STUDY AND EXAM STRATEGIES
IN SCIENCE, MATH, AND TECHNICAL COURSES

From LSS Tutors: (Doctoral, Master's and Undergrads in chemistry, computer science, biochemistry, chemical engineering, and operations management.)

1. There is often one large premise from which everything else is derived. Look for it, find it, learn it. We have to make the connections between the parts and the larger whole. Operational definitions help take it to a different level.
2. Go back between notes PLUS the text, looking for ways in which they intersect, complement each other, etc.
3. Whenever there's a reference, track it down and look it up, even if it's from last semester. It makes our learning active and helps us make connections.
4. Notes, chapter summaries, headings, etc. give us the info to make lists of which topics we must know.
5. Math and Chemistry: take the information apart; play with it.
6. It starts out in a big lump and we have to refine it into smaller parts, or distill it into something more precise.
7. The essence of success is critical (thorough) thinking.
8. Study groups are good for clarifying concepts and asking questions.
9. Have you gone through the whole exam prep packet?
10. Know and make diagrams.
11. With new problems, write in each part what questions will be needed.
12. Do different problems using the same method and the same questions.
13. Work so many problems that they no longer intimidate you, and you can be flexible in your thinking.
14. Works so many problems until you know the equations thoroughly.
15. Work problems several ways (backwards, too) so you can catch your mistakes.
16. Understand the core equations.
17. Using it somehow makes memorization easier.
18. Use flashcards.
19. Mnemonics (Memory tricks)
20. **Study groups**:
    - If you're making mistakes, you probably won't catch them on your own.
    - Study groups help catch incorrect thinking.
    - If you get together for three hours, don't be upset if you goof off for some of the time.
    - Having fun helps give balance and perspective.
    - Find things to laugh about.
21. Don't expect or demand that you learn every single thing. Give yourself some slack.
22. **Graphs and Charts**:
    - Make sure you understand the underlying concepts on the axes.
    - Explain it out loud.
    - Explain it to someone else.
    - Explain it in words and concepts that mean something to you.
        - Look for anything that's different. That's where the problem is.
        - Look for variations.
        - Notice the clusters
        - What is the purpose of plotting this?
        - What are we trying to detect?
        - If the process is out of control, it needs to be changed.
        - If it isn't, leave it alone.
        - What am I trying to figure out?
    - What does slope mean?
        - Is this increasing or decreasing?
    - What kind of equations am I going to use to describe this graph or chart?

From "Becoming a Master Student" (Ellis):

1. Practice. Work lots of problems. Make up your own. Use a study buddy, and make up problems for each other.
2. Divide the problems by type. Make a list of the different kinds of problems and note the elements of each. By dividing problems into type or category, you can isolate the kinds of problems you have that are difficult for you.
3. Know your terminology. See if you can state the problem in your own words. Translate equations into English sentences. Use flash cards to study special terms.
4. Understand formulas. If you understand the basic concepts behind the formulas, it is easier to recall them accurately. You can probably recreate the formula if you recall falters.
5. Use summary sheets. Groups of terms or formulae can be easier to memorize if you list them on a sheet of paper or put them on 3x5 index cards. Mind map summary sheets allow you to see how various kinds of problems relate to one another.
6. Play with possibilities. There's not usually one "right" way to solve a problem. Be willing to think about it from several angles.
7. Read it out loud to yourself.

- **Challenge your assumptions about how much you must learn.**
- **What are your department's requirements?**
- **If you are worried about this all the time, check with a friend, LSS, or CAPS, about how you can lessen your anxiety and stress level. It is possible to do that.**

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