APES (AP Environmental Science)
Mrs. Van Metre
Room 110B
2023-2024

Welcome to APES! You textbook is <u>Environmental Science for the AP Course</u> by Friedland and Relyea 3rd Edition.

For your summer work I would like you to complete the following:

1. Items you will need for this class:
    A **Binder** (1 ½ inch)

        Your binder should have 11 sections for each Unit 1-9, Key Terms and AP Exam Review

2. This AP Class is set up into 9 UNITS. When we return to school you will sign into your class's AP Classroom which is found in College Board website. There you will have access to Multiple Choice Questions MRQ's and Free Response Questions FRQ's which will prepare you for the types of questions you will find on the AP Exam which is schedule for **Thursday May 9, 2024 at 12:00PM**.

3. On the first page of your notebook write down what you believe to be the
    1. three greatest *environmental* crises facing your generation. Think about what you read in newspapers, or listen on news shows, or what you have learned in your previous science classes, or political candidates' discussions. If you still have problems, skim through your textbook.
    2. Then briefly write down two reasons you think these issues are so important.
    3. Then research and document instances where the US or SC has these problems.

4. In your book, find the water cycle. Draw the water cycle. Label the following on your water cycle and then define each term. (evaporation, condensation, precipitation, transpiration, infiltration, runoff)

Is water a renewable or nonrenewable resource?
Defend you answer:

_____

_____

5. "Tragedy of the Commons" essay by **Garrett Hardin.**
Read the following article:
https://online.hbs.edu/blog/post/tragedy-of-the-commons-impact-on-sustainability-issues

    a.   What is Tragedy of the Commons?

_____

_____

_____

    b.   What do you think the difference between private property and common property? Give an example of each type of property. Which property has the "tragedy" and why.

_____

_____

_____

_____

    c.   What are 2 examples of tragedy of the commons in the environment. Please explain the ragedy

_____

_____

_____

_____

    d.   What are some solutions to the tragedy of the commons?

_____

_____

_____

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_____

6. Graphing Questions: Complete the following:

**Use the temperature and precipitation data provided in
Table 1 to complete the following questions.**

Table 1: Average Monthly High Temperature and Precipitation in Four Cities
(T = Temperature in °C; P = Precipitation in cm)

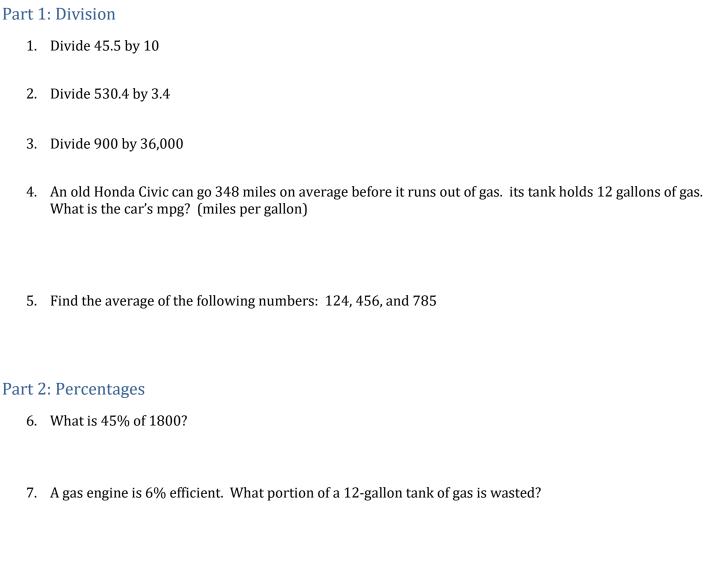|		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Fairbanks, Alaska	T	-19	-12	-5	6	15	22	22	19	12	2	-11	-17
	P	2.3	1.3	1.8	0.8	1.5	3.3	4.5	5.3	3.3	2.0	1.8	1.5
San Francisco, California	T	13	15	16	17	17	19	18	18	21	20	17	14
	P	11.9	9.7	7.9	3.8	1.8	0.3	0	0	0.8	2.5	6.4	11.2
San Salvador, El Salvador	T	32	33	34	34	33	31	32	32	31	31	31	32
	P	0.8	0.5	1.0	4.3	19.6	32.8	29.2	29.7	30.7	24.1	4.1	1.0
Indianapolis, Indiana	T	2	4	9	16	22	28	30	29	25	18	10	4
	P	7.6	6.9	10.2	9.1	9.9	10.2	9.9	84	8.1	7.1	8.4	7.6

1) Compare monthly temperatures in Fairbanks with temperatures in San Salvador.

    a. Can data for both cities be plotted on the same graph? Yes or No (circle one)

    b. How should the x-axis be labeled?

       _____

    c. How should the y-axis be labeled?

       _____

    d. What is the range of values for the y-axis?

       _____

    e. What type of graph should be used?
Bar graph, Line graph or Pie Chart (circle one)

2) Compare the average September temperature for the four cities in the table.

    a. Can data for all four cities be plotted on the same graph? Yes or no (circle one)

    b. What is the range of values on the y-axis?

       _____

    c. How should the y-axis be labeled?

       _____

    f. What type of graph should be used?
Bar graph, Line graph or Pie Chart (circle one)

3) Using graph paper, graph the temperature and precipitation data for San Francisco.

7. AP Environmental Math problems. Complete the following.
Math Diagnostic

This math paper will help you discover your weaknesses and strengths in the types of math found on the AP Environmental Science Exam. Do your calculations here or on scratch paper but place your answers on the answer sheet which is found on the last page. ALWAYS SHOW YOUR WORK!! **I will collect this this on orientation day.**

Part 1: Division

1. Divide 45.5 by 10

2. Divide 530.4 by 3.4

3. Divide 900 by 36,000

4. An old Honda Civic can go 348 miles on average before it runs out of gas. its tank holds 12 gallons of gas. What is the car's mpg? (miles per gallon)

5. Find the average of the following numbers: 124, 456, and 785

Part 2: Percentages

6. What is 45% of 1800?

7. A gas engine is 6% efficient. What portion of a 12-gallon tank of gas is wasted?

8. In a pasture of grass and other plants, the biomass of insects makes up 5000 kilograms. This is 5% of the total biomass of the pasture. What is the total biomass of the pasture? Set up the problem and solve below:

Part 3: Scientific Notation
Write the following numbers in scientific notation:

9. 550,000,000,000

10. 15 million

Solve.

11. $(2.96 \times 10^7) + (1.0 \times 10^7)$

12. $(2.96 \times 10^7) + (1.0 \times 10^8)$

13. $(6.0 \times 10^6) \div (3.0 \times 10^4)$

14. $(2 \times 10^5) \times (3 \times 10^{10})$

15. $(8 \times 10^{12}) - (1.2 \times 10^{12})$

Part 5: Percent Change

16. If cyanide in a stream next to a gold mine increases from 240 ppm to 360 ppm, what percent increase is this? Set up the problem below:

17. A toxin increases from 12 ppm to 48 ppm. What percent increase is this? Set up the problem below:

Part 6: Metric Conversions

18. 1200 watts = _____ kw (kilowatts)

19. 500 km = _____ meter

20. 60 gram = _____ milligram

21. 14,000 milliliter = _____ liter

22. Convert 5 km^2 to _____ m^2

Part 7: Half-Life Calculations

These half-life problems require no formula or calculator. "Sketch" out the problem to solve.

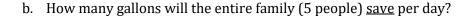23. A 50g sample of radioactive Iodine-131 has a half-life of 8.0 days. After 32 days, how much is left?

24. A 48g sample of Germanium-66 is left undisturbed for 10 hours. At the end of that period, only 3.0g remain. What is the half-life of this material?

Part 8: Basic Word Problems

You will be required to set-up math problems on the free-response section of the AP Environmental Science Exam. You must write out the set-up EVEN IF you can do it in your head. No set-up = no points. You have room below to set up each problem and solve.

25. A Family of five recently replaced its 5-gallon-per-minute showerheads with water-saving 2-gallon per minute showerheads. Each member of the family averages 8 minutes in the shower per day.

    a. How many gallons will each person <u>use</u> each day?

    b. How many gallons will the entire family (5 people) <u>save</u> per day?

    c. In a 30-day period, how many fewer gallons of water will the family use with the new showerheads?

26. Burning one gallon of gasoline in a car releases approximately 20 pounds CO_2 into the atmosphere.

    One person drives 50,000 miles in a hybrid car that averages 50 miles per gallon (mpg), while another person drives 50,000 miles in an SUV that averages 20 mpg. Over the course of the 60,000 miles, how many fewer pounds of CO_2 are released by the 50-mpg car than by the 20-mpg car?

27. Americans recycle about 35% of their solid waste (trash). If an average American generates about 2 kg of waste every day, how much of that waste is recycled per **<u>year</u>**?

APES Math Diagnostic Answer Sheet

Name_____ Period _____

Division	1	2	3	4	5
Percentages	6	7	8		
Scientific Notation	9	10	11	12	13
	14	15			
Percent Change	16	17			
Metric Conversions	18	19	20	21	22
Half Life	23	24			
Word Problems	25a	25b	25c	26	27