

AP ENVIRONMENTAL SCIENCE – MATH PRACTICE

This math assignment will help you discover, practice and review the types of math found in APES and on the AP Exam.

Completion of this summer assignment, including the reflection during the first week of school, will count as a **50-point quiz**. **You will be graded on effort and completion, not accuracy.** If you are not sure, try. You may use a calculator, internet, or other resources. The purpose is to identify areas needed for more practice throughout the year.

Instructions: (approximate time to complete is 1-2 hours)

1. Solve the following problems and **show all of your work** (this is an important part of APES), including units. Write your work and solutions by hand. Make sure each problem number is clearly labeled.
2. Take photos of your work and upload them to the Summer Assignment on the class Canvas page.
3. The photos of your work for the entire assignment are **due by 11:59pm on Monday September 1.**
4. During the first week of school, you will receive the answers/work for these problems. You will then complete and submit a reflection to help identify areas which may need more practice throughout the year.
5. Any questions contact Dr. Colyer kcolyer@epsicopalacademy.org

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:

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 km² to _____ m²

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: 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.

- How many gallons will each person use each day?
- How many gallons will the entire family (5 people) save per day?
- 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 CO₂ 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 CO₂ 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 year?