**How can I better study for Science Class?**

It never fails that immediately after progress reports go out in the 1st grading session that I have a small mob of students in homeroom telling me with exasperated finality, “I study hard for your tests, but I still can't get a good grade!”

To which, my reply most often is, “There is a difference between studying hard and studying smart.” If I needed to get into my classroom, the hard way would be to break the door down with my shoulder….but it's much easier to use the key and the door knob (and less painful in the end).

Studying is a very personalized habit. The same techniques do not work for every person, but there are a few pieces of advice that I can offer that will hopefully apply to most of you, or at least get you started in the right direction to establish your own study habits.

I myself faced this dilemma when I was in college. I didn't come across the need to study during my middle school and high school years. In middle school, if you pay attention in class, you'll do well on tests. The same doesn't quite apply to high school; high school is all about study skills, and as a result, I floundered in the early semesters. I wasn't alone either. I witnessed the most genius of students playing "second fiddle" in grades to students who had developed good study habits.

Before you can really start studying, there is some prep work you need to accomplish. (1) You should have already read any and all assigned text book pages and (2) written down all assigned vocabulary words. No, reading a chapter in the book is NOT studying; its reading. You can read a chapter over and over and over again and still perform badly when given a test on the information…because you've only read it, you didn't learn it. (Think about it...Just because a student reads a law book, that does not make them a lawyer).

Also, before you start studying you should establish a study schedule. Studying is MUCH more effective if you do it numerous short sessions rather than one or two long ones. Human brains are very good at remembering the beginnings and ends of things. If you want proof, try this: Have a friend read a list of 20 or so numbers to you. Then, try to read them back by memory. Odds are, you'll be able to come up with the first few numbers and the last few numbers, but the ones in the middle will be fuzzy and confuddled.

The same concept applies to study sessions. If you sit down and study for an hour…odds are you're only really going to remember the material you looked at in the first and last 10 minutes of that hour…that means that over ½ of your study time was wasted!

So, instead of waiting and studying for 4 hours the night before a test, you‟d learn more if you studied for 20 minutes at a time every day for 5 days leading up to a test (and it takes less time too).

So, now onto what and how to study… Vocabulary is the absolute foundation of studying for science class. You will learn more vocabulary in a year of science than you will in a year of a foreign language (or English class for that matter). It's a basic fact, if you don't know what the words mean that the book and the teacher are using, you'll never be able to understand the meaning of the concepts found within. If you don't learn the vocabulary, I may as well be talking in Greek or Russian…you'd get the same amount of meaning from it. So, what's the best way to learn vocabulary? In my opinion: Flash Cards. Check out the document about Mr. Kelly's Super Duper Fantastic Full Brain Flashcard Technique. 

Once you know the vocabulary you can move onto learning the concepts. The best way to start this is to organize the information into some sort of an outline and/or a flowchart. So, head back to your text and your notes and try to pull out the biggest ideas. In science, this is usually easy because most books give you the big idea at the start of each chapter section. (Mr. K also gives this to each day...It's the big question that you write down in your planner). Under the big ideas, write the important items you need to know about that idea. It is MUCH easier to study a "boiled down" set of organized information than a page full of text. Here's an example of what this might look like: (this outline covers 20+ pages of your textbook)

**UNIT 3: LIVING THINGS (PART 2)**

A. PIONEERING PEOPLE: Robert Hooke & Anton von Leewenhoek

B. CELL THEORY

1. People behind the theory: Schleiden, Schwann, & Virchow

2. Three parts of the cell theory

a. (1) All Living things are composed of cells

b. (2) Cells are the basic unit of structure and function

c. (3) All cells are produced by other cells.

C. STRUCTURE OF CELLS

1. Compare & Contrast: **Plant** vs. **Animal** cell characteristics

2. Know all the organelles and how they function together

D. CHEMICALS IN A CELL

1. **Organic** vs. **Inorganic**

2. Chemicals Needed for Life

a. **Carbohydrates**

b. **Lipids**

c. **Proteins**

i. **Amino Acids**

ii. **Enzymes**

d. **Nucleic Acids**

i. **DNA**

ii. **RNA**

e. Water

Lastly, if you are studying for an exam, go back over all the old quizzes. At least 80% of an exam is usually questions taken directly from the old quizzes….so, if you study using questions from those quizzes you'll be more prepared to answers similar questions on the exam. (There will be a quiz each Friday). Keep in mind though, DO NOT just try to memorize the quiz questions and answers – you need to understand “why” the answers are correct. The best way to do this is to read the questions aloud and follow each answer with a “BECAUSE…”. Exam questions can be similar to quiz questions, but are rarely exactly the same (eg. Often opposite vocab terms are used: heterozygous/homozygous, heterotroph/autotroph/chemioautotroph, chloroplast/mitochondria, solute/solvent, etc.). This is the reason why we have DCN'S.

Also, don't ignore incorrect answer choices on quizzes when you study – at least one of them is meant to be a "distracter", an answer choice that targets a misconception. If you can explain the right & wrong answers to every single answer on the quizzes to a parent or friend, you will have mastered the material and be immeasurably prepared for the exam.

So, to reiterate: **(1) set up a study schedule that contains many short study sessions, 10 minutes per day (2) learn your vocabulary using flashcards, (3) Outline the ideas and concepts from your notes and your book, and (4) study questions from your old quizzes.**

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