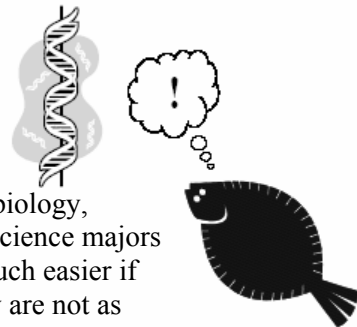




Careers in Marine Biotechnology

The field of marine biotechnology is exciting and growing. Do you think you might be interested in a career in marine biotechnology? Here is some information to get you started.



What classes should I take now?

You should take as many science and math classes as you can, especially biology, chemistry, and calculus. Don't skip physics! Satisfaction of most college science majors requires at least one college physics course, and college physics will be much easier if you take it in high school first. Specialized courses such as marine biology are not as critical, but if they are offered at your school, you might want to check them out too. Also, make sure you are taking the right classes to meet college admission requirements. Some schools require certain numbers of humanities classes, or foreign language classes. Keep those grades up, even through the end of your senior year!

Good colleges are looking for well-rounded students (and you know what they say about all work and no play) so your extra-curricular activities are important too.

How can I get involved in marine research while I'm still in high school?

One way to find out if you really enjoy marine research is to actually *do it*, yes, now, while you're in high school! This experience will also build your college admission record, and will serve as a good foundation for later research you might do in college.

Many schools conduct science fairs for which you could do a marine science-related project. Some schools even participate in the Intel International Science and Engineering Fair, a very prestigious science fair for high school students. Most of the students who participate in the Intel program do their projects in a "real" science lab at a local university or company. Intel even offers special training programs all over the country for students who are interested. Ask your science teacher or check out Intel's web site (www.intel.com/education/isef/) to find out how to get involved.

Even if you don't enter a science fair, many labs offer opportunities for high school students to work there or even conduct their own research projects under the guidance of a scientist mentor. Ask your science teacher to help you get in touch with research labs in your area to find out if they take on high school students. Be aware that most labs will not pay a high school student, so you'll be looking for the experience, not a paying job.

If you do land an internship in a research lab (you lucky dog), here are a few things to keep in mind:

- Make sure to set a schedule for when you'll be in the lab, and stick to it. Even if you're not getting paid, you should treat this commitment like a job.
- Make sure to offer to help at every opportunity. The scientists you work with will be happy to have the help, and impressed with your initiative. You can learn a lot doing even the most menial tasks.

- Ask questions. Ask lots of questions. There are no dumb questions! The scientists and graduate students will be happy to answer them, and that's how you learn stuff, after all!
- Make sure that you ask your mentor(s) to review anything you write or prepare for the project. They can help improve your presentation, correct mistakes, and give you good ideas.
- Don't forget to ask your mentor(s) for college recommendations!
- Try to keep in touch with your mentor(s) when you are done working in their lab – they will always appreciate knowing what you're up to.

What should I look for in a college?

Should you go to a big school, a small school, a state school, a private school, in state, out of state? These are all questions that you and your family will have to answer, and there are no wrong answers. Your choice of college is a personal decision. There are lots of schools all over the country where you can get a first-rate undergraduate science education.



However, there are a few guidelines. When considering colleges, you should specifically look at their science programs. What types of science majors do they offer? How big are the science classes (in many schools, introductory classes are large, but are there opportunities to take smaller classes later on)? How are their undergraduate lab facilities? If the school has research labs, are there opportunities for undergraduates to work in them and do independent projects? Can undergraduates take graduate level classes? In many schools, the focus of undergraduate science education is pre-med studies. If this is not your area of interest, do they have classes and other support resources for you?

What should my major be in college?

If you are interested in marine biotechnology, or marine science in general, any science major is appropriate, so it depends on your own interests. One word of advice – it is really not necessary to major in marine biology or marine science in order to become a marine scientist. The best thing to do is to get an excellent basic science education in your field (see the discussion below of specific classes to take). Specific marine knowledge can be obtained through individual classes, outside research, or even later, in graduate school.

What classes should I take in college?

You will have a suite of required classes to take to complete your major which will vary somewhat by school. These will likely include chemistry, biology, calculus and physics, and may also include biochemistry, organic chemistry, or other classes depending on the school. In addition to your required classes, additional math and science elective classes, depending on your particular interests, are recommended. If you can take an independent study or research credit class, go for it. It would also be great to take graduate level classes if you can.

Some schools offer science writing classes, which would also be very helpful. Writing is not just for English majors! As a science major and later as a working scientist, it is very important to be able to communicate your ideas and research results to all kinds of people, so writing and other communication skills are critical.

For most jobs in the biotech field, you will need a graduate degree (M.S. and/or Ph.D) as well as an undergraduate degree.

What is life like as a marine biotech researcher?

The answer to this question depends on what kind of job you have. Typically, after graduate school, if you earn a Ph.D., you would become a “post-doc,” which is kind of like being an apprentice (without Donald Trump!). A post-doc works in the lab of an established research scientist but runs his or her own research program. This type of job usually lasts from one to three years. Sometimes scientists do more than one post-doc. The next step is usually a “regular” job at a university, company, or other employer.

An early-career scientist will spend a lot of time in the lab and in the field (depending on the type of research you’re doing) and a lot of time writing grant proposals. Especially in an academic setting, your full salary will not be paid by your employer; instead, you are expected to write proposals for funding to various money sources (government agencies, industry, non-profit funders, etc.). These grants will pay for part of your salary and the expenses of the research projects you are working on. Your other major activities will be writing papers for publication in scholarly journals in order to share your work with your fellow scientists, and maybe teaching if you are employed at a college or university.

Later in your career, when you become a famous scientist, you will have more people working for you in your lab (technicians, graduate students, and even lowly undergraduate and high school students!) and you might spend less time in the lab yourself. Instead, you will focus more on grant and paper writing and other types of activities.

At all of these stages, the field of marine biotech is hard work! You may find yourself coming into the lab on weekends to check on the progress of an experiment, staying in your office late to meet a deadline for a grant proposal, or working long hours to finish grading student papers in time for the end of the semester. But on the other hand, the rewards are big – you will be aiding the process of discovery, working in the beautiful marine environment, and potentially helping humankind.

Check out these web sites that contain more information about careers in the marine sciences:

www.marinecareers.net

www.womenoceanographers.org

aslo.org/career/aquaticcareer.html

www-ocean.tamu.edu/Careers/

