AP Environmental Science Summer Assignment

Due: Monday, September 21st
Feel free to email me with any questions! Jensen@sjbdhs.org

Welcome to AP Environmental Science! I am so excited to have you, and hope you are looking forward to the course! This summer assignment is to help you review concepts and practices that you must already be familiar with, as we will be building on the foundation that you have made in Earth Science, Living Environment and Chemistry.

We will have a quiz on this material within the first few weeks of class, it is imperative that you put the effort into working through this assignment on your own, as to diagnose and strengthen your understanding

PART I: MATH

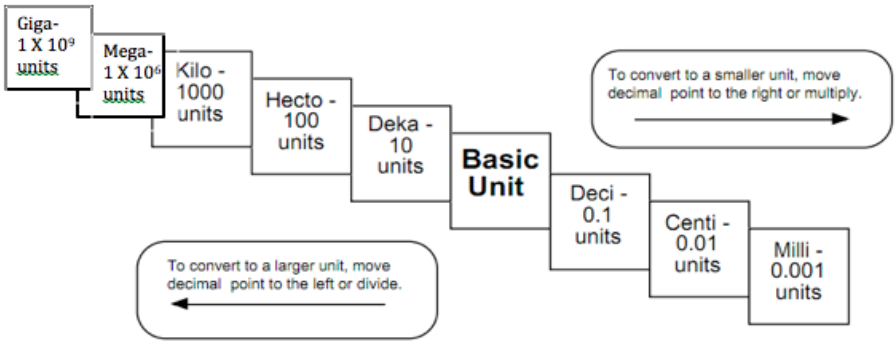
Calculations:

Most APES math involves simple calculations that can be solved using dimensional analysis (factor-label method). You must be able to calculate averages, percentages and percent change, metric unit conversions and be comfortable with scientific notation. There will also be several formulas that we will learn throughout the year that you will need to memorize

You **MUST show all of your work, including units throughout each step and your final answer.** *No credit will be given on the AP exam without calculation set-ups and units in each step*, so it will be required on all your assignments, labs, quizzes, and tests as well!

You must know how to convert between different metric units

Kilo- and milli- are the most frequently used prefixes of the metric system. The metric system is based on powers of 10, so all units from the base unit can be converted by moving the decimal



Know how to calculate percent change: Percent Change = | New – Original | X 100

Original

Calculations: APES math is simple but usually involves several steps, take your time breaking down each problem **SHOW ALL WORK AND INCLUDE UNITS IN EACH STEP AND FINAL ANSWER**

1) If one termite consumes 1.2mg of wood per day, **calculate** the number of grams of wood that 150,000 termites would consume in one week

2) Fourteen percent of a 55,000 acre forest is destroyed by the invasive pine weevil. **Calculate** the number of acres of forest that were destroyed

3) A pesticide was sprayed on a portion of the forest in an attempt to exterminate the invasive pine weevil. The pesticide killed 25,000 native honey bees, which is 41% of the total local population. **Calculate** the total local honey bee population

A textile company has started a program to recycle textiles so they are not added to a nearby landfill as part of the waste stream. The company collects old T-shirts, sorts them by color, breaks down the fibers, and respins the fibers into yarn, which is used to make new shirts. The recycling process is different from traditional manufacturing because it does not use dyes and it reduces the amount of water used in the manufacturing process to make new shirts.

4) In 1950, 1,710 tons of textile waste were sent to a landfill. In 2015, 10,530 tons of textile waste were sent to the same landfill. **Calculate** the percent change in textile waste sent to the landfill between 1950 and 2015.

5) The company has recycled 875,000 cotton T-shirts in the new recycling program. Assuming that a T-shirt has an average mass of 140g**, calculate** the mass (in kg) of waste that was diverted from the landfill by recycling the T-shirts instead of throwing them away.

6) Traditional manufacturing processes use an average of 700 gallons of water to manufacture one new T-shirt. Using their unique recycling process, the company uses only 5 gallons of water to manufacture one recycled T-shirt. The company received an order for 950 recycled T-shirts. **Calculate** the number of gallons of water that would be saved by making 950 recycled T-shirts instead of the same number of traditionally manufactured T-shirts

For questions 7-12, use the following statement along with your knowledge of the scientific method and the chart given below

A clam farmer has been keeping records concerning the water temperature and the number of clams developing from fertilized eggs. The data is recorded below:

Water Temperature in °C	Number of developing clams
15	75
20	90
25	120
30	140
35	75
40	40
45	15
50	0

7) **Identify** the dependent variable

8) **Identify** the independent variable

9) **Identify** the optimal temperature for clam development

10) The average temperature of seawater surrounding the aquaculture farm is 30.2^{o}C. With an increase of greenhouse gasses in the atmosphere, it is expected that global ocean temperatures will rise. **Make a claim** for the effect on the number of developing clams using evidence from the experiment

11) Other than water temperature, **identify** another variable that may affect clam production

12) **Construct** a line graph of the data.

PART II: CHEMISTRY

You must memorize these chemical names and formulas over the course of APES

CO_2 carbon dioxide	NO_3^- nitrate ion	K potassium
CO carbon monoxide	NH_3 ammonia	Mg magnesium
H_2CO_3 carbonic acid	NH_4^+ ammonium ion	Ca calcium
$C_6H_{12}O_6$ glucose	O_2 atmospheric oxygen	NaCl sodium chloride
CH_4 methane	O_3 ozone	Fe iron
$CaCO_3$ calcium carbonate	P phosphorus	Zn zinc
H_2 hydrogen gas	PO_4^{3-} phosphate ion	Pb lead
H_2O water	S sulfur	Hg mercury
N_2 nitrogen gas	SO_2 sulfur dioxide	Al aluminum
NO nitric oxide	SO_3^{2-} sulfite ion	As arsenic
NO_2 nitrogen dioxide	SO_4^{2-} sulfate ion	Rn radon
N_2O nitrous oxide	H_2S hydrogen sulfide	U uranium
NO_2^- nitrite ion	Cl chlorine	

PART III. REVIEW CONCEPTS

Although APES focuses on environmental issues and solutions, the backbone of the course is a culmination of biological, chemical and geological science concepts. The following are topics you have learned over the past 3 years in science.

Give a detailed description of each, using your own words! Make sure to address/define all related vocabulary terms. It may be helpful to add diagrams or pictures. Remember, this assignment is for YOU and your preparedness, you will get out of it what you put in!

1. The water cycle (evaporation, condensation, precipitation, infiltration, evapotranspiration)
2. The carbon cycle (photosynthesis, respiration, combustion, decomposition)
3. Trophic levels (producers/autotrophs, consumers/heterotrophs, primary vs secondary vs tertiary)
4. Food chains and food webs (energy flow)
5. Ecological succession (primary vs secondary)

6. Carrying capacity (limiting factors)
7. Plate tectonics (convergent, divergent, transform, subduction, earthquakes, tsunamis, volcanoes)
8. Earth's atmosphere (troposphere, stratosphere, mesosphere, thermosphere, exosphere)
9. Solar radiation and Earth's seasons (insolation, solstice, equinox, tropic of cancer, tropic of capricorn, latitude values)
10. The Greenhouse Effect (greenhouse gas, warming, sea-level rise)
11. Ozone-Depletion (o-zone layer, ozone-depleting chemicals/CFC's, UV radiation)
12. Half-life (nuclear decay, uranium, fission)