ L}} = \frac{150 \text{ km}}{1 \text{ L}}$$

Online dimensional analysis tutorials are available:

[http://www.chemprofessor.com/dimension\\_text.htm](http://www.chemprofessor.com/dimension_text.htm)

<http://www.chem.tamu.edu/class/fyp/mathrev/mr-da.html>

**Prefixes**

m (milli)	=1/1000	= $10^{-3}$
c (cent)	=1/100	= $10^{-2}$
k (kilo)	=1000	= $10^3$
M (mega)	=1,000,000	= $10^6$
G (giga)	=1,000,000,000	= $10^9$
T (tera)	=1,000,000,000,000	= $10^{12}$

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Complete each of the following problems including a detailed set up with **labeled units** and proper **scientific notation**. **NO CALCULATORS!** You must show all work to get credit.

- All problems should be expressed in scientific notation (do not write out large numbers with multiple zeros as place holders). If you need assistance with this, a quick google or youtube video will help.
1. What is ten million times three thousand?
  2. What is thirty-four million plus two hundred fifty-six thousand times four hundred?
  3. A population of deer had 200 individuals. If the population dropped 15% in one year, how many deer were lost? What is the total population of deer the next year?
  4. One year we had 120 APES students and the next year we had 150 APES students. What percentage did the population of APES students grow by?
  5. One year we had 2500 endangered sea turtles hatch. After one year there were only 1500. What percentage of turtles died?
  6. Electricity costs 6 cents per kilowatt hour. In one month one home uses one megawatt of electricity. How much will the electric bill be? (be sure to look at the conversion chart for the conversion factor from kilo to mega)
  7. Your car gets 12 miles to the gallon and your friend's car gets 20 miles to the gallon. You decide to go on a road trip to Virginia Tech, which is 300 miles away. If gas costs \$4 per gallon and you decide to split the gas money, how much money will you save by driving your friend's car?
  8. A turtle was crawling at the rate of 38 cm per minute. How many kilometers would the turtle crawl in 2 hours?
  9. A turtle was crawling at the rate of 43 cm per minute. How many kilometers would this turtle crawl in one day (24 hours) if it did not rest and continued to crawl at a continuous pace?
  10. There are 125 blades of grass in a square cm of lawn. Assuming the grass stand is even, how many blades of grass would be found in a lawn measuring 8 meters by 6 meters? Use scientific notation in your answer.
  11. You purchase a home that is 2500 square feet of living space. How many square meters of living space is this?
  12. If a calorie is equivalent to 4.184 joules, how many joules are contained in a 250 kilocalorie slice of pizza?
  13. A coal-fired electric power plant produces 12 million kilowatt-hours (kWh) of electricity each day. Assume that an input of 10,000 BTUs of heat is required to produce an output of one kilowatt-hour of electricity. Calculate the number of BTUs of heat needed to generate the electricity produced by the power plant each day.
  14. (Using the information in 13) Calculate the pounds of coal consumed by the power plant each day assuming that one pound of coal yields 5,000 BTUs of heat.
  15. If a city of 10,000 experiences 200 births, 60 deaths, 10 immigrants and 30 emigrants in the course of a year, what is its net annual percentage growth rate? (By what percentage did the population change?)

### Section 3: Case Study

Choose an Environmental Science topic-based case study as your inspiration.

The following website can help. [www.mhhe.com/Enviro-Sci/CaseStudyLibrary/](http://www.mhhe.com/Enviro-Sci/CaseStudyLibrary/). (Or another site that you may have found) Be sure that your topic is relevant and current. For example: A study on an environmental incident that occurred 30 years ago, may be interesting, but clearly is not current.

1. Find **two additional articles** on the same topic.
2. On separate pages; cite each of the **three** article/case study using APA format. Then, briefly summarize **each** in a 150-200 word paragraph.
  - a. APA format is going to be new to you. Please **Google the correct procedure** for citing your particular source of information.
3. Following your 3 article summarizations, write a 2-3 page paper on your topic that answers the following questions: What is the science behind the story? What situation(s) or crisis has occurred? What are the impacts to the environment? How is the problem being dealt with? What are the aftereffects of the problem/situation/crisis? What changes in regulations/legislation have been made as a result of the problem/situation/crisis?
  - a. 1 inch margins, #12 font, double spaced, APA format – NOT MLA format!

**Checklist:**

Please place this completed checklist at the front of your assignment before you turn it in.

Name \_\_\_\_\_

**Section 1: Score \_\_\_\_\_/10**

- I have identified all of the chemical compounds and I am ready for a quiz.

**Section 2: Score \_\_\_\_\_/20**

- I have read through the math review material and understand how to solve these types of problems.
- I have completed all of the review problems and am ready to take a math quiz.

**Section 3: Score \_\_\_\_\_/70**

- I have chosen a topic-based case study from the website provided and printed out and summarized the article
- I have found two additional articles related to my chosen topic. Printed out and summarized.
- I have written a thoughtful, 2-3 page paper on my topic, using the guiding questions.
- I have cited my three articles using APA format.

This Assignment is due August 5<sup>th</sup> when you enter the classroom. If you turn in the assignment late, you will only earn a MAXIMUM of 50%.

Extra credit will be given if you turn in this assignment on our **first day of class!!** 😊

Email me with any questions or concerns. [ann.nemeck@cobbk12.org](mailto:ann.nemeck@cobbk12.org) I check my email daily.

Have a wonderful summer !!

Mrs. Nemeck