Welcome to AP Environmental Science! I know this will be a GREAT year and we will be learning many exciting things together. Not only will we be using the textbook to expand our understanding of the environment and humans’ impact on the environment, we will also explore current events. For example, the West Virginia coal mine collapse and the Deepwater Horizon Oil Spill, both of which happened in 2010; these situations may affect you for years to come, so we need to be informed! If you have a topic of interest, please let me know and I will see how I can fit it into our curriculum.

This is a fast paced course but if you keep up with the readings and assignments you should succeed. This packet includes your summer assignment and information about the textbook; the summer assignment has multiple parts, so I highly recommend starting early and not waiting until a week before school starts. 😊 In addition, please return the signed slip to let me know if you will be purchasing or borrowing a textbook for the 2016-2017 school year before we leave for the summer (so before June 14, 2016).

If you have any questions or concerns over the summer, please feel free to email me. Although I will not be checking my email every day, I will respond as soon as I can. Please have a wonderful summer… I will see you in the fall!

~Miss Jessica Clark

Textbook Information:
While it is highly recommended that you purchase the textbook, it is not required. We are using a relatively new textbook this year which is slightly more expensive than the textbook used in previous years as there are few used copies available. The text we will be using is Friedland and Relyea’s Environmental Science for AP 1st Edition (ISBN-13: 978-0-7167-3849-7; ISBN-10: 0-7167-3849-X). This is one of the most widely respected texts in high schools and was written and advised by individuals who assist with the AP grading. It is not required, but it is highly recommended that you own your own book so you may highlight the chapters directly, which is an assignment during the course of the school year; an alternative assignment will be given to students who borrow a class textbook.

Since this is an older edition (the second edition has been released), used copies can be found on Amazon.com and other such sources; in addition, you can talk to the 2015 or 2016 graduates who took the course to purchase the textbook off of them. Since we understand this is more expensive we do have enough textbooks for students to borrow.

Please discuss this with your parents/guardians and fill out the appropriate form, included in this packet, to return to Miss Clark by June 14th.
2016 Summer Assignment:
The first day of class for AP Environmental Science is **August 25, 2016**. When you come to class that day, it is important that you have had some background and experience with the subject already. This summer assignment is **not** meant to have you cover a few chapters in the textbook on your own. **It is** meant for you to broaden your horizons and experiences with environmental aspects of our world and allows me to evaluate your understanding of environmental science coming into the course. All parts of this assignment are included in this packet and may be found on my website: [www.missclarkswebsite.weebly.com](http://www.missclarkswebsite.weebly.com); go to the APES tab at the top and scroll down to “Summer Assignment”. All parts of this assignment are due on the first day of class.

The summer assignment comes in five parts, each are further explained in the rest of the packet.

1. First, you need to select a nongovernmental organization (NGO) that you will research. You will be completing a project on this during the fourth marking period. You simply need to pick a project topic.

2. You will need to watch the film/documentary “Home,” and answer the questions in this packet. In addition, you will need to write a 2-3 page (**1” margins**, double spaced, **2 page minimum**) **critical** reaction paper in response to it.

3. A bit of math practice. Complete the Math Assignment included in this packet. If you need assistance, you can access my website for a PDF that will provide you with some basic math guidelines. Since you will not be allowed to use a calculator on the AP exam, you may **NOT** use a calculator for this assignment. You must show all of your work and include all units.

4. The main theme of APES is how man can strike a balance between utilizing the assignment for his current wants and needs, and conserving the environment for the wants and needs of the future. This is especially true of resource all can access but no one person owns – the air we breathe, the water we drink, the oceans that give us food and recreation. The article entitled “The Tragedy of the Commons” by Garrett Hardin is the definitive critique on man’s relationship with the environment. Because we will loop back to this theme all year, you will read the article and answer the questions provided.

5. There are a lot of environmental laws and statutes that are important to this course. Your last assignment is to construct a table regarding environmental legislation for the laws/treaties provided. This will be an excellent (hopefully!) study tool for you to use when preparing for the AP test.

All of this may sound like a lot of work, but it really is not. It is just meant to assist you in becoming academic and tuning in to your environment as parts of your lifestyle. Have a **great** summer. Keep in touch by e-mail with any questions or concerns, and **always**: Reduce, Reuse, and Recycle.
Assignment #1: NGO Project Topic

First, you need to select a nongovernmental organization (NGO) that you will research. During the fourth marking period (yes, this is far away but it will reduce your work load later) you will be given a project assignment about an NGO of your choosing. Choosing your NGO now will allow you to pick an organization in which you have some interest and contact them for information (this is a requirement). Here’s how to get started:

- Use any search engine or start at [www.envirolink.org](http://www.envirolink.org). (Follow these links: Environmental Resources> below Resource by Topic – Categories within...>Organizations). Click a topic of interest and then choose one of the many available organizations.
  - Please check your NGO’s website to make sure this organization is still active as this resource, while very encompassing, was created a number of years ago.
  - You may also Google terms like “environmental nongovernmental organizations” or specific topics of interest like “rain forest NGO’s.”

- Make contact with your organization and ask them send you some information (ie: brochure, free resources, etc).

- It is highly recommended that you consult their webpage to ensure the NGO is still active and that the website contains information such as:
  - Mission Statement
  - History/Background of NGO
  - What the NGO is/does
  - Method of Operation
  - Finances/Cost (you may also check out Charity Navigator for this)
  - Membership

- By the first day of school you need to select an organization. You may also let me know in school before the end of this school year or over the summer via email if you have made a choice.
  - Choices are on a first come/first served basis, so therefore there may be no duplicate NGOs.
Assignment #2: Video with Questions
You will need to watch the film/documentary “Home,” which can be found on YouTube by accessing the following link: https://www.youtube.com/watch?v=jqxENMKaeCU&feature=c4-videos-. Please answer the questions below (ONLY HANDWRITTEN RESPONSES WILL BE ACCEPTED) and write a 2-3 page (1” margins, double spaced, 2 page minimum) critical reaction paper in response to it. Your written essay is due the first day of class (August 25, 2016). If you use any information from outside sources, you will need to include a bibliography.

Home Questions

1. Describe the conditions on early Earth.

2. What happened to the carbon that poisoned the atmosphere?

3. How did the agricultural revolution change the Earth?

4. How has Earth changed in the last 60 years since the use of oil has become more widespread?

5. What is most of the grain in the US used for?

6. What led to the dramatic decline in the biodiversity of agricultural crop species?

7. How many kilos of water does it take to produce 1 kilo of beef? ________________________________

8. How have cars shaped the way housing is laid out in the US and other developed countries?

9. How much has the volume of international trade increased since 1950? __________________________

10. What are your thoughts on how the video portrays Dubai? Is it self-sustainable?

11. Rainforests are cut down to make farmland for which products/crops?

12. What makes the growth of Lagos different from how most other cities grow?

13. Where does the water from Greenland’s melting ice sheet go?

14. Why are the glaciers of mountains so important for the people in the lowlands?
15. This video project covers many topics that we will discuss in APES this year. Give two specific examples that are portrayed in the video about each of the APES concepts that are listed below:

a. All living things are linked
   i. 
   ii. 

b. Developed vs. Developing Countries
   i. 
   ii. 

c. Human Innovation and Technology
   i. 
   ii. 

d. Climatic Balance
   i. 
   ii. 

e. Shortage of Resources
   i. 
   ii. 

16. After watching the film, what topics are you most looking forward to learning about this year? What questions do you have?

17. How does the movie end? Why do you think the filmmaker Yann Arthus-Bertrand finishes his film in this way?

18. What conclusion(s) do you think the filmmaker Yann Arthus-Bertrand wants us to reach?
Assignment #3: Math Practice
Complete the Math Assignment included in below. If you need assistance, you can access my website for a PDF that will provide you with some basic math guidelines. Since you will not be allowed to use a calculator on the AP exam, you may NOT use a calculator for this assignment. **You must show all of your work and include all units.** This assignment will be due on the first day of class.

Scientific Notation Practice:
Write the following numbers in scientific notation:

1. 1,000,000
2. 48,000
3. 5,878,300
4. 0.015
5. .003
6. 0.2220
7. 1267

Convert the following to regular notation:

8. 2.45 x 10^4
9. 9.1 x 10^2
10. 7.5469 x 10^{-4}
11. 8 x 10^{-1}
12. 5.000 x 10^{-3}
13. 9.444 x 10^2
14. 6.08 x 10^3

Use Scientific Notation (and only Scientific Notation) solve the following problems:
15. \((6.235 \times 10^{-8}) \times (6.7 \times 10^2) = \)
16. \((2.456 \times 10^4) \div (1.436 \times 10^{13}) = \)
**Significant Figures**

How many significant figures are in the following numbers?

1. 30
2. 66000
3. 968
4. 9050
5. 0.078
6. 0.007040
7. $1.7 \times 10^6$
8. 20006.0

Solve the following using the correct number of significant figures:

9. $(3.6 \times 10^{-1}) \times (1.2 \times 10^6)$

10. $4.0001 \times 6$

**Dimensional Analysis**

1. Convert 8,640 mm to cm

2. Convert 175 lbs to kg

3. Convert 33.2 kg/L to kg/mL

4. Convert 3.8 km/sec to miles/year
5. Twelve hundred metric tons of solid waste is how many kilograms?

6. Traveling at 70 miles/hour, how many minutes will it take to drive 175 miles to San Antonio?

Percentages

1. If 35% of a natural area is to be developed, leaving 500 acres untouched, how many acres are to be developed?

2. If the concentration of mercury in a water supply changes from 65 ppm to 7 ppm in a ten-year period, what is the percentage change of the mercury concentration?

3. Fifteen million is what percentage of the U.S. population of 300 million?

4. What is 20% of a $34.80 bill so you can give a good tip?
Applied Math Problems

1. A population of deer had 200 individuals. If the population grows by 15% in one year, how many deer will there be the next year?

2. One year I had 40 AP Environmental Science students and the next year I had 50 Environmental Science students, what percentage did the population of APES students grow by?

3. Electricity costs 6 cents per kilowatt hour. In one month one home uses one megawatt hour of electricity. How much will the electric bill be? (HINT: mega = 1,000 kilo)

4. Your car gets 15 miles to the gallon and your friend's car gets 25 miles to the gallon. You decide to go on a road trip to Virginia Tech, which is 300 miles away. If gas costs $4 per gallon and you decide to split the gas money, how much money will you save in gas by driving your friend's car?

5. Virginia Beach is 10 miles wide and 30 miles long. If one inch of rain falls on Virginia Beach, how many cubic feet of rain fell on Virginia Beach. (Hint: convert all units to feet first).
Assignment #4: Tragedy of the Commons Reading and Questions

The main theme of APES is how man can strike a balance between utilizing the assignment for his current wants and needs, and conserving the environment for the wants and needs of the future. This is especially true of resource all can access but no one person owns – the air we breathe, the water we drink, the oceans that give us food and recreation. The article entitled “The Tragedy of the Commons” by Garrett Hardin is the definitive critique on man’s relationship with the environment. Because we will loop back to this theme all year, you will read the article and answer the questions provided. The article can be found on my website (www.missclarkswebsite.weebly.com) and I have included it in this packet.

Answer each question on a separate sheet of paper in complete sentences, unless a short phrase makes more sense. ONLY HANDWRITTEN RESPONSES WILL BE ACCEPTED.

1. How did Thomas Malthus predict that human populations would naturally grow? According to the article, population growth must eventually do what?

2. According to Adam Smith’s The Wealth of Nations, how do decisions made by individuals affect the entire society? Be sure to use the key phrase Smith used to describe how individual and public interests coincide.

3. Garrett Hardin offers a rebuttal to Smith’s theory using a scenario put forth by William Forster Lloyd as well as his own evidence. Using a brief paragraph with complete sentences, describe the scenario Hardin uses to describe “the tragedy of the commons.” Be sure to use his example, how the individuals in the scenario typically act, and the impacts of individual actions on the common area.
4. 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. Using at least one complete sentence and some research, given a specific example of something which prevents industries from dumping their wastes into our common air and water supplies.

5. What does Hardin characterize as being hard to legislate?

6. Research the meaning of the word “fecundity.” Write a definition of the word.

7. Although he offers no solution, what other problem does Hardin cite as contributing to “the tragedy of the commons” in the last three pages of the article?

8. Is the “Tragedy of the Commons” unavoidable? Use support for your claims.

9. Identify one “commons” in your own life (at school, home, work) and explain how it is (or is not) being managed wisely to avoid the situation described in the essay.
Assignment #5: Laws and Statutes

Construct a table like my example that organizes important information regarding environmental legislation for the laws/treaties listed below. Include the following information: - Name of Law or Treaty - Draft Year and Amendment Years - Is it International or National (just the U.S) - Describe the Function. - What Environmental Issues are Affected by this Legislation? - Agency/Group Responsible for Regulation and Enforcement (United Nations, Department of Interior, EPA, etc.)

Use this template to guide your table design.

<table>
<thead>
<tr>
<th>Name</th>
<th>Draft &amp; Amendment Year(s)</th>
<th>International or US?</th>
<th>Description</th>
<th>Issue(s) Affected</th>
<th>Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean Air Act</td>
<td>1963, 1977, 1990</td>
<td>US</td>
<td>To monitor and control air pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide, particulate matter, ozone, lead, carbon dioxide, volatile organic compounds, mercury. Meant to protect public welfare and health and to regulate emissions of dangerous air pollutants.</td>
<td>Air pollution, human health</td>
<td>EPA</td>
</tr>
</tbody>
</table>

Your table must include the following laws:

<table>
<thead>
<tr>
<th>Clean Air Act (CAA) *</th>
<th>General Mining Act of 1872</th>
<th>Nuclear Waste Policy Act (NWPA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean Water Act (CWA)</td>
<td>Hardrock Mining &amp; Reclamation Act</td>
<td>Oil Pollution Act (OPA)</td>
</tr>
<tr>
<td>Comprehensive Environmental Response, Compensation, Liability Act (CERCLA)</td>
<td>Healthy Forests Initiative (HFI)</td>
<td>Refuse Act</td>
</tr>
<tr>
<td>Convention on the International Trade in Endangered Species (CITES)</td>
<td>Kyoto Protocol</td>
<td>Safe Drinking Water Act</td>
</tr>
<tr>
<td>Endangered Species Act (ESA)</td>
<td>Lacey Act (1900)</td>
<td>Soil &amp; Water Conservation Act</td>
</tr>
<tr>
<td>Federal Food, Drug and Cosmetic Act (FFDCA, FDCA, or FD&amp;C)</td>
<td>Marine Protection, Research, and Sanctuaries Act (MPRSA)</td>
<td>Surface Mining Control &amp; Reclamation Act (SMCRA)</td>
</tr>
<tr>
<td>Federal Insecticide, Fungicide and Rodenticide Act (FIFRA)</td>
<td>Montreal Protocol</td>
<td>Toxic Substances Control Act (TSCA)</td>
</tr>
<tr>
<td>Fish and Wildlife Act</td>
<td>National Environmental Policy Act (NEPA)</td>
<td>Wilderness Act</td>
</tr>
</tbody>
</table>

*You must still include the Clean Air Act, even though the information is provided above.

Table Hints: - You may find it easier to do this in landscape orientation. - You can use your textbook or online SCHOLARLY resources (Wikipedia is not reliable) to find the information. Since this part of your assignment is governmental in nature, .gov sites are best! ***You will have a QUIZ on this material the first/second week of school, so be prepared!