

Excerpts from the Principles of Life Second Edition Survival Skills guide

AP Biology is a college course and the Principles of Life is a text book used in colleges. With that in mind, this Survival Skills guide is addressing you as if you are college student, and the information is provided by the publishers in order that you may succeed in the course. Take each and every message to heart!

General Study Habits

College professors will routinely expect you to exceed the accomplishments of your high school coursework, and that means you must adjust your study habits appropriately to meet this challenge. A good way to begin this adjustment process is to consider the ways in which (this) college coursework differs.

- Material is presented more rapidly and in larger quantities.
- Each exam covers more material.
- All assignments count.
- Keeping up with previous material is essential to understand new topics.
- Considerable out-of-class time investments are required to effectively learn course material.
- Critical thinking is more important than rote memorization.
- Students are expected not only to understand the specific examples given in class, but also to apply their knowledge broadly.
- Neither professors nor parents are “looking over your shoulder” to ensure that necessary coursework gets done on time.
- Help is available, but you must take the initiative to seek it out.

Take Studying Seriously

One of the keys to academic success is learning to balance often conflicting pressures. Take your studying seriously by devoting the necessary time to achieve academic success. (It is a general rule-of-thumb that for every hour of time you spend in class, approximately 3 hours of work outside of class is required to master the material. Of course, this will vary depending on the individuals)

Study Often and Early

The coursework that accompanies this class is demanding. It is therefore essential that you stay ahead of the class by studying often and early. Stay ahead of the lecture schedule. Getting ahead of your studies and staying there is one of the biggest favors you can do for yourself!

Don't Be Afraid to Ask for Help

Sometimes it's difficult for students to admit that they are having trouble with a class. Pride, embarrassment, or just the shock of realizing for the first time in your school career that you are unable to quickly master a topic can all contribute to this situation. Experience has shown that biology can be such a “problem” course for students.

Unfortunately, many students wait too long before doing something constructive about their difficulties in class. Should you find yourself having problems with biology, you must not be afraid to ask for help as early in the course as possible!

Time Management

In school, as in life in general, there never seems to be enough time to go around. One of the most difficult challenges you will face is to recognize and deal constructively with the fact that you are in charge of determining how your valuable time is spent.

In the past, other may have managed your time for you. Now, the responsibility for scheduling your time and making room for all you have to do rests squarely on your shoulders. One of the most serious mistakes you can make is to commit the error of thinking that you have “plenty of time” to get things done. Because your high school workload is getting heavier, and also because less of the work in high school will be involving simple memorization as opposed to true understanding of a subject, it is not a viable option to “cram” the night before a test (and still expect a good grade).

You simply cannot get by with only last minute efforts on assignments, and thus you must learn to manage your time wisely.

You must take studying seriously and make a commitment to your work.

This means prioritizing your academic and social activities to ensure that there is adequate time in your schedule to complete all course assignments.

A well-known theory of human learning also holds that people remember information best by studying in frequent, relatively short bouts of time, rather than in last-minute marathon study sessions. One effective way to make time for all your work is to create a weekly activity planner. Get in the habit of making a weekly schedule of your study plans. Then, stick to your plan!

Taking Notes and Reading

College professors expect you to follow a rapidly developing train of thought and to capture those thoughts in your own notes. The notes you take in biology *should...*

- Capture the main points of a lecture, including relevant examples.
- Be organized in some coherent manner for later study.
- Leave room to include additional information learned after lecture.
- Use a personalized shorthand notation that makes sense to you.

Do not record every word said during a lecture or copy, verbatim, words on PowerPoint slides. You must learn to filter out nonessential portions and concentrate on connections between the essential ideas and terms.

Getting the Most out of Your Textbook

To get the most out of your textbook, you need to get in the habit of using it regularly. Moreover, you should consult the book before and after a topic has been covered in class.

The best use of a textbook before lecture is to concentrate on the section headings, boldfaced words, figures and figure captions. This will familiarize you with the main points of the topic and facilitate your note-taking efforts.

After lecture, you should go back and carefully reread the assignment. This time you should look for details that reinforce the lecture discussion and supplement your notes with this information. You should also pay special attention to any figures from the textbook that were used during the lecture, possibly recopying some form of those figures into your notes.

Read, Stop, and Ask

This simple rule can really help you in your efforts to assimilate textbook information. The sheer quantity and density of information in biology texts can sometimes be overwhelming, so one way to help transfer what you've read from your short term memory into your long-term memory is to read a section no longer than one page, stop, and then quiz yourself on what you've just read and how it relates to what you already know about the subject.

This method plays on the human brain's ability to learn more easily when material is presented in short segments. It also forces you to make conceptual and factual connections between new and old ideas, which help to organize complex information in your brain more meaningfully.

Survival Skills

EXAMINATIONS

Success on biology exams is a two-step process. First, you must prepare properly so that information is in your head in a meaningful form and accessible during the exam. Second, you must discipline yourself to think carefully while reading and evaluating test questions.

Your exam preparation should begin well in advance of the exam itself. Ideally, you should be studying lecture material on a regular basis, i.e., 2 to 3 times weekly throughout the pre-exam period so that very little in the way of studying is actually necessary immediately prior to the exam itself. As part of this preparation process, you should . . .

- ♦ Do all the assigned readings and take good lecture notes.
- ♦ Learn material in accordance with lecture objectives and other guidelines.
- ♦ Practice applying your knowledge with sample exam questions.
- ♦ Write key concepts on note cards for frequent review.
- ♦ Be sure to have your questions about unclear topics answered.
- ♦ Attend any review sessions offered by the professor.
- ♦ Study enough in advance to avoid the need for all-night cram sessions.
- ♦ Get a good night's sleep and be well-rested for the examination.

Question Types and Examination Formats

Because of the large size of most biology lectures, exam questions tend to be predominantly multiple choice in format, although short answers and essays are also used in some cases. Despite what you may have heard about multiple choice questions being "picky" or "too specific," biology professors try very hard to avoid this problem. In fact, many of the multiple choice questions on biology exams can be thought provoking and thorough in their scope.

For this reason, you must learn to read and think very carefully while taking biology tests. There are a number of strategies for training yourself to be a careful thinker on exams, and you should feel free to use whatever method works best for you. One proven method is to employ this simple three-step technique:

1. Read the question completely and carefully.
2. Think about your answer before looking at the possible choices.
3. Evaluate each choice critically before selecting the best answer.

Let's consider a specific example of a typical biology exam question to see how this three-step method works.

Cell A is a roughly spherical animal cell with a radius of 10 microns. Cell B is also roughly spherical and has a radius of 20 microns. Which of the following statements about these two cells is *false*?

- a. Cell A has a smaller volume than cell B.
- b. Cell B has a larger surface area than cell A.
- c. Cell A has a larger surface area-to-volume ratio than does cell B.
- d. Cell B has a larger surface area-to-volume ratio than does cell A.

Step one: Read the question completely and carefully.

Cover up the answers—pretend they aren't there and read the question carefully. You can force yourself to read carefully by identifying key words in the question that provide important information.

[Cell A] is a roughly [spherical] animal cell with a [radius of 10 microns].
[Cell B] is also roughly [spherical] and has a [radius of 20 microns].
Which of the following statements about these two cells is [false]?

- a. Cell A has a smaller volume than cell B.
- b. Cell B has a larger surface area than cell A.
- c. Cell A has a larger surface area-to-volume ratio than does cell B.
- d. Cell B has a larger surface area-to-volume ratio than does cell A.

Step two: Think about your answer before looking at the possible choices.

Answer the question in your head, pretending it's an essay or short-answer question. The important ideas here are that surface area is determined by the square of the radius, and volume by the cube. Surface areas, volumes, and surface area-to-volume ratios for the two cells will thus be different.

[Cell A] is a roughly [spherical] animal cell with a [radius of 10 microns].

[Cell B] is also roughly [spherical] and has a [radius of 20 microns].

Which of the following statements about these two cells is [false]?

- a. Cell A has a smaller volume than cell B.
- b. Cell B has a larger surface area than cell A.
- c. Cell A has a larger surface area-to-volume ratio than does cell B.
- d. Cell B has a larger surface area-to-volume ratio than does cell A.

Step three: Evaluate each choice critically before selecting the best answer.

Uncover the answers and read each one carefully, evaluating the correctness of each as you go. It is useful to actually put a T or F next to each choice to indicate whether the answer is true or false. Doing this shows us that answer d is false, and thus the correct choice.

[Cell A] is a roughly [spherical] animal cell with a [radius of 10 microns].

[Cell B] is also roughly [spherical] and has a [radius of 20 microns].

Which of the following statements about these two cells is [false]?

- [T] a. Cell A has a smaller volume than cell B.
- [T] b. Cell B has a larger surface area than cell A.
- [T] c. Cell A has a larger surface area-to-volume ratio than does cell B.
- [F] d. Cell B has a larger surface area-to-volume ratio than does cell A.

Summary

1. Cover up the answers and read the question carefully. Highlight, underline, or circle key words to make sure that you don't miss important information.
2. Think about the answer to the question as though you had to provide it to the professor. Consider only the subset of biological information you need to answer that particular question.
3. Uncover the answers provided, and carefully read each one to evaluate its correctness. Put marks indicating true or false by each answer, and then make the appropriate choice.

Sometimes you will find yourself initially unable to select between what appear to be two correct answers. In this case, repeat the three-step method but only consider the two remaining choices. Then ask yourself what evidence is there that one of the answers is *better* than the other—not perfect, not absolutely correct, but simply better.

If you discipline yourself to do this form of educated guessing, and if you have studied well, you will likely get more of these kinds of questions right than wrong.

It Takes Practice

Like any other worthwhile skill, becoming a good exam taker requires practice. Think of it as analogous to a dancer, who wouldn't consider performing without substantial amounts of practice doing the specific moves in his or her routine. Similarly, you should think of an exam as your "performance," and you should practice doing the maneuvers by thinking through questions that you will be expected to execute.

As a general rule, you should practice taking tests to the point that when the real examination comes around, the process of thinking carefully and clearly is second nature. Practice tests supplied by the professor and questions of your own design can all accomplish this goal. Furthermore, by practicing the test-taking process early and often in your studying, you will help yourself learn the subject matter in exactly the context that the professor wants.

Doing A Post-Exam Review

Just as an athlete analyzes the results of a game after the fact in an effort to improve his or her skills, you too should conduct a post-exam review to see why you got particular questions wrong. Specifically, you should try to determine if you got the wrong answer because you

1. Read the question incorrectly or carelessly.
2. Did not properly think your way through your answer before looking at the choices available.
3. Incorrectly read the possible choices offered.
4. Simply did not know this particular material.
5. Made a careless mistake such as writing down the wrong answer number or letter on the test form.

By carefully assessing the nature of your incorrect responses on an exam, you can help prevent similar mistakes from occurring on subsequent tests, and thus become a better overall test taker.

This concludes the tutorial. Good luck in your study of biology!