

Montachusett Regional Vocational Technical High School
AP Environmental Science Summer Assignment 2017-18
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Welcome future APES students! This is an advanced science course that combines the disciplines of biology, chemistry, geology, physics, government and economics to investigate global environmental issues. We will discover how the Earth's systems function together and how humans have affected our planet. We will also examine our personal consumption habits and learn ways to be responsible global citizens in the face of serious environmental issues.

Because this is a college level course, you will be responsible for learning a large amount of material on your own. I will help you as we go, but it will be your responsibility to take notes, study and learn your vocabulary! We also work on the assumption that you have a general science background that includes biology, chemistry and algebra. The purpose of this project is to help you prepare for the APES content by getting organized, reviewing some background information, and getting familiar with some of the basic concepts of environmental science and your own consumption habits.

- 1. There are 4 parts to the summer assignment. DO NOT PROCRASTINATE!**
 - **ASSIGNMENT #1 CURRENT EVENTS: ENVIRONMENTAL ARTICLES SUMMARIES & REFLECTIONS 20 points**
 - **ASSIGNMENT #2: BE AWARE OF AND ENJOY NATURE 20 points**
 - **ASSIGNMENT #3 AP ENVIRONMENTAL SCIENCE MATH REVIEW 20 points**
 - **ASSIGNMENT #4: HOME Movie questions 5 points**
- 2. Read the directions for each section carefully!**
- 3. All work is to be completed on your own. You may not work with other students to complete this assignment. It is expected that your work will be done on your own and not plagiarized.**
- 4. This assignment is due the first day of class it will count as your first test grade for Quarter 1!**
- 5. During the first week of classes we will have a test on the math concepts from Assignment #3.**

1. ASSIGNMENT #1 CURRENT EVENTS: ENVIRONMENTAL ARTICLES SUMMARIES & REFLECTIONS 20 points (10 points each article)

Find **two** articles that have been published this summer 2017 (from May-August).

- Each article should be about a **different** environmental issue.
Examples: chemical contamination, climate change, pollution, deforestation, overpopulation, endangered species, invasive species, pesticides, habitat destruction
- Include a hard copy of each article (either printed out, photocopied, or cut out) OR include the hyperlink to the URL if you found it online.
- Sources can include scientific publications, journals, newspapers like the National Geographic(aim high - the more scholarly the better) or use recognized news sources such as The Washington Post, New York Times, The Wall Street Journal etc., Internet based sources such as The Economist or BBC World or science specific journals or magazine, etc. Online newspapers or journals or .gov, .edu. or .org sites are okay too.
- Include a Works Cited at the end of your reflections (APA).

For each article please address the following criteria in at least 1/2 page per article. It must be typed single-spaced Times new roman 12 pt font. This is similar to work we will do throughout the year for each chapter.

- 1. Summarize the content of the article in your own words. (4 pts each)**

Focus on the following questions:
What is the problem? When did it begin?
Do we know who are the responsible parties? If so, who is it?
How severe is the environmental impact?
- 2. Reflect on or write your personal reaction to the article. (3 pts each)**

Focus on the following questions.
What are your thoughts on the issue?
How does it compare to information you have heard or read before? Does it support/refute what you know or thought you knew?
What other information would be helpful for you to better understand the environmental impacts?
- 3. Are there words/concepts you don't understand? (1 pt each)**
- 4. Do you know who to trust in regards to "the facts" presented? (1 pt each)**
- 5. Works cited in APA format. (1 pt each)**

2. ASSIGNMENT #2: BE AWARE OF AND ENJOY NATURE

20 points

1. Visit a **natural area**, go for a walk, go to a park or the beach or anywhere outside (get the point?) and make some observations! There are a few great areas in our area to visit. Locally any Reservoirs, Conservation land, Cogshall Park, Leominster State Forest, Mount Wachusett and any Audobaun areas like the Lincoln woods to name a few. Also feel free if on vacation to use habitats you visit, sandy shore ecosystems, lakes or estuaries would also be great too. This activity is very similar to the habitat assessment labs we will do throughout the year.

2. Record the date, time, duration, and location of your outing. You must include a photo or drawing of the area as well. (2pts)

3. Record observations on the following things:

Geology must be specific (rocks, soil, etc.) (2pts)

Weather (today) and Climate (throughout the seasons) (2 pts)

Flora (plants)

Fauna (animals, fungi, etc.)

For flora and fauna you must **identify 5 species** total in your habitat. Evidence of a species presence is also acceptable such as snake skins, deer droppings, shells etc. It doesn't need to be in complete sentences. For each of the organisms you identified you will need: The organism common name and a picture of it. You must include a photo or drawing of the organisms, **a picture taken by you is ideal**. A picture from the internet is acceptable if they are hard to photograph, of the organisms in each site. **(2 pts each organism =10 pts)** You, your dog or pokemon are not usable organisms. This cannot be done in your yard unless there is a natural non manmade habitat close by.

4. Write a paragraph (complete sentences, etc.) reflecting on the following questions: **(4pts)**

What did you encounter?

What questions did you wonder as you observed everything?

How much and what kinds of human impacts did you notice in that area? How did you enjoy the activity?

3. ASSIGNMENT #3 AP ENVIRONMENTAL SCIENCE MATH REVIEW (20 pts)

Read pages 4-11, then complete pages 12-18 below and be prepared to turn in those pages on the first day of school.

We will have a test on this material during the first week of class. (Adapted from Kara House, Franklin Central High School, Indiana)

This year in APES you will hear the two words most dreaded by high school students...NO CALCULATORS! That's right, you cannot use a calculator on the AP Environmental Science exam. Since our classwork and exams are meant to help prepare you for the APES exam, you will not be able to use calculators in class either. The good news is that calculations exams are written to be fairly straight forward calculations and to come out in whole numbers or to only one or two decimal places. The challenge is in setting up the problems correctly and knowing enough basic math to solve the problems. With practice, you will be a math expert by the time the AP exam rolls around. So bid your calculator a fond farewell, tuck it away so you won't be tempted, and start sharpening your math skills!

Section 1: Math Review

The following problems represent some of the basic math skills that are required to be successful in AP Environmental Science. Use this sheet over the summer to review. There will be a math quiz the first week of school. **NO**

**CALCULATORS ARE ALLOWED TO BE USED IN CLASS, ON EXAMS OR ON THE COLLEGE BOARD TEST!!
SHOW ALL OF YOUR WORK to get full credit!! Write directly on this sheet.**

Here are some tutorials to help review your math skills:

Scientific notation: <http://www.chem.tamu.edu/class/fyp/mathrev/mr-scnot.html>

Dimensional analysis: http://www.chemprofessor.com/dimension_text.htm

<http://www.chem.tamu.edu/class/fyp/mathrev/mr-da.html>

Long division and multiplication: <http://www.mathsisfun.com/dividing-decimals.html>

<http://www.tutors4you.com/tutorialondecimals.htm>

Contents:

- A. Decimals
- B. Averages
- C. Percentages
- D. Metric Units
- E. Scientific Notation
- F. Dimensional Analysis

Reminders

1. **Write out all your work**, even if it's something really simple. This is required on the APES exam so it will be required on all your assignments, labs, quizzes, and tests as well.

2. **Include units in each step.** Your answers always need units and it's easier to keep track of them if you write them in every step.
3. **Check your work.** Go back through each step to make sure you didn't make any mistakes in your calculations. Also check to see if your answer makes sense. For example, a person probably will not eat 13 million pounds of meat in a year. In addition, check to see that the answer is in the units the question is asking for. If you get an answer that seems unlikely, it probably is. Go back and check your work.

Directions

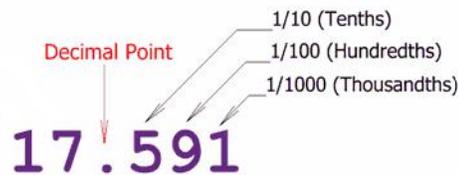
Read each section below for review. Look over the examples and use them for help on the practice problems. The practice problems can be found in the separate document that contains just the practice questions and a place to show your work (including units for each step).

REMEMBER: NO CALCULATORS – SHOW ALL WORK – USE UNITS IN WORK AND ANSWER – WORK INDEPENDENTLY. You will not receive credit for answers that don't show work or units or on which you clearly used the help of a calculator or another person. We are very serious about all of this.

A. Decimals

Part I: The basics

Decimals are used to show fractional numbers. The first number behind the decimal is the tenths place, the next is the hundredths place, the next is the thousandths place. Anything beyond that should be changed into scientific notation (which is addressed in another section.)



Part II: Adding or Subtracting Decimals

To add or subtract decimals, make sure you line up the decimals and then fill in any extra spots with zeros. Add or subtract just like usual. Be sure to put a decimal in the answer that is lined up with the ones in the problem.

$$\begin{array}{r}
 123.0000 \\
 0.0079 \\
 +43.5000 \\
 \hline
 166.5079
 \end{array}
 \qquad
 \begin{array}{r}
 27.583 \\
 - 0.200 \\
 \hline
 27.383
 \end{array}$$

Part III: Multiplying Decimals

Line up the numbers just as you would if there were no decimals. DO NOT line up the decimals. Write the decimals in the numbers but then ignore them while you are solving the multiplication problem just as you would if there were no decimals at all. After you have your answer, count up all the numbers behind the decimal point(s). Count the same number of places over in your answer and write in the decimal.

$$\begin{array}{r}
 3.77 \times 2.8 = ? \\
 \begin{array}{r}
 3.77 \text{ (2 decimal places)} \\
 \times 2.8 \text{ (1 decimal place)} \\
 \hline
 3016 \\
 +754 \\
 \hline
 10.556 \text{ (3 decimal places)}
 \end{array}
 \end{array}$$

Part IV: Dividing Decimals

Scenario One: If the divisor (the number after the / or before the $\overline{)}$) does not have a decimal, set up the problems just like a regular division problem. Solve the problem just like a regular division problem. When you have your answer, put a decimal in the same place as the decimal in the dividend (the number before the / or under the $\overline{)}$).

$$\begin{array}{r}
 \overline{) 424.9} \\
 38 \overline{) 16146.2} \\
 \underline{152} \\
 94 \\
 \underline{76} \\
 186 \\
 \underline{152} \\
 342 \\
 \underline{342} \\
 0
 \end{array}$$

Scenario Two: If the divisor does have a decimal, make it a whole number before you start. Move the decimal to the end of the number, then move the decimal in the dividend the same number of places.

$$\begin{array}{r}
 \overline{) 1614.62} \\
 3.8 \overline{) 1614.62}
 \end{array}$$

Then solve the problem just like a regular division problem. Put the decimal above the decimal in the dividend. (See Scenario One problem).

Answer #1-8 on your review sheet.

B. Averages

To find an average, add all the quantities given and divide the total by the number of quantities.

Example: Find the average of 10, 20, 35, 45, and 105.

Step 1: Add all the quantities. $10 + 20 + 35 + 45 + 105 = 215$

Step 2: Divide the total by the number of given quantities. $215 / 5 = 43$

Answer #9-10 on review sheet.

C. Percentages

Percentages show fractions or decimals with a denominator of 100. Always move the decimal TWO places to the right to go from a decimal to a percentage or TWO places to the left to go from a percent to a decimal.

Examples: $.85 = 85\%$.

$.008 = .8\%$

Part I: Finding the Percent of a Given Number

To find the percent of a given number, change the percent to a decimal and MULTIPLY.

Example: 30% of 400

Step 1: $30\% = .30$

Step 2: 400

$$\begin{array}{r}
 \\
 \times .30 \\
 \hline
 12000
 \end{array}$$

Step 3: Count the digits behind the decimal in the problem and add decimal to the answer.

12000 120.00 120

(Does this make sense? Yes, 120 is about 1/3 of 400)

Part II: Finding the Percentage of a Number

To find what percentage one number is of another, divide the first number by the second, then convert the decimal answer to a percentage.

Example: What percentage is 12 of 25?

Step 1: $12/25 = .48$

Step 2: $.48 = 48\%$ (12 is 48% of 25)

Part III: Finding Percentage Increase or Decrease

To find a percentage increase or decrease, first find the percent change, then add or subtract the change to the original number.

Example: Kindles have dropped in price 18% from \$139. What is the new price of a Kindle?

Step 1: $\$139 \times .18 = \25

Step 2: $\$139 - \$25 = \$114$

Part IV: Finding a Total Value

To find a total value, given a percentage of the value, DIVIDE the given number by the given percentage.

Example: If taxes on a new car are 8% and the taxes add up to \$1600, how much is the new car?

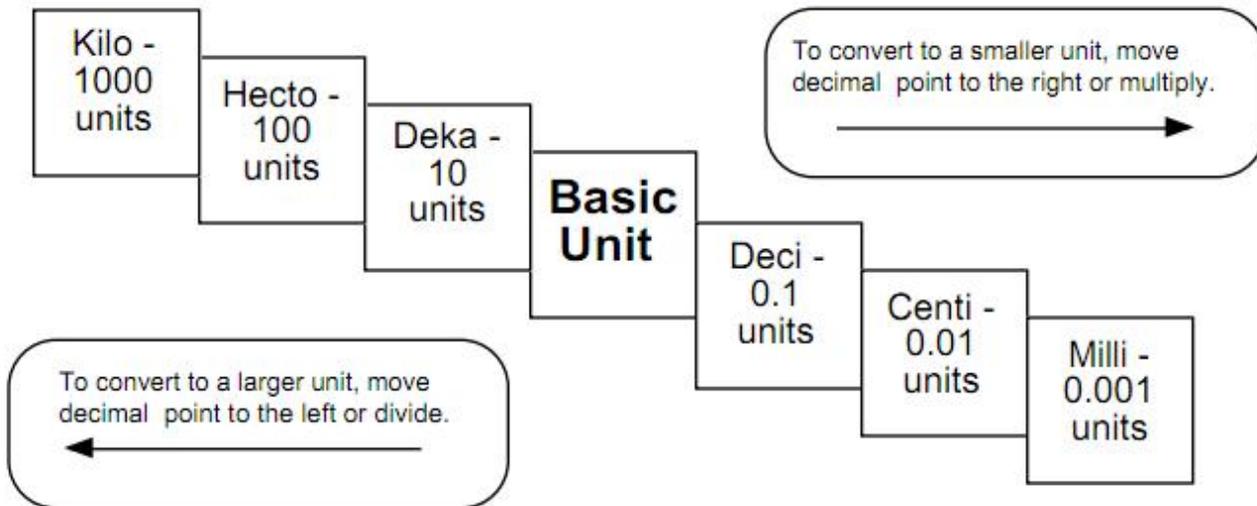
Step 1: $8\% = .08$

Step 2: $\$1600 / .08 = \$160,000 / 8 = \$20,000$ (Remember when the divisor has a decimal, move it to the end to make it a whole number and move the decimal in the dividend the same number of places. .08 becomes 8, 1600 becomes 160000.)

Answer #11- 33 on your review sheet.

D. Metric Units

Kilo-, centi-, and milli- are the most frequently used prefixes of the metric system. You need to be able to go from one to another without a calculator. You can remember the order of the prefixes by using the following sentence: *King Henry Died By Drinking Chocolate Milk*. Since the multiples and divisions of the base units are all factors of ten, you just need to move the decimal to convert from one to another.



Example: 55 centimeters = ? kilometers

Step 1: Figure out how many places to move the decimal. *King Henry Died By Drinking...* – that’s six places. (Count the one you are going to, but not the one you are on.)

Step 2: Move the decimal five places to the left since you are going from smaller to larger.

$55 \text{ centimeters} = .00055 \text{ kilometers}$

Example: 19.5 kilograms = ? milligrams

Step 1: Figure out how many places to move the decimal. ... *Henry Died By Drinking Chocolate Milk* – that’s six places. (Remember to count the one you are going to, but not the one you are on.)

Step 2: Move the decimal six places to the right since you are going from larger to smaller. In this case you need to add zeros.

$19.5 \text{ kilograms} = 19,500,000 \text{ milligrams}$

Answer #34-52 on your review sheet.

E. Scientific Notation

Scientific notation is a shorthand way to express large or tiny numbers. Since you will need to do calculations throughout the year WITHOUT A CALCULATOR, we will consider anything over 1000 to be a large number. Writing these numbers in scientific notation will help you do your calculations much quicker and easier and will help prevent mistakes in conversions from one unit to another. Like the metric system, scientific notation is based on factors of 10.

A large number written in scientific notation looks like this:

$$1.23 \times 10^{11}$$

The number before the x (1.23) is called the coefficient. The coefficient must be greater than 1 and less than 10. The number after the x is the base number and is always 10. The number in superscript (11) is the exponent.

Part I: Writing Numbers in Scientific Notation

To write a large number in scientific notation, put a decimal after the first digit. Count the number of digits after the decimal you just wrote in. This will be the exponent. Drop any zeros so that the coefficient contains as few digits as possible.

Example: 123,000,000,000

Step 1: Place a decimal after the first digit. 1.23000000000 *Step 2: Count the digits after the decimal...there are 11.*

Step 3: Drop the zeros and write in the exponent. 1.23×10^{11}

Writing tiny numbers in scientific notation is similar. The only difference is the decimal is moved to the left and the exponent is a negative. A tiny number written in scientific notation looks like this:

$$4.26 \times 10^{-8}$$

To write a tiny number in scientific notation, move the decimal after the first digit that is not a zero. Count the number of digits before the decimal you just wrote in. This will be the exponent as a negative. Drop any zeros before or after the decimal.

Example: .0000000426

Step 1: 00000004.26

Step 2: Count the digits before the decimal...there are 8.

Step 3: Drop the zeros and write in the exponent as a negative. 4.26×10^{-8}

Part II: Adding and Subtracting Numbers in Scientific Notation

To add or subtract two numbers with exponents, the exponents must be the same. You can do this by moving the decimal one way or another to get the exponents the same. Once the exponents are the same, add (if it's an addition problem) or subtract (if it's a subtraction problem) the coefficients just as you would any regular addition problem (review the previous section about decimals if you need to). The exponent will stay the same. Make sure your answer has only one digit before the decimal – you may need to change the exponent of the answer.

Example: $1.35 \times 10^6 + 3.72 \times 10^5 = ?$

Step 1: Make sure both exponents are the same. It's usually easier to go with the larger exponent so you don't have to change the exponent in your answer, so let's make both exponents 6 for this problem.

$$3.72 \times 10^5 = .372 \times 10^6$$

Step 2: Add the coefficients just as you would regular decimals. Remember to line up the decimals.

$$1.35 + .372 = 1.722$$

Step 3: Write your answer including the exponent, which is the same as what you started with.

$$1.722 \times 10^6$$

Part III: Multiplying and Dividing Numbers in Scientific Notation

To multiply exponents, multiply the coefficients just as you would regular decimals. Then add the exponents to each other. The exponents DO NOT have to be the same.

Example: $1.35 \times 10^6 \times 3.72 \times 10^5 = ?$

Step 1: Multiply the coefficients.

$$1.35 \times 3.72 = 5.022$$

Step 2: Add the exponents.

$$5 + 6 = 11$$

Step 3: Write your final answer.

$$5.022 \times 10^{11}$$

To divide exponents, divide the coefficients just as you would regular decimals, then subtract the exponents. In some cases, you may end up with a negative exponent.

Example: $5.635 \times 10^3 / 2.45 \times 10^6 = ?$

Step 1: Divide the coefficients.

$$5.635 / 2.45 = 2.3$$

Step 2: Subtract the exponents.

$$3 - 6 = -3$$

Step 3: Write your final answer.

$$2.3 \times 10^{-3}$$

Answer #53-99 on your review sheet.

F. Dimensional Analysis

Introduction

Dimensional analysis is a way to convert a quantity given in one unit to an equal quantity of another unit by lining up all the known values and multiplying. It is sometimes called factor-labeling. The best way to start a factor-labeling problem is by using what you already know. In some cases you may use more steps than a classmate to find the same answer, but it doesn't matter. Use what you know, even if the problem goes all the way across the page!

In a dimensional analysis problem, start with your given value and unit and then work toward your desired unit by writing equal values side by side. Remember you want to cancel each of the intermediate units. To cancel a unit on the top part of the problem, you have to get the unit on the bottom. Likewise, to cancel a unit that appears on the bottom part of the problem, you have to write it in on the top.

Once you have the problem written out, multiply across the top and bottom and then divide the top by the bottom.

Example: 3 years = ? seconds

Step 1: Start with the value and unit you are given. There may or may not be a number on the bottom.

$$\left[\frac{3 \text{ years}}{1} \right]$$

Step 2: Start writing in all the values you know, making sure you can cancel top and bottom. Since you have years on top right now, you need to put years on the bottom in the next segment. Keep going, canceling units as you go, until you end up with the unit you want (in this case seconds) on the top.

$$\left[\frac{3 \text{ years}}{1} \right] \left[\frac{365 \text{ days}}{1 \text{ year}} \right] \left[\frac{24 \text{ hours}}{1 \text{ day}} \right] \left[\frac{60 \text{ minutes}}{1 \text{ hour}} \right] \left[\frac{60 \text{ seconds}}{1 \text{ minute}} \right]$$

Step 3: Multiply all the values across the top. Write in scientific notation if it's a large number. Write units on your answer.

$$3 \times 365 \times 24 \times 60 \times 60 = 9.46 \times 10^7 \text{ seconds}$$

Step 4: Multiply all the values across the bottom. Write in scientific notation if it's a large number. Write units on your answer if there are any. In this case everything was cancelled so there are no units.

$$1 \times 1 \times 1 \times 1 = 1$$

Step 5: Divide the top number by the bottom number. Remember to include units.

$$9.46 \times 10^7 \text{ seconds} / 1 = 9.46 \times 10^7 \text{ seconds}$$

Step 6: Review your answer to see if it makes sense. 9.46×10^7 is a really big number. Does it make sense for there to be a lot of seconds in three years? YES! If you had gotten a tiny number, then you would need to go back and check for mistakes.

In lots of APES problems, you will need to convert both the top and bottom unit. Don't panic! Just convert the top one first and then the bottom.

Example: 50 miles per hour = ? feet per second

Step 1: Start with the value and units you are given. In this case there is a unit on top and on bottom.

$$\left[\frac{50 \text{ miles}}{1 \text{ hour}} \right]$$

Step 2: Convert miles to feet first.

$$\left[\frac{50 \text{ miles}}{1 \text{ hour}} \right] \left[\frac{5280 \text{ feet}}{1 \text{ mile}} \right]$$

Step 3: Continue the problem by converting hours to seconds.

$$\left[\frac{50 \text{ miles}}{1 \text{ hour}} \right] \left[\frac{5280 \text{ feet}}{1 \text{ mile}} \right] \left[\frac{1 \text{ hour}}{60 \text{ minutes}} \right] \left[\frac{1 \text{ minute}}{60 \text{ seconds}} \right]$$

Step 4: Multiply across the top and bottom. Divide the top by the bottom. Be sure to include units on each step. Use scientific notation for large numbers.

$$50 \times 5280 \text{ feet} \times 1 \times 1 = 264000 \text{ feet} \quad 1 \times 1 \times 60 \times 60 \text{ seconds} = 3600 \text{ seconds}$$

$$264000 \text{ feet} / 3600 \text{ seconds} = 73.33 \text{ feet/second}$$

Answer 100-112 on your review sheet.

Name _____ Period _____ Date _____

ASSIGNMENT #3 AP ENVIRONMENTAL SCIENCE MATH REVIEW 20 points

Show all work for all problems in AP Environmental science as well as on the AP exam not credit will be given if no work is shown. NO CALCULATOR may be used on this exam.

A: Decimals Practice (Please write your final answer on the line)

1. $1.678 + 2.6 =$ _____

5. $28.4 \times 9.78 =$ _____

2. $344.59 + 276.9 =$ _____

6. $32 \times 8.4 =$ _____

3. $45.7 - 13.43 =$ _____

7. $64.5 / 5 =$ _____

4. $199.007 - 124.553 =$ _____

8. $14.5 / 34.5 =$ _____

B: Averages Practice (Please write your final answer on the line)

9. Find the average of the following numbers: 11, 12, 15, and 29
= _____

10. Find the average of the following numbers: 124, 788, and 343
= _____

C: Percentages Practice (Please circle your final answer) Show all work.

10. 10 is what percent of 1,000?

11. What is 25% of 2,500?

12. What is 30% of 3,000,000?

13. 25 is what percent of 4,000?

14. 35 is what percentage of 2800?

15. What is 45% of 900?

16. You start with 100 units and end with 150 units, what is the percentage increase?

17. You start with 100 units and end with 50 units, what is the percentage decrease?

18. You start with 25 units. How many units would you have after a 400% increase?

19. You start with 200 units. How many units would you have after a 75% decrease?

20. The population of a certain country is decreasing by 0.8% every year. The population in 2015 is 9 million, what will the population be in 2016?

21. Thirteen percent of a 12,000 acre forest is being logged. How many acres will be logged?

22. 14,000 acres of a 40,000 acre forest burned in a forest fire. What percentage of the forest was damaged?

23. Home prices have dropped 5% in the past three years. An average home in Indianapolis three years ago was \$130,000. What's the average home price now?

24. In a small oak tree, the biomass of insects makes up 3000 kilograms. This is 4% of the total biomass of the tree. What is the total biomass of the tree?
25. 900 acres, or 15%, of a forest is being logged. How large is the forest?
26. You use 1,000 kilowatts of power. You increase your usage by 40%. How many total kilowatts are you using?
27. A light bulb uses 100 watts of power. 95 watts are wasted as heat. What percentage of energy is used to light the bulb?
28. A fluorescent bulb uses 24 watts and gives off the same amount of light as a 100 watt regular bulb. What is the percentage in energy savings by switching to a fluorescent bulb?
29. Your old microwave used 2 kilowatts an hour. Your new microwave uses 1.5 kilowatts an hour. What is your percent energy savings?
30. A population starts the year with 1,000 residents. By the end of the year, 100 new babies were born. What is the percent increase for this population?
31. You dissolve 5 grams of salt into 95 grams of water. What is your percent salt solution?
32. If 1.2 billion tons of iron ore are produced every year and 95% is used in steel production. How many tons of iron ore are used in steel production?

D. Decimals Practice (Please write your final answer on the line)

33. 670,000 meters = _____ hectometers
34. 6544 liters = _____ milliliters
35. 21. .078 kilometers = _____ meters
36. 17 grams = _____ kilograms
37. 2000 mg = _____ g
38. 5 L = _____ mL
39. 16 cm = _____ mm
40. 104 km = _____ m
41. 2500 m = _____ km
42. 480 cm = _____ m

43. 75 mL = _____ L
44. 65 g = _____ mg
45. 5.6 kg = _____ g

Compare using <, >, or =.

46. 56 cm 6 m
47. 7 g 98 mg
48. 63 cm 6 m
49. 5 g 508 mg
50. 1,500 mL 1.5 L
51. 43 mg 5 g

E. Scientific Notation Practice (Please write your final answer on the line)

Write the following numbers in scientific notation:

52. 145,000,000,000 = _____
53. 13 million = _____
54. 32 trillion = _____
55. 2.5 billion = _____
56. 0.000348 = _____
57. 0.00003 = _____
58. 170,000 = _____
59. 0.005 = _____
60. 376 = _____
61. 4160 = _____

Write the following numbers in standard notation (convert from scientific)

62. $3 \times 10^7 =$ _____
63. $5.6 \times 10^3 =$ _____
64. $8.2 \times 10^8 =$ _____
65. $7 \times 10^1 =$ _____
66. $2.1 \times 10^0 =$ _____
67. $3.4 \times 10^{-2} =$ _____
68. $5.1 \times 10^{-1} =$ _____
69. $6 \times 10^{-9} =$ _____

Complete the following calculations:

70. $3 \times 10^3 + 4 \times 10^3 =$ _____
71. $4.67 \times 10^4 + 323 \times 10^3 =$ _____
72. $3.7 \times 10^{13} - 2.9 \times 10^{11} =$ _____
73. $0.0012 \times 10^{-13} - 1.5 \times 10^{-10} =$ _____
74. $1.9 \times 10^{-4} / 9.5 \times 10^{-6} =$ _____
75. $3.7 \times 10^3 \times 2.9 \times 10^2 =$ _____
76. $1.3 \times 10^8 \times 2.4 \times 10^4 =$ _____

77. $10^2 \times 10^5 =$ _____

78. $10^1 \times 10^2 =$ _____

79. $10^2 \times 10^{-5} =$ _____

80. $10^{-1} \times 10^7 =$ _____

81. $10^{-3} \times 10^{-3} =$ _____

82. $10^{-4} \times 10^{-2} =$ _____

83. $10^4 / 10^5 =$ _____

84. $10^1 / 10^3 =$ _____

85. $10^2 / 10^{-3} =$ _____

86. $10^{-6} / 10^{-4} =$ _____

87. $10^{-2} / 10^{-6} =$ _____

Solve the following using answer using scientific notation

88. $0.004 \times 0.006 =$ _____

89. $0.025 \times 0.004 =$ _____

90. $0.00005 \times 0.000007 =$ _____

91. $26,000 \times 1,000 =$ _____

92. $237 \times 1,000,000 =$ _____

93. $320,000,000 \times 0.0005 =$ _____

94. $0.003 \times 4,000 =$ _____

95. $2,000 / 13,000 =$ _____

96. $25 / 0.0015 =$ _____

97. $200 / 1,000,000 =$ _____

98. $0.001 / .00001 =$ _____

F: Dimensional Analysis Practice: Set up and solve the following equations using all units and showing all work. Use scientific notation when appropriate. **Show all work. Do not use a calculator.** Circle your answers.

HINT: Try using scientific notation wherever possible

Conversions:

1 square mile = 640 acres

1 hectare (Ha) = 2.5 acres

1 metric ton = 1000 kg

99. A 1 million square mile forest is how many hectares?

100. There are 2.2 pounds in 1 kilogram. How many pounds in 140 kilograms?

101. 8.9×10^5 tons = _____ kg

102. There are 2.54 centimeters in one inch. How many centimeters are in 32 inches?

103. There are 36 inches in one yard, how many centimeters are in two yards?

104. There are 100 centimeters in 1 meter. How many yards are in one meter?

105. Given 1000 watts in 1 kilowatt, how many watts are in 2.4 kilowatts?

106. 1 megawatt is 10^6 watts. How many kilowatts are there in one megawatt?

107. There are 1,000 grams in one kilogram, and 1,000 micrograms in one gram. How many micrograms are in 2,500 kilograms?

108. You have 24 light bulbs, each using 100 watts an hour. How many watts will be used in 120 hours?

109. 1,000 homes are in a city. Each home uses 200 kilowatt hours a month. How many kilowatt hours does the entire city use in a month?

110. In Poland the largest coal burning power plant in the world produces 27.5 terawatt hours of electricity each year (1 terawatt = 1 billion kilowatts). 10,000 BTU's produce 1 kilowatt hour (kW-h) of electricity. 1 pound of coal produces 10,000 BTU's of heat. How many pounds of coal are consumed by this power plant every year?

111. Assuming that the coal used by the plant in question 110 is 1.5% sulfur by weight how many pounds of sulfur are released by this power plant every day.

HOME Movie questions 5 points

Please complete the following questions as you watch the movie, *Home*, which can be found at <http://www.youtube.com/homeproject>.

1. What does the following term *homo sapiens* mean?
2. When did life originate on Earth?
3. When did homo sapiens originate?
4. What was our planet like originally?
5. What was a cloud of good knitted dust particles similar to so many similar clusters in the universe?
6. What was our Earth was like at its birth?
7. Why was it important for the Earth to be at the right distance from the sun-not too far, not too near?
8. How is the water cycle described?
9. How did the ocean get salty?
10. What is shared by every life-form on our planet?
11. What originated as stardust?
12. What provides the Earth's red, black, blue, and yellow?
13. Where did life first spark into being?
14. What fed off the Earth's heat?
15. What organism were the first that had the capacity to turn to the sun to capture its energy?
16. How did these organisms change the destiny of our planet?
17. What happened to the carbon that poisoned the atmosphere?
18. How much time can be read in the walls of Colorado's Grand Canyon?
19. How did the organisms grow their shells?
20. What happened to the shells of the microorganisms that died?
21. What did plant life finally do?
22. What is the Earth's water cycle?
23. Why water called one of the most unstable of all?
24. What happens when water freezes?
25. .What is the engine of life?
26. Why are water and air inseparable?
27. What are the green organisms that supply _____% of the oxygen?
28. Coral is the mutualistic relationship between what two organisms?
29. Where is and how big is the Great Barrier Reef?
30. The Great Barrier Reef has _____ species of fish, ___ species of mollusks and _____ species of coral.
31. It took more than _____ years for it to make trees.
32. In a chain of species, why are trees a pinnacle species?
33. Trees have inherited from _____ the power to capture light's energy.
34. Why are trees so important for the formation of soils?
35. Soils are the factory of _____.
36. How is soil a world of incessant activity?
37. Why is it said that the Earth is a miracle?
38. What is meant by the phrase that "Every species has a role to play"?
39. Humans settled down after _____ nomadic years.
40. The _____ was, an invention that opened up new horizons and turned humans into navigators.
41. The majority of mankind lives _____.
42. The first _____ grew up less than 6000 years ago.
43. One in _____ people still use only the strength of their bodies.
44. _____ billion human beings are more than the combined population of all the wealthy nations.
45. _____ are a family's only assets, as long as every extra pair of hands is a necessary contribution to its subsistence.
46. _____ feeds people, clothes them and provides for their daily needs. Everything comes from the Earth.
47. How did towns change humanity's nature as well as its destiny?
48. The physical energy and strength with which nature had not endowed them was found in _____

49. _____ was humans' first great revolution that was developed barely _____ years ago.
50. The uncertainty of _____ resulted in the first surpluses and gave birth to cities and civilizations.
51. Humans harnessed the energy of animal species and plant life, from which they at last extracted the _____.
52. _____ are the yeast of life.
53. The principal daily concern of all humans is to _____.
54. _____ of humankind tills the soil over _____ of them by hand.
55. What is the pure energy-the energy of the sun-captured over millions of years by millions of plants more than a hundred million years ago. _____
56. In the last _____ years, the Earth's population has almost _____, and over _____ people have moved to the cities.
57. Today, over _____ of the world's _____ inhabitants live in cities.
58. _____ resulted in the invention of _____ which in turn permitted the invention of skyscrapers.
59. A _____ of oil generates as much energy as _____ in 24 hours, but worldwide only _____ percent of farmers have use of a tractor.
60. In the United States, only _____ farmers are left. (Equal to number of people in jails and prison in US)
61. They produce enough grain to feed _____ people. But most of that grain is used to feed _____ or _____.
62. Agriculture accounts for _____% of humanity's water consumption.
63. _____, another gift of the petrochemical revolution, exterminated _____.
64. Toxic pesticides seeped into the _____.
65. _____ of the varieties developed by farmers over _____ of years have been wiped out.
66. How can a growing worldwide demand for meat be satisfied without recourse to _____ farms?
67. The result is that it takes _____ of water to produce one kilogram of potatoes, _____ for one kilo of rice and _____ for one kilo of beef.
68. We know that the end _____ is imminent, but we refuse to believe it.
69. The automobile shapes _____ where every _____, a safe distance from the asphyxiated _____, and where neat rows of houses huddle round _____.
70. If LA's model were followed by all, the planet wouldn't have _____ vehicles, as it does today, but _____.
71. Everywhere, machines dig, bore and rip from the Earth the pieces of stars buried in its depths since its creation: _____.
72. As a privilege of power, _____% of this mineral wealth is consumed by _____% of the world's population.
73. Before the end of this century excessive _____ will have exhausted nearly all the planet's _____.
74. Since _____, the volume of international trade has increased _____ times over.
75. _____ percent of trade goes by sea. _____ million containers are transported every year headed for the world's major hubs of consumption.
76. _____ is one of the biggest construction sites in the world, a country where the impossible becomes possible.
77. The ocean covers _____ of the planet.
78. The _____ remain a secret. They contain _____ of species whose existence remains a mystery to us.
79. Since _____, fishing catches have increased _____, from _____ to _____ million metric tons a year.
80. _____ of fishing grounds are exhausted, depleted or in danger of being so. Most large fish have been fished out of existence since they have no time to _____. Fish is the staple diet of one in five humans.
81. _____ humans live in the world's desert lands, more than the combined population of _____.
82. What is fossil water?
83. Across the planet, one major river in _____ no longer flows into the sea for several months of the year.
84. Lake Powell took _____ to reach high-peak mark. Its level is now _____ of that.
85. Water shortages could affect nearly _____ people before _____.
86. These wetlands are crucial to all life on Earth. They represent _____ percent of the planet. What are wetlands? _____
87. Trees provide a habitat for _____ of the planet's biodiversity-that is to say, of all life on Earth. Every year, Why is this biodiversity important? _____
88. What are mangrove forests and why are they important?
89. Every year, _____ hectares of tropical forests disappear in smoke and as lumber.

90. What happens when the rain forest burn?
91. How long did it take Borneo's vast primary forest to totally disappear? _____
92. Over _____ people-almost a _____ of the world's population-still depend on charcoal for cooking and heating.
93. On the hills of Haiti, only _____ percent of the forests are left.
94. What is the story of the Rapa Nui, the inhabitants of the Easter Island?
95. In _____ years, the gap between rich and poor has grown wider than ever. Today, _____ of the world's wealth is in the hands of the richest _____ percent of the population.
96. One human being in _____ now lives in a precarious, unhealthy, overpopulated environment, without access to daily necessities, such as water, sanitation or electricity. Hunger is spreading once more. It affects nearly _____ people.
97. It's all about carbon. Under the effect of global warming, the ice cap has lost _____ % of its thickness in _____ years. Its surface area in the summer shrinks year by year. It could disappear before _____.
98. By _____, a _____ of the Earth's species could be threatened with extinction.
99. Around the North Pole, the ice cap has lost _____ % of its surface area in _____ years.
100. Greenland's ice contains _____ % of the freshwater of the whole planet. When it melts, sea levels will rise by nearly _____ meters.
101. Sea levels are rising. Water expanding as it gets warmer caused, in the 20th century alone, a rise of _____ centimeters.
102. Coral reefs, for example, are extremely sensitive to the slightest change in water temperature. _____ percent have disappeared.
103. _____ of the _____ biggest cities stand on a coastline or river estuary. As the seas rise, salt will invade the water table, depriving inhabitants of drinking water.
104. What will happen when the glaciers in the Himalayas recede? _____
105. Droughts are occurring all over the planet. In Australia, _____ of farmland is already affected.
106. The permafrost is the ground that is constantly frozen. What will happen when it melts? _____
107. The world spends _____ times more on military expenditures than on aid to developing countries.
108. _____ people a day die because of dirty drinking water
109. _____ people have no access to safe drinking water
110. Nearly _____ people are going hungry
111. Over _____ % of grain traded around the world is used for animal feed or bio fuels
112. _____ % of arable land has suffered long-term damage
113. Every year, _____ hectares of forest disappear
114. One mammal in _____, one bird in _____, one amphibian in _____ are threatened with extinction
115. Species are dying out at a rhythm _____ times faster than the natural rate
116. _____ of fishing grounds are exhausted, depleted or in dangerous decline
117. The average temperature of the last _____ years have been the highest ever recorded
118. The ice cap is _____ % thinner than _____ years ago
119. There may be at least _____ climate refugees by 2050
120. In Bangladesh, a man thought the unthinkable and founded a bank that lends only to the poor. In barely _____ years, it has changed the lives of _____ people around the world.
121. Gabon is one of the world's leading producers of wood. What is selective logging? _____
122. I have seen houses producing their own energy. _____ people live in the world's first ever eco-friendly district in _____.
123. _____ % of the energy we consume comes from fossil energy sources. Every week, _____ new coal-fired generating plants are built in _____ alone.
124. _____, _____, _____ and _____ are the biggest investors in renewable energy. They have already created over _____ jobs.
125. In _____ hour, the sun gives the Earth the same amount of energy as that consumed by all humanity in _____ year. As long as the Earth exists, the sun's energy will be inexhaustible.