

AP ENVIRONMENTAL SCIENCE SUMMER ASSIGNMENT

Welcome! AP Environmental Science is a vast, interdisciplinary course that is designed to examine biological, chemical, physical, ecological, and environmental concepts. I am giving this work to you for the same reason I hope you signed up for the class...to open your mind to the world around you.

This course is designed to help you identify and analyze environmental problems, both natural and man-made, evaluate the risks associated with them, and examine solutions to prevent them from causing lasting damage.

Watch for an invitation to your AP Enviro Google Classroom. Turn on notifications so you don't miss any posts.

The written work assigned here will be due on the first day of school in September. It can be typed or handwritten, but please keep it organized. If you have any questions, you can email us at tkwerner@jacksonsd.org or dchristensen@jacksonsd.org.

Assignments (4 parts = 100 points):

1. Current events in Environmental science (30 points). On some of the days you're not out exploring the world, find an article about an environmental issue. The more local the better, but if something big happens elsewhere...great. Summarize the article in one to two paragraphs, and then write a two to three paragraph response to the article: questions, opinions, impacts, relevance to our class, etc. ***Minimum of 3 articles (summary and responses for each article should be about 1 full page).***

2. Read a book (20 points). One is assigned below, but feel free to read more. Nothing in the world is a better measure of how successful you will be in life than how much you read.

Toms River: A Story of Science and Salvation (Fagin, 2013).


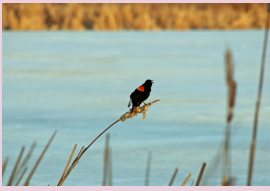
This book should hit close to home...it's just down the road. Discuss it with your parents, family, etc. See what they recall, experienced, felt, etc. Keep a journal as you read, either typed or handwritten. After you have completed each chapter, explain the heading given to each chapter, summarize the chapter, and add your personal thoughts on the chapter. ***Two to three paragraphs per chapter will be appropriate.***

3. Explore your world (30 points). Visit a natural area, go for a walk, and be cognizant of your surroundings. Be observant. Most importantly, be safe. Don't go anywhere alone, without letting people know where you are, and without a way to get back home safe.

- Go to the beach <http://www.state.nj.us/dep/parksandforests/parks/island.html>
- Go to a wildlife preserve <http://wildlifepreserves.org/njpreserves.htm>
- Go to a state park <http://www.state.nj.us/dep/parksandforests/>
- Go for a hike <http://www.everytrail.com/best/hiking-new-jersey>

Keep a journal and find 14 different species of (7) plants and (7) animals. There are free plant identification apps that you can use, as well as websites. Before the internet, scientists had to keep the specimens and use field guide books to identify organisms. Now you can take pictures and utilize the internet to identify them properly. PICTURES MUST BE YOUR OWN/WHAT YOU OBSERVE (not from Google). Keep note of the sites and apps that you liked best.

Identify the common name, scientific name, description, location, and picture for each species (see examples below).

Common Name	Scientific Name	Description	Location	Picture
Identify the common name of the species, there may be more than one *MUST be a SPECIFIC SPECIES	Identify and properly write the scientific name (italic)	Describe the organism. If animal: may use call, coloration, behavior, flight pattern, or remnants left behind (tracks, nest, fecal material etc) If describing plant: leaf shape, bark, overall shape of plant, height. Identify if native to area	These descriptions must be in real time. The data you gather may be jotted down and finalized later after doing research. Here describe: where, when, type of habitat, current weather	Take a picture of organism (use your cell phone) do not use a google image. This is evidence which you can refer to later to ensure your naming is correct or to view variations within species/specimens.
Plant Example				
Pitch Pine	<i>Pinus rigida</i>	<ul style="list-style-type: none"> -stiff and slightly curved needles -3 needles per fascicle -needles twisted and roughly 10 cm long -dark green color, with new growth -Short stubby cones -Needles on ground around tree -Bark light brown with deep fissures <p>Native to area</p>	Cattus Island, 13:45 July 7 2018, Upland marsh environment, partly cloudy, soil slightly moist (slightly acidic), surrounded by others of the same type and shorter foliage, ground covered in needles and moss	
Animal Example				
Red Winged Blackbird	<i>Agelaius phoeniceus</i>	<ul style="list-style-type: none"> -Seen flying between marsh grass stalks -Quick maneuverable flight -Distinct 'Conk-a-ree' call observed -at least 2 others of the same species observed at same location, additional passerine birds also observed -Native to area 	Stockton University (near lake), 16:30, July 8 2018, Tidally influenced lake in the Pine Barrens, Weather sunny, windy and dry. Water temperature 18 degrees C.	

4. Biochemical Cycles (20 points). Any substance an organism needs in order to live, grow, or reproduce is called a nutrient. Some elements (such as carbon, nitrogen, sulfur, oxygen, and phosphorus), called macronutrients, are needed in fairly large amounts. These nutrient substances are continuously cycled from the abiotic environment to the biotic environment and then back again in what are called biogeochemical cycles. They are driven directly or indirectly by incoming solar energy and gravity.

Do some research. Find the following information for each biochemical cycle. Answer each question thoroughly in full sentences/paragraphs. Keep the information neat and organized.

Carbon cycle:

1. What 4 organic compounds is carbon found in?
2. Carbon dioxide comprises approximately what percent of tropospheric gases?
3. How is the relative amount (%) of CO₂ significant in contributing to the Earth's "natural thermostat"?
4. Identify the two processes that have the greatest influence on tropospheric concentrations of CO₂ on a monthly or yearly basis.
5. Name the two largest sinks (storage areas) for carbon.
6. Discuss how oceans play a major role in regulating CO₂ levels in the troposphere.
7. Describe the two major anthropogenic interventions in the carbon cycle.

Nitrogen Cycle:

1. What 2 organic compounds is nitrogen found in?
2. Identify the two major ways that nitrogen is "fixed."
3. Describe what takes place in each of the following processes or steps of the nitrogen cycle (include a description of the events and chemical transformations in each step):
 - a. Nitrogen fixation
 - b. Nitrification
 - c. Ammonification
 - d. Denitrification
4. Describe two anthropogenic interventions in the nitrogen cycle.

Phosphorus cycle:

1. Which organic compound is phosphorus found in?
2. Explain why phosphorus does not circulate in the troposphere to a great extent
3. Identify the largest sinks for phosphorus
4. Phosphorus is typically found in what ionic form?
5. Explain why the addition of phosphate compounds to aquatic areas typically has a dramatic effect on biological productivity
6. Comment on how human activities have influenced the phosphorus cycle regarding each of the following:
 - a. Mining phosphate rock
 - b. Animal waste from livestock feedlots
 - c. Commercial phosphate fertilizers in agricultural areas
 - d. Discharge of municipal sewage/water treatment facilities

Sulfur cycle:

1. Which organic compound is sulfur found in?
2. Identify the two largest storage areas for sulfur
3. Identify two major human activities influencing the sulfur cycle.