

AP BIOLOGY SUMMER ASSIGNMENTS EAST HIGH SCHOOL

Welcome to Advanced Placement Biology!

The attached summer assignment is required for all AP Biology students for the 2024-2025 school year. This assignment is designed to keep you engaged in Biology over the summer. Space it out and it will be totally manageable. Upon successful completion of AP Biology, you will have covered content that is equivalent to the first year of college Biology.

On the first day of class in the Fall you must bring your completed packet. The summer assignment helps me know where we are as a class and what skills need more attention and the skills to build on.

If you sign up for the Summer Camp you will be excused from **some** of the assignments. No need to show proof of attendance, the AP Department sends report of attendees.

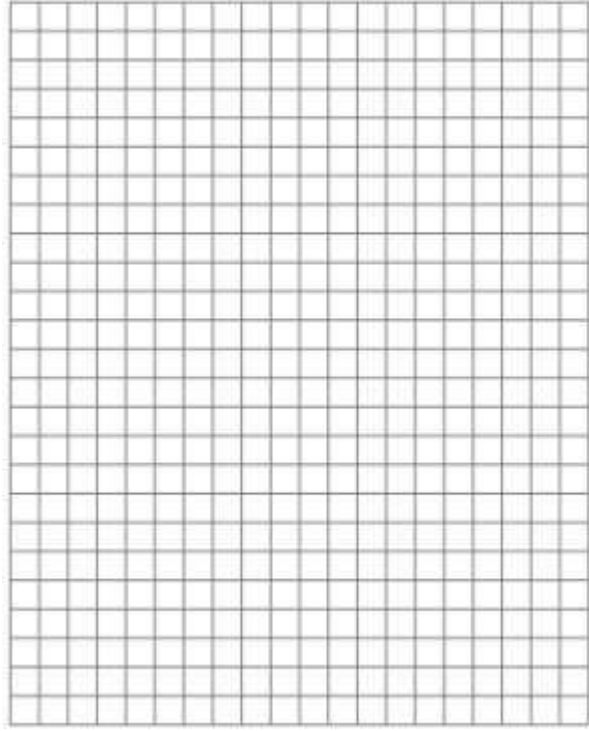
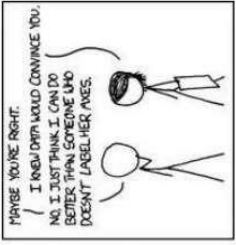
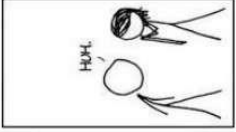
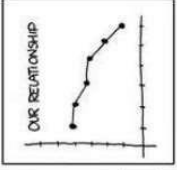
Part 1: Graphs and Diagrams

0. Construct¹ a graph showing the relationship between different pandemics and the number of deaths using the information found in the table below. Your graph should have the following things: Title, X and Y axis labels with units, X and Y axis scale (if needed).

Table 1.2 Major pandemics in human history

Year	Name	Deaths	Comments
430 BC	“Plague of Athens”	100,000	First documented pandemic
541	Justinian plague (<i>Yersinia pestis</i>)	30–50 million	Killed half of world population
Around 1340	“Black death” (<i>Yersinia pestis</i>)	50 million	Killed a quarter of world population
Around 1500	Tuberculosis (<i>Mycobacterium tuberculosis</i>)	Many millions	Since 60,000 years with humans; pandemic in middle ages
Around 1520	“Hueyahuati” (<i>Variola major</i>)	3.5 million	Pandemic in Central America brought by Europeans
1918	“Spanish flu” (Influenza virus)	50 million	Pandemic in the whole world, killed 2% of population
1976–2000	Ebola (Ebolavirus)	>15,000	Many regional epidemics in Africa
Since 1981	AIDS (HIV-1)	37 millions	Ongoing pandemic with most victims in Africa
Since 2019	COVID-19 (SARS-CoV2)	>4 million	Ongoing pandemic with victims all over the world

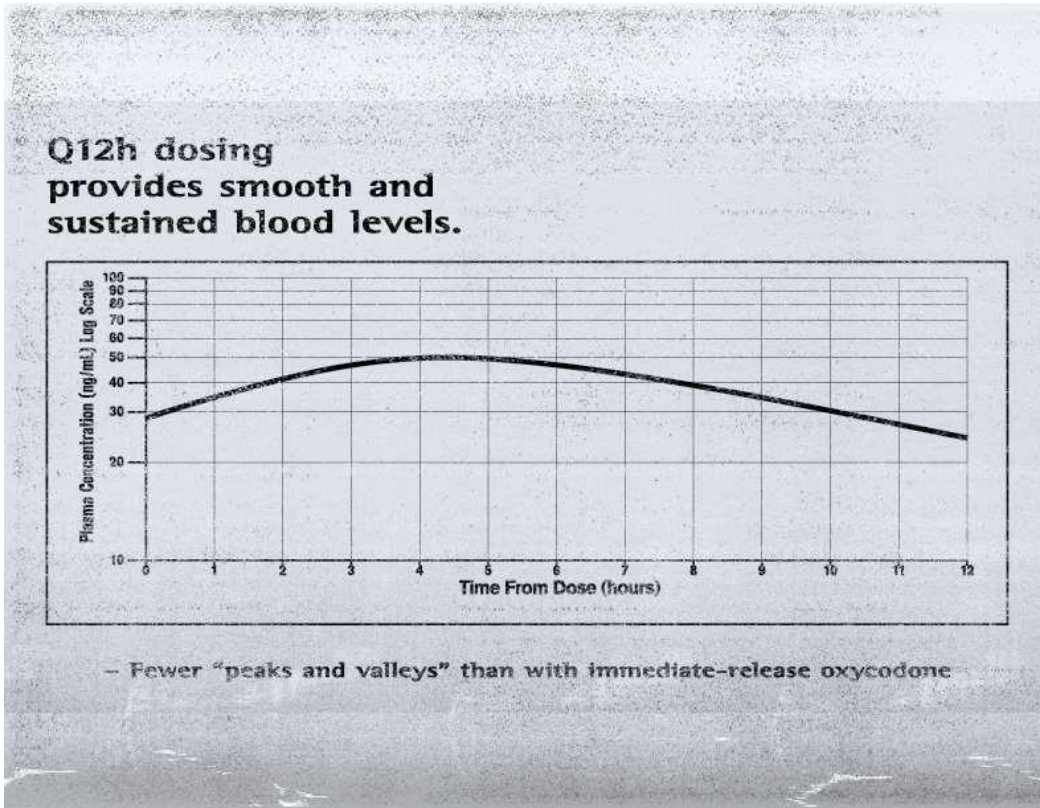
Newly emerging infectious diseases were threatening humans since hunter-gatherers settled into villages and domesticated animals. The number of victims before 1900 are estimates



1. Ignoring Tuberculosis, **Describe** all the ways the information in the table is incomplete. Think about the graph you made, does it give a full picture of the data? For each incomplete thing that you find, **Explain** why the information could be improved.

2.

The graph² below was used as evidence in a FDA filing that Oxycodone would not be addictive like other opioids. **Explain** why this graph is misleading.



Problem Solving

The formulation of a hypothesis and a subsequent experiment to test that hypothesis is vitally important in science.

With Arkansas being such a natural state, there are a lot of roads that cut across beautiful natural areas.

A. Consider all the types of things that affect the natural environment in Arkansas and identify a question/problem that could be researched/investigated.

B. Propose a hypothesis to your problem/question.

C. Define here what a control is for an experiment and why it is essential to understanding the data that you collect.

Water

- There are 4 attributes of water that are key in the sustaining of life as we know it.

Attribute	Explanation and Biological Importance	Define These Key Terms
Waters Polarity		Polarity-
Waters ability to dissolve almost anything... i.e. it's called the Universal Solvent		Solvent- Solute – Solubility -
Waters high heat of vaporization... i.e. it has a high specific heat value		Temperature - Specific heat –
Waters ability to stick		Cohesion – Adhesion – Capillary Action –

- Based on the properties of water above...
Explain the molecular movement of water from the root of a plant to the leaves of its branches

Explain how freezing temperatures will kill the green leaves of a plant.

Functional Groups

➤ Being aware of functional groups can help you know properties of a molecule without knowing what the molecule is... fill in the chart below to create a reference sheet for functional groups.

Functional Group	Structure	Properties (character)	Location	Example
Hydroxyl	-OH	Polar	Amino Acids, Sugars, Alcohol	<p>Serine Amino Acid</p> <p>Serine</p> $\begin{array}{c} \text{COOH} \\ \\ \text{H}_2\text{N}-\text{C}-\text{H} \\ \\ \text{CH}_2\text{OH} \end{array}$
Carbonyl				
Carboxyl				
Methyl				
Amine				
Phosphate				
Sulfhydryl				

- Contrast condensation and hydrolysis reactions (a type of cleavage reaction)
- and draw a diagram of each.

Proteins

- Proteins are composed of 20 different monomers called _____
- Draw a generic amino acid molecule

- Identify 4 functions of proteins in life.

- Protein structure is very important in the function of any given protein... on the table below organize the 4 levels of protein structure. Include the **name given to each level, what is involved in creating each level and the chemical bonding involved in each level.**

Level Name	Description

Evolution

- How do structure and function relate in the realm of biology?

➤ Contrast inductive and deductive reasoning.

➤ Compare and Contrast prokaryote vs. eukaryote

Prokaryotes	Similarities	Eukaryotes

➤ In a general sense, what is meant by the term evolution and how does it account for the diversity of life?