AP Environmental Science (APES)
Course Information

Course Description
Advanced Placement Environmental Science (APES) is designed to be the equivalent of a college-level semester course in Environmental Science. It will be demanding of your time**. Plan on devoting about 2-5 hours per week to homework for this class**. Consider this as you plan your schedule. Upon successful completion of the AP Exam in May, students can receive advanced placement college credit.

Class Prerequisites
- Completion of Integrated Science 1-4, or equivalent, with 2.75 GPA.
- Completion of, or concurrent enrollment in, Chemistry OR Physics
- Successful completion of Advanced Algebra is strongly recommended

Textbook: *Environmental Science 14th Edition* by Miller and Spoolman, 2013

Recommended Summer Reading
The books listed below are all directly related to environmental science. In addition to providing hours of entertainment, they are likely to add to your success in both the course and the AP exam. Choose one of the titles from the list below. Read it over the summer. You'll be glad you did ☺.

Casey,S (2005) *Devil's Teeth: A True Story of Obsession and Survival Among America's Great White Sharks*. New York: Holt

Hertsgaard, Mark (2011). *Hot: Living Through the Next Fifty Years on Earth*: Houghton Mifflin Harcourt

Kamkwamba, W & Mealer, B (2009) *The Boy Who Harnessed the Wind: Creating Currents of Electricity and Hope*. New York, New York: William Morrow

Pollan, Michael (2006). *The Omnivore's Dilemma*: A Natural History Of Four Meals. New York: Penguin Press

Roman, Joe (2011). *Listed: Dispatches from America's Endangered Species Act.* Cambridge: Harvard University Press

Course Overview

Topic	Chapter	Duration
Environmental Problems, Causes, and Sustainability	1	2 weeks
Science, Matter, And Energy	2	2 week
Ecosystems	3	2 weeks
Evolution and Biodiversity	4	2 weeks
Populations	5	2 weeks
Human Populations	6	2 weeks
Climate and Biodiversity	7	2 week
Sustaining Biodiversity – Species Approach	8	2 week
Sustaining Biodiversity – Ecosystem Approach	9	1 week
Food, Soil & Pest Management	10	3 weeks
Water Resources and Water Pollution	11	2 weeks
Geology & Non-Renewable Minerals	12	1 week
Energy	13	2 weeks
Environmental Hazards and Human Health	14	2 weeks
Air and Air Pollution, Climate Change and Ozone Loss	15	2 weeks
Solid and Hazardous Waste	16	2 weeks

Sample Free Response Question

The question below appeared on a previous AP Environmental Science Exam and is a good indication of the type of math expected in the course. Recommended time for completion is about 22 minutes. Since calculators are NOT permitted on the exam, you should attempt this problem without a calculator.

. Termites are social insects that are essential decomposers in tropical rain forest ecosystems. Termites may account for up to 95 percent of insect biomass in tropical rain forests. Termites consume vast amounts of dead and decomposing plant material, thanks to the work of mutualistic cellulose-digesting microorganisms that inhabit their guts. In addition to their roles as important decomposers, termites digest plant materials and directly contribute to carbon dioxide and methane emissions into the atmosphere. It is likely that, like many insect species, termites and their symbionts may be sensitive to changes in their microclimate caused by global climate change, especially with regard to temperature and humidity.

		Relative Humidity		
		50%	70%	90%
Temperature	20°C	0.04	0.05	0.05
	25°C	0.05	0.07	0.10
	30°C	0.12	0.13	0.27
	35°C	0.09	0.13	0.15
	40°C	0.00	0.00	0.00

(a) Respond to the following using the data in the table above, which gives the rate of wood consumption by termites, in mg per day per termite, under various temperature and relative humidity conditions. Under optimal conditions, the emission rate of methane by termites is approximately 70 kilograms of CH_4 per year per 1,000 termites.

(i) According to the data, what are the optimal temperature and relative humidity for termite activity?

(ii) Given a density of 4.5×10^7 termites per hectare and optimal conditions, calculate the annual amount of methane emitted, in kilograms, by the termites inhabiting a 2,000-hectare tropical rain forest.

(iii) Suppose the temperature increases to 35°C and the relative humidity decreases to 50 percent. Using the data provided, determine the amount of methane, in kilograms, that would be emitted by the termites in the 2,000-hectare tropical rain forest.

(iv) Explain why the population size of termites is also affected by temperature and humidity.

(b) It has been observed that soon after a tropical rain forest is cleared, termite density increases to an estimated 6.8×10^7 termites per hectare. Thereafter, the termite population size decreases dramatically.

(i) What is the most likely reason that the density of the termites increases when a tropical rain forest is cleared?

(ii) Why do the termite populations eventually decrease dramatically?

(c) Describe one way, other than changes in termite activity, that tropical rain forest destruction contributes to anthropogenic climate change.