

AP ENVIRONMENTAL SCIENCE Summer of 2026

Parts 1, 2, & 3 of this assignment will be due the SECOND week of school. The specific due date will be given during your first class period. **Part 4** is due on the first day of class. A full introduction to the class will be provided via the class syllabus, which will be available both at Open House and the first day of school.

Supplies

- 3-ring binder (this can stay at home)
- 5 tabbed dividers for binder – Unit Info, FRQs, Summaries, Math, Lists
- Loose-leaf paper
- Pen **and** pencil
- Laptop

Part 1 – An Introduction to APES

The following questions are your study guide for your first quiz, to be given the second week of school. Answers to these questions will not be collected.

Use the following websites to find the answers to most of the questions:

http://apcentral.collegeboard.com/apc/members/exam/exam_information/228876.html

http://apcentral.collegeboard.com/apc/public/exam/exam_information/2003.html

<http://media.collegeboard.com/digitalServices/pdf/ap/ap-environmental-science-course-description.pdf>

<https://apstudent.collegeboard.org/creditandplacement/search-credit-policies>

1. What is the date of the national exam? The day of the week? The time?
2. How many multiple-choice questions are there on the exam? How long do you have to answer them? What percentage of your final score is based on the multiple-choice portion of the exam?
3. How many free-response questions (FRQs) are on the exam? What three types do they fall into? What percentage of your final score is based on the FRQ portion of the exam?
4. What is the calculator policy for the national exam?
5. How many answer choices are present for each multiple-choice question on the national exam?
6. What is the first year for which you can find posted FRQs from the APES national exam?
7. On the appropriate website, scroll down to the section labeled “2015: Free-Response Questions.” What was the approximate range of scores for the FRQs given that year? How many points are possible for each FRQ? How many sample student responses are posted for each FRQ?
8. According to the Topic Outline, how many major topics are covered in APES? Which single topic will appear in the most multiple-choice questions on the national exam? What percentage of the multiple-choice questions will pertain to this topic?
9. List the credit policy for APES for the following schools: University of Florida, Florida State University, University of South Florida, University of Central Florida, Florida Atlantic University, Florida Gulf Coast University, Harvard University. Specifically, note what minimum APES score will earn credit at these institutions.
10. List three reasons to take an AP class at SBA other than earning a passing grade on the national exam for college credit. “There was an open spot in my schedule” or other response that does not directly benefit you in some way is not acceptable.

Part 2 – The Tragedy of the Commons

Familiarize yourself with the story called “The Lorax.” You can use any of the following resources to do so:

Book – “The Lorax” by Dr. Seuss – available at public libraries, or read to you here

<https://www.youtube.com/watch?v=aKmbSJjXzFk>

Original video – “The Lorax” - <https://www.youtube.com/watch?v=8V06ZOQuo0k>

Updated movie – “The Lorax” – available for rent/purchase on sites like amazon.com, or in stores, or via a public library

Answer the following questions. Some answers will be reproduced in class while others will be discussed. You will be graded on your ability to discuss all questions, so interacting with material yourself rather than copying answers will greatly enhance your ability to receive a high discussion grade. The principles behind all questions will serve as the basis for one of your first writing prompts.

1. The story follows the Once-ler’s efforts to grow his thneed business. His growing enterprise has a variety of negative consequences on the local ecosystem, beyond the cutting down of truffula trees. Name two specific impacts the Once-ler has on the ecosystem. Each impact should have two parts – what the Once-ler is doing/producing that has the impact, and the specific impact itself. Do NOT consider the loss of truffula trees as one of your impacts.
2. The phrase “The Tragedy of the Commons” comes from a magazine article written by Garrett Hardin in 1968. The events detailed in “The Lorax” could be considered a “tragedy of the commons.” Use the following article to enhance your understanding of this term and how it applies to environmental science.
 - a. How did Thomas Malthus predict that human populations would naturally grow? According to the article, population growth must eventually do what?
 - b. According to Adam Smith’s *The Wealth of Nations*, how do decisions made by individuals affect the entire society? Identify the key phrase Smith used to describe how individual and public interests coincide.
 - c. Garrett Hardin offers a rebuttal to Smith’s theory using a scenario put forth by William Forster Lloyd as well as his own evidence. Describe the scenario Hardin uses to describe “the tragedy of the commons” – identify his example, how the individuals in the scenario typically act, and the impacts of individual actions on the common area. Define what a “common” in “the tragedy of the commons” is.
 - d. When was this article written? Do you see any examples of “the tragedy of the commons” in modern times? Describe such a situation not described in the article.
 - e. In the “Pollution” section of the article, Hardin states that “the rational man finds that his share of the cost of the wastes he discharges into the commons is less than the cost of purifying his wastes before releasing them.” In the United States, we have safeguards in place to counteract this “rational” chain of logic. Research, name and describe a specific example of something which prevents industries from dumping their waste into our common air, water, and/or land.
 - f. Research the meaning of the word “fecundity.” Write a definition of the word.
3. The Once-ler harvests truffula trees without any restrictions until they are all gone. Describe one ecosystem service that trees provide to humans. Describe one way that would have prevented this tragedy from happening. (Consider that banning the Once-ler from cutting down any trees at all would keep him from having a business, so this is not a viable answer.) Describe one way to remediate (fix) the loss of the truffula forest.

Part 3 – Your Ecological Footprint

Go to <http://www.footprintnetwork.org/en/index.php/GFN/page/calculators/> and complete the footprint activity to the best of your ability using accurate information. Although you are welcome to use the detailed setting, you only need use the basic setting for this exercise. Screenshot or write down your results so you can share them via a Chromebook assignment which will be given on Day 1. Information to record includes: number of planets to support your lifestyle if everyone lived like you, number of acres of land to support your lifestyle, number of tons of carbon dioxide produced by your lifestyle, percent of your footprint accounted for by the food you eat.

In your ecological footprint results is a link called “Explore Scenarios.” Record what would happen to your Planet Earth Resources count if you reduced the amount of animal products you eat AND purchased products that use less packaging. In other words, record how many planets would be needed to support your lifestyle if you did these two things. If you know how, take a screenshot of your results.

Go back and take the quiz again, this time selecting India as your home country. Take the quiz as if you were the average person in India – a poor vegetarian living without developed world amenities (electricity, personal car, etc.) in a large family unit. (For your reference, one kilometer is about 0.6 miles.) Record the number of planets it would take to support your lifestyle. If you know how, take a screenshot of your results.

There will be a writing assignment attached to this activity, as well as the submission of your results. To prepare yourself for the writing prompt, consider the following: there is only one planet upon which all humans will spend their entire lives, the planet is a closed system in terms of resources, compare/contrast the use of these resources in developed countries like the US vs developing countries like India, compare/contrast the reasons for resource use in developed vs developing countries.

Part 4 Math

APES students have a wide range of math skills coming into the class and certain “basics” will be assumed as we move through the year. Most students find some part of the math challenging (from the scientific notation, to always writing out the set-up of the problem with units, to remembering their multiplication facts!) All of the concepts on this sheet will be used repeatedly over the course of the year, and all will be done without calculators. Really. (The AP exam does allow calculators.) If you have any hesitation on any part of this review, you will need to do some independent work with whatever resources you find most helpful. This will be **due on the first day of class**. You will have a quiz over this material within the first week of class.

Contents : Decimals, Percentages, Metric Units, Scientific Notation, Dimensional Analysis

DIRECTIONS

1. For this assignment, you'll need to **show me all your work done by hand**, even if it's something really simple. This is both to practice without using a calculator, and to practice making it legible enough for me. **Please do all your work on a separate sheet of paper.**
2. In problems involving unit conversions, always show the full initial set-up WITH UNITS. On the APES exam, the set-up with units is required (not your multiplication or division work) so it will be required on all your assignments, labs, quizzes, and tests as well – and worth half of the points. We will practice typing with calculations later in the year.
3. Check your work. Go back through each step to make sure you didn't make any mistakes in your calculations. Also check to see if your answer makes sense. For example, a person probably will not eat 13 million pounds of meat in a year. If you get an answer that seems unlikely, it probably is. Go back and check your work.

WORKING WITH DECIMALS

During the year, you will only be required to show the set-up for a problem, but for this assignment, I want to see that you can do multiplication and long division, so please write out all of your work.

1. $125.93 \times 12 =$
2. $28.4 \times 9.78 =$

3. $64.5 / 5 =$
4. $113.85 / 34.5 =$

WORKING WITH PERCENTAGES

Still show all of your work.

5. What percentage of 162.5 is 26?
6. Thirteen percent of a 12,000 acre forest is being logged. How many acres will be logged?
7. You have driven the first 150 miles of a 2000 mile trip. What percentage of the trip have you traveled?
8. Home prices have dropped 10% in the past three years. An average home in Indianapolis three years ago was \$130,000. What's the average home price now? What would it be if the prices had fallen 5%?
9. A water heater tank holds 280 gallons. Twenty percent of the water is lost as steam. How many gallons *remain* to be used?
10. 240 acres, or 15%, of a forest is being logged. How large is the forest?

METRIC UNITS

The main point here is to show me you know how to figure these, not just to have the right answer. (I want to see your set-up with units cancelling.)

11. 14000 millimeters = ? meters
12. 1200 kilograms = ? grams

13. 100 megawatts = ? kilowatts
14. $17 \text{ m}^2 = ? \text{ mm}^2$

SCIENTIFIC NOTATION

Write the following numbers in scientific notation, and then complete the calculations below.

15. 145,000,000,000
16. 13 million
17. 435 billion
18. .000348
19. $3.7 \times 10^3 \times 3 \times 10^2$
20. $1.3 \times 10^8 \times 2.3 \times 10^4$
21. one thousandth of seven thousand
22. $3.6 \times 10^9 / 9 \times 10^3$
23. $1.9 \times 10^{-4} / 1.9 \times 10^{-6}$
24. The Greenland Ice Sheet contains 2,850,000 cubic kilometers of ice. It is melting at a rate of .006% per year. How many cubic kilometers are lost the first year?

DIMENSIONAL ANALYSIS

Dimensional analysis is a way to convert a quantity given in one unit to an equal quantity of another unit by lining up all the known values and multiplying. In APES it is often an integral part of a larger word problem, and there are often multiple ways to do the conversions. Just be sure that you see what you have to start with, and what you want to end with, and don't ignore or make up a unit to make it work! (Write out full set-up with units to see places to simplify the math.)

Conversions:

1 km = 0.62 mi

1 square mile = 640 acres

1 hectare (Ha) = 2.5 acres

1 kWh = 3,400 BTUs

1 barrel of oil = 160 liters

1 metric ton = 1000 kg

1 cubic meter = 1000 liters

1 gram water = 1 ml water

25. Sixty kilometers per hour = ? miles per hour
26. A city that uses 34 billion BTUs of energy each month is using how many kilowatt-hours (kWh) of energy?
27. A 2.5 million square mile forest is how many hectares?
28. If one barrel of crude oil provides 1.6 million BTUs of energy, how many BTUs of energy will one liter of crude oil provide?
29. Fifty eight thousand kilograms of solid waste is equivalent to how many metric tons?
30. If 5 mm of rain falls in a 100 m² field, what volume of rain, in m³, fell in the field?
31. If 20% of that rain ran off into the city stormwater drains, how many liters would that be? How many kg?
32. Between 1950 and 2000, global meat production increased from 52 billion kilograms to 240 billion kilograms. During this period, the global human population increased from 2.6 billion to 6.0 billion. Calculate the per capita meat production in 1950 and in 2000.
33. Use your answers from #32, to calculate the change in global per capita meat production during this 50-year period as a percentage of the 1950 value.