

ST. MARK'S AP BIOLOGY STUDENT HANDBOOK

2007-2008 School Year

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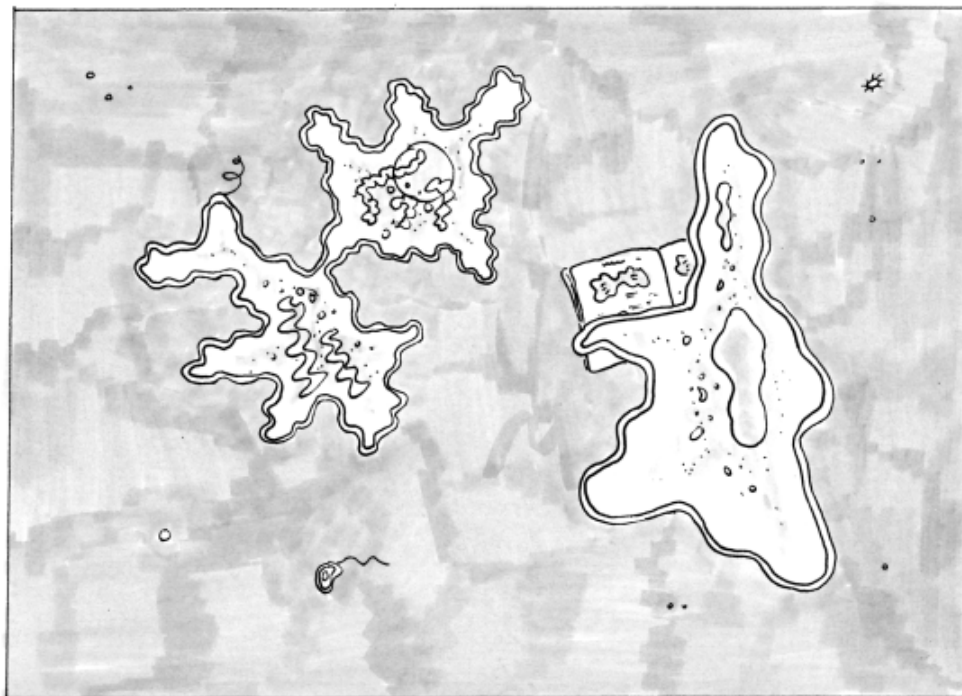
Phone: 214-346-8664

8th Period

1420-1505

Thursday Labs

1420-1555



"Here's where you screwed up - telephase comes after metaphase."

St. Mark's School of Texas
Advanced Placement Biology
Student Handbook Table of Contents
2007-2008
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Dear AP Biology Students and Parents:

I am pleased to have you as the twelfth Advanced Placement Biology class of my teaching career as well as my first year's class at St. Mark's. I wanted to get in touch with you before the school year started so that you might understand what you are getting into and what you might expect to get out of AP Biology, under the instruction of a teacher new to St. Mark's. With that in mind, an ideal Advanced Placement Biology should be no different from one school to another. The difference between schools is the student's enthusiasm for learning science.

As you are aware, by now, the Advanced Placement Program of the College Board is designed to let students in high school earn college credit and/or advanced placement in college above the introductory level courses. This is a program of credit by examination. The College Board hires the Educational Testing Service (ETS) to write and grade the AP Biology Exam. Grades are assigned on a basis of 1-5 with a 3 as a "passing" score. Over 130,000 students took the Biology exam last spring, and over 60% of them made a 3 or better.

The College Board recently asked professors at the hundred colleges and universities regularly receiving the most AP candidates to respond to a questionnaire asking them to describe the content of their introductory biology courses for biology majors. The content of the Advanced Placement course description that follows was developed by the AP Biology Committee after a thorough analysis of the survey results.

The AP Biology course is designed to be taken by students who have successfully completed a course in high school biology and chemistry and who are motivated to begin understanding the nature of science. The course aims to provide students with the conceptual framework, factual knowledge, and the analytical skills necessary to deal critically with the rapidly changing science of biology.

AP Biology is a college course taught in high school. Colleges expect a student to have had an "equivalent" experience to their own freshman course, including the laboratories, and to have mastered its content. Many colleges give credit for introductory biology to applicants with a score of 3 if they are non-science majors, but few, if any, will accept a score of 3 for credit or advanced placement if the student is a science major.

Since the sciences, particularly the biological sciences are always changing and being updated, colleges and universities place a greater emphasis on the laboratory experience. This is one reason why a score of 3 on the AP Biology exam does not necessarily reflect the mastery of the subject matter needed for a science major. However, most colleges and universities have confidence in a score of 4 or 5, but it is important to determine if the colleges or universities you plan to attend will accept those scores for credit or advance placement.

The Advanced Placement Biology exam is prepared by a development committee made up of secondary school and college teachers appointed by the College Board. The exam is three hours in length and is designed to measure a student's knowledge and understanding of modern biology, based upon eight major themes, as mentioned later. It consists of an 80-minute, 100-item multiple-choice section, followed (after a short break) by a ten minute period to read the free response questions/prompts and a 90 minute, free-response section, consisting of four prompts that encompass broader topics and analytical skills. The number of multiple-choice items from each major subset of biology reflects the percentage goal for that part of the course description. In the free-response portion of the exam, one essay question, or prompt, is taken from each of the three areas of the course description and one of the essays/prompts focuses on a laboratory investigation. Any one of these four questions may require the student to analyze and interpret data or information drawn from the twelve mandatory laboratory

experiences as well as lecture material. The multiple-choice section is worth 60 percent and the free-response section is worth 40 percent of the student's examination grade.

In order to provide the maximum information about differences in students' achievements in biology, the exams are intended to have average scores of about 50 percent of the maximum possible score for both the multiple-choice and the free-response sections. In order to be broad enough in scope to give every student who has covered an adequate amount of material an opportunity to make a good showing, the test must be so comprehensive that no student should be expected to make a perfect or near-perfect score.

Thought-provoking problems and questions based on fundamental ideas from biology are included in the multiple-choice section along with questions based on the recall of basic facts and major concepts. In this section of the exam, as a correction for haphazard guessing, one-fourth of the number of questions answered incorrectly will be subtracted from the number of questions answered correctly. The free-response portion of the exam asks the students to organize answers to broad questions, thereby demonstrating reasoning and analytical skills, as well as an ability to synthesize material from several sources into a cogent and coherent essay.

In light of these facts it is important for you to consider why you are taking AP Biology. If you're primary goal is a desire to take on an intellectual challenge, to enjoy the learning and understanding of the biological sciences, or to get ahead of the "game" in college and beyond, then AP Biology at St. Mark's can meet these goals. However, if your primary goal is to obtain credit for a college biology course, then to avoid being disappointed, you should determine if the colleges you plan to attend accept AP scores for credit. If they do, ask what scores they require for credit in their non-majors, general, and/or major's introductory courses. Also, find out if they will require a course syllabus, samples of your writing, lab notebook, etc... so that we can make needed adjustments in the course, if possible, to meet those requirements.

This will be my twelfth year of teaching and in all of my years of teaching, I have taught AP Biology. My first seven years of teaching were in Little Rock, Arkansas, and the last four years were at Creekview High School, in Carrollton, Texas, where I served as the districts' lead AP Science teacher. The past six years I have served as a College Board consultant for Pre-AP Middle School science, Pre-AP Biology, as well as AP Biology. Prior to teaching, I worked as a research associate in a biophysics and physiology lab in both Texas and Arkansas. I have been fortunate in moving from the research field to teaching AP Biology in the sense that it has helped give me an idea of what science and teaching science can entail; hard work, consistency, determination, and enjoyment of learning and solving problems. These are common traits of students that have been successful on the AP Biology exam. I am proud of the accomplishments of all my past AP students. Notably, my sophomores, whom have had equal, if not better (at times), success on the AP Biology exam. No matter what year of high school students are in, AP Biology is a demanding course, and those successful students all realized and accepted those demands. There is a tremendous amount of material to cover, a lot of work to do, and very little time available. Each student and parent should not be surprised by course requirements that are in excess of what you would expect from a normal honors course. (Sidebar: You should note the first law of thermodynamics; energy in equals energy out. If you are willing to put forth the energy required to be successful on the AP Biology exam and in the course, then that energy will be conserved and returned in college and beyond).

These additional requirements include the following: All students are expected to take the AP exam in the spring-its cost will be about \$85; each student will be required to read and learn material outside of the text, although in might not be covered in lecture, may be covered on tests.

In my experience, the greatest challenge is that students remain consistent throughout the year. In regular courses, a bright, high-ability student can let his effort slide from time to time and make up for it with a big push right before the test. Other students may work very hard for one semester and then, upon acceptance to college, may let his efforts decline in the spring. These strategies will threaten even the brightest student's chances of passing the difficult AP Biology exam.

Although extracurricular activities should be chosen wisely, past AP Biology students have been able to participate fully in athletics, student government, clubs, student publications, etc... but they had to plan their time carefully. Success in the course will be determined by your motivation, ability to read, good writing habits and study skills, as well as efficient time management.

So, in order to "hit the ground running" this fall I would like to give you your first assignment. Read **CAREFULLY Chapter 51 *Behavioral Ecology***, pages 1106-1118, Concepts 51.1 through 51.3 in your textbook, *BIOLOGY* 7th edition by Neil A. Campbell and Jane B. Reece. **Be prepared for a laboratory and test on material, the first week of school.**

I am looking forward to what I expect to be a stimulating, educational, and successful year with you and your classmates.

Sincerely,

Mark Adame

My Personal Philosophy of Teaching AP Biology

In teaching AP Biology, I feel that it is important for the AP Biology student to have an understanding of the process of science as a whole instead of just a narrow understanding of Biology. Also, I feel that it is important for the AP Biology student (and all students) to see the connections between all aspects of science and biology and how they are involved in various societal and environmental concerns. In addition, after taking my class, it is my intent that students are able to be independent thinkers and are able to find and analyze information and data from published scientific journals and documents.

Overview of My AP Biology Course

Since the foundation of modern Biology is based on evolutionary processes, my main goals of AP Biology are to help students develop a conceptual framework for modern biology and to help students gain an appreciation of science as a process. To ensure that these goals are met, I integrate the hierarchy of life (from the elements to the biosphere) to the lesson, unit, or concept that is being addressed in the classroom. This allows me to integrate the eight themes of AP Biology (Science as a Process, Evolution, Energy Transfer, Continuity and Change, Relationship of Structure to Function, Regulation, Interdependence in Nature, Science, Technology, and Society) into any or all of each level of this hierarchy. Each time I begin a new unit or lesson, I have my students apply any of the concepts being discussed to the eight themes. I feel that using this approach allows students to better see the progression of the curriculum and interrelatedness of these themes of biology and in the hierarchy of life.

Laboratory Assessments

After completing my AP Biology class I expect my students to be able to design and perform a controlled experiment based upon observations made about a particular topic. In addition, students are also expected to be able to collect and analyze data, through basic statistical analysis, and draw conclusions based on their results. In order to be successful, students have to keep a laboratory journal, in which they record their procedures, data/results, and write their conclusions for each laboratory they perform. They are required to write a report for various laboratories performed, which they place in their journals. These reports must include a title, problem, hypothesis (in an “If...then...” format), prediction, background information, data (graphs, table, data analysis, etc...), conclusion, and sources of error.

General Course Syllabus

Unit I. Molecules and Cells (August – Thanksgiving)

- A. Biochemistry
- B. Cells
- C. Cellular Metabolism (Respiration & Photosynthesis)

Unit II. Genetics and Evolution (Thanksgiving – Late February)

- A. Classical Genetics
- B. Chemical Basis of Genetics
- C. Molecular Genetics
- D. Evolution

Unit III. Organisms, Populations, and Ecology (Late February – Early May)

- A. Taxonomy
- B. Plant Classification, Anatomy, and Physiology
- C. Animal Classification, Anatomy, and Physiology
- D. Ecology; Populations through the Biosphere

Grading:

The school year is divided up into trimesters. Each trimester's grade is divided up as follows:

Four exams.....	400 points (54%)
Four Lab Write-ups.....	200 points (27%)
One formal & three informal (80 & 3x40 points)	
Two articles.....	40 points (5%)
Eight Pop Quizzes.....	40 points (5%)
Two BioQuests.....	40 points (5%)
Three Connections.....	30 points (4%)
	Total: 750 points (100%)

There are **NO RETESTS** if a student fails a major test. **ALL WRITTEN WORK**, including major tests, articles, lab write-ups, bioquests, and connections are expected to be **done by each individual without the help or cooperation of others unless specified in advanced by the teacher**. Copying from any of the aforementioned written work is considered cheating and will be dealt with by the Disciplinary Council. It cannot be over stressed how important it is for each boy to master the material as it is presented. The AP Biology exam is the **ONLY** final given for the course and the free-response portion may be used as the final exam in the course.

Students having difficulty may, at any time, seek additional help individually or in small groups during unscheduled periods. Students are encouraged to make appointments in advanced on any day or after school. In addition to extra-help sessions with the teacher there are some self-help materials available.

Communication

I expect that AP Biology students to check their St. Mark's email account on a regular basis. Periodically I will email you information about the class, including interesting/informative/helpful links and feedback. If you have any questions and cannot contact me directly in my office or classroom, feel free to email me if you have any questions, concerns, information, etc...

Readings, by Trimester, from Textbook (Biology, Campbell & Reese, 7th Edition)

The following pages and chapters are to be read while the material is being covered in class, throughout the school year. We will not have time to cover all of the following material in class, however, it is your responsibility to keep up with the textbook.

First Trimester

Topic	Chapter	Pages (7 th Ed)
Exploring Life	1	All
Chemistry	2	All
Water	3	All
Carbon Chemistry	4	All
Macromolecules	5	All
Cell	6	All
Cell Membranes	7	All
Metabolism	8	All
Cellular Respiration	9	All
Photosynthesis	10	All

Second Trimester

Topic	Chapter	Pages (7 th Ed)
Cell Communication	11	All
Cell Cycle	12	All
Meiosis	13	All
Mendelian Genetics	14	All
Chromosomal Basis of Inheritance	15	All
DNA Replication	16	All
Trans-Trans-Expression	17	All
Viral & Bacterial Genetics	18	All
DNA Packaging	19	All
DNA Technology	20	385-402
Genetic Basis of Development	21	412-415, 418-421, 427, 431-432

Third Trimester

Topic	Chapter	Pages (7 th Ed)
Evolution	22	All
Evolution	23	All
Evolution	24	All
Evolution	25	491, 496-499
Evolution	32	627, 630-635
Plants	29	Plant life cycles, Fig 29.5, Table 29.1
Evolution of Seed Plants	30	597-600, 603
Plant Structure	35	All
Transport in Plants	36	All
Plant Nutrition	37	763-767
Angiosperm Reproduction	38	All
Plant Hormone	39	789-813
Animal Form & Function	40	823-827
Digestion	41	844-845, 853-864
Circulation & Respiratory	42	All
Immunity	43	898-915
Osmoregulation	44	All
Endocrine	45	All
Reproduction	46	964-981
Nervous	48	1012-1035
Sensory	49	1045-1072

Formal Laboratory Report Format

Format includes size 12 font and Times New Roman, double space, and normal margins. Each section should include a title. Write the report in third person, with no references to you or any person that completed the laboratory.

Title (10 points)

Informative/descriptive but brief.

Example:

“Transforming E. coli HB101 Bacteria with the pGLO Plasmid”

Abstract (15 points)

Abstract is a summary of the whole report. It should be short and to the point. It should include about a sentence or two from the following topics:

Purpose

Background information

Methods

Results

Conclusion

Introduction (15 points)

The introduction gives the reader any and all the information that is relevant to the laboratory report. It should include an explanation of the purpose, the reasoning for the purpose, and the necessary principles that explain the purpose. It should be finished up with the hypothesis and an explanation of the hypothesis and prediction, if applicable.

Materials & Methods (10 points)

This should include all the steps that were taken in completing your experiment. They can be in bulleted or paragraph format. Be specific where applicable. Do NOT list the materials but include them in your explanation of the methods.

Results (10 points)

This is where any tables or figures are placed. All tables and figures are to be properly titled. Anything that is NOT a table (graphs, diagrams, etc...) is named/labeled as a figure. All axes are to be correctly labeled and all data MUST have units. Any calculations or statistics are to be placed in the results section. If using statistical equations, be sure to include their H_0 : & H_A :. Failure to label axes or numbers (data) will result in no credit for the results section.

Conclusion/Discussion (15 points)

Start this section by restating the hypothesis or purpose. Then give the conclusion of the experiment. Finally, use/cite the RELEVANT data that supports the conclusion. The conclusion should support or not support the hypothesis, NEVER prove.

Bibliography (5 points)

You must have at least three sources, with one being the College Board's Lab Manual for Students. Include all references used, either by MLA or APA style/format.

Informal Laboratory Report Format

1. Title	2 points
2. Observation/Problem	3 points
3. Hypothesis and Prediction	5 points
4. Procedure	5 points
5. Data/Results	5 points
6. Conclusion	10 points
7. Answers to questions from lab manual	<u>10 points</u>
Total	40 points

1. The title should be a brief BUT concise description of the experiment.
2. The observation should include a few sentences about what you observed about the lab BEFORE you started (This is an informal hypothesis/prediction).
3. The hypothesis is a general statement about the problem. It should be written in an “If...then...” format. The prediction is more specific than the hypothesis. It’s what you expect to happen in your outcome.
4. Procedure for the informal report should be brief and general.
5. The data/results should include any tables or graphs relevant to the question being asked. Points will be taken off for not including the appropriate units for all the data in any graphs, tables etc...
6. The conclusion should include an explanation of the results (DO NOT state the results, EXPLAIN their relevance to the question being asked).
7. Answer assigned questions from the end of each experiment in the lab manual for students.

Instructions for Writing a Summary of a Scientific Article

1. List the title, source, and date of the article.
2. Write a one paragraph summary describing the main ideas developed in the article.
3. What hypothesis/problem is the author trying to study? In other words, what question(s) is the author trying to answer in the article?
4. What instruments or scientific equipment did the investigator use to answer his/her questions and why were they used (be specific)?
5. List **FIVE** AP Biology course related concepts that are mentioned in this article. Include, with each concept, how you understood it; from the article itself, reading your text, or from lecture.
6. How do the figures contribute to the understanding of the article? Be specific. For at least one of the illustrations, tell what you learned and how the information was communicated.
7. What questions arose in the course of the study? What lies ahead in this area of study? If the author did not have any questions, what questions occurred to you?

BioQuests

Since each student will be required to answer four free-response questions on the AP Biology exam, each grading period students will be required to research and answer two released AP Biology free-response questions. The topic of the essay will probably be from some area of the course that we have not yet covered or one that we may never get to formally address in class. The answers to these questions **MUST BE TYPED** and in essay form. When answering these questions, try to include who, what, where, why, when, and how. You must include **TWO** other sources in addition to your textbook and **CITE** these sources at the end of your answer. The exercise will help you practice in writing free-response answers and better prepare you for such examination questions.

List of BioQuests

1. During development in multicellular organisms, the cells become different from one another, even though they possess a common genetic heritage. Describe experiments in several organisms which explore the problem of differentiation at the gene level, the cell level, or the tissue level, and discuss how these experiments have aided our understanding of development.
2. Describe releasers, imprinting, and communication, as each of these terms relates to animal behavior. You may include in your answer a discussion of the classical studies of Nikolaas Tinbergen, Konrad Lorenz, and Karl vonFrisch.
3. Discuss the sources and actions of each of the following pairs of hormones in humans and describe the feedback mechanisms that control their release.
 - a. Insulin..glucagon
 - b. Parthyroid hormone..calcitonin
 - c. Thyotropin (TSH) ..thyroxine (T4)
4. Describe negative and positive feedback loops, and discuss how feedback mechanisms regulate each of the following:
 - a. The menstrual cycle in a non-pregnant human female.
 - b. Blood glucose levels in humans.
5. The immune response of organisms involves antigens, antibodies, and other factors. Describe the immune response and discuss its role in three of the following phenomena:
 - a. blood transfusions
 - b. Rh incompatibility
 - c. tissue transplants
6. The problems of survival of animals on land are very different from those of survival of animals in an aquatic environment. Describe four problems associated with animal survival in terrestrial environments but not in aquatic environments. For each problem, explain an evolutionary solution.
7. Define, discuss, and give an example of each of the following close interactions of species.
 - a) Predator-prey relationships
 - b) Commensalism
 - c) Mutualism
8. Describe the process of ecological succession from a pioneer community to a climax community. Include in your answer a discussion of species diversity and interactions, accumulation of biomass, and energy flow.
9. Using an example for each, discuss the following ecological concepts.
 - a) Succession
 - b) Energy flow between trophic levels
 - c) Limiting factors
 - d) Carrying capacity
10. Describe the structure of a bean seed and discuss its germination to the seedling stage. Include in your essay hormonal controls, structural changes, and tissue differentiation.

Contents of AP Biology Laboratory Drawer

Drawer

Number: _____

Name (Print): _____

1. Your goggles from chemistry
2. Dissecting kit with nine (9) items:

1 curved forceps	1 straight forceps
1 eye dropper	1 camel hair brush
1 scissors	1 scalpel
2 teasing needles	1 probe
3. Plastic 45 mL Graduated Cylinder
4. Erlenmeyer flasks: 250 mL & 50 mL
5. Glass Stirring Rod
6. Watch Glass
7. Petri dish
8. Plastic beaker 350 mL
9. Test Tube Rack and Test Tubes
10. Test Tube Brush
11. Test Tube Holder
12. Slide Box with one (1) depression slide and 3-5 glass slides
13. Coverslip Box with 3-5 coverslips
14. Container of Dissection Pins
15. Carolina *Drosophila* Manual
16. Inoculating Loop
17. Lens Paper
18. Bibulous Paper
19. Thermometer
20. Plastic Ruler 15 cm
21. Funnel
22. Matches
23. Pipet Pumps
24. Spatula (scapula)

Signed: _____ Date: _____

Standards of Academic Honesty

Academic honesty is expected at ALL times at St. Mark's.

Homework

It is assigned to allow students increases in understanding of the subject on a consistent nightly basis ALL homework assignments are to be completed by the individual whose name appears at the top of the paper unless otherwise specified by the teacher. In the case of absence a student may confer with another to find out the nature of an assignment but the actual work MUST be done without the help of another person. If you have any questions regarding an assignment contact the teacher.

Laboratory

Students may work alone in laboratory, however, most of the time you will work with a lab partner. Laboratory data will be the property of the individual or lab pair. If one must use another's data, one may do so provided that he receives the teacher's prior permission to use the data and identifies whose data it is when writing a lab report. Lab data and conclusions are not to be shared among lab groups. Answers to questions and conclusions should be formulated individually. If working as a lab pair both members of a lab pair will complete a lab write-up for each lab, with both members of the pair working individually to make each lab report as complete as possible. Use the formats given in the AP handbook for writing the lab report, depending on what is assigned.

Quizzes and Tests

All quizzes and tests are to be done individually without the use of unauthorized books, materials, or devices. A student may not communicate verbally or otherwise with other students during the test/quiz period or with students that have previously taken the test/quiz. A student should report immediately any information written on his desk or materials near his desk. It is the responsibility of each student to maintain confidentiality of his work. If a student has any doubt as to what is acceptable behavior, it is the student's responsibility to check with the teacher. Ignorance is NOT an excuse for academic dishonesty.

ALL CASES OF SUSPECTED ACADEMIC DISHONESTY WILL BE IMMEDIATELY REFERRED TO THE HEAD OF SCHOOL FOR DISCIPLINARY ACTION.

I HAVE READ AND I UNDERSTAND THE ABOVE STANDARDS. I PLEDGE TO UPHOLD EACH OF THE ABOVE STANDARDS AS I SEEK TO OBTAIN THE BEST POSSIBLE EDUCATION AND TO BECOME THE BEST POSSIBLE PERSON.

Date: _____ Student Signature: _____