RETURNING TO MATH & SCIENCE?

Study Strategies for Nervous Newbies

APPROACHING MATH AND SCIENCE COURSES

The most important thing you can do to ensure success in a math or science course is to keep up with your homework. You will learn with the least effort if you keep up with the class. Cramming is even less effective in math and science than in other subjects.

Expect to work hard, especially in the first few weeks:

→ If you have a weak background in the subject (if you never understood it, or it’s been several years since your last class), you need to be honest with yourself about what you don’t know.

→ The Learning Centre and your instructor can help you to identify gaps and review subjects covered in previous courses.

After the first few classes, your instructor will assume that everyone in the class knows all the material covered in the prerequisite.

If you’re unsure if you’re in the right class, doing all the homework will help you gauge if the class is at your level. Being in the right class from the beginning will help you to feel more confident, and will give you the best chance to get a good mark.

If you are coming to math or science from an arts background, be prepared for a new approach to learning:

→ Arts classes are best approached from the general to the specific. However, in science courses you may not be able to understand the generalization without first knowing the specific details. Learning from the specific to the general works best for most students in math and science courses.

→ Most arts textbooks are written like essays: they have introductory paragraphs, topic sentences and conclusions that introduce a concept and then reinforce it. These types of texts can be read very quickly, because they repeat information. Math textbooks don’t repeat information in the same way, and ‘reading’ them isn’t a good way to learn for most students. Most students learn the most from the text by doing the example problems themselves as they’re reading, as well as taking notes.

WHAT TO DO BEFORE CLASS

Review the section in the textbook before the lecture:

→ By reviewing the material before the lecture, you will create ‘hooks’ for new material to hang on. Studies have shown that you will learn faster, and remember more, if the lecture isn’t your first exposure to the material.

→ If you’ve already looked through the chapter in the textbook, you will be able to gauge the extent to which your instructor is following the textbook. Knowing what’s in the textbook will help you take better notes in class, and avoid re-copying material that you don’t need.
Make sure that you have learned the material covered in the previous lecture. You will understand the new lecture better if you have done the homework that was assigned in the last class. Also, you can ask the instructor for help with difficult questions right away.

WHAT TO DO DURING A LECTURE

In taking notes, develop a system that works for you. There are lots of books that describe different note-taking methods, and many students find them helpful. Use any system you like, so long as your notes are an accurate record of what you learned in class.

When your instructor does an example in class, always copy down their explanation of why they took each step as they solve the problem.
→ Most instructors don’t write their decision steps down on the chalkboard, but that information is very helpful when you’re solving problems on your own.
→ Knowing why each decision was made in solving a problem will help you to understand how the solution was found, rather than memorizing without understanding.

If you don’t understand the lecture, then it is difficult to take good notes.
→ Try to write down all the main points that the teacher makes, so that you can review (with the textbook, classmates, the instructor or the Learning Centre tutor) later on.
→ No matter how confused or tired you get, never stop taking notes. If you can’t manage anything else, just copy down all the problems and solutions that the instructor writes down.
→ Writing down just the examples is also a good approach if the teacher is talking too fast for you to copy down everything. Remember to include as much of their reasoning as you can in your notes.

Try to never miss class:
→ Lectures are almost always cumulative in math and science courses.
→ If you miss a class, you will not only miss that material, but will also miss part of the class when you return as you scramble to understand what the instructor is talking about.

WHAT TO DO AFTER CLASS

As soon as possible after lecture, review your notes actively:
→ Fill in any blanks, and re-write any confusing parts. Make sure your notes are so clear that someone with no previous knowledge of the subject could learn from them (that person might be you in a few weeks when you’ve forgotten the lecture).
→ Cover up part of your notes, and quiz yourself to see if you really understood the lecture. Re-write your notes in your own words, summarizing the lecture.
→ If you can do this within twenty-four hours of lecture, you will stand the best chance of remembering the material later on.

If you had trouble following the lecture, talk with classmates, to the instructor, or to anyone who understands the material as soon as possible.
Review your notes and make sure you understand them now. Rewrite the notes in a way that makes sense to you. Do as many practice problems as you have time for. You should always understand the material covered in the previous class before each lecture.

**HOW TO APPROACH HOMEWORK PROBLEMS**

Once you feel that you understand how examples in the text were done, start doing problems right away. Don’t wait until you understand every detail of the subject, because you may never get there.

You will learn best by doing problems, not by reading the textbook.

The assigned homework is a minimum. If this seems like a lot of homework, make this deal with yourself: do every single homework problem until the next test. If you get 90% or more, then you can reduce the number of problems you do. Otherwise, you need to do more problems, not fewer.

Many math, chemistry and physics questions differ only by a few numbers:

→ Making notes for yourself detailing how to solve a type of problem will help you remember how to tackle that type of problem on tests.

→ This is particularly true of word problems in math. There are sheets in the Learning Centre that can help you see the patterns in math word problems.

After you have finished a problem, review your work and look for mistakes before you check the answer key. Everyone makes little mistakes like dropping a negative or writing the question down wrong, but students who get good marks are able to find these mistakes before they hand in their tests.

→ Reviewing your homework will help you to practice recognizing errors, so you can do it easily on tests.

**HOW TO STUDY FOR MATH AND SCIENCE COURSES**

Schedule a few times during the week when you do your homework and review your notes. As well as doing homework questions, summarize the review sheets you made after class into master review sheets every time your class finishes a topic.

You will learn most efficiently if you work for a short period of time (1-3 hours), but often.

→ If you do your homework once a week (or once a month!) you will waste a lot of time re-learning things that you’ve forgotten since you learned them in class.

Your ability to learn new things drops off dramatically after a few hours.

Study in a place that’s quiet and free of interruptions. If you’re easily distracted, you may not be very efficient working in the library or the Learning Centre.

→ Do whatever you need to (unplug the phone, get up early in the morning) to create a study space where you can focus.
Tests will always measure your ability to do problems, not necessarily your understanding of the textbook. Since tests will examine your ability to do problems, it is most important that you practice – so **do lots of problems**!

If you are having trouble with a subject, look for more questions in another textbook, or ask your instructor. Keep doing problems until you can get them right.

Once you feel comfortable with a subject, start trying to do problems **quickly**.

→ Any practice tests should be done with a time limit, since you will need to do problems quickly, as well as correctly, on a test.

→ Practicing working under time pressure on your own might help make you less anxious when you write tests.

**WRITING TESTS**

Start by **looking over the whole exam:**

→ Usually it is best to start with problems you can do easily and quickly.

→ Very anxious students, however, sometimes do better by doing the hardest questions first. After getting the most difficult questions out of the way, you can relax and focus on checking your work and finishing the rest of the test. If you use this approach you must be very careful that you don’t run out of time, however.

If you are running out of time on a test, go through what’s left of the test and write down as much as you can for each question. Just writing the correct formula to solve a question will often gain you one mark.

When you get a test back, **review** all the mistakes you’ve made. You should be able to get 100% if you were to get the same test again. Questions on the final are often very similar to those on term quizzes.