

AP BIOLOGY PROGRAM

HANDBOOK

Containing
Course Syllabus

Procedural Information

Lab Write Up

&

Summer Assignment

2016-2017

Mrs. Gallagher

julie_gallagher@snowlineschools.com

MAKE SURE YOU READ EVERYTHING

Looks like a lot I know, but now you have a handbook with everything you need to know in one place to be successful in AP Biology.

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Welcome to the AP Biology Course
Syllabus/Handbook 2016-2017
Everything you need to be successful in AP Biology

*****IMPORTANT PLEASE READ EVERYTHING BELOW!!!*****

Note: A copy of this can and should be printed and placed in your 3-ring binder for easy reference.

Course Description:

The 2016-2017 year of Advance Placement (AP) Biology is designed to offer students a solid curriculum in general biology concepts. There are four “Big Ideas” that the course centers around:

- **Big Idea 1:** Evolution.
- **Big Idea 2:** Biological systems using energy to maintain homeostasis for survival.
- **Big Idea 3:** Passing heritable information to provide continuity for life.
- **Big Idea 4:** The interaction of biological systems with biotic and abiotic factors.

The AP Biology course shifts from a traditional “content coverage” model of instruction to one that focuses on enduring, conceptual understandings and the content that supports them. Students will spend less time on factual recall and more time on inquiry-based learning of essential concepts which will help them to develop the reasoning skills necessary to engage in the science practices.

Students taking this course will also develop advanced inquiry and reasoning skills, such as designing a plan for collecting data, analyzing data, applying mathematical routines, and connecting concepts in and across domains. The result will be readiness for the study of advanced topics in subsequent college courses. The AP Biology course is equivalent to a two-semester college introductory biology course and has been endorsed by higher education officials.

In AP Biology, the teacher serves as a facilitator, while the students develop as independent thinkers and learners, especially through laboratory investigations. In class, students are given opportunities to learn and apply their knowledge through the process of inquiry rather than learning from lectures and/or prescribed lab protocols. A sense of wonder and use of original thought are fostered as students are encouraged to extend their learning via scaffolded conceptual understandings and open inquiry.

Recommendation: A grade of “B” or better in previous science course.

Textbook: *Biology: Campbell AP Biology (2013) Ninth Edition.*

Pre-requisite Knowledge Required

There is pre-requisite knowledge needed prior to students embarking on this course. Students were exposed to this content in 7th and 8th grade as part of the core curriculum. The summer assignment is designed to ensure that the student is prepared for the rigor of AP Biology.

Introduction Summer Assignment

There are two parts of the summer assignment; the first one focusing on introduction to evolution, the second one focusing on a couple case studies pertaining to concepts associated with evolution. This is your first introduction to student-based inquiry and analysis. Please follow the instructions for completing each part exactly. Make sure you refer to the items below as they apply to your summer assignment and future AP Biology assignments.

Essential Questions and Learning Objectives

You will find that the assignments contain **essential questions** that you are attempting to find the answers to in each of the four “Big Ideas”. Make sure you read and refer often these, as they will be the material you are tested on. The learning objectives address specific parts of the essential questions. Keep in mind that there are multiple lab/inquiry-based activities that we will be conducting to answer the essential questions; so that means that the learning objectives for current activity may only address a part of the essential questions. By the time we finish the unit, we will have covered all parts of the essential questions.

Course Materials Required

One composition book (any color cover; pages are bound and can't be removed) for lab/activity/case study write ups, class notes, video notes, vocabulary, recording assignments..., colored pencils, access to a computer/internet and printer, 3-ring binder (1 inch minimum) to keep all assignments/handouts/worksheets organized, black or blue ink pens, glue stick, clear tape, small scissors. Note: You will need a 2nd composition book for second semester; so you may want to purchase when they are on sale.

Communication:

Class webpage is available at www.serranohighschoolapbiology.weebly.com

Teacher Email: julie_gallagher@snowlineschools.com Feel free to contact me any time you have a question.

Important: **Make sure in the subject heading that you put a concise heading and your last name;** otherwise I might think you have sent spam. Example: AP Biology Question Your last name. Also, make sure in the body of your email that you include your full name.

Remind 101: (enables you to get reminder/informational texts from teacher): Text 81010 enter text code: @bg7c You will get a text back indicating that you have joined my class. Make sure you include the @ symbol. I won't know your number and you won't be able to text me back. Go ahead and sign up now as I will send out a remind text just before school starts!!!

Information Regarding Notebooks

Attention: This is a required assignment to be done before the first day of school and is **graded!** Make sure you **read and re-read directions** and follow them carefully!

You will need **1** “Composition book” for presenting your research findings and recording you assignments (from hereon called **ISN-interactive student notebook**). **Do the following to the pages in your “ISN” before doing anything else:**

Page 1: On the first page, create a cover page for your notebook in ink. Use colored pencils, or glue in a color printout to decorate front cover with something that relates to biology...you may use anything but pencil (Only pens and/or colored pencils will be used in this book; except when creating a sketch to be colored in). It should be neat and **include the following:** Name, School Year (2016-2017), Teacher Name (Gallagher), and Period (leave a space for it since schedules aren't posted yet; you will add later)

Page 2: (Back side of page 1) Leave Blank. You will begin summer assignment on page 3

Composition (ISN) Book Rules:

1. Black or blue ink only. Everything must be written in **ink**. Writing in **pencil=zero credit**.
2. Be as **neat** and **organized** as possible. Neatness and readability counts!!!
- 4 Always **use third person**
- 5 Answer in **full sentences**. Re-phase the question and be as complete as possible. Err on the side of too much information
- 6 If you make a mistake, cross it out with **one** line. **Do Not** use white out. **Do Not** scribble out. **Do Not** tear out pages.
- 7 Any additions to ISN must be glued or taped in neatly in the appropriate place (**no staples!**).
- 8 **Diagrams, graphs, charts** are important. They may be hand drawn in your book, or you can make up in a program like Excel, print out and paste in your book. You can also print out graph paper for graphs on computer, or make one with a ruler.
- 9 If you take pictures of activities/labs (strongly encouraged!), you may also print those out and paste in your book. These often enhance your understanding and retention of material!

Lab Report Format

Unless told otherwise, use the following format when writing up all lab experiments. ***Each lab report consists of five clearly labeled and easily identified sections.*** See below for exact guidelines for each section.

- I. Introduction/Purpose
 - question
 - hypothesis
- II. Methods (Procedure)
- III. Data and Observations
 - Present the experimental data and/or observations in ruled data table(s).
- IV. Analysis of Results
 - Calculations (if applicable)
 - Graphs (if applicable)
 - Discussion of results
 - Answers to assigned analysis questions (if applicable)
- V. Conclusion
 - Bulleted conclusions
 - Answers to assigned conclusion questions (if applicable)

Follow the guidelines below for the specific contents for each of the five sections of the lab report:

Date performed

Title of Experiment

I. Introduction/Purpose

- Describe the overall goal(s) of the experiment. What is it that you are trying to accomplish/determine with the experiment? This is often called the purpose of the experiment. What is the question you are trying to answer? Why? What do you hope to find out?
- Briefly summarize any relevant background information about the experiment and/or describe the theoretical principles on which the procedure is based, including all relevant chemical equations and/or algebraic equations. This is a couple paragraphs! Don't skimp on details! The reader should know what you are trying to find out, why, and what specific procedures you will use to accomplish your goal (this is not the same as methods/procedure below; but more of a why you are using specific method/tools/procedure)
- Hypothesis: If...then... Make sure you are specific! Include your independent and dependent variable. Needs to be testable/measurable. Needs to be falsifiable.

II. Method/Procedure

- The "Method" section tells **how** the work was done. Clearly, but **briefly**, describe in a step-by-step fashion the procedure used for the experiment. **Excessive detail is not required**; however a competent student should be able to follow the gist of **what you did and understand the purpose** of what you did (as explained in the intro).

III. Data and Observations

- **Do not attempt to discuss the interpretation of your data here**---this should be done in the “Analysis of Results” section.
- Include in this section **all calculations, graphs, analysis and discussion of your results.**
- Show **all** calculations clearly, and with attention to **significant figures** and **units** for those experiments that involve calculations. Explain clearly what you are calculating...Don't leave it to the reader to figure out what is being calculated!! Examples of each calculation should be provided corresponding to the table that depicts that result. You need only show one sample calculation if that calculation is used repeatedly in the analysis of the data.
- *Graphs **must have** a descriptive title, and each axis must be labeled with name of the variable and the unit* (Don't lose these “easy” points because you ignored this!) Use a ruler! Remember that the controlled or independent variable is placed on the horizontal axis and the dependent variable on the vertical axis. Computer generated graphs from **LoggerPro, Graphical Analysis, or Excel** can be pasted into the report.

Record neatly and directly into a ruled data table (i.e. made with a ruler!!) all pertinent measurements that are made during the lab period.

- If a data table is provided with the lab handout or is computer generated, simply cut and paste it with a "glue stick" or tape into your lab. Do not use a stapler, as staples are too bulky and do not hold well.
- If a data table is not included with the lab handout, use a **ruler** to construct a data table in your lab notebook so that all data is shown in an easy to read table. **Pay attention to units and significant figures.**

IV. Analysis of Results

A full analysis of the results....

1. **States what information** can be drawn from the results and most importantly **explains WHAT this information represents, as well as, HOW you arrive at what it means.** (e.g., what conclusion can you reach based on the data?) It should relate to your purpose/goal, answering your question, and supporting or rejecting your hypothesis. Make sure you include the Why, What and How!!! In other words, justify your analysis/data/conclusions.
2. **Uses specific numerical data and/or observations gathered in the experiment to **support all conclusions made,****
3. Will attempt to **explain** why results might be inconsistent with the predictions you made (what you thought would happen before you did your study, **based on a specific hypothesis** or other background information),
4. **Addresses** the major sources of error (**Be very specific!**) and explains how these errors affect the results,
5. **Addresses** problems that arose in your study and how they could be avoided in the future,
6. **Explains** what you may have done, if anything, to improve the experiment,
7. **Compares** your results with those of other students/scientists and cites the references used for comparisons,

8. **Explains** any exceptional aspects of your data or unexpected results,
9. **Examines** your results for possible errors or bias, and
10. **Recommends** further work that could augment the results of the study you have presented.

Note: If there are **analysis questions** assigned with the lab activity, answer them clearly, but concisely with **full sentences in your lab**. **Number your answers** as the questions are numbered and make it clear (rephrase the question) to *anyone* what the question is that you are answering.

V. Conclusion

Briefly, using “bullets”, state your major conclusions as clearly as possible (these will be same ones you addressed in your analysis, but now they are bulleted and to the point). Use specific supporting examples from your analysis/results. Your conclusion should relate directly to the purpose or goals of the experiment.

Use your data to support your conclusions!! It is *not* enough to simply state in the conclusion that you calculated a gene frequency in a population or calculated the rate of enzyme action in a reaction. Indicate what gene frequency you calculated and the rate of the enzyme action. **Always use your data support/substantiate your conclusions!!**

VI. Literature Citation

Given that some of the information included in your lab write up will have been taken from a published lab activity, you must include a citation of the source. The source(s) used should be cited within your lab write-up (especially in the introduction section) using scientific citation. Example: (College Board, 2001).

The **following citation format** will be appropriate for lab reports based on one of the 13 AP Biology labs:

Lab # _____ Title of Lab (College Board, 2001)

AP® Biology Lab Manual for Students (2001) New Jersey: College Board. p. ____ - ____.

VII. Questions – The **discussion questions** found throughout the laboratory information and directions should be *written and answered* in this section.

Lab Write: A great website to guide you in writing formal lab reports

<http://www.ncsu.edu/labwrite/>

Lab write up Source: BioLEARN <http://www.wisc.edu/cbe/biolearn/index.html>

Additional Course Information:

Visual Representations and Models

You will be asked to be asked to make visual representations and/or models you use to analyze situations. These visual representations may be in the form of graphs, charts, Venn diagrams, labeled drawings or sketches, pictures, etc. When you are asked to give a visual representation, it is up to you to determine how you can best present your representation/model in a visual manner so that others can “see” what data or model you are presenting. Not everyone will necessarily present the data in the same way. What’s important is that whatever method you select that you present the information in a visual, logical, clear, complete, and neat manner.

Notes from Videos/ podcasts

You will be asked to view a number of videos online throughout the semester in addition to or in lieu of lecture in class. Many of them are found on “You Tube” under “Bozeman Biology” and/or at www.bozemanscience.com. Others will be assigned as the semester progresses. In your “ISN” composition book, you will **Title the page with the video title, URL for the video, and date viewed.** **You will take notes on key concepts presented in the video.** (For full credit, this must be exact format!) You may record your notes however they are most useful to you (numbered, bulleted, graphically organized (flow chart, Venn diagram...)). You may glue in pictures/charts/diagrams if they help. You may want to record diagrams as presented, or make a concept map. It must be neat!

Following your notes, skip a line and please title a section “**Summary Paragraph**”. Write at least one paragraph (including an **introduction, and minimum 5 supporting facts**) about what you learned in this video segment. Be specific and give examples. For example:

Title: Enzyme Action

URL:

http://www.youtube.com/watch?v=nDCxIpiI7&list=PL7A750281106CD067&index=8&feature=plpp_video **Date Viewed:**

13 March, 2012 **Notes:**

- Enzymes are catalysts
- Enzymes speed up chemical reactions; decreasing energy needed for reaction
- Active site on enzyme substrate (reactant) goes into.
- Lock and Key analogy

Summary Paragraph:

Enzymes are proteins that function as catalysts. Enzymes speed up chemical reactions by decreasing the amount of energy required for a reaction to take place. Enzymes have an active site that the substrate acts on and forms a product. Enzymes work like a lock and key; if the key fits the door opens. If the substrate fits the active site then a chemical reaction takes place.

Case Studies

You will be asked to read a number of articles over the year that relate to current topics and research. You may be asked to ask questions, hypothesize, analyze, do additional research, record data, and complete an assessment. These will also be included in your ISN notebook. If you are asked to record your answers to questions, **you will not rewrite the questions**; however, you will number **and include the question in your answer (rephrase)**. For example: Question: Are the product claims of each drink legitimate? Why? Your rephrased answer: The product claims of “Red Bull” are..... legitimate, because.....

Scholastic Honesty (Please Review Honesty Code on next page and at end of Student Handbook)

The work you turn in is **your independent work**. It is **not work copied** from any other source. You are required to think independently and supply your own independent thoughts on **all** assignments. If, on rare occasion, you are documenting information taken from another source, you need to correctly site that source (MLA format). See the OWL website by Purdue if you need help with this:

<http://owl.english.purdue.edu/>

Scholastic Dishonesty

School Policy:

Scholastic dishonesty includes cheating, plagiarism, tampering with records, and taking teacher materials.

A first incident of cheating or plagiarism may result in any or all of the following:

- A warning to the student and parent, and a “0” or “F” for the paper, test, assignment, or project in question
- Mandatory retake/redo of assignment for less than full credit
- Lower citizenship grade

Any subsequent incident could also result in a loss of credit due to a second “0” or “F” on the paper, test, assignment, or project in question. When there is an incident of tampering with or taking of official records or teacher materials, a student may receive discipline consequences, and the Snowline police will be notified for a possible citable offense.

Class/Teacher Policy:

CHEATING is a growing problem among honors/AP level students and will not be tolerated. This includes, but is not limited to, **plagiarism of written work** from other sources (**classmate, former AP Bio students, or the internet**) and copying information from other students or from notes during an exam, or other evaluation. The consequences for cheating are loss of credit with a “0” grade, loss of a teacher reference for college, phone call home, and a school referral form. A second incidence will result in a “0” grade for the semester. Keep your eyes on your own paper and hand in only original work; this is for your benefit and academic growth as well.

Procrastination

Avoid at all costs. Get your assignments done as soon as possible. The sooner you get them done the sooner you are “Free”. Plus, if you have questions, they need to be addressed as early as possible. **Email is the quickest, easiest way to get a timely response.** Don’t ever leave your assignments and questions to the last minute; you never know when the internet will go down, electricity will go out...

Summer Assignment Due Date

Your summer assignment is to be completed and turned in **no later than the 26th of August.** Bring to class with you. There will be a test on what you learned over summer to be announced on the first day of school as to exact date. **Late summer assignments will generally not be accepted.** Please email me if you have any questions or concerns about your assignment!!! Make sure you have followed all the guidelines above if you expect full credit.

All other assignments will be due on the date announced. Generally, my policy is that **no late assignments will be accepted.** There are a couple of assignments that have hard deadlines, in other words, they are not accepted late for any reason. You may always turn in prior to the deadline! These usually involve projects in which time has been set aside for presentation and peer/teacher review and no other time can be feasibly scheduled (quite simply; if your project isn’t here it won’t be graded).

STUDENTS MAY NOT DO ANY PART OF THE ASSIGNMENT IN CLASS (or in hallway) ON THE DAY IT IS DUE!!! Any questions or confusion with an assignment/lab must be handled before it is due. This will result in zero credit!

Late Work Exception (other than summer assignment and other projects with hard deadlines): I do understand that students have full schedules and sometimes things happen! ANY TIME AN ASSIGNMENT CANNOT BE TURNED IN ON THE DUE DATE, students may submit a SHEET OF LINED NOTEBOOK PAPER WITH A PROPER HEADING (NAME, DATE, "AP BIO" AND ASSIGNMENT GIVEN), WHICH EXPLAINS IN NARRATIVE FORM, A LEGITIMATE REASON WHY THEY COULD NOT TURN IT IN. If the excuse involves a schedule conflict (late school practices, work obligations or home situation) the excuse **MUST BE SIGNED BY A PARENT AND HANDED IN AT THE TIME THE ASSIGNMENT IS DUE AND COLLECTED.** There will be no late penalty for this, and the assignment will be accepted **the next day.** This is permitted only **two times.**

IF THE NOTE IS NOT TURNED IN ON THE ASSIGNMENT DUE DATE AND THE ASSIGNMENT IS NOT TURNED IN, THE GRADE IS A ZERO AND THERE IS NO OPPORTUNITY TO MAKE IT UP!

Homework

Students will have **homework daily.** This may include vocabulary review, reviewing video clips on internet, study guides, lab reports, or other assignments. To do well in this class the student will need to spend a minimum of 3-5 hours a week studying. Studying is in addition to doing homework! Students may occasionally need to come in early or stay after school to work on their lab, collect data, and monitor apparatus... There is often work assigned over winter and spring break.

Grades

Grade Scale

90-100% =A 89-80%=B 79-70=C 69-60 =D 59-0= F

Assessments are 50% of the overall grade. (This includes, tests, quizzes, and projects)

Labs are 30% of the overall grade (This includes lab participation, lab work, and lab write-ups)

Other assignments 20% of the overall grade (This includes notes/summary for videos, worksheets, essays, article analysis, homework...).

Note: All make-ups and retakes of assessments are conducted on _____ (**to be announced**) after school. Students will also be permitted to improve their grade by retaking most tests they have done poorly. Make-up for missed test must be completed within **one week** and retakes have to be completed **within two weeks** of original test date. Students will earn the average grade between the two scores.

Absences

In the event a student is absent, extra copies of work and assignments are kept in the classroom, so on return, students are to ask their lab partners, check the board, check the stack of handouts, or check with the teacher, and then retrieve the handouts from the designated area. Most assignments can also be retrieved at www.serranohighschoolapbiology.weebly.com

If a student is absent the day an assignment is due, it must be turned in on the day that the student returns to school if the student expects to receive credit for the work. The student is responsible for work covered during an absence. If a student is absent the day before an exam, but was present any day prior when exam was announced, he/she must still take the exam on the day of the exam. It is the student's responsibility, on the day he/she returns to school to make arrangements for make-up work and/or exams. Make-ups will not be allowed for unexcused absences, truancy, or class cuts. Make-ups for lockouts will be at the teacher's convenience. All missed tests must be made up within one week after school on designated day.

Missed labs must be made up with a 3-page research paper (MLA format, typed, double space) on the topic of the lab. You must use and include a bibliography for a minimum of three references. Encyclopedias do not count. Research paper is due one week from absence return. Note: Due to the length, depth, and requirements of the labs required of the new revised AP Biology course, make ups for labs will be modified, yet it is expected that you will read the lab, review any podcasts on the lab, and gear your write up toward the content, expectations, and conclusions of the original lab.

Excessive Absences

Absences will significantly affect the student's ability to do well in AP biology due to the structure of coursework; the amount of material covered each day and the required laboratory work. Students with 10 unexcused absences, tardies, truancies, class cuts, will receive an "F" for the semester.

Extra Credit

Extra credit is **ONLY** available to students who do not have any missing work. This opportunity is for those students that do all the assignments and need extra points. **EXTRA CREDIT WILL BE EDUCATIONALLY BASED AND APPROVED BY THE TEACHER.** Extra credit may be offered periodically throughout the semester up to 100 points.

Standards and Objectives

Coursework and accompanying assessments have been carefully aligned and coordinated with the College Board AP Biology, California State Frameworks, and National Science Educational Standards, Science Practices, along with District policies. Students are given a copy of the appropriate required standards and learning objectives prior to each accompanying lesson. These standards and objectives indicate what the student should know at the end of each lesson. The grade earned by the student will represent what has been shown to have been learned by them. These standards and objectives should serve as a guideline to you and your student about the exact requirements they are expected to master in AP biology. We will be covering the following units: Biochemistry, Evolution, Cellular Biology, Heredity, Molecular Genetics, Ecology, and Anatomy.

Class Rules:

1. Be considerate of others and their property at all times
2. All electronics (cell phones, computers, tablets, IPOD's, earbuds, etc...) are to be silenced and put away prior to entering the classroom and shall remain put away until exiting. They may not be used unless direct permission has been given by the instructor for instructional purposes.
3. Food, drink, gum and candy are not allowed in the classroom/ lab except with permission.
4. Profanity, verbal abuse, bullying, or horseplay is not tolerated.
5. Come prepared for scheduled class activities. Be in your seat when the tardy bell rings. Every day, at the beginning of the period, students are expected to have their class textbook, writing utensils and notebooks on top of the desk. **I DO NOT HAVE ANY TO LEND.**
6. Grooming in class is a disruption and safety hazard. It is not permitted. Keep all grooming materials put away
7. Hat, beanies, hoodies, sunglasses or other items on the head or covering eyes are to be removed prior to entering class and kept off until exiting the class.
8. Throwing of any object in class is a safety hazard and not permitted.
9. Remain in your seat or at your lab station unless given permission to leave. The instructor excuses the class at the end of the period, not the bell.
10. Laboratory materials become the financial responsibility of the student when checked out for use during the period. Be careful with your equipment.
11. Students are expected to clean lab areas following lab activities/experiments, and to leave their assigned seating area clean.
12. Students are expected to pay attention during lecture and help to maintain a distraction-free learning environment. This means that you do not talk to anyone unless it is in direct relation to an assigned activity.
13. Students are expected to participate intelligently in class discussions when called upon.

Safety

Any student caught violating the safety rules for the science class will not be allowed to participate in lab activities for the remainder of the semester and will receive zeros for all subsequent labs. A safety lecture and examination will be conducted week one of the school year. Students are expected to get 100% on this examination to participate in lab activities. A safety lecture will accompany all laboratory activities. If you are not present for safety instruction, for safety of all concerned, you will not be permitted to participate in lab portion in which safety is a concern.

Consequences

The consequences for violating class/lab rules or other school rules can result in any or all of the following: lowering of citizenship grade, sentences, teacher detention, school detention, referral to office, class suspension, and/or school suspension.

Tardy Policy

The school's lockout/tardy policy will be in effect. In addition to that, a student will be considered tardy if he/she is not in their assigned seat or does not have the necessary materials when the tardy bell rings. If this occurs the student will be sent in lockout.

Audiovisual

The following PG or PG-13 films may occasionally be shown in class throughout the year. Please take a moment to read over the list. If you have any objections to your student viewing a particular film please send a note indicating your concerns. An alternative assignment will be given and student will be sent to another classroom. Your signature on parent form will indicate that you have read the list and give permission for your student to view the films listed below.

Medicine Man	Jurassic Park	Apollo 13	Outbreak
Lorenzo's Oil	Gross Anatomy	Awakenings	Perfect Storm
Gorillas in the Mist	Standard Deviants: Biology and Anatomy & Physiology		
GATTACCA	Patch Adams		

Animals in classroom/lab

There are periodically a variety of animals (reptiles, fish, and rodents) in the classroom, some of them on a permanent basis and some on a temporary basis. I believe that having animals in the classroom enhances science education and provides opportunities many students would never experience otherwise. However, there has to be specific safety precautions taken in order to protect the students and the animals. Students are not permitted to remove animals from cages unless they have specific permission from Mrs. Gallagher. Animals are never to be removed from cages when substitutes or other personnel are in charge. All animals will bite and unfortunately I cannot predict when or why one might bite. If a student is bitten they will be sent to the nurse to have wound washed and a report taken. None of the animals are poisonous, however, to avoid infection it is important to clean out wound. It is imperative that students wash hands prior to and immediately following any handling of animals. This helps prevent transmit of diseases to the animals, as well as, to yourself. Anyone caught mishandling, or being abusive, toward the animals will be subject to disciplinary action.

SOCIAL RESPONSIBILITY

SHOW INTEGRITY

HONOR SELF & OTHERS

Academic Honesty is:	Cheating is:
Using the internet and other library materials for insight and research. Rewording and rephrasing facts, with proper documentation is acceptable.	Copying phrases or sentences word-for-word from any source, such as the Internet, text, or study guides. Not documenting information taken from sources also constitutes cheating.
Working together and discussing an assignment with classmates to develop ideas; however, writing papers and completing assignments independently.	Copying word for word or rephrasing any portion of a classmate’s paper, notes, projects, lab notes, essays, worksheets or any other assigned material; knowingly providing other students with material that can assist them in cheating (including use of social media).
Studying for the test with notes and sharing ideas and notes on the material (not on test information) with classmates in preparation for the quiz or test.	Using any type of aid during a test that is not allowed by the teacher including, but not limited to: cheat sheets, formula or calculation, text messaging, wandering eye, crib notes, talking during a quiz or test.
Saying “I’m not sharing test information,” creating a testing environment that is fair to all students.	Sharing what is on a test or quiz between classes or at lunch with students who have not taken the quiz or test.
Admitting you lost an assignment; accepting a low grade.	Falsifying the assignment using technology, i.e., computers, scanners, copier, etc.
Having your parent/guardian sign school paperwork as required.	Signing papers as your parent(s).

Serrano High School Academic

Sign & Return the bottom portion to Mrs. Gallagher on first day of school

Honesty Code

with your summer assignment

I have received a copy of the Course Outlines and Policies for AP Biology.
I have read and understood the Outline and Policies. I agree to adhere to the guidelines. **Bring
with you on first day of class with your summer assignment! (10 pts)**

Print Students Name

Student Signature and date

Parent Signature and date.



**AP BIOLOGY 2016 -2017
SUMMER ASSIGNMENT**

DUE DATES

August 11th=20 extra credit points

August 12-19th=10 extra credit points

August 26th=Final due date

(Keep in mind that you will be in school and have regular daily work to keep up on as well—really in your best interest to try and complete before school starts if at all possible)

AP Biology Summer Assignment Part A-D

AP Biology Summer Assignment: Evolution Case Study and Sample AP Free Response Questions

Curriculum Connection: This assignment addresses the following AP Biology College Board standards of learning...

Essential Knowledge 1.A.1: Natural selection is a major mechanism of evolution.

- a. According to Darwin's theory of natural selection, competition for limited resources results in differential survival. Individuals with more favorable phenotypes are more likely to survive and produce more offspring, thus passing traits to subsequent generations.
- b. Evolutionary fitness is measured by reproductive success.
- c. Genetic variation and mutation play roles in natural selection. A diverse gene pool is important for the survival of a species in a changing environment.
- e. An adaptation is a genetic variation that is favored by selection and is manifested as a trait that provides an advantage to an organism in a particular environment.

Essential Knowledge 1.A.2: Natural selection acts on phenotypic variations in populations. a.

Environments change and act as selective mechanism on populations.

- b. Phenotypic variations are not directed by the environment but occur through random changes in the DNA and through new gene combinations.
- c. Some phenotypic variations significantly increase or decrease fitness of the organism and the population.

Essential Knowledge 1.A.4: Biological evolution is supported by scientific evidence from many disciplines, including mathematics.

- a. Scientific evidence of biological evolution uses information from geographical, geological, physical, chemical and mathematical applications.
- b. Molecular, morphological and genetic information of existing and extinct organisms add to our understanding of evolution.

Essential Knowledge 1.C.3: Populations of organisms continue to evolve.

- a. Scientific evidence supports the idea that evolution has occurred in all species.
- b. Scientific evidence supports the idea that evolution continues to occur.

Assignment Components: (Please submit all items below in order given in your ISN)

Part A- Video podcasts

1. Go to www.bozemanscience.com You will be clicking on the link to AP Biology. Bookmark this page so you can easily find it later. We will be using this website frequently throughout the year for many lectures you can view and re-watch as needed at home. Please go to Big Idea 1: Evolution. You will be watching and taking notes (including notes summary) in your **ISN** of each lecture...**(see specific directions in syllabus on page 9--you must follow directions for full credit)** on the following video podcasts: Each one is approx. 8-10 minutes long. (20 points each)

001 - Natural Selection

002 - Examples of Natural Selection

003 - Genetic Drift

004 - Evidence for Evolution

005 - Essential Characteristics of Life

2. Next, go to Howard Hughes Medical Institute <http://www.hhmi.org/biointeractive/making-fittest> and watch each of the 5 films listed on this page. Each film is about 15-20 minutes long. You don't need notes on every little thing in each of these films. However, for each film, you need an overall summary of the concepts, investigations, and conclusions covered by the scientists. Each of the summaries (5 of them) will take a page or two in your ISN. Include science vocabulary you learned from Bozeman lectures. Most students find these films and case studies very interesting. I think you will enjoy them. (30 points each)



(Co-evolution of the rough-skinned newt and the garter snake)

Part B: Case Study (Biological Warfare and the Co-evolutionary Arms Race)

Part B - Answer the questions given on the next page that are related to the online evolution case study (Note: this portion of the assignment is an assessment of your content reading / analysis skills). This goes in **your ISN.** (25 points total)

Directions: Access the online evolution case study at the web address given below. Use the “next” button at the bottom right corner of each page to continue the case study. Answer the questions below thoroughly and accurately in your ISN. You must use complete sentences.

Web Address: http://evolution.berkeley.edu/evolibrary/article/0_0_0/biowarfare_01

1. Why are snowshoe hare coloration and newt poison considered adaptations? What environmental factors shaped the evolution of these two adaptations? (2 points)
2. Describe how newt toxicity could have evolved by natural selection. Relate your answer back to Darwin's theory (summarized below). (2 points)

Darwin's Theory

- Natural Variation = “Each individual is unique”
- Adaptations = characteristic that helps an organism be more suited to its environment/survive and reproduce
- Overproduction of offspring results in more offspring than can survive
- Struggle for Existence = Organisms must compete for food, space, mates
- Natural Selection = individuals that are best suited to their environment will reproduce (survival AND reproduction of the fittest!); inherited favorable/successful characteristics become more common from one generation to the next
- Fitness = measure of organism's reproductive success (greater number of offspring that carry your genes)

3. How did Butch test his hypothesis that the newts were poisonous? What were his findings? (2 points)

4. Identify the following elements of Butch’s first experiment. If the element is not described in the case study, use your knowledge and imagination and make it up! (5 points)

Element	Definition
Independent Variable	What the scientist changes
Dependent Variable	What the scientist measures ; this variable depends on changes in the independent variable
Experimental Group	The group of test subjects that ARE exposed to the independent variable
Control Group	The group of test subjects that ARE NOT exposed to the independent variable ; measurements from this group are compared to measurements from the experimental group
Constants	Variables that are not changed between the experimental and control group ; scientists must keep every other condition constant to be sure that changes in the independent variable are the cause of changes in the dependent variable

5. Why did Butch consider the extremely high levels of newt toxin “counter-adaptive?” In other words, how did Butch explain his idea that over multiple generations, newts would evolve just the right amount of toxin to protect themselves from predators (not too little and not too much)? (2 points)
6. Describe the relationship between the newts and garter snakes in your own words. Use the terms “coevolution” and “arms race” in your answer. (2 points)
7. Describe the evidence Butch used to demonstrate that TTX production in newts met the three requirements of traits “selected” by nature – variation, heritability, and differential reproductive success / selection. (3 points)
8. Describe the evidence Butch used to demonstrate that TTX resistance in garter snakes met the three requirements of traits “selected” by nature identified in #7. (3 points)
9. What are the tradeoffs to increased TTX production in newts? What are the tradeoffs to increased TTX resistance in snakes? (2 points)
10. What evidence did Butch gather to support his hypothesis that co-evolution was occurring between the newts and snakes? Why did he study multiple populations of snakes and newts? (2 points)

Part C: Designing an Experiment

You will be presented with a different scenario related to evolutionary adaptations and asked to design an experiment to address a particular hypothesis regarding the scenario. (Note: this portion of the assignment mimics a “design an experiment” long response question, a common question format on the College Board AP Biology Exam) This goes in your **ISN**. (20 points total)

Background Information: For years, British scientists have studied a species of moth called the “peppered moth.” Peppered moths are found in two different colors – light and dark. Scientists have found that in heavily polluted areas, there tends to be a higher percentage of dark moths than light moths. They predict that the darker form of moth is more “fit” in polluted environments because a dark moth can blend into soot-stained trees and is less likely to be seen / eaten by a predator (ex: a bird) than a light moth.



Directions: In your **ISN**, you are to design and describe an experiment to test the following hypothesis: “**If light and dark moths are exposed to predators in a polluted environment, then the dark form of moth will have a higher rate of survival than the light moth.**” (You are not actually doing the experiment, but you are designing and describing the following elements as if you were doing the experiment)

Note: I have given you the hypothesis upon which you are to base your experiment on). Use the lab write up format given to you in the syllabus starting on **Page 6**.

Your description is not limited to the following, but must include these elements of a properly designed experiment (see Page 6 in syllabus for more lab write up guidelines). Remember to write in third person and as if you were doing/did the experiment.

Introduction:

- What **observations** will you have made? (2 points)
- What is the **question** you are trying to answer? (2 points)
- Provide a **hypothesis** that is reasonable, testable, and measurable (*Hint: it is easier to design a testable hypothesis if you put it in “If, then” format. This has already been given to you*) (2 points)
- Provide a **null hypothesis** (research and correctly format) (2 points extra credit)
- Identify your **independent variable** (the manipulated variable) (1 point)
- Identify your **dependent variable** (1 point)
- Explain how you will **measure** your dependent variable. Make sure it is quantifiable. (1 point)
- Identify your two **experimental** groups (*two different color forms*) and **control** group (2 points) (*Hint: Your control group should be a group of moths not mixed with predators to determine the “normal” moth survival rate*)
- Identify **three constants** in your experiment (factors that are the same between your control and experimental groups) (3 points)

Materials:

- Identify **organisms / materials / tools** used in your experiment (1 point)

Procedure/experiment:

- Specify the **length** of the experiment and the **frequency** of measurements (2 points)
- Specify the number of **trials** (*How many moths will you use? Why does this matter?*) (2 points)

Data and Analysis:

- Explain how you will analyze your data (*Will you use a chart or graph (make sure you include sample based on data you would expect to collect)? How will you draw conclusions from these data analysis tools? What did you see? Why did you get these results?*) (2 points)

Conclusion:

- Provide sample results and draw conclusions (remember these are bulleted) that support or refute the original hypothesis based on analysis of these sample results (3 points)

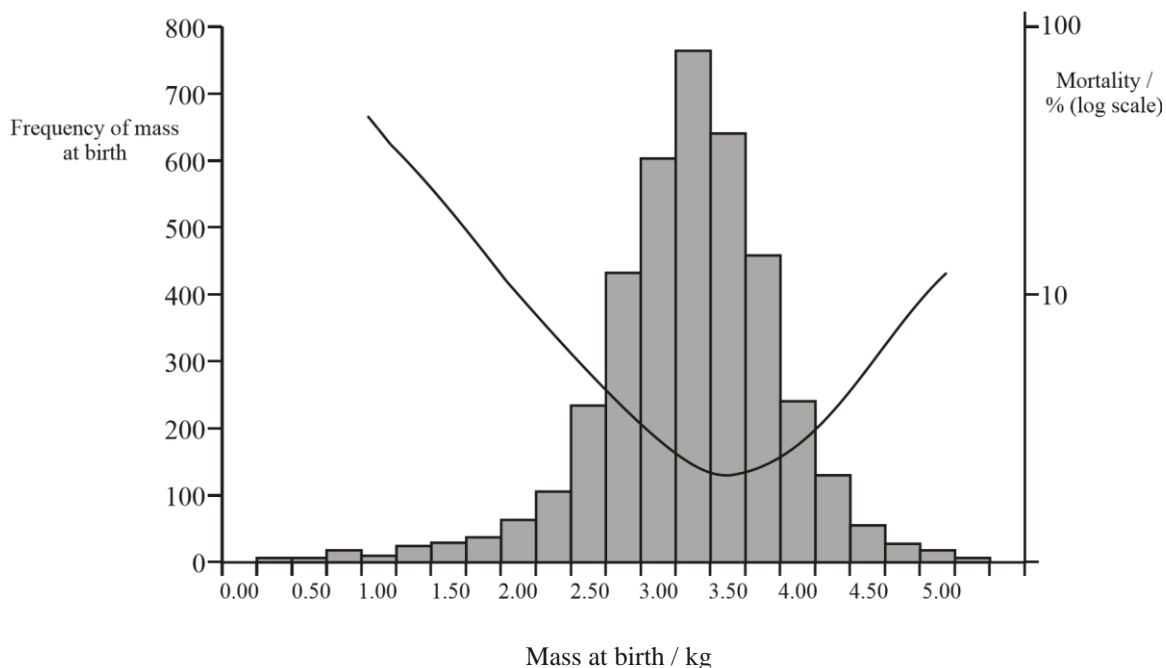
Works Cited:

Part D: THREE SHORT RESPONSE ESSAY QUESTIONS

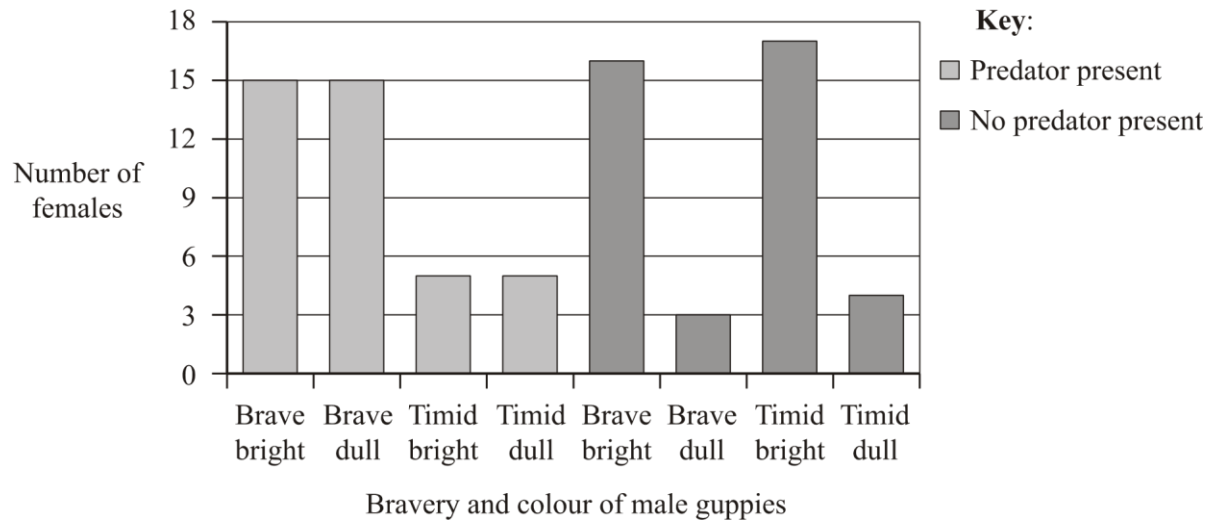
Part D– You will be given a set of short response essay questions relating to evolution. (Note: this portion of the assignment mimics the type of short response essay questions found on the College Board AP Biology Exam). These go in your ISN. (21 points total)

Directions: In you ISN, answer the following questions thoroughly and accurately. You must use complete sentences. **This is an essay!** And I will be looking for the completeness and accuracy of your responses. You do not need introductions and conclusions; however, you must answer the question(s)! **Your responses must “flow continuously”**. However, you should write the letter that corresponds to each portion of the question in the margin next to and to the left of your response.

1. Researchers carried out a study on 3760 children born in a London hospital over a period of 12 years. Data was collected on the children’s mass at birth and their mortality rate. The purpose of the study was to determine how natural selection acts on mass at birth. The chart shows the frequency of babies of each mass at birth. The line superimposed on the bar chart indicates the percentage mortality rate (the children that did not survive for more than 4 weeks). (7 points total)
(***Remember to reread the directions before writing your response)
 - (a) Identify the mode value for mass at birth. (1 point)
 - (b) Identify the optimum mass at birth for survival. (1 point)
 - (c) Outline the relationship between mass at birth and mortality. (2 points)
 - (d) Explain how this data supports natural selection. (2 points)
 - (e) Suggest **one** environmental factor that could cause a low mass at birth. (1 point)



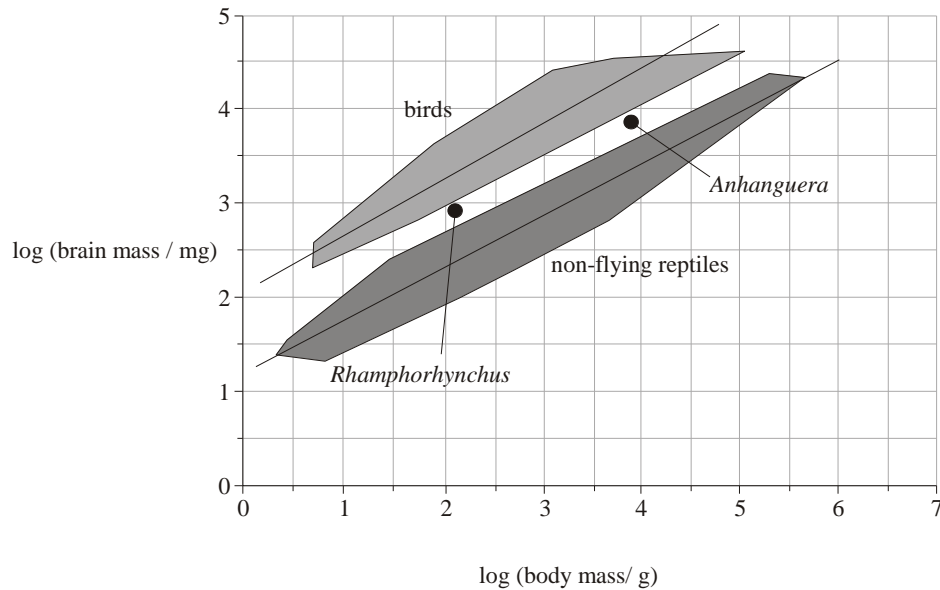
2. The guppy (*Poecilia reticulata*) is a small fish commonly found in Trinidad. In an experiment, male guppies were divided into those with a lot of color (bright) and those with little color (dull). They were also exposed to a predator to see if they approached it (brave) or swam away from it (timid). Female guppies were allowed to select males to mate with, in the presence and absence of predators. The bar chart summarizes their choice of males. (8 points total) (***)Remember to reread the directions before writing your response)



- State how many females chose dull male guppies with a predator present. (1 point)
- Calculate the difference in timid bright males chosen by the females with and without the predator present. (1 point)
- Compare mate selection by females in the presence and absence of a predator. (2 points)
- Suggest reasons for this pattern of mate selection (AKA "sexual selection," a form of natural selection in which female choice is the environmental factor that determines the ability to reproduce in males). (2 points)
- Evaluate the hypothesis that bravery is more important than color to females when selecting a mate. (2 points)

3. As the ability to fly needs control by the nervous system, it is to be expected that the evolution of flight should have been accompanied by changes in the nervous system. Casts were made of the skulls from two extinct flying reptiles, *Rhamphorhynchus* and *Anhanguera*.

The graph below shows the brain mass and body mass of these two individuals. It also shows the range of brain mass and body mass for living birds and living non-flying reptiles. (6 points total)
 (**Remember to reread the directions before writing your response)



- (a) Compare the brain mass of birds and non-flying reptiles. (3 points)
 (b) Suggest **one** reason, based on the data, for the extinction of *Rhamphorhynchus* and *Anhanguera*. (1 point)
 (c) Using the data in the graph, evaluate the claim that larger brains evolved to support the demands of flight. (2 points)