AP Environmental Science (APES) – 2018/2019 **Summer Assignment**

Welcome to Advanced Placement Environmental Science!

AP Environmental Science is designed to be the equivalent of a college course in environmental science. This class will be conducted in similar fashion to what you could expect to see in college. The goal of APES is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world. This class is interdisciplinary; it embraces a wide variety of topics including several non-science courses. In order to cover the material necessary for the APES Exam in May, we need to move at a rapid pace. To cover everything required, we have a summer assignment.

Reading Assignment
You must acquire a copy of Bill Bryson's *A Walk in the Woods.* You will be reading and answering questions on this text. When you return from summer break you will turn in your questions and take a quiz on what you have read. While this book is humorous, Bryson's encounters introduce themes we will see emerging in the course. The questions are attached to this document.

Calculations
Math is a component of APES. The math should pose no problem for any of you as the calculations are fairly basic. The APES Exam does not allow calculators so you should try to perform these problems without the aid of such devices. You would be surprised how often you make simple mistakes when you are out of practice in basic math operations. The required calculations are included in this packet. The division problems should be done without the use of a calculator at all.

I am looking forward to our time together in APES, as I am sure many of you are. If you have any questions over the course of the summer, feel free to email me at tobisd01@wsdmi.org .

Please post all work in the google classroom for APES. It can be reached with the classroom code: pozjun. To enter the google classroom you must use your district provided google ID (student#@student.wsdmi.org, password is your computer login password). We will be using the google classroom to post work and discussions all year.

Enjoy the summer!

Mr. Tobis

For this summer, here are some ways to "Go APES." None are required; all are fun.

Instead of driving, ride a bike or take a walk
Get out in a downpour (not in a thunderstorm)
Follow a stream to its headwaters
Follow a stream to its mouth
Speaking of water, where does yours come from?
Watch an ant colony
Study the waves at the beach
Go into the marsh and smell decomposition at work
Consider the local deer overpopulation problem
Watch the Discovery Channel
Figure out why dew forms on the grass at night, but not every night
Compare star counts in Waterford vs. your vacation spot (required: lay on your back)
Look up what "metamorphic" means
Play around with Google Earth
Grow your favorite vegetable
Look at a big tree and determine where all that mass came from
Go fishing
Follow the path of your favorite gem or precious metal from mine to your ring finger
Pretend that you have no electricity for an evening
Where does your electricity come from, and why does it matter?
Camp out, even if it's in your back yard
Use sunscreen regularly (NO FAKEBAKING)
Change your light bulbs to compact florescent
Compare your car's interior to the greenhouse effect
Watch some birds or bats
Compare the color and 'blinking' patterns of different fireflies
Visit a farm, or at least the farmer's market
Have a septic tank? How does it work?
Listen to the *Environment Report* Podcast
Buying organic food? Not buying organic food? Does it matter?
At the pool? Figure out how many gallons of water it takes to fill.

OPTIONAL READING

If you have nothing better to do this summer or need some beach reading, give these books a try. It is not required to read any of these books.

Environmental science has a problem. That "problem" is that it's an immense field of study. Not only is it a science in the traditional sense, but it's complicated by societies, opinions, government, beliefs, economics, laws, and ethics. If you want to succeed in APES, you'll need to constantly embrace this inter-disciplinary perspective. The list of books below is by no means presenting an agenda of any kind. It's nothing more than a mix of books demonstrating the variety of environmental topics. Agree, disagree, like, or dislike, it's up to you. By the way, go to the library and borrow these books. Save some paper, save some cash.

***A Sand County Almanac*, by Aldo Leopold**
A collection of essays written in a similar style to Thoreau. A bit on the philosophical side, read this as a collection over time, not as a cover-to-cover read in a few sittings. Leopold's prose can be as beautiful and majestic as the landscapes he describes.

***Ishmael*, by Daniel Quinn**
From Amazon.com: *The unnamed narrator is a disillusioned modern writer who answers a personal ad ("Teacher seeks pupil. . . . Apply in person.") and thereby meets a wise, learned gorilla named Ishmael that can communicate telepathically. The bulk of the book consists entirely of philosophical dialogues between gorilla and man, on the model of Plato's Republic. Through Ishmael, Quinn offers a wide-ranging if highly general examination of the history of our civilization, illuminating the assumptions and philosophies at the heart of many global problems.*
This is an odd but fascinating book that draws you in once you get beyond the premise.

***Maiden Voyage*, by Tania Aebi**
This is just a great personal account that has little to do with environmental science (the sailing U weather stuff is relevant), but everything to do with growing up as a teenager. From the book's cover: *Tania Aebi was an eighteen-year-old dropout, a bicycle messenger in New York City by day, a Lower East Side barfly at night. In short, she was going nowhere-until her father offered her a challenge: Tania could choose either a college education or a twenty-six foot sloop. The only catch was that if she chose the sailboat, she'd have to sail around the world-alone.*

***The Omnivore's Dilemma*, by Michael Pollan**
Like to eat? Wonder about what you're eating? The author dissects food in what he describes as "a natural history of four meals." From McDonald's to foraging and hunting, it's a thoughtful look at not only where food comes from, but how it affects the planet. This is not a vegetarian's manifesto; it's a very balanced attempt by the author to retrace the steps of the food supply chain. Part of the book focuses on a farm in Staunton, Virginia, Polyface Farms, that you can visit.

***Silent Spring*, by Rachel Carson**
As the cover of the book declares, this is "the classic that launched the environmental movement." Frankly, it's a little hard to read, because the author is trying to make her case about the role of DDT in our environment in an indisputable way. You have to read this book in context; imagine a woman in the early 1960's confronting a government and industries that were clearly opposed to her viewpoints. It's a work of courage as much as a work of science.

***The World Without Us*, by Alan Weisman**
Einstein used to conduct what was termed *gedanken*, or thought experiments. Weisman considers a large-scale *gedanken*: What would the Earth be like if people suddenly vanished?
Although it's a disturbing thought at first, Weisman uses this premise to apply his "thought experiment" in amazing ways. It's another approach to answering the question, "What effect does humanity have on the planet?" From New York subways to nuclear waste, he addresses some very interesting "what-if" scenarios.

Math Portion

Calculators are not allowed on the APES Exam so you must complete the following division problems without a calculator and SHOW ALL WORK.

1:	2:	3:	4:	5:
77.275 ÷ 2.810	11.880 ÷ 0.660	8.455 ÷ 0.095	32.488 ÷ 13.100	36.600 ÷ 20.000
6:	7:	8:	9:	10:
46.982 ÷ 2.780	33.831 ÷ 18.900	63.800 ÷ 0.220	18.252 ÷ 11.700	19.869 ÷ 0.179
11:	12:	13:	14:	15:
25.715 ÷ 18.500	47.895 ÷ 30.900	13.800 ÷ 0.690	62.382 ÷ 222.000	22.218 ÷ 1.380

Answer each problem on a separate piece of paper without the use of a calculator, showing all work.

1. This is a near-true scenario—Mr. Smith runs his 1996 Ford Taurus on 87 octane gasoline and averages 19.2 mpg fuel efficiency. He pays $3.79/gallon for the gas. He then fills his car up with 89 octane and averages 21.5 mpg fuel efficiency--not much better than the 87 octane. Most importantly, he now pays a whopping $4.02/gallon for the 89 octane. Which gas should Mr. Smith use for his car if he is **only** concerned with saving money? Prove this mathematically.
2. The Redding household uses approximately 250 KW hours of electricity every month. How much energy do they use in a year? How many joules of electricity do they consume in a month? If they switched from regular 60 W incandescent lighting to 13 W CFLs (compact fluorescent lights), and they have 10 lamps in their house they use for on average of 39 hours/month (each lamp is on for 39 hours), how much energy would they save per month? Per year?
3. The island country of Miabby has a population that consists of 53,598 Caucasian, 24,119 Asian, 8,934 Black and 87,658 Natives. What is the % composition by race on the island? Using the general statistic of 51% of any population being female, how many Asians on the island are male? If 17% of the native men carry a recessive gene for a certain cancer, how many male natives have the gene?

Reading Questions (adapted from R Schlegel) for *A Walk in the Woods* (ISBN # 0767902521) by Bill Bryson

Each of the following questions will require at least a one paragraph response.

Chapter 1—How are Bryson's expectations of the AT (Appalachian Trail) influenced by his identity as an "urban dweller?"

Chapter 2—This chapter deals with two "animals"—bears and "Katz"! Katz is clearly representative of the rise in consumption patterns among Americans, intersecting with a rise in leisure activities. How is his bag full of Snickers likely to cause a literal problem and how does this create a figurative (metaphorical) in our society?

Chapter 3—How was the AT a response to the urban conditions of the early 20th century? What does Bryson learn about reading maps during his first days on the trail? How does Katz get involved in environmental degradation and resource depletion very early on?

Chapter 4—Forestry is a form of agriculture managed along the AT most often by the U.S. Forest Service. What aspects of the Forest Service's management practices does Bryson approve and/or criticize? How do you feel about these aspects of the Forest Service?

Chapter 5—What geographical patterns does Bryson (a northerner) take note of during his side trip into the southern Appalachian town of Hiawassee? (Note the driving, dialect, marital customs, and food.)

Chapter 6—How do communities adjacent to the AT seem to have a "market dependence" on the resource of the trail itself?

Chapter 7—In what ways does Bryson care about the political boundaries of state lines during his hike? In what sense does he care about political boundaries such as National Park Service boundaries? Where does he notice crossing a boundary from one ecological area into another? To what extent do these boundaries share the same lines?

Chapter 8—How do you feel about Bryson's decision to take the long cab ride to Virginia? If you put yourself in his place, would you do the same thing?

Chapter 9—How does Bryson's sense of scale change when he switches from foot to automobile transportation? How does it change his perception of the region?

Chapter 10—What is Chestnut Blight and how did it change the Appalachian region? What do you feel our responsibility is with regard to these invasive species that destroy native populations?

Chapters 11—Before the creation of Shenandoah Park, humans were the dominant species in the food chain. What has taken their place since the creation of the park? What's the most dangerous "predator" for Katz in this chapter?

Chapter 12—How has the land-use pattern in the area now known as Shenandoah National Park changed over the past 100 years?

Chapter 13—So far in the book, what are your thoughts on Bryson (either as an individual or as an author)? Do you tend to agree with his thoughts or are you offended by him?

Chapter 14—What do you find interesting about the story of Centralia? Jot down your impressions of the story.

Chapter 15—What positive and negative impacts has the Army Corps of Engineers had in the Delaware Valley, in Bryson's view?

Chapter 16—How have economic decline and out-migration (loss in population) changed the character of the rural areas of New England over the past century? What factors contributed to the economic decline and the out-migration? How does Bryson benefit from this out-migration?

Chapter 17—Is Bryson acting like an idiot in this chapter?

Chapter 18—How did changes in leisure and consumption patterns among Americans affect the landscape of the White Mountains over the past 100+ years? Given the choice yourself, say today, would you hit the beach or head for the mountains?

Chapter 19—Now that Bryson has reached Maine, recall what he experienced way back in Georgia. What are the regional differences in land use and culture?

Chapter 20—What regions along the AT are most welcoming to urban-dwelling hikers, and which is most foreboding? What factors put Maine in the latter category?

Chapter 21—Do you agree with Bryson's final assertion that "he hiked the Appalachian Trail?" What percentage of something do you have to cover in order to say you've "done it?" When you get to the end of next May, how will you know you've "done" APES?

Final question: What adventure of Bryson's did you enjoy the most? What is your favorite quote? (I will expect you to provide one)

Focus Questions
Introduction to Environmental Science
Chapters 1-2
APES

Chapter 1
- What is natural capital? Provide examples of the components. (1-1)
- Explain the general model of nutrient cycling in the environment. (1-1)
- Give specific examples of the differences between developed and developing countries. (1-2)
- Describe the differences between renewable, nonrenewable, and perpetual resources. Provide examples of each. (1-3)
- Describe in detail the concept of Tragedy of the Commons. Provide examples. (1-3)
- Compare and contrast the ecological footprint of a person living in a developed country with a person living in a developing country providing specific examples. (1-3)
- Describe and provide examples of point source and non-point source pollution. (1-4)
- Explain the strengths and weaknesses of both output pollution control and input pollution control. (1-4)
- Describe the five basic causes of environmental problems. (1-5)
- Explain the four scientific principles of sustainability. (1-6)

Chapter 2
- Explain the difference between radioactive decay, nuclear fission, and nuclear fusion. (2-4)
- What is kinetic energy? In what forms can it be found in nature? (2-4)
- In your own words, explain the first and second laws of thermodynamics. (2-4)
- Explain and provide examples of positive and negative feedback loops. (2-5)

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developing countries (p. 11)
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ecology (p. 7)
economic development (p. 10)
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environmental degradation (p. 12)
environmental ethics (p. 20)
environmental science (p. 6)
environmental worldview (p. 20)
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environmentally sustainable economic development (p. 11)
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