

Welcome to AP Environmental Science!

SUMMER ASSIGNMENT

**** Due Friday, September 14th ****

You are expected to uphold the highest level of academic integrity when completing all assignments in this course.

1. Sign up for our google classroom using the code: **mhz2wg5**
2. Take notes on chapters 1, 2, and 20
 - Our textbook is “Environmental Science for AP” by Friedland and Relyea.
 - A PDF of each chapter can be found on our google classroom.
 - For each chapter I’ve provided you with a detailed outline of the information I expect you to include in your notes.
 - You are expected to take **HANDWRITTEN** notes. Typed notes will not be accepted.
3. Graphing assignment
 - For each data set, be sure to graph the data using the appropriate kind of graph and answer all of the accompanying questions.
4. Math Review
 - For the Math portion of the assignment, please be sure to **SHOW ALL WORK**, and do **NOT** use a calculator! These problems were designed to be solvable without a calculator because you **cannot use a calculator on the AP Environmental Science exam.**

**All work must be handwritten.
No typed work will be accepted**

Email me at calbanesedemair@shsd.org with questions – I will do my best to respond promptly

Chapter 1: Environmental science: Studying the state of our earth

Be sure to include the following			
Your name	Chapter number & title	At least 2 drawn figures	At least 3 colors

- Opening case study: To frack, or not to frack
 - What is fracking?
 - What are the advantages of fracking? Why do we do it?
 - What are the environmental advantages of fracking?
 - What are the environmental consequences of fracking?
 - How is fracking an example of tradeoffs that are a part of every environmental issue?
- Module 1: Environmental science
 - Define the field of environmental science and discuss its importance
 - What is a system?
 - What do environmental scientists do?
 - Contrast environmental scientists with environmental activists
 - Identify ways in which humans have altered and continue to alter our environment
 - Explain two negative impacts humans have had on our environment
 - Explain one positive impact humans have had on our environment
 - How has the growing human population impacted the environment?
- Module 2: Environmental indicators and sustainability
 - Identify key environmental indicators and their trends over time
 - How do environmental scientists use environmental indicators?
 - What can't environmental indicators tell us?
 - What are the five global scale environmental indicators?
 - Summarize each of the three types of biodiversity
 - How are they measured?
 - How have they changed over time?
 - How has food production changed over time?
 - How has global surface temperature changed over time?
 - How have global carbon dioxide concentrations changed over time?
 - How has the population size of humans changed over time?
 - How has our natural resource consumption changed over time?
 - How are developed and developing countries different in their consumption of resources
 - Define sustainability and explain how it can be measured using the ecological footprint
 - What is sustainability?
 - Summarize the cautionary story from Easter Island
 - What are the three principals of living sustainably?
 - Why does biophilia make sustainable development a necessity?
 - Discuss how lifestyle choices impact a person's ecological footprint
- Module 3: Scientific method
 - Summarize the scientific method
 - What is a null hypothesis?
 - Why is having a small sample size a problem?
 - Why do experiments need a control group?
 - How are natural experiments different from controlled experiments?
 - Summarize the unique challenges and limitations of environmental science
 - Why does environmental science lack baseline data?
 - What challenge does the lack of baseline data present?
 - Why is it hard for environmental scientists to determine what is better for the environment?
 - How does poverty affect whether or not people are concerned about the environment?
- Working toward sustainability: Using environmental indicators to make a better city
 - How do the indicators used by a city differ from global indicators?

Chapter 2: Environmental systems

Be sure to include the following

Your name

Chapter number & title

At least 2 drawn figures

At least 3 colors

- Opening case study: A lake of salt water, dust storms, and endangered species
 - Summarize what happened to California's Mono Lake.
 - How is this example of a single change in an ecosystem having ripple effects?
- Module 4: Systems and matter
 - Describe how matter comprises atoms and molecules that move among different systems
 - What's the difference between an atom and a molecule/compound?
 - Describe the structure of an atom
 - How are radioactive isotopes different from other atoms?
 - How are hydrogen bonds different from covalent or ionic bonds?
 - How is a polar molecule different from a nonpolar molecule?
 - Explain why water is an important component of most environmental systems
 - Explain the unique qualities of water (surface tension, capillary action, boiling and freezing point, and universal solvent)
 - Discuss how matter is conserved in chemical and biological systems
 - What's the difference between organic and inorganic compounds?
 - What atoms are important for living things (hint: they comprise the carbohydrates, proteins, nucleic acids, and lipids in our bodies)?
 - What's bigger: an atom or a cell? By how much?
- Module 5: Energy, flows, and feedbacks
 - Distinguish among various forms of energy and understand how they are measured
 - Give an example of a type of potential energy.
 - Give an example of a type of kinetic energy.
 - Explain how energy is converted by living things
 - Discuss the first and second laws of thermodynamics and explain how they influence environmental systems
 - What's the difference between high quality and low quality energy?
 - How is entropy affected as energy is converted from one form to another?
 - Explain how scientists keep track of energy and matter inputs, outputs and changes to environmental systems
 - What's the difference between an open and closed system?
 - Give an example of an open system
 - Give an example of a closed system
 - How are negative and positive feedback loops different?
 - Give an example of a negative feedback loop
 - Give an example of a positive feedback loop
- Working toward sustainability: Managing environmental systems in the Florida Everglades
 - Why are the Florida Everglades environmentally significant?
 - What problem is occurring in the Everglades?
 - What solution are environmental scientists proposing?
- Science Applies: What happened to the missing salt?
 - What is a terminal lake?
 - Why is the water of Mono Lake not as salty as expected?

Chapter 20: Sustainability, economics, and equity

Be sure to include the following

Your name	Chapter number & title	At least 2 drawn figures	At least 3 colors
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- Opening case study: Assembly plants, free trade, and sustainable systems
 - How have the US, Canada, and Mexico benefitted from NAFTA?
 - How have Mexican people been negatively impacted by NAFTA?
 - What three things priorities have to be balanced to establish sustainable development?
- Module 65: Sustainability and economics
 - Explain why efforts to achieve sustainability must consider both sound environmental science and economic analysis
 - What factors influence demand?
 - How does price affect supply?
 - What is an externality?
 - What are the externalities of supplying energy from burning coal?
 - What four types of spending does GDP measure?
 - How is GDP different between developing and developed countries?
 - How is GPI different from GDP?
 - Summarize the Kuznets curve
 - Explain how leapfrogging is advantageous for developing nations
 - Describe how economic health depends on the availability of natural capital and basic human welfare
 - How are externalities an example of market failure?
 - How can we make our current economy more sustainable?
- Module 66: Regulations and equity
 - Explain the role of agencies and regulations in efforts to protect our natural and human capital
 - What is environmental stewardship?
 - Contrast the precautionary principle with the innocent-until-proven-guilty principle
 - What international agreement was made based on the precautionary principle? What did this agreement aim to eliminate?
 - What is the goal of the UNEP?
 - What three important treaties did the UNEP negotiate?
 - What are the four goals of the World Bank?
 - What criticism do environmentalists make of the World Bank?
 - What are the five key objectives of the WHO?
 - What are NGOs? Identify 2 examples.
 - What impact did the Santa Barbara oil spill have?
 - What impact did Rachel Carson's *Silent Spring* have?
 - What does the EPA do?
 - What does OSHA do?
 - What does the DOE do?
 - Describe the approaches to measuring and achieving sustainability
 - What does the HDI measure? How are these measure different between developing and developed countries?
 - What does the HPI measure? How are these measures different between developing and developed countries?
 - What is the purpose of the following laws:
 - NEPA
 - OSHA
 - ESA
 - CAA
 - CWA
 - RCRA
 - CERCLA
 - Discuss the relationship among sustainability, poverty, personal action, and stewardship
 - How does poverty affect use of land, degradation of water, and disease incidence
 - Give an example of an environmental injustice
- Working toward sustainability: Reuse-a-sneaker
 - What are the negative aspects of Nike's manufacturing process?
 - What sustainable practices has Nike employed?
 - What are some obstacles that prevent companies from adopting sustainable practices?
- Science applied: Can we solve the carbon crisis using cap-and-trade?
 - Explain the command-and-control approach to restricting CO2 emissions
 - Explain the cap-and-trade approach to restricting CO2 emissions
 - What are the advantages to using carbon offset strategies?
 - What are the disadvantages to using carbon offset strategies?
 - Summarize one example where cap-and-trade was a success

Graphing Assignment

Directions: Use the following steps to create graphs and answer questions for each of the problems below.

Steps to graphing data:

1. Identify the variables. The independent variable is controlled by the experimenter. The dependent variable changes as the independent variable changes. The independent variable will go on the X axis and the dependent on the Y axis.
2. Determine the variable range. Subtract the lowest data value from the highest data value.
3. Determine the scale of the graph. The graph should use as much of the available space as possible. Each line of the scale must go up in equal increments.
4. Number and label each axis.
5. Plot the data. If there are multiple sets of data on one graph, use a different color for each.
6. Either draw a smooth, best-fit line for the data set or connect the data points with a straight line. You will need to determine on your own which is more appropriate.
7. Title the graph. Titles should explain exactly what the graph is showing and are often very long (almost a whole sentence). Don't be afraid of a long title!
8. Create a key to the graph if there is more than one set of data

Name: _____

APES BASIC MATH SKILLS

Directions: DO NOT use a calculator! These problems have been set up with numbers that multiply and divide evenly to produce whole number answers, just like you would find on a typical APES exam.

1. 14000 millimeters = _____ meters

2. 6544 liters = _____ milliliters

3. 0.078 kilometers = _____ meters

4. 17 grams = _____ kilograms

5. Put the following in scientific notation:

a. 0.025 = _____ b. 1150000 = _____ c. 6070 = _____

**** SHOW YOUR WORK FOR ALL OF THE FOLLOING PROBLEMS ****

6. Write your 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. $(2 \times 10^5) * (3 \times 10^{10}) =$ _____

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

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

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

g. $(2 \times 10^5) * (3 \times 10^{-10}) =$ _____

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

