AP Biology Summer Assignment
CGHS

Welcome to AP biology! My class is highly intensive, with a lot of material that needs to be covered. Please be aware that part of taking this class is commitment to being on time, on task, and hard working. Although AP Biology is a huge commitment, ***we will have a lot of fun.*** I look forward to working with each one of you next year! Here are a few items of interest before you get started on the summer assignment.

I know the words "summer assignment" tends to send chills down any high school student's spine, but I think that you will find that this assignment will be very beneficial to you as we start the school year in the fall and even a little fun! The reason I am giving you a summer assignment is to keep your mind sharp and thinking, so you are ready to hit the ground running!

Mandatory Assignment 1 ***Introduction letter***

First, I would like to know a little about who you are so your first assignment is to send me an email. Yup….that's it! Your first AP Biology grade will be sending me an email after August 1st, 2019…if only all the grades were this easy! I will reply so you have electronic record that your assignment was received. Here is what I would like you to email me **jumana.lakdawala@browardschools.com**

Subject Line: AP Biology 19-20
Body: Your full name (& nickname that you go by if you have one) & stuff about you!

1. Who was your last science teacher? What class?
2. What other science classes have you taken? Are planning to take next year?
3. What do you like to do (hobbies, sports, music, interests, etc.)?
4. Do you have a job or plan on getting a job next year? What kind?
5. What are your personal strengths when it comes to learning new material?
6. What causes you to struggle in a course?
7. What is the most effective way for you to prepare for a test?
8. How many AP classes have you taken so far? How many have you passed with a 3 or higher?
9. How many AP classes are you taking this year (please list)?
10. Have you or will you be taking anatomy and physiology?
11. Have you or will you be taking APEs (AP Environmental)?
12. Was there anything that you liked or disliked about your earlier biology class?
13. What are you looking forward to the most in AP Biology?
14. What are you most anxious about in AP Biology?
15. **Why are you taking AP Biology? What do you hope to accomplish/gain?**

Don't worry! There is no right or wrong answer….be honest so that I can figure out the best way to help you next year! ☺ A word of advice: please remember to use proper salutations, closing, phrasing, etc.

Mandatory Assignment #2 Graphing and Data skills practice

Complete the data analysis and graphing packet attached and have it ready to turn in on DAY ONE of the AP Biology class. The new AP biology curriculum stresses the importance of being able to analyze and graph data. So we will begin our year with a tutorial on data analysis graphing, and statistical analysis tools that you will use throughout your AP biology year.

Mandatory Assignment 2 Graphing and Data skills practice

Math and Statistics for AP Biology - Research the answer to the following questions

1. In designing an experiment or other scientific study, why do scientists need to sample from a population rather than using an entire population?

2. Suppose you are designing an experiment to test the effects of feeding excessive sugar on the heart rate of rats. What are the disadvantages of having too small a sample size (i.e., testing on too few rats)? What are the disadvantages of having too large a sample size (i.e., testing on too many rats)?

3. Explain the difference between discrete variables and continuous variables. Give an example of each.

4. Explain the difference between quantitative and categorical variables. Give an example of each.

5. What is a null hypothesis?

6. Explain the difference between a Type I error and a Type II error.

7. What are some steps that scientists can take in designing an experiment to avoid false negatives?

Graphing Practice

INTRODUCTION

Graphing is an important procedure used by scientists to display the data that is collected during a controlled experiment. **Line graphs** must be constructed correctly to accurately portray the data collected. Many times the wrong construction of a graph detracts from the acceptance of an individual's hypothesis

A graph contains five major parts:

a. **Title**
b. **The independent variable**
c. **The dependent variable**
d. **The scales for each variable**
e. **A legend**

- The **TITLE**: depicts what the graph is about. By reading the title, the reader should get an idea about the graph. It should be a concise statement placed above the graph.
- The **INDEPENDENT VARIABLE**: is the variable that can be controlled by the experimenter. It usually includes time (dates, minutes, hours, etc.), depth (feet, meters), and temperature (Celsius). This variable is placed on the X axis (horizontal axis).
- The **DEPENDENT VARIABLE**: is the variable that is directly affected by the independent variable. It is the result of what happens because of the independent variable. Example: How many oxygen bubbles are produced by a plant located five meters below the surface of the water? The oxygen bubbles are dependent on the depth of the water. This variable is placed on the Y-axis or vertical axis.
- The **SCALES** for each Variable: In constructing a graph one needs to know where to plot the points representing the data. In order to do this a scale must be employed to include all the data points. This must also take up a conservative amount of space. It is not suggested to have a run on scale making the graph too hard to manage. The scales should start with 0 and climb based on intervals such as: multiples of 2, 5, 10, 20, 25, 50, or 100. The scale of numbers will be dictated by your data values.
- The **LEGEND**: is a short descriptive narrative concerning the graph's data. It should be short and concise and placed under the graph.
- The **MEAN** for a group of variables: To determine the mean for a group of variables, divide the sum of the variables by the total number of variables to get an average.
- The **MEDIAN** for a group of variables: To determine median or "middle" for an even number of values, put the values in ascending order and take the average of the two middle values. e.g. 2, 3, 4, 5, 9, 10 Add 4+5 (2 middle values) and divide by 2 to get 4.5
- The **MODE** for a group of variables: The mode for a group of values is the number that occurs most frequently. e.g. 2, 5, 8, 2, 6, 11 The number 2 is the mode because it occurred most often (twice)

Problem A:
Using the following data, answer the questions below and then construct a line graph.

Depth in meters	Number of Bubbles / minute Plant A	Number of Bubbles / minute Plant B
2	29	21
5	36	27
10	45	40
16	32	50
25	20	34
30	10	20

1. What is the dependent variable and why?

2. What is the independent variable and why?

3. What title would you give the graph?

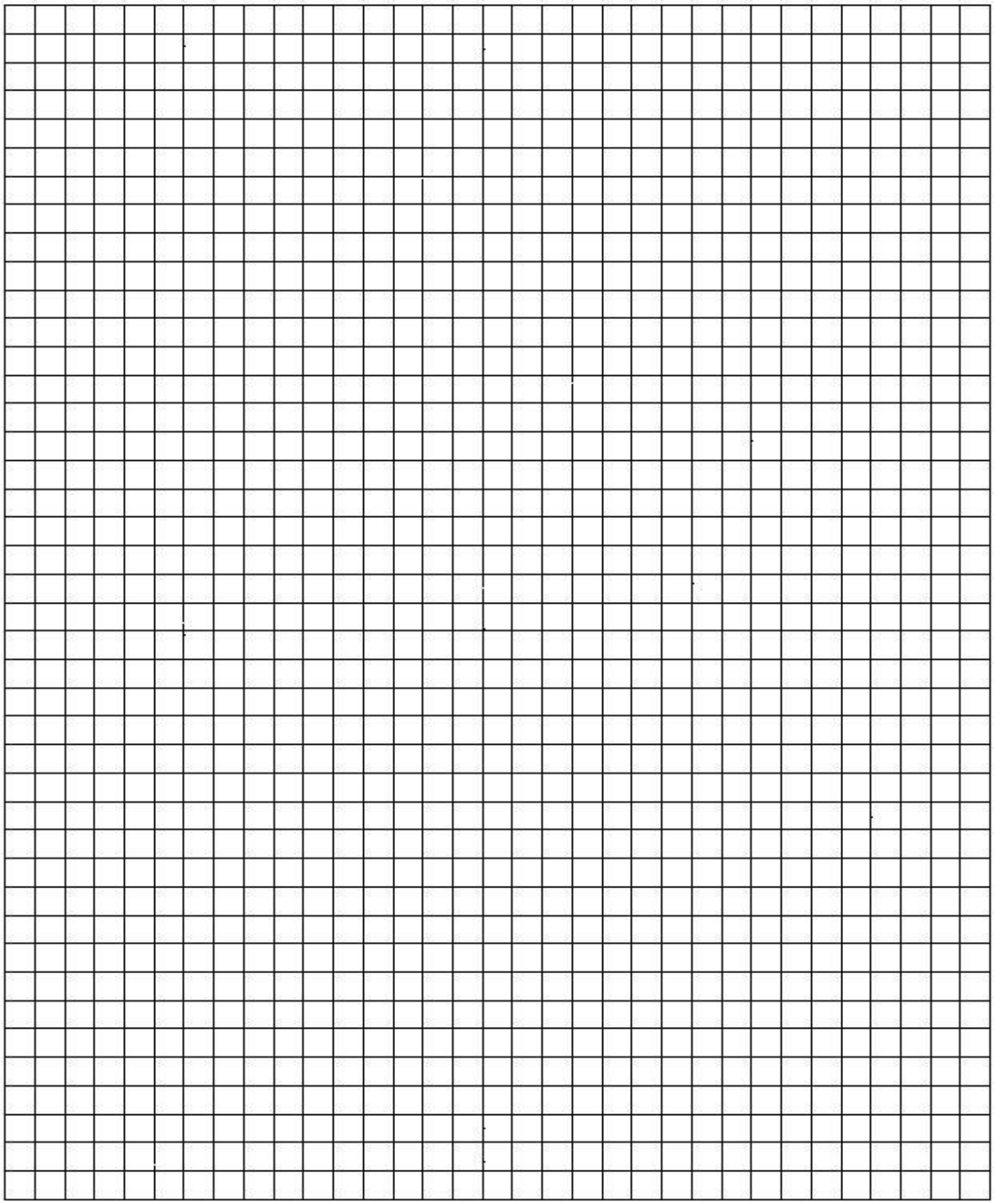
4. What are the mean, median, and mode of all 3 columns of data?

a). Depth : Mean_____Median_____Mode_____

b). Bubble Plant A.: Mean _____Median_____Mode_____

c). Bubbles Plant B: Mean _____Median_____Mode_____

Title: _____



LEGEND:

Problem B:

Diabetes is a disease affecting the insulin producing glands of the pancreas. If there is not enough insulin being produced by these cells, the amount of glucose in the blood will remain high. A blood glucose level above 140 for an extended period of time is not considered normal. This disease, if not brought under control, can lead to severe complications and even death.

Answer the following questions concerning the data below and then graph it.

Time After Eating hours	Glucose ml / Liter of Blood Person A	Glucose ml / Liter of Blood Person B
0.5	170	180
1	155	195
1.5	140	230
2	135	245
2.5	140	235
3	135	225
4	130	200

1. What is the dependent variable and why?

2. What is the independent variable and why?

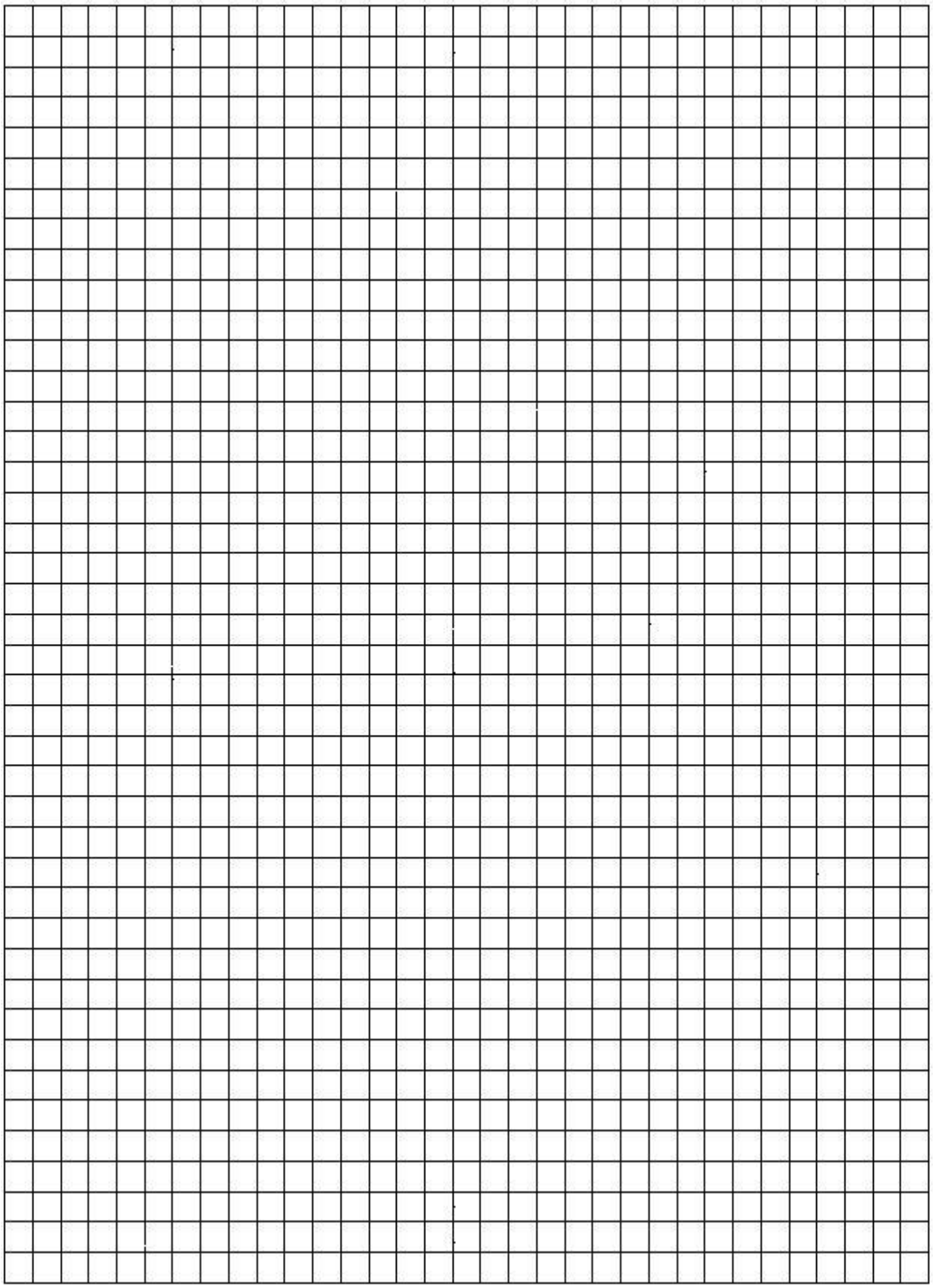
3. What title would you give the graph?

4. Which, if any, of the above individuals (A or B) has diabetes?

5. What data do you have to support your hypothesis?

6. If the time period were extended to 6 hours, what would the expected blood glucose level for Person B?

Title: _____



LEGEND:

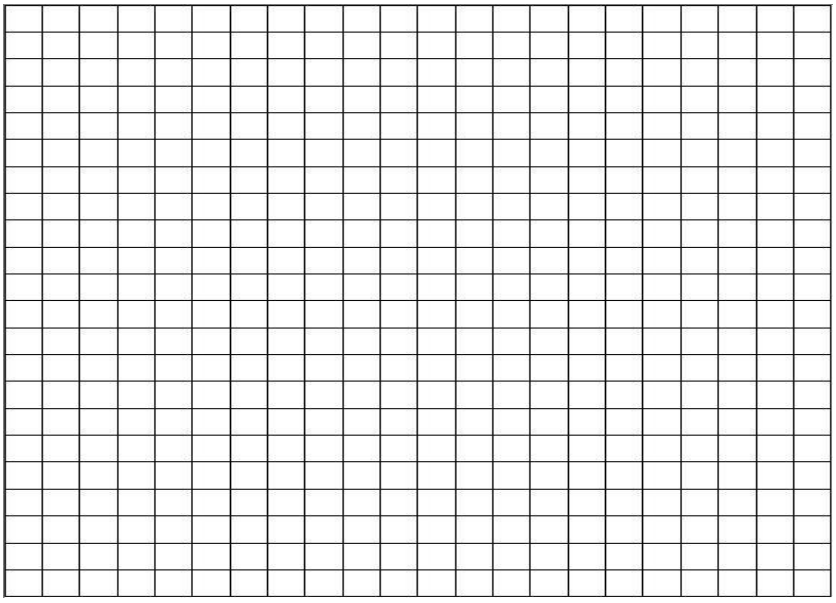
Problem C

Temperatures were obtained in November in a fairly arid area of Nevada. At two different sites, temperature readings were taken at a number of heights above and below the soil surface. One site was shaded by a juniper (a plant) whereas the other was not.

Table 1

Condition	Height in cm from soil surface	Temp. in Co - Beneath Forest Cover	Temp in Co – Unshaded Field
Air	150	18	20
Air	90	18	21
Air	60	18	20
Air	30	18	21
Soil surface	0	16	33
Humus	-6	12	19
Mineral	-15	9	15
Mineral	-30	7	12

Construct a line graph and plot the data



Problem D

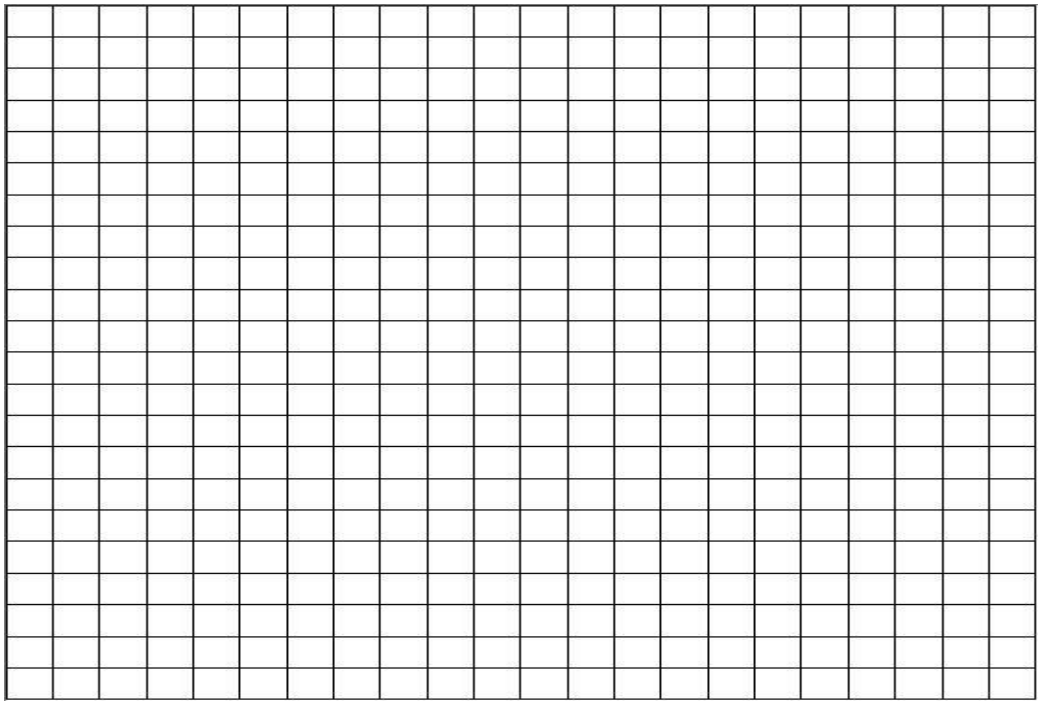
A researcher interested in the disappearance of fallen leaves in a deciduous forest carried out a field experiment that lasted nearly a year. She collected all the leaves from 100 plots scattered throughout the forest. She measured the amount of leaves present in November, May and August. The percentages reflect the number of leaves found, using the November values as 100 percent.

Table 2

Collection Date	Ash	Beech	Elm	Hazel	Oak	Willow
November	4271g 100%	3220g 100%	3481g 100%	1723g 100%	5317g 100%	3430g 100%
May	2431g 57%	3190g 91%	1739g %	501g %	4401g 83%	1201g 35%
August	1376g 32%	2285g 71%	35g %	62g %	1759g 33%	4g 0.1%

Complete the table by calculating the missing percentages

Construct a line graph for the ash and elm leaves



Problem E

A species of insect has been accidentally introduced from Asia into the US. The success of this organism depends on its ability to find a suitable habitat. The larval stage is very sensitive to changes in temperature, humidity and light intensity. Expose to situations outside the tolerance limits results in a high mortality(death) rate. Study the data table below.

Table 3

Temp. (oC)	Mortality (%)	Relative Humidity(%)	Mortality (%)	Light intensity (fc)	Mortality (%)
15	100	100	80	300	0
16	80	90	10	400	0
17	30	80	0	600	10
18	10	70	0	800	15
19	0	60	0	1000	20
20	0	50	50	1200	20
21	0	40	70	1400	90
22	0	30	90	1600	95
23	20	20	100	1800	100
24	80	10	100	2000	100
25	100	0	100		

On the graphs, plot line graphs for the effects of temperature and humidity of mortality rates.