AP Environmental Science Summer Assignment 2016-2017 School Year

Welcome future APES students! 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, study and learn your vocabulary! We also work on the assumption that you have a general science background that includes biology, chemistry and algebra. The purpose of this assignment 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 and your own consumption habits.

General Guidelines:

- **Read the directions for each section carefully!**
- Each section should be clearly labeled.
- Each section of the assignment must be fully completed, neat and typed when specified.
- All work is to be completed on your own. You may not work with other students to complete this assignment.
- The checklist, provided at the end of this packet, should be completed and attached to the front of your work.

Section 1: Chemistry Review Chemistry is a big part of environmental science. That is why chemistry is a prerequisite for the course. In order to review some of the basic chemistry concepts you will need to 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_2	CO	$C_6H_{12}O_6$	CH_4	H_2
N_2	NO_2	NO_3	NH_3	NH_4
O_2	O_3	P	PO_4^{3-}	S
SO_2	SO_3	H_2SO_4	NaCl	Pb
U	Rn	Hg	Cl	H_2O

2. Write at least a paragraph that explains the following:
    a. What is the pH scale? What does it measure?
    b. How do the numbers on the pH scale compare? Example – is a pH of 4 twice as strong as a pH of 2? Hint- the pH scale is not linear!
    c. What are the average pH ratings of the following common substances in the environment?
        i. Blood
        ii. Rain
        iii. Freshwater (lake or river)
        iv. Ocean water

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 million / 300 million = .05 = 5%
- What is 20% of this $15 bill so that I can give a good tip? $15 x .20 = $15 x 20/100 = $3

Rates

- percent change = (final –initial)/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

Thousand = 10^3 = 1,000
Million = 10^6 = 1,000,000 (people in the US)
Billion = 10^9 = 1,000,000,000 (people on Earth)
Trillion = 10^{12} = 1,000,000,000,000 (National debt)

- When using very large numbers, scientific method is often easiest to manipulate. For example, the US population is 300 million people or $300x10^6$ or $3x10^8$
- 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

Ex. $9x10^6 / 3x10^2 = (9/3) \times 10^{(6-2)} = 3 \times 10^4$

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?

24 mi / 1 gal	1.6093 km / 1 mi	3.7854 gal / 1 L	=	150 km / 1 L

Online dimensional analysis tutorials are available:
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	$=10^{12}$

AP Environmental Science Summer Assignment 2016-2017 School Year

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, please refer to tutorial videos on khan academy or youtube.

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. A turtle was crawling at the rate of 38 cm per minute. How many kilometers would the turtle crawl in 2 hours?

Section 3: Environmental Legislation

Create a chart similar to the one here and fill in the missing information pertaining to important legislation. **Make sure this is typed so that you can add as many details as needed!** You can change the formatting to fit your preferences (example – make it landscape if that's easier for you). We will study MANY different environmental policies throughout the year. This is just to get you started.

Legislation Name	**Date Enacted (Year)**	**Description of the Legislation (Give the purpose, important founding organizations or people, any major points that you find)**
Kyoto Protocol		
Montreal Protocol		
Endangered Species Act		
Lacey Act		
General Mining Act		
CITES		
SMRCA		
RCRA		

Taylor Grazing Act		
Clean Water Act		
Safe Drinking Water Act		
Clean Air Act		
Paris Agreement		
Emergency Planning Community Right-to-Know Act		
CERCLA		

Section 4: Current Events

In environmental science, it is important to know about current issues. One of my goals is to familiarize you with environmental issues that are important to our community, country and world. Over the course of the summer, find 3 recent articles related to environmental science.

All articles should be current (during the past 1 year and taken from a reliable source. The sources may be scientific publications, popular magazines, newspapers etc. Try the NY times (especially Tuesday), Washington Post, National Geographic, Discover Magazine, Natural History Magazine, Treehugger.com, etc. I do not care if you use a paper or online copy of your article as long as it is property cited.

Each article should relate to a different topic chosen from the following list. As the year progresses you will be able to cover all of the topics!

Environmental Law	Ecosystems	Climate	Evolution	Preserving our biodiversity
Water pollution	Population growth	Cities and waste	Geology	Renewable Energy
Nonrenewable energy	Food/agriculture	Air pollution	Human Health	Forest or Rangeland

Article Analysis Directions:

Include all of the following components and clearly identify each component with headings. Each analysis should be either typed or very neatly written in blue or black ink. Each article should be on its own paper.

- Title of the Article
- Summary: **brief** summary that tells me what the article is about.
- Analysis:
    a. Points of view – does the article have more than one side/pov? If so what are they?
    b. Bias – Is this article biased in any way? In your opinion, does the author give a positive, negative, or neutral view of the environmental science topic?
    c. Controversy: Is there any controversy surrounding this article? If so briefly explain it.
    d. Your perspective: State your perspective on this news article based on your personal knowledge of the topic and your reading of the article.
    e. Effect on you: How does this topic relate to you or your affect you?
- Attach the article – either a physical copy of the article or a working web address must be included.

Section 5:

Subscribe to my APES Remind by texting @warrenapes to 81010
Also, if you use twitter, follow me at @MC_ScienceGuyBW

FALL STUDENTS: In August, I will send out a REMIND and TWEET for dates and times to pick up your textbook. You can also check out my website for announcements. I will have a new Google site that can be accessed via the Middle Creek directory. There will be assigned readings and questions in the book that should be completed prior to the first day of class.

SPRING STUDENTS: You may pick up your book in January during exam week. I would strongly encourage completing the rest of this assignment prior to August so that you aren't doing it in January.

Checklist:

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

Name _____

Section 1: Score _____/20

- ☐ I have identified all of the chemical compounds and I am ready for a quiz.
- ☐ I have written at least one paragraph about pH and I am ready to explain it to someone else.
- ☐ I have cited all of the sources I used to find my information.

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 solve future problems.

Section 3: Score _____/20

- ☐ I have researched and recorded information for all of the legislation listed.
- ☐ I have cited all of the sources I used to find my information.
- ☐ I have studied the legislation and am ready to learn more.

Section 4: Score _____/20

- ☐ I have completed three article current events.
- ☐ I have either attached a paper copy of my article, or listed a working web address to my article.

Section 5: Score _____/20

- ☐ I have read the required chapters.
- ☐ I have complete the multiple choice questions at the end of each chapter.

This Assignment is due on the first day of class when you enter the classroom. If you turn in the assignment late, you will only earn a MAXIMUM of 60% (as this is the policy for all late work in APES).