

2017-2018 RHS Summer AP Environmental Science Preparation Assignment

MAJOR GRADE CATEGORY- Due by first Friday of school: 9/1/17

Welcome future APES students! This is an advanced science course that combines the disciplines of biology, chemistry, geology, physics, government and economics to investigate global environmental issues. We will discover how the Earth's systems function together and how humans have affected our planet. We will also examine our personal consumption habits and learn ways to be responsible global citizens in the face of serious environmental issues.

Because this is a college level course, you will be responsible for learning a large amount of material on your own. I will help you as we go, but it will be your responsibility to take notes, study and learn your vocabulary! **There will be nightly textbook reading with questions to answer.** They are not graded but will help you absorb the material and at the end of the unit they will get turned in. It is essential that students read the textbook! We also work on the assumption that you have a general science background that includes biology, chemistry and algebra. The purpose of this project is to help you prepare for the APES content by getting organized, reviewing some background information, and getting familiar with some of the basic concepts of environmental science and your own consumption habits.

**General Guidelines:** You will be expected to bring this to my classroom (Room 2802) during the **first week** of school in August, regardless of which semester you have the class and it will be graded (Major category in 1<sup>st</sup> or 3<sup>rd</sup> quarter).

- **There are 4 parts to the summer assignment. DO NOT PROCRASTINATE!**
- **Read the directions for each section carefully!**
- **All work is to be completed on your own. You may not work with other students to complete this assignment.**

### Section 1: Math Review

The following problems represent some of the basic math skills that are required to be successful in AP Environmental Science. Use this sheet over the summer to review. There will be a math quiz the first week of school. **NO CALCULATORS ARE ALLOWED TO BE USED IN CLASS, ON EXAMS OR ON THE COLLEGE BOARD TEST!! SHOW ALL OF YOUR WORK to get full credit!! Write directly on this sheet.**

**Here are some tutorials to help review your math skills:**

Scientific notation: <http://www.chem.tamu.edu/class/fyp/mathrev/mr-scnote.html>

Dimensional analysis: [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>

Long division and multiplication: <http://www.mathsisfun.com/dividing-decimals.html>

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

**Put the following numbers into scientific notation- SHOW ALL WORK**

1)  $0.00003 =$  \_\_\_\_\_

2)  $170,000 =$  \_\_\_\_\_

3)  $0.005 =$  \_\_\_\_\_

4)  $376 =$  \_\_\_\_\_

5)  $4160 =$  \_\_\_\_\_

**Write the following numbers in standard notation (convert from scientific- SHOW ALL OF YOUR WORK)**

6)  $3 \times 10^7 =$  \_\_\_\_\_

7)  $5.6 \times 10^3 =$  \_\_\_\_\_

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8)  $8.2 \times 10^8 =$  \_\_\_\_\_

9)  $7 \times 10^1 =$  \_\_\_\_\_

10)  $2.1 \times 10^0 =$  \_\_\_\_\_

11)  $3.4 \times 10^{-2} =$  \_\_\_\_\_

12)  $5.1 \times 10^{-1} =$  \_\_\_\_\_

13)  $4.7 \times 10^{-4} =$  \_\_\_\_\_

14)  $6 \times 10^{-9} =$  \_\_\_\_\_



**Solve the following- SHOW ALL WORK, PLACE IN SCIENTIFIC NOTATION**

15)  $10^2 \times 10^5 =$  \_\_\_\_\_

16)  $10^1 \times 10^2 =$  \_\_\_\_\_

17)  $10^2 \times 10^{-5} =$  \_\_\_\_\_

18)  $10^{-1} \times 10^7 =$  \_\_\_\_\_

19)  $10^{-3} \times 10^{-3} =$  \_\_\_\_\_

20)  $10^{-4} \times 10^{-2} =$  \_\_\_\_\_

21)  $10^4 / 10^5 =$  \_\_\_\_\_

22)  $10^1 / 10^3 =$  \_\_\_\_\_

23)  $10^2 / 10^{-3} =$  \_\_\_\_\_

24)  $10^{-6} / 10^{-4} =$  \_\_\_\_\_

25)  $10^{-2} / 10^{-6} =$  \_\_\_\_\_

**Solve the following using scientific notation- SHOW ALL WORK**

26)  $0.004 \times 0.006 =$

27)  $0.025 \times 0.004 =$

28)  $0.00005 \times 0.000007 =$

29)  $26,000 \times 1,000 =$

30)  $237 \times 1,000,000 =$

31)  $320,000,000 \times 0.0005 =$



32)  $0.003 \times 4,000 =$

33)  $2,000 / 13,000 =$

34)  $25 / 0.0015 =$

35)  $200 / 1,000,000 =$

36)  $0.001 / .00001 =$

**Percentages- SHOW ALL WORK**

37) 10 is what percent of 1,000?

38) What is 25% of 2,500?

39) What is 30% of 3,000,000?

40) 25 is what percent of 4,000?

41) You start with 100 units and end with 150 units, what is the percentage increase?

42) You start with 100 units and end with 50 units, what is the percentage decrease?

43) You start with 25 units. How many units would you have after a 400% increase?

44) You start with 200 units. How many units would you have after a 75% decrease?

45) You use 1,000 kilowatts of power. You increase your usage by 40%. How many total kilowatts are you using?

46) Your old microwave used 2 kilowatts an hour. Your new microwave uses 1.5 kilowatts an hour. What is your percent energy savings?

47) A light bulb uses 100 watts of power. 95 watts are wasted as heat. What percentage of energy is used to light the bulb?

48) A fluorescent bulb uses 24 watts and gives off the same amount of light as a 100 watt regular bulb. What is the percentage in energy savings by switching to a fluorescent bulb?

49) A population starts the year with 1,000 residents. By the end of the year, 100 new babies were born. What is the percent increase for this population?

50) You dissolve 5 grams of salt into 95 grams of water. What is your percent salt solution?

**Dimensional Analysis- SHOW ALL WORK**

Set up and solve the following equations using all units and showing all work. Use scientific notation when appropriate.

51) There are 2.2 pounds in 1 kilogram. How many pounds in 140 kilograms?

52) There are 2.54 centimeters in one inch. How many centimeters are in 32 inches?

53) There are 36 inches in one yard, how many centimeters are in two yards?

54) There are 100 centimeters in 1 meter. How many yards are in one meter?

55) Given 1000 watts in 1 kilowatt, how many watts are in 2.4 kilowatts?

56) 1 megawatt is  $10^6$  watts. How many kilowatts are there in one megawatt?

57) There are 1,000 grams in one kilogram, and 1,000 micrograms in one gram. How many micrograms are in 2,500 kilograms?

58) You have 24 light bulbs, each using 100 watts an hour. How many watts will be used in 120 hours?

59) 1,000 homes are in a city. Each home uses 200 kilowatt hours a month. How many kilowatt hours does the entire city use in a month?

**Section 2: HOME video and questions. Watch HOME video and Answer on a separate sheet in thorough, complete sentences- typed (font 12) <https://www.youtube.com/watch?v=jqxENMKaeCU>**

1. Describe the conditions on early Earth.
2. What happened to the carbon that poisoned the atmosphere?
3. How did the agricultural revolution change the Earth?
4. How has Earth changed in the last 60 years since the use of oil has become more widespread?
5. What is most of the grain in the US used for?
6. What led to the dramatic decline in the biodiversity of agricultural crop species?
7. How many kilos of water does it take to produce 1 kilo of beef?
8. How have cars shaped the way housing is laid out in the US and other developed countries?
9. How much has the volume of international trade increased since 1950?
10. What are your thoughts on how the video portrays Dubai? Is it self-sustainable?
11. Rainforest are cut down to make farmland for which products/crops?
12. What makes the growth of Lagos different from how most other cities grow?
13. Where does the water from Greenland's melting ice sheet go?
14. Why are the glaciers of mountains so important for the people in the lowlands?
15. What hope does this video offer at the end?

This video project covers many topics that we will discuss in APES this year. Give **three** specific examples that are portrayed in the video about **each** of the APES concepts that are listed below:

16. All living things are linked
17. Developed vs. Developing Countries
18. Human Innovation and Technology
19. The Carbon cycle
20. Climatic Balance
21. Shortage of Resources

**Section 3: Environmental Legislation and Diseases Flash Cards**

Put these facts on index cards. All cards must be **handwritten** by your very own hand. The term or phrase before the colon (:) goes on one side, and the definition/explanation goes on the other side. It would not hurt to draw/sketch something to help you to remember! Place on a **large Binder ring**. You will also need a ring for vocabulary cards in class.

**LEGISLATION:**

1. Surface Mining Control & Reclamation Act: (1977) requires coal strip mines to reclaim the land
2. Madrid Protocol: (1991) Suspension of mineral exploration (mining) for 50 years in Antarctica
3. Safe Drinking Water Act: (SDWA, 1974) set maximum contaminant levels for pollutants in drinking water that may have adverse effects on human health
4. Clean Water Act: (CWA, 1972): set maximum permissible amounts of water pollutants that can be discharged into waterways; aims to make surface waters swimmable and fishable
5. Water Quality Act: attempts to reduce non-point source pollution
6. Ocean Dumping Ban Act: (1988): bans ocean dumping of sewage sludge and industrial waste in the ocean
7. Clean Air Act: (CAA, 1970) set emission standards for cars and limits for release of air pollutants
8. Kyoto Protocol: (2005) controlling global warming by setting greenhouse gas emissions targets for developed countries
9. Montreal Protocol: (1987) phase-out of ozone depleting substances
10. Resource Conservation & Recovery Act (RCRA): (1976) controls hazardous waste with a cradle to grave system
11. Comprehensive Environmental Response, Compensation & Liability Act (CERCLA): (1980) —Superfund, designed to identify and clean up abandoned hazardous waste dump sites
12. Nuclear Waste Policy Act: (1982) U.S. government must develop a high level nuclear waste site (Yucca Mtn.)
13. Endangered Species Act: (1973) identifies threatened and endangered species in the U.S., and puts their protection ahead of economic considerations
14. Convention on International Trade in Endangered Species (CITES): (1973) lists species that cannot be commercially traded as live specimens or wildlife products
15. Magnuson-Stevens Act: (1976) Management of marine fisheries
16. Food Quality Protection Act: (1996) set pesticide limits in food, & all active and inactive ingredients must be screened for estrogenic/endocrine effects
17. Migratory Bird Treaty Act: prohibits shooting non-game migratory birds
18. Wilderness Act: recognizes wilderness areas and strives to preserve them by keeping them road and development Free
19. Delaney Clause: prohibits adding cancer causing agents to food
20. National Environmental Policy Act: (1969) Environmental Impact Statements must be done before any project affecting federal lands can be started
21. Stockholm Convention on Persistent Organic Pollutants: (2004) Seeks to protect human health from the 12 most toxic chemicals (includes 8 chlorinated hydrocarbon pesticides / DDT can be used for malaria control)
22. Federal Insecticide, Fungicide, Rodenticide Act: FIFRA, regulates the effectiveness of pesticides
23. Food Quality Protection Act: set pesticide limits in all food and all active and inactive ingredients must be screened for estrogenic/endocrine effects
24. Agenda 21: UN program to make development environmentally and socially sustainable in the 21<sup>st</sup> century
25. London Dumping Convention (Law of the Sea): international agreement banning ocean dumping of plastics, oil and industry waste
26. Healthy forest initiative: primary goal is to reduce the fire danger and return out forests and rangelands to a healthier state; done by clearing underbrush and setting controlled burns.
27. US Climate Bill: reduce gases linked to global warming; to force sources to power to shift away from fossil fuels, which when burned, release heat-trapping gases, and toward cleaner sources of energy such as wind, solar and geothermal
28. Lacey Act: protects both plants and wildlife by creating civil and criminal penalties for a wide array of violations; prohibits trade in wildlife, fish, plants that have been illegally taken, possesses, transported or sold.

29. OSHA: primary federal law which governs occupational health and safety in the private sector and federal government in the US
30. Rio Earth Summit: UN Conference on Environment and Development (UNCED), Rio de Janeiro, June 1992. Nothing less than a transformation of our attitudes and behavior would bring about the necessary changes

Diseases you need to know:

31. Carcinogens: is any substance, radionuclide, or radiation that is an agent directly involved in causing cancer.
32. Herbicides: commonly known as a weedkiller, is a type of pesticide used to kill unwanted plants.
33. Mercury: harmful if swallowed, causes burning in throat, diarrhea, vomiting, numbness, uncontrollable shaking, blindness, memory problems, seizures and even death.
34. Pesticides: The health effects of pesticides depend on the type of pesticide. Some, such as the organophosphates and carbonates, affect the nervous system. Others may irritate the skin or eyes. Some pesticides may be carcinogens. Others may affect the hormone or endocrine system in the body.
35. Pollution: Adverse air quality can kill many organisms including humans. Ozone pollution can cause respiratory disease, cardiovascular disease, throat inflammation, chest pain, and congestion. Water pollution causes approximately 14,000 deaths per day, mostly due to contamination of drinking water by untreated sewage in developing countries.
36. Radiation: Radiation sickness is also called acute radiation sickness, acute radiation syndrome or radiation poisoning. Common exposures to low-dose radiation, such as X-ray or CT examinations, do not cause radiation sickness. Although radiation sickness is serious and often fatal, it's rare.
37. Asthma: a condition in which breathing is difficult, affects millions of Americans. Environmental triggers for asthma are everywhere and include naturally occurring triggers such as animal dander, plant pollen, dust, and mold, and manmade triggers such as chemicals. Not everyone is sensitive to these triggers, but many people are sensitive to some of them.
38. Black lung disease: is an illness in which coal miners' lungs become coated with coal dust, causing a chronic condition in which breathing becomes difficult and painful.
39. Bronchitis: an inflammation of the airways of the lungs, can be caused by breathing in certain chemicals or smoke. Welders and fire fighters are some of the people at risk for this condition. Smokers are also at increased risk for the development of bronchitis and lung cancer.
40. Breathing asbestos (a natural mineral fiber): can lead to asbestosis, a severe lung disorder, and lung cancer. Schools, homes, and businesses that have asbestos in them as a fire retardant put people at risk when the asbestos dust begins to leak into the air during repairs and renovations. These buildings used asbestos in the walls and ceilings as insulation before laws were passed to ban their use.
41. Silicosis: is a lung disease caused by exposure to the silica dust in clay. Pottery workers are at risk of developing this disease.
42. Sick Building Syndrome: Sick Building Syndrome describes an elusive health problem in which people attribute a variety of symptoms to the buildings where they work. Common complaints include headaches, dizziness, nausea, tiredness, concentration problems, sensitivity to odors, dry itchy skin, a dry cough, and irritated eyes, nose, and throat.
43. Malaria: is a mosquito-borne infectious disease of humans caused by eukaryotic protists of the genus *Plasmodium*.
44. Chagas disease: Caused by parasites, typically contracted by American's visiting Mexico. The acute phase lasts for the first few weeks or months of infection. It usually occurs unnoticed because it is symptom free or exhibits only mild symptoms that are not unique to Chagas disease. These can include fever, fatigue, body aches, headache, rash, loss of appetite, diarrhea, and vomiting.
45. Lyme disease: Lyme disease is the most common tick-borne disease in the Northern Hemisphere. *Borrelia* is transmitted to humans by the bite of infected ticks belonging to a few species of the genus *Ixodes* ("hard ticks"). Early symptoms may include fever, headache, fatigue, depression, and a characteristic circular skin rash called erythema migrans.

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46. African Sleeping sickness: caused by a parasite, fever, headaches, joint pains, and itching. Invasion of the circulatory and lymphatic system by the parasites is associated with severe swelling of lymph nodes, often to tremendous sizes
47. AIDS: a disease of the human immune system caused by the human immunodeficiency virus (HIV). This condition progressively reduces the effectiveness of the immune system and leaves individuals susceptible to opportunistic infections and tumors.
48. Hepatitis: is a medical condition defined by the inflammation of the liver and characterized by the presence of inflammatory cells in the tissue of the organ.
49. West Nile: WNV produces three different outcomes in humans. The first is an asymptomatic infection; the second is a mild febrile syndrome termed West Nile Fever; the third is a neuroinvasive disease termed West Nile meningitis or encephalitis.
50. SARS : Initial symptoms are flu-like and may include: fever, myalgia, lethargy, gastrointestinal symptoms, cough, sore throat and other non-specific symptoms. The only symptom that is common to all patients appears to be a fever above 38 °C (100.4 °F). Shortness of breath may occur later.
51. Coliform bacteria: are a commonly-used bacterial indicator of sanitary quality of foods and water. While coliforms are themselves not normally causes of serious illness, they are easy to culture and their presence is used to indicate that other pathogenic organisms of fecal origin may be present. Fecal pathogens include bacteria, viruses, or protozoa and many multi-cellular parasites.
52. Ebola: look it up!

#### Section 4: Documentaries

**CHOOSE TWO DOCUMENTARIES ON DIFFERENT TOPICS TO WATCH:** Documentaries must be a minimum of 45 minutes in length. Documentaries should look at Environmental ISSUES, not just nature. Please complete the following for EACH Documentary. Type the information (12 font).

- Provide the name of the documentary and year in which it was released.
- Describe any questions you may have as a result of your viewing (3 Questions Minimum)
- Describe your opinion of the documentary – positive/negative/neutral. Reference items in the documentary to support your thoughts. (Minimum 1 paragraph- 8 sentences/paragraph)
- Relate what you have learned to your personal life – how does it affect/impact you? What information affected you the most? Will it impact how you live your life? (Minimum 1 paragraph- 8 sentences/paragraph)
- Choose **one** documentary and design a unique movie poster and slogan for it (8X11 COMPUTER PAPER SIZE). Your movie poster should be colorful, neat, and include an original slogan that identifies the take home message of the film. Then justify and defend your poster /slogan (Minimum 1 paragraph- 8 sentences/paragraph)

**Suggested Documentaries** - many can be found on NetFlix, Amazon Instant Video, or some even stream on the web.

National Geographic: Human Footprint Flow: For the Love of Water

National Geographic: Six Degrees Could Change the World

180° South

King Corn

Who Killed the Electric Car/Revenge of the Electric Corn

Manufactures Landscapes

Vanishing of the Bees

Blue Gold: World Water Wars

World in Balance: The Population Paradox

Planet in Peril

Empty Oceans, Empty Nets (PBS)

Harvest of Fear (Frontline)

Dirt

Trapped

Food, Inc.

Fresh

Fuel

Bag It

Baraka

Trashed

Plastic Planet

An Inconvenient Truth

The Cove

Hawaii: Message in the Waves

**Checklist:**

Please place this completed checklist at the **front** of your assignment before you turn it in. I will score your work, but this ensures you have completed all components. Turn in first week of school in August- room 2802.

Name \_\_\_\_\_

Semester: 1<sup>st</sup> or 2<sup>nd</sup> Circle your semester

**Section 1: Score \_\_\_\_\_/59**

- I have shown ALL of my work.
- I have NOT used a calculator.
- I have read through the math review material and understand how to solve these types of problems.
- I have completed all of the review problems and am ready to take a math quiz.

**Section 2: Score \_\_\_\_\_/33**

- I have watched the entire video
- I have typed all my answers and they are thorough

**Section 3: Score \_\_\_\_\_/53**

- I have hand written all of the legislation and diseases listed on index cards.
- I have placed all cards on a binder ring with my name on it

**Section 4: Score \_\_\_\_\_/24**

- I have completed all of the written components for EACH documentary.
- I have completed a movie poster and slogan on one documentary
- I have typed a paragraph defending my poster/slogan

Signature: \_\_\_\_\_

Date: \_\_\_\_\_