



California State
University

BIOLOGY

C H A N N E L
I S L A N D S

CI BIOLOGY PROGRAM HANDBOOK

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WELCOME TO THE PROGRAM

Welcome to the Biology Program at California State University Channel Islands!

The Biology Program at CI provides preparation for successful careers in the biological sciences and for entrance to graduate programs and medical schools. The program provides BS and BA degrees in Biology, as well as a Minor in Biology. Our graduates have been admitted to top PhD and masters degree programs, and to medical, dental, veterinary, and pharmacy schools, and have found employment after graduation in biotechnology, environmental sciences, teaching, and a variety of other professions.

This handbook will provide answers to many questions most frequently asked about the program. This handbook is not intended to replace the current CI Catalog of Courses, or regular consultation with your advisors from Academic Advising and from within the Program. Instead, we have tried to summarize and simplify some of the available information here with you in mind, to help you navigate your way through your undergraduate career as Biology majors. This handbook will also help you understand the expectations we will have of you. The Biology Program is student centered: that means that we try to provide a variety of opportunities for you to be a biologist and to get to know your fellow biologists. But that also means it is up to you to take advantage of them fully. Your accomplishments here at CI will be yours, and yours alone, when you graduate!

Please refer to this handbook periodically as you make your way through the Biology Program. We welcome your suggestions or corrections to help us make this handbook as useful to you as it can be.

– *The Faculty of the Biology Program*

This handbook describes the opportunities available to biology majors at CI and contains information that can help guide them through their degree program. This handbook is not intended as a replacement for the official CI Catalog, or regular meetings with an academic advisor.

Please address corrections or suggestions for improvement to:
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DEGREES AND EMPHASES OFFERED IN THE BIOLOGY PROGRAM

There are 10 different ways to be a Biology Major:

1. Bachelor of Science in Biology
2. Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology
3. Bachelor of Science in Biology with an Emphasis in Clinical Laboratory Sciences
4. Bachelor of Science in Biology with an Emphasis in Ecology, Evolution, and Organismal Biology
5. Bachelor of Science in Biology with an Emphasis in Medical Imaging
6. Bachelor of Arts in Biology with an Emphasis in Ecology, Evolution, and Organismal Biology
7. Bachelor of Arts in Biology with an Emphasis in General Biology
8. Bachelor of Arts in Biology with an Emphasis in Pre-professional Studies
9. Bachelor of Arts in Biology with an Emphasis in Subject Matter Preparation in Teaching Biology
10. Minor in Biology

This is all very confusing at first. How are you to choose between this many options? We will discuss this process in the sections below.

Choosing between the BA and the BS:

Your first question is probably: “What is the difference between a Bachelor of Arts degree and a Bachelor of Science degree?” Both degrees seek to accomplish basic educational goals:

- To provide sufficient depth of preparation in the Biology major to prepare you for a career as a biologist.
- To provide opportunities for electives in Biology to suit your particular goals.
- To provide the background in Chemistry, Physics, and Mathematics generally recognized to be essential to career as a biologist.
- To provide the knowledge of the Arts, Humanities, and Social Sciences that characterizes a university-level education.

Therefore, either a BA or a BS will serve your purposes, regardless of your future goals.

In general, the difference between the BA and BS is that a BA degree is less specialized than a BS degree. For example, the emphases in Biotechnology and Clinical Laboratory Sciences are BS degrees, while the emphases in General Biology, Pre-professional Studies, and Teaching are BA degrees. In order to choose between the BA and BS degrees, don't think about the “A” or “S”; instead, think about the required coursework, and your future goals. If your goal is to go to medical school, it may seem that the Bachelor of Arts in Biology with an Emphasis in Pre-professional Studies is the “right” way to go. But is it really the only “right” choice? What about the Bachelor of Science in Biology with an Emphasis in Cell and Molecular Biology? Would that work?

Let's compare the two:

BS:		BA:	
Lower Division Requirements (8 units):		Lower Division Requirements (8 units):	
BIOL 200 Principles of Organismal <i>and</i> Population Biology (4)	↔	BIOL 200 Principles of Organismal <i>and</i> Population Biology (4)	
BIOL 201 Principles of Cell and Molecular Biology (4)	↔	BIOL 201 Principles of Cell and Molecular Biology (4)	
Upper Division Requirements (40 units):		Upper Division Requirements (32 units):	
I. Required (31 units)		I. Required (21-22 units)	
BIOL 300 Cell Biology (4)	↔	BIOL 300 Cell Biology (4)	
BIOL 301 Microbiology (4)		–	
BIOL 302 Genetics (4)	↔	BIOL 302 Genetics (4)	
BIOL 303 Evolutionary Biology (3)	↔	BIOL 304 Comparative Animal Physiology (3)	
BIOL 400 Molecular Biology (4)	↔	BIOL 400 Molecular Biology (4)	
BIOL 401 Biotechnology and Recombinant DNA Techniques (5)		BIOL 303 Evolutionary Biology (3) OR BIOL 433* Ecology and the Environment (4)	
BIOL 431* Bioinformatics, GE-B2, B4, UDID (4)		–	
BIOL 499 Senior Capstone in Biology (3)	↔	BIOL 499 Senior Capstone in Biology (3)	
2. Electives (9 units)		2. Electives (10-11 units)	
Select a minimum of 3 courses from a list of 400-level courses.		Select a minimum of 10-11 units of Biology courses from 300 <i>and</i> 400 levels, one of which should be a lab course.	
Required Supporting Courses (72 units):		Required Supporting Courses (69-70 units):	
I. Chemistry:		I. Chemistry:	
CHEM 121 General Chemistry I (4)	↔	CHEM 121 General Chemistry I (4)	
CHEM 122 General Chemistry II (4)	↔	CHEM 122 General Chemistry II (4)	
CHEM 311 Organic Chemistry I (3) <i>and</i> CHEM 312 Organic Chemistry I Laboratory (1)	↔	CHEM 311 Organic Chemistry I (3) <i>and</i> CHEM 312 Organic Chemistry I Laboratory (1)	
CHEM 314 Organic Chemistry II (3) <i>and</i> CHEM 315 Organic Chemistry II Laboratory (1) OR CHEM 318 Biological Chemistry (3)		CHEM 314 Organic Chemistry II (3) <i>and</i> CHEM 315 Organic Chemistry II Laboratory (1)	
2. Physics:		2. Physics:	
PHYS 100 Introduction to Physics I (4)		PHYS 100 Introduction to Physics I (4)	
PHYS 101 Introduction to Physics II (4)		PHYS 101 Introduction to Physics II (4)	
OR			
PHYS 200 General Physics I, GE-B1 (4)		–	
PHYS 201 General Physics II, GE-B1 (4)		–	
3. Mathematics and Statistics (7 units):		2. Mathematics and Statistics (3-4 units):	
BIOL 203 Quantitative Methods for Biology (3)		BIOL 203 Quantitative Methods for Biology (3)	
AND		OR	
MATH 150 Calculus I (4)		MATH 150 Calculus I (4)	
4. Other GE Courses (36 units)		4. Other GE Courses (36 units)	

Notice how the BA allows more opportunities for electives, and is less technical in nature (for example, in using PHYS 100 instead of PHYS 200) than the BS. But note, also, that for the most part, the two curricula are very similar, and one could easily structure the BS in a way that would also work for the BA! Why then do we offer both? Essentially, it is because if you are going to graduate school you will be expected to have a certain level of background regarding subject matter content and actual techniques, whereas if you are going to medical school, they want you to be broadly educated, and they will teach you the specialized content and techniques you need to be a doctor.

Perhaps the best advice to give regarding the choice of BA or BS is not to worry about it at first; as you move through the major, you can start to tailor your choices of courses to your interests as they develop, and structure your degree according to whether it is a BA or a BS, and what the emphasis is.

All Biology Majors should start their coursework by focusing on the courses common to most of the Biology emphases: two semesters of Introductory Biology, Cell and Molecular Biology, Genetics, and the Chemistry, Physics, and Math courses.

Choosing an Emphasis (or not!):

Your next challenge is to choose whether to go for the BS in Biology, the BA in General Biology, or one of the several emphases. As with the choice of BA or BS, you do not need to worry about the emphasis when you first begin your studies in Biology. However, you should be developing interests as you become more educated in Biology, and these interests should be guiding your curriculum as you move into your second, third, and fourth years at CI.

We cannot advise you on your interests! Developing these interests is one of your obligations as a student!

Approach your major the way you would approach any of the individual courses: do your homework, research the meaning of various emphases and the careers for which they may (or may not) prepare you, and make choices based on this knowledge. The time to start is during Introductory Biology, BIOL 200/201. It is in these courses that you will receive the most comprehensive and for many of you the only comprehensive, overview of the field of Biology. Pay attention to which topics caught your attention, and also in which topics you were able to do well. By the end of your first year, you should have some idea of your interests. By the end of your second year, it will be important for you to have begun to focus your studies toward your ultimate degree choice.

If you really don't have a preference, simply choose the BS in Biology, or the BA in General Biology. With regards to the other emphases, perhaps the following descriptions will help:

Clinical Laboratory Science: Students of clinical laboratory science learn to examine body fluids, such as blood, for clues in the diagnosis of diseases. They are trained to conduct and supervise complex medical tests and to manage clinical labs (CollegeBoard.com). This emphasis is for those who wish to go directly into employment in the health care industry after graduating, working typically in a hospital laboratory. Related careers might be in forensics, in the pharmaceutical industry, or other laboratory settings. If you like problem-solving, you're detail oriented and precise, you work well with your hands, and are comfortable with lab instrumentation, this may be for you. Take Microbiology as early as you can – if you like it (as most students here at CI do!), you may enjoy this field.

Medical Imaging: Professionals in Medical Imaging are those people who carry out and analyze the X-rays, MRIs, ultrasound, CT scans, PET scans and the other technologies that allow you to look inside a living body without cutting it open. This is another clinical field, designed for those who will be getting jobs after graduation in hospitals or other clinical settings. One may also want to go further with a masters degree, usually from a medical school. Medical imaging is one of the most cutting edge aspects of modern medicine, and would be a fascinating career for someone comfortable with sophisticated technology and being in a medical setting.

Teaching: A good career in teaching requires a background in the subject matter, along with a grounding in pedagogical philosophy and technique. This emphasis will provide that necessary background, and so is a specialized choice of emphasis. Teaching is a challenging, and rewarding profession, for which there is currently high demand. However, a good career in teaching increasingly demands a masters degree. Therefore, this choice is for those who are committed to a teaching career, and anticipate graduate work at some point in the future. It should be noted that this would not be the route for teaching at the college or university level; those careers almost always require a PhD.

Pre-professional Studies: This is designed for students targeting medical, dental and veterinary schools after graduation. A major goal of this emphasis is to prepare the student for the qualifying exams that are so critical to acceptance into medical schools. It is separated from other routes to the biology degree in leaving a little breathing space for the student to take a broader range of course work: medical schools like widely educated applicants; they'll teach you the technical aspects of being a doctor themselves. This emphasis would be appropriate for those who are determined to attempt admission to medical school, but any of the Biology majors would in fact permit one to apply to medical school. Conversely, the Pre-professional Studies emphasis would adequately prepare you for entrance to graduate schools in MS or PhD programs.

Cell and Molecular Biology: Students who wish to study the function of cells and organisms at the molecular level may choose this emphasis. The curriculum would be appropriate for those who anticipate careers in biomedical research, biotechnology, medicine, and the health professions. Since most careers like this require a masters or PhD degree, the student should expect to be applying to graduate school after graduation. This emphasis would also be appropriate for a career in teaching, provided the student subsequently, or concurrently, acquired the necessary background for certification in teaching.

Ecology, Evolution, and Organismal: This emphasis is for students who are attracted to the study of adaptation, how organisms function as a whole, and how they interact with other organisms and their environment. The student in this emphasis will gain the theoretical and scientific underpinnings required to understand the interrelationships of all organisms. Despite this holistic view, good skills in molecular biology, chemistry, and math will be required for a successful career in this area. Most career opportunities will require advanced work at the graduate level and, as with Pre-professional Studies, and Cell and Molecular Biology, the student choosing this emphasis should be prepared for competitive and challenging post-baccalaureate work. This emphasis would also be good preparation for teaching, as described above.

Minor in Biology: The Minor in Biology is designed for those who wish a brief exposure to Biology, to complement their other studies. This choice is popular with those preparing for teaching outside the teaching emphasis described above, chemistry majors, and others in diverse fields such as business or law, or even art! The minor in Biology can be completed with as few as 5 or 6 courses.

AN EXAMPLE COURSE SCHEDULE BY YEAR

Students are often confused as to how to structure each year so that they finish their course work in 4 years, as most (parents!) expect. Planning each year can be daunting, especially when higher level course work can be confusing because it is only offered in the Fall or Spring semester, or has various prerequisites. We will give you an example of what courses to take and when; we will use the BA Emphasis in Pre-professional Studies as an example. This example could be easily adapted to the other emphases.

For more extensive and detailed course schedules, check out the posted “Roadmaps” to graduation for Bio majors: biology.csuci.edu/bio_roadmaps.htm

In planning each year, it is important to order the courses so that prerequisites are taken before, not concurrently with, the courses for which they are prerequisites. When a course has prerequisites, we expect you to have that material mastered. We will not expect to have to re-teach you the prerequisite material! It is your obligation to have learned the material from the prerequisite course sufficiently to move on. If you receive poor grades in a course that is required for higher level course work, you should give serious consideration to whether you have mastered the material adequately to move on, or whether you should retake the course – if you do not have the background, you will not do well in upper level courses.

If you are anticipating a major in Biology you are strongly advised to include BIOL 200 and BIOL 201 in your course work during the first year at CI.

An example of the Pre-professional curriculum by semester and year:

FIRST YEAR

	FALL	SPRING
1	BIOL 200: Organismal and Population Biology (4)	BIOL 201: Cell and Molecular Biology (4)
2	CHEM 121: General Chemistry I (4)	CHEM 122: General Chemistry II (4)
3	University Graduation Requirement	University Graduation Requirement
4	–	–
5	–	–
	(Total Credits: at least 15)	(Total Credits: at least 15)

(Summer: Research, internship, volunteer, or work experience)

SECOND YEAR

	FALL	SPRING
1	BIOL 300: Cell Biology (4)	BIOL 302: Genetics (4)
2	CHEM 311: Organic Chemistry I + CHEM 312: Lab (4)	CHEM 314: Organic Chemistry II + CHEM 315: Lab (4)
3	BIOL 203: Quantitative Methods (3)	MATH 150: Calculus I (4)
4	University Graduation Requirement	University Graduation Requirement
5	–	–
	(Total Credits: at least 15)	(Total Credits: at least 15)

(Summer: Research, internship, volunteer, or work experience)

THIRD YEAR

	FALL	SPRING
1	BIOL 304: Comparative Animal Physiology (3)	BIOL 400: Molecular Biology (4)
2	PHYS 100: Physics I (4)	PHYS 101: Physics II (4)
3	BIOL 303: Evolutionary Biology (3) OR BIOL 433: Ecology and the Environment (4)	BIOLOGY ELECTIVE: (300 or 400)
4	University Graduation Requirement	University Graduation Requirement
5	–	–
	<i>(Research Medical Schools)</i>	<i>(Admissions test prep course)</i>
	(Total Credits: at least 15)	(Total Credits: at least 15)

(Summer: Continue research, internship, volunteer, or work experience. Take MCAT, DAT, GRE, etc. Prepare applications and personal statement.)

FOURTH YEAR

	FALL	SPRING
1	BIOL 499: Senior Capstone (3)	BIOLOGY ELECTIVE: (300 or 400)
2	BIOLOGY ELECTIVE: (300 or 400)	–
3	University Graduation Requirement	–
4	–	–
5	–	–
	<i>(Submit applications and recommendations)</i>	
	(Total Credits: at least 15)	(Total Credits: at least 15)

Note that this Pre-professional Studies curriculum includes regular extracurricular work experiences. Some of this experience should be in a clinical, hospital, or research setting appropriate to your ultimate goals. This experience will be an important part of the medical school application. The list goes on and on – these are just a few ideas.

SELECTING COURSES OUTSIDE THE MAJOR REQUIREMENTS

A Biology major requires approximately 120 credit hours, but the core curriculum involves only about 2/3 of those hours. What to do with the rest? Well, guess what? You're actually allowed to have interests outside Biology. You could even construct your course work to include a minor, or even a double major!

First, though, you should review your educational goals and select courses within the sciences that satisfy your interests and extend competence in areas needed to meet your career or graduate school goals. A planned strategy will provide a better learning experience than simply choosing whatever majors science course happens to fit your schedule.

It is especially important to realize that not all courses are offered every semester, or even every year. It is your responsibility to plan ahead and get the courses you need to graduate and proceed with your graduate school or employment goals. Do not assume that you will be allowed to waive or substitute a requirement.

With regard to courses outside the sciences, there are many courses that might complement your goals or interests. Computer courses or workshops that assist you in writing papers, data analysis and presentation are invaluable. You need to be able to communicate effectively with prospective employers or professional schools and present your findings, and courses in Communications or English may give you the extra edge you need to compete successfully against other applicants. Many fields of biology are visual; art classes in illustration, graphic design, digital illustration may be useful... and fun! Social science courses will increase your understanding of peoples and social institutions (great for people-oriented fields such as medicine). Philosophy courses might address the philosophy or ethics of science in ways that would be useful. The list goes on and on – these are just a few ideas.

Minors and double majors:

A minor is a secondary concentration of courses in a specific area. A minor may be used to augment abilities being developed in your major, to prepare for a non-related area with good career possibilities, or simply to pursue a hobby interest. Hobby interests are favorably looked upon by Admissions Officers of graduate schools and by personnel officers in industry since these interests tend to round out a student's personality. Regardless of your reason for considering a minor, it is essential that you begin to plan early in your college career. See your advisor about this.

Perhaps the most obvious addition to the Biology major would be a Chemistry minor. As a Biology major, you already have 16 of the 23 credits required for a Chemistry minor. Much of the technical and professional work in biology is focused on the application of chemistry to living systems. The Chemistry minor is also valuable for employment, especially in the pharmaceutical industry.

A minor in Applied Physics could also be valuable. Biophysics is a rapidly growing area of biology (see: www.biophysics.org/). Physics related techniques are used extensively in physiology, molecular biology and in many areas of medical research. An Emphasis in Medical Imaging gets you within 2 courses of an Applied Physics minor!

More of a reach would be minors in Environmental Science and Resource Management, Math, or Computer Science. An ESRM minor might be useful to those who are interested in environmental science, law, policy, or management. Minors in Math or Computer Science would equip a Biology major to better interface with the growing applications of mathematical modeling, data storage and analysis, and bioinformatics in Biology.

If you are interested in the areas of scientific administration, sales, personnel, marketing or management, a background including a minor in Psychology, Sociology, Communication, Business or Economics would be of value.

And don't overlook the Arts and Humanities. For example, careers in medical illustration, scientific illustration, or advertising might require an art minor or major. A background in graphics or advertising art combined with your Biology major would be of value in pharmaceutical supply house sales, basic research publications, and grant development. An Art minor can also be of value if you have an interest in teaching.

The above are only suggestions, and would apply to the consideration of a double major. Discuss these options with your advisor.

ACADEMIC ADVISING, TUTORING, AND DISABILITY SERVICES

Advising:

Majors in the Sciences will be advised by two advisors:

(1) Before entering your Freshman year, you met with individuals from Academic Advising. They provide invaluable advice on navigating the University requirements enabling you to finish on time. They will also be the ones to ensure that you are meeting the requirements for graduation, so that you will not be caught by surprise late in your career regarding some oversight. Their input is especially important if you are transferring credits from another school: be sure to get all transfer credit approved before assuming it will be acceptable for graduation! Continue to seek their advice throughout your University career.

You can download an official advising form here:

[www.csuci.edu/academics/advising/Major %26 Minor Forms Library.htm](http://www.csuci.edu/academics/advising/Major_%26_Minor_Forms_Library.htm)

It is advisable to check your official transcript periodically, and compare it to the coursework you have taken. Be sure to look at the grades that have been entered for you! Faculty members are human, and can make mistakes. Get any omissions or errors corrected as quickly as possible.

The ultimate responsibility for completing the academic requirements for graduation is yours.

For more information on the Advising Center, or to make an appointment to meet with them, visit their web site: www.csuci.edu/academics/advising/index.htm

(2) Majors in the Sciences should also consult regularly with their assigned advisor from within the Program. We will have recommendations for course and career preparation that will supplement, and in some instances differ from, the advice you obtain from Academic Advising. If you have not been assigned an advisor, see the Department Chair. In addition, each of the faculty has a unique background, and may have invaluable advice to offer you on your choice of direction as an undergraduate, and in your career choices. Take advantage of this extensive resource! Don't ever be afraid to just stop in on any of the faculty; if we are busy we will gladly set up a later time when we can discuss your goals and plans.

Tutoring:

Freshmen, listen up: the transition from a high school to a college or university can present many challenges for a first year student. Even those who did well in high school may find the content or pace of university-level classes demanding.

If you are struggling with your classes, it is your responsibility to get help. Don't wait until it is too late.

Your first option is to simply consult the instructor. Many difficulties and misunderstandings can be cleared up in a short meeting with the instructor. Keep in mind that a single question can probably be satisfactorily dealt with in a minute or two, even between classes. If you wait until you have a lot of questions, it may be too much to go through effectively. The faculty is here for you – don't ever be afraid to just knock on our door, and see if we are free to talk!

Sometimes, difficulties with a course require regular, on-going assistance from a tutor. The Biology program has students who provide tutoring in a casual setting, and on an ad-hoc basis, and they should be sought out at the first sign of trouble. The University also has tutors available for individual help.

Disability Services:

The Disability Resource Programs provide a broad range of services to meet the needs of students with all types of physical, learning, psychological, and/or sensory impairments that limit major life activities. Their goal is provide access to all the opportunities available on campus, regardless of one's individual needs. In the Biology Program, we regularly work with the Disability Resource Programs to ensure that all our students are able to perform at a level that accurately reflects their intellectual abilities. The most common accommodation is extra time for exams, and the students who take advantage of this and other services are among our smartest and most successful students. If you find you are always the last to finish an exam, or are struggling to keep up with a work load that other student in your course seem to be able to handle comfortably, you should contact them for more information. See: www.csuci.edu/disability/.

TIPS FOR SUCCESS

- Take responsibility for your own academic career. Consult academic resources on a regular basis and review your progress modifying goals if needed.
- Your advisor: contact your advisor at least once or twice a year; you should maintain a good working relationship with your advisor by regularly discussing your strategy for meeting degree requirements, options for electives, and career goals. Keep your advisor informed if you decide on changes in your academic career.
- Fill out required paperwork on time (what are the main concerns here for our students?)
- Be cautious regarding advice from friends and other students, if they have the facts wrong or poor advice you are ultimately responsible.
- Keep track of your upper division hours. You are required to have X upper division hours to graduate.
- Courses with labs require more in-class time and are more likely to lead to scheduling conflicts. Try for two or three lab classes a semester so that you do not find yourself trying to schedule four in a semester to catch-up. Always prepare ahead of time for your labs so that they are a learning experience rather than a catching up experience.
- Keep up with all of your science requirements; some chemistry courses are prerequisites for upper division biology courses.
- Enrolling in Summer courses; a summer course or two can ease your schedule if you are feeling stretched, allow you to catch-up if you fall behind your scheduled goals or allow more focus on a course you perceive to be problematic.
- Graduating in four years without summer courses requires averaging 15 credit hours per semester (and meeting all GPA requirements). Not every course is offered every semester; prepare a course plan at least two semesters in advance and be sure to go over the plan with your advisor on a regular basis.
- GPA concerns; every student has unique demands on their time in terms of ability, goals and personal situation. An important part of a career plan is recognition of the potential impact of your GPA on your goals. Matching the number of credit hours per semester to your unique situation is an important part of achieving your GPA goals. Repeating a course is usually not a good strategy for improving your GPA. Be prepared at the start of a semester to meet your GPA goals including adjusting your course load during the drop period if you find yourself overmatched.
- Employment: because every student is different rigid guidelines with respect to employment don't make sense. You must consider your individual situation to determine how many credit hours are feasible (remember GPA!) a semester. Avoid scheduling conflicts that will have your arriving late for either school or work-or depending on ideal conditions to always be on time!
- Study! Always strive to completely understand biological processes. Upper division courses often expand on principles introduced in lower division courses. Biology is a scientific process based upon investigation not merely an accumulation of facts. Rote memorization crammed before an exam is

a poor substitute for reading ahead and maintaining comprehensive lecture notes. Write down or highlight problems as you encounter them-like you faculty have limited time do not waste both of your time by having to search out your problems when seeking help. Learn from your mistakes! Review your exams; go over what went wrong and get it right.

- Interact with your faculty they want to see you learn and earn good grades. Do your best to be organized such as a written list of your questions. Optimally you would like occasional contact to get answers to specific questions regarding course material.
- Ask questions and participate in class.
- Interact with your fellow students; you can make study friends and life-long friends.
- Get involved with the Biology program and with CI in general. Join clubs and participate in University activities. Try to visit the gym a couple times a week and participate in intramural sports. The Biology program is the two-time defending champion in the battle of the majors. Lend your support as a participant or by cheering on the program.
- Performance is more important than time. Your most important concern should be completion of the proper courses with a GPA and letters of recommendation that will advance your career.
- Transfer students need to determine what courses transfer and have this verified.

Expectations for Students

Dr. Steven Clark of the Languages Program and Dr. Jorge Garcia of Mathematics have put together these two handouts of “expectations” for their students, and we think they are of use to Biology students a well. So, here they are:

“The Languages Program at CI is committed to helping its students succeed, both academically and professionally. In keeping with this commitment, we have established the following expectations for our students.”

- 1.** Students are expected to attend all classes and to arrive on time, with all course materials. Excessive absences and lateness will be penalized according to the policies listed in your course syllabus. Students should not assume that their instructor will provide make-up opportunities for tests or quizzes.
- 2.** Students are expected to pay attention, participate actively, and treat their instructor and classmates with respect and courtesy. Cell phones should be turned off before class begins. Students should check with their instructor before assuming that food is allowed in class.
- 3.** Students are expected to turn in all work on time. Late work may be penalized or refused according to the policy stipulated in the course syllabus.
- 4.** Students are expected to be professional in their communication with instructors; this is especially important for e-mail communication. Being professional means using correct grammar, spelling, punctuation, and capitalization, as well as a proper salutation and closing. Remember that writing to an instructor is not the same as posting a note on a friend’s Facebook page or sending a casual text message from your cell phone. Use your CI email account whenever possible to communicate with your instructor and check it regularly as your instructor may use this means to communicate with the class.

5. Students are expected to submit hard copies of all written assignments, unless directed otherwise. Students should not assume that their instructor will accept email attachments in lieu of hard copies. If assignments are more than one page, make sure to staple your pages before submitting them.
6. Students are expected to be academically honest and to refrain from plagiarizing (i.e., passing off another's words or ideas as one's own). Plagiarism includes using computerized translation programs for compositions and other written work.
7. Students should keep in mind that in order to receive an "A," their work must be excellent, not merely above average. Investing a lot of time and effort is not always synonymous with producing excellent ("A"-level) work. Also keep in mind that a minimum grade of "C" (not "C-") is required to fulfill CI's one-semester language (and graduation) requirement.
8. Finally, students should keep in mind the importance of cultivating good relationships with their instructor and classmates. Remember that a positive attitude goes a long way to improving these relationships and to improving your academic performance. Think of ways to cultivate these relationships, such as greeting your instructor and classmates, participating in class, asking questions, showing interest and enthusiasm, etc. Try to contribute something positive to your class each day.

We ask you to keep these expectations in mind during the semester. We wish you great success in your studies and hope that your experience at CI prepares you for even greater success in the future."

– Dr. Steven Clark, Languages Program

"The Virtues of My Students"

1. My students are **precautious**. If they are going to have exam conflicts, they will tell me during the first two weeks of the semester.
2. My students are **responsible**. They collect phone numbers and e-mails from at least four students in the class; this consists of their Backup Team.
3. My students are **conscientious**. When they miss a class, they immediately copy the class notes from somebody in their Backup Team.
4. My students are **good writers**. After a test, they take responsibility when they have something in mind but write something different.
5. My students are **unafraid** of questions, especially the students who sit at the back of the class.
6. My students are **realistic**. They know that if they do not come to class, they cannot earn a good grade. If they do not dedicate at least 10 hours per week to my class, they never expect an A.
7. My students are **social and cooperative**. They work to learn together in teams in and outside of class.
8. My students are **self-confident**. They know that the statement: "I do not want to go to the board because I do not know how to do it" is a fallacy. They come to my class because they are going to learn, so that everybody in class has the capability of solving the problems.

9. My students are **adults**. When they must miss a class, they neither apologize to me for not coming nor report their reasons with e-mails. Instead, they contact members of their Backup Team to learn about what happened in the missed class and about how to prepare for the coming class.

10. My students are **reliable**; they submit their assignments on time, even when I do not remind them to do so.

11. My students are **thoughtful**; they take the first minute of the class to turn off their cell phones. If their cell phone rings during the class, they take that emergency call outside by leaving the classroom and not returning until the next class.

12. My students are **down-to-earth**; they know that their grades express achievement (as described in the grading policy) and not their effort. They know that the sentence: “ I deserve to pass this class because I work hard” is a fallacy.”

– by *Dr. Jorge Garcia, Associate Professor of Mathematics*

HONORS AND HONOR SOCIETIES

Honors:

CI does not have an “Honors Program”, but it is still possible to graduate with University honors, and to be awarded honors within your program. Graduating with honors is, well, an honor! The traditional levels of honors are:

Summa Cum Laude (“with highest praise”): GPA 3.9-4.0

Magna Cum Laude (“with great praise”): GPA 3.75-3.89

Cum Laude (“with praise”): GPA 3.5-3.74

University honors are based solely on your GPA, and are administered through the Office of Records and Registration. If you are eligible for University honors, you will be notified directly by Records and Registration and invited to attend the annual Honors Convocation held at the end of the spring semester. If you are maintaining sufficiently high grades, you should make sure you are included when the time comes. There are also honors indicated each semester for those who complete 12 or more units with a 3.75 or higher. These look really good on your transcript!

During the spring semester, the Biology program faculty vote to award program honors to two outstanding seniors. To graduate with honors in Biology, you do not need to apply. To be eligible, you must meet the following requirements:

- Achieve a minimum grade point average of 3.5 for all courses satisfying the requirements for the major;
- Take at least seven courses in the major at this university.

The Biology program may grant honors to exceptional students who have not met the above requirements, but who have in the judgment of the program brought distinction upon themselves and the program in some other significant and appropriate manner.

Honor Societies:

Being a young school, CI is just coming up to speed on the establishment of honors societies that recognize exceptional achievement in various fields. We currently have a chapter of Gamma Beta Phi (an honor society not connected to a particular discipline), and Sigma Tau Delta (English). A task force has been established to look into the establishment of more, and perhaps one for Biology will be available in the future. Stay tuned.

EXTRACURRICULAR OPPORTUNITIES

Increasingly, admission to graduate and medical school programs requires some type of practical experience obtained prior to application. You may not find this listed as a requirement. However, admissions to post-baccalaureate programs is competitive, and if the other applicants have such experience, your application will be compromised if you do not have it. This experience can be obtained on campus, or in the community.

Taking the initiative to gain some extracurricular experience is your responsibility.

Lab assistant: Students hold jobs as laboratory assistants. Both the Biology and Chemistry labs require such assistance. If interested, see the Program Chair.

Tutoring: Each semester, qualified students serve as tutors for their peers. If interested, see the Program Chair.

Internship (BIOL 492): Internships require that you arrange the work with an individual instructor who will be your sponsor and with the external agency or individual with whom you will be doing the work. The Biology program does not organize an ongoing local internship program, but faculty may be helpful in identifying potential internship opportunities and are available to explore these possibilities with you. Internships involve supervised work and study in work situations involving biological research and technical skills, and may involve service learning. Internship is available for 2-3 credits, and will be graded credit/no credit. For more information about internships, see: biology.csuci.edu/internships.htm. You may not apply for internship credit to be awarded retroactively for work done in the past, and credit is generally not available for participation in any regular employment duties you may have.

Independent Research (BIOL 494) and Directed Study (BIOL 497): Independent research requires that you arrange the work with an individual instructor whose research is of interest to you. You may work in a laboratory on or off campus, or engage in library research (BIOL 497). These courses are available for 1-3 credits, and will be graded credit/no credit.

Clubs: There are numerous clubs on campus, each focusing on an area of interest to its members. Participation in club activities can be fun, and can be a way to obtain extracurricular activities relevant to your personal goals or interests. There is a Biology Club that organizes events such as trips to the Channel Islands National Park. There is a chemistry club – the “Free Radicals” – that is infamous for their barbecues. There is also an Association of Health Pre-Professionals club, which facilitates networking among students targeting any of the health and allied health professions, and sponsors presentations from representatives of local medical schools. For a listing of all the campus clubs, visit the CI Clubs/Organizations Directory.

Volunteer work: Many local hospitals and charity institutions welcome free help from ambitious university students. Talk to faculty and other students to find out more.

CAREER INFORMATION FOR BIOLOGY MAJORS

What do people do after getting a degree in Biology? Many people imagine that a Biology degree is only good for two things: being a doctor, or teaching Biology at the K-12 level. This is because these are the only professional applications of Biology to which most people are exposed. In fact, people graduating with a degree in Biology go on to do all kinds of things – in fact, all things! The Biology degree is an education, not job training. And the great thing about a degree in the Sciences is that you will have learned to learn, think about, analyze and apply information with a rationality and rigor not obtained from a non-science major (Shh! Don't tell anyone I said that!)

It is easy to assume that after graduation you will move directly into the next phase of your plan: the perfect job, or the prestigious medical or graduate school. This thinking stems from having gone to 1st grade, then 2nd grade, then... until 12th grade, then straight to college or university, and then... what?!? It can be scary to suddenly, for the first time in your life, be thrown to the wolves to fend for yourself. However, the reality is often far from this assumption. Life looks more like a random walk than a straight line, and goals are often achieved through circuitous routes. Be prepared for some delays and detours along the way! The best advice is simple: stay active, stay employed or learning, stay engaged. The future will arrive, regardless of what you do!

“Life is what happens to you while you’re busy making other plans.”

– John Lennon, 1980

So, what do Biology Majors do after graduating?

Many graduates are successful in gaining admission to graduate school or medical school in the fall after graduation. The outcome for such people is to obtain a Masters, a PhD, or one of the many medical degrees. Apart from the familiar MD, DDM, and DVM degree programs, you might target one of the “allied Health” professions, such as nursing, physician’s assistant, or physical therapy.

Many recent graduates find themselves working as laboratory technicians in academic or commercial settings for a while, and such a job can be a great jumping off place for the future. In particular, this can be a route of access to graduate schools, medical schools, or company jobs that may have otherwise been out of reach for reasons of competitiveness, training, grades, or whatever.

Another frequent outcome is K-12 education. Although obtaining a job in a publicly funded school will typically require specialized training in education, private schools are free to hire people with BA or BS degrees to teach their science courses. Be prepared to be able to teach Chemistry and Physics if you try to go this route!

Don’t overlook going into an administrative position. For example, hospitals are run by Hospital Administrators who have to understand the basic science and medicine, but happen to have an interest in and talent for business and management as well. Similarly, schools, Public Health departments, and organizations such as parks, agriculture, and natural resource management agencies are often run by people with backgrounds in science.

Researching career choices:

If you are thinking about career choices, one place to start is to check out the Bureau of Labor Statistics Occupational Outlook handbook – a classic resource regarding the training and education needed for various jobs, potential earnings, expected job prospects, and what workers do on the job:

www.bls.gov/OCO/

www.bls.gov/oco/ocos047.htm

www.princetonreview.com/Careers.aspx?uidbadge=%07

Outside of this, there are really too many possible resources to list, but below is a collection that will give you plenty of ideas:

www.si.edu/Encyclopedia_SI/nmnh/careers.htm

www.library.ucsb.edu/istl/98-fall/internet.html

emporia.edu/biosci/carebiol.htm

sciencecareers.sciencemag.org/

facweb.furman.edu/~jsnyder/careers/careerlist.html

www.botany.org/bsa/careers/

www.aspt.net/careers/

www.apsnet.org/careers/

www.accessexcellence.org/RC/CC/bio_intro.php

www.accessexcellence.org/RC/CC/bio_career_1.php

www.sicb.org/careers/ and www.sicb.org/careers/faqs.php3

www.esa.org/education_diversity/explore.php

www.ejobs.org/

www.cyber-sierra.com/nrjobs

www.princeton.edu/~oa/jobs/careeroe.html#Finding%20Your%20Career

genetics.faseb.org/genetics/gsa/careers/bro-menu.htm and www.faseb.org/genetics/gsa/careers/bro-01.htm

www.kumc.edu/gec/prof/career.html

www.abgc.net/english/view.asp?x=1

www.istl.org/98-fall/internet.html

www.aamc.org/students/cim/

www.theaosa.org/

www.aapa.org/

www.apta.org/pt-prof/index.html

www.apma.org

www.aavmc.org/

hopkins.stanford.edu/careers.htm

www.anapsid.org/resources/univ.html

www.asih.org/herpjobs

THINKING ABOUT GRADUATE AND MEDICAL SCHOOL

Admission to graduate and medical schools is highly competitive, and may require some special preparation. Your Program Advisor is your first resource for finding out about this special preparation, and how best to obtain it. You should also research the backgrounds of the other faculty members, and consult with one who has specialized in the area that interests you.

Some general advice follows:

- (1) Get through your core science requirements as early as you can. It is best to have the 4 core Biology courses, the 4 Chemistry, 2 Physics, and 2 Math courses done by the end of your Third Year.
- (2) Find opportunities for extracurricular experiences relevant to your ultimate goals. These can be work, volunteer, or for-credit experiences, either on-campus or off-campus.
- (3) Maintain a GPA >3.0. Although one or two grade slip-ups may be overlooked, a pattern of mediocre grades, repeated courses, or blowing off courses that don't seem "interesting enough" to warrant your best efforts will not be viewed positively by an Admissions Committee. Keep in mind that nearly 70% of people sufficiently interested in medical school to take the MCATs do not end up getting into medical school!
- (4) Plan to take the qualifying exams – MCAT, GRE, etc. – during the Spring semester of your Third year. These tests are content-intensive, and good scores are essential for admission. A special prep course may be advisable.
- (5) You will need good letters of recommendation; these can come from faculty, off-campus supervisors or mentors, or others who have had extensive experience with you. It is your responsibility to cultivate relationships with people who will be able to write the letters of recommendation for you!
- (6) Approach your next educational career as if it is the most important class you've ever taken, because it is! Do your homework, learn about the schools and fields you are interested in, and the faculty you would like to study under in graduate or medical school. Plan to be preparing your applications during the summer between your Third and Fourth Years.

Medical school admission:

Admission to a medical school is one of the most challenging goals you can set for yourself as an undergraduate. For this reason, we will give special attention to planning and executing a premedical undergraduate career. However, the advice presented here is easily adapted to admission to graduate programs leading to a PhD, or even to being hired after graduation by the company of your choice!

Strategies for a successful pre-medical career:

(1) Examine your motives for wanting to be a physician: Traditionally, being a Biology major meant one of three things: you want to become a doctor, you want to go into research, or you want to teach. If you were among the smartest kids in your high school, you undoubtedly heard “You oughta be a doctor!” on frequent occasions. This is not sufficient reason to actually pursue medicine as a career! Ask yourself why, really, do you want to be a doctor? Do you want to make a lot of money? Do you want the prestige of the “MD” after your name? Is your favorite TV show ER, or House, or something? Or is it possible you’re just trying to please your parents? And in coming up with an answer to the question of why you want to be a doctor, note one more thing: “I’ve always wanted to be a doctor” is not a good answer!

(2) Learn about medicine: Being a doctor is not the glamorous, dramatic profession often displayed on TV. It is, in fact, a challenging profession that requires an encyclopedic knowledge of the human body and the diseases that plague it. It requires that you be able to make quick, life-and-death decisions, often under extreme pressure. It can be physically demanding: do you realize that there is currently a controversy raging in the medical profession about restricting medical residents in hospitals to no more than 16 hours per day and 80 hours per week?!? Physicians often work 30 hour shifts, are on call nights and weekends, and have few days off.

You also want to consider whether you would prefer to be in private practice or a hospital setting; whether you would want to be in an urban, suburban, or rural area; whether you are interested in devoting your career to under served populations. Last, are there specialties that attract you, or would you like general practice? Specializing can be attractive (how often is a dermatologist going to be called in the middle of the night with a life-or-death emergency?), but some specialties require exceptional physical strength, dexterity, years of extra training, or superior performance in medical school. If you are serious about being a doctor, you will have formed some ideas about these issues.

(3) Be strategic about your undergraduate career: By “strategic”, we mean that you have organized your coursework and other activities to prepare you to apply for and, hopefully, enter medical school. Being strategic starts when you enter your first year: take introductory biology and chemistry course, establish good study habits, and get A’s. In your second year, continue getting A’s, especially in the tough core courses, Cell Biology and Genetics. You also want to start collecting extracurricular activities; plan to have a productive summer, too! In your third year, you should be finishing the courses required for the MCATs, such as Organic Chemistry, Physics, and Calculus. This is the time to get serious about your plans for medical school: research target schools, take a MCAT prep course and then the MCATs, and talk to your advisors and faculty about your plans to make sure you’re on the right track. It might be a good idea to begin to feel people out about supplying you with good recommendations. In your fourth year, plan to have applications done well before the end of the Fall semester; many schools are accepting applications during the summer.

Don't let up on getting A's, and extracurricular experience. And begin to give serious thought to "Plan B": in 2007, about 40,000 people applied to US medical schools, but only about 17,000 got in...

(4) Maintain a high GPA: Admission to medical school is all about numbers, particularly two numbers: your GPA and your MCAT scores. You want to be consistently getting A's and B's in all your classes if you expect to be admitted to medical school. For example, the average GPA at UCLA's Geffen School of Medicine is a 3.72; at USC's Keck School of Medicine, it is a 3.62. A few missteps may be acceptable, but as mentioned above, a pattern of poor grades or repeating classes will not be overcome by a decent GPA: you are expected to take classes once, do well, and move on.

(5) Have extracurricular experiences that support your desire to be a doctor: Admissions committees look at more than just the numbers – they also consider qualities such as empathy, leadership, commitment to service, and an interest in advancing higher goals such as advancing basic knowledge of medicine, or providing care to under served populations. How can you demonstrate these types of qualities in your normal course work? Well, you can't! The way to demonstrate these qualities is to commit some time to extracurricular activities such as working in a health care setting, doing research, or volunteering in nursing homes or with sick children or some other humanitarian organization.

Students often think that they need a research experience to support their med school application – research is good, but what the med schools really want to know is whether you can actually handle being around sick or injured people. They don't want to admit someone who's going to faint at the sight of blood! The more closely your extracurricular activities support your stated goals, the better. So, if you have a chance to do research, that's good (partly because most applicants won't get into med school!), but be sure to supplement it with experience in a medical setting!

Extracurricular activities don't need to be off-campus; participate in clubs, school government, whatever! Med schools are looking for people with above average "capacity": the ability to get A's in classes and be active in the community.

Your grades will be broken down into overall GPA and sciences GPA. If you are getting C's in core science classes, you may want to consider "Plan B"...

(6) Become a person the people on the medical school admissions committees want as a colleague: The faculty of medical schools are highly accomplished people, and they expect you to appreciate that fact. Research the schools you're applying to, and be prepared to discuss the school's strong points and the faculty's research interests, in the event you are granted an interview. Be up-to-date on what's happening in medicine, both the science and the business, and regulatory ends of the business. Also, be prepared to discuss your strong points and interests – if you get the chance to interview, it will be important to remind them of why they asked you to in the first place. And, oh yeah, always dress for success!

(7) Last, but not least, try to make sure there are no “red flags” in your application: You want an application that will stand out, but only for the right reasons. A “red flag” might be a low GPA, or inconsistent performance: would you want a doctor who was inconsistently excellent? Another red flag might be some unexplained feature of your college career: are there gaps, or other “obvious questions” that would be apparent from your transcript? Perhaps the worst red flags will be the ones you can’t see, because they will be found in the recommendations from faculty and others: were you always late to class, or always expecting special attention or considerations, or were you insolent or disrespectful with your teachers? Somewhere in the back of your mind, keep reminding yourself that in 2008 there were nearly 50,000 applicants to medical schools in California, and only about 1,000 admitted!

The application process:

The application process consists of two rounds of application: the primary application and the secondary application. Your primary application consists of 4 components: your GPA and transcript, your MCAT score, your personal statement, and other biographical information such as your research/volunteer work. We have already discussed your GPA and the importance of extracurricular research/volunteer experience. Before covering the other components of the application, let’s view a brief time line of the application process (assuming entrance in the Fall following graduation):

2nd year: Research medical schools and develop a target list: what are their average GPA and MCAT admission scores, what are their specialties, and when do they begin accepting applications for the year you are targeting for admission?

3rd year: Register for the MCAT, take a prep course, and take the MCAT (and repeat once if necessary). Get transcripts from all schools attended and check them for accuracy. Arrange for letters of recommendation, and let the recommenders know what the deadlines will be. Work on your personal statement. Submit applications. Research financial aid options.

4th year: Complete secondary applications. Visit campuses. Interview. Celebrate!

For a more thorough timeline, see: www.aamc.org/students/considering/timeline.htm.

MCAT:

MCAT stands for “Medical School Admission Test”. Your score on the MCAT is one of the most important components of your med school application, because the MCAT is considered a very strong predictor of your performance in medical school. Medical schools try to examine each applicant in a “holistic” way, looking at all the qualities of the applicant, but the reality of the volume of applications they receive is that those applications without “The Numbers” – GPA and MCAT score – will be very likely to be rejected immediately.

The MCAT is a standardized test, and so may be considered similar to SATs and other standardized tests you have taken in the past. One difference is that it is given on the computer; in that sense it is different from most tests with which you are familiar. For example, there is no way to write things next to a question

to help you think or organize your thoughts. You will also be reading the questions on the screen, which will slow your reading by 10-15%. For these reasons, it is especially important to practice with this testing format; prep courses are offered by companies such as Kaplan or Princeton Review, and although they may seem expensive, they are probably a good investment for most people.

The MCAT is very content-heavy, much more so than the other professional school admission tests like the LSAT used for law school. It is essential to prepare exhaustively – you will treat this preparation like a real class, and this preparation should be factored into your workload for the 3rd year of college. Before taking the MCAT you must have already taken the courses that will be covered: Intro Biology, General Chem, organic Chem, Physics, Math (calculus), and English courses. Advanced courses in Biology will help you – Cell Biology and Genetics.

The MCAT has 4 sections. The first is Physical Science: general chem and physics; it has 52 questions and lasts 70 minutes. The second is Verbal Reasoning: it tests your ability to understand, evaluate, and apply information and arguments; it has 40 questions and lasts 60 minutes. The third is a Writing Sample: it tests “expository response to general issues”; this section does not figure into your overall numerical score, and is graded J (bad) through T (good); it is the least important component of the test. The fourth section is Biological Sciences: Biology and Organic Chemistry; it has 52 questions and lasts for 70 minutes. Each of the three numerical sections has a maximum score of 15; the three scores are added to give you The Number. In 2007, 52,000 took the MCATs; about 40,000 of these people applied to medical schools and about 17,000 were accepted. The average score in 2007 was a 26. The average applicant score was about 27; the average matriculant – people who actually get in and go – is 30.5 nationally, 33 in California. A widely recognized guideline is that a successful med school applicant will have a total of ~30; this would place you at the 75th percentile – 25% of the people will score above you. No one gets a perfect score – a score of 34 would put you at the 90th percentile, and is really good; a score of 40 would put you at the 99th percentile. On the other end, a score of 24 would put you at the 40th percentile – 60% of the people taking the test do better than that. Needless to say, a 24 is not very supportive of a person’s desire to go to medical school. It is possible to take the MCAT three times per year, but in practice by the time you’ve scored poorly twice, medical schools will not want to see a third attempt. It is worth repeating once if you score poorly the first time, but bear in mind that one poor score followed by a good score will not be considered as highly as an equivalent good score obtained on the first try. We advise you to be realistic about the influence of the MCAT score on your chances for admission to medical school.

Personal Statement:

The personal statement is an essay you will write to explain your motivations and qualifications for admission. It's actually more like a half dozen essays – you will write one or two for each primary application and four or five more for each secondary application (more below on primaries and secondaries). The influence of the personal essay on your chances for admission is huge. It is not the time to insist that you've always wanted to be a doctor, or that you know you will get in and do well. Instead, you need to demonstrate that you are unique among the pile of applicants. This is your chance to sell your “talking points” – to demonstrate that you are a person with the character and characteristics required for success.

You will be writing several personal essays, and they will have more impact if there is a clear theme that recurs in each essay. What this theme is will depend on what you have to offer. Themes can be organized in a chronological way, but a better strategy is to have an anecdotal theme in your essays. What drives you to your obsession to be a doctor? What personal experiences shaped your world view and goals? Of all the ways there are to help people, or to be a scientist, why medicine? Why not help people by volunteering in a soup kitchen? Why not go into the pharmaceutical industry if you want to cure disease?

The essay should not be sent out without feedback from other people. Get a good friend to read it – they may point out qualities you have missed, or are too shy to bring up. Their job is to help you project yourself not the essay – they will do a better job of knowing if it is “you” than you will. Get a professor that knows you well, or your academic advisor to read it. They will have the professional perspective to catch the trite, the immature or just plain totally dorky comments. And you need one more reader: someone whose English is really really good to check grammar, spelling, and technical aspects of the essays. Start working on your essay early – you will be amazed (and perhaps dismayed) by how many changes you will want to make after letting it mellow for a month or two.

Secondary applications:

Believe it or not, the primary application is not the end of the application process. Most schools will immediately follow the primary application review with a request for a follow-up: a secondary application. How schools handle this secondary is quite variable: some invite all applicants to immediately submit secondaries, while some review the primaries and invite secondaries from only the most promising candidates. In some cases, the schools don't even review applications until secondaries are complete, which means that you haven't even applied until you get the secondary done. Each individual school can clarify their practice for you, and it may be worth finding out by consulting their web site or contacting the admissions office. In general, the secondary application consists of: additional biographical information, additional short answer statements and essays, an additional application fee, and the letters of recommendation

It is important to get the secondary done as quickly as possible -- many schools will give you a deadline to return the secondary applications, but *do not wait until the deadlines* to submit materials. The sooner you

return your secondary application the sooner you will move into the next stage of evaluation. Completing and returning the secondary application quickly signals your sincere interest in the school to the admissions committee. Remember that schools do not wait on late applications to fill their classes. Many good applicants fall down at this stage, and do not do as well in the admissions process as they should have!

Letters of recommendation:

Letters of recommendation are letters from professors and others who have gotten to know you professionally, that attest to your intelligence, skills, and personal qualities. They are not about your grades – grades are easily seen on your transcript. In order to write a good letter of recommendation, the recommender needs to know you. A short or superficial letter of recommendation is one of the ‘red flags’ that can end up in your application. So what is a good recommendation? Some of the questions we may ask ourselves are: **(1)** Are you dependable, consistent, hardworking, dedicated, motivated? **(2)** Does your work in the labs indicate that you have “good hands” – do you have the innate talent and developed skills to work well with your hands? **(3)** Do you “work to your ability” – sometimes being the smartest person around is not as impressive as being the hardest working person around! **(4)** What is my impression of your maturity, judgment, ethics? **(5)** How do you compare to previous students – are you in the top half, the top quarter, the top 10%? How about med school applicants? **(6)** Would I want you as MY physician?

Note that letter of “recommendation” is somewhat misleading – not all letters will necessarily recommend admission! It is customary to summarize one’s “recommendation” for admission as: recommend highly (good), recommend (just OK), recommend with reservations (not so good), and do not recommend (bad). Why would one not recommend you? Were you always late to class? Were you insolent or disrespectful? Were you always doing as little as possible in lab, turning on your cell phone or iPod at every possible chance instead of engaging with the material in front of you?

Show some courtesy when asking for a letter of recommendation. We don’t mean say please, we mean:

(1) Contact your prospective recommenders as soon as you know that you plan to attempt to go to medical school, keep them in the loop about your plans, and make it clear what exactly you need from them: what schools are you targeting, and when are recommendations due? Recommendations will go out when you submit your secondary applications, so this is the time-point that the recommenders need to be aware of.

(2) Limit the number of schools to less than a dozen – way less. You should definitely apply to all the public medical schools in your state, since most medical schools will draw matriculants primarily from their own state. You should also apply to medical schools in other states that are appropriate for your interests, GPA, MCAT score, etc. Keep two things in mind: First, med school admission is not a random process – if you are found unacceptable by 10 schools, it is unlikely that you will get a bite in a second set of ten schools. Second, it may seem that your recommenders just need to thrash out a template and shoot it off to as many schools as you want them to – not so! Each letter takes time, and you should bear in mind that your recommender is probably more busy than you are.

(3) Give your recommenders plenty of time to write a good recommendation. It takes only a couple minutes to write a superficial letter, but it takes research and thought to write a really good one. Returning to the point made above, your recommenders are probably more busy than you are. If you breeze in a week before letters are due, you just said something about your organization, your level of preparation, your dedication to the process, and your consideration of others – these are not the things you want in your letter!

To repeat: show some courtesy if you want a good recommendation.

Useful web sites:

www.aamc.org/data/facts/2008/2008school.htm

www.bestpremed.com/index.php

hpplc.indiana.edu/ohp/