How to Study for Quizzes and Exams in Biochemistry

Since the entire course grade in Biochemistry is based on the quizzes and exams, students often are anxious about studying for quizzes and exams. The very best way to prepare for quizzes and exams in Biochemistry is to study the course material before and after each lecture as well as paying attention for important non-content information during lecture. Some help in doing this daily study of Biochemistry is described in a companion document also posted to the course web site entitled "How to Study Daily."

If one studies daily, what else can be done to produce the best performance on quizzes and exams? Some advice for how to study for quizzes and exams are described below, Remember, **this advice is about studying that is <u>in addition</u> to how one should study daily for Biochemistry**.

Quizzes versus Exams

Studying for quizzes is similar to studying for exams, so these are covered together below. However, there are some differences: Quizzes cover fewer lectures, topics, and learning objectives (e.g., less material) than exams, and thus studying for quizzes is easier and less time consuming than studying for exams. However, if one studies for each quiz as well as does the daily studying for the class, studying for exams is much easier than it would be otherwise.

Amount of study time

Assuming the daily studying has been done, the study for a quiz typically should take around 30 to 60 minutes per lecture covered on the quiz. If studying for quizzes and daily studying has been done, studying for exams also should need 30 to 60 minutes per lecture covered. This time is time spent studying alone or in groups, but does not include time spent in help sessions or seeking help from the TAs or instructors. These are only estimates for the majority of students in the middle. Those having difficulty with the course will need more time to study, those who are minimally challenged will need to study less.

Before quizzes and exams

LIST: Identify which lectures will be covered by the quiz or exam; then make a list of topics actually covered in those lectures (see Topics and Readings by Lecture on the course web site)

REVIEW MATERIAL: Go over each learning objective for these topics, making sure you have learned it. (See How To Study Daily document on the course web site for how to assess whether or not you have learned each objective.) Also, make sure that you know which learning objective is associated with which topic (see Knowledge Integration section in How to study daily document.)

You may find that studying with other students is helpful for testing your understanding of concepts, particularly the most challenging concepts. If any objective is not well understood and learned, then the lecture notes and/or reading on that subject should be reviewed until it is clear. If that does not help, then attend a help session or visit a TA or instructor during office hours, or if the question can be clearly articulated in a brief manner, submit the question by email to a TA or instructor.

REVIEW QUIZZES: For exams, review the quizzes and practice quizzes you took since the last exam and identify the areas where your learning was week. For a quiz, check out the practice quiz to see where your learning was not good enough. Check to <u>make sure</u> that you have learned the material that caused your weak performance on past quizzes. Please note that on-line practice quizzes test one topic per question, and thus can never integrate more than one topic into a complex problem that requires strategic problem solving. The only way to get practice at strategic problem solving is the old quizzes and exams.

Practice: For quizzes, take the practice quiz (if available). There are also chapter review quizzes available on the Student Resources page from the publisher (see the textbook web page on the course web site for the link to this.) On the course web site (under Help with this course) there are links to old quizzes and exams from previous years when 208 was taught.

After quizzes and exams

It is important to determine why you lost points on every quiz and exam. Finding out which of your learning and/or test-taking skills are the weakest allows you to focus your efforts appropriately to improve the most (i.e., where you are weakest.)

<u>This should be done immediately after each exam and quiz, when the memory of taking the quiz or exam is most fresh.</u>

To do this, first check your answers against the key posted on the course web site to identify which problems were missed and to identify the correct answers for those problems.

In cases of essay/short answer problems where partial credit is awarded, it should be clear what was wrong/missing in your answer and why the points were lost. However, it this is not clear to you, see the TA who graded the question to get clarification.

The next step is to identify, for each problem missed, why you were not able to determine the correct answer when taking the quiz or exam. Typically, this is the hardest part of this process. Doing this is most easy when done as soon as possible after taking the exam or quiz, when your memory of what you were thinking for each question is still fairly clear. There are several possible reasons for why you were unable to identify or produce the correct answer:

a. You misunderstood the problem
b. You didn't correctly identify the topic(s) applicable to the problem
c. You didn't correctly remember a factual, formulaic process, or concept learning objective needed to solve the problem
d. You applied a correctly remembered, but inappropriate fact, formulaic process or concept to try to solve the problem
e. You didn't correctly apply a formulaic process needed to solve the problem
f. You didn't adequately understand a concept, and hence did not apply it correctly to solving the problem

From the list of problems you missed and why you missed them, try to identify the most commonly occurring weaknesses. For each type of weakness, you need to work on why this is happening and figure out ways to improve your skills so this does not happen (or happens less frequently).

Some tips for each of these types of skill deficiencies:

Misunderstanding the problems: This could be caused by English language difficulties. Also, it could be caused by not approaching the problem with the idea that it has been described by someone else, and that you much read it very carefully and objectively, not looking for familiar patterns (such as phrases taken directly from the lecture slides, textbook, handout, or learning objectives) or for phrases that you might want to see (such as from a problem from a previous or old quiz or exam). Practicing by taking old exams and quizzes can improve this skill. This issue also can result from poor integration of knowledge, where the knowledge indicated in the problem is intended to indicate the topic being addressed by the problem. If topic identification is not done correctly, this often leads to misunderstanding of the problem.

Incorrectly identifying the topic(s) applicable to the problem: This is most frequently seen with complex problems that integrate more than one topic. But it can also be an issue if the integration of knowledge was so poor that the relevant topic for a question could not be identified.

Incorrectly remembering a factual learning objective: To fix this, focus more effort on committing the factual learning objectives to memory. If you studied alone without flash cards, then go thee and make flash cards and use them. If you studied with others with lists, you either should consider doing more drill or to let your study partners choose the list to drill and start the drill without letting you review the material just before the drill. If you only used one method, consider using both methods.

Applying the wrong learning objective(s): This can occur with complex problems that integrate the application of more than one learning objective (or as a consequence of determining the wrong topics apply to a complex problem). Other causes include not adequately remembering which topics are associated with which learning objectives, though this often has to be coupled with either misunderstanding the problems or with weak learning of the learning objectives for it to have a sizable impact on performance. The best way to build this skill is to focus on learning the linkage between the learning objectives within each topic and learning how to distinguish similar/related topics.

Misapplying a formulaic process: Practice makes perfect. Also, double check your answer when you take the test or quiz. Typically, there are ways to double check that the answer is correct, or at least makes sense, without repeating the process exactly. Such "independent" double checks are very useful for catching errors in the application of formulaic processes.

Misapplying a concept: Generally, if the concept was the correct concept to apply to solve the problem, and it was not applied correctly, then there was inadequate understanding of the concept. If this is a problem, it suggests that the self-assessment of mastering the learning objectives is not being done properly. If the self-assessment is not adequate, fix it and it will tell you which concepts for which you need to do more review of the concept material and get more practice at applying the concept. A common problem with self-assessment of concept learning is when students don't really check if they can accurately apply a concept, and instead check their understanding by vaguely (intuitively) sensing their level of comfort with their understanding, or even worse, by testing if they have memorized some definition or description of the concept without understanding it enough to apply that understanding of the concept. For more information on this, see the companion document on "How to study daily" – also available on the course web site.

Why do this "after-the-fact" analysis of quizzes and exams?

It should be obvious why this is important: to learn all the material. Teaching in Biochemistry assumes that students retain their learning from prior chapters, even if they were on a prior exam. Not only will you need to have learned the material for future tests in Biochemistry, but also for future assessments, such as the NAPLEX licensure exam. You will also need to know this material for use in future classes and in your future career. In addition, doing this after-the-fact analysis of what you did wrong on the quiz and exams helps you figure out what you are doing right in your studying and learning and what you are not doing right.