Lawrence High School’s
AP Environmental Science
2019 Required Summer Assignment
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  o *Read Chapter 2: Science, Matter, Energy, and Systems
  o *Chapter 2 Vocabulary (define each term your own way – quizlet, flashcards, written or typed – but use book definitions)
  o *Read the Chapter 2 Online Notes

Part 2 – Review of Math Skills
  o *Math Concept Review Videos-posted on google classroom
  o *Math Practice Problems

Part 3 – Preview of APES Science Concepts
  • Science Concept Research Topics → Quizlets for 3 concept groups

School Assignment Timeline:
  • First Week of School: All Chapter 2 work, Math Practice Problems, and Quizlets are due
  • First Week of Class: Chapter 2 Test
  • First week of Class: Math Skills Quiz

*You do not need the textbook for this assignment. A copy Chapter 2 will be available online via the AP Environmental Science Summer Assignment Google Classroom Site. A copy of the assignment and Chapter 2 reading will be posted on the LTPS.org site and accessed via the Summer Assignment tab. All worksheets are included in this package and may be handed in in written or electronic form. I will also have a scanned and printed version of Chapter 2 available for pickup if you do not have internet access. See Ms. Buck in room 101 after school for a copy.

*Students should work independently on these assignments, consulting their personal knowledge, the text, and included websites.

*Students should produce original work. If I cannot see your revision history and your work is simply copy and pasted into google classroom it will not be accepted. If anyone copies from another student both will be penalized.

Questions can be directed through google classroom or my email, kbuck@ltps.org, I will be checking sporadically throughout the summer.
Google Classroom Group Code:

- Go to www.classroom.google.com
- Click on I’m a Student
- Enter access code to access the class.
- CODE: fev02s

This Google group has been established in order to provide you, the students, with support as a group. If you are struggling with concepts/material, there is a blog option to post questions to one another. In addition, you have the educational resources listed below for additional assistance. The instructor might monitor the Google Classroom throughout the summer.

Preparing for a successful year in Advanced Placement Environmental Science

To find success in Advanced Placement Environmental Science you will need to be familiar with science concepts from biology, physics, and chemistry as well as math skills from Algebra through Calculus. A basic understanding in all of these courses is required to master AP Environmental Science concepts and applications. Reasoning and problem solving skills are also utilized in this course as AP Environmental Science is highly based on data interpretation, predictions of outcomes, and solutions to real-world problems. Concepts from across content areas such as thermodynamics, law of supply-and-demand, and cost-benefit analysis will be applied to the problems faced in the Environmental Science field. Other aspects in the course include geology, geography, and human health which will be reviewed briefly as students should already have background knowledge in these areas.

The most successful students who have taken Advanced Placement Environmental Science have been able to combine the information learned in class with prior knowledge to synthesize predictions and solutions to Environmental Science concepts and problems. Students who lack backgrounds in specific areas should seek additional assistance for their instructor.

Assignment Grading and Marking Period Grade

Each assignment will count as a separate homework grade, when you return to school you will have a test over the chapter material as well as a math quiz. These assignments together will account for approximately 15-20% of your total 1st quarter grade.
Part 1 – Summer Review of Biology, Chemistry, and Physics

The first part of your summer assignment includes reading Chapter 2: Science, Matter, Energy, and Systems from the AP Environmental Science Textbook *Living in the Environment* by Miller and Spoolman. Please read the chapter, view the online notes, and complete the work provided in this packet. APES Summer coursework notes and materials are provided on Google Classroom. All of the assignments are provided in worksheet form in this packet. You may alternatively choose to complete these in electronic format via Google Classroom and submit your documents, be mindful that you should submit your own work for this assignment and collaboration with other students is not permitted.

A test will be given the first week of school on Chapter 2, the material will be reviewed and there will be an open question time on the first few days of school. If you require more review please schedule an appointment with the teacher.

Part 1 is created to help you understand the work load and types of skills you will be asked to use during the course. Each chapter has similar assignments and generally takes one to one and a half weeks to complete.

You will find the following assignments for Chapter 2 to follow.
Chapter 2 Vocab – complete as a quizlet or written/typed

1. Scientific Hypothesis
2. Scientific Theory
3. Scientific Law
4. Matter
5. Element
6. Compound
7. Atom
8. Isotope
9. Molecule
10. Ion
11. Acidity
12. pH
13. Chemical Formula
14. Organic Compound
15. Inorganic Compound
16. Cell
17. Chromosome
18. Physical Change
19. Chemical Change
20. Nuclear Change
21. Radioactive Decay
22. Nuclear Fusion
23. Law of Conservation of Matter
24. Energy
25. Kinetic Energy
26. Heat / Thermal Energy
27. Electromagnetic Radiation
28. Potential Energy
29. Renewable Energy
30. Nonrenewable Energy
31. High-quality Energy
32. Low-quality Energy
34. Second Law of Thermodynamics
35. Positive Feedback Loop
36. Negative Feedback Loop
Part 2 – Math Skills Review and Practice Problems

You are expected to enter Advanced Placement Environmental Science with a good mathematical background. You will be asked numerous times during the course to apply basic mathematical concepts and skills to environmental problems and models. You will be asked mathematics questions on the AP Environmental Science Exam and will not be allowed to use a calculator; therefore calculators will not be used in class. Work must be show for all math computations to receive credit. The following is a review of concepts. Please complete the Math Skills Worksheet provided, again show all work and do not use a calculator. During the first month of school there will be a quiz on the Math Skills you reviewed in this packet.

1. Percentages – Percent means divided by 100, this is a measure of a part of the whole

   Finding a percentage: 18% = 18/100 = .18

   Sample Problem 1: 15 million is what percentage of the US population??

   Sample Answer 1: 15 million / 300 million = 0.5 = 5%

2. Rates – typically calculate how much an amount changes in a given amount of time or distance

   Rate Formulas:

   Rise / Run ; Change / Time ; y=mx+b

   Growth Rate = [(Present Value – Past Value) / Past Value] * 100

   Annual Rate of Change = Growth Rate / Time between Past and Present Values

   Sample Problem 1: New City has a population of 800,000 in 1990 and a population of 1,500,000 in 2008. Find the growth rate of the population in New City.

   Sample Answer 1: [(1,500,000 – 800,000) / 800,000] * 100 = 87.5% growth rate

   87.5% / 18 years = 4.86% average annual growth rate

3. Scientific Notation – when using very large numbers, scientific notation is often easiest to manipulate

   Thousand = 10^3 = 1,000

   Million = 10^6 = 1,000,000

   Billion = 10^9 = 1,000,000,000
4. **Metric System** – students will be required to convert between metric units and know which magnitude each of the prefixes represents.

**Math Skills Practice Problems**

Directions – complete the following math practice problems on lined paper. All work must be shown.

1. What is one million times one thousand? Show your work in scientific notation. Give the answer in scientific notation and in words.

2. A population of deer has 2000 individuals. If the population grows by 15% in one year, how many deer will there be the next year?

3. Electricity costs 8 cents per kilowatt hour. In one month one home uses one megawatt hour of electricity. How much will the electric bill be?

4. Last year there were 40 AP Environmental Science students, this year there are 50 AP Environmental Science students. What is the growth rate of the AP Environmental Science class?

5. Carlos purchased a house that has 2500 square feet of living space. How many square meters of living space is this?

6. 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 $3 per gallon and you decide to split the gas money, how much money will you save in gas by driving your friend’s car?

7. Virginia Beach is 10 miles wide and 20 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).

8. A coal-fired electric power plant produces 12 million kilowatt-hours (kWh) of electricity each day. Assume that an input of 10,000 BTU’s of heat is required to produce an output of one kilowatt-hour of electricity.  
   A) Calculate the number of BTU’s of heat needed to generate the electricity produced by the power plant each day.  
   B) Calculate the pounds of coal consumed by the power plant each day, assuming one pound of coal yields 5,000 BTU’s of heat.

9. If a city of 10,000 experiences 200 births, 60 deaths, 10 immigrants, and 30 emigrants in the course of a year, what is its net annual percentage growth rate?

10. The combustion of one gallon of automobile fuel produces about 5 pounds of carbon (in CO2). Two autos are making a trip of 600 miles. The first auto gets 20 miles per gallon, and the second gets 30 miles per gallon. Approximately how much less carbon (in CO2) will be produced by the second auto on this trip?
Part 3 – Preview of APES Concepts

To stay on top of the considerable amounts of information you will be working with during the coming school year you are being tasked, as part of your summer assignment, with researching and reviewing concepts or content related to the AP Environmental Science course. Please create a quizlet for each column’s concepts and provide a link or printed version for the following content:

<table>
<thead>
<tr>
<th>Environmental Incidents</th>
<th>Environmental Laws</th>
<th>Environmental Activists</th>
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<tbody>
<tr>
<td>Include a brief description of the incident including location, material of concern, and year</td>
<td>State the main objective of each law</td>
<td>Describe the connection between each individual and the environmental movement</td>
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<tr>
<td>Chernobyl</td>
<td>Clean Air Act (1970 / 1990)</td>
<td>Aldo Leopold</td>
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<td>Bhopal</td>
<td>Clean Water Act (1972)</td>
<td>Theodore Roosevelt</td>
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<td>Deepwater Horizon</td>
<td>Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund)</td>
<td>Rachel Carson</td>
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<td>Minimata</td>
<td>Convention on International Trade in Endangered Species (CITES)</td>
<td>John Muir</td>
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<td>Love Canal</td>
<td>Endangered Species Act (1973)</td>
<td>Gifford Pinchot</td>
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<td>Fukushima</td>
<td>Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)</td>
<td>John F. Lacey</td>
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<td>Chesapeake Bay</td>
<td>Kyoto Protocol (1997)</td>
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<td>Three Mile Island</td>
<td>Hazardous and Solid Waste Amendments (HSWA)</td>
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<td>Toxic Substances Control Act (TSCA)</td>
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<td>Wilderness Act (1964)</td>
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<td>Montreal Protocol (1987)</td>
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