# AP Environmental Science(APES) Summer Assignment

Welcome to APES at Lake Central High School!!

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. This class is for the student that is willing to do work and challenge themselves in the process. **If you do not complete the summer work, your participation in this class will be denied.**

Please note that these assignments will be collected for a grade at the end of the ***first week*** of school. Please assemble all materials in a binder with dividers. All materials should be typed (except the math). Once school has started you will be required to use Canvas and be a part of the class. If you have questions or need any guidance, please email me at **julieshupryt@lcscmail.com**. I hope that you have an enjoyable, exciting, and educational summer! I look forward to meeting you and for some of you seeing you again in August! We are going to have a fun and memorable time together in APES! -

*Mrs. Shupryt*

Below are the tasks you should complete this summer. All final materials should be ***typed, and assembled in order in a binder with dividers*** to be handed in at the end of the ***first week of school.***

## 1. Environmental Surveys / Ecological Awareness

a. Got to: http://www.h2oconserve.org/ or http://www.gracelinks.org/824/water-program and complete the water footprint calculator. Record how much water you use as a family and as an individual. Print your results. Submit your results to the teacher in your binder.

b. Go to: http://www.nature.org/greenliving/carboncalculator/index.htm and find your individual carbon footprint.
Print your results. Submit your results to the teacher in your binder.

c. Go to: http://www.myfootprint.org/ and find your ecological footprint. (For # 2 - use the U.S. Measurement System). This site does cost $1. If you would like to save money, go to http://footprint.wwf.org.uk/ or http://footprintnetwork.org/en/index.php/GFN/page/calculators/ and find your ecological footprint. You might have to convert your information to the metric system. Print your results. Submit your results to the teacher in your binder.

## 2. Tragedy of the Commons

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?
c. Is the "Tragedy of the Commons" unavoidable?
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.

## 3. Brush Up Your Math Skills

Math Assignment - Please complete the following problems, showing all work. ***This assignment does not have to be typed. MUST SHOW ALL WORK! NO WORK = NO CREDIT.***

a. You may someday purchase a house that has 2500 square feet of living space. How many square meters of living space is this?

b. If a calorie is equivalent to 4.184 joules, how many joules are contained in that 250 kilocalorie slice of pizza?

c. A coal-fired electric power plant produces 12 million kilowatt-hours (kWh) of electricity each day. Assume that an input of 10,000 BTU's of heat is required to produce an output of one kilowatt-hour of electricity.

d. Calculate the number of BTU's of heat needed to generate the electricity produced by the power plant each day.

e. Calculate the pounds of coal consumed by the power plant each day, assuming one pound of coal yields 5,000 BTU's of heat.

f. If a city of 10,000 experiences 200 births, 60 deaths, 10 immigrants, and 30 emigrants in the course of a year, what is its net annual percentage growth rate?

g. What is 45% of 900?

h. Thirteen percent of a 12,000 acre forest is being logged. How many acres will be logged?

i. Home prices have dropped 5% in the past three years. An average home in Schererville three years ago was $200,000. What's the average home price now?

j. A teenager consumes 20% of her calories each day in the form of protein. If she is getting 700 calories a day from protein, how many calories is she consuming per day?

k. 1300 kilograms = ? milligrams
17000 millimeters = ? meters
680 hectometers = ? centimeters
6544 liters = ? milliliters
.078 kilometers = ? meters
17 grams = ? kilograms

l. Write the following numbers in scientific notation:

145,000,000,000
13 million
435 billion
.000348
135 trillion
24 thousand

m. Complete the following calculations.

$(3 \times 10^3) + (4 \times 10^3)$
$(4.67 \times 10^4) + (323 \times 10^3)$
$(1.278 \times 10^{13}) - (1.021 \times 10^{10})$
$(2.9 \times 10^{11}) - (3.7 \times 10^{13})$
$(1.32 \times 10^8) \times (2.9 \times 10^2)$
$(3.78 \times 10^3) \times (2.34 \times 10^4)$
$(3.45 \times 10^9) / (2.6 \times 10^3)$
$(1.98 \times 10^{-4}) / (1.72 \times 10^{-6})$

n. Graphing Problem: The thickness of the annual rings indicate what type of environmental situation was occurring at the time of its development. A thin ring, usually indicates a rough period of development, lack of water, forest fires, or a major insect infestation. On the other hand, a thick ring indicates just the opposite.

| Age of the tree in years | Average thickness of the annual rings in cm. Forest A | Average thickness of the annual rings in cm. Forest B |
|---|---|---|
| 10 | 2.0 | 2.2 |
| 20 | 2.2 | 2.5 |
| 30 | 3.5 | 3.6 |
| 35 | 3.0 | 3.8 |
| 50 | 4.5 | 4.0 |
| 60 | 4.3 | 4.5 |

1. Make a line graph of the data.
2. What is the dependent variable?
3. What is the independent variable?
4. What was the average thickness of the annual rings of 40 year old trees in Forest A?
5. Based on this data, what can you conclude about Forest A and Forest B?

## 4. Think Global: Watch THREE Environmental Documentaries

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.

a. Provide the name of the documentary and year in which it was released.
b. Describe any questions you may have as a result of your viewing (3 Questions Minimum)
c. Describe your opinion of the documentary – positive/negative/neutral. Reference items in the documentary to support your thoughts. (Minimum 1 paragraph)
d. 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)
e. Choose one documentary and design a unique movie poster and slogan for it. Your movie poster should be colorful, neat, and include a slogan that identifies the take home message of the film. Then justify and defend your poster /slogan (Minimum 1 paragraph)

*****Suggested Documentaries - many can be found on NetFlix, Amazon Instant Video, at your local library, or some even stream on the web, for example: http://www.youtube.com, below is a list to help you get started:
* National Geographic: Human Footprint
* National Geographic: Six Degrees Could Change the World
*180° South
* Flow: For the Love of Water
* Tapped
* Trashed
* Food, Inc.
* King Corn
* Dirt
* Gasland
* Who Killed the Electric Car / Revenge of the Electric Car
* Manufactured Landscapes
* Vanishing of the Bees
* Fresh
* Fuel
* Bag It
* Baraka
* Blue Gold: World Water Wars
* World in Balance: The Population Paradox
* Plastic Planet
* Planet in Peril
* An Inconvenient Truth
* Empty Oceans, Empty Nets (PBS)
* Harvest of Fear (Frontline)
* The Cove
* Hawaii: Message in the Waves

* Cane Toads: An Unnatural History
*Cowspiracy
*Fresh
*The Human Experiment
* True Cost

## 5. Ecological Literature

*To get us started thinking about the environment we are going to do some reading over the summer. I have chosen a list of books that are all well known and pertain to this course. As we go through the course you will find yourself thinking about what you read and relate it to what we are learning. Your job this summer is to* ***choose one*** *of the books from this reading list and* ***do the following assignment****:*

1. *Write down the title, author and publisher of the book.*
2. *Then as you read you are going to keep a daily journal of what you read. Include the dates and page numbers in the journal*
3. *Write down any important information and take notes on what you read that day. Also write down any new vocabulary words that you do not understand.*
4. *Respond to the reading. Write down any feelings that you have about the reading, positive or negative, in the journal.*
5. *Lastly, write a one page summary about how you felt about the book, was it a good book? Would you recommend it to others? What information affected you the most? How do you think it will relate to this course?*
6. *This will be due at the end of the first week of school.*

AP Environmental Science Suggested Reading List

| Title | Author |
|---|---|
| A Civil Action | Jonathan Harr |
| A Fierce Green Fire | Philip Shabecoff |
| A Green History of the World | Clive Pointing |
| A reason for Hope | Jane Goodall |
| Atmosphere, Climate and Change | Thomas Graedel and Paul Crutzen |
| Biogeochemistry of a Forest Ecosystem | Gene Likens |
| Cadillac Desert | Marc Reisner |
| Changes in the Land | William Cronon |
| Climate Change: The IPCC Scientific Assessment | J.T. Houghton et al. |
| Deep Ecology | Bill Devall |
| Degrees of Disaster: Prince William Sound | Jeff Wheelwright |
| Desert Solitaire | Edward Abbey |
| Digging Dinosaurs | John Horner |
| Earth in Mind | David Orr |
| Earth in the Balance | Al Gore |
| Earth Under Siege | Richard P. Turco |

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| Ecology and the Politics of Scarcity | William Ophuls |
| Ecology, Economics, Ethics: The Broken Circle | Bonnann and Kellert |
| Eco-warriors | Rick Scarce |
| Encounters with the Archdruid | John McPhee |
| Endurance: Shackelton's legendary Antarctic Expedition | Caroline Alexander |
| Energy: From Nature to Man | William C. Reynolds |
| Extinction: Bad Genes or Bad Luck | David Raup |
| Field Guide to Nature Observation and Tracking | Tom Brown |
| Four Corners | Kenneth Brown |
| Gorillas in the Mist | Dianne Fossey |
| Green Delusions | Martin Lewis |
| Guns, Germs and Steel | Jared Diamond |
| How Many People Can the Earth Support? | Joel E. Cohen |
| In the Shadow of Man | Jane Goodall |
| Into the Wild | Jon Krakauer |
| Into Thin Air: Personal Account of the Mt Everest Disaster | Jon Krakauer |
| Isaac's Storm | Eric Larson |
| Ishmael | Daniel Quinn |
| Last Refuge: Environmental Showdown in the American West | Jim Robbins |
| Life in the Balance: Humanity and the Biodiversity Crisis | Niles Eldridge |
| Living Downstream: Cancer and the Environment | Sandra Steingraber |
| Mad, Mad, Mad World of Climatism | Steve Goreham |
| No Turning Back | Richard Ellis |
| Ocean's End | Colin Woodward |
| Of Wolves and Men | Barry Lopez |
| Omnivore's Dilema | Michael Pollan |
| On Human Nature | E.O. Wilson |
| Our Common Future | World Comm. On Env. and Devel. |
| Our Ecological Footprint | Wackernagel and Rees |
| Out of Gas: The End of the Age of Oil | David Goodstein |
| Pilgrim at Tinker Creek | Ann Dillard |
| Prisoner's Dilemma | William Poundstone |
| Red Sky at Morning | James Gustave Speth |
| Replenish the Earth | Lewis Regebstein |
| Sand County Almanac | Aldo Leopold |
| Silent Spring | Rachel Carson |
| Silent Snow | Marla Cone |
| Sociobiology | E.O. Wilson |
| Strange Encounters | Daniel Botkin |
| Surely You're Joking Mr. Feynmann? | Richard Feynmann |
| Tales of the Shaman's Apprentice | Mark Plotkins |
| The Burning Season | Andrew Revkin |
| The Cold and the Dark: The World After Nuclear War | Carl Sagan, Paul Ehrlich et al |
| The Coming Plague | Laurie Garrett |
| The Condor's Shadow | David S. Wilcove |
| The Control of Nature | John McPhee |

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| The Cowboy Way | David Mc Cumber |
| The Dinosaur Heresies | Robert Bakker |
| The Diversity of Life | E.O. Wilson |
| The End of Food | Paul Roberts |
| The End of Nature | Bill McKibben |
| The Future of Life | E.O. Wilson |
| The Heat is On: Climate Crisis | Ross Gelbspan |
| The Limits to Growth - 2nd Edition | Donella Meadows |
| The Monkey Wrench Gang | Edward Abbey |
| The Naturalist | E.O. Wilson |
| The Night of the Grizzlies | Jack Olsen |
| The Perfect Storm | Sebastian Junger |
| The Population Bomb | Paul Ehrlich |
| The Population Explosion | Paul and Anne Ehrlich |
| The Sand Dollar and the Slide Rule | Delta Willis |
| The Sixth Extinction | Richard Leakey |
| The Solace of Open Spaces | Gretel Ehrlich |
| The Song of the Dodo | David Quammen |
| The Stork and the Plow | Paul Ehrlich |
| The Warning: The Accident at Three Mile Island | Mike Gray and Ira Rosen |
| Three Scientists and Their Gods | Robert Wright |
| Tinkering with Eden | Kim Todd |
| Tracking the Vanishing Frogs | Kathryn Phillips |
| Walden Pond | Henry Thoreau |
| Why People Believe Weird Things | Michael Shermer |
| Where Mountains are Nameless: ANWR | Jonathon Waterman |
| Wolves of Isle Royale | Rolk Peterson |

Also:
Any books by Carl Sagan,
Stephen J. Gould, E. O. Wilson and Edward Abbey

*** Be prepared to discuss all your experiences from these assignments****