BISHOP MCGUINNESS

AP Biology: Summer Packet 2024

Advanced Placement Biology is designed to be the equivalent of a two-semester college biology lab course in its quality and sophistication.

Primary emphasis will be on developing an understanding of concepts rather than on memorizing terms and technical details. Essential to this conceptual understanding are the following:

- A grasp of science as a process rather than as an accumulation of facts; personal experience in scientific inquiry
- Recognition of unifying themes that integrate the major topics of biology
- Application of biological knowledge and ***critical thinking*** to environmental and social concerns.

A few important points that students should consider

- AP Biology is a **college level course** for highly motivated students.
- Students should have successfully completed both Chemistry and Biology and have solid foundations in both content areas.
- This course will make heavy demands on students' time and energy. Students who score well on the AP exam typically report spending an average of 7-10 hours of study time outside of class each week.
- We will move quickly through material. It is imperative that students keep up with assigned work and reading. This course is designed to prepare students for the College Board Biology Advanced Placement Exam. Every student is required to sit for the exam.
- If students are unable or willing to make the commitment to the class, AP Biology will not be the right choice.

AP Biology Summer Requirements- this work should be complete by the first day of class.

Part I -Graphing

Graphing is an important procedure used by scientists to display the data that is collected during a controlled experiment. When a graph is put together incorrectly, it detracts the reader from understanding what you are trying to present. Most graphs on the AP exam are graded based on:

a. **Title**—depicts what the graph is about. Reading the title gives the reader an understanding about the graph. A good title is closer to a sentence than a phrase and is usually found at the top of the graph. It often includes both variables. (Ex: The effect of rainfall on plant growth).
b. **X-axis scale and labels:** The X axis should include your independent variable—the variable that can be controlled by the experimenter.
c. **Y-axis scale and labels:** The Y axis should include your dependent variable—the variable that is affected directly by the independent variable (what you are measuring).
   *Scale doesn't always have to start at zero, but it must be consistent. If you start off making each box worth 5cm, each subsequent box much also be 5cm. Always make sure your scale is labeled with units. Your scale should be appropriate so that as much of the graph paper is used as possible.
d. **Appropriate type of graph and legend (if applicable)**—You should know the appropriate time to use a bar graph vs a line graph vs a scatter plot. They have different purposes. Also, make sure that your line graphs DO NOT connect to (0,0) unless this is an actual data point.

DRY MIX- is a good way to remember where the independent and dependent variables go-
D-dependent, R- responding variable, Y-axis.
M- manipulated variable, Independent, X-axis

Experiment 1—Use the following data to answer the questions and create a multiple line graph on the grid below-

Time after Eating (hours)	Blood glucose of Person A (mg/dL)	Blood glucose of Person B (mg/dL)
0.5	170	180
1	155	195
1.5	140	230
2	135	245
2.5	140	235
3	135	225
4	130	200

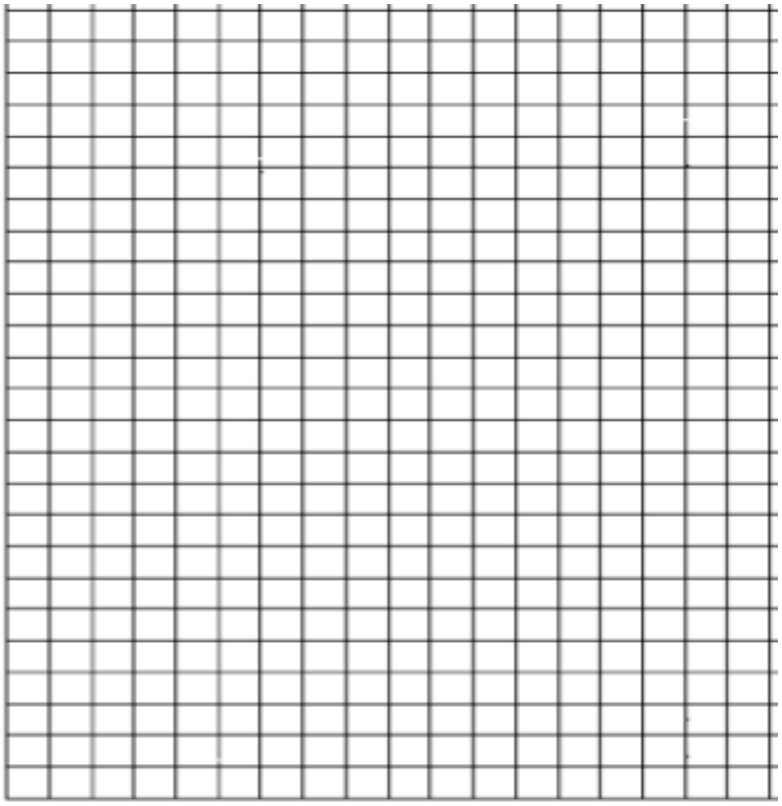
What is the independent variable?

What is the dependent variable? How do you know?

Whenever possible, it is best to title graphs as "The effect of IV on DV" where IV indicates the independent variable and DV indicates the dependent variable. Using this formula, what would you title your graph?

Why is a multiple lines type of graph best for this data? Explain based on the purpose of the graph.

Graph the data below. Be sure to include all of the required parts.



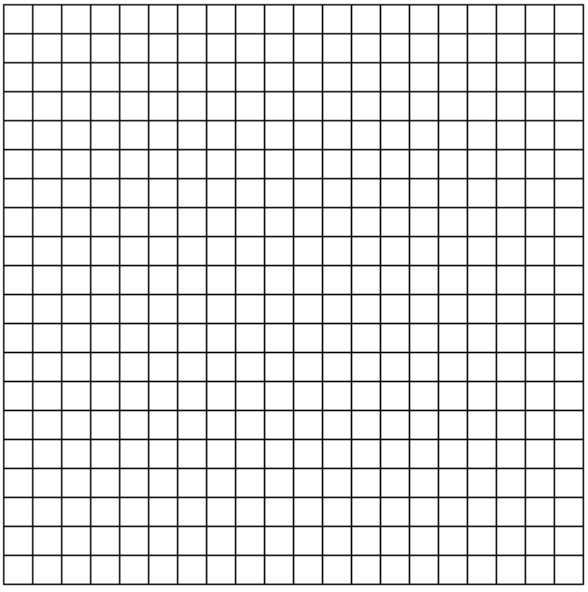
A common theme in Biology is homeostasis and feedback mechanisms. The human body uses many examples of **negative feedback** to maintain homeostasis, or a constant internal environment. For example, you use sugar as a source of energy. To maintain constant levels, you must continue to eat but your body also uses different enzymes to store or release glucose into your blood to be brought to cells for use. People who are **diabetic** are either unable to create insulin or are unable to use insulin. This means that their blood glucose levels are not regulated by these enzymes. Look up the insulin /glucagon glucose feedback loop and sketch it below—In the graph above-which individual shows symptoms of diabetes.

What are STANDARD ERRORS bars and what do they demonstrate?

You must show ALL WORK. Make sure graphs have <u>Titles and are properly labeled WITH UNITS</u>:

Graph the following sample data set showing the number of leaf disks that rise in a solution over time as photosynthesis occurs.

Time (min)	Number of Disks Floating
1	0
2	0
3	0
4	0
5	0
6	0
7	1
8	1
9	1
10	2
11	5
12	8
13	10
14	14
15	14
16	15
17	20
18	20
19	20
20	18

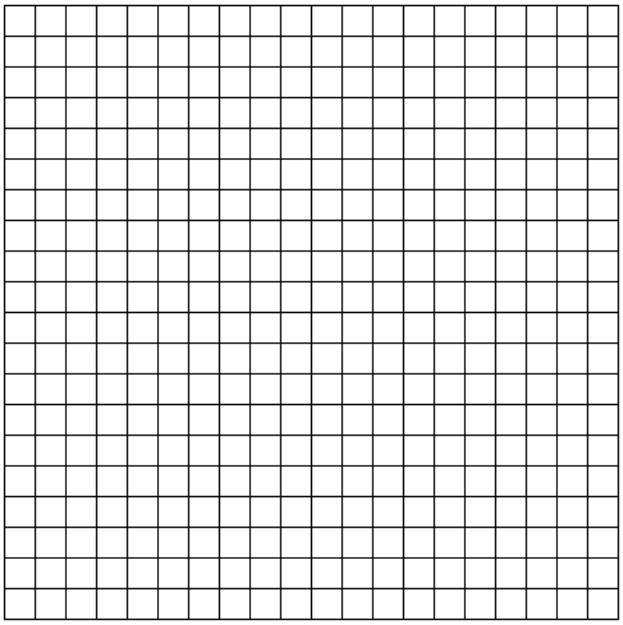


A clam farmer has been keeping records concerning the water temperature and the number of clams developing from fertilized eggs. The data is recorded in the chart:
Make a line graph of the data on graph paper.
Connect these data points with a smooth line.

Water Temperature in °C	Number of developing clams
15	75
20	90
25	120
30	140
35	75
40	40
45	15
50	0

What is the dependent variable?

What is the independent variable?
According to the data, what is the optimum temperature for clam development? _____



Part II- Biochemistry Review-

Please use a reputable resource to look up the following information.

(online textbook -CK-12, science sources, chemistry text)

1. Draw and label a phospholipid-
2. Why are phospholipids so important?
3. Draw and label the chemical structure of an Amino Acid. What type of bond holds the Amino acids together?
4. What are the six main functions of proteins?
5. What are the three subunits of a nucleotide?
6. What are the main classes of the nucleic acids?
7. Where is energy stored in ATP?
8. Distinguish between a polar and nonpolar covalent bond. Give an example of each.
9. Diagram 2 water molecules and indicate the Hydrogen bond(s) with labeled dashed lines.
10. Describe how the pH scale works (in terms of H+ and OH-) Explain how buffers resist changes in pH (refer to carbonic acid/bicarbonate for an example)
11. List at least 5 properties of water.
12. Explain why water is a good solvent (include the terms polar and hydrophilic)
13. Compare & contrast cohesion and adhesion. Give an example of each as it relates to a living organism (ex- root uptake of a tree)
14. Explain water in terms of specific heat. Compare with a substance that has a 'contrasting' specific heat, such as a metal.
15. What was the Urey-Miller experiment and why what it so important?

Fill in the table

Macromolecule	Monomer	Polymer	Linkage bond
Carbohydrates			
Proteins			
Nucleic Acids			
Lipids			