

STUDY SKILLS WITH EMPHASIS ON MATH AND SCIENCE

Helen Baril
Quinnipiac College
Hamden, Connecticut

It is an unfortunate fact that the tutees a tutor will work with in almost any tutoring center will come to college with little or no sense of how to study. This intensifies the problem for tutors in that they must teach not only the material that a professor expects the student to know but must also address the learning process as it relates to the student.

One might well ask if a tutor is able to include study skills in the everyday tutoring session. In concept-based subjects such as English, psychology, and writing, there is a very specific process for reading, studying, and remembering material presented in class. Most students are fairly familiar with the process. However, in math and the sciences (accounting can be included here also), there exists a very different process for reading, studying and remembering the material. Many teachers in public schools either are not aware of that fact or choose not to address that fact. Therefore, it is necessary for the tutor to try to include some of the more pressing study skills relative to the field of math and science when working with a tutee.

During tutor training sessions, the tutors of math and the sciences need to work with someone who is particularly skilled in the area of teaching mathematics and sciences. This does not necessarily mean that they should work with the best mathematicians or scientists on the faculty. It is nice to think that the two skills go hand-in-hand, that is, great teaching and a vast amount of mathematical or scientific knowledge, but, unfortunately, many times that is not the case. Depending on the size, structure, and focus of the institution, the range of expectations of professors and demand of course material can vary widely. However, the

study skills that need to be in place in order for a student to be successful in mathematics or science are virtually the same.

The method of reading a mathematics assignment varies greatly from the generally recommended SQ3R system that most tutors and tutees are familiar with. If tutors or tutees alike have had any direct contact with a study skills course or training, they have probably only been introduced to this process. Reading the sciences, however, does not generally progress from a topic sentence for each paragraph. More often than not, the most important sentence of a paragraph is at the end of the paragraph. The flow of the material is such that the paragraph is building towards a major principle, formula, or theory. Therefore, the skimming process is not the same as when reading non-scientific material. After the initial reading of material, it is generally necessary to perform a second rather tedious reading, sometimes almost word-by-word, at which time the student must read all of the problems which are done in their entirety in the text. Depending on the thoroughness of the author, this may take quite some time depending on how many of the steps in a particular process are preceded by the dreaded "obviously." After this process is completed, it is time to do more problems to reinforce concepts, formulas, and order of operation.

It is important that the math or science student be made aware of the integral part of the learning process that the notes from class must play in processing material effectively. Most math and science professors will give at least one, if not many, examples of a process or use of a formula. It is necessary that the student see that these examples are to be used as models for the homework and that they have a natural progression from the easier to the more complex. If a tutor can help a tutee integrate his or her notes from a lecture with the

math assignments, the learning process will be enhanced and the tutee will more readily become less dependent on the tutor as a lifeline.

One of the most valuable assets for the tutor is the completed or partially completed assignment of a tutee. It should be made very clear to the tutee that he or she must seriously attempt to complete an assignment before coming for a tutoring session. A tutor can tell a lot about the problems that a tutee is having if he or she can see some written work, even if it is incomplete. Without this honest attempt at completing a problem set, the tutor is working “in the dark.” The temptation of the tutee is to agree all the time. There is a vast difference between understanding a process and being able to complete the process. How often do tutees who do poorly on a quiz or exam say, “But I understood it all”? The question that the tutor must ask at that point is, “But how many of these problems did you practice?”

In math and science, it should be quite easy for the tutor to anticipate test questions for the tutee, posing a few at the end of each tutoring session. It is always a good idea to do a few problems that are routine, and then conclude with some which may illustrate exceptions to the process. This short quiz of facts of procedures could easily be the beginning or the end of each tutoring session. This, of course, means quite a commitment on the part of the tutor in that there is some preparation necessary to produce a short list of examples. Most centers, however, have extensive libraries of workbooks and texts that can be used for this purpose. If the center does not have such a supply, contact the professors. Most of them have many books given to them by publishers and are generally happy to send materials to the center, and also many professors are eager to take the time to enumerate the best sections for such problems. This not only saves money for the center, it builds public relations with the departments.

As in other areas, the use of note cards is invaluable in math and the sciences. Formulas and definitions are ready made for the use of note cards as a study device. The tutor could approach the use of note cards as a time-saving device if he or she is working with a tutee on time management. So many times tutees tend to become overwhelmed when there is a long list of formulas to be learned, and all are on the same page or pages. If the formulas and facts can be broken up into singular units on note cards, the tutee can better concentrate on one at a time, sort the ones he or she knows and does not know, and the note cards are very portable. It is easy to put one in a pocket and pull it out while standing in line waiting for lunch, walking from the residence hall to class, or waiting at a red light in traffic.

Studying math and sciences also lends itself well to small study groups. It is advisable that the number of members not exceeds four, including the tutor. Bigger groups tend to lose the focus of the meeting and end up being a little too social. These study groups may be initiated and led by a tutor who sees common bonds between two or more tutees, but often the groups end up being study groups outside of the center itself. Many times the strength of one student helps to improve the weakness of another in a symbiotic fashion. When well thought out by the tutor, this process can minimize the time necessary for the tutor to be involved and render the tutee less dependent on the tutor, certainly a goal of all personnel in learning centers.

In summary, there are a number of specific study skills that can and should be addressed by a tutor in the areas of science and mathematics.

1. The tutor must insist that the tutee bring to a session his or her class notes.
2. The tutor should impress upon the tutee the fact that it is important for him or her to have at least tried the assignment before coming for a tutoring session.

3. The tutor should attempt to impress upon the tutee the way that class notes impact on the understanding of the homework and remembering the material. Of course, this assumes an organized professor!
4. The tutor should introduce the tutee to the reading process for both mathematics and the sciences and actually read a section of the text with the tutee while utilizing this process.
5. The tutor should begin and/or end each session with some questions that anticipate test questions.
6. The tutor should suggest that the tutee initiate the use of note cards for pertinent material.
7. The tutor should attempt to have the tutee verbalize material. It is often hard to do with mathematics and science, but it is generally necessary to the understanding of the information.
8. The tutor should make an effort to realize likenesses in some of his or her clients and suggest informal study groups, with the tutor as the moderator and with the ultimate goal being that the group can function on its own at a later date.