

# AP Environmental Science

## 2017-2018 Summer Assignment

Welcome to APES!

The summer assignment will give you a brief introduction of the topics we will go over this year. Over the course of the year we will learn more about the science and social issues associated with each of the topics. There are TWO parts to the summer assignment; both parts of the assignments are due on the Friday of the second week of school. Any late assignment can only receive half credit. If you have any questions about this assignment, feel free to email me at [stephaniee.clark@cms.k12.nc.us](mailto:stephaniee.clark@cms.k12.nc.us). The summer assignment will count for a significant portion of your grade. All work turned in must be your OWN work.

The assignments will be graded as follows:

1. Math Problems – 30 points
2. 2 current events related to APES (these will be presented to the class during our 1<sup>st</sup> unit)- 30 points

Total Points: 60 Points

### PREREQUISITE BASIC MATHEMATICAL SKILLS

#### Percentage

$$17\% = \frac{17}{100} = 0.17$$

- Remember that “percent” literally means divided by 100
- Percentage is a measure of the part of the whole, or part divided by whole.
- For Example: 15 million is what percentage of the US population?

$$\frac{15 \text{ million}}{300 \text{ million}} = 0.05 = 5\%$$

- For Example: What is 20% of this \$15 bill so that I can give a good tip?

$$\$15 \times 0.20 = \$15 \times \frac{20}{100} = \$3$$

## Rates

$$\frac{\text{Rise}}{\text{Run}} = \frac{Y_2 - Y_1}{X_2 - X_1} \quad \text{Slope} = \frac{\text{change}}{\text{time}} \quad y = mx + b$$

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 miles per hour. The word “per” means to divide, so miles per gallon is actually the number of miles driven by one gallon.

Rates are calculating how much an amount changes in a given amount of time.

## Scientific Notation

Thousand =  $10^3 = 1,000$  (notice how many zeros there are)

Million =  $10^6 = 1,000,000$  (300 million people in the US)

Billion =  $10^9 = 1,000,000,000$  (people on Earth = 7 billion)

Trillion =  $10^{12} = 1,000,000,000,000$  (National Debt)

- When using very large numbers, scientific notation 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 that 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.
- Online tutorial: <http://www.chem.tamu.edu/class/fyp/mathrev/mr-scnot.html>
- For Example:

$$\frac{9 \times 10^6}{3 \times 10^2} = \frac{9}{3} \times 10^{(6-2)} = 3 \times 10^4$$

## Dimensional Analysis

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

$$m \text{ (milli)} = \frac{1}{1,000} = 10^{-3}$$

$$c \text{ (centi)} = \frac{1}{100} = 10^{-2}$$

$$k \text{ (kilo)} = 1,000 = 10^3$$

$$M \text{ (mega)} = 1,000,000 = 10^6$$

$$G \text{ (giga)} = 1,000,000,000 = 10^9$$

$$T \text{ (tera)} = 1,000,000,000,000 = 10^{12}$$

## Long Division and Multiplication

You should be able to do these calculations by hand, including values with decimals and scientific notation. Many students struggle in this area because CALCULATORS ARE NOT ALLOWED ON THE AP EXAM. Online tutorials are available:

<http://www.mathsisfun.com/dividing-decimals.html>

<http://www.tutors4you.com/tutorialondecimals.htm>

## Math Practice Problems

Name: \_\_\_\_\_

*Answer the questions, use a separate sheet of paper to show all work. Write only the answers in the space provided. You are NOT allowed to use a calculator on the AP Exam, do your best to do all calculations by hand.*

1. What is ten thousand times one hundred million? Show your work in scientific notation. Give the answer in scientific notation and in words. (3 pts.)
2. A population of deer had 325 individuals. If the population grows by 16% in one year, how many deer will there be the next year? (3 pts.)
3. One year I had 124 AP Environmental Science students and the next year I had 87 Environmental Science students. What percentage did the population of APES students decrease by? (Round to the nearest tenth) (3 pts.)
4. Electricity costs 7 cents per kilowatt hour. In one month, one home uses 1.8 megawatt hours of electricity. How much will the electric bill be? (be sure to look at the prefixes chart on the previous page for the conversion of kilo to mega) (3 pts.)
5. Your car gets 21 miles to the gallon and your friend's car gets 28 miles to the gallon. You decide to go on a road trip to Penn State University, which is 162 miles away. If gas costs \$4 per gallon, how much would it cost to take each car? (3 pts.)
6. Virginia Beach is about 20 miles wide and 28 miles long. If one inch of rain falls on Virginia Beach, how many cubic feet of rain fell on Virginia Beach? (Hint: convert all units to feet first) (3 pts.)
7. The concentration of mercury in a water supply changes from 10 ppm (parts per million) to 56 ppm over a ten-year period. What is the percentage change of the mercury concentration? (3 pts.)

8. SHOW YOUR WORK for the following multiplication and division problems. You can use a calculator to check your work, but I want to see that you understand how to solve these problems by hand. Just like on the AP exam, no credit is given if you don't show your work. (1 pt. each)

a.  $75.3 \times 16.9$

b.  $1964 \times 0.718$

c.  $5.80 \times 10^{-3} \times 2.17$

d.  $2362/71.9$

e.  $0.08/0.0094$

f.  $4.60 \times 10^4/0.0530$

g.  $34.6 + 3.009$

h.  $4.76 \times 10^2 - 2.2 \times 10^5$

i.  $23900.5 - 438.76$

## Current Events

In environmental science, it is important to know about current issues in the news. One of my goals for this course is to familiarize you with environmental issues that are important to our community, our country, and our world. We will be reading and discussing a variety of current events throughout the school year as well. This is a great opportunity for you

to start thinking about the environment and how it affects you. Over the course of the summer, find two recent articles related to Environmental Science.

**Requirements regarding articles:**

- (a) Articles must be the original form from a science-related journal (Scientific American, Nature, National Geographic etc.) newspaper, magazine, good internet source (Science Daily, etc.) and the articles should not all be from the same source.
- (b) All articles must pertain to Environmental Science and have significant science content. Do not include advertisements, pure opinion pieces, or light reviews of other articles.
- (c) The date and source of the article must be included on the page with the article.
- (d) It is ok to print the article as 2 pages per one side of the paper, only print pages 1-4 if the article is really long.
- (e) Articles should be neatly cut out and attached to your summary sheet. Your writing should be on a separate page in front of the article.

**Possible Article Topics (you will need one sustainability and one population article)**

1. **Sustainability:** Forest management, fishing, agriculture, natural resources, steps towards using renewable resources, improvements in recycling, producing less waste as a country, etc.
2. **Population:** Growth, TFR, Stabilization, Governmental policy to control, education and impact on population growth, birth control methods, etc.

**Format for Current Event Summary/Review (include all of the following components and clearly identify each component – Following the title, label as (b) Summary, (c) Analysis, etc.**

- (a) Title: Clearly list the topic I have assigned
- (b) Summary: Give a brief summary of the article (1-2 paragraphs)
- (c) Analysis (Include and clearly label each of the following parts of your analysis)
  1. Points of view - Does the article give two different points of view? Yes or No what are they?
  2. Controversy - Is there any controversy surrounding this article? If so, briefly state it. This may not be directly stated in the article, so you will need to think about how this may impact others.
- (d) Your perspective? State your perspective on this news article based on your personal knowledge of the topic and your reading of this article. (1 paragraph)
- (e) Affect on you? How does this topic affect you or how does it relate to your life? (This could be direct or indirect)
- (f) Include a citation for the paper that you read (it can be MLA or APA format)

**Grading**

*Each article will be graded using the following guidelines. 15 points per article.*

- Article pertains to the correct topic (article citation must be included) – 1 point
- The format described above is followed and labeled properly –1 point
- Summary is thorough and covers all important parts of the article– 5 points
- Analysis is thorough and covers all three areas – 5 points
- Your perspective is stated and made clear – 2 points
- The affect the article has on you is stated and made clear – 1 point