

AP Environmental Science (APES) 2019-2020

Summer assignment

- *all summer work is dependent upon your finalized schedule;*
- *attendance at this meeting does NOT ensure your enrollment in this course.*

Instructor: Mr. Haughwout

Welcome to APES! The summer assignment will be due **Monday, September 9th, 2019**. The summer assignment has four parts, **all four are to be completed by the due date**.

******You will be tested on all of the information from this summer assignment within the first week of your return to school. ******

Part I—Vocabulary and science terminology

(much of this information is found in Ch 1 & 2 of the textbook)

There is certain information with which **you must be familiar prior to the commencement of APES**. This information will **not be explicitly covered in class, you must learn this on your own**. This information is listed below. Define each one of the items—you may use your textbook, the internet or other reference materials to define each term

Define/explain each term, **neatly hand-written**, on 3-holed notebook paper (it will later be put into your binder).

- 1) Positive/negative feedback loops—with example of each
- 2) System, input, outputs—explain how they work w/in a system
- 3) Element
- 4) Compound
- 5) Atom—proton, neutron, electron
- 6) Isotope
- 7) Ions
- 8) pH and pH scale:
 - a) What makes something acidic/basic
 - b) Draw a pH scale
 - c) Label a few items on the scale—including acids, bases, and a few in between
- 9) Acid/base—with examples of solutions
- 10) Organic vs. Inorganic
- 11) Prokaryotic vs. eukaryotic cells
- 12) Genes
- 13) Chromosomes

- 14) Genetic engineering/GMOs (genetically modified ingredients)
 - a) How is it different than **artificial selection/selective breeding**?
 - b) Where in our food system are GMOs used?
- 15) Law of Conservation of Matter
- 16) Kinetic & Mechanical vs. Potential Energy
- 17) Radioactive decay
- 18) Half-life—why is this value important?
- 19) 1st Law of Thermodynamics
- 20) 2nd Law of Thermodynamics
- 21) Electromagnetic radiation and draw the Electromagnetic spectrum
- 22) Aerobic vs. Anaerobic respiration
 - a) What are the **reactants and products** for each type?
 - b) What organisms use this type of respiration? Why?
- 23) Eutrophication, describe causes and effects.
- 24) Define Keystone species and give example
- 25) Identify a species on the endangered species list and describe how it became endangered.
- 26) Identify an invasive species, what problems does it cause?
- 27) What is Rosy periwinkle, why is it significant?
- 28) Differentiate between intrinsic and instrumental value and give an example of each.

Write the full name of each of these chemical abbreviations—make sure you know the **names & abbreviations**:

- | | |
|--|--------------------------------------|
| 1. CO ₂ | 13. Pb |
| 2. CO | 14. Hg |
| 3. C ₆ H ₁₂ O ₆ | 15. Rn |
| 4. CH ₄ | 16. U |
| 5. H ₂ | 17. O ₃ |
| 6. H ₂ O | 18. P |
| 7. N ₂ | 19. (PO ₄) ³⁻ |
| 8. NO _x | 20. S |
| 9. NO ₃ ⁻ | 21. SO ₂ |
| 10. NH ₃ | 22. Cl |
| 11. O ₂ | 23. K |
| 12. NaCl | |

Part II- Laws and Treaties

These are the most vital laws/treaties/acts you need to know for the school year:

Find and include the following for each of the laws and/or treaties:

- a) Name
- b) Description of the legislation's function and the specific environmental issues affected
- c) Agency/Group Responsible for Regulation and Enforcement of the legislation (i.e. United Nations, Department of Interior, EPA, USDA etc.)

Each treaty/law **must be neatly hand-written**, on 3-holed notebook paper (it will later be put into your binder).

- 1. The Clean Air Act of 1963, 1965, 1970, 1977, 1990 (CAA)**
- 2. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 1986, 1990 (CERCLA or Superfund)**
- 3. Kyoto Protocol**
- 4. Montreal Protocol**
- 5. Convention on International Trade in Endangered Species of 1973 (CITES)**
- 6. The Endangered Species Act 1973, 1982, 1985, 1988 (ESA)**
- 7. Federal Food, Drug, and Cosmetic Act 1938, 1954, 1958 (FFDCA)**
- 8. Federal Insecticide, Fungicide and Rodenticide Act 1972, 1988 (FIFRA)**
- 9. Food Quality Protection Act of 1996 (FQPA)**
- 10. Lacey Act**
- 11. Surface Mining Control and Reclamation Act**
- 12. The Oil Pollution Act of 1990 (OPA)**
- 13. The Resource Conservation and Recovery Act (RCRA)**
- 14. The Safe Drinking Water Act of 1974, 1984, and 1996 (SDWA)**
- 15. The Toxic Substances Control Act of 1976 (TSCA)**
- 16. U.S. Clean Water Act 1977, 1981, 1987 (CWA)**
- 17. Wild and Scenic Rivers Act**
- 18. Wilderness Act**
- 19. Marine Mammal Protection act**
- 20. Antiquities act**

Part III—Math Practice

****Math skills are vital for this course and they will be used continually throughout the school year. In order to help you re-familiarize yourself with several math skills it is imperative that you complete the following math packet. Show any/ all work**

Convert the following into or from scientific notation.

1. 1,000,000,000,000=

2. 0.0000003178=

3. 2.23×10^{-9} =

4. 1.38×10^6 =

Scientific Notation Calculations:

1. $(4.93 \times 10^{-8}) - (2.03 \times 10^{-9})$ =

2. $(7.25 \times 10^4) + (6.27 \times 10^5)$ =

3. $(1.25 \times 10^{-5}) \times (2.00 \times 10^9)$ =

4. $(6.75 \times 10^9) / (2.25 \times 10^7)$ =

Problems (show work): use dimensional analysis

1. How many kilograms are in 40 pounds?

2. How many miles are in 375 kilometers?

3. How many liters are in 50 gallons?

4. Convert 50 meters to km and 50 meters to centimeters.

Percent Change (show work): formula (original-new/original x 100 = %)

1. From 250 to 325=

2. From 450 to 300=

3. A utility companies operating cost was the following:

2000=\$400,000

2001= \$450,000

What were the percent changes from 2000 to 2001:

Part IV—”Silent Spring” by Rachel Carson

Please obtain a copy and read “Silent Spring” by Rachel Carson. This book was pivotal in the regulation and awareness of pesticide usage. **In addition to the questions please be prepared to discuss this book and the implications it had within the first week of school.**

1. Why did Carson title her book “Silent Spring”?
2. Why are DDT and other chlorinated hydrocarbons uniquely problematic?
3. Carson states that “It is not possible to add pesticides to water anywhere without threatening the purity of water everywhere. Explain what is meant by this.
4. Carson states, “In nature nothing exists alone” Why is this an important part of her critique? How would you characterize her view of the many relationships in nature: between human beings and their environments, between plants and animals, between water and earth?
5. What does Carson suggest as alternatives to the chemicals that control unwanted pests and plants? Do you think these alternatives make sense?
6. When was DDT first found in fatty tissue of humans?
7. Why is runoff in rivers and the ocean such a serious problem?
8. Carson uses the term “human price” for the use of toxins. What is meant by this? Why is it so crucial that human beings begin to see themselves as an essential part of the natural world? Why did she believe that people resisted thinking about themselves in those terms?
9. Carson describes the possibility of genetic damage by environmental hazards as something new. She also discusses cellular damage caused by environmental carcinogens, an especially poignant example because Carson herself died of breast cancer. Do you think of these as novel, even controversial theories? Why or why not?
10. Do you agree that the project of controlling nature is arrogant, foolish, and dangerous, as Carson argues? Why or why not?
11. Carson defines the balance of nature at the beginning of chapter 15 on p. 246. Read her definition and explain its major features in your own words.
12. In chapter 12 it is referenced that “there is an ecology of the world exists within our bodies.” What is meant by this?