

CP Biology Summer Assignment

Welcome to Bishop Eustace.

We are looking forward to this year with you and to working closely with you. This course may be challenging, but if you put the work in, you will succeed. This summer assignment is composed of skills needed to start your year successfully in Biology.

Supplemental notes are provided to you in the form of a PDF document. Videos are provided in this supplemental document to help you with certain concepts.

You are to complete this assignment independently.

Note on Collaboration: Authentic collaboration where students discuss the skills, contents, and processes required to complete the following questions is not only permitted but encouraged and very much in keeping with the practice of science as implemented in academia and industry. Students are cautioned however that there is a *significant* difference in both ethical behavior, adherence to the Academic Honesty Policy, and benefit derived from work done between authentic collaboration and either simply seeking the answers from or providing the answers to a peer.

Academic Honesty Policy: As a community committed to the ideals of St. Vincent Pallotti, Bishop Eustace Preparatory School prides itself on maintaining the highest standards of academic integrity and therefore does not tolerate any form of academic dishonesty or misconduct. By signing or typing their names on every assessment, Bishop Eustace students are agreeing to abide by all aspects of the Academic Honesty Policy as written in the Student Planner.

This assignment is due on the very first day of class. **All assignments turned in late will lose points. Points will be deducted for each day the assignment is late.** If you have any questions regarding the summer assignment, you may contact us via the school email addresses provided below.

You will **be quizzed on this material within the first 2 weeks of school.**

Have a good summer and we look forward to meeting you in September.

Mrs. Fox and Dr. Nicoletto

Mrs. Fox: pfox@eustace.org

Dr. Nicoletto: rnicoletto@eustace.org

Materials needed

- Minimum 1 inch, maximum 1 ½ inch binder for the lab manual only
- 2 pocket folder to keep loose papers
- Small pack colored pencils NOT crayons
- Notebook options, choose one of the following;

3-subject spiral notebook

2 one subject Spiral notebooks (one for each semester)

Marble composition book

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Your assignment must be neatly handwritten.

Part I: Characteristics of Life

Amoeba Sisters Characteristics of Life Video:

<https://www.youtube.com/watch?v=cQPVXrVOGNA>

Select an organism different from the example and explain how it meets all of the characteristics of life. Research may be required to learn more about the organism. The organism may be from any kingdom.

Characteristic	Example Organism: Opossum	Your Organism
Made of One or More Cells	Opossums are multicellular, made of many cells	
Shows Organization	Made of cells, tissues, and organs- <i>Have 4 legs, 2 ears, a tail, and 50 teeth</i>	
Obtains and Uses Energy	Eat fruit, bird eggs, small snakes, ticks, crayfish, and dead animals	
Respond to Stimuli	Play dead when frightened or threatened	
Maintains Homeostasis	Maintain a body temperature of 94-97°F	
Grows and Develops	Born hairless and grow in pouch for 2 months; weaned after 5 months; reach 8-14 pounds	
Reproduces	Sexual reproduction; give birth to 20-25 babies but only about 6-9 survive	
Adapts to Environment	Have a prehensile tail that allows them to grasp branches as they climb trees	

Part II: The Scientific Method

Amoeba Sisters Nature of Life Video:

<https://www.youtube.com/watch?v=3nAETHZTObk>

Answer the following questions:

1. **Define** the Scientific method.

2. **List** the steps of the scientific method.

3. Define hypothesis.

4. How is a theory different from a hypothesis?

5. What is meant by the term “controlled experiment”?

6. How many variables should an experiment test at a time? Explain your answer.

7. Define Independent variable.

8. Define Dependent variable.

9. What is the difference between quantitative and qualitative data?

a. Give an example of quantitative data.

b. Give an example of qualitative data.

10. Why is it important that scientists communicate and report their findings?

11. Why must experiments be repeated many times?

Part III: Graphing Scientific Data

During scientific investigations, scientists gather data and present it in the form of charts, tables, or graphs. The data must be properly collected, analyzed, and interpreted to allow scientists to make informed decisions regarding the validity of their study and any further work necessary to achieve their objectives. The ability to present and use data charts, tables, and graphs correctly is essential for good scientific practice and also prevents unnecessary or inappropriate work and misinterpretation of the data.

Graphing is an important procedure scientists use to display the data collected during a controlled experiment.

There are three main types of graphs:

Pie/circle graphs: Used to show parts of a whole.

Bar graphs: Used to compare amounts. X-axis values are in **words** or non-continuous data.

Line graphs: Used to show the change of one piece of information as it relates to another change.

X-axis values are in numbers or continuous data.

Both bar and line graphs have an “X” axis (horizontal) and a “Y” axis (vertical).

Parts of a Graph:

Title: Summarizes information being represented in ANY graph. Must include the independent and dependent variables.

Independent/Manipulated Variable: This variable is controlled by the experimenter, such as time, dates, pH, or temperature. This is placed on the **X-axis**.

Dependent/Responding Variable: This variable is directly affected by the IV. It is the result of what happens as time, dates, pH, or temperature are changed. This is placed on the **Y-axis**.

Scales for each Variable: In constructing a graph, one needs to know where to plot the points representing the data. To do this a scale must be used that includes all the data points. The scales should climb in **equal** intervals such as multiples of 2, 5, 10, 20, 25, or 100. The scale for the X-axis and Y-axis can be different. Most of the graph should be used.

Key: Used for identification when there is more than one line on a graph or multiple bars.

Watch the Bozeman Science Videos on Graphing and answer the following questions.

Beginner's Guide to Graphing <http://www.bozemanscience.com/beginners-guide-to-graphing-data>

1. Why do we use graphs?

2. For each of the following graphs, describe/sketch what each looks like and describe when we would choose to use it.

Graph Type	Description	Sketch
Line		
Scatter		
Bar		
Histogram		
Pie		

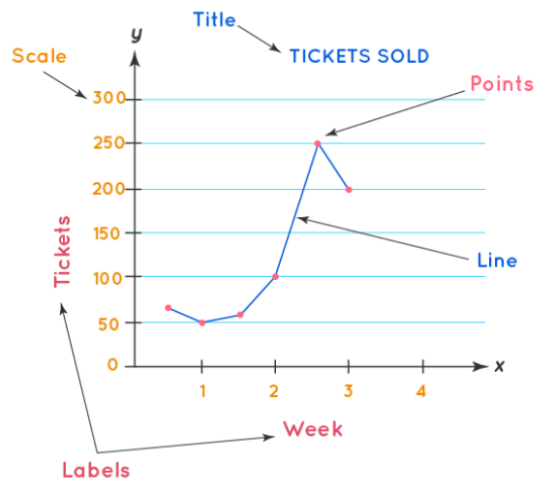
3. What are the elements of a good graph (What should you include when you set up a graph)?

4. What information should be included in the title?

5. How do you draw a line of best fit (trend line)?

Line Graphs:

Parts of a line graph:



The following steps can be used to create a line graph:

Create a table: Draw the x- and y-axes on a page. On the top of the page, place a title that briefly describes the purpose of the chart.

Label each axis: If time is one of the factors, it should go along the horizontal (x) axis. The other numeric values, i.e., the dependent variables measured should be placed along the vertical (y) axis. Each axis should be labeled with the name of the numeric system as well as the measurements being used. For example, you may label the x-axis with independent variables like hours or months, indicating that each number written on the axis is the number of hours or months. Divide each axis evenly into applicable increments.

Add data: Data for a line graph is usually presented in a two-column table corresponding to the x- and y-axes. Once you've added your data, your line graph will automatically reflect its values.

Create a key: If you are comparing multiple items, you'll want to create a key that identifies what each line is by its color.

Using the information in the data table, construct a line graph on the grid.

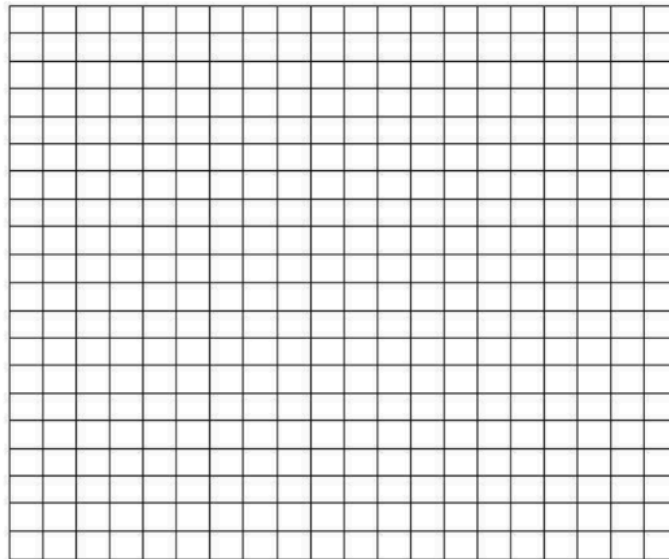
Bozeman graphing by hand: <https://www.youtube.com/watch?v=GUYRMdcEs00>

Graph the following line graph.

- **Label and number** the x and y-axis with appropriate scale and include units.
- Include a descriptive **title**.
- You should **connect** the data points. Do not make a best-fit line.

Background: Natalie sets out to run 15 kilometers. Every 30 minutes she checked her pedometer to determine how far she had run. Use the data below to create a proper scientific graph and to answer the corresponding questions.

Time (minutes)	Total Distance (km)
0	0
30	6.8
60	10.1
90	12
120	13.3
150	15



Questions:

1. How many kilometers had Natalie run after 40 minutes? _____
2. What is the difference in distance between 30 and 60 minutes? _____

Bar Graphs:

How to Make a Bar Graph?

Let us understand how to draw a bar graph with the help of an example. Liza went to the market to buy different types of fruits in different quantities of each- 5 apples, 3 mangoes, 2 watermelons, 3 strawberries, and 6 oranges. She wants to display the data by making a bar graph so that she can visually understand which type of fruits she buys the most.

Let us use the following steps to make a bar diagram of the most bought fruit.

Step 1: Take graph paper and give the title of the bar graph like "Most Bought Fruits".

Step 2: Draw the horizontal axis (x-axis) and vertical axis (y-axis) on a plane.

Step 3: Now label the horizontal axis as "Types of Fruits" which is an independent category and the vertical axis as "Number of Fruits" which is a dependent category.

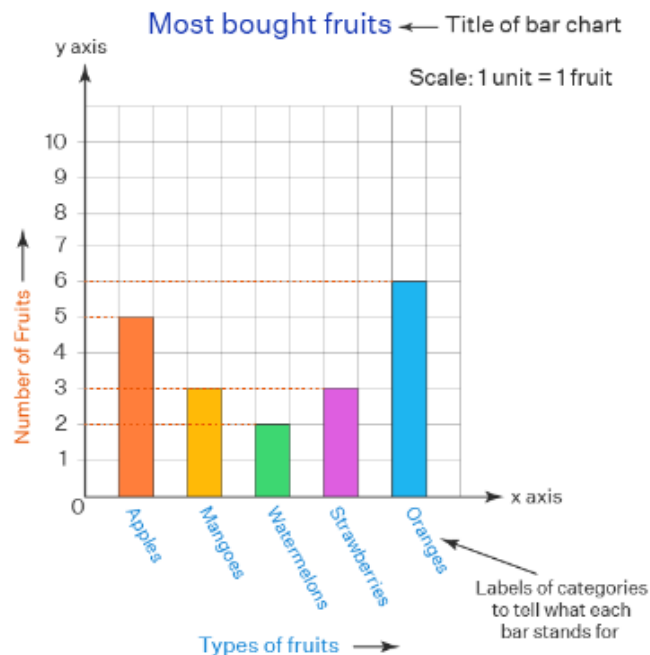
Step 4: Label the fruits' names such as apples, mangoes, watermelon, strawberries, oranges and give an equal gap or leave equal space between each fruit on the horizontal axis.

Step 5: Give the scale of the graph which shows how numbers are used in the data. It is a system of marks at fixed intervals which helps in measuring objects. For example, the scale of a graph can be written as 1 unit = 1 fruit.

Step 6: Now start making rectangular bars with equal gaps for each fruit and give height to their respective numbers.

Step 7: The bar graph is ready, observe the heights of the rectangular bars of each fruit and find out the most bought fruit.

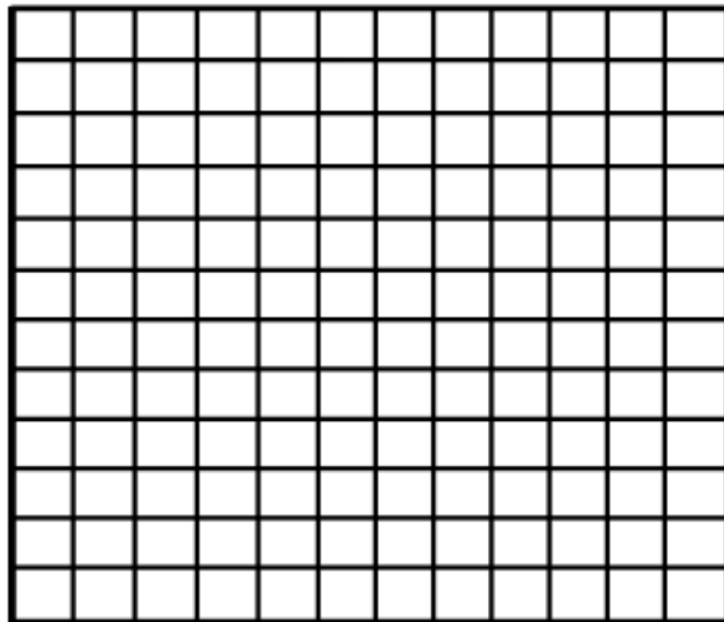
While drawing a bar graph it is very important to mention four things - labels on axes, title, scale, and name of the axes.



Using the information in the data table, construct a bar graph on the grid.

Students were surveyed to determine which candy they liked the best. The results are posted in the data table below:

Types of candy	Tally
Candy Corn	5
Candy Bar	8
Hard Candy	2
Caramel Apple	5
Bubble Gum	10



Questions:

1. Which candy has the most votes? _____
2. How many students voted in all? _____