

AP Biology Summer Assignment

MHS - Mrs. Matthew

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 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...if only all of 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 at angela.matthew@myoneclay.net **before the end of this summer:**

Subject Line: AP Biology 17-18

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? What are you 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 & Physiology?
- 11) Was there anything that you liked or disliked about your earlier biology class?
- 12) What are you looking forward to the most in AP Biology?
- 13) What are you most anxious about in AP Biology?
- 14) 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. **Also make sure you use your school email account.**

Mandatory Assignment #2 - Signing up for class communication

1. **Join our Facebook page (you will get an emailed invite):** Facebook-we have a class Facebook page. You should know this is a closed group. I send you an invite to join our class group using the email address you provide with your introduction email. Please be advised that we will all have access to the "group page" however the group page is set up so that **I will not have access to your personal Facebook page and you will not have access to my Facebook page.**

- **FB group page name: Mrs. Matthew AP Biology Broncos**

2. **Join our Remind101 Test Class:** When I need to send out fast class information quickly or send out reminders I use Remind101. It will send you automatic text messages from me.

Tell people to text @fekb8h to the number 81010

They'll receive a welcome text from Remind.

If anyone has trouble with 81010, they can try texting @fekb8h to (904) 425-8438.

Mandatory Assignment #3 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 2017-2018 school year. 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.

- Graphing exercises are located at the end of this packet.

Mandatory Assignment #4 Free-Response Question Practice (FRQ)

Complete the three FRQs that are provided at the end of the packet. Review concepts relating to these objectives by viewing a series of Crash Course and/or Bozeman Biology videos. Your assignment is to complete 3 essays relating to the learning objectives. AP

biology essays should be concise/to the point. This is not a five paragraph essay format, like an English paper. Your essays should address the specific questions being asked and do not need an introductory or conclusion paragraph. **You will type each response in separate Google docs. Please feel free to submit your assignments at any point over the summer. Last day they will be accepted is DAY ONE of the 2017-2018 school year.**

Directions: Below you will find links to online video resources. You will have some choices in your learning; you may choose to view the crashcourse videos or the BozemanScience videos (or both). After viewing the videos complete the free response (essay) questions. Complete these essays in order. Your responses should be typed using your own words. Be sure to address each part of the questions and label your answers (ex. Part A, Part B, etc.). Save your typed responses in 3 separate word document files. Please title your files with your name and the essay number. Share your files with me (angela.matthew@myoneclay.net).

ESSAY #1

Standard: All biological systems from cells and organisms to populations, communities and ecosystems are affected by complex biotic and abiotic interactions involving exchange of matter and free energy.

Learning Objectives:

- A. Refine scientific models and questions about the effect of complex biotic and abiotic interactions on all biological systems, from cells and organisms to populations, communities and ecosystems.
- B. Design a plan for collecting data to show that all biological systems (cells, organisms, populations, communities and ecosystems) are affected by complex biotic and abiotic interactions.
- C. Analyze data to identify possible patterns and relationships between a biotic or abiotic factor and a biological system (cells, organisms, populations, communities or ecosystems).

Crashcourse Biology Videos:

[Community Ecology: Feel the Love - Crash Course Ecology #4](#)

[Community Ecology II: Predators - Crash Course Ecology #5](#)

[Ecological Succession: Change is Good - Crash Course Ecology #6](#)

Videos by Paul Anderson at BozemanScience.com:

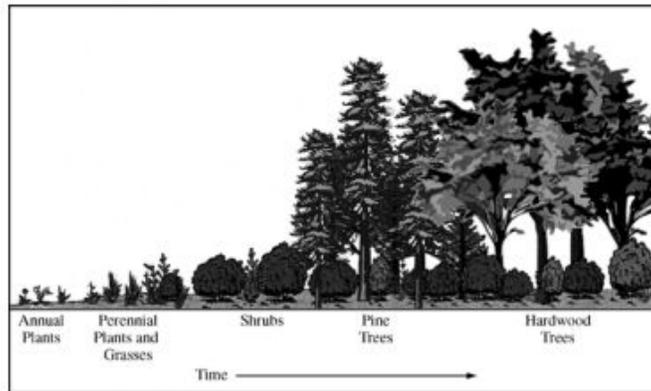
["Niche"](#)

["Communities"](#)

["Coevolution"](#)

["Ecological Succession"](#)

["Biodiversity"](#)



The diagram above shows the succession of communities from annual plants to hardwood trees in a specific area over a period of time.

- Discuss** the expected changes in biodiversity as the stages of succession progress as shown in the diagram above.
- Describe** and **explain** THREE changes in abiotic conditions over time that lead to the succession, as shown in the diagram above.
- For each of the following disturbances, **discuss** the immediate and long-term effects on ecosystem succession.
 - A volcano erupts, covering a 10-square-kilometer portion of a mature forest with lava.
 - A 10- square-kilometer portion of a mature forest is clear-cut.

ESSAY #2

Standard: The level of variation in a population affects population dynamics.

Learning Objectives:

A. Use evidence to justify a claim that a variety of phenotypic responses to a single environmental factor can result from different genotypes within the population.

B. Use theories and models to make scientific claims and/or predictions about the effects of variation within populations on survival and fitness.

Review videos from Essay #1 and these additional selections:

Crashcourse Biology Videos:

[The History of Life on Earth - Crash Course Ecology #1](#)

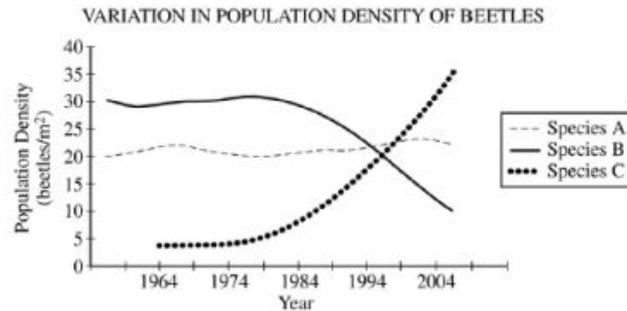
[Population Ecology: The Texas Mosquito Mystery - Crash Course Ecology #2](#)

[Human Population Growth - Crash Course Ecology #3](#)

Videos by Paul Anderson at BozemanScience.com:

["r- and K- Selection"](#)

"Ecosystems"



According to fossil records and recent published observations, two species of leaf-eating beetles (species A and B) have existed on an isolated island in the Pacific Ocean for over 100,000 years. In 1964, a third species of leaf-eating beetle (species C) was accidentally introduced on the island. The population size of each species has been regularly monitored as shown in the graph above.

- Propose** an explanation for the pattern of population density observed in species C.
- Describe** the effect that the introduction of beetle species C has had on the population density of species A and species B. **Propose** an explanation for the patterns of population density observed in species A and species B.
- Predict** the population density of species C in 2014. Provide a biological explanation for your prediction.
- Explain** why invasive species are often successful in colonizing new habitats.

ESSAY #3

Standard: Biological systems interact, and these systems and their interactions possess complex properties.

Learning Objectives

- Interactions among living systems and with their environment result in the movement of matter and energy.
- Energy flows, but matter is recycled.
- Changes in regional and global climates and in atmospheric composition influence patterns of primary productivity.

Review videos from Essay #1 & #2 and these additional selections:

Crashcourse Biology Videos:

[Ecosystem Ecology: Links in the Chain - Crash Course Ecology #7](#)

[The Hydrologic and Carbon Cycles: Always Recycle! - Crash Course Ecology #8](#)

[Nitrogen & Phosphorus Cycles: Always Recycle! Part 2 - Crash Course Ecology #9](#)

Videos by Paul Anderson at BozemanBiology.com:

["Energy Flow in Ecosystems"](#)

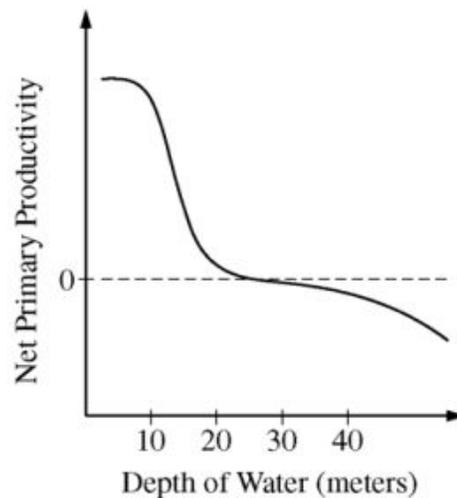
["Biogeochemical Cycling"](#)

["Ecosystem Change"](#)

Consumers in aquatic ecosystems depend on producers for nutrition.

- Explain** the difference between gross and net primary productivity.
- Describe** a method to determine net and gross primary productivity in a freshwater pond over a 24-hour period.

NET PRIMARY PRODUCTIVITY IN A FRESHWATER POND ECOSYSTEM DURING SPRING



In an experiment, net primary productivity was measured, in the early spring, for water samples taken from different depths of a freshwater pond in a temperate deciduous forest.

- Explain** the data presented by the graph, including a description of the relative rates of metabolic processes occurring at different depths of the pond.
- Describe** how the relationship between net primary productivity and depth would be expected to differ if new data were collected in mid-summer from the same pond. **Explain** your prediction.

Mandatory Assignment #5 Get your supplies for AP Biology Class

Get yourself ready for class! Below is the list of supplies that you will need for class. **WOW**, it is quite a list, but one thing you can be assured of is that your class is interactive- that being said you will need the proper tools to engage in project based, interactive learning, labs and classroom activities.

1. Mead/Five star Heavy Duty (plastic cover) 5 subject Notebook **College ruled**. (You will need this for 1st semester). Will be used daily in class for notes and daily activities this will be called your BILL- *Biology Interactive Learning Log*

2. Mead/Five star Heavy Duty (plastic cover) 3 subject notebook **College ruled**. (You will need this for 2nd semester). Will be used daily in class for notes and daily activities this will be called your BILL- *Biology Interactive Learning Log*
3. **ONE** 1 $\frac{1}{2}$ inch binder White with clear cover for title page. *Will be kept in class and used to store Review Materials.*
4. Blue/black pens and red pen (for corrections) - & pencils
5. Pack of highlighters (several different colors). *Will be used for interactive BILL reading and activities*
6. Colored pencils or markers that **WILL NOT** bleed through pages of notebook
7. Glue sticks and tape. *Will be used to secure items in your BILL*
8. Post it notes (various sizes and colors - pack of small, medium, and large post-its). *Will be used for various BILL activities*
9. Pack of **Post it divider tabs** for BILL
10. Pack of 8 dividers for your review binder
11. Notecards and note card rings. *Will be used for Bill activities and vocabulary cards about 500-600 vocabulary words, students are encouraged to buy note cards in various colors*
12. Pack of Window Crayons by Crayola *Will be used on tables for labs and other activities*
13. One bottle of Clorox wipes -- *Will be used for messy labs*

Mandatory Assignment #6 Get your BILL ready for Semester One of AP Bio!

BILL- The Biology Interactive Learning Log

You will also be spending a lot of time with something called BILL. In our AP Biology course, students keep an interactive student notebook (ISN), where you will document your learning and interact with course content. Our ISN is called BILL and we will use it daily.

On any given day, we could be doing one of the following things in our notebook:

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

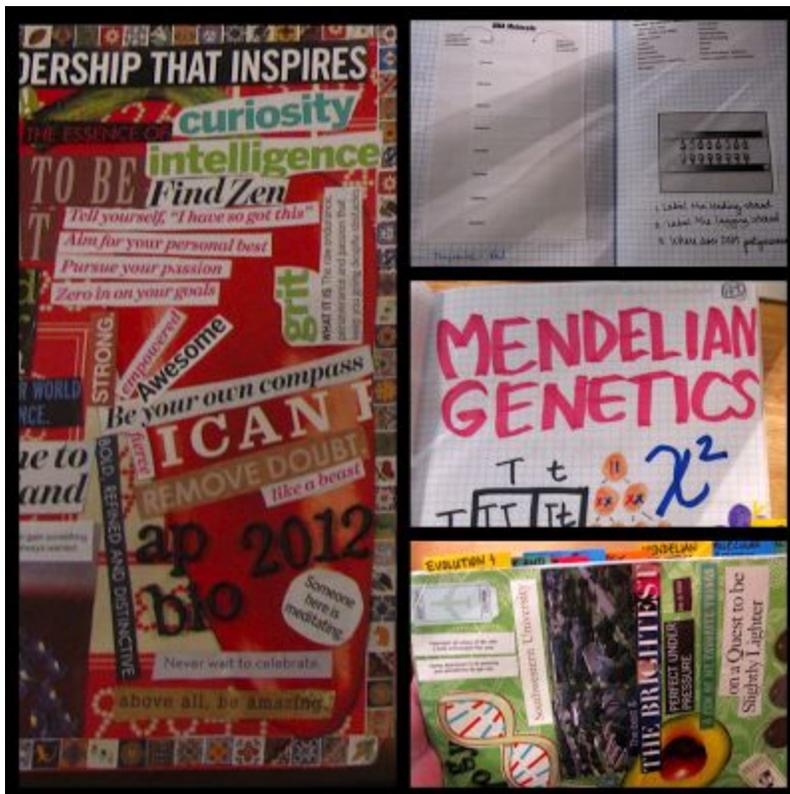
The activities we will do in our BILL are meant to allow you to interact with the biology content of our class in various ways. The more ways you interact with biological concepts, the more likely you will be able to apply them to new situations, whether it is a test or a lab investigation

To create your BILL, you will need a MEAD/Five star Heavy Duty (Plastic Cover) spiral 5 subject notebook. **These notebooks are the most durable spiral notebooks--so please make sure you get a high quality one to ensure that your notebook does not fall apart (as will be the case with generic spiral notebooks).** This is important because by the end of the year, you will have a homemade study guide

This summer: You will need to decorate the cover of your BILL with a collage of some sort that represents you. I recommend that you cover the front of your notebook with clear packing table once you have completed the cover to add durability, but also to protect the collage you make

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

It is important that you keep up with your BILL on a daily basis, since this learning log is the physical representation of your processing of course concepts. We will use this notebook in class on a daily basis to catalog all the learning that you do both inside and outside the classroom, so it is important that you have it with you each day. One the next page is a collage that illustrates a little bit about what a BILL is and how it might appear.



***BILLS are a brainchild of Lee Ferguson--Master AP Biology Teacher..This photo is from her personal BILL**

Optional Assignment--Summer Scavenger Hunt

Extracurricular activity scavenger hunt. Complete the task listed, and provide the appropriate documentation (indicated in parentheses). For every five that you complete and document successfully, we will give you five bonus points on your first course exam.

1. Watch the news/Check the Google news Aggregator/Read a newspaper at least once a week. (copy of article, Log of date/URL and a 1-sentence summary of a news item from each week)
2. See a movie in a theater. Make sure it's a good one. (stub)
3. Feed ducks on three separate occasions. (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. (photo and stub)
7. Go see a movie at the MOSH planetarium. (Photo of you in the hallway--you can't take a picture in the gallery and stub)
8. Go to a water-based amusement park. (photo and stub)
9. Go to the beach. Collect sand in a glass jar. (Jar of sand and photos)
10. Catch a cicada. (molt)
11. Sleep outside, under the stars. (photo)
12. Find an animal in the wild (no dangerous ones!). (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 the board game "Settlers of Catan" or "Risk" or the card game "Apples to Apples" (photo)
15. Put a Linux distribution on your computer (photo)
16. Build your own personal website. (URL)
17. Set up a geocaching tournament for you and your friends. (Photo and map)
18. Make your own clothing. (Wear it to school)
19. Identify three species of tree in your neighborhood. (Leaves & genus/species of each)
20. Hold five earthworms OR two slugs. (Photo)

Task #	Due Date	Task Description	Objective	Check it off when complete
1	Before the 1st day of class	Mandatory Assignment 1: Letter of introduction email sent to angela.matthew@myoneclay.net	So I can begin to get to know you as a student	
2	Before the 1st day of class	Mandatory Assignment 2: Signing up for class communication	Students will be signed up and ready to receive class communications by the first day of school	
3	First day of class	Mandatory Assignment 3 Graphing and Data Skills Practice Graphing Packet	To offer additional practice and tutorial on Scientific thinking and Statistical Analysis in Biology	
4	First day of class	Mandatory Assignment 4: Free Response Question Practice	To offer an introduction and practice to Free-Response questions which are on the AP Exam	
5	First day of school	Mandatory Assignment 5: Get your supplies for AP Biology class Get your AP Biology Supplies	Assemble your supplies for class so we can get started right away	
6	2nd Day of School	Mandatory Assignment 6: Get your BILL ready for Semester One of AP Bio Have your BILL ready	Students BILL is ready and student is prepared to engage in interactive learning processes	
NA	1st day of School	Optional Assignment Scavenger HUNT	Have some fun this summer....you deserve it and you will need the rest!!	

My email address is angela.matthew@myoneclay.net if you have any questions about the summer assignment you can get in touch with me through email. I may send emails out about this class over the summer. Have an Awesome summer!

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 1 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 times (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 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 scale 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 Plante 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) Bubble Plant B: Mean _____ Median _____ Mode _____

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?

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.

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

1. 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.

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

Temp (C)	Mortality (%)	Relative Humidity (%)	Mortality (%)	Light intensity (F)	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 two graphs, plot line graphs for the effects of temperature and humidity of mortality rates