This summer, you have two assignments to complete, both of which are outlined below and posted to Google Classroom and are **due on the first day of school (9/1) at 7am**.

Each assignment will be entered into the grade book as a 30 point formative and you will have a quiz on the mathematical skills in the first week of school.

Students are welcome to stop in to discuss the assignment with their teacher if needed.

Teacher	Period	Days	Code
Mrs. Frey	Per 2 block	2 / 4	lryoc4rm
Mr. Foster	Per 1 block	1 / 3	dupykgn3
Mr. Foster	Per 1 block	2 / 4	ox54zbww

Honor Code Statement These assignments must reflect your independent thought and effort. The use of peer work, plagiarism, or AI generation (e.g., ChatGPT) is strictly prohibited.

I understand and will abide by these expectations: **Initials: _____**

ASSIGNMENT #1: AP Environmental Science Summer Scavenger Hunt

Welcome to AP Environmental Science!

This summer, your mission is to explore your local environment and start thinking like an environmental scientist. Your task is to find and photograph yourself with 15 different items or locations that connect to key APES topics. You may choose from the 20 prompts below—pick the ones that inspire you most!

Wherever you are this summer—around town, on vacation, or at home—keep an eye out for science in the real world. Be ready to briefly describe how each photo connects to environmental science when we return in the fall.

Explore safely and responsibly—bring a friend, wear sunscreen, and always respect nature!

You are welcome to take pictures of the items together with a friend but you must make your own captions and reflection.

Using the list below, paste your image below the prompt AND include a 1-2 sentence caption that explains what the pictures are, where it is from, and how it displays the intended topic/connection to our course.

Your Scavenger Hunt List (Pick 15 out of the 20)

1. Visible Erosion
 Find a place where erosion is occurring—on a trail, beach, or roadside.
 Topic: Soil degradation, land use

2. Wastewater Treatment Facility or Storm Drain
 Snap a photo near the facility or labeled storm drain cover.
 Topic: Water pollution, human infrastructure

3. Invasive Species
 Find a non-native plant or animal and identify it (look it up if needed).
 Topic: Biodiversity, species interactions

4. Composting or Organic Waste Bin
 Locate a composting area, community garden, or your own compost bin.
 Topic: Waste reduction, nutrient cycles

5. Native Plant or Pollinator Habitat
 Look for a wildflower garden, pollinator zone, or native species in a wooded area.
 Topic: Ecosystem services, biodiversity

6. Renewable Energy Source
 Find a solar panel, wind turbine, or even geothermal heating/cooling.
 Topic: Energy resources and consumption

7. Evidence of Climate Impact
 Look for signs like beach erosion, saltwater intrusion, or high-tide lines.
 Topic: Climate change, sea level rise

8. Sustainable Agriculture or Local Food Source
Visit a local farm stand, community garden, beehive, or even a backyard vegetable garden.
Topic: Agriculture, food systems, sustainability

9. Air Quality Monitoring or Transportation Emissions
Find a public transit station, traffic-heavy area, or biking/walking path.
Topic: Air pollution, urban planning

10. A Local Water Source
Visit a stream, pond, lake, or beach—note water clarity and surrounding land use.
Topic: Freshwater resources, human impact

11. Ecosystem Affected by Eutrophication
Find a pond, lake, or body of water that shows signs of nutrient pollution (algae growth, low clarity).
Topic: Aquatic ecosystems, nitrogen & phosphorus cycles

12. Carbon Cycle in Action
Capture a moment that represents part of the carbon cycle—photosynthesis, combustion, decay, etc.
Topic: Biogeochemical cycles

13. Water Cycle Component
Find an example of evaporation, condensation, precipitation, infiltration, or runoff.
Topic: Water cycle, Earth systems

14. Phosphorus Cycle Evidence
Photograph fertilizer use, soil erosion, rock weathering or other signs related to phosphorus movement in the environment.
Topic: Biogeochemical cycles

15. Food Web Dynamic
Take a photo of a predator-prey interaction, herbivory, decomposers, or trophic levels.
Topic: Ecology, energy flow

16. Energy Transfer
Capture an example of energy moving through an ecosystem—sunlight on plants, animals eating, etc.
Topic: Energy pyramids, ecosystem dynamics

17. Interactions Between Earth Systems
Show a photo where two or more Earth systems (atmosphere, biosphere, hydrosphere, geosphere) interact—like flooding, wildfires, or erosion.
Topic: Earth system science

18. Interactions Between Species and Environment
Document an animal in its habitat, migration path, or shelter/nesting behavior.
Topic: Species adaptation, habitat use

19. Sustainability in Action
Find a sustainable practice—like a green building, rain barrel, reusable bag display, or eco-friendly transportation.
Topic: Human impact, resource conservation

20. Your Wild Card!
Take a photo that you believe connects to AP Environmental Science and explain your reasoning.
Topic: Your choice—surprise us with your scientific insight!

Reflection (Select 1 item and write a paragraph) including:

- What it is
- Where you found it

- What APES topic it connects to and how it connects to one of the 4 big ideas in APES (energy transfer, interactions in Earth systems, interactions between different species and the environment, sustainability)

Scavenger Hunt Rubric (30 points total)

Category	Points	Criteria
Completion	10 pts	15 unique photos that you took yourself (not images found online or generated digitally), includes brief explanation / caption of what the impact shows
Accuracy	10 pts	Items clearly match the assigned topics
Reflection	10 pts	Reflection is thoughtful and links back to one of the 4 big ideas of APES

ASSIGNMENT #2: Science and Math skills refresher

Part 1: Experimental Design
Answer the following questions using the following statement, your knowledge of experimental design and the graph below. Need a refresh on experimental design? Watch this video or this one.

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 (ºC)	Number of developing clams
5	75
10	90
15	120
20	140
25	75

30	40
35	15
40	0

a.) Identify the independent variable of this experiment.

b.) Identify the dependent variable of this experiment.

c.) Identify the optimum (best) temperature for clam development.

d.) Identify the average temperature in this experiment.

e.) Identify at least two constants the scientists should maintain in this experiment.

f.) When graphing this data, should it be a bar graph, a line graph or a scatterplot with a line of best fit? Explain how you know. (here's a source if you're stuck)

g.) Graph this data in Google Sheets. Copy and paste the graph below. Do you have axis labels (with units) AND a descriptive title? (here's info or a video of how to graph in sheets)

h.) What can the farmer learn from this experiment? Refer to data numbers in your analysis.

i.) What is the scientific question being tested? The best format for your answer is, "What is the effect of …."

**** COMPLETE THIS PART ON PAPER. Bring your completed math with you to your first APES class.**

Part 2: Math Skills (what this is a science class, why so much math?)

There are seven Science Practices that we will incorporate throughout the year, these are skills and a way to apply your content knowledge. You can check them all out here.

Reminders

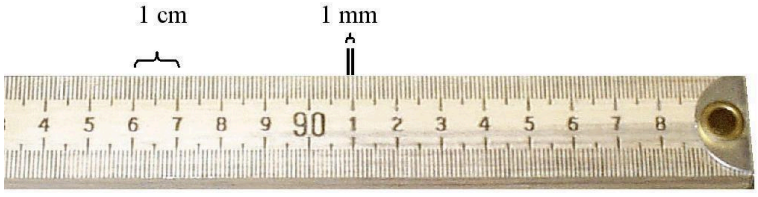
1. Write out all your work, even if it's something really simple. This is required on the APES exam so it will be required on all your assignments, labs, quizzes, and tests as well.
2. Include units in each step. Your answers always need units and it's easier to keep track of them if you write them in every step. No naked numbers!
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.
4. You may use a calculator but will not be provided with a formula sheet.

Metric Units: YOU MUST MEMORIZE THE METRIC CONVERSION CHART

We usually see these units in class

Prefix	Symbol	Multiply Base Unit by	Example
tera	T	1,000,000,000,000	teragram = Tg = 10^{12} g
giga	G	1,000,000,000	gigaliter = GL = 10^{9} L
mega	M	1,000,000	megagram = Mg = 10^{6} g
kilo	k	1,000	kilogram = kg = 10^{3} g
hecto	h	100	hectogram = hm = 10^{2} m
deka	da	10	decagram = dag = 10 g
deci	d	1/10	deciliter = dL = 10^{-1} L
centi	c	1/100	centimeter = cm = 10^{-2} g
milli	m	1/1000	millimeter = mm = 10^{-3} m
micro	μ	1/1,000,000	microgram = μg = 10^{-6} g

Base Unit (g, m, W, L, etc.)



1. How many mm are in a centimeter?

2. How many centimeters are in a meter? (The prefix *centi-* means 100. How many cents (pennies) are in a dollar?)

3. The prefix milli- means a thousand. How many millimeters are in a meter?

4. 400 kilograms = _____milligrams

5. 600 mm = _____ cm

6. 25 MW = _____ W

Dimensional analysis - These problems come up all the time in this class. Please review how to complete these problems and then show all work to finish the problems that follow.

How to Do Dimensional Analysis (Unit Conversions)

Dimensional analysis is a powerful method that lets you convert from one unit to another step by step using conversion factors. Think of it as a math puzzle where you cancel out the units you don’t want and keep the ones you do.

Basic Steps

Step 1: Identify your starting quantity.

Write down what you're given — this is your starting number and unit.

Step 2: Multiply by conversion factors.

Use known relationships (like 1 km = 1,000 m) to build conversion fractions. You can multiply by as many as you need!

Each conversion factor is a fraction that equals 1 (like 1,000 m= 1km)

Step 3: Cancel units as you go.

Units that appear on the top and bottom of adjacent fractions cancel out. Keep going until you're left with the unit you want.

Step 4: Do the math.

Multiply and divide the numbers across the top and bottom.

Tips for Success

- Always write out units in every step.
- If a unit appears on the top and bottom, cross it out — it's gone!
- You can stack as many conversions as you need until you land on the right unit.
- Keep track of what the problem is asking for — that's your goal unit.

Sample problems

a. Convert 2.5 kilometers to centimeters.

$$\frac{2.5\text{ km}}{1} \times \frac{100{,}000\text{ cm}}{1\text{ km}} = 250{,}000\text{ cm}$$

b. A person drives 12,000 miles per year. Their car gets 30 miles per gallon. Each gallon of gas creates 8.89 kg CO_2. How much CO_2 do they emit in a year?

$$\frac{12{,}000\text{mi}}{1\text{year}} \times \frac{1\text{ gal}}{30\text{ mi}} \times \frac{8.8\text{ kg } CO_2}{1\text{ gal}} = \frac{3{,}556\ CO_2}{1\text{ yr}}$$

** show all work, including how units cancel out **(TIP: complete this on PAPER and bring into school on the first day)**

7. A car is traveling 90 kilometers per hour. How many meters per second is this?

8. A snail crawls at a speed of 1.5 centimeters per second. How many meters per hour is that?

9. A doctor prescribes a dose of 15 mg/kg of a medication. If a patient weighs 165 pounds, how many milligrams of medication should they receive?

10. A car gets 30 miles per gallon of fuel. Convert this to kilometers per liter. *(1 mile = 1.609 km, 1 gallon = 3.785 L)*

11. Burning 1 gallon of gasoline produces about 8.89 kg of CO_2. A person drives 15,000 miles per year, and their car gets 25 miles per gallon. How many kilograms of CO_2 does this person emit per year from driving?

12. A low-flow showerhead uses 9 liters per minute, while a standard showerhead uses 15 liters per minute. If someone showers for 10 minutes a day, how many gallons of water does the low-flow showerhead save in a month (30 days)? *(1 gallon = 3.785 liters)*

Write the following in scientific notation

13. 394 billion

14. 0.000070202

Percent Change = (New – Original) X 100
Original

15. If you scored a 1090 on your first PSAT and 1210 on your second PSAT. What was your percent improvement (percent change)?

16. A town had 25,000 people in 2020. By 2024, the population dropped to 22,500. What is the percent decrease in population?

17. A pair of shoes originally cost $80. They are now on sale for $60. What is the percent decrease in price?

18. Jordan's salary increased from $50,000 to $55,000. What is the percent increase in salary?

Percent = (Part / Whole) X 100

19. In 2020, a country had 1.5 million hectares of forest. By 2024, it had lost 300,000 hectares due to deforestation. What percent of forest was lost?

20. A beach cleanup group collected 2,400 pounds of trash. Of that, 1,800 pounds were plastic. What percent of the collected trash was plastic?

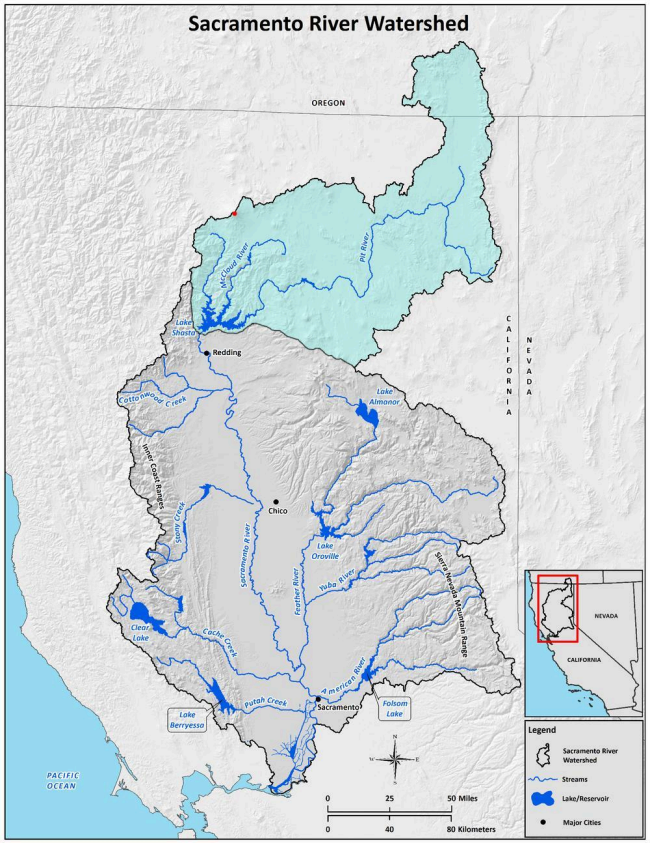
21. A town generates 60% of its electricity from renewable sources. If the total energy used is 200,000 kWh, how much of that is from renewable sources?

Practice FRQ

Shasta Lake is a large reservoir on the Sacramento River in Northern California. It is created by Shasta Dam, which also produces hydroelectric power.

At full capacity, Shasta Lake holds 19.5 trillion gallons of water.

Helpful conversion for this assignment:
1 gallon = 3.785 liters
1 megaliter (ML) = 1,000,000 liters



1. Current Water Levels

Right now, Shasta Lake is 42% full. How many trillion gallons of water are currently in the lake? Show your work.

2. Snowmelt Contributions

Each year, about 8.75 trillion gallons of water flows into Shasta Lake. In 2021, because of drought, the total river flow was only 38% of normal. How many trillion gallons of water flowed into the lake in 2021? Show your work.

3. Water Use by Households

The average household in the U.S. uses about 50,000 gallons of water per year. If 8.75 trillion gallons flows into Shasta Lake in an average year, about how many households could that water support for one year? Show your work.

4. Conversions — Gallons to Megaliters

In an average year, 8.75 trillion gallons flows into Shasta Lake. Convert this amount to megaliters (ML). Show all unit conversions.

Final Verification: *I verify that the work submitted above is entirely my own independent creation and complies with the class academic integrity policy explained at the top of the document.*

Signature: _____