

3 TASKS—MANDATORY FOR ALL APES STUDENTS:

- #1 “Home” Video Questions—due 7/3/17
-Must make an account through EDpuzzle.com – see instructions below
- #2 Math Review Problems—due 8/9/17
- #3 GH Biology & Chemistry Concepts Review—Assessment on 8/11/17

All students should begin the school-year with these skills **mastered**. An assessment will be given at the end of the first week assessing proficiency. Your performance on this assessment will serve as a predictor of academic readiness for the APES course.

HOW TO ACCESS THE SUMMER ASSIGNMENT:

The “Home” documentary and questions for Task 1 can be found on Ms. Wilson’s edPuzzle page. You will need to make an edPuzzle account (www.edpuzzle.com) and then sign up for my class at the following address:

<https://edpuzzle.com/join/decinor>

Class ID: decinor

All other assignments and resource links may be found at Ms. Wilson’s web page:

<http://mvhsapenvirosci.weebly.com/>

RESOURCES FOR APES—visit the web page to access the hyperlinks:

- [Biology Textbook](#)
- [Chemistry Tutorials](#)
 - [Math/Dimensional Analysis](#)
 - [Chemistry Concepts](#)
- [Textbook Preview](#)

- Click on “Select a Chapter” and then “Chapter Summary” from the menu on the left side

Thank you for using the summer to review the concepts from the Gifted/Honors Biology and Chemistry prerequisite courses. Be prepared with the mastery of these foundation concepts and skills as we will jump right in to APES...see you in early August!

Kristen Wilson

Kristen_Wilson@gwinnett.k12.ga.us

APES Math Review Concepts

1. **PERCENTAGE**—Percentage is a measure of the part of the whole.

Example 1: 15 million is what percent of the United States population of approximately 300 million?
 $15 \text{ million} / 300 \text{ million} = 0.05 \times 100 = 5\%$

Example 2: What is 20% of a \$15 restaurant bill?

$$20\% = 20/100 = 0.20$$

$$0.20 \times \$15 = \$3.$$

2. **RATES**—change in amount in a given time; rise/run; change/time; $\Delta Y/\Delta X$

Rates will often be expressed using the word, “per” followed by a unit of time, for example, grams per minute, liters per year. For AP Environmental science you will often have to calculate PERCENT CHANGE of a population or amount of a pollutant.

KNOW THIS EQUATION: $|(\text{Original} - \text{New}) / \text{Original}| * 100 = \text{rate of change}$

3. SCIENTIFIC NOTATION

$$\text{Thousand} = 10^3 = 1,000$$

$$\text{Million} = 10^6 = 1,000,000 \text{ (relative to US population)}$$

$$\text{Billion} = 10^9 = 1,000,000,000 \text{ (relative to people on Earth)}$$

$$\text{Trillion} = 10^{12} = 1,000,000,000,000 \text{ (national debt)}$$

When using very large numbers, scientific notation is often easiest to manipulate.

- For example, the US population is 300 million people or 300×10^6 or 3×10^8

When adding or subtracting, exponents must be the same. Add the numbers in front of the ten and keep the exponent the same.

$$\bullet \quad 9 \times 10^4 + 3 \times 10^2 = 900 \times 10^2 + 3 \times 10^2 = 903 \times 10^2 \text{ or } 9.03 \times 10^4$$

When multiplying or dividing, multiply or divide by the number in front of the ten and add the exponents if multiplying or subtract the exponents if dividing

- $9 \times 10^6 \times 3 \times 10^2 = (9 \times 3) \times 10^{(6+2)} = 27 \times 10^8 \text{ or } 2.7 \times 10^9$
- $9 \times 10^6 / 3 \times 10^2 = (9/3) \times 10^{(6-2)} = 3 \times 10^4$

4. **DIMENSIONAL ANALYSIS**—using the prerequisite of Chemistry AKS, you are expected to be able to convert between units of measure accurately. Online tutorials assistance is available:

<http://joneslhs.weebly.com/>

5. PREFIXES

$$\text{m (milli)} = 1 / 1000 = 10^{-3}$$

$$\text{c (centi)} = 1 / 100 = 10^{-2}$$

$$\text{k (kilo)} = 1000 = 10^3$$

$$\text{M (mega)} = 1,000,000 = 10^6$$

$$\text{G (giga)} = 1,000,000,000 = 10^9$$

$$\text{T (tera)} = 1,000,000,000,000 = 10^{12}$$

MATH PROBLEMS—Show all work, answer the questions.

Note: Practice not using the calculator—the formal APES Exam and our practice work will not permit calculator usage.

1. What is one million times one thousand? Use scientific notation in your work and answer.
2. A deer population of 200 individuals grows by 15% in one year. How many deer will there be the next year (year 2)?
3. Last year, I had 40 APES students and this year I will have 50 APES students. By what percentage will the population of APES students increase?
4. Electricity costs \$0.06 per kilowatt hour. In one month, one home uses one megawatt hour of electricity. How much will the electric bill be?
5. Your car gets 15 miles per gallon and your friend's car averages 25 mpg. You decide to head off to Hilton Head on vacation, 281 miles away. If gas costs \$3.75/gallon and you decide to split the gas costs, how much money will you save by driving your friend's car?
6. A beach is 10 miles wide and 30 miles long. If one inch of rain falls on this beach, how many cubic feet of rain fell in this area? Hint: convert units to feet first.

Scientific Process Skills

1. Give an example of quantitative data/qualitative data.
2. Create a lab scenario and describe the independent variable, dependent variable(s), control variables, as well as control group and experimental groups.
3. Know how to properly label the axis on a graph (where to put the Independent and Dependent variables)

Ecology

4. List the levels of Ecological organization from most specific to broadest.
5. Give examples of Biotic and Abiotic factors in an environment.
6. What is the difference between habitat and niche?
7. Define symbiosis.
 - a. Describe the 3 types of symbiosis.
 - b. Give examples of each.
8. Define and give examples of predation and competition.
9. Construct a food chain. Label: producer, consumer, primary consumer, secondary consumer, 1st trophic level, 2nd trophic level etc...Describe the rule of 10.
10. What is biomass?
11. The law of conservation of energy states that _____.
12. Know an overview of the major land biomes.
13. Describe the steps in Primary Land Succession; and Secondary Land Succession.
14. What is the primary energy source for ALL living things?
15. Draw an exponential growth curve and a logistic growth curve.
16. What happens to a population as it reaches carrying capacity?
17. What is the effect of birth rate, death rate, emigration, and immigration on a population?
18. What is the widespread effect of CFCs in the atmosphere? Explain how this occurs.
19. What is the widespread effect of CO₂ in the atmosphere? Explain how this occurs.
20. What law is responsible for limiting the production of CFCs? What law is responsible for limiting CO₂?

Biochemistry

21. What is an enzyme?
22. How do enzymes alter chemical reactions?

Cell Energy

23. What is photosynthesis? Equation? Occurs where?
24. Why is photosynthesis important to all living things?
25. What is cellular respiration? Equation? Occurs where?
26. Why is cellular respiration important to all living things?

Measurement/Lab Skills/Atomic Structure/Matter

1. What piece of equipment is used to measure mass? In what unit is this mass reported?
2. What piece of equipment is used to ACCURATELY measure volume? In what unit is this volume reported?
3. What is the value of percent error determined using data—what is the formula?

Nomenclature

Compound Name	Chemical Formula	Compound Name	Chemical Formula
Butane		Ozone	
nitric acid		Sulfate	
methane		Nitrite	
chlorofluorocarbon		Nitrate	
sulfuric acid		Ammonia	
carbon tetrafluoride			

Acids & Bases

4. Identify the properties of an acid; of a base.
5. Acids have a pH range from _____, with _____ being the strongest. Bases have a pH range from _____, with _____ being the strongest.
6. What is a neutralization reaction?
7. How many times stronger is a pH of 3 than a pH of 4?

Chemical Equations

Research the chemical equations for the following important APES topics:

Photosynthesis:

Cellular Respiration:

Burning Coal:

Burning Natural Gas:

Nitrogen Fixation (by bacteria):

Formation of Sulfuric Acid Rain:

Ocean Acidification: