Amherst College – Biology Department

Comprehensive Examination

The Biology Department senior comprehensive exam provides an opportunity for synthesis across the various courses you have taken in the Biology Department. It also provides the opportunity for a scientific discussion with Biology faculty. The dates for the exam for all senior Biology majors this year will be October 25\textsuperscript{th} or 26\textsuperscript{th}, according to your availability.

The comprehensive exercise consists of a 30-minute oral exam that takes the form of a conversation between you and two professors in the department focused around one central theme in biology. \textbf{The themes for this year include: Energy, Information transfer, Regulation, Sex, and Water.} Please choose one of these themes, and use your coursework to probe this theme at different levels of Biology. Although your coursework forms the basis of the exam, topics of conversation may venture outside the specifics of courses and you may be asked to draw together ideas across courses or apply what you have learned in novel contexts. In preparation for your exam, we recommend that you prepare a list of how your chosen theme entered into each of the courses you have taken. All of the themes involve inquiry at various levels of organization from the molecular and biochemical to the ecological and evolutionary. We expect that students demonstrate a solid understanding of the ways in which the theme is relevant to specific courses or fields of study, but note that the strongest exams are those in which students successfully integrate across levels.

All senior majors are required to take the exam during the fall semester. Please reply to the directions from the departmental ADC, Karen Racz, about indicating your availability for dates and times of the exam and also your chosen theme. Students who do not pass the exam in the fall will have a second opportunity to complete this requirement for the Biology major in the spring semester.
Guide to Biology Comprehensive Exams

Many students have questions about senior comprehensives. What purpose does this exam serve? How do I prepare? How well did I do? What happens if I fail? Why am I nervous? The following is intended as a brief guide to help address such questions and hopefully ease any anxiety you may be feeling.

What are Comps? The comprehensive examination in Biology is taken in the fall of the senior year. It is designed to ensure that students who major in Biology are not deficient in any major area of biology. More importantly, it serves as an encouragement to students to review and integrate during their last year the diverse material of the major. According to the latter view, we emphasize that the preparation for the exam is perhaps as important as the exam itself.

What form does the exam take? You will select one central theme from among a list (Energy, Information transfer, Regulation, Sex, Water) to focus the exam. The examination takes the form of a half hour conversation between you and two professors in which your examiners pose questions related to your chosen theme. Often the exercise will begin by offering you an opportunity to reflect on your preparation for comprehensives; use this moment to highlight those processes and phenomena you consider especially relevant to your theme.

Thirty minutes is insufficient time to explore everything in detail and your examiners may move quickly past topics you clearly understand to focus on material that is less well understood or even somewhat speculative in an effort to determine how well you can explain things and make connections that go beyond the basics.

Preparing for the exam. The exam should be approached as a way to bring together all you have learned in your time as a major at Amherst, and viewed as an opportunity to demonstrate your knowledge and enthusiasm for biology. Our expectations for you include demonstration of a solid understanding of the ways in which your theme intersects with material in your introductory coursework. However, you should also prepare for questions drawn from your more advanced courses and be ready to apply what you have learned in novel contexts.

In preparation, we suggest that you assemble a list of how your chosen theme came up in each of the courses you have taken. We would also remind you that biology is a vast field whose study involves a diverse set of approaches across many scales of organization. As such, we encourage you to demonstrate that you can think broadly across these levels, as well as, deeply in those areas in which you have a particular expertise. You are strongly encouraged to discuss the exam with others who are preparing for the exercise and to form study groups around particular themes or the intersections among themes in anticipation of the exam.
Exam psychology. Many find the idea of a comprehensive exam intimidating and we acknowledge that all of us are subject to some level of anxiety in similar situations (e.g., job interviews, public presentations). However, the design of the exam represents an efficient way for us to evaluate several things about a student's level of understanding. (1) Did the student prepare for the exam? (2) Can the student integrate material covered in several independent courses? (3) Can the student explain phenomena clearly which he or she actually does understand? (4) Which areas are inadequately or perhaps only marginally understood?

During the exam, you may feel frustrated or especially challenged by a particular question. Don’t panic, as this is quite natural. It is inevitable that more time will be spent on those topics you are least certain about, because your examiners will quickly determine those topics in which you have a solid understanding. Stay as calm as you can, ask for clarification if needed, and remember that we all want to see you do well. The good news is that your performance is almost always better than you suppose.

What happens if I fail? In the event your exam in the fall is deemed unsatisfactory, you will have a second opportunity to complete the requirement for the Biology major in the spring semester. The second exam also will be an oral exam, but with a new set of examiners selected from the department.

During the intervening time, you should commit yourself to preparing for the spring examination. This may include a detailed review of your course notes, directed research and reading on specific topics, attending selected lectures (if possible or relevant), joining study groups with others, or discussing strategies for preparation with your professors. If your second examination in the spring is also deemed unsatisfactory, you will be asked to address in a written paper those subjects in which deficiencies in your knowledge were detected. If your paper is unsatisfactory, you will not be able to graduate with a major in Biology in the spring.

We end by noting that a great many of you will go on to future careers in research, teaching, medicine, conservation and public policy, all fields which require that you be able to effectively communicate your biological expertise to those around you. We encourage you to approach the comprehensive exam as preparation for the diverse and interesting careers that await you.