
Test-Taking Strategies for the AP Biology Examination

Here are a few tips for preparing yourself in the weeks leading up to the examination.

- The earlier you start studying for the AP Biology Exam, the better. Some students use this AP Biology prep book along with their textbook throughout the course, taking notes in the margin to supplement their teacher's lectures. You should definitely begin serious preparation for the test at least one month in advance.
- Each chapter in Part II is correlated to *Campbell Biology*, Ninth Edition, by Reece et al. For each topic, review your lecture notes, study the figures in your text that explain key concepts, and then make your way through the corresponding section of Part II of this book. If possible, retake your unit test on the topic, and also answer the questions in this guide for each unit. This will help you identify topics that will require further study. Do not try to reread your text; use it as a tool for those topics that need further study. You can use the correlation guide at the end of Part I of this book to link AP Biology topics to your textbook. Pace yourself!

AP Review: Lab Essays

The College Board has published a manual with 13 recommended inquiry labs. It is expected that you will complete two labs for each Big Idea during the course of the school year. Your teacher may elect to use some of the labs from the College Board's *AP Biology Investigative Labs*, or others of his/her choosing. All the laboratories will emphasize the science practices, and you will become more proficient in working and thinking like a scientist only by engaging in this type of work. These labs will often run over multiple days or even weeks, and will include components where you learn new techniques, and then use them to answer your own experimental questions.

Here is a list of the labs in the College Board's *AP Biology Investigative Labs*. An asterisk is placed by those labs that use techniques or cover concepts many teachers are familiar with from the "old" *AP Biology Laboratory Manual*.

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Big Idea 1: Evolution

- Investigation 1: Artificial Selection
- Investigation 2: Mathematical Modeling: Hardy-Weinberg
- Investigation 3: Comparing DNA Sequences to Understand Evolutionary Relationships with BLAST

Big Idea 2: Cellular Processes: Energy and Communication

- Investigation 4: Diffusion and Osmosis*
- Investigation 5: Photosynthesis*
- Investigation 6: Cellular Respiration*

Big Idea 3: Genetics and Information Transfer

Investigation 7: Cell Division: Mitosis and Meiosis*

Investigation 8: Biotechnology: Bacterial Transformation*

Investigation 9: Biotechnology: Restriction Enzyme Analysis of DNA*

Big Idea 4: Interactions

Investigation 10: Energy Dynamics

Investigation 11: Transpiration*

Investigation 12: Fruit Fly Behavior*

Investigation 13: Enzyme Activity*

It is likely that at least one essay on the exam will be based on an AP laboratory, though it may not be one that you have done. Not to fear! Since the questions are based on objectives for the course, your teacher will have prepared you to work with data from a variety of sources, so you will simply need to apply your expertise in scientific thinking acquired over the course to a novel situation. If you have done a similar experiment, this may be helpful—but be sure you read carefully and do not anticipate what is being asked.

You may be asked to “design an experiment to determine . . .” If you performed a lab in your AP class that would answer this question, it is fine to describe this lab. There are a number of items that would generally be included in your design, so consider including each of these:

Section	Question Type	Number of Questions	Timing
I	Part A: Multiple Choice	63	90 minutes
	Part B: Grid-In	6	
II	Long Free Response	2	80 minutes + 10-minute reading period
	Short Free Response	6	

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- **State a hypothesis** as an “If . . . (conditions), then . . . (results)” statement. Your hypothesis must be testable.
- **Identify the variable factor** for the experiment (e.g., temperature).
- **Identify a control**. You must explain the control for the experiment.
- **Hold all other variables constant**. Explain how you would do this.
- **Manipulate the variable** (e.g., one group at 10°C, one at 20°C, and one at 30°C).
- **Measure the results** (e.g., cm grown, mass increase in grams).
- **Discuss results expected** as related to hypothesis.
- **Replication or verification**. The experiment must be repeated or large sample sizes must be used.

If appropriate, you could also consider using statistical analysis of data (see Chi-square analysis, Lab 7) and review of the literature.

Graphing Data

It is likely that you will be asked to graph data. You will need to consider the type of graph that is appropriate for your data. Bar graphs are used when data points are discrete, that is, not related to each other, such as the number of girls in AP Biology vs. the number of boys in AP Biology. Line graphs are used when the data are continuous, such as the change in an individual's height at each birthday. Consider if there is a data point at 0 on the graph. Be sure to extend your line to 0 if there is, but do not take the line to 0 if there is no measurement for that data point. Also,

- Label the graph with a descriptive title.
- Label the x - and y -axes. Be sure you know which variable is independent and which is dependent.
- Keep all measurement units constant. Each division on the graph must be a unit equal to all the others.
- If you are asked to draw a line to predict what would be shown if some change occurred, be sure that you include a legend for the second line.

Sample Tests

When you are ready to check your preparation, take the sample exam in Part III of this book. Keep track of your time, and try to simulate test conditions. Circle the items you get wrong, or could not answer, and keep a list of the subject matter of those questions. Then analyze the list to look for patterns—are you having a hard time with questions on animal physiology or the process of photosynthesis specifically? Spend the next week or so studying the topics in which you are weak. Spend the final days before the test looking through this guide, your class notes, and your textbook to fill in any remaining gaps.

The Day of the Exam

If you have followed this suggested study plan, you should feel well prepared by test day. Plan your schedule so that you get two very good nights of uninterrupted sleep before exam day. The night before the exam, relax, think positive thoughts, and focus on getting a good night's rest. Below is a brief list of basic tips and strategies to think about before you arrive at the exam site.

1. **Arrive early!** It's a good idea to arrive at the exam site 30 minutes before the start time. On the day of the exam, make sure that you eat a good, nutritious meal. These tips may sound corny or obvious, but your body must be in peak form in order for your brain to perform well. Remember, you are going to need ATP to fuel brain cells at peak efficiency for more than three hours.
2. **Bring a photo ID.** (It's essential if you are taking the exam at a school other than your own.) Carrying a driver's license or a student ID card will allow you to prove your identity.
3. **Bring at least two sharpened #2 pencils** for the multiple-choice section. Also, bring a clean pencil eraser with you. Many pencils today have cheap erasers that smudge. Invest in a good eraser. The machine that scores Section I of the

exam recognizes only marks made by a #2 pencil. Poorly erased responses are often misscored.

4. **Bring two black ballpoint pens** for the free-response portion of the test. Felt-tip pens run and pencils and inks of other colors are harder to read.
5. **Bring a watch** with you to the exam. Most testing rooms do have clocks. Still, having your own watch makes it easy to keep close track of your own pace. Watches with calculators or alarms are not permitted in the exam room.
6. **Bring a four-function calculator** (or your school may arrange to have them available).

Several other items that are forbidden from the testing room are books, notes, laptops, beepers, cameras, and portable listening or recording devices. If you must bring a cellular phone with you, be prepared to turn it off and to give it to the test proctor until you are finished with your exam. For a complete list of what not to bring, see the College Board website.

Educational Testing Service prohibits the objects listed above in the interest of fairness to all test-takers. Similarly, the test administrators are very clear and very serious about what types of conduct are not allowed during the examination. Below is a list of actions to avoid at all costs, since each can result in your immediate dismissal from the exam room.

- Do not consult any outside materials during the three hours of the exam period. Remember, the break is technically part of the exam—you are not free to review any materials at that time either.
- Do not speak during the exam. If you have a question for the test proctor, raise your hand to get the proctor's attention.
- When you are told to stop working on a section of the exam, you must stop immediately.
- Do not open your exam booklet before the test begins.
- Never tear a page out of your test booklet or try to remove the exam from the test room.
- Do not behave disruptively—even if you're distressed about a difficult test question or because you've run out of time. Stay calm and make no unnecessary noise.

Section I: Strategies for Multiple-Choice Questions

Obviously, having a firm grasp of biology is, of course, the key to doing well on the AP Biology Examination. In addition, being well-informed about the exam itself increases your chances of achieving a high score. Below is a list of strategies that you can use to increase your comfort, your confidence, and your chances of excelling on the multiple-choice section of the exam.

- Become as familiar as possible with the format of Section I. The more comfortable you are with the multiple-choice format and with the kinds of questions you'll encounter, the easier the exam will be. Remember, Part II and Part III of this book provide you with invaluable practice on the kinds of multiple-choice questions you will encounter on the AP Biology Exam.

- Every question you answer correctly is a point, so pacing is important. If you have done all the suggested practice tests, you should have a good sense of how to pace yourself. You will have 90 minutes to answer 63 multiple-choice and 6 grid-in questions (about 78 seconds per question). Keep track of time!
- Some of the questions will require calculations. If you encounter a question that will require extra time, leave it blank and make a note. Your goal should be to reach the end of the test, picking up all the points from questions you can answer easily.
- The test is organized with three types of questions: standard multiple choice, lab sets, and grid-ins. Lab sets are generally the most tedious. When a data table or graph is presented, proceed directly to the related questions. Determine what information is needed to answer the questions, and then return to the data table or graph and seek the information. Sometimes, although the data appear daunting, the questions are actually very easy.
- Make a light mark in your test booklet next to any questions you can't answer. Return to these questions after you reach the end of Section I. Sometimes questions that appear later in the test will refresh your memory on a particular topic, and you will be able to answer one or more of those earlier questions.
- Always read the entire question carefully, and underline key words or ideas. You might wish to double underline words such as NOT or EXCEPT in multiple-choice questions.
- Read each and every one of the answer choices carefully before you make your final selection.
- Use the process of elimination to help you arrive at the correct answer. Even if you are quite sure of an answer, cross out the letters of incorrect choices in your test booklet as you eliminate them. This cuts down on the incorrect choices and allows you to narrow the remaining choices even further.
- Become completely familiar with the instructions for the multiple-choice questions before you take the exam. By knowing the instructions cold, you'll save yourself the time of reading them carefully on exam day.
- If you finish early, you should go back over as many items as possible to catch any careless errors.

Section II: Strategies for Free-Response Questions

Below is a list of strategies that you can use to increase your chances of excelling on the free-response section of the exam.

- You will have a 10-minute period to review the essay questions before you receive a response book. During this time, you should organize your thoughts and outline your essays in the space provided. After the preparation time, you should record your answer on the pages provided for each question response book, and this is where you should record each answer. You have about 22 minutes to spend on each 10 point essay, and you should gauge your time for the short essays based on the instructions.
- *Read the question; then read the question again!* Be sure you answer the question that is asked and that you address each part of the question. As you read a

question, underline any directive words (usually the first word in an essay) that indicate how you should answer and focus the material in your essay. Some of the most frequently used directives on the AP Biology Exam are listed below, along with descriptions of what you need to do in your writing to answer the question.

- *Analyze* (show relationships between events; explain)
 - *Compare* (discuss similarities and differences)
 - *Contrast* (discuss points of difference or divergence between two or more things)
 - *Describe* (give a detailed account)
 - *Design* (create an experiment and convey its ideas)
 - *Explain* (clarify; tell the meaning)
 - *Predict* (tell what you expect to happen when conditions change)
 - *Justify* (explain why a response is reasonable)
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- Reread the question as many times as necessary to make sure that you will cover each aspect of the topic. Free-response questions frequently have several parts, so you will need to take this into account as you outline your ideas.
 - Write an essay! As the exam states clearly in the directions to free-response questions, a diagram or graph by itself is never an acceptable way to answer a free-response question. However, you should think about whether you could use a labeled diagram or graph to develop your written answer in some useful way.
 - The essay you craft for this exam is not the same type of essay you should write for an English course. Yes, it should be well-organized; however, introductory sentences and conclusions are absolutely not necessary. Readers are interested in what you know and how well you express your knowledge. Spend your time packing the essay with the biological information you have worked so hard to learn.
 - If the question has several parts, answer the parts in the sequence given. Use a letter or some other indication for each part, so that the faculty consultant does not overlook a section of your response.
 - If you are asked to perform a calculation, be sure to show the steps used to arrive at your answer. You have heard this before: Show your work!
 - If you cannot remember a specific term, describe the structure or process.
 - Define any scientific term that you use that is directly related to your response. For example, if you discuss hydrogen bonding and how it relates to properties of water, be sure to explain what hydrogen bonds are, and then describe or define adhesion, cohesion, and so on.
 - Your handwriting can affect your results. Although faculty consultants make every attempt to read each essay, sometimes it is impossible to decipher messy handwriting. When your handwriting is poor, the reader may lose concentration or patience and miss an important word or phrase.
 - Don't leave any part of any essay blank. Every point made is worth approximately twice as much as each multiple-choice point.

- ⌘ If time allows, proofread your essays. Don't worry about crossing out material—readers understand that your responses are first drafts and that you are writing down ideas under the pressure of time.

The success of your free-response essays will depend a great deal on how clearly and extensively you answer the questions posed. Of course, the structure of your essays will depend entirely on your knowledge of the subjects at hand. Take a look at an example of a free-response question below.

2. In cancer, the cell's reproductive machinery experiences a loss of control that makes cancer cells reproduce continually, and eventually form a tumor.
- (a) **Describe** three DNA-related cellular events that could lead to the loss of cell division control that contributes to cancer.
- (b) **Describe** why tumors are detrimental to the body.
- (c) **Predict** two cell processes that could be targeted to find a cure for cancer.

In order to answer this question, you should isolate exactly what it is that you must answer. You may want to underline the relevant information in the question to remind yourself of your focus:

2. In cancer, the cell's reproductive machinery experiences a loss of control that makes cancer cells reproduce continually, and eventually form a tumor.
- (a) Describe three DNA-related cellular events that could lead to the loss of cell division control that contributes to cancer.
- (b) Describe why tumors are detrimental to the body.
- (c) Predict two cell processes that could be targeted to find a cure for cancer.

In order to answer the first part of the question, you'll need to identify three appropriate DNA-related cellular events.

1. A mutation or change in the original DNA sequence
2. Errors in DNA replication that go undetected by the cell's proofreading devices
3. A translocation

Under each of the three events, you should list any and all details you remember about those events to use in your description. When you flesh out these details, you'll need to clearly connect them to the concept of the loss of cell division control leading to cancer.

To answer the second part of the question, you'll need to list as many reasons as you can think of as to why tumors are harmful to the body. These might include cancerous cells' ability to metastasize; tumors' ability to occur almost anywhere in the body; their tendency to block the flow of blood when they grow near blood vessels; disruption of the natural function of any organ in the body; and endangering of homeostasis. Of course, after you list reasons, you'll need to add details to each item in your list.

To answer the final part of the question, you'll need to consider first what causes cancer. Then you must think creatively in order to predict reasonable approaches to dealing with each specific cause.