A Guide for Understanding

For the Student…

1. Read the assigned text material at least twice; once for an overview and once to analyze the text word-by-word and chart-by-chart to grasp details. Re-read the text several times when you run across a difficult concept.

2. Do homework the night it is assigned; do not save it for the last minute.

3. Consult other students in the class – they may have insights that help you. Discuss your insights with others to deepen your own understanding.

4. Don't miss class. You will discover that a significant amount of material is covered each day and you will quickly fall behind if you miss class.

5. Review previously-studied material periodically, especially if you had difficulty understanding the concepts.

6. Don't give up. For many people, learning is a difficult chore. Persistence will usually pay off in greater understanding.

7. Consult with your teacher as soon as misunderstandings arise. Give yourself and the teacher enough time before a test to clear up any concept you don't understand.

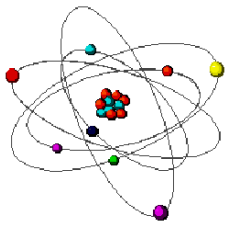
8. Spend a lot of time on definitions. Mathematical analysis of problems becomes much easier if you have a clear understanding of the terms used.

9. Take good class notes. Your memory may not be as good as you suppose. Class notes help immeasurably when you are trying to understand homework.

10. Have confidence in yourself. If you believe you can grasp the difficult concepts and you keep on trying, you will find that you actually start to understand them.

11. One of the purposes of performing laboratory experiments is to give you a concrete example of a theoretical concept. Thus, it is to your advantage to do your write-up promptly.

12. As strange as it may seem, it is true that if you are having difficulty with math problems, you should do more problems than assigned. Eventually, you will understand them.



For the Parent…

1. Provide your student with a distraction-free place for study.

2. Encourage your student to go through the steps on the left-hand side of this sheet.

3. Understand that the problem-solving approach used in the physical sciences (chemistry and physics) may be new and difficult for some students. It is not unusual that some students will need up to 9 or 10 weeks of persistent effort to initiate understanding. Encourage your student to persist and not give up.

4. Students who have done well in most of their other classes sometimes have an overly optimistic view of their memory and thus are reluctant to take class notes, and certainly wouldn't dream of recopying their class notes. You might encourage your student along these lines.

5. Recognize that some students need the shock of doing poorly on a test to stimulate them to initiate a new strategy for studying. The disbelief that a new approach is needed sometimes continues until the reality of a poor progress report grade looms large upon the horizon. One shocking progress report grade should be enough, however, so don't be reluctant to let them know what *their* expectations should be.

6. Do not feel any compulsion to assist your student with his science homework. He has plenty of resources in his text, class notes, fellow students, and teacher. If your patience will allow, it may be helpful if you encourage your student to think a problem out loud to you. Some strategic questions, like: "Specifically, what does the problem want you to find?", or "What do you know that relates the given quantities to the desired quantity?" should assist your student in thinking things out for himself.

7. Above all, positive support and encouragement of your student along with stated faith in his ability to understand the material will provide the greatest long-term benefit.

STUDY TIPS

1. When studying, gather all of your study materials (textbook, class notes, worksheets, paper, pencil, calculator) together. You never know what you will need.

2. Skim the material, deciding which parts are most difficult and which parts you understand best.

3. Plan out how much time you need for each topic.

4. Read aloud, and study with a partner or parent. Listen to yourself as you read.

5. Think up possible test questions and quiz yourself.

6. Recopy your notes for clarity; you will understand them better.

7. Mark main ideas or key terms in your notes.

8. Pay special attention to vocabulary words or boldface type in the textbook.

9. Make a written outline of the material in the text, or just take notes. Most textbooks are outlined for you, with key topics and subtopics in different size or color print.

10. Think back on what points the teacher emphasized in class. If appropriate, ask the teacher how many points will be devoted to each topic covered by the test.

11. Try mnemonics, which are devices to help you memorize large amounts of information. For instance, "ROY G BIV" is the mnemonic for the colors of the visible light spectrum (red, orange, yellow, green, blue, indigo, violet). "King Phillip Came Over For Good Spaghetti" is a mnemonic for the scientific classification levels of living things (kingdom, phylum, class, order, family, genus, species).

12. Another memorizing tactic is association, which is associating mental pictures to the material and then linking the pictures together. "My toe says, 'The professor met an ant on a television interview,'" could be used to memorize the phases of cell division, called mitosis. (The phases of mitosis are prophase, metaphase, anaphase, telophase, and interphase.)

TEST-TAKING TECHNIQUES

1. Always put your full name and class period on the test paper or answer sheet.

2. Answer first the questions you know and the ones requiring quick answers.

3. If there is an answer you are afraid you might forget, do that question immediately.

4. Keep an eye on the time. Budget your time, allowing more time to answer essay questions or other questions that are worth many points.

5. In true-false tests, long statements are often true. (A teacher trying to be as specific as possible tends to lengthen the statement.) Words such as *only, never,* and *always* often indicate that the statement is false. Words such as *often, sometimes, probably,* and *usually* often indicate that the statement is true.

6. For multiple-choice questions where you don't know the answer right away, rule out two of the possible answers immediately, and then choose between the remaining answers. Often, distracters such as *all of the above* or *none of the above* are not the correct answer.

7. Go with your first guess or instinct if unsure between two answers. You will usually be correct.

8. For matching sections, use the process of elimination like you do with multiple-choice questions.

9. For essay or short-answer questions, organize your thoughts before you write, and answer only the question that is being asked. Do not write down every piece of information you think you know about the subject and risk giving incorrect and inappropriate information.

10. When you are finished with the test, check the entire test to be sure you haven't skipped any questions.

11. There is no substitute for knowing the material. Prepare yourself thoroughly for the tests. This includes paying attention in class, studying outside of class, and, after struggling on your own, asking for help when needed.