AP Environmental Science
Summer Assignment – 2020

Mrs. Rowder

WELCOME TO APES!
I am so excited you signed up for this course! I love teaching Environmental Science and especially APES because it provides a greater opportunity to delve deeper into the content and more time to explore laboratory inquiries all while getting to better know each other and work together. Since there are still so many unknowns for next school year, we are going to proceed as the lab course it is intended to be with hopes for hands-on inquiry this fall. To be the best prepared for a successful year, I have put together these assignments to be completed and submitted at different times. Do not let the length of this document discourage you. If you browse through it, you will see that most of it provides step-by-step instructions, examples, and answer sheets.

Each section of the summer assignment has a different due date and weight. Please refer to each section for the information. If you have questions at any time, please e-mail me, Mrs. Rowder, at rowderj@calvertnet.k12.md.us I look forward to working with you!

Part I: Current Events in Environmental Science
Due: Tuesday, September 1, 2020 (first day of school)
Lecture Process Grade

Find 1 online news article from a credible source that relates to a topic we will be studying in APES. You must provide the title, the news source, and the link of the article on a current event-topics currently in the news this summer. For a list of topics we will be studying, please go to the AP Central Website and scroll down to "Course Content" for acceptable topics: https://apstudents.collegeboard.org/courses/ap-environmental-science

Articles must be at least 5 paragraphs long. For each article, type the following information on a separate document in Calibri or Times New Roman, 12 font, doubled spaced with 1 inch margins:

1. Title of article
2. Source of article (what news source it came from), include the link
3. Date of article
4. A one-paragraph summary of the content of the article
5. A one-paragraph connection between the article and how it is related to the content of the APES course
6. A paragraph about your opinion on the content of the article- not it was a "good" or "bad" article but what you think about the content or issues presented in the article.
7. A paragraph that discusses possible sources of bias in the presentation of the article.

The article link must be included to receive credit.

Part II: Lab Safety Rules
Due: Wednesday, September 2, 2020
Lab Product Grade

Please review your lab safety rules and be prepared for your lab safety test on Wednesday, September 2, 2020.

Laboratory Safety Rules

Safety in the laboratory is important to prevent serious accidents to yourself and to others. Follow the rules and listen to all directions given by your teacher. You are responsible for yourself and classmates while working in the laboratory.

Most accidents can be prevented if you make safety a HABIT!

1. Know where all emergency equipment is and how to use it. Know the proper fire drill procedure.

2. Be able to identify and properly use all science equipment used in the classroom.

3. Read and follow all directions very carefully.

4. Listen to your teacher for all verbal instructions and safeguards before beginning the experiment.

5. If your teacher asks for your attention during the experiment, immediately stop what you are doing and pay special attention.

6. Never mix, touch, taste, heat or inhale chemicals unless you are told by your teacher it is all right to do so.

7. Safety goggles and lab aprons must always be worn during exercises specified by the teacher. These will include:

    - when using caustic or explosive chemicals/materials
    - when using hot liquids or solids
    - when heating of liquids or solids in vessels subject to heat fracture
    - when cutting or heating glassware
    - when examining and/or dissecting organisms stored in preservative chemicals such as formalin or alcohol

8. Take precautions when handling chemicals.

9. Do not perform any unauthorized experiments.

10. Do not perform any experiments when your teacher is not in the room.

11. When using a Bunsen burner, strike the match before turning on the gas.

12. Turn off the gas (at the jet) when not in use.

13. Never work alone.

14. Read all labels on all bottles carefully before using the contents. Have your lab partner check to see that you are using the proper amounts of chemicals.

15. Loose clothing should not be worn near burner flames. Long hair should be tied back. All excess chemicals should be placed well away from flame.

16. Handle all hot objects with clamps or tongs. Use the proper tool for the proper job. Do not use these items for any other purposes.

17. When heating liquids in a test tube, tilt the tube while moving it gently back and forth.

18. Never point a test tube you are heating toward yourself or anyone else.

19. When mixing acid and water, always add the acid to the water slowly. <u>NEVER ADD WATER TO ACID</u>.

20. When inserting a glass tube into a cork or rubber stopper, first fire polish the end of the tube then lubricate it with water, soap or preferably glycerin. Hold the tube near the end being inserted with a cloth and carefully twist the stopper into the tube.

21. When testing for odors hold the chemical about an arm's length away and wave your hand over it, cautiously sniffing from a distance. (Test for odors only after teacher approval).

22. Never contaminate stock solutions by pouring chemicals back into their original bottles. Also, never exchange stoppers between bottles or lay stoppers on the table.

23. To prevent contamination, all science equipment should be cleaned before and after each use.

24. Wash hands thoroughly at the end of each lab experiment.

25. In case of burns from an acid or base, wash the affected area immediately with plenty of running water. If the eye is involved, quickly rinse it with running water by holding the eyelid open and rinsing from the inner corner of the eye outward. NOTE: Most eye burns are caused when students rub their eyes with unclean hands.

26. Report all accidents to your teacher immediately.

27. Do not throw matches into waste baskets. A special container should be provided for their disposal.

28. Do not use household electricity for experiments. Instead, use batteries or low voltage power supplies.

29. When inserting or removing an electrical plug from its socket, grasp the plug and not the cord. Make sure your hands are dry.

30. Inspect all electrical power cords from bare or frayed wires.

31. Dispose of all waste materials (chemicals, etc.) in the special container identified by your teacher. Do not pour any solid waste or broken glass down the drain of a sink.

32. All science projects or individual experiments must be approved by the teacher before you begin.

33. When chiseling or grinding rocks, safety goggles must be worn.

34. Never eat or drink from laboratory equipment. Always use a mechanical method to pipet a liquid. Never put your mouth on a pipet!

35. Spilled acid may be neutralized with sodium bicarbonate (baking soda). Spilled base may be neutralized with diluted acetic acid (vinegar).

36. Be extra careful when working with sharp instruments such as dissecting tools. Be aware of the mechanical advantage that simple machines have and use caution when using them.

37. Be prepared for the unexpected. Have a plan for specific emergencies.

38. Unsafe technique or any form of horseplay will not be tolerated. Violators of safety rules will have lab privileges revoked.

39. You are responsible for your own actions. Never do anything that might injure yourself or others.

40. Students should inform teachers of any health conditions they are aware of. Examples: allergies, contact lenses, headaches, etc.

41. If a laboratory fire erupts you should notify your teacher and follow instructions carefully.

42. Handle animals only with permission. Wash hands thoroughly after handling animals.

43. Do not clean up blood except your own. Report blood stained surfaces to the teacher.

44. Microscope work should always be done in accordance with teacher instruction. All precautions dealing with electrical equipment should be followed. If microscopes have mirrors, sunlight must not be used as a light source since it can damage the eye.

45. Students with eye infections must not use a microscope.

PART III: Math Practice Problems **Due: Monday, September 7, 2020**
AP Environmental Science Math Prep **Lab Process Grade**

Since the unit tests you will take are designed to help prepare you for the APES exam and include math, you need to know how to complete conversions and calculations. The calculations on the tests and exams are written to be fairly easy and generally come out in whole numbers or to only a few decimal places. The challenge is in setting up the problems correctly and knowing enough basic math to solve the problems. College Board gives 1 point in FRQs for just the correct set-up. While we will not devote entire lessons to learning these concepts because you have completed it in the prerequisite courses, we will practice throughout the year and I am always here to help you. With practice, you will be a math expert by the time the exam rolls around. Make sure you ALWAYS show all of your work!

Contents

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. If you get an answer that seems unlikely, it probably is. Go back and check your work.

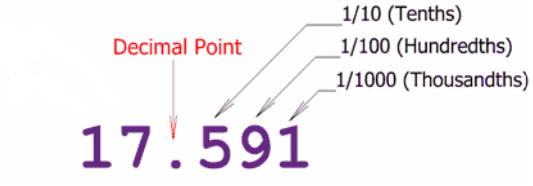
Directions

Read each section below for review. Look over the examples and use them for help on the practice problems. **For the practice problems, print out and use the answer sheets at the end of this assignment, write out all your work, and be sure to include units on each step.** Check your work.

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.

$3.77 \times 2.8 = ?$

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

Part IV: Dividing Decimals

Scenario One: If the divisor (the number after the / or before the ⟌) 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 ⟌).

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

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.

$$3.8\overline{)\,1614.62}$$

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

Practice: Remember to show all your work, include units if given, and NO CALCULATORS! All work and answers go on your answer sheet.

1. 1.678 + 2.456 =
2. 344.598 + 276.9 =
3. 1229.078 + .0567 =
4. 45.937 – 13.43 =
5. 199.007 – 124.553 =
6. 90.3 – 32.679 =
7. 28.4 x 9.78 =
8. 324.45 x 98.4 =
9. 1256.93 x 12.38 =
10. 64.5 / 5 =
11. 114.54 / 34.5 =
12. 3300.584 / 34.67 =

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

Practice: Remember to show all your work, include units if given, and NO CALCULATORS! All work and answers go on your answer sheet.

13. Find the average of the following numbers: 11, 12, 13, 14, 15, 23, and 29
14. Find the average of the following numbers: 124, 456, 788, and 343
15. Find the average of the following numbers: 4.56, .0078, 23.45, and .9872

Percentages

Introduction:

Percents show fractions or decimals with a denominator of 100. Always move the decimal TWO places to the right 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

x .30

12000

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

12000 → 120.00 → 120

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 x .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.)*

Part V: Calculating percent change

Percentage change is calculated this way:

$$Percent\ change = \frac{later - earlier}{earlier} \times 100\%$$

The sign indicates whether it is a decrease or increase.

Example: Staff hours for 2006 were 28011 and for 2007 were 31230. How do I find the percentage of increase?

$$Percent\ change = \frac{31230 - 28011}{28011} \times 100\% = \frac{3219}{28011} \times 100\% = 0.115 \times 100\% = 11.5\%.$$

Since this is a positive figure, it is an 11.5% increase.

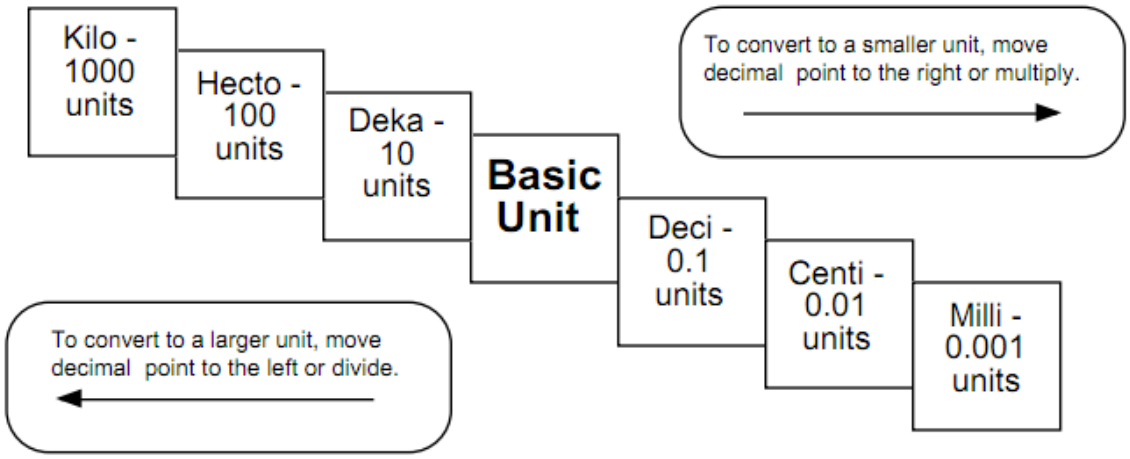
Practice: Remember to show all your work, include units if given, and NO CALCULATORS! All work and answers go on your answer sheet.

16. What is 45% of 900?
17. Thirteen percent of a 12,000 acre forest is being logged. How many acres will be logged?
18. A water heater tank holds 280 gallons. Two percent of the water is lost as steam. How many gallons remain to be used?
19. What percentage is 25 of 162.5?
20. 35 is what percentage of 2800?
21. 14,000 acres of a 40,000 acre forest burned in a forest fire. What percentage of the forest was damaged?
22. You have driven the first 150 miles of a 2000 mile trip. What percentage of the trip have you traveled?
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. The Greenland Ice Sheet contains 2,850,000 cubic kilometers of ice. It is melting at a rate of .006% per year. How many cubic kilometers are lost each year?
25. 235 acres, or 15%, of a forest is being logged. How large is the forest?
26. A teenager consumes 20% of her calories each day in the form of protein. If she is getting 700 calories a day from protein, how many calories is she consuming per day?
27. The biomass of a small oak tree increases from 3000 kilograms to 9000 kilograms in 2 years. What is the percent increase in the biomass of the tree per year?

Go on to the next page!

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 centimeters = .00055 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 kilograms = 19,500,000 milligrams

Practice: Remember to show all your work, include units if given, and NO CALCULATORS! All work and answers go on your answer sheet.

28. 1200 kilograms = ? milligrams
29. 14000 millimeters = ? meters
30. 670 hectometers = ? centimeters
31. 6544 liters = ? milliliters
32. .078 kilometers = ? meters
33. 17 grams = ? kilograms

Scientific Notation

Introduction:

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:

1.23×10^{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.

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

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

$$\begin{array}{r} 1.35 \\ +\ .372 \\ \hline 1.722 \end{array}$$

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

Step 1: Multiply the coefficients.

$$\begin{array}{r} 1.35 \\ \times\ 3.72 \\ \hline 270 \\ 9450 \\ 40500 \\ \hline 50220 \rightarrow 5.022 \end{array}$$

Step 2: Add the exponents.

$5 + 6 = 11$

Step 3: *Write your final answer.*

5.022×10^{11}

To <u>divide</u> 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.

$5.635 / 3.45 = 2.3$

Step 2: Subtract the exponents.

$3 - 6 = -3$

Step 3: Write your final answer.

2.3×10^{-3}

<u>Practice:</u> Remember to show all your work, include units if given, and NO CALCULATORS! All work and answers go on your answer sheet.

Write the following numbers in scientific notation:

34. 145,000,000,000
35. 13 million
36. 435 billion
37. .000348
38. 135 trillion
39. 24 thousand

Complete the following calculations:

40. $3 \times 10^3 + 4 \times 10^3$
41. $4.67 \times 10^4 + 323 \times 10^3$
42. $7.89 \times 10^{-6} + 2.35 \times 10^{-8}$
43. $9.85 \times 10^4 - 6.35 \times 10^4$
44. $2.9 \times 10^{11} - 3.7 \times 10^{13}$
45. $1.278 \times 10^{-13} - 1.021 \times 10^{-10}$
46. three hundred thousand plus forty-seven thousand
47. 13 million minus 11 thousand
48. $1.32 \times 10^8 \text{ X } 2.34 \times 10^4$
49. $3.78 \times 10^3 \text{ X } 2.9 \times 10^2$
50. three million times eighteen thousand
51. one thousandth of seven thousand
52. eight ten-thousandths of thirty-five million
53. $3.45 \times 10^9 / 2.6 \times 10^3$

54. $1.98 \times 10^{-4} / 1.72 \times 10^{-6}$

55. twelve thousand divided by four thousand

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.

$$\frac{3 \text{ years}}{}$$

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.

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

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

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

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

$$\frac{50 \text{ miles}}{1 \text{ hour}}$$

Step 2: Convert miles to feet first.

$$\frac{\cancel{50 \text{ miles}}}{1 \text{ hour}} \times \frac{5280 \text{ feet}}{\cancel{1 \text{ mile}}}$$

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

$$\frac{\cancel{50 \text{ miles}}}{1 \text{ hour}} \times \frac{5280 \text{ feet}}{1 \text{ mile}} \times \frac{\cancel{1 \text{ hour}}}{60 \text{ minutes}} \times \frac{\cancel{1 \text{ minute}}}{60 \text{ seconds}}$$

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 x 5280 feet x 1 x 1 = 264000 feet
1 x 1 x 60 x 60 seconds = 3600 seconds
264000 feet / 3600 seconds = 73.33 feet/second

Practice: Remember to show all your work, include units if given, and NO CALCULATORS! All work and answers go on your answer sheet. Use scientific notation when appropriate.

Conversions:
1 square mile = 640 acres
1 hectare (Ha) = 2.47 acres
1 kw-hr = 3,413 BTUs
1 barrel of oil = 159 liters
1 metric ton = 1000 kg

56. 134 miles = ? inches
57. 8.9×10^5 tons = ? ounces
58. 1.35 kilometers per second = ? miles per hour
59. A city that uses ten billion BTUs of energy each month is using how many kilowatt-hours of energy?
60. A 340 million square mile forest is how many hectares?

61. If one barrel of crude oil provides six million BTUs of energy, how many BTUs of energy will one liter of crude oil provide?
62. Fifty eight thousand kilograms of solid waste is equivalent to how many metric tons?

Data for plotting graphs- print out 4 sheets of graph paper on last page

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Graphing Practice Problem #1:

Ethylene is a plant hormone that causes fruit to mature. The data below show the amount of time it takes for fruit to mature from the time of the first application of ethylene by spraying a field of trees.

Amount of ethylene in ml/m^2	Wine sap Apples: Days to Maturity	Golden Apples: Days to Maturity	Gala Apples: Days to Maturity
10	14	14	15
15	12	12	13
20	11	9	10
25	10	7	9
30	8	7	8
35	8	7	7

A. Make a line graph of the data.
B. What is the dependent variable?
C. What is the independent variable?

Graphing Practice Problem #2:

A clam farmer has been keeping records concerning the water temperature and the number of clams developing from fertilized eggs. The data is recorded below.

Water Temperature in °C	Number of developing clams
15	75
20	90
25	120
30	140
35	75
40	40
45	15
50	0

A. Make a line graph of the data.
B. What is the dependent variable?
C. What is the independent variable?
D. What is the optimum (best) temperature for clam development?

Graphing Practice Problem #3:

The thickness of the annual rings indicate what type of environmental situation was occurring at the time of its development. A thin ring, usually indicates a rough period of development. Lack of water, forest fires, or a major insect infestation. On the other hand, a thick ring indicates just the opposite.

Age of the tree in years	Average thickness of the annual rings in cm. Forest A	Average thickness of the annual rings in cm. Forest B
10	2.0	2.2
20	2.2	2.5
30	3.5	3.6
35	3.0	3.8
50	4.5	4.0
60	4.3	4.5

A. Make a line graph of the data.
B. What is the dependent variable?
C. What is the independent variable?
D. What was the average thickness of the annual rings of 40 year old trees in Forest A?
E. Based on this data, what can you conclude about Forest A and Forest B?

Graphing Practice Problem #4:

pH of water	Number of tadpoles
8.0	45
7.5	69
7.0	78
6.5	88
6.0	43
5.5	23

A. Make a line graph of the data.
B. What is the dependent variable?
C. What is the independent variable?
D. What is the average pH in this experiment?

E. What is the average number of tadpoles per sample?
F. What is the optimum water pH for tadpole development?
G. Between what two pH readings is there the greatest change in tadpole number?
H. What is the percent change in number of tadpoles from pH 6.5 to pH 8?
I. How many tadpoles would we expect to find in water with a pH reading of 5.0?

APES Math Prep Answer Sheet

Remember to **SHOW ALL YOUR WORK**, include units on each step and circle your final answer. NO CALCULATORS!!!!

DECIMALS
1.
2
3.
4.
5.

6.
7.
8.
9.
10.
11.

12.

AVERAGES
13.
14

15.

PERCENTAGES
16.
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18.
19.

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21.
22.
23.
24.
25.
26.
27.

METRIC SYSTEM
28.
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30.
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SCIENTIFIC NOTATION
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36.
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DIMENSIONAL ANALYSIS

56.

57.

58.

59.
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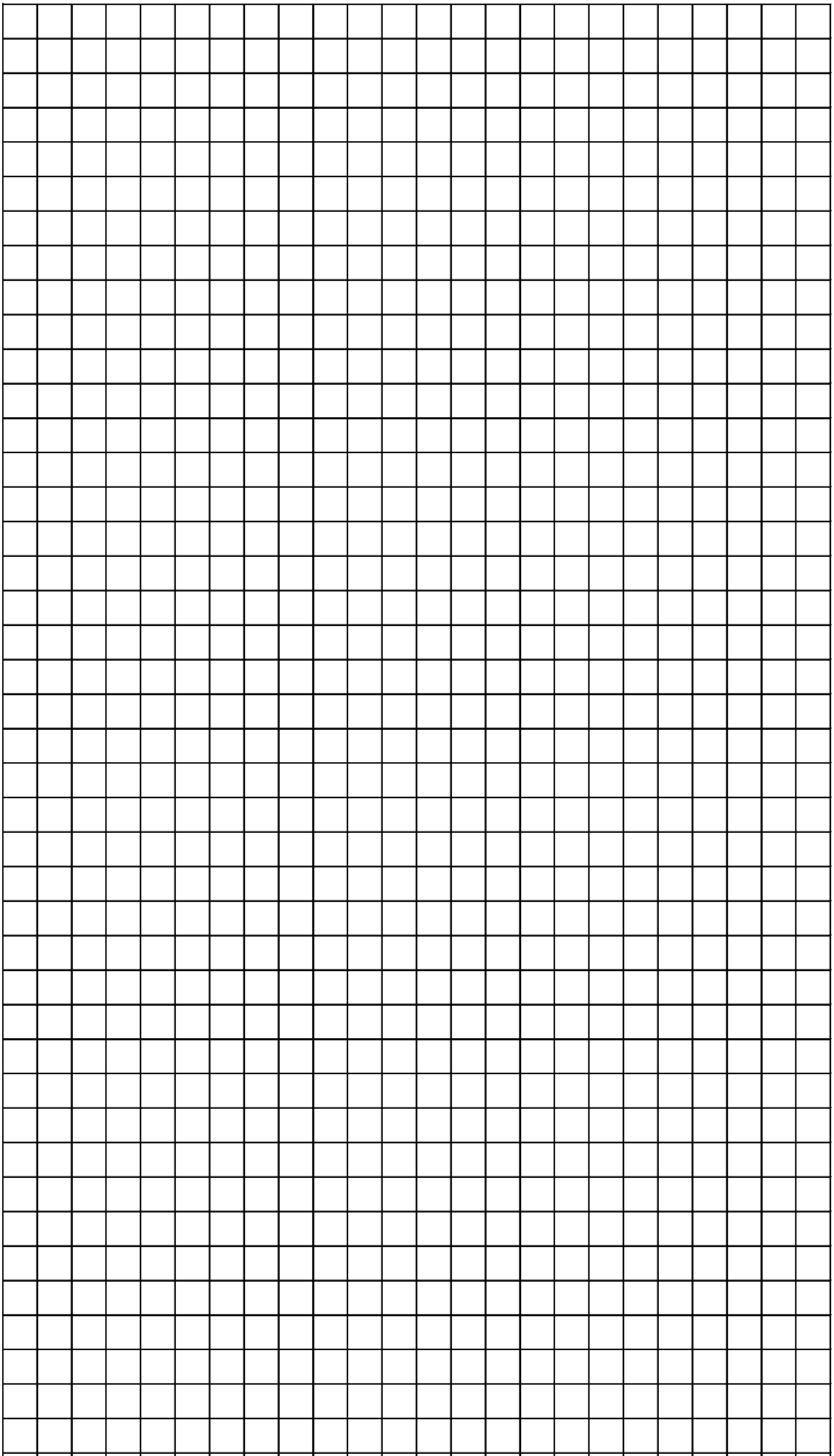
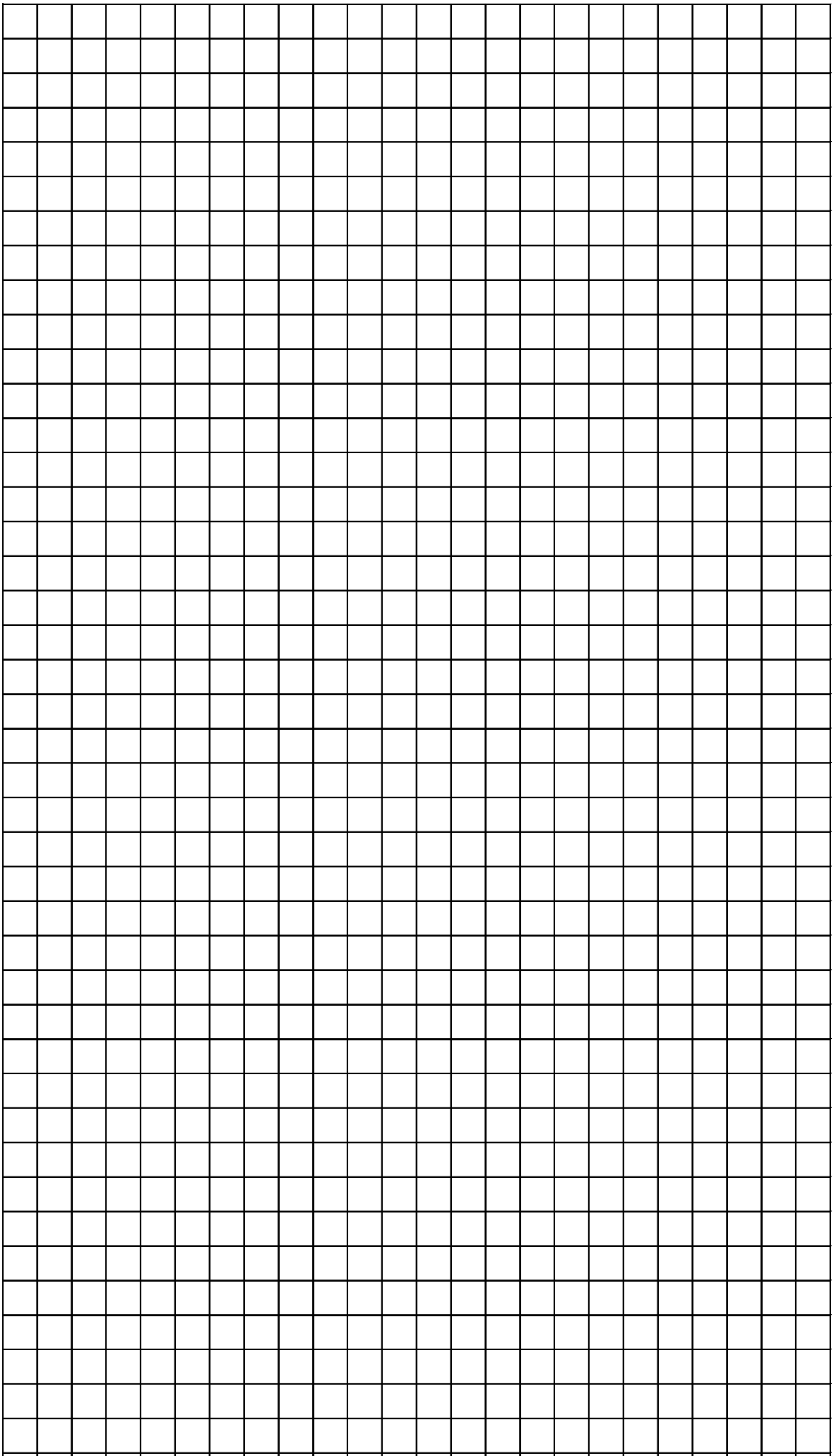
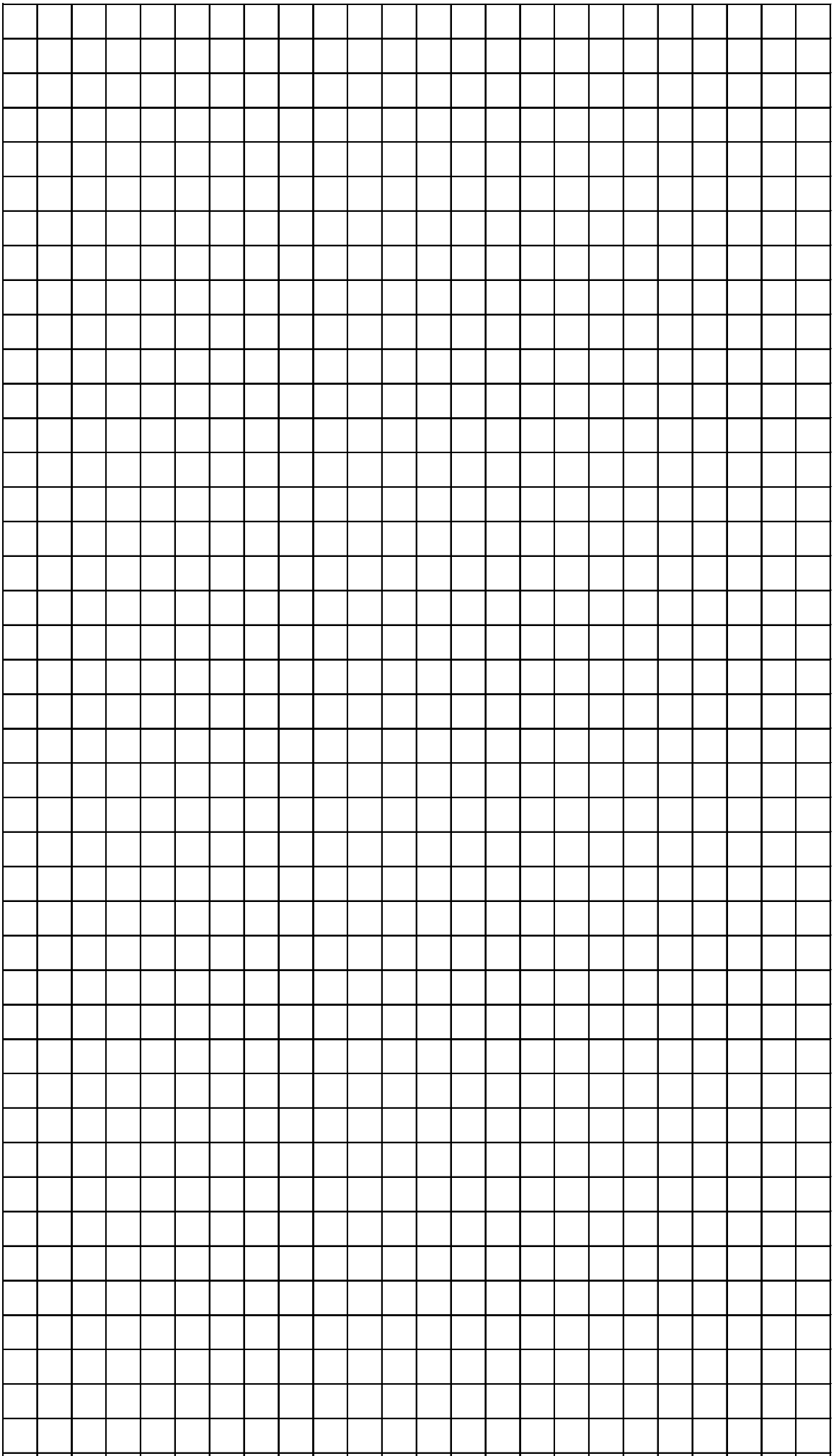
61.
62.







Part IV: Conservation Hall of Fame Presentation
Due: Thursday, September 10, 2020
Lab Product Grade

CONSERVATION HALL OF FAME PRESENTATION

1. Go to the following web site: https://www.nwf.org/About-Us/History/Conservation-Hall-of-Fame Review the 28 people who have been inducted into the Conservation Hall of Fame.

2. Choose one person from this list about whom you would like to study and prepare a presentation of your choosing. Include the following information in your presentation:

   - ✓ The attitudes, available technologies, and major environmental concerns of the time in which this person lived. Make sure to include the time period!
   - ✓ The major contributions of this person to conservation or environmental science during their lifetime.
   - ✓ An explanation of how this person's contribution affects conservation or environmental science, issues, attitudes, and policies today.

3. You may work independently or with one other student from our class to prepare a 3-5 minute presentation for the class. The presentation must include 5-8 slides and adequately cover the information listed above and have visuals that support the information. I encourage you to create a video presentation. Flip Grid, PowerPoint with voice recording, iMovie are all great options! If you are working with another student, both students must be part of the presentation!

4. Assignments will be given on a first-come-first-served basis. Each Hall of Fame person will be assigned to only one student. Be prepared with a 2nd, 3rd, and 4th choice in case your first choice has already been taken. The more you procrastinate the fewer your choices!

5. **All digital presentations need to be received by your teacher via email at rowderj@calvertnet.k12.md.us before the start of class on Thursday, September 10, 2020**

CONSERVATION HALL OF FAME PRESENTATION SCORING RUBRIC

	10	8	6	4	0
Contributions of Hall of Fame Inductee	specific Contributions well described	One major contribution overlooked or undeveloped	Contributions of inductee mentioned with little development	Contributions of inductee mentioned with no development	Contributions of inductee not stated
Time period of inductee and key environmental issues	Key issues, attitudes, and technologies of the time explained well	Key issues explained without a link to attitudes or technologies of the time	Time period and key issues mentioned but not developed	Time period OR key issue mentioned but not developed	Time period, key issues, attitudes and technologies absent
5-8 slides	5-8 relevant slides used in presentation with effective visuals	5-8 slides used with 1 slide irrelevant to presentation or ineffective visuals	5-8 slides used with 2 slides irrelevant to presentation or lacks visual interest	More than 3 slides, but most are irrelevant to presentation and lacks visual interest	Less than 3 slides or most slides irrelevant to presentation and no visuals present
Student preparation 3-5 minutes	Within the time allotted, demonstrates personal understandin g of content, generates high interest	Within time guidelines, but only generated some interest	Within guidelines, but does not keep interest	Short of guidelines but kept interest	Presentation less than three minutes, and did not keep interest

* For an example, please email Mrs. Rowder and she will send one to you!

Cooperative Grading Policy:
Since you may choose to work with a partner and we know that sometimes one student ends up doing more than their share of the project, we will be using the cooperative grading policy. The cooperative grading policy allows points to be allocated to students according to the amount of effort each student contributes.

The way the Cooperative Grading Policy works is as follows:
The project will be scored using the rubric out of a total of 50 points that can be earned. The points earned on the project will then be multiplied by the number of students in that group (2). Students will then discuss their contributions to the project and divide the points according to the effort put forth by each member. So, if one student puts forth more effort than another student, the student who worked harder, will earn more points (they may even exceed the 100% value!) While students will determine the initial point allocation, they must provide evidence and a constructive argument as to how they earned the points. The teacher will then determine the final distribution of points earned. The Cooperative Grading Agreement is on the next page.

Project Title: _____

Date: _____ Period: _____

Associate Cooperative Grading

Group Contract:
Each member of the group understands and accepts the grading procedures reviewed in class. WE will allocate points fairly based upon the evidence of individual effort within our cooperative group.

	Printed Name	Signature
1.	_____	_____
2.	_____	_____

Teacher Evaluation of the Project:

Overall Project Grade: _____

After receiving your grade, students will discuss the allocation of points within the group. Your signature below is the approval of your group's decision. If you disagree, please submit a letter describing your opinion and evidence of the work you did and attach it to this sheet.

Total Points to be distributed among Cooperative Group Members:

_____ x _____ = _____
(# of group members) (Overall Project Grade) (Total Points available for allocation)

	Printed Name	Signature	Points
1.	_____	_____	
2.	_____	_____	

Points divided among members MUST equal the Total Points available for allocation!!!