

## **Tips for Succeeding in Introduction to Natural Science**

Science requires you to utilize logical and analytical skills, absorb a new vocabulary, and master a wealth of technical details and general concepts. Although there is a large body of knowledge that you must know to succeed in science, it is critical for you do more than just memorize "facts." One of our primary goals is to emphasize critical and analytical thinking skills. We will ask you to identify the similarities, differences, and connections between processes and events, interpret experimental results, and identify unifying concepts. We want you to understand how and why things happen, not just that they do. This sort of understanding requires an ongoing active involvement on your part; we do not want you to just take in facts and regurgitate them back to us on an exam. You should be able to use the information provided in this program, not just recall it.

The following are tips for success in the different areas of the program. These differ from learning goals and you should familiarize yourself with both.

### **Time Management**

The most important activity you can do is study every day. A general rule for college classes is that you should expect to spend at least 3 hours out of class for every hour in class; for 4 hours of lecture you should expect to spend about 12 hours each week beyond in-class time. These hours should be spent reading, writing, studying, or doing other activities related to the class. When studying, do not spend long periods of time struggling with one subject, topic or problem. Take study breaks. Study during the hours that work best for you.

### **Reading**

Assigned reading will help guide you through the material presented in the program. It is important that all reading is completed prior to the activities that will require you to use the information. Do not passively read through the text! Take clear, organized notes as you read, highlighting the major points that are covered. If you see a figure or an equation during your reading, do not just pass it up – study it to understand what is being presented and why it is presented. Texts are meant to be reference tools. Look up anything that you do not understand prior to asking faculty about the topic.

### **Lectures**

Lectures introduce topics and how scientists think about them. Lectures may not always follow the material in the textbook, but will give you an idea of what points the lecturer considers most important. Faculty may use workshop-like activities during lecture to help you better understand the material being presented. Do not assume that because you are in lecture that you can learn passively. You are responsible for all material covered in lecture. Come to class having already done the reading and take detailed notes. Challenge yourself by asking questions and by relating the material to everyday life. Review your notes as soon after each class session as possible. Fill in any missing information so that they are complete and logical.

### **Study Groups**

Study groups can make studying more efficient, effective, and fun. Focused study with others allows you to pool your ideas and see material from a different perspective. It also gives you a chance to organize, verbalize, and explore your own ideas or questions and get feedback from the group. We strongly encourage you to form study groups that meet regularly to discuss the subject matter of the course.

To get a study group started:

Talk to people in the program to find others with similar schedules and goals.

Aim for 3-4 students per group. Larger groups may not give everyone a chance to participate fully; smaller ones may not generate enough ideas or feedback. Choose a convenient, comfortable place to meet, with minimal distractions. Schedule the first meeting early in the quarter, to clarify the goals of the group (to go over weekly study questions, to study for exams, to discuss the reading and/or ideas generated by the class, etc). We recommend a weekly meeting, but other arrangements can work well, too. Make verbal commitments not to schedule other activities during the agreed on meeting times. At the first meeting, discuss how long you will meet each time, the kinds of activities you think would be most helpful, if you would prefer a structured group that might assign particular duties or questions to each person or a group that is more free-form, etc. If you find that the group you have signed up for does not have compatible goals or preferences, then find another.

Some possible study group activities:

- Review lecture notes. Help each other fill in missing bits of information or raise questions or clarify confusing concepts.
- Go over the assigned readings. Make connections between lectures and readings.
- Answer study questions, problems provided, or questions from the text. Discuss strategies for solving particular types of problems.
- Make up your own exam questions and quiz each other. Mix questions that require just memory with questions that require you to compare different concepts, combine aspects of different topics, or apply concepts to a novel situation.

Guidelines for a successful study group:

- Come prepared. Be sure that you have read the relevant material, worked through study questions or problem assignments, and reviewed your lecture notes.
- Remind each other of the agreed-upon goals, procedures, and time limits at the beginning of each meeting. Allow some time for socializing (this is one of the benefits of the group, after all), but then get to work!
- Take turns explaining ideas or problems to each other. The old adage "You don't really know the stuff until you have to teach it" is true. One of the best ways to check your own understanding of a topic is to explain it to someone else. Make sure that everyone participates by contributing ideas or comments.
- If the group cannot resolve a question, assign someone to ask the instructor for help.
- Take a few minutes at the end of each meeting to summarize what you have accomplished. Decide what questions need follow-up and how that is going to be done. Look ahead and set the agenda for the next meeting. Make assignments or agree on what each person needs to do to get ready for next time.

### **Homework**

Homework is an opportunity to utilize the information presented in the program and prepare for upcoming activities. Completing all homework assignments and turning them in on time ensures that you are keeping up with the material and are studying.

### **Exams**

Not only will you need to understand the concepts involved and remember terminology, concrete examples, and mechanisms, you will also need to be able to explain those ideas clearly and concisely and apply them to novel situations. Do not wait until exam time to figure things out; there is too much material to master for cramming to work well. Spend time each day reading your text, reviewing your notes, learning new vocabulary, and working on problems or study questions. Simply reading the text

passively will not do the trick. You must be able to work with the material, apply it to novel situations, solve problems, and perhaps most importantly, explain it clearly to another person.

### **Labs**

Never come late to lab! Read the laboratory handouts prior to each lab. A successful laboratory experience is dependent on your participation. You must have all of the appropriate laboratory materials (goggles, calculators, lab notebooks, etc..) in order to participate. During lab, try to connect what you are doing in lab with what you are learning in the other parts of the program. Spend time after each lab to reflect on your results and conclusions.

### **Workshops**

Workshops are yet another opportunity to engage in the material with your peers when the faculty are present. This works best when students come prepared for each workshop. Determine your role in your workshop group and be willing to try new roles throughout the year. Do not let your workshop group get off topic – stay on task! Contribute equally to the work! Remember that science is collaborative.

### **Seminars and Presentations**

Complete all reading and assigned work before coming to seminar. It is critical that everyone participates so that you learn how to communicate science. Monitor your participation; do not dominate the discussions and do not fail to contribute your ideas. You will have all quarter to prepare for your presentations so budget your time accordingly.

### **Other Resources**

We will have tutors for the different areas of the program, be sure to use them! The QuaSR and Key Student Support Services are other great resources for getting assistance.