

AP Biology Summer Assignment 2017-2018

Mrs. Hulihee fhulihee@heritageacademyaz.com

Welcome to AP Biology. This class will be very intensive and there will be a lot of material covered. I know that the words *summer assignment* are the last thing you want to hear at the end of a school year, but I think you will find this assignment interesting and maybe even fun 😊 It will be beneficial for you when we start the new school year in August. I am giving you these assignments to keep you sharp and focused and so that we can hit the ground running when school begins.

This assignment is divided into 6 parts. Some of them are easy, some of them are a little harder. Below is a table that outlines the assignments and when they are due.

Task #	Due Date	Task Description	Objective	Check it off when completed
1	Before 1 st day of school	Assignment #1: Letter of introduction emailed to fhulihee@heritageacademyaz.com	So I have some basic information about you and get to know you a little.	
2	Before 1 st day of school	Assignment #2: Signing up for class communication and accessing class website	Students will be ready to receive communications regarding class/assignments	
3	1 st day of class	Assignment #3: Graphing and data skills practice. Entire packet is due at beginning of class on the first day.	To refresh graphing skills and practice scientific thinking and statistical analysis	
4	1 st day of class	Assignment #4: supplies for AP biology class and have BILL ready	Assemble supplies and have BILL ready so you are prepared to engage in learning immediately	
5	1 st day of class	Assignment #5: Survival of the Sickest questions completed	To expose you to some of the concepts and connections in biology	
6	1 st day of class	Optional Assignment #6: Scavenger Hunt	Have some fun this summer	

If you have any questions about any aspect of these assignments, email me at fhulihee@heritageacademyaz.com I may not respond immediately as I don't check my work email every day. Have a great summer!!!

ASSIGNMENT #1: Letter of introduction

Your first assignment is to send me an email, before the end of summer, with the following information:

Subject Line: AP Biology 17-18

1. Your full name and any name that you prefer to be called.
2. Who was your last science teacher? What class was that?
3. What other science classes have you taken?
4. What do you do (hobbies, sports, music, interests, etc.)?
5. Do you have a job or are you planning on getting one? If you do, where do you work?
6. What are your personal strengths when it comes to learning new material?
7. What causes you to struggle in a course?
8. How many AP classes are you taking this year? (Please list them)
9. Was there anything that you liked or disliked about your previous biology class?
10. What are you looking forward to most in AP Biology?
11. What are you most anxious about in AP Biology?
12. Why are you taking AP Biology? What do you hope to accomplish/gain?

ASSIGNMENT #2: Signing up for class communication and accessing class website.

1. The class website can be found here: <https://tinyurl.com/l9brq47> If you have any problems with this, I can send you a link when you send me your letter.
2. I am going to try Remind this year. I have never used it, but your class will be my guinea pigs to test it out and see how I like it. To sign up for Remind, follow the directions on the next page.

This assignment is due before the 1st day of class.



Sign up for important updates from Mrs. Hulihee.

Get information for Heritage Academy Laveen right on your phone—not on handouts.

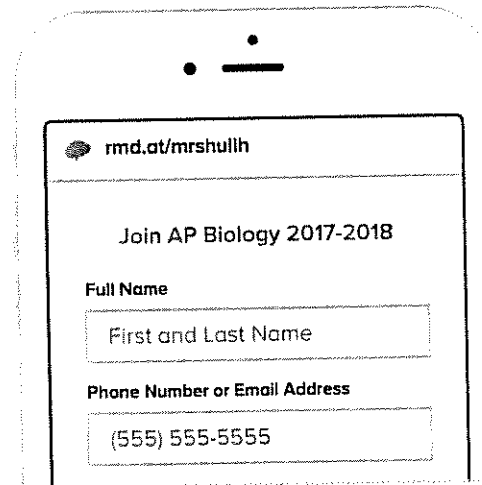
Pick a way to receive messages for AP Biology 2017-2018:

A If you have a smartphone, get push notifications.

On your iPhone or Android phone, open your web browser and go to the following link:

rmd.at/mrshulih

Follow the instructions to sign up for Remind. You'll be prompted to download the mobile app.

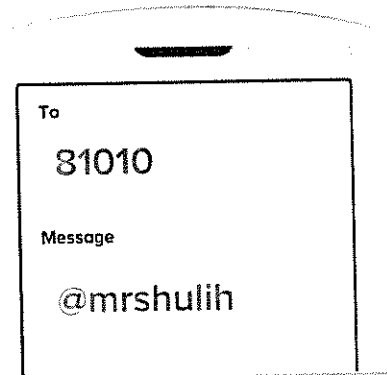


B If you don't have a smartphone, get text notifications.

Text the message @mrshulih to the number 81010.

If you're having trouble with 81010, try texting @mrshulih to (385) 245-2207.

** Standard text message rates apply.*



Don't have a mobile phone? Go to rmd.at/mrshulih on a desktop computer to sign up for email notifications.

ASSIGNMENT #3: Graphing and data skills practice. Complete the attached packet on graphing and data analysis. This will be due at the beginning of the first class and we will have a quiz on it in the first class. If you have any questions, or need any help, you can email me.

ASSIGNMENT #4: Supplies for AP Biology and preparing your BILL.

PART 1:

The supplies you will need to obtain are the following:

1. 2 – Quad ruled composition notebooks. Spiral bound notebooks will not be accepted as they fall apart too easily. You will need one for each semester and we will be using this every day. This will be your BILL (explained below).
2. 1 ½ - 2 inch binder with clear covered for title page. You will have the option of leaving this in class as it will hold your review material and will become extremely important prior to the AP exam which is held on May 14, 2018.
5. Blue/black pens for daily use and Red or Green pens for corrections. Also, you will need pencils for test days.
6. Highlighters – a variety of colors. You will be using these in your BILL reading and activities.
7. Colored pencils or markers that will not bleed through the pages of your notebook.
8. Stapler or double-sided tape to secure things in your BILL
9. Post it notes in various sizes and colors.
10. Pack of Post it dividers for BILL
11. Pack of 8 dividers for your binder
12. Note cards and rings for them.
13. A calculator. There is a lot of math in biology. You are not allowed to use a graphing or programable calculator on the AP Biology exam, so a small, 4-function calculator that can do square roots will be fine for this class. You must have it the first day of class and you must bring it with you to every class.

PART 2:

Getting your BILL ready.

You will be spending a lot, of hopefully quality, time with your BILL. In this AP Biology course, you will keep a Biology Interactive Learning Log (BILL). In BILL you will take notes, practice problems, and generally document your learning.

On any given day, we could be doing the following things in our notebooks:

- Solving practice problems
- Interpreting graphs or diagrams
- Creating graphic organizers or concept maps about biology content
- Writing practice free response questions

The activities we will do in your BILL are meant to allow you to interact with the biology content of our class in various ways. The more ways you interact with biological concepts, the more likely you will be able to apply them to new situations, whether it is a test or a lab investigation.

To create your BILL, you will need a quad ruled composition notebook. Nothing else will be acceptable and you will not receive any points for any other type of notebook. These notebooks need to hold up for the entire year and will act as your study guide as you approach the test.

To prepare your notebook:

You will need to decorate your BILL with a collage of some sort that represents you. I recommend you cover the front of your notebook with clear packing tape once you complete your collage to protect it.

We will go over how to set up your BILL in class on the second day so be sure to have your notebook with you.

Your BILL will become your best study buddy and it is important that you keep it up on a regular basis. We will use it in class daily and you will frequently use it outside of class, so it is important that you have it with you for every class. On the next page is a collage that illustrates a little bit about what a BILL is, and how it might appear.

ASSIGNMENT #5: Survival of the Sickest.

Get ahold of a copy of this book and read it. Answer the questions on the attached worksheet. Turn it in the first day of class.

The book can be purchased on Amazon as a book or a Kindle book, there are also limited copies available at the public library.



***BILLS are the Brainchild of Lee Ferguson - Master AP biology teacher This photo is from her personal BILL.

Assignment #6: Optional scavenger hunt

This activity is completely optional. Complete the task listed, and provide the appropriate documentation (indicated in parentheses). For every five that you complete and document successfully, I will give you five bonus points on your first course exam.

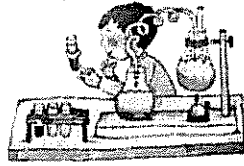
1. Watch the news/check Google news aggregate/read a newspaper at least once a week. (copy of article or log of date/URL and a 1-sentence summary of a news item from each week)
2. See a movie in a theater (stub).
3. Feed ducks/geese on three separate occasions – please don't feed them bread though, it's bad for them. (photos)
4. Grow a plant (living plant brought to class on Day 1)
5. Go to two state parks and take a walk (photos and maps)
6. Go to the zoo (photos and stub)
7. Go to a planetarium (photo and stub)
8. Go to a water based amusement park (photo and stub)
9. Go to a beach and collect sand in a jar (photos and jar of sand)
10. Catch a cicada (molt)
11. Sleep outside under the stars (photo)
12. Find an animal in the wild (not a dangerous one and don't harm it) (photo of animal and photo of you standing where the animal was).
13. Read more than one book (list, photos, and 3 sentence summaries)
14. Play a board game (photos)
15. Identify three species of tree in your neighborhood (leaves and genus/species of each)
16. Identify three species of flowers in your neighborhood (flowers or photos and genus/species of each).
17. Table showing the name, birth date and death date of 10 people's tombstone found in a local cemetery (table)
18. Brief biography of a woman in biology (1 paragraph)
19. Find the specific breed of 3 dogs you know (photos and breeds)
20. Visit a desert plant exhibit, such as an arboretum or a botanical garden (pictures and stub)

Mandatory Assignment 3 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 nicotine 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?

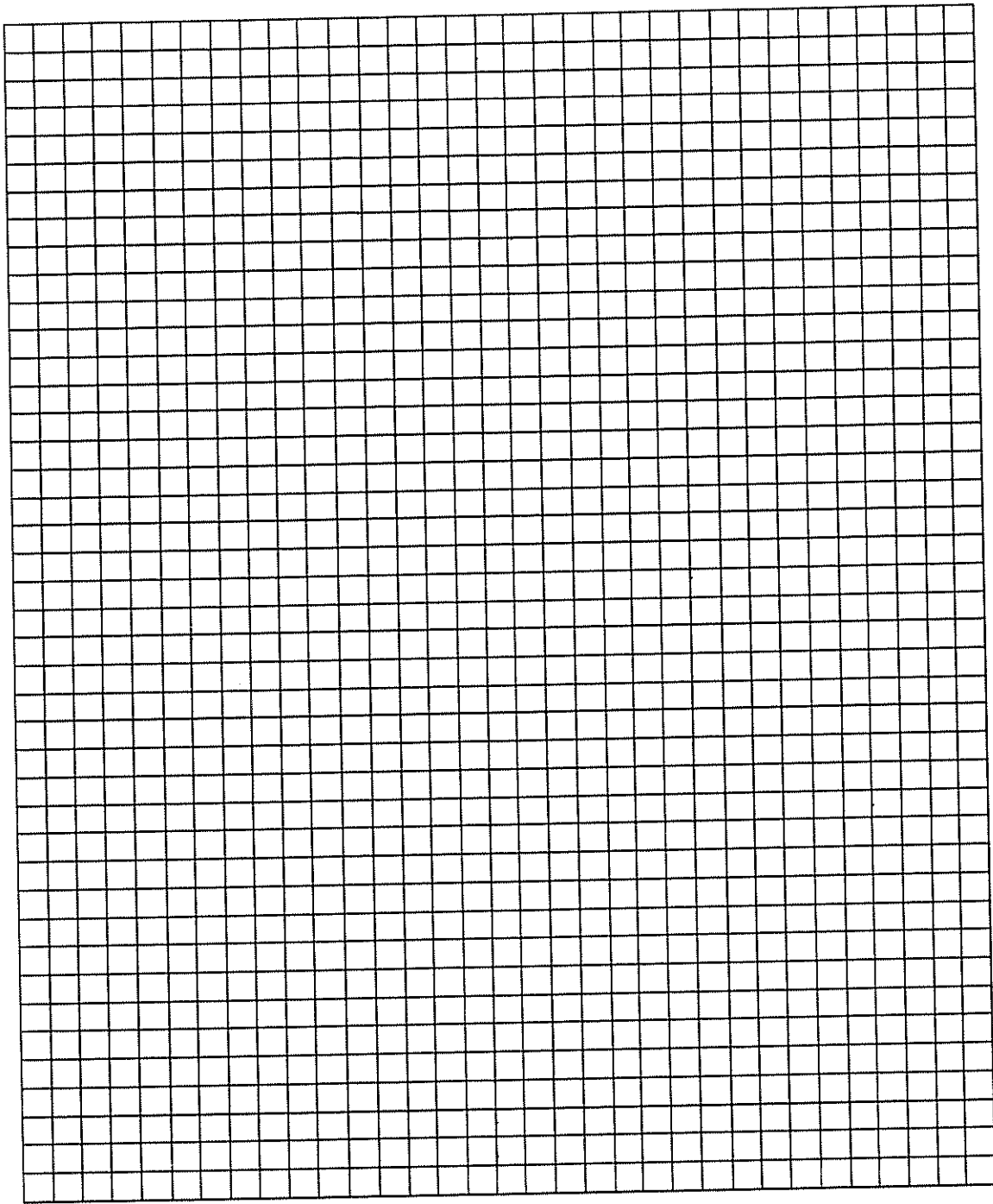
4. What are the mean, median, and mode of all 3 columns of data?

a). Depth : Mean _____ Median _____ Mode _____

b). Bubble Plant A: Mean _____ Median _____ Mode _____

c). Bubbles Plant B: Mean _____ Median _____ Mode _____

Title: _____



LEGEND:

Problem B:

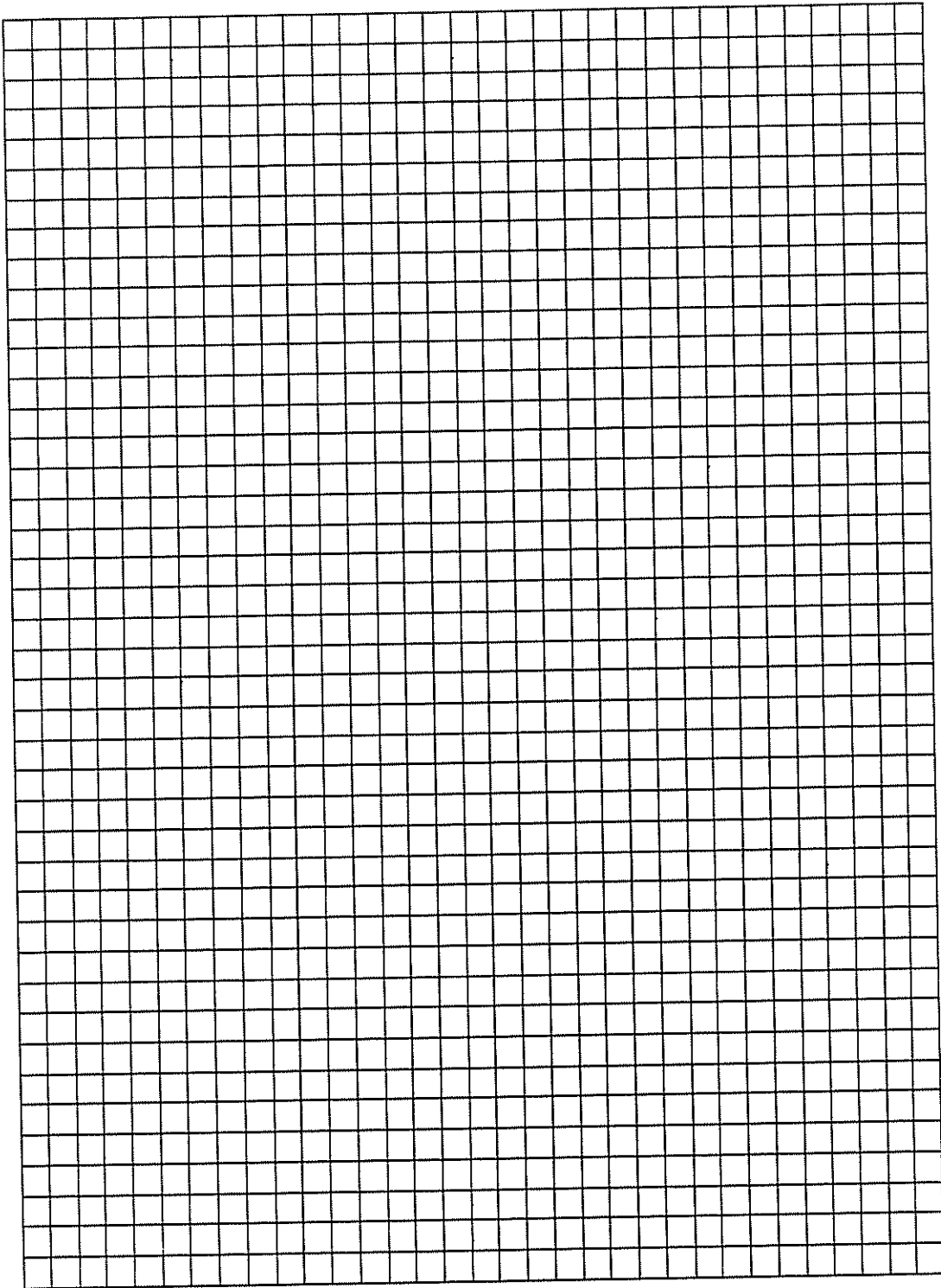
Diabetes is a disease affecting the insulin producing glands of the pancreas. If there is not enough insulin being produced by these cells, the amount of glucose in the blood will remain high. A blood glucose level above 140 for an extended period of time is not considered normal. This disease, if not 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:

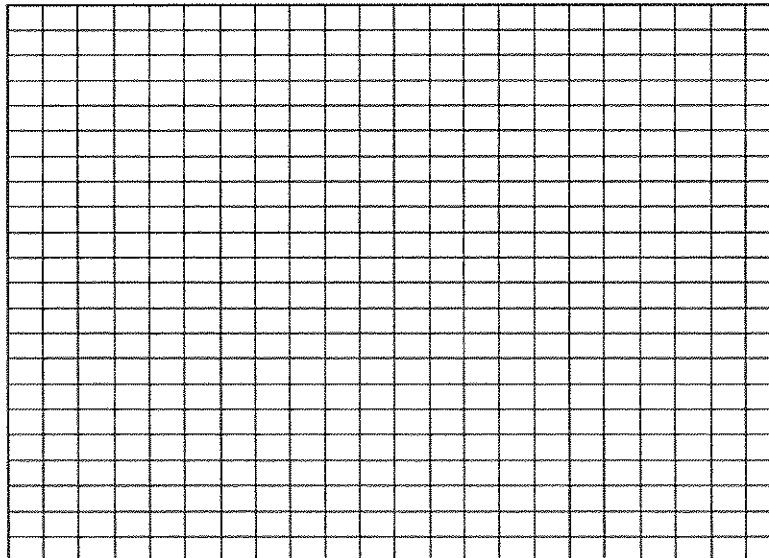
Problem C

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

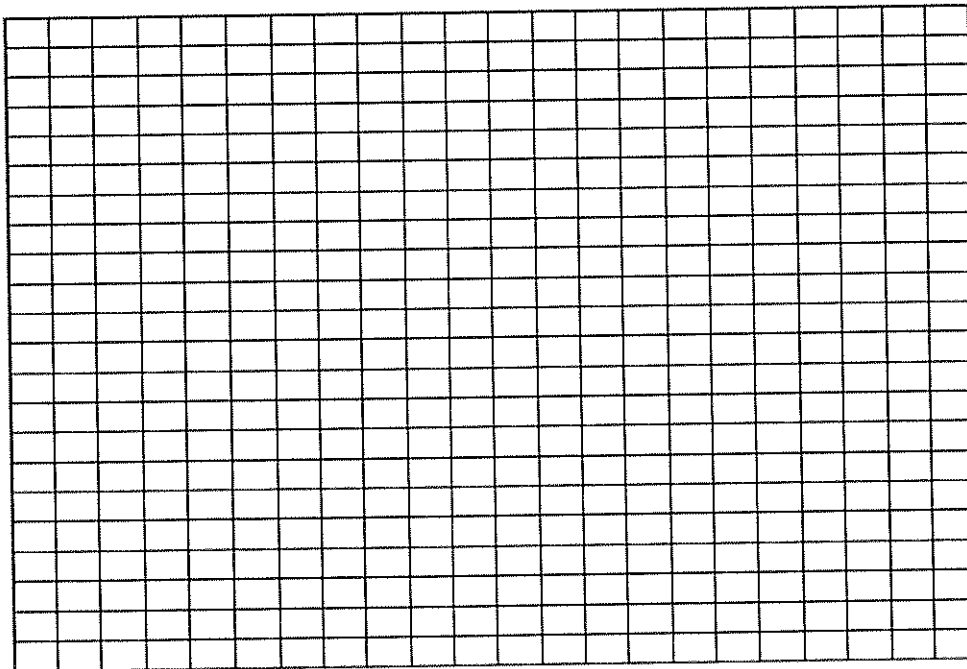
A researcher interested in the disappearance of fallen leaves in a deciduous forest carried out a field experiment that lasted nearly a year. She collected all the leaves from 100 plots scattered throughout the forest. She measured the amount of leaves present in November, May and August. The percentages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



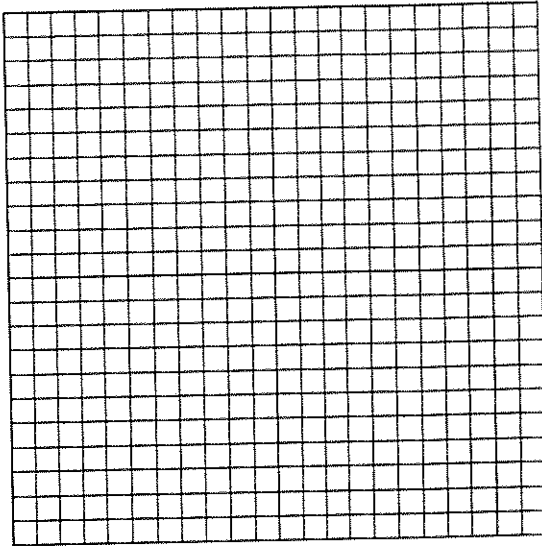
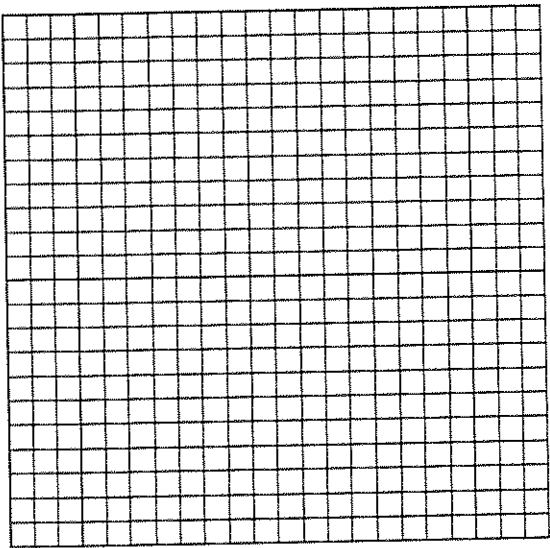
Problem E

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. Exposure to situations outside the tolerance limits results in a high mortality (death) rate. Study the data table below.

Table 3

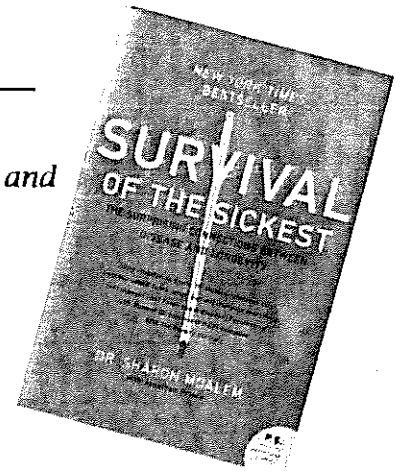
Temp. (°C)	Mortality (%)	Relative Humidity(%)	Mortality (%)	Light intensity (fc)	Mortality (%)
15	100	100	80	300	0
16	80	90	10	400	0
17	30	80	0	600	10
18	10	70	0	800	15
19	0	60	0	1000	20
20	0	50	50	1200	20
21	0	40	70	1400	90
22	0	30	90	1600	95
23	20	20	100	1800	100
24	80	10	100	2000	100
25	100	0	100		

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



Name _____
Evolution Reading Assignment: Survival of the Sickest

The following questions should be answered on a separate piece of paper and attach to this assignment page.



Introduction

1. What is the “big” question the book will attempt to answer?

Chapter I

2. The author points out many ways in which iron impacts life. Identify/describe at least five.

3. In the context of this chapter, explain the author’s reference to Bruce Lee and to the barber pole.

Chapter II

4. Distinguish between each of the three types of diabetes.

5. What did the ice cores of 1989 reveal about the Younger Dryas?

6. Describe the body’s “arsenal of natural defenses” against cold.

7. Describe the connection between *Rana sylvatica* and diabetes.

8. In Chapters I and II several inherited disorders were discussed. Create and complete a chart with the following information: Disease/Disorder, Symptoms, Evolutionary Advantage

Chapter III

9. Why do we need Vitamin D? Cholesterol? Folic acid?

10. Briefly describe the connection between the two concepts:

- a. tanning beds; birth defects
- b. sunglasses; sunburn
- c. hypertension; slave trade
- d. Asian flush; drinking water
- e. skull shape; climate
- f. body hair; malaria

11. What’s so *fishy* about the Inuits skin color?

12. Explain the good and the bad of ApoE4.

Chapter IV

13. Explain the role of G6PO.

14. Briefly describe the connection between the two concepts:

- a. European clover; Australian sheep breeding crisis of the 1940s
- b. Capsaicin; birds and mammals
- c. Malaria; air conditioning
- d. Fauvism; fava beans

15. Explain the following statement found on page 87: “Life is such a compromise.”

Chapter V: "Of Microbes and Men"

16. Complete Parasite Chart (go to end of assignment)

17. Identify 3 ways in which microbes/parasites move from host to host.

18. For each pathway listed in question #2, explain the relationship of the mode of transmission to the virulence of the invader.

19. What is our advantage in the survive-and -produce race?

Chapter VI: "Jump into the Gene Pool"

20. Briefly discuss the following terms/scientists:

- a. Jenner
- b. vaccine
- c. antibodies
- d. B-cells
- e. "junk DNA"
- f. Lamarck
- g. McClintock
- h. retroviruses

21. What is the Weissman barrier?

22. Make connections between the following terms:

- a. transposons; viruses; evolution
- b. sunspots; flu epidemics

23. Humans have about 25,000 genes and more than a million different antibodies. How is this possible?

24. What is a *persisting virus*?

Chapter VII: "Methyl Madness"

25. Make connections between the following terms:

- a. vitamin supplement; agouti mice
- b. snakes; long-tailed lizards
- c. Barker Hypothesis; fathers who smoke
- d. Smoking grandmothers; asthmatic children
- e. Betel nut chewing; cancer

26. Epigenesis may be partially responsible for the childhood epidemic of obesity. Explain.

27. "Good times mean more boys. Tough times mean more girls." Explain.

Chapter VIII: "That's Life: Why You and Your iPod Must Die"

28. Make connections between the following terms:

- a. Progeria; lamina A
- b. Hayflick limit; telomeres
- c. Cancer cells; stem cells
- d. Size; life expectancy
- e. Risky child birth; big brains and bipedalism

29. Explain the author's iPod and aging analogy.
30. Identify the 5 lines of cancer defense.
31. What are the two accomplishments of biogenic obsolescence?
32. Compare and contrast the *Savanna* and *aquatic ape* hypotheses.

Conclusion

33. The author hopes that you will come away from this book with an appreciation of three things:

- ✓ Life is in a constant state of creation
- ✓ Nothing in our world exists in isolation
- ✓ Our relationship with disease is often much more complex than we may have previously realized.

On a personal note, what would you add to his list?

34. "Nothing in biology makes sense except in the light of evolution." How does the book, *Survival of the Sickest*, support this quote by Theodosius Dobzhansky, a noted evolutionary biologist?

Parasites: Survive and Reproduce!

Parasite	Host/s	Manipulative Adaptation	Evolutionary Advantage
<i>Dracunculus metinensis</i> Guinea worm			
<i>Hymenoepimecis argyraphaga</i> wasp			
<i>Dicrocoelium dentriticum</i> Liver fluke			
<i>Spinochordodes tellinii</i> Hairworm			
Rabies virus			
<i>Toxoplasma gondii</i>			
Pin worms			
Cholera			
<i>Plasmodium</i> Malaria			

Inherited Genetic Disorders

Disease/Disorder	Symptoms	Evolutionary Advantage