

This summer assignment is designed to prepare you for **AP Environmental Science** by giving you basic understanding of some major concepts and themes that we will be discussing during the course. It also will help you to review math skills, geography, some science terms and concepts studied in previous science courses.

This assignment consists of **6** tasks.

- You must print this assignment to complete it.
- All parts of this assignment must be **HANDWRITTEN** in blue or black ink and written clear and legibly.
- It will count as a **5%** of the the 1st quarter grade
- Final submission will be due **Friday, September 16th 2022.**

If you have any questions when working on the assignment in the summer you can email me at nakutaviciust@gcufsd.net.

Task #1: Vocabulary Assignment – Effective Flashcards

1. Watch video, “How to Study Effectively with Flash Cards - College Info Geek” (<https://www.youtube.com/watch?v=mzCEJvtED0U>) and answer questions below about how to make effective flashcards.
 - a. Why is it important to make your flashcards?

 - b. What are the best practices for making an effective flashcard?
 - _____
 - _____
 - _____
 - _____
 - c. Why must you use multiple strategies to study effectively?

2. For each of the following vocabulary terms, make **handwritten** flashcards on 3” x 5” cards. The front will have the **term** and the back will have a **description/definition** in the context of environmental science AND a **strategy** that was discussed in the video (picture, mnemonic device, etc.). The index cards are to be placed in a zip lock bag with your name on them upon submission. There will be a quiz the first weeks of school on these terms. (31 cards)

Abiotic
Acre
Anthropogenic
Background extinction rate
Biomass
Biotic
Biodiversity
Developed Countries
Developing
Ecological Footprint
Ecology

Ecosystem
Ecosystem diversity
Ecosystem services
Environmental indicators
Environmentalist
Environmental science
Environmental studies
Genetic diversity
Greenhouse gases
Hectare
Natural resources

Per capita
Speciation
Species
Species diversity
Sustainability
United Nations
World Health Organization
Environmental Protection Agency
New York State Department of Conservation (NYSDEC)

Task #2-Essay: Read the essay “Tragedy of the Commons” by Garrett Hardin. Here is a link: http://www.garretthardinsociety.org/articles/art_tragedy_of_the_commons.html. When you have completed the reading, please respond to the following in **complete sentences**:

a. What is Garrett Hardin’s central idea in this essay?

b. Do you personally agree with Hardin’s central idea? Support your answer.

c. Is the “Tragedy of the Commons” unavoidable? Support your answer.

d. Identify one “commons” in your own life (at school, home, work) and explain how it is (or is not) being managed wisely to avoid the situation described in the essay.

Task #3 Current Events Article – Find ONE (1) article (substantial – meaning more than a couple of paragraphs) about an environmental issue such as *chemical contamination, oil spills, pesticides, air pollution, climate change, deforestation, overpopulation, desertification, coral reef destruction, urban sprawl, introduction of non-native/invasive species, endangered species, etc.*

For the article:

1. Print the article and attach to this assignment.
2. Complete the table below.

Name of Article	
APA citation	
Summary of article (one-paragraph)	
Answer the Questions	<ol style="list-style-type: none"> 1. Identify the issue you think is the most important present in this article? 2. How does this issue affect or a group of people ? 3. What should/ could be done to address this issue? 4. Do you know anything about the topic that you could add to the article? Any opinion is acceptable as long as it is serious.

Task #4 - Environmental Laws: In environmental science, it is very important to know the environmental laws which impact our everyday lives. Complete the following table. You will be quizzed on these laws throughout the school year so coming into the course with these already done will be VERY helpful.

Law/Treaty	Draft Year (international or national)	Description of Function (keep it brief, main point)	Agency/Group Responsible for Enforcement
Clean Air Acts			
Clean Water Act			
Safe Water Drinking Act			
Comprehensive Environmental Response, Compensation Liability Act (CERCLA/Superfund)			
National Environmental Policy Act (NEPA)			
Montreal Protocols			
Kyoto Protocols			
Convention on International Trade in Endangered Species (CITES)			
Endangered Species Act (ESA)			
Marine Mammal Protection Act			
Occupational Safety and Health Act (OSHA)			
Surface Mining Control and Reclamation Act			

Task #5-Math Assignment: For AP Environmental Science, you will be required to be able to complete the following types of mathematical calculation without the use of a calculator. Also, expect a quiz in the first weeks of school using these type of computations and mathematical analysis.

<p style="text-align: center;">Percentage</p> <p>$17\% = 17/100 = .17$</p> <ul style="list-style-type: none"> Remember that “percent” literally means divided by 100. Percentage is a measure of the part of the whole, or part divided by whole. <p>Example #1: 15 million is what percentage of the US population? $15 \text{ million} / 300 \text{ million} = .05 = 5\%$</p> <p>Example #2: What is 20% of this \$15 bill so that I can give a good tip? $\\$15 \times .20 = \\$15 \times 20/100 = \\$3$</p>	<p style="text-align: center;">Rates</p> <p>Rise Y2-Y1 slope change $y=mx+b$ dX Run X2-X1 time dt</p> <ul style="list-style-type: none"> 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 divided by one gallon. Rates are calculating how much an amount changes in a given amount of time.
<p style="text-align: center;">Scientific Notation</p> <p>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)</p> <ul style="list-style-type: none"> When using very large numbers, scientific notation is often easiest to manipulate. For example, the US population is 300 million people or 300×10^6 or 3×10^8 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 <p>Online tutorial: http://www.chem.tamu.edu/class/fyp/mathrev/mr-scnnot.html</p> <p>Ex. $9 \times 10^6 / 3 \times 10^2 = (9/3) \times 10^{(6-2)} = 3 \times 10^4$</p>	<p style="text-align: center;">Long Division and Multiplication</p> <p>You should be able to do these calculations by hand, including values with decimals and scientific notation.</p> <ul style="list-style-type: none"> 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
<p style="text-align: center;">Dimensional Analysis</p> <p>You should be able to convert any unit into any other unit accurately if given the conversion factor.</p> <ul style="list-style-type: none"> Online tutorials are available: http://www.chemprofessor.com/dimension_text.htm http://www.chem.tamu.edu/class/fyp/mathrev/mr-da.html 	<p style="text-align: center;">Metric System Prefixes</p> <p>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) = $1,000,000,000,000 = 10^{12}$</p>

Complete the following problems, showing ALL work and units.

- 14000 millimeters = ? meters _____
- 6544 liters = ? milliliters _____
- 0.078 kilometers = ? meters _____
- 17 grams = ? kilograms _____

5. Expand the following:

a. 2.96×10^7

b. 6.02×10^{-3}

c. 6.67×10^{-11}

d. 9.8×10^5

6. Put the following in scientific notation:

a. 0.025

b. 1150000

c. 0.0000550

d. 6070

7. Perform the following calculations without a calculator and write the answers in scientific notation:

a. $(2.96 \times 10^7) + (1.0 \times 10^7)$ _____

b. $(6.0 \times 10^6) \div (3.0 \times 10^4)$ _____

c. $(2 \times 10^5) \times (3 \times 10^{10})$ _____

d. $(8 \times 10^{12}) - (1.2 \times 10^{12})$ _____

8. Perform the following calculations without a calculator and write the answers in scientific notation:

a. $(2.96 \times 10^7) + (1.0 \times 10^8)$ _____

b. $(6.0 \times 10^6) \div (3.0 \times 10^{-4})$ _____

c. $(2 \times 10^5) \times (3 \times 10^{-10})$ _____

d. $(8 \times 10^{12}) - (1.2 \times 10^{11})$ _____

9. Perform the following calculations without a calculator (but show some work) and write the answers in scientific notation:

a. $(2.96 \times 10^7) \div (3.7 \times 10^8)$ _____

b. $(6.8 \times 10^6) \div (1.7 \times 10^{-4})$ _____

c. $(2.1 \times 10^5) \times (3.1 \times 10^{10})$ _____

d. $(9.6 \times 10^{12}) \div 160,000$ _____

Show ALL work for these problems below:

10. What is 45% of 1800?

11. A gas engine is 6% efficient. What portion of a full 21 gallon tank of gas is wasted?

12. The Greenland Ice Sheet contains 2,850,000 cubic kilometers of ice. It is melting at a rate of .006% per year. How many cubic kilometers are lost each year?

13. In a small oak tree, the biomass of insects makes up 3000 kilograms. This is 4% of the total biomass of the tree. What is the total biomass of the tree?

14. If a city of 10,000 experiences 100 births, 30 deaths, 10 immigrants, and 20 emigrants in the course of a year, what is its net annual percentage growth rate?

15. If 1 square mile = 640 acres, how many acres is a 100 square mile area of a national forest?

How many hectares? (1 ha = 2.5 acres)

Task #6- Geography Assignment: We will be discussing environmental issues throughout the world so a working knowledge of world geography is essential. A map quiz will be given the first weeks of school that will require you to locate the following locations and features. On the attached map, complete following:

1. Lightly color the following:
 - LIGHT BLUE - Oceans, major seas and lakes
 - LIGHT BROWN/TAN – continents

2. Label the following:
 - Draw in and label (7): The Equator, North Pole, South Pole, Tropic of Cancer, Tropic of Capricorn, Arctic Circle, Antarctic Circle
 - All continents (7): Africa, Antarctica, Asia, Australia, Europe, North America, South America
 - All oceans (5): Atlantic Ocean, Pacific Ocean, Indian Ocean, Arctic Ocean, Southern/Antarctic Ocean
 - Major seas and lakes (8): Caribbean Sea, Gulf of Mexico, Mediterranean Sea, Arabian Sea, Black Sea, Great Lakes, Caspian Sea, Aral Sea
 - Label and using a BLUE pencil draw in the approximate location of the following Major rivers and river systems (8): Amazon, Nile, Mississippi (also Missouri and Ohio Rivers), Yangtze, Ganges, Yellow
 - Major mountain chains (6): Rockies, Andes, Appalachians, Alps, Urals, Himalayas

Map of the World Showing Major Countries

