APES Summer 2022 Assignment

AP Environmental Science is a lab based course that is designed to examine ecological, biological, chemical, physical and environmental concepts and interactions. A student of this course should be familiar with local, regional and global concerns within their own environment. The objective of this summer assignment is to get you thinking environmentally and to refresh some math skills. Please note that this assignment will be collected for a test grade on **August 16th (first day of school)**. Any late or incomplete assignments will result in a score of **ZERO** and may result in you being dropped from the course. All materials should be typed. I hope that you have an enjoyable, exciting, and educational summer!

Contact Information:
Felicia Lukins
lukins@cardinalnewman.org

Google classroom:

- Use your Cardinal Newman email to sign into google classroom.
- Use the + sign at the right top corner of the page.
- Enter the AP environmental science class code to join our class.
  Classroom code: sj4fo3o

Integrity:
By your enrollment in this course, it appears that you are willing to challenge yourself. This is a college-level course. You are expected to complete your own work in your own words. **Plagiarism and cheating will not be tolerated and will receive a grade of ZERO**. Administrative discipline may also occur. **Simply because you worked with a partner does not mean you submit identical assignments.**

Add your work at the end of each section to this document where it is highlighted.

I. Experience the Natural World:

Visit a natural outdoor area, go for a walk, and make some observations. Please attempt to go beyond your backyard. Here are some nearby places you could visit

- Sonoma County Regional Parks https://parks.sonomacounty.ca.gov/visit/find-a-park
- California State Parks - search by region or county https://www.parks.ca.gov/parkindex

On your walk, please do the following:

1. Find a plant OR an animal IN YOUR COUNTY that you have NEVER SEEN BEFORE "in the wild" and create a photo journal. This is a local assignment only. Pics you took while traveling will not receive credit.
    a. IF YOU CHOOSE A PLANT, YOU NEED AT LEAST 5 PHOTOS AT LEAST ONE WEEK APART: Take at least one DIGITAL photo at least once every two weeks that has a DATE STAMP (date stamp need not appear on the photo itself, but when you upload it to your computer the file properties should list "Date Taken" (NOT only "Date Modified").

    b. IF YOU CHOOSE AN ANIMAL: You only need to have one good digital photo if you're going for an animal instead of a plant, but it's got to be a photo that's clear enough to be 100% sure of what you're looking at. Spend some time in your backyard or at a local park and look around. Mammals and birds will probably be hard to sneak up on to get a good photo, but if you're quick with the camera or if you set up a bird feeder and keep a close eye on it perhaps you'll have some luck. Don't forget about fish, reptiles, amphibians, and BUGS. Don't think you're going to get away with common stuff like deer, robins, squirrels, chipmunks, etc., either. If you think the animal will be too difficult - pick a plant!

    c. For either, please describe the location. Include whether it was sunny or shady, wet or dry, the outside temperature the day you are taking the photo, what other types of plants or animals you see in the vicinity, time of day, etc. (1 paragraph)

    d. For either, do your best to identify the species. If you have any field guides at home, terrific! Start there. If not, try here:

http://www.backyardnature.net/i-ident.htm#b If it's a plant and you're still not sure what you've got, take closeups of leaves, stem, and any flowers or fruit and/or bring a sample to the first day of class. Write down what you think it is and why.

e. For either, give a brief biography of your plant or animal. You should give important details such as diet, native habitat, number of offspring, time of migration or reproduction, ect.

SECTION I: Link or add your answer here

II. Current Events in Environmental Science (Part A and B):

The topics are as follows:

1. Human population growth
2. Non-native (invasive) species
3. Food production, food safety
4. Fossil fuels (coal, oil, natural gas)
5. Renewable resources (solar, wind, geothermal, hydroelectric, etc.)
6. Nuclear energy
7. Air quality
8. Water quality (surface or groundwater)
9. CO2 and global warming
10. Recycling or another aspect of waste management (garbage)
11. Nature Conservancy, Sierra Club, World Wildlife Fund, or similar NGO (non governmental organization)
12. Overfishing, overhunting
13. Deforestation 1
14. Ozone depletion
15. Legislation or International Treaty dealing with an environmental issue.

A. Collect a copy of **1** article, published since January 1, 2019, relating to ONE environmental issue found on the list of topics. (An issue involves an environmental concern, not just some interesting scientific finding.) The sources may be scientific publications, popular magazines, newspapers or the like. Try the NY Times (especially Tuesdays), National Geographic, Discover Magazine, Natural History Magazine, as well as the more scholarly Scientific American, Science, Nature, etc. You may find it more convenient to look online, but you still must indicate the source.

a. For each, write at least 2 paragraphs, a paragraph or two summarizing the content, and a paragraph or two discussing your reaction. For example, does the article teach you something new? Does it support or refute other information you have heard or read? Are there other points of view on this issue?

b. Provide a link of the article to your summary and reaction paragraphs.

SECTION II Part A: Link your Answer here

B. Listen to or watch at least **1 hour** of podcasts relevant to an environmental science issue(s) on the list of topics. You may choose several from one series or mix and match. Below is a list of some of the available podcasts; all of the podcasts in each series may

not be about environmental science, so please choose episodes that are relevant. Also, there are many more podcasts than the ones on this list that apply - feel free to choose others. All of them are available free from the iTunes music store. If you need instructions for downloading and/or listening, please email Mrs. Lukins.

List of podcasts

- TED talks are available for free online at http://www.ted.com/talks, through apps for your smart phone or tablet, and on Instant Netflix.
- 60-Second Science
- Nature Podcast
- Ecogeeks: Science Video Podcast
- Nature Stories Podcast
- NPR Climate Connections Podcast
- NPR: Environment Podcast
- NPR: Health and Science Podcast
- NPR: On Science Podcast
- Science Talk: The Podcast of Scientific American
- Science Times
- Podcast of Life
- Terra

a. For each podcast, write at least 2 paragraphs, a paragraph or two summarizing the content, and a paragraph or two discussing your reaction. For example, does the article teach you something new? Does it support or refute other information you have heard or read? Are there other points of view on this issue?

b. Attach a copy of the link and the title of the podcasts you completed to your summary and reactions paragraphs.

SECTION II PART B: Link or add your answer here

III. Definitions:

Vocabulary is very important in APES. You have all used a quizlet as a study tool and now it is time to create your own!

1. Go to quizlet.com
2. Use your cardinalnewman.org account to create your signup (this should be free)
3. Click on the create option at the top of your page
4. Name your quiz: YourLastName 2022 (For example, My quiz would be Lukins 2022)
5. You are only responsible for words and definitions. Images are extremely helpful for studying but not required.
6. Please use definitions that you understand. Coping and pasting will not help you score a 5 on the exam.
7. Add a link to your quiz below for full credit:

Create quizlet with words and definitions of the following words:

1. Environment
2. Environmental science
3. Ecosystem
4. Biotic
5. Abiotic
6. Environmentalist
7. Ecosystem service
8. Economic service
9. Biodiversity
10. Atom
11. Element
12. Molecule
13. Isotopes
14. Covalent bond
15. Ionic bond
16. Hydrogen bond
17. Polar molecule
18. Surface tension
19. Capillary Action
20. Acid
21. Base
22. pH
23. Chemical reaction
24. Law of conservation of matter
25. Carbohydrate
26. Protein
27. Lipid
28. Nucleic acid
29. DNA/RNA
30. Cell
31. Energy
32. Chemical energy
33. First law of thermodynamics
34. Second law of thermodynamic
35. Genetic Diversity
36. Species
37. Species diversity
38. Speciation
39. Greenhouse gases
40. Anthropogenic
41. Sustainability
42. Biophilia
43. Ecological footprint
44. Hypothesis
45. Control group
46. Sample size
47. Replication (during experimentation)
48. Theory
49. Matter
50. Mass

IV. Math Skills:

The APES Examination will require you to do mathematical calculations. Occasionally these calculations may be somewhat esoteric, and you may find it possible to do them in your head; nonetheless, it is mandatory to show all work for all calculations on the free-response section of the APES exam. This worksheet is designed to help to prepare you for the type of calculations you may encounter on this year's APES exam. **Expect a math skills test the first full day of school. *Calculators <u>will</u> be allowed to be used during the test.***

- **For each problem show every step of your work, and indicate the cancellation of all units.**

- **Answers should be bolded**

Scientific Notation—All APES students should be able to work comfortably with numbers in scientific notation.

Place the following numbers into scientific notation.

1. one billion
2. twenty three thousand
3. 70 trillion
4. three hundred
5. 0.00025
6. 7,310,000

Perform the following calculations in scientific notation.

7. five hundred billion times thirty five thousand

8. six thousand divided by 300 billion

9. $\frac{3.4 \times 10^{-2}}{1.7 \times 10^{-5}}$

10. $\frac{1.0 \times 10^{5}}{2.0 \times 10^{3}}$

11. $(3.5 \times 10^{-2})(2.0 \times 10^{-5})$

12. $(1.11 \times 10^{-5})(6.0 \times 10^{9})$

Metric Conversions—All APES students should be comfortable converting between common metric prefixes. Below are common prefixes, and the number of base units each represents. For example, 1 teraWatt = 109 Watts; 1 millimeter = 10^{-3} meters

n = nano = 10^{-9} k = kilo = 10^{3} G = Giga = 10^{12}

u = micro = 10^{-6} M = mega= 10^{6}

m = milli = 10^{-3} T = Tera = 10^{9}

13. 2.8 mm = _____ m

14. 1.3 nm = _____ m

15. 300 mg = _____g

16. 12 g = _____ng

17. 250 mL = _____ L

18. 400 GW = _____W 1

19. 5 x 10^{4} kg= _____Mg

Unit conversions—All APES students should be able to convert from one system of units to another.

Use the information below to complete the following. Show all of your work including the canceling of all units.

1 mi^2 = 640 acres 1 acre = 0.405 hectares

1 barrel oil = 42 gallons

1 L = 0.264 gallons

1 kilowatt-hour = 3.4 x 10^4

BTU= 8.6 x 10^5 calories

1 metric ton = 1 x 10^3 kg

20. A 100 square mile area of national forest is how many acres? How many hectares?

21. A city that uses ten billion BTUs of energy each month is using how many kilowatt-hours of energy?

22. Fifty eight thousand kilograms of solid waste is equivalent to how many metric tons?

Percentages—All APES students should be able to work comfortably with percentages.

$$\%\ \text{increase} = 100 \times \frac{(\text{final} - \text{initial})}{|\text{initial}|}$$

23. Calculate the percentage growth rate for a country with a population of 6 million in a year in which it had 100,000 births, 70,000 deaths, 30,000 immigrants, and 50,000 emigrants.

24. If the concentration of mercury in a water supply changes from 65 parts per million (ppm) to 7 ppm in a ten-year period, what is the percentage change of the mercury concentration? How much per year?

V. Environmental Laws, Terms and Agencies:

Understanding some of the basic environmental legislation and the duties of different agencies is an important part of the course. We will refer to this information throughout the year.This information can easily be found on the internet. Please be sure to phrase information in terms that you understand.

****Environmental Legislation/Agreements****

Provide the year the legislation was first ratified, and give a brief description of the important components These Laws WILL appear on your AP exam.

Name	**Abbr.**	**Year**	**Description**
Clean Air Act	CAA		
Clean Water Act	CWA		
Comprehensive Environmental Response, Compensation Liability Act	CERCLA Superfund		
Convention on International Trade in Endangered Species	CITIES		
Resource Conservation and Recovery Act	RCRA		
Endangered Species Act	ESA		
Kyoto Protocol	KP		
Montreal Protocol	MP		
Safe Drinking Water Act	SDWA		
Soil and Water Conservation Act	SWCA		
Solid Waste Disposal Act	SWDA		
Surface Mining Control and Reclamation Act	SMCRA		
Delaney Clause of Food, Drug, and Cosmetic Act			

Legislative Terms

Define these terms in your own words as they relate to environmental legislation. Understand the difference between each term.

Conservation	
Preservation	
Restoration	
Remediation	
Mitigation	
Reclamation	

Regulatory Agencies

Provide the year the agency was instituted, and a brief description of responsibilities related to environmental quality.

Agency	Abbr.	Year	Description
Dept. of Health and Human Services	DHHS		
Environmental Protection Agency	EPA		
Bureau of Land Management	BLM		
National Parks Service	NPS		
Dept. of Agriculture	USDA		
National Oceanic and Atmospheric Organization	NOAA		
US Fish and Wildlife Service	USFWS		
US Geological Survey	USGS		
Dept. of Energy	DOE		
Council on Environmental Quality	CEQ		

APES Summer Assignment Rubric

(Minus 2 points for each section if not in complete sentences)

	2	**4**	**6**	**8**	**Comments**
Section 1 Accuracy: Experience the Natural World	Plant/Animal photographed	Plant/Animal photographed and identified. Missing part C or E	Plant/Animal photographed and Identified Part C of E needs improvement	Plant/Animal photographed, identified and Part A-E completed	
Section 2 Part A Accuracy: Current event Articles	Summarizes but does not respond to the article or Missing article	Summarizes and includes only an opinion of the issue.	Summarizes, offers opinion, and describes the impact on the future.	Summarizes the article and fully responds to the article.	
Section 2 Part B Accuracy: Current event podcast	Summarizes but does not respond to the Podcast or is missing Podcast	Summarizes and includes only an opinion of the issue	Summarizes, offers opinion, and describes the impact on the future.	Summarizes the podcast and fully responds to the podcast.	
Section 3 Accuracy: Definitions	Student completed less than 29 words	Student completed only 30-39 words	Student completed only 40-49 words	Student completed 50 words	
Section 4 Accuracy: Math Practice	Student has completed 1-7 questions accurately	Student has completed 8-15 questions accurately	Student has completed 16-21 questions accurately	Students has completed 22-24 questions accurately	
Section 5 Accuracy: Laws	Student has completed less than 10 terms accurately	Students has completed 10-19 terms accurately	Student completed only 20-28 terms accurately	Student has completed 29 terms accurately	