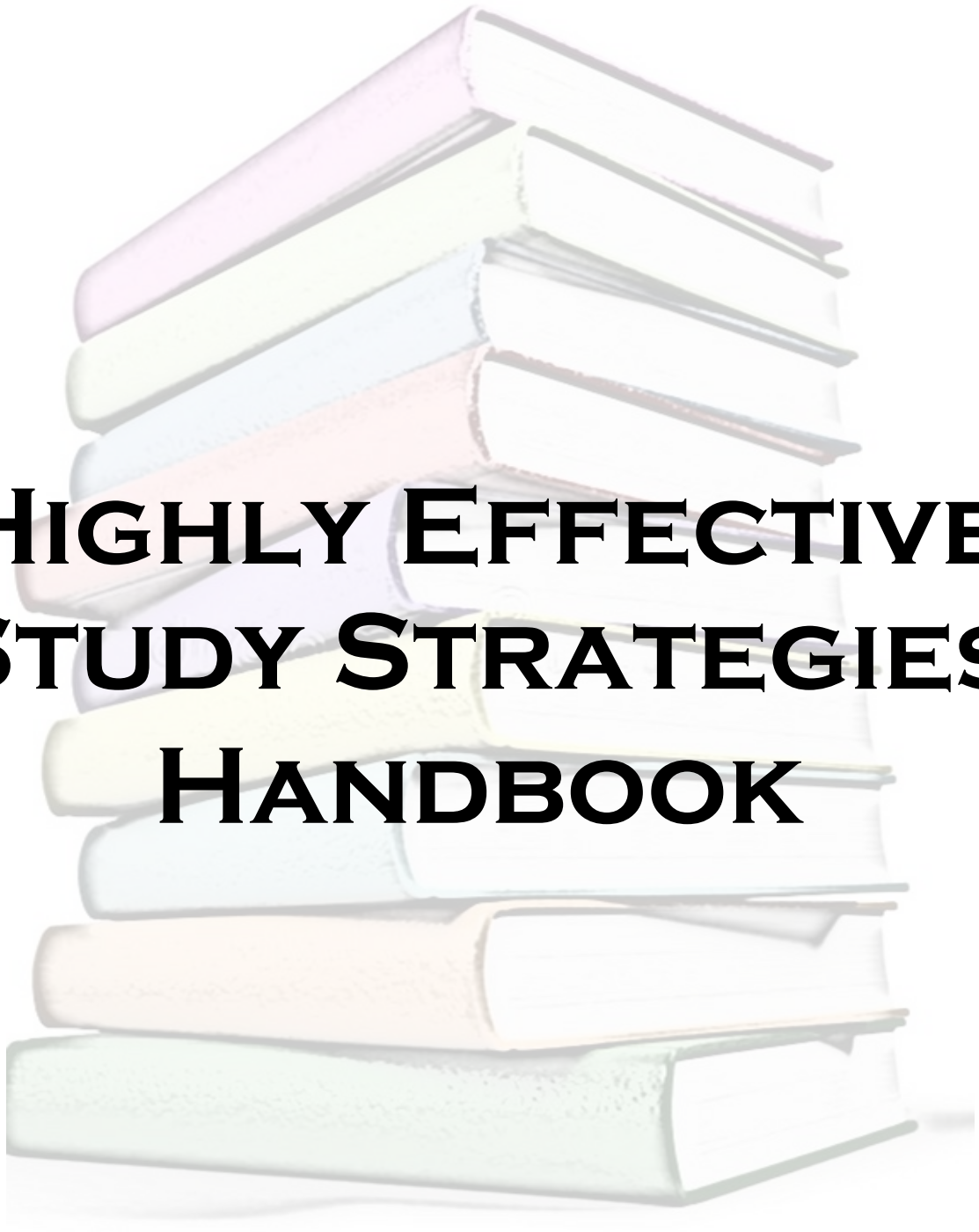

Highly Effective Study Strategies Handbook

Adapted by CGCC's Title V Project from:
Loveless, Becton. "Study Skills for Students", January 2024, Education Corner, https://www.educationcorner.com/study-skills/. Accessed 3 July 2024

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Ten Core Habits of Highly Successful Students

Learning and consciously applying the following ten habits can significantly improve academic performance, allowing students to work smarter and not harder:

1. **Don't cram all studying into one session** – Cramming everything right before an exam may help with grades but it is an ineffective long-term memory retention. Research shows that spacing out several study sessions over longer periods improves long-term memory and overall academic success.

2. **Plan when to study** – Successful students use a weekly study schedule to remain on top of work to ensure developing habits that enable long-term success A study plan helps in the management and achievement of learning goals.

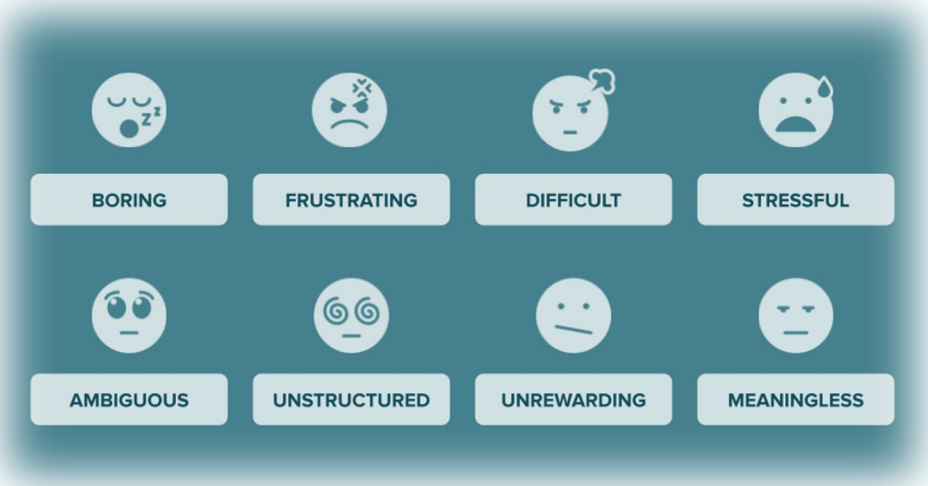
3. **Be consistent about study time** – Creating a consistent, daily study routine prepares the student mentally and emotionally for more productive study sessions. The power of consistency allows the student to rely less on intensity, which means fewer late nights and fewer moments of overwhelm and panic, which is good for mental health. Motivation increases, and so will productivity. These are some strategies to stick to a routine:

    - **Prepare a timetable** – Making a realistic timetable and displaying it in a place of study aids in time management, which research shows to have a direct positive impact on academic results.
    - **Exercise and meditate** – Physical exercise helps maintain good health and a fresh mind, while meditation helps reduce stress and anxiety.
    - **Reward yourself** – Following the timetable deserves a reward (i.e., taking a break from studying). Doing so will motivate students to remain consistent.
    - **Take breaks** – Taking breaks can increase productivity rather than decrease it. Avoiding activities such as scrolling through social media or surfing the internet is critical. Taking a short walk, exercising, having a healthy snack, or speaking with someone are better choices.

4. **Each study period should have a specific goal** – Simply studying without direction is inefficient. Setting goals clarifies what needs to be done. It helps to focus attention and effort while avoiding distractions. Reaching a goal boosts confidence in abilities, enhances motivation, and sets the student up for further success. Here are some best practices:
    - **Set optimally challenging goals** – goals must be such that they push the student to achieve them, but at the same time, they must not be so hard that they demotivate.
    - **Make goals specific, measurable, and time-bound** to indicate what will be done exactly, how to measure it, and by what time it must be completed. "Memorize 30 Spanish vocabulary words in 60 minutes to ace the Spanish test." is a good goal example.
    - **Set mastery goals** – goals must focus on deeply understanding concepts and skills to help in long-term learning that exceeds far beyond exams and grades.

Don't procrastinate a planned study period – It is a tough habit to break, particularly when the Internet allows students to escape frustrations with the click of a mouse. Procrastinating can have negative effects – waiting until the last minute makes studying less effective and affects mental health by increasing stress and anxiety. Procrastination results from the emotional part of the brain taking over the logical side. Here is what can be done to give the logical brain the upper hand:

- **Identify triggers**: One of these triggers can lead to task procrastination:



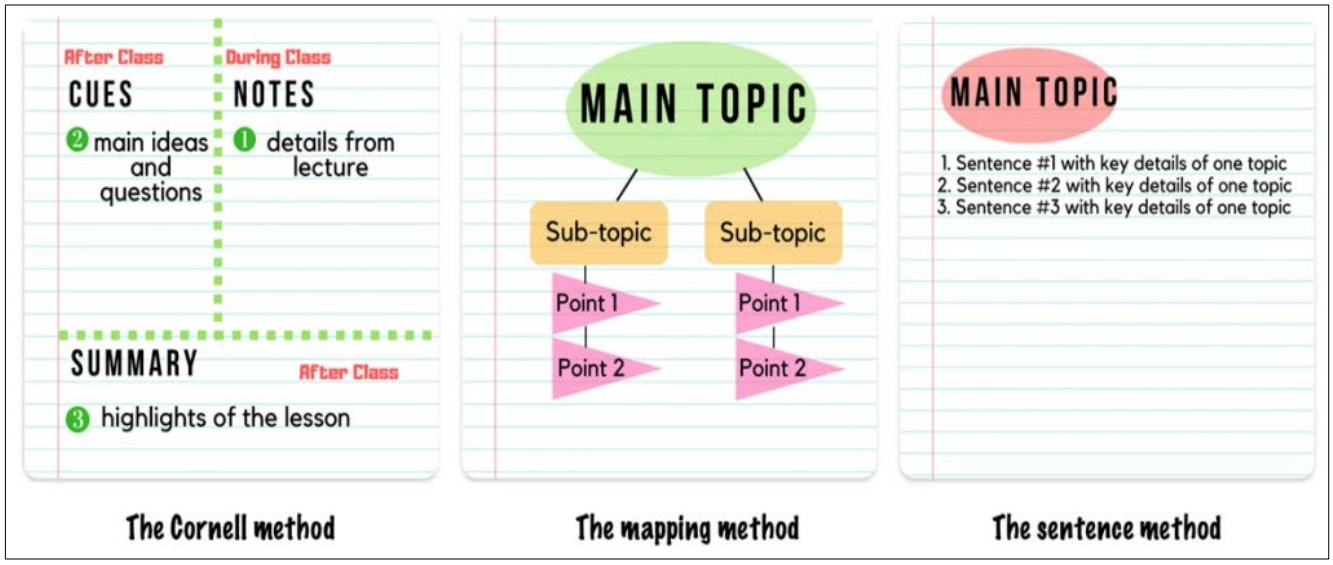
- **Reverse the trigger -** Consider which triggers set off the study time. Then, try to think differently about the task – visualizing completion makes the task less dreadful. For example, if studying history through plain reading can be boring, make it interesting by drawing a timeline with important events and characters.
- **Do something to get started, anything -** Tasks that induce procrastination are rarely as bad as imagined. It's easier to keep going after overcoming the initial hump of starting it in the first place. Starting a task means further processing, making the student more likely to resume the work later.
- **List the costs of procrastination** and what it would cost to postpone something.
- **Disconnect -** Cut down the distractions that affect focusing on the task, i.e., silence the phone or put it in another room.

5. **Start with the most difficult subject first** – The student's most difficult assignment or subject will require the most effort and mental energy; hence, start with it first. Research has shown that when tired, the brain saves mental energy to help make decisions quickly. By completing the most challenging part of studying in a fresh state of mind, completing the easier ones later becomes easier. This can significantly improve the effectiveness of study sessions and academic performance.

6. **Always review notes before starting an assignment** – Research shows that 10 minutes of review for every lecture hour, done within 24 hours of class, dramatically improves recall. Hence, regularly reviewing class notes is one of the most powerful study strategies. Before reviewing notes, there must first be notes to review. While there is no single right approach to note-taking, the following

are some of the most popular ones:

- **Cornell Method -** Split up the paper into three sections (see image). The first aspect requires writing out notes during class as heard. Once class is over, reread the "Notes" section and add any questions or essential ideas within the "Cues" section. Once the two sections are filled, write a summary of the lesson. This method creates neatly organized notes from each lecture by exam time.
- **Mapping Method -** Allows a visual representation of notes in a way that shows the relationships between ideas. Start by jotting down the lecture's main idea and add subheadings throughout the class. By the end, there should be a main topic with many subheadings and additional notes beneath them.
- **Sentence Method -** A Simple method that requires a main topic followed by notes in sentences or point form. The heading creates some organization while allowing for freedom.



While these three are time-tested pen-and-paper methods (more details can be found in the Note-Taking Methods for Better Learning section on page 18 of this handbook), students can also use electronic devices for note-taking. Apps like Evernote, Microsoft OneNote, or Google Keep can help with organization and note-taking.

7. **Find a good place to study, void of distractions** – Distractions make students lose their train of thought and become unable to focus, both of which lead to prolonged learning time due to the need for reacquaintance with material, induce mental fatigue from constant task-switching, and reduce long-term memory retention. Before starting, find a place where distractions or interruptions would be minimal. For some people, this is a quiet cubical in the library, and for others a common area with some background noise. Also, it is important to find a comfortable spot, well-lit and that does not lead to any physical discomfort. Having all the necessary study materials in the study area is also a good idea. Wherever the place, find a consistently available location.

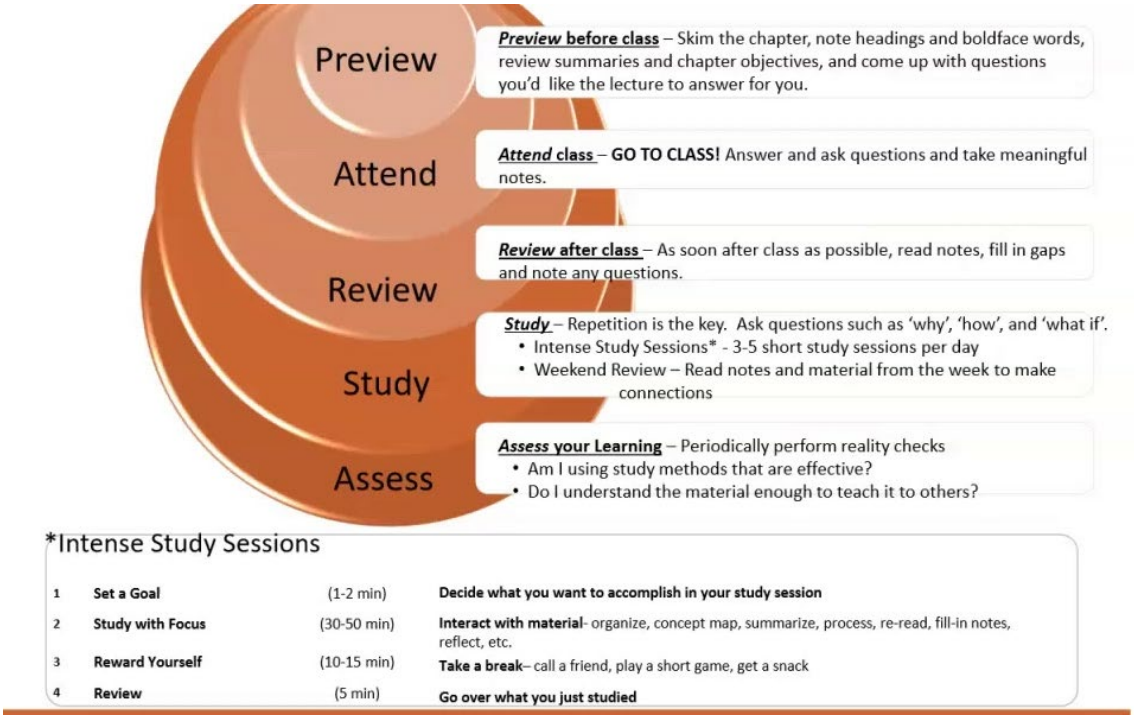
8. **Use study groups effectively** – Working in groups enables a student to get help from others in understanding a concept, completing assignments more quickly, and teaching others, thereby helping both the others and the self to internalize the subject matter. However, study groups can become very ineffective if they're not structured and other members are not prepared. These are some best practices for forming effective study groups:
    - **Limit the group size** – in larger groups, it becomes increasingly difficult to keep everyone involved. Typically, 3-5 students can ensure a good functional dynamic.
    - **Have a structure** – define the goals for every session and stick to them.
    - **Come prepared** – it is much easier as a group to help each other if each member comes to the session with a list of questions or topics to discuss.
    - **Empower each other** – Don't hesitate to help classmates. Tutor-tutee relationships are mutually beneficial. Teaching the subject helps you learn it better.
    - **Quiz each other** – Quizzing each other on facts and concepts is a valuable way to prepare for an exam. This could also mean designing practice tests together.
    - **Work independently but together** – students working on their own before meeting as a group, makes group time will be more rewarding.
    - **Form friendships** – connections can leave the student feeling more motivated than ever, making studying enjoyable.

    Online tools are great ways to connect when the group cannot meet in person.

9. **Review notes, schoolwork, and other class materials over the weekend** – Research shows that academic success is positively correlated with weekend study time. Tips:
    - Plan your weekend study time on or before Fridays
    - Budget time for enjoyable activities
    - Balance your sleep and energy
    - Wake up early enough on the weekend to have enough time to study and still enjoy yourself

The Study Cycle Approach for More Effective Learning

The study cycle is a 5-step technique to learning that reinforces new content and builds confidence.



Step 1: Preview – Preview text and other study materials before class to develop a big picture of what will be covered. Skim through the chapter, noting all headings, subheadings, bold words, graphs, pictures, and summaries. Once the big picture has been developed, it will be much easier to remember and learn the details.

Step 2: Attend – Missing even a few classes can be detrimental to the learning process, especially in subjects such as math. Combined with previewing, attending class will allow the student to get more from lectures and take better, more concise notes.

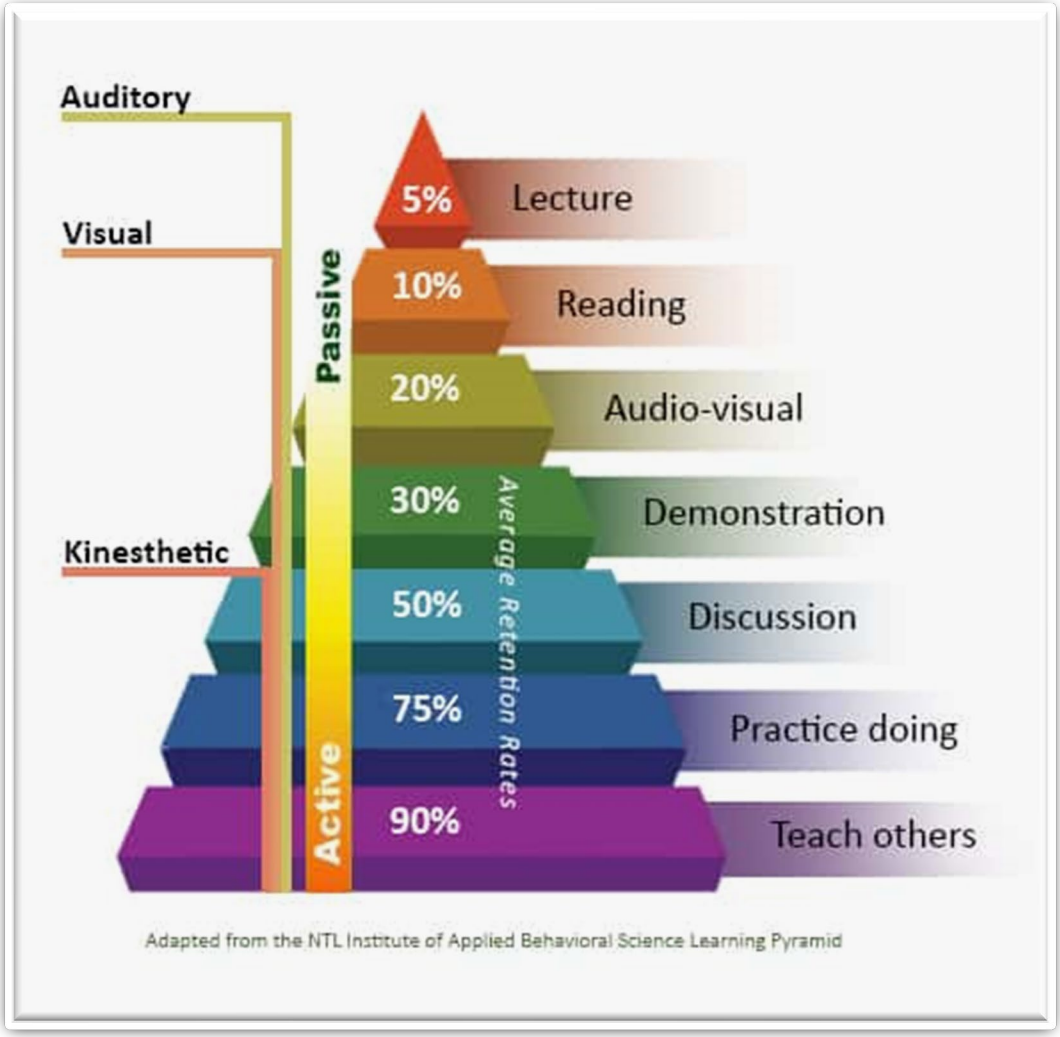
Step 3: Review – Take about 10 minutes to review class notes, preferably right after class, but at least sometime during the day. This process of review transfers the information learned during class from short-term to long-term memory. It also reinforces new concepts and increases confidence.

Step 4: Study – To reinforce the new material learned during class, and to ensure a thorough understanding of the subject matter being taught, take about 30-50 minutes to review notes, read the textbook, work problems, make concept maps, or form a study group. Repetition is the key.

Step 5: Assess – Assessing your studying is an essential aspect of learning. Ask, "Is the information I'm studying making sense?", "Am I confident with the new material?", "Do I understand the material well enough that I can teach it to someone else?"

Effective Study Methods and the Learning Pyramid Model

The Learning Pyramid model below suggests that some methods of study are more effective than others and that varying study methods will lead to deeper learning and longer-term retention.



- **Lecture** – "Lecture" is a passive form of learning and one of the most ineffective for retaining information. However, for auditory learners, lectures are most effective when the student arrives to class prepared, actively participates in class discussions, and takes good notes.

- **Reading** – Reading is still one of the least effective methods for acquiring and retaining information, but not always so for visual learners. Practicing effective reading strategies such as the SQ3R improves the ability to retain and recall read material.

Audio-visual –The audio-visual learning method may incorporate various audio-visual learning/teaching tools including videos, sound, pictures, and graphs. The effectiveness of audio-visual learning and study methods are enhanced when combined with other, more active forms of study such as demonstration and study groups.

- **Demonstration** – ***Demonstration***, along with ***Group Discussion***, ***Practice by Doing***, and ***Teaching,*** is one of 4 study methods that involve active learning, and hence effective especially when information is ambiguous or confusing.

- **Group Discussion** – It is also an active study method that can lead to greater retention of information of study material as it stimulates student thinking, and increases participation and engagement.

- **Practice (by) doing** – Practice by doing is one of the most effective methods for greater retention and better recall, encouraging students to take what they learn and put it into practice, thereby promoting deeper understanding, and moving information from short-term to long-term memory.

- **Teach others/Knowledge Sharing** – The key to subject mastery is teaching it to others, allowing for about 90% of what is being taught to be retained. When able to accurately and correctly teach a subject to others (through study groups and peer tutoring), there is increased mastery of concepts, superior retention, and recall.
- **Principles of Learning Retention:**

Principles of Learning Retention:

1. **Active engagement –** Students retain information better when they actively engage in the learning process through activities, discussions, and application
2. **Repetition and practice -** Repeated exposure and practice of learned material help reinforce memory and enhance retention
3. **Chunking -** Breaking down complex information into smaller, manageable chunks can aid retention and facilitate understanding
4. **Spaced repetition -** Distributing learning and review sessions over time, with increasing intervals between sessions, promotes long-term retention
5. **Visual aids and multi-modal learning -** Incorporating visual aids, multimedia resources, and multi-modal approaches (e.g., combining text with images or audio) can enhance comprehension and retention.

Conclusion – Each of the learning methods presented in the Learning Pyramid is important. Multi-modal learning explains how engaging with content in multiple forms improves learning – be it through kinesthetic methods such as talking about the material with another person, working out problems, re-writing notes, developing new examples, or relying on audio-visual methods like video watching. Engaging with content in different modalities requires the student to pay attention in different ways, which only deepens understanding and recall.

Strategies for Building Effective Study Groups

Benefits of Joining a Study Group:

- **Improved notes –** Comparing notes allows students to fill in any information or important concepts missed during the lecture.
- **Support system –** Joining or forming a study group is a great way to give and receive motivation, and support, and obtain class notes due to an absence.
- **Cover more material –** A group can decide to assign topics to individual group members to research and study and then provide a summary for the group.
- **It makes learning fun –** Studying in a group environment can make learning more fulfilling and enjoyable.

Recommendations for forming effective study groups.

- **How many –** It's recommended to keep study groups between 3 to 5 people. In bigger groups, some members do not contribute as much, and socializing and organization can become a problem.
- **Who –** The most effective study group is composed of members with the common goal of earning good grades. Sometimes it's advantageous to select group members with unique talents or knowledge.
- **Where –** It is best to study in environments without distractions and areas where group members can communicate freely.
- **How long –** It is best not to study more than 2 to 3 hours at a time when studying in a group, as longer sessions can lead to socialization.
- **When –** If planning on meeting regularly with a study group, organize sessions at the same location and time. Having the study group meet at the same time each week allows students to fit it into their permanent schedule and come prepared for the work.

Strategies for Maximizing the Value of Study Group Sessions

- **Create clear objectives and goals –** Before each session, group members should discuss what they hope to achieve, so the session is productive and stays on track.
- **Be prepared –** Group study can be very ineffective if individual members come unprepared for sessions. Each member of the study group should review lecture notes, complete select readings from the textbook, and identify specific subjects to study.
- **Ensure participation –** Every member of a study group should actively participate. A great way for each member to contribute is to assign specific topics and have each member instruct the group. Teaching is a great way for individuals to retain information.
- **Stay focused –** Before each session, someone should be assigned to manage it. The person charged for leading a session must ensure it is productive, stays on track and all necessary material is covered. The person responsible for managing the session should also schedule breaks to avoid getting burned out.

Goal Setting and Academic Success

Setting realistic goals and accomplishing goals is the key to achieving and maintaining academic success. Ultimately, goals should provide direction and motivation to succeed academically.

There are generally two types of goals, short-term goals and long-term goals.

- Short-term goals are goals to be achieved soon (i.e., in a week or two).
- Long-term goals are to be achieved down the road (i.e., by the end of the term.)

If goals are not clear, or measurable, the effort put towards achieving goals will lack direction and focus. In preparing for academic goals, follow "**The Three W's of Goals**".

The Three W's of Goals

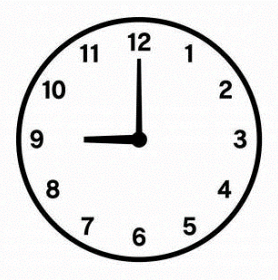
1. **WRITE –**The number one key to accomplishing any goal is committing the goal to writing. Writing goals down forces the person to clarify what is to be accomplished and provides the motivation to take action steps toward achieving those goals.
2. **WHAT –** Vague goals that lack focus and are not measurable, are ineffective and difficult to accomplish. Each goal set should state exactly what is to be accomplished.
3. **WHEN –**Goals without deadlines are not realistic and are far less likely to be achieved. Setting a realistic deadline forces the student to think about what it will take to accomplish the goal, helps prioritize what work must be done to achieve the goal, and pushes the student to stay on pace so that the goal comes to fruition.

An example of an appropriate goal might be the following: *I will begin researching topics for (what you will do) my psychology class by October 3 (when you will accomplish the goal).*

Good goals are S-M-A-R-T:

1. **Specific** – *Write* your goal, *What* is going to be accomplished, and by *When*
2. **Measurable -** A goal to improve performance in Math is an example of an ineffective goal. Setting a goal to get an A on the next Math exam to move the grade from 75% to 83% is a measurable goal that is achievable and realistic.
3. **Attainable** - Make sure the goals set push the student to excel but are well within his/her skill set and ability to accomplish.
4. **Relevant and Realistic -** Setting a goal to get straight A's when approaching the end of the semester and failing most classes may not be realistic. A realistic goal may be to pass all classes.
5. **Timely but Flexible**. Rigid goals that cannot be modified if circumstances change are ineffective. Better to set goals that allow the achievement of some success even if the entire goal cannot be achieved.

Effective Time Management: The Basis for Academic Success



Carefully manage study time daily, weekly, and throughout the semester to improve academic performance.

Step 1. Prepare a Term Calendar – Before getting heavily involved in studies or other activities, prepare a calendar that covers the entire term at the start of each new term. The term calendar can look like a regular monthly calendar or it can employ a different format. Regardless of the format, the term calendar should outline the following:

1) Assignments with their due dates
2) Tests with their dates
3) All college activities
4) All extra-curricular activities

Step 2. Prepare a Weekly Schedule – Unlike the term calendar, which is planned in its entirety at the beginning of each term, the weekly schedule is prepared no later than on Sunday of every week with updates as the week progresses and new items arise. To prepare the weekly schedule do the following:

1) Write down on the calendar each class for each day of the week
2) Take a look at the term calendar and write down on the weekly calendar items that need to be completed, or are occurring that week (i.e., assignments, tests, events, etc.)
3) Review all class notes and your schedule from the prior week to see if anything is carrying over that needs to be added to this week's schedule.
4) Add to the weekly schedule any extra-curricular activities during the upcoming week.
5) Note the day and time for each assignment, study session, workgroup, or project that requires completion or participation during the week.

Step 3. Prepare a Daily Schedule (TO DO List) – Successful students also prepare a daily schedule. Each evening, prepare a daily schedule for the next day. Place a checkmark next to each item to be completed as it is completed. To prepare the daily schedule do the following:

1) Jot down everything from the weekly schedule that needs to be done the next day.
2) Write down everything from the previous daily schedule that wasn't completed and needs to be completed in the coming day.
3) Check the daily schedule for the current day to see if any other activities need to be included for the following day.

One of the keys to effectively managing study time is to start with the big picture and then work down to the details.

- The term calendar provides direction and instruction for accomplishing the big picture.
- The weekly and daily schedules provide the detail required to accomplish everything in the term calendar, enabling the accomplishment of term goals one day and week at a time.

More Time Management Tips – In addition to term, weekly, and daily calendars, other strategies to help accomplish more and make the most effective use of time include:

1) **Prioritizing assignments –**Tackle the hardest subjects first, while still fresh and energized; this makes the remainder of study periods easier.

2) **Breaking it down –** Study topics can be vast, approaching them all at once can be overwhelming, and knowing where to start can be difficult. Think about everything that must be done to study the entire topic and write them down. Then, break it down into small chunks to learn them one at a time. As each is completed, check it off or cross it out. Seeing the list get smaller motivates continued completion.

3) **Finding a dedicated study space –** A key to ongoing time management is to find and stick to a dedicated study space free from distractions to sustain concentration.

4) **Creating blocks of study time –** Have dedicated study time–blocks to focus on studies. Blocks around 40 to 50 minutes are ideal, but may be longer or shorter based on the subject and ability to concentrate. It's okay to take study breaks between study blocks for a snack or to walk around and stretch, but whatever you do, go back to studying after five or ten minutes.

5) **Scheduling fun activities after academic work –** One of the most difficult, yet important, elements of effective time management, is to put academics first. It's easy to think that assignments can get done later, before bedtime, or tomorrow. Putting off less important activities until after completing academic work allows enjoyment of "fun" activities without the pressure of schoolwork looming.

6) **Using helpful resources –** It's critical to rely on the help, expertise, and knowledge of others to assist with the learning process. Instructors, smart friends, tutors, study groups, and even the Internet, are useful resources for tackling complex subjects and making the most effective use of time.

7) **Joining a study group –** Study groups offer several advantages to students, the least of which is the ability to cover more material faster. Working in a study group can expedite learning.

8) **Exercising. Eating healthy. Getting plenty of sleep –**. If not at your peak, you won't be able to focus or concentrate, nor will you have the energy or stamina to complete your studies efficiently.

9) **Being flexible -** Unforeseen obstacles are bound to happen, therefore avoid waiting until the last minute and build in "cushion time" to respond accordingly. After a challenge, get back on track as soon as possible and maintain the monthly, weekly, and daily schedule.

The illustration below recaptures key facts about effective time-management:

MAKE A PLANNER

Block off time for

- Homework
- Project Work
- Assignments
- Test Preparation

DO NOT PROCASTINATE

- Begin Early After School
- Make A To Do List Daily
- Break Down The Larger Tasks Into Smaller Ones

PRIORITIZE

- Prioritize Your Work
- Set Time Aside For Important Projects
- Set Realistic Goals

DO NOT MULTITASK

- One Task At a Time
- Take Short Breaks
- Stay Away From Distractions
- Manage Stress

Improving Listening Skills for Better Learning

Attentive listeners tend to be good learners as they not only hear but *effectively process* the information presented to them. The following strategies help students be attentive, active listeners:

- **Listen for meaning** – To decipher messages, determine the central idea being communicated first. Pay close attention to anecdotes, explanations, and other details meant to clarify meaning. Did what was related make sense within the context of the topic or central idea being communicated?

- **Focus on what's important** – Ineffective listeners often attempt to jot down every detail from a lecture. Effective listeners focus on central ideas and jot down details that expand on, or clarify, the central concepts of a lecture.

- **Be prepared** – Not completing the required reading or reviewing notes from previous lectures before class, makes it very difficult to process information and attentively listen to lectures.

- **Be physically ready** – It's easy to get into bad routines in class. Attention may start to drift. Being physically ready starts with sitting up straight and not getting too comfortable. Maintain constant eye contact with the instructor. Good posture and eye contact help with overall alertness and detecting critical information from non-verbal cues and possible changes in voice inflections.

- **Engage with the instructor** – Part of listening includes asking questions when not quite understanding a topic or concept.

- **Don't get distracted** – Put away any unneeded materials and distracting devices, like phones, tablets, and materials from other classes. Avoid missing out on verbal and non-verbal communication that could signal that critical information is being presented.

- **Don't Ignore Sleep and Nutrition** – It is hard to listen when struggling to stay awake. Good, healthy eating can also help the student feel more energized and attentive during lectures.

Improving Memory and Retention

Creating a study schedule and using active learning strategies can significantly improve your memory. The following are other proven memory retention strategies linked to academic success:

- **Make the information meaningful** – To remember new information, mentally summarize the information just learned in your own words. If you are unable to do this, it is a strong sign that you do not fully comprehend the concept you're attempting to learn–and consequently will have difficulty recalling it for future use.

- **Organize the information** – Organizing information into logical categories is one of the most effective ways of improving recall and memory. For example,
    - If trying to memorize vocabulary for a foreign language class, classify words together that have similar meanings or that fall under similar categories. Organized information is much, easier to retain than random information.
    - Chunking" is another organizational strategy for memorizing information. Chunk history by events or periods when events occurred. Chunk foreign language vocabulary into functional groups like items in a house, car parts, or body parts.

- **Visualization to improve memory** – Visualization is one strategy that can be used to remember information that's been read in a textbook or spoken during a lecture. This strategy is especially useful when studying abstract or confusing subjects. To apply this strategy, create images in the mind that relate to, or have similarities to, the abstract concept. Visualization is particularly effective for memorizing systems, cycles, and processes. Visualization allows the creation of vivid, meaningful, and memorable concepts that allow information recollection. Can also use maps, charts, graphs, and pictures to help visualize and remember important material.

- **Active Studying** – One way to be an active studier is to teach the information you are studying to classmates in a study group. Can also critically analyze the material being studied by contrasting it with correlating details, by coming up with questions about what's being learned, or by finding ways to apply what's being learned.

- **Association** – Association is a very powerful memory strategy that allows the brain to connect something it's already familiar with to something new that it's not familiar with. When given a new vocabulary word to memorize, write it down, and then the definition next to it. Now write a familiar person, place, thing, event, or movie next to the word, or combine them in a sentence to create a strong association. For example, "My uncle is an *ardent* environmentalist". (Ardent meaning intensely devoted.)

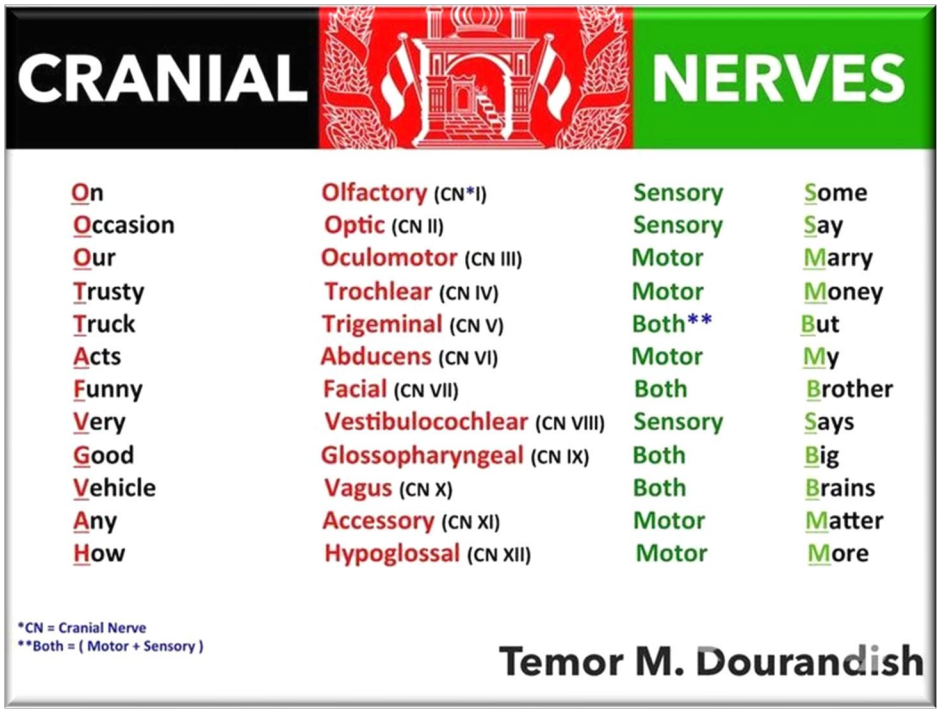
- **Frequent Reviewing** – Although people cram right before tests, it is not an effective long-term

learning or memorization strategy. The key to memory retention is to frequently review notes and other study materials weeks or days before tests. If possible, review notes immediately following lectures and jot down or highlight information that will probably show up on a test. Also, adopt this strategy after completing textbook reading assignments by reviewing the highlighted information and chapter headings.

- **Storytelling** – By integrating data, information, and material into a vivid story to tell, a person can memorize and recall information in any subject. Focus on the key learning points and organize them (within the story) in a logical sequence. Why? Because each event in the story triggers the memory of the next event, therefore the ability to memorize information is as limitless as the ability to create, remember, and tell a story.

- **Talking** – Talking is a very powerful–and underutilized–strategy for improving memory. Talk about what has been learned and need to remember to yourself or a study buddy.

- **Mnemonic devices** – Mnemonic devices work by relating facts with short phrases, words that rhyme, or anything else an individual is familiar with.
    - Rhymes - when a concept rhymes with a favorite or recognizable person or object, use this mnemonic device to remember the word.
    - Acronym - a word composed of the first letters of a list of words. An example of a simple acronym is MADD–Mothers Against Drunk Driving. Want to memorize something and never forget it? Then create a catchy song or put it to a favorite tune.



Note-Taking Methods for Better Learning

Effective note-taking is one of the keys to succeeding in college. Students need to devote a considerable amount of time to reviewing information discussed during class lectures.

The following note-taking strategies help students take better notes:

1. **Come to class prepared** – Students properly prepared for class includes completing assigned reading before class and reviewing notes from previous lectures.

2. **Compare your notes** with the notes of other students after class is over. This strategy will make classroom notes more thorough and precise.

3. **Organize your notes** – Notes organized by date, class, and subject make it easier to locate specific lecture details.

4. **Use abbreviations and symbols** such as "&" (and), "w/o" (without), "e.g.," (for example), and "i.e." (that is) to save time and keep up.

5. **Write clearly and leave space** in the margins and near key concepts to add important details relating to previous lecture topics that are addressed during future lectures.

6. **Review your notes** – To retain information discussed during lectures, it is best to review notes immediately after class. This will help better understand the lecture, and the notes, and it will enable long-retention of what was just learned. Review the notes a second time just before the next lecture.

7. **Write down questions** – No matter how intelligent a student is, from time to time they're bound to get confused and end up having questions unanswered by the lecture. For this reason, it is a good idea to write down questions to ask after class, during subsequent lectures, or seek answers on the internet, from a tutor, or by using reference books.

8. **Avoid Digital Notes** – Research shows that taking digital notes on electronic devices, instead of by hand, actually reduces how much a student remembers. Typing often involves taking verbatim notes, while abbreviated hand-written notes require students to be more selective and more actively engaged in the lecture.

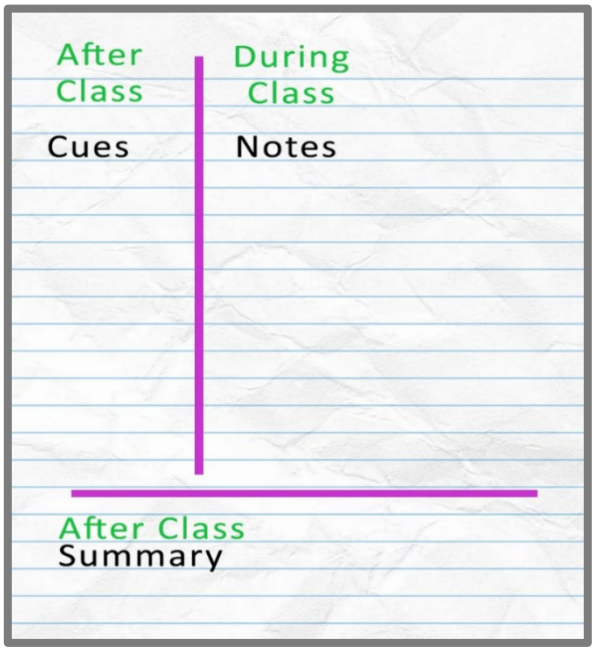
9. **Overlook the PowerPoints –** If the instructor has PowerPoint displays on the screen that are heavily text-based, best to focus on what is being said, synthesize information in your own words, and avoid copying verbatim from the slides. Much like taking digital notes, copying from PowerPoint reduces the amount of effort devoted to engaging with the lecture. To optimize note-taking, focus on the words being spoken, be selective in what notes are taken, and record those notes in physical form. This approach is likely to lead to better memorization and learning over time.

The Cornell System for Taking Notes

The Cornell note-taking system is designed to save time while enabling students to maximize note-taking effectiveness. There is no rewriting, revising, or retyping of your notes. It consists of the following steps:

Step 1 – Divide the paper into two columns

1) Use a large loose-leaf notebook for taking notes. Only use one side of each leaf of paper in the notebook to enable laying out notes to see the direction of a lecture.
2) Draw a vertical line 2 ½ inches from the left side of your paper. This is the recall column of the notes. All lecture notes will be taken to the right of this margin.
3) Later, keywords or phrases can be written in the recall (left) column.
4) Similarly, leave the bottom 2" inches for the summary section.



Step 2 – Take notes in the note-taking column

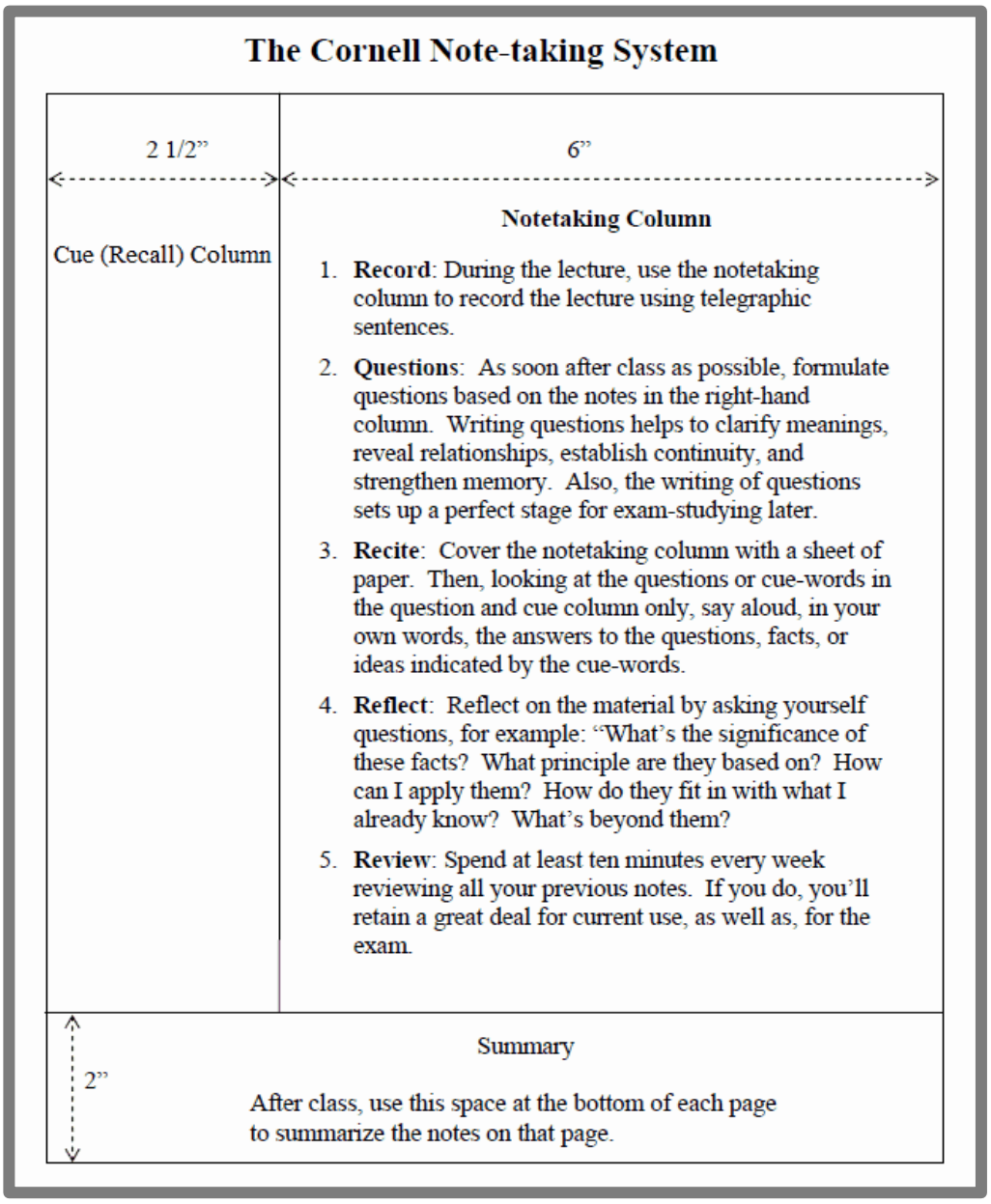
1) During the lecture, record notes in paragraph form in the note-taking column to the right. Capture general ideas and concepts, not illustrative ideas. Use short, telegraphic sentences as much as possible.
    - Example: "In the presence of sunlight, plants convert carbon dioxide and water into glucose and oxygen using a process known as photosynthesis" can be written as "Photosynthesis: plants in sunlight convert CO2, water into glucose and O2."
2) Skip lines to show the end of ideas or thoughts. Using abbreviations will save time.
    - Note down relevant questions and keywords in the recall/cues (left) column to assist with future reviews of your notes.

Step 3 – Review your notes within 24 hours

1) After each lecture, read through your notes. Research shows that 10 minutes of review for every lecture hour, done within 24 hours of class, dramatically improves recall. Make them more legible if necessary.
2) Formulate questions /summaries based on the notes in the right-hand column. This helps clarify meanings, reveal relationships, establish continuity, and strengthen memory. Use the summary section

for this. Reread the lecturer's ideas, reflect on them, and put them into your own words.

3) Cover the note-taking column (Right) with a sheet of paper and recite the general ideas and concepts of the lecture from memory. Overlap the notes, showing only the cues column, and use this for review.



The Cornell Note-taking System

2 1/2"	6"
Cue (Recall) Column	**Notetaking Column** 1. **Record**: During the lecture, use the notetaking column to record the lecture using telegraphic sentences. 2. **Questions**: As soon after class as possible, formulate questions based on the notes in the right-hand column. Writing questions helps to clarify meanings, reveal relationships, establish continuity, and strengthen memory. Also, the writing of questions sets up a perfect stage for exam-studying later. 3. **Recite**: Cover the notetaking column with a sheet of paper. Then, looking at the questions or cue-words in the question and cue column only, say aloud, in your own words, the answers to the questions, facts, or ideas indicated by the cue-words. 4. **Reflect**: Reflect on the material by asking yourself questions, for example: "What's the significance of these facts? What principle are they based on? How can I apply them? How do they fit in with what I already know? What's beyond them? 5. **Review**: Spend at least ten minutes every week reviewing all your previous notes. If you do, you'll retain a great deal for current use, as well as, for the exam.
2"	Summary After class, use this space at the bottom of each page to summarize the notes on that page.

Active Reading Textbook Strategies

Before Reading – Previewing and developing a big picture of a text before reading it will help identify what's important and make retaining details easier.

1) **PREVIEW-** The steps below will help preview a text and enhance comprehension and retention.
   - Review all chapter headings and subheadings.
   - Glance over any pictures, charts, or graphs in the section you'll be reading.
   - Read any bold or italicized words and make sure you understand them.
   - Read the chapter summary.
   - Review any end-of-chapter questions.
2) **QUESTION -** Developing a set of questions to answer before reading a text provides direction and focus. While you're previewing the text, turn each heading and subheading into a question. For example, if the heading is "Root causes of the American Civil War," then your question may be "What were the root causes that led to the American Civil War?"

While Reading – The following strategies help maximize comprehension and retain information while reading textbooks.

3) **REFLECT -** From reviewing chapter headings, subheadings, and bold or italicized words, ask yourself what you've already learned. Now as you read:
   - Answer the questions developed while previewing the text.
   - Try and predict the answers to the questions and find out if your predictions are correct.
   - Develop a picture in your mind of the concepts presented. Visualizing information, concepts, or material presented makes it much easier to remember.
4) **HIGHLIGHT -** As you read through the text, highlight important passages that support central themes and concepts. Be selective. If you're highlighting more than 20% of a passage, you're not being selective enough.
   - As you read, try and identify important concepts and facts that could be likely test questions. Underline and identify these concepts with a "Q" in the margin.
   - Circle with a pencil key terms and vocabulary. Write a short definition for each in your notes or the margin of the textbook.
   - Take well-organized notes on the backside of your corresponding class lecture notes. This way the lecture notes and textbook notes for the same topic will be easy to access and review in preparation for the test.
   - Make visual aids, including, pictures, graphs, diagrams, or tables, to help visualize what you're reading. Visualization is a great way to take information that is complex or difficult and make it easy to understand and remember.
   - Write a summary of the central themes and ideas in your notes. Being able to develop a summary of what you learned will help you master the material and retain the information.

After Reading – What you do after you read a text, can be almost as beneficial to learning and retention, as reading the text itself.

5) **RECOUNT -** Once finished reading a text or passage, try explaining to yourself what you've learned. This is arguably the most effective way to promote mastery of the material and improve retention. Joining a study group is a great way to have the opportunity to share with others what you've learned from your reading.

6) **REVIEW -** Review. And then review again! Within a day of the initial reading, spend 20 to 30 minutes, depending on the amount of material covered, reviewing your notes and the information you learned, reciting the main points and topics. This will move the information from short-term to long-term memory. Each week spend about 10 minutes reviewing your notes and the highlighted parts of your text. Reviewing will make sure you're prepared when test time arrives.

A direct way of applying the reading tips outlined above is to employ the SQ3R Reading Textbook Method explained below.

This method improves understanding, recall, and retention of textbook material.

- **S** = Survey the pages you plan to read.
- **Q** = Question what you intend to take from your study session.
- **3R** = Read, Recall, and Review.

Step 1. Survey

The step provides focus and direction to the reading. Before reading the text, skim through it to get a general idea of the main themes, topics, and concepts

- Identify and read the chapter headings, subheadings, or introductions.
- Notice any graphics, such as charts, maps, or other diagrams.
- Read the chapter summaries and conclusions.

Step 2. Questions

Turn chapter headings and subheadings into questions when surveying the text. For example, the heading "Causes of World War II" changes to "What are the primary factors that led to World War II?" When the mind is actively searching for answers as you read, you stay engaged.

- Write out the questions you develop from chapter headings.
- Examine the questions to find the direction of the text.
- Attempt to answer these questions as you read.

Step 3. Read

After surveying the text and developing a set of questions, read the text paying close attention to the information you already know and that you want to discover. Read for meaning and understanding.

- Seek to answer the set of questions developed in the previous step and add more questions if necessary.
- Take notes in the margins or on a separate piece of paper.

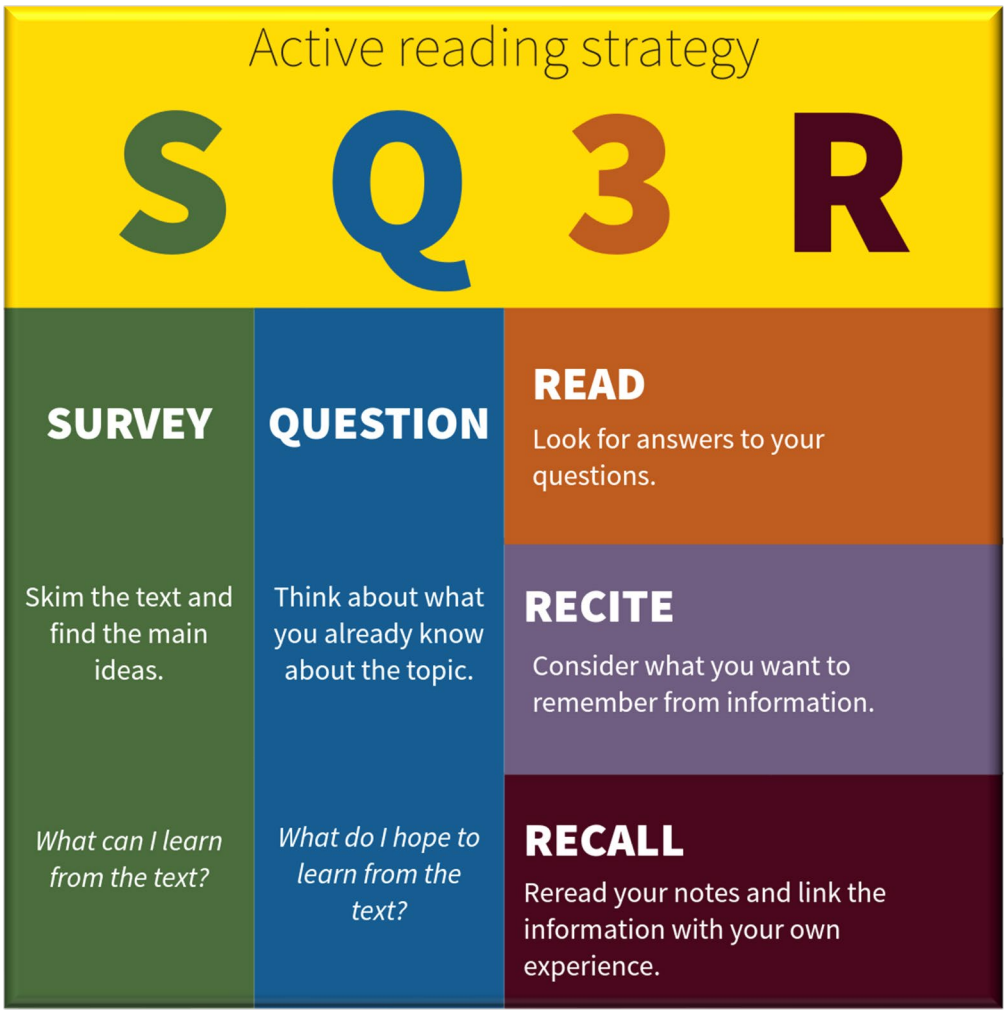
Step 4. Recall

This is one of the most important steps for comprehending, mastering, and retaining information from textbooks. Without referring to notes or the textbook, immediately after completing each section of reading, develop in your own words a summary of what you read, highlighting the most important topics, concepts, and themes. Recall enables you to:

- Make sure you understood what you read
- Transforms information you retained from reading into a usable form.
- Find out what you didn't understand.

Step 5. Review

Go back over the question you developed using chapter headings and subheadings. Can you develop answers to each without relying on the text or your notes? If not, look back over your notes, the answer you wrote down, and the annotation you put in your textbook.



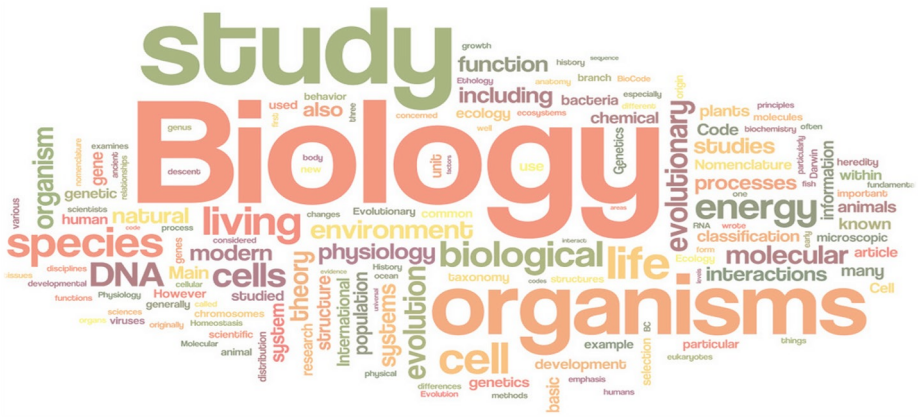
SUBJECT-BASED STUDY STRATEGIES

While general study strategies like time management, reading for comprehension, and note-taking apply to all courses, each subject is unique and requires a slightly different learning approach. Next are specific study skills and strategies as they relate to performance in subjects commonly viewed as challenging.

Effective Strategies for Studying Biology

Learning biology is a cumulative process. Proven tips and strategies for learning biology:

1. **Come to class… and come prepared** – What is learned in one class will create the building blocks for what will be learned in the future. Arrive at each lecture having read the textbook, completed all lab assignments, and reviewed notes from the prior lecture. Students who consistently attend their biology class perform far better than those students who don't.



2. **Don't play catchup** – "Catchup" does not work with biology classes. Making up a lab is difficult. Making up several labs at the end of the semester is impossible… and fruitless. Staying on top of the subject matter and completing assignments on time is key to learning biology.

3. **Go from general to specific** – Make certain to master general concepts before tackling specific ones. For example, before trying to understand the Krebs cycle, there needs to be a basic understanding of animal cell structure. Study each new biological concept and process thoroughly before moving on to the next level.

4. **Take advantage of lab time** – Learning biology theory by reading the textbook or listening to a lecture is one thing, putting biology into practice in a laboratory is a whole different experience. What is learned in the lab will stay a lot longer with the student than what is read in a book.

5. **Use drawings and diagrams** – Biology is full of complex systems and processes that need to be understood, memorized, applied, and reproduced for an exam. Employing imagery, particularly drawings, and diagrams, can make even the most challenging biological processes easy to understand and remember. Employ drawings and diagrams to study biology. It will improve understanding and recall.

6. **Learn the terminology** – Understand the words and terms used to explain biology. When encountering unrecognized words, write them down and then look them up. When words seem to have prefixes or roots, take the time to break them down and understand their parts.

7. **Read effectively… read with purpose** – Reading biology to learn requires much more than gazing over pages looking for main points. Successful biology students attack each reading assignment with a pencil in hand and a notebook at their side, are actively engaged, and read with purpose.

For every reading assignment, write down in a notebook important information, including vocabulary, processes, concepts, and explanations. Writing things down: (1) helps to process and understand challenging material, (2) improves retention, and (3) improves reviewing for exams. While reading, write down the following:

- **Terminology -** Write unfamiliar terms and vocabulary down and then look them up. This is a necessary part of learning biology.
- **Concepts –** For each new concept**,** read the details and read for meaning. Afterward, write about the new concept in your own words to improve understanding.
- **Diagrams and Drawings-** Drawing pictures and developing diagrams to represent and describe the processes and systems read will improve understanding and recall.

8. Learn how to memorize – These are proven tips for memorizing biology information:

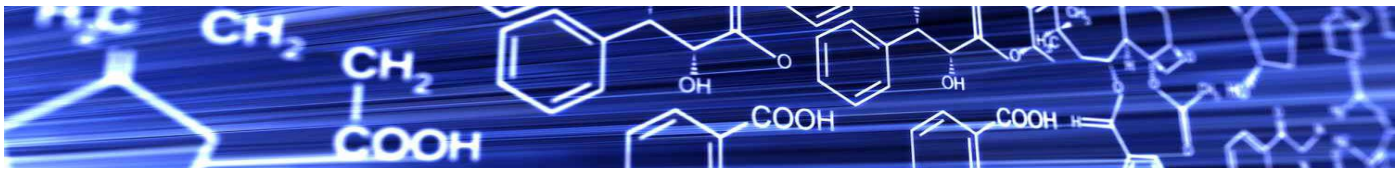
- **Teach it -** There is no better way to ensure understanding than to teach it to someone else. Teaching biology to others moves information from short-term to long-term memory.
- **Use it -** Biology is full of terminology and specialized vocabulary. The best way to learn new terminology and remember it is to use it. With each new term or word, write it down, look it up, and then use it in a sentence. Discuss the new terminology with a classmate or study buddy if possible.
- **Employ mnemonic devices -** The human brain responds to relationships and associations – especially associations of familiarity. Take the time to associate complex or unfamiliar biology terms and vocabulary with familiar words and phrases.
- **Flashcards -** Write terms and concepts on one side of a 3×5″ card and their definitions and descriptions on the other side. This is an effective method to study alone or with someone else.

9. Preparing for tests - Effective methods and strategies for preparing for biology exams:

- **Review past exams** - If available, use past exams to identify major concepts likely to be found on the exam to test the knowledge of the concepts. Past exams will also give an idea of what question formats to expect (i.e., essay, multiple choice, true/false, etc.).
- **Labs -** Review all lab notes, there's a good chance content will be on the exam.
- **Lectures -** Pay close attention to what the instructor finds most important and interesting in class and during labs.
- **Assignments -** Review all assignments for the semester, as exam questions can come directly from completed assignments.

10. Jump in with both feet - At the beginning of the semester, regardless of major, personal interests, or dislikes, biology requires giving it your all.

Effective Strategies for Studying Chemistry



Below are proven strategies and techniques that if applied, improve the ability to study and learn chemistry.

1. **Review and Study Material Before Going to Class** –The best way to learn chemistry is to come to each lecture having already read and studied the material that is going to be presented that day. Why? By arriving at class already familiar with the subject matter, students can follow along better and understand what is being taught, can ask more relevant questions during the relevant lecture, and classroom time is used more effectively as a learning tool.

2. **Take Good Notes** – Attending class regularly and paying attention is important, but it's not enough. It is also necessary to take copious notes. Why?
   - Note-taking forces the student to write things down, which makes it far easier to remember and understand.
   - Taking good notes, and then reviewing those notes, will help determine what needs to be clarified and better understood.
   - Note-taking must be organized. Taking organized notes helps with reviewing lectures effectively and preparing for exams.
   - Note-taking enables the student to participate and contribute to a study group.
   - When taking notes during the lecture, listen and copy down all key verbal points and concepts. Review the notes after class. Use the textbook to improve the notes and understanding of key concepts covered.

3. **Practice Daily** – A key to learning and staying on top of chemistry is daily practice, at least an hour a day. Completing practice problems, solving equations, working formulas, etc. should be the core feature of a daily study routine.
   - When working on chemistry problems, don't look at the answer key unless you have worked out the answers or are completely stumped. Re-read the textbook to gain understanding and clarification before seeking help.
   - If you get a problem wrong, work it again on paper until you're able to get it correct. Make sure you understand each step of the problem and why it is necessary. Once you've been able to figure out the problem, find another problem of the same type and work on it. Continue to do so until you thoroughly understand the concept being taught.

4. **Take Advantage of Lab Time** – There is no substitute for hands-on experience, and there is no better way to get this experience than by attending chemistry labs. Working through chemistry problems and conducting chemistry experiments in a practical environment will strengthen understanding and knowledge of chemistry.

Use Flashcards – Chemistry is full of scientific symbols, formulas, and vocabulary that must be memorized and interpreted correctly. Flashcards are ideal for organizing and studying chemical symbols, formulas, and vocabulary.

5. **Use Study Groups –** Using a well-organized study group is a great way to tackle chemistry. The following are tips for forming effective study groups.
    - Keep groups between 3 and 5 people.
    - All members must come prepared for group study sessions.
    - Include members who are dedicated to their individual success as well as the success of the other group members.
    - Schedule group study sessions at the same time and place each week.
    - Keep study sessions between 2 to 3 hours.
    - Keep study sessions focused. Don't let them turn into social events.
    - Study as a group in an environment free from distractions.

6. **Break Large Tasks Into Smaller Ones –** When studying chemistry, break the material down into smaller pieces, it helps to learn. Once one concept has been mastered, move to the next.

7. **Focus on the Work, Not the Grade –** Learning chemistry requires total concentration. Continually focusing on grades takes away from learning.

Effective Strategies for Studying Computer Science

1. **Don't procrastinate** – Procrastinating is the worst possible thing to do in a computer science or programming class. When receiving an assignment or project, get started right away. That way there will be time to get help from an instructor or someone else if you need help.

2. **Know the math** – Computer science and math go hand in hand - discrete math, automata theory, math-based probability, and statistics. If you don't like math, you may find computer science challenging.

3. **Don't cram** – Computer science requires thought, energy, problem-solving, and time. All-nighters the day before a deadline, whether it be for a project or exam, will not work. Computer science requires staying on top of things and keep working throughout the entire semester.

4. **Don't be a loner** – In computer science, it is important to be self-motivated and work independently, but it's just as important to be able to work as part of a team. Teamwork will be required to work in the field, as codes and ideas are not always going to be right, and working in a team can help. Other benefits of forming a study group and working with a team while studying computer science include:
    - ability to cover more material
    - share knowledge and talents
    - improve notes
    - more effectively study for exams
    - get help with difficult concepts
    - review each other's code for errors
    - make learning fun

5. **Write more than just code** – Really good programmers include consistent and clear comments that make their code more valuable to their team, as well as the companies that employ them. In addition to developing top-notch coding skills, software engineers are expected to write requirements, specifications, and test plans that require strong business and technical writing skills.

6. **Take advantage of all resources available** – The Internet provides thousands of online resources from forums to tutorials to virtual tutors that can help work through even the most challenging computer science problems. Many of the same strategies and skills used to effectively study chemistry can also be employed for studying computer science.

Effective Strategies for Studying English

1. **Read daily** – If you want to improve your ability to read, then read. Spend at least 20 minutes a day reading books, newspapers, online blogs, poems, etc. There is no other activity that will improve your ability to read and write in English faster than reading a little each day.

2. **Don't cram** – Cramming is especially problematic when it causes a student to sacrifice sleep. Students who sacrifice sleep to study more than usual are likely to perform worse academically, not better, the following day.

3. **Get extra help** – If you want to improve your writing and mastery of English, then ask for help from a tutor. Written English is one of those subjects that is difficult to "figure out" on your own and can best be learned from those who've mastered this skill.

4. **Take good notes**, as it is essential to the study of English for several reasons. Why?
   Writing things moves concepts from short-term to long-term memory. It requires active listening which forces you to pay close attention to what is being taught and what's meaningful. Notes can be used to review and prepare for English exams.

Tips for taking good notes:

- Make sure notes are clear and accurate.
- Focus notes on what the teacher indicates is important.
- Come to class prepared and with all assignments completed.
- Compare notes with those of other students.
- Try to avoid distractions (talking with friends, sitting where there is noise, etc.)
- Make sure your notes are organized
- Use abbreviations and symbols for long words to save time.
- Write legibly so your notes are useful to you later.
- Review notes immediately after class and then again before the next class.
- Write down any questions

For more information on taking notes read Note-Taking Methods for Better Learning on page 18

5. **Pay attention in class** – There is a science to English reading and writing, but the subject is also a

bit objective at times. To perform well in your class, learn what the instructor is looking for. The best way to do this is by attending class and paying attention

6. **Take advantage of online study guides** – There are a variety of online study guides designed to help students with English reading, writing, and literature. Some of these include Cliff Notes, Sparknotes, and Jiffynotes, to name just a few.

7. **Form a study group** – Forming a good study group will help by improving note-taking, learning from the knowledge and unique insights of other students, developing a support system, covering more material, and making learning English more fun. The following are a few tips for forming an effective study group.
    - Keep the study group to between 3 and 5 people.
    - Select group members who are responsible and dedicated.
    - Find a study area for the group that is free from distractions.
    - Keep study sessions under 2 to 3 hours.
    - Plan to meet with the study group at the same time and place each week.

8. **Ask questions** – Come to class prepared but when you don't understand something, ask.

9. **Prepare for exams in advance** – Keep up with readings, attend class, take good notes, complete all assignments as assigned, and start reviewing for the exam at least four weeks in advance. Meet with the study group routinely, review notes and essays, and make sure to get a good night's sleep the day before the exam. Avoid cramming at all costs as it causes loss of sleep and adds stress.

Effective Strategies for Studying Math

The study skills needed to succeed in math are unique. Math requires patience, discipline, and dedication.

1. **Math requires active learning** – Math requires actively doing all homework and assignments. While some people think they're just not good at math, most people can do math but must work to become proficient at math. It requires routine studying and daily learning.

2. **Math is cumulative** – Math learning is like building blocks. What is learned one day builds on what was learned previously and is required to support future learning. This is why with math it's so easy for students to fall behind if they miss school or don't complete homework on time.

3. **Focus on the principles** – Math involves so many formulas, equations, and procedures that it can be difficult to remember everything. Don't try and memorize everything. With math, understanding is more important than knowledge.

4. **Learn the vocabulary** – Math has a vocabulary all of its own. Additionally, many commonly used words have different meanings when used in association with math. Take the time to create a math vocabulary log where you note down and define each new math vocabulary term you encounter.

5. **Math grows in complexity and difficulty** – It's not uncommon to spend several hours a day studying math. In this regard, students are not alone.

6. **Note-taking** – Unless otherwise instructed, focus note-taking on key concepts and formulas that are discussed during class, in addition to any explanatory remarks made by the instructor. Take copious notes on formulas or concepts the instructor emphasizes, as these are likely to show up on future quizzes and tests. Ask for clarification during and after class. Make a list within the notes of those concepts that you're struggling with to get additional help. Immediately after class, review your notes. Take a moment to make sure you understand everything you wrote down while the lecture is still fresh in your mind.

7. **Homework is key to learning –** Most people do not understand math instantly after hearing an instructor's lecture. Math learning requires theory and practice. **Homework is most effective when it's completed while the lecture is still fresh in the mind.** One of the biggest problems students have when completing math homework is that they don't read the notes and/or text associated with the assignment and therefore give up quickly. Reading all the instructions and notes before each homework assignment is necessary to complete math homework problems. When completing math homework, always show your work.

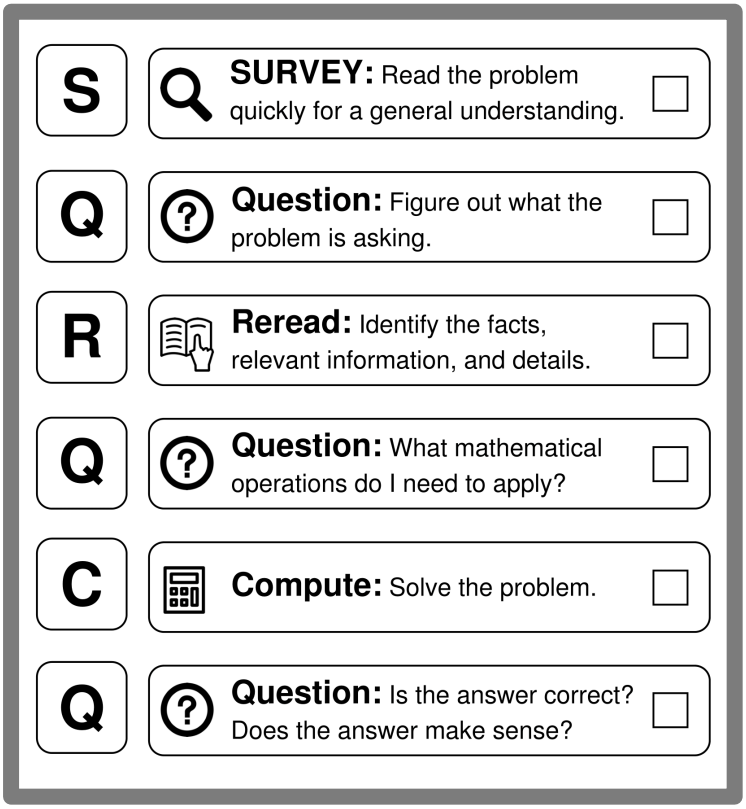
8. **How to ace problem-solving** – The following are tips for how to go about solving math problems.
    - **Read the problem -** Read the problem carefully and make sure you understand what is being asked.
    - **Re-read the problem -** Now read the problem again and note down what you are given and what you're being asked to find.
    - **What is the problem asking for?** Write down in your own words exactly what is the question is asking you to solve or find.
    - **Write down what you know -** Now go back through the problem and write out the information, facts, and figures provided in an organized format.
    - **Draw a diagram -** If applicable, develop a diagram that more fully represents the problem. Drawing a well-thought-out diagram often suggests a solution.
    - **Put together a plan -** Identify any formulas that may help you solve the problem. Figure out what you're going to need to work on the problem. Often there are intermediate steps/answers that you'll need to complete before arriving at your final answer.
    - **Find an example problem -** If you're having a difficult time getting your mind around the problem, try finding a similar problem that you do understand, or that has already been worked out. Work the simpler problem and then go back and work the harder, yet similar, problem.
    - **Carry out your plan -** Once you have a good grasp on what's being asked and what needs to be accomplished, work out the plan. Make sure to show your work, step by step, so your instructor can see your reasoning and logic – and so that you can go back and check your work.
    - **Check your answer -** Sometimes your first answer isn't the correct answer. Does the answer you came up with make sense? If you're able to plug your answer back into the original problem do so. This will let you know if your answer is correct.
    - **Review the problem -** Once you've settled on an answer, go back and review the problem one last time paying attention to the concepts, formulas, and principles that were required to come up with your solution. This will help you internalize what you've learned and prepare you to tackle more challenging math problems.

9. **Get help** – Do not wait until the last minute to get help if you need it. Math is cumulative. If there isn't enough time during class to get the clarification you need, visit the instructor during office hours or after class. Go to tutoring.

General Strategies for Solving Math Word Problems

Employing the **SQRQCQ Method** can make solving math word problems easier and less intimidating. SQRQCQ is an abbreviation for:

1) **S**urvey
2) **Q**uestion
3) **R**ead
4) **Q**uestion
5) **C**ompute
6) **Q**uestion.



Step 1: SURVEY the Math Problem – The first step is to read the problem in its entirety to understand what is being asked to solve. After reading it, decide the most relevant aspects of the problem that need to be solved and what aspects are not relevant to solving the problem.

Step 2:QUESTION – Once you have an idea of what you're attempting to solve, determine what formulas, steps, or equations should be utilized to find the correct answer. Basically, what are the questions being asked by the problem?

Step 3: REREAD – Now reread the problem and pay close attention to specific details. Determine which aspects of the problem are interrelated. Identify all relevant facts and information needed to solve the problem. As you do, write them down.

Step 4: QUESTION – Once familiar with specific details and how different facts and information within the problem are interrelated, determine what formulas or equations must be used to set up and solve the problem. Be sure to write down what steps or operations will be used for easy reference.

Step 5: COMPUTE – Use the formulas and/or equations identified in the previous step to complete the calculations. As each step is completed, check it off the list.

Step 6: QUESTION – Once the calculations are completed, review the final answer and make sure it is correct and accurate. If it does not appear logical, review the steps taken to find the answer and look for calculation or set-up errors. Recalculate the numbers or make other changes until getting an answer that makes sense.

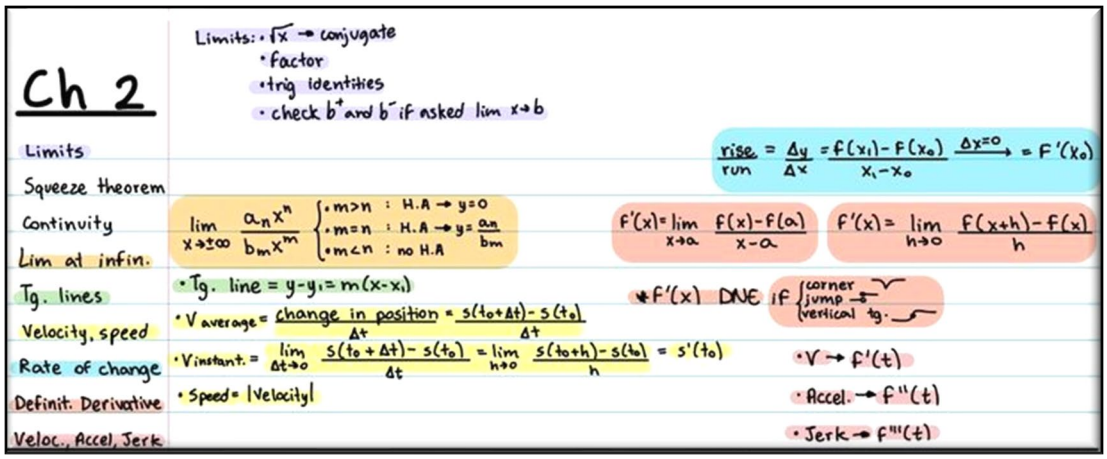
Math and Quantitative Test Preparation Tips

1. **Repetition is key** – The best way to learn and master math concepts is through practice and repetition.
   - First master the fundamental math concepts and formulas then complete as many practice problems as possible.
   - Do not repeat the same type of practice problem as it will not test understanding and mastery of fundamental concepts presented on an exam. Select practice problems that challenge and force tackling concepts in different ways.

2. **Practice difficult problems** – Practice problems that relate to each concept being tested on and take time to practice hard problems. If possible, review problems from past tests administered by your instructor (if allowable).

3. **Work through problems first before seeking assistance** – This practice is key to developing good math skills and developing a strong understanding of fundamental math concepts. Before seeking assistance, go back to the textbook, class notes, or other reference material and spend five to ten minutes figuring out the problem. This type of *struggle* is good, as the brain gains a greater ability to understand. However, if unable to set a problem up, then consult a tutor or teacher.

4. **Focus on understanding principles** – It's imperative to gain an understanding of the key concepts and principles that underpin each mathematical topic to progress through math since mathematics is cumulative. It is not enough to memorize a mathematical formula. Understanding mathematical principles will improve the ability to learn math and performance on math tests.



5. **Mathematics is cumulative, keeping up is critical!** – Cramming for a math test isn't effective. Almost every new mathematics concept is based on an understanding of a more basic mathematics concept. A key to learning math, and performing well on math tests, is staying current on homework and understanding of all concepts throughout the course.
   - Come to each math class having read ahead chapters and concepts that will be covered in class. Familiarity with concepts enhances understanding during and after class.

6. **List important formulas/concepts** – Write down all formulas in a math test on a single sheet and

memorize these formulas. Understand the mathematical principle behind each.

- **Tip**: Write down the formulas to be utilized on a test in the margins or opposite side of the test immediately **after** getting the exam. It is useful to have them written when the test becomes difficult and stress kicks in.

7. **Use study groups** – Studying for math tests in groups can ensure awareness of all the material to be covered on the test and a way to gain assistance, clarity, and understanding. The combined effort of the group can also allow each group member to more quickly and thoroughly prepare for the math exam.

8. **Rework homework problems** – Don't just review homework problems, actually rework them. Write down the steps required to complete each problem and then rework the problem without looking at the solution. Use previously completed homework assignments to check answers once completed.

9. **Practice problems in a variety of ways** – Problems on tests could be presented in a slightly different way or format than presented before. Practice challenging to test knowledge. This will also help with learning how to utilize and apply numerous types of formulas.

10. **Read instructions carefully** – Since questions may contain more than one part, carefully read instructions in each section.

11. **Estimate the correct answer** – If possible, estimate the correct answer before working out a problem. If your answer is nothing close to what you expected, double-check your work to ensure your figures are correct and that you employed the right process or formulas.

12. **Show the work** – Always show the steps taken to arrive at an answer. Writing down the steps enables the student to review the answer for mistakes before turning in the exam and could gain the student partial credit if the final answer ends up being incorrect. Other times, no credit is given for a correct answer if it isn't supported by work.

13. **Don't ignore confusing problems** – When faced with challenging problems, don't attempt to figure out the entire problem at once. Start by writing down everything you know about the problem including what type of problem it is, the information provided in the question/problem, and the formulas that could apply to solve the problem.

14. **Review exam answers** – If time permits, review final answers. If time permits, re-solve problems to double-check work on a separate piece of paper. If after re-working problems you get new answers, re-examine the instructions or look for calculation errors.

Effective Strategies for Studying Nursing

Proven study tips and strategies to help improve performance in a nursing program.

1. **Study daily –** A fatal mistake many nursing students make is to leave their studies to the weekend, or procrastinate until exam time. A key to excelling in nursing school is to study every day and stay caught up. Studying just a little every day is key to success in nursing school.

2. **Time management** – One of the biggest obstacles to success for nursing students is poor time management. The most important aspect of effective time management is setting a schedule and sticking to it.
    a. At the beginning of each semester look at the nursing class(es) syllabi for important dates, including assignment deadlines, clinical hours, and exams.
    b. Use a planning device (calendar, phone, etc.) to keep track of these dates. Not writing down important dates at the beginning of each semester is a recipe for disaster.
    c. Next, create a monthly and weekly schedule that includes the tasks, milestones, and goals for preparing for each of these dates.
    d. At the beginning of each week, plan your week identifying what you need to accomplish daily to meet weekly goals. For more information on managing time read the Effective Time Management: The Basis for Academic Success section on page 12 of this handbook.

3. **Study the right material** – There aren't enough hours in the day to cover all assigned nursing reading materials in depth. To determine what materials are most important and where to focus the bulk of study time, pay close attention to the topics your instructor focuses on and covers in class.

4. **Focus on critical thinking, not memorization –** Nursing students are required to learn and memorize a lot of information, but the **most important skill to develop is Critical Thinking.** The goal of critical thinking as a nursing student should be:
    - Goal-directed thinking with a purpose
    - Oriented toward making evidence-based judgments rather than relying on opinion-based guesswork

Most nursing exams use case-based or application-based questions. These types of questions are commonly referred to by nursing students as "NCLEX style" questions. Typically, these questions employ a multiple choice format with four answer options, as shown in the NCLEX Question trainer examples below.

NCLEX QUESTION TRAINER EXPLANATIONS
TEST 4

1. A young adult who was in a motorcycle accident is brought to the emergency room with a closed head injury with suspected subdural hematoma. Although the client complains of a severe headache, he is alert and answers questions appropriately. The nurse would question which of the following orders?

   1. "Promethazine (Phenergan) 25 mg IM 3 h."
   2. "Morphine sulfate 10 mg IM q3-4h."
   3. "Docusate sodium (Colace) 50 mg PO bid."
   4. "Ranitidine (Zantac) 50 mg IVPB q12h."

   Strategy: All answers are implementations. Determine the outcome of each answer choice. Is it desired?

   (1) H_1 receptor blocker, used as an antiemetic
   (2) correct–narcotic analgesic, causes CNS and respiratory depression, contraindicated in head injury because it masks signs of increased intracranial pressure
   (3) stool softener, used for an immobilized patient
   (4) H_2 histamine antagonist, reduces acid production in stomach, prevents stress ulcers

2. The nurse has just returned to the desk and has four phone messages to return. Which of the following messages should the nurse return FIRST?

   1. A woman in her first trimester of pregnancy complaining of heartburn.
   2. A man complaining of heartburn that radiates to his jaw.
   3. A woman complaining of hot flashes and difficulty sleeping.
   4. A boy complaining of knee pain after playing basketball.

   Strategy: Determine the least stable client.

   (1) caused by reflux of gastric contents into esophagus, treatment is small frequent meals, don't consume fluids with food, don't wear tight clothing
   (2) correct–indicates chest pain, needs to seek medical attention immediately
   (3) caused by menopause, treat with hormone replacement therapy (HRT)
   (4) should treat with rest and ice

NCLEX-style questions can be challenging because all of the answers presented technically may be correct. However, not

all answers are equal. To do well, the student must select the answer that *best answers* the question based on the information provided. Often, selecting the best answer relies more on critical thinking and common sense than it does on knowledge of facts and information.

Critical thinking in nursing school and as a nurse requires:

- Basing judgments on reasoning and facts
- Supporting opinions with evidence
- Evaluating the credibility of sources
- Thinking critically – ask "why" and "why not"?
- Turning failures into learning opportunities
- Looking for patterns and themes
- Developing evidence-based hunches

What is the best way to develop critical thinking skills? Repetition and practice, attend class, do all homework and exercises, and stay involved in the learning process.

5. **Think about the application of what you're learning** – As you study different health conditions and explore human physiology, always ask yourself how you're going to apply what you're learning to help your patients. Think about how you would discuss each condition you study with a prospective patient. Doing this will help you become a better student and nurse.

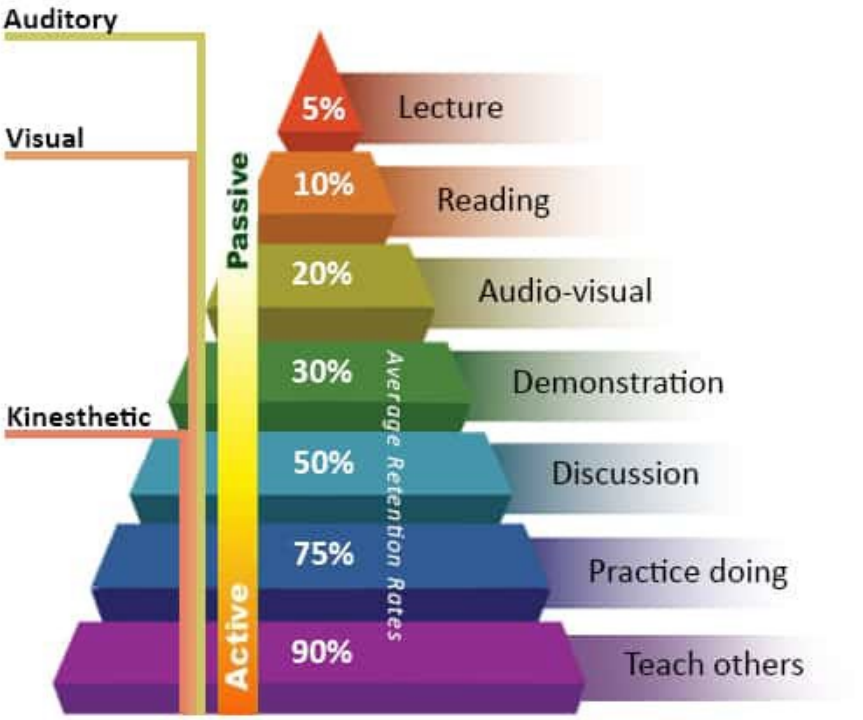
6. **Skim first. Read second** – Nursing school requires a lot of learning. And much of what you learn is going to come from reading. To facilitate learning through reading, skim each chapter of your textbook before reading the entire chapter. As you skim the chapter, try to get a sense of the main themes and topics being covered. Read the chapter headings and subheadings. Review the chapter summary and any end-of-chapter questions. Try to determine what information is most important and then go back and read the entire chapter with purpose.

7. **Form a study group** – The number one reason to use a study group is that studying with others facilitates learning. Students retain significantly more information in study groups when teaching each other than through listening to class lectures or reading a textbook. To learn more about the topic read the Strategies for Building Effective Study Groups section on page 10 of this handbook.

8. **Study in systems –** Nursing students tend to study by health condition. For example, studying six health conditions from three different systems. We recommend studying by system. The advantage of studying by system, as opposed to condition, is (1) it saves time and energy to group everything for each system for review and (2) medical and nursing management usually follow a similar treatment route, hence, studying by system prevents you from over-studying. The same reasoning applies when studying pharmacology. Study drugs according to their purpose as they relate to individual body systems.
9. **Include study breaks in your studying –** The brain starts to become overloaded with information after about an hour or so of studying. The most effective studying occurs during short 45 to 60-minute study sessions with breaks in between. When you take a break, actually get up from where you're studying and participate in some other activity for at least 10 minutes. This will allow your brain to decompress and prepare to learn and absorb more information.

10. **Vary your study materials and methods –** A key to effective learning is engaging with content

in different modalities (auditory, visual, kinesthetic) requiring you to pay attention in different ways, which deepens understanding. Ultimately, varying study materials and methods will improve your ability to retain and recall what you study and learn. Most students only remember about 10% of what they read from a textbook. However, students who teach material or concepts to others effectively, retain about 90% of what they've learned through teaching others. Varying your study method, as demonstrated in the Learning Pyramid, will lead to much stronger and long-term learning.



Adapted from the NTL Institute of Applied Behavioral Science Learning Pyramid

11. **Orient your study to the NCLEX** – Not everything you'll need to know as a nurse is found on the NCLEX exam, but if you orient your study toward the NCLEX, you'll be better prepared come test day. The NCLEX requires a great deal of preparation so we highly recommend not putting off preparing for the NCLEX until graduation. Incorporate NCLEX preparation into your regular study throughout your schooling.

Effective Strategies for Online Courses

There is a learning curve to online courses though, as they are often structured and run very differently than traditional courses.

These strategies are key:

1. **Get to Know the Course Format** – At the beginning of the semester, create a master chart or list with all the expectations and information about each course, to decrease the likelihood of making mistakes.

2. **Know How You Will Be Assessed** – Take time at the beginning of the course to plan out how you will approach the course material based on how you will be asked to use the material in assessments. This will help you be more efficient and effective in your learning.
    - If assessed primarily through writing, it can be helpful to make note of quotes and passages as you read course materials that will help support your writing.
    - If assessed with online tests or quizzes, try to take notes on everything you learn and highlight course materials so it's easy to look back at the key information.

3. **Don't Procrastinate** – Procrastination can be costly in online courses because of the possibility of running into technical difficulties which can lead to turning in the assignment late. Also, procrastinators may not have time to ask any questions and get a response from their professors before the assignment is due, as they aren't immediately available like they are in a traditional class. Therefore, aim to work on things early to have time to ask questions and get clarification on assignments.

4. **Be an Active Learner** – Many online courses are very rigorous. Give yourself time to put forth the proper effort to learn the material. An effective strategy for being an active learner is knowing how you learn best. Think about what works best for you when you're sitting in a traditional class and apply that to your online courses. Some strategies to try are:
    - Taking notes during a video (this works well for ***reading/writing learners***)
    - Listening to a lecture while you're washing dishes or going for a walk (this works well for ***kinesthetic learners***)
    - Color coordinating or highlighting your notes and reading materials (this works well for ***visual learners***)
    - Using text-to-speech to listen to course readings (this works well for ***auditory learners***)

Use whatever strategies work best for you, don't be passive about your education.

The Challenge of Motivation with Online Classes:

Concentration – Among the challenges of online learning is losing motivation. Motivation is often the driving force that keeps students constantly working hard. Students struggling with motivation should not become too discouraged, as there are strategies that can be utilized to regain motivation, including the following tips:

- **Establish Goals –** Remain motivated by developing goals and following specific steps to attain them. It is best to set small goals that can be attained. One effective strategy is to write small goals on specific days of a calendar. Once you have achieved the goal, cross the day off on the calendar. Goal achievement is a great way to build self-confidence and remain motivated.

- **Create Community –** Make an effort to communicate with other people enrolled in the same online class through message boards where comments and questions can be posted. It is also helpful to regularly communicate with the course instructor. This will provide an opportunity to ask questions or discuss course material.

- **Engage with Others –** Take advantage of forums and chat rooms about the course. Students use these forums to arrange online study sessions with other students.

- **Leverage Social Media –** One way of staying motivated is by leveraging social media circles to your advantage. Posting the course progress online can generate a few congratulations that can make a person feel better and boost motivation toward finishing their education. Social media can also be a means by which people are held accountable. Updates can help keep a person focused on completing their online courses.

- **Use Supportive Tools –**Staying accountable is one of the most important aspects of staying motivated. Fortunately, there is software that can help students stay on task and motivated in their online work. One of the biggest distractions is the lure of websites and social media destinations. Students can now download a plugin for the web browser that prevents them from wandering away from their work and surfing over to a distracting website.

- **Treat Online Courses like Traditional Ones –** Structure online courses to set a routine, just like with in-person courses. Get into a rhythm of waking up at the same time every day, starting your online work at the same time, and finishing at the same time. Treat it just like a traditional course.

- **Take Breaks –**Taking breaks every 50 minutes or so when doing online coursework can help reinvigorate the mind. When taking a break don't let your break last too long. An ideal break lasts for no longer than ten minutes, and during that time, don't get lost in unrelated tasks that distract more than refocus, like playing games or watching TV. Make sure that you get back to your work within a brief amount of time so that you stay focused on your courses.

- **Don't Ignore Nutrition –** When nutrition is poor, people get tired more quickly and end up losing focus more quickly. Eating a balanced meal is key to maintaining a consistent focus throughout the day. Fruits and vegetables should form the core of any diet, followed by carbohydrates and, finally, meat and dairy. Junk food, sugar, caffeine, and carbohydrates can create spikes in energy levels followed by an energy crash, during which it becomes harder to focus and stay on task.

- **Self-Encouragement and Vision –** Some of the most underrated methods of staying motivated are by envisioning the future and encouraging one's self. Part of establishing and envisioning the future involves connecting even mundane coursework with the end goal. These small, frustrating moments in a course can mentally be connected with a person's vision of the future. This simple mental connection can help students power through even the most discouraging moments of taking a course.

- **Work and Life balance –** An easy way to quickly burn out and lose your motivation for sticking with a course is by taking on too heavy of a workload and forgetting to attend to your personal life. Creating that balance has a lot to do with staying on schedule and establishing boundaries. Schedules aren't just meant to get people to stay on task. They're also meant to help people understand when it's time to step away and give themselves a break.

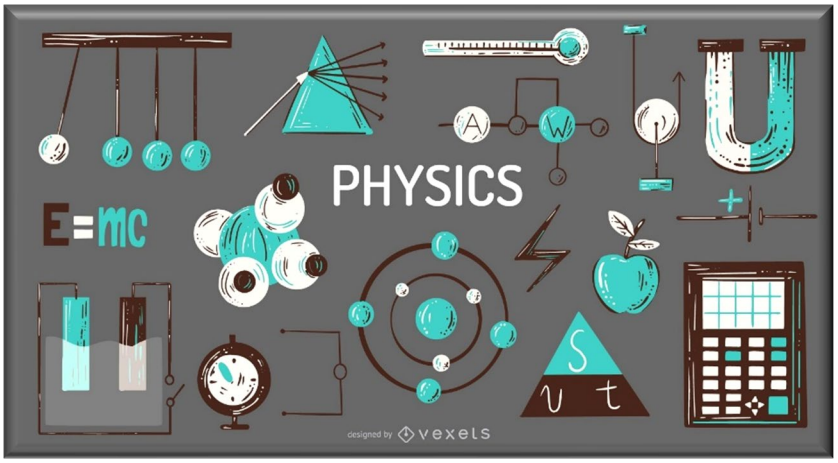
- **Indulge in some Rewards –** Take a step back and reward yourself for a job well done, whether that meant completing a difficult project or scoring well on a test.

Effective Strategies for Studying Physics

At its most basic, physics tries to quantify different forces in the universe. After quantifying different parts of the natural world, physicists then try to understand the relationship between different quantities. This makes physics one of the most applicable and complex fields of study.

1. **Calculators Won't Solve Problems** – It's necessary to understand how a formula is applied and what it explains.

2. **Practice Active Learning** – Practice hands-on problem-solving as independently as possible, trying to solve problems with only minimal guidance. Also, do not procrastinate and get the learning process underway as early as possible. Spend days leading up to the exam reviewing materials, including previous homework and quizzes, not learning course materials for the first time



3. **Note-taking** – Different types of note-taking are more effective in different circumstances.
    - **The outline method** is the most commonly used approach to note-taking, best when learning concepts, not formulas.
        - Write the main topic first. For instance, your main topic might be movement.
        - The subtopic is where you record a specific idea that's part of the main topic, such as velocity
        - Support the sub-topic with specific details. Under the sub-topic of velocity, you might write the formula describing it or write times when you should apply the formula.
    - **The two-column method,** is best for math and formulas.
        - Write your main topic at the top of your paper where you can review the topic in greater depth.
        - In the left column, write the formula and then an example of a problem being solved, step by step.
        - In the right column, write an explanation of what the formula means, including what the variables in the formula mean. Then, use words to describe the step-by-step solution to the example problem. Finally, write key ideas about the formula at the bottom of the page. For instance, write the appropriate time to apply the formula and what sort of questions it can solve.

The final part of note-taking includes drawing out visual aids. You can use an approach similar to the two-column method for this. On the left-hand side of the paper, draw an example of the concepts. On the right-hand side, write the formula that applies and explain in detail what's happening at every stage.

4. **Math and Problem Solving** – Sometimes, physics problems can require innovative and creative approaches to find a solution, thinking outside the box and looking at problems from different perspectives.

5. **Independent Study** – Physics lessons build one upon the other, so it helps to refresh knowledge and connect it to previously learned ideas with new ones. When reviewing texts, be on the lookout for the following.

    - **Terms -** Learn the specific meaning of each term, how they differentiate from one another, and how they're applied. You'll benefit from learning these terms in advance, that way you won't get lost on the day of your lectures.
    - **Concepts -** Concepts are different from terms because they explain in more depth certain physics principles. When reviewing the textbook, look for the titles of new sections to get an idea of what the central concept is. Pay special attention to the first sentence of every paragraph. This will help more easily identify the core ideas the paragraph is trying to communicate.
    - **Visual Aids –** Textbooks often use diagrams, charts, and other visuals to help illustrate concepts. Copy these charts and draw your own versions, to better understand the concepts the visuals are meant to represent.

6. **General Tips**

    - Physics is a cumulative subject, make sure to go to every class. The information learned in one lecture will build upon previous lessons.
    - Missing just one class is harmful, but the chance of effectively learning gets smaller with every missed class.
    - During class take effective notes. Document important concepts and supporting facts, or draw your own diagrams to help with your notes.
    - Take the time out to quiz yourself independently, outside of class.
    - Make a series of flashcards with terms, questions, and critical concepts on one side and answers on the other.

7. **Additional Help** – It's not unusual for students to need additional help in physics, even if they're taking the best notes and attending every class. The first resource should be the course teacher and tutoring. It's also fairly common for students to seek help online for complex physics topics or use digital codes that unlock online help. Another good resource is to form a study group to compare notes, teach, and quiz each other.

TEST-TAKING GUIDES

Test-taking is a skill in and of itself. Learning how to take tests is an important aspect of educational performance, development, and progression. There are general and specific tips and strategies for taking and enhancing performance on various types of tests.

Guides include:

- Coping With Test Anxiety
- Effective Test Preparation Techniques
- Effective Test-Taking Strategies
- Test-Taking Strategies for Essay Exams
- Test-Taking Strategies for Multiple Choice Test-Taking Tips
- Test-Taking Strategies for Nursing Exams
- Test-Taking Strategies for Short Answer Tests
- Test-Taking Strategies for True/False Tests

Coping With Test Anxiety

Most students, even those who have prepared extensively, experience some level of anxiety before and during tests. While a certain level of test anxiety is beneficial (as it motivates students to adequately prepare), too much can be detrimental if it prevents them from studying, preparing properly, or concentrating during a test.

The following strategies can help control extreme test-taking anxiety:

1. **Develop good study habits** – One of the most effective ways to handle test-taking anxiety is through proper preparation. Studying builds confidence, and as confidence increases, test anxiety decreases.

2. **Be prepared** – If completely prepared for a test to the point of being familiar with any question that could be asked, anxiety will dramatically decrease. When studying a subject or concept that is difficult to understand, start early in the semester working with the professor, or a tutor to get the help needed.

3. **Don't cram** – Cramming for an exam the night before is a major cause of test anxiety. Students who take their time to regularly study for an exam throughout the term will experience less anxiety than those who decide to study a day or even hours before one. If studying a difficult subject (i.e., chemistry, biology, math, etc.) it's imperative to start studying early on in the semester, as it is likely that some concepts, topics, and subjects will require outside help. Cramming can leave the student unable to get the help needed in time.

Get adequate exercise – Exercise relieves stress and increases mental function. It can also increase energy. Taking the time to take care of the body will help the student experience far less anxiety all around.

4. **Get plenty of sleep** – Not only is adequate sleep necessary for good health, but it's also an effective way to decrease anxiety. Not getting enough sleep before a text leaves the student fatigued, less able to concentrate, unable to remember everything, and more anxious.

5. **Get plenty to eat** – Never take a test on a hungry stomach, at least have a snack. Nutrients are necessary for proper brain function and physical energy while taking a test on a grumbling stomach will make it more difficult to concentrate on the test.

6. **Stay positive** – Dwelling on negative thoughts will increase anxiety and make it more difficult to perform. Confidence in the ability to take the tests allows the student to perform better.

7. **Stay relaxed** – Take a few minutes to relax before taking a test. Take deep breaths if struggling to relax and take a moment to clear your head. Focusing on something completely unrelated to the test and thinking about something fun to do later can help with relaxation.

8. **Ask for help** – If all else fails, ask for help. Severe test anxiety can be debilitating for students. If your mind goes completely blank every time you sit down to take a test, or you feel like you're going to pass out or throw up, you need to speak with a counselor. Don't be scared or ashamed to seek assistance. Test anxiety can be a real psychological condition that can cause otherwise smart, hardworking students to perform poorly academically.

Effective Test Preparation Techniques

The following are proven strategies that have helped students improve test scores and prepare more effectively for exams.

1. **Manage your time effectively and plan study time** – The difference between a poor student and a good student often boils down to how effectively each manages and uses their time. Time management isn't about "activity but rather "*productivity*" as the goal. Setting aside regular time to study is critical for achieving high test performance. Prepare a term calendar, weekly schedule, and daily schedule that includes regular study sessions. As you progress through the term it's okay to amend your study schedule to meet changing needs, but make sure you plan study sessions in advance and most importantly stick with them. For more details review the Effective Time Management: The Basis for Academic Success section on page 12 of this handbook.

2. **Employ the SQ3R method to reading materials before going to class** – Most tests are based on reading assignments, class notes, work assignments, and if applicable lab work. Employing the SQ3R reading method will improve understanding, recall, and ultimately test performance. SQ3R stands for Survey, Question, and Read, Recall, and Review (3Rs).
    - **Survey -** Before jumping in to read the text, skim through each chapter to get a general idea of the main ideas and themes. Pay attention to chapter headings, introductions, subheadings, visual aids, and summaries. Try to develop an idea of what the text is going to communicate. This will provide your reading direction and focus.
    - **Question –** While surveying the text, use chapter headings, subheadings, and introductions to develop questions. Actively searching for answers to these questions as you read will help you stay focused and engaged.
    - **Read, Recall, Review** - After surveying the text and developing questions, begin reading for meaning and understanding, and seek to answer the questions previously developed. Immediately after reading each section, summarize in your mind what was just read, paying attention to the important concepts and topics covered. This improves the ability to *recall* important information come test time. Finally, *review* the questions you developed and try to answer each one without referring to the text or your notes. Can you answer them from memory?

For more information about the SQ3R Reading Textbook Method go to page 24 of this handbook.

3. **Go to class prepared and employ a well-organized note-taking method** – Preparation for class is key to effective note-taking. Arrive at class having read all assigned material AND having reviewed class notes from the previous lecture. There are several effective note-taking methods. Key recommendations include:
    - Start a new notes page for each new lecture or class period.
    - Date and number each page.
    - Keep notes in chronological order within the binder/notebook.
    - Leave blank spaces within the notes to add comments or additional notes later.

- Use only one side of the paper, make additional notes in the margin but don't write on the back.
- Keep notes concise using phrases instead of sentences.
- Use abbreviations and symbols when possible.
- Note down unfamiliar concepts and vocabulary and seek clarification later
- Bring a highlighter to class to underline important concepts within your notes that will likely be on the test.

Visit the section on Note-Taking Methods for Better Learning on page 20 of this handbook for details.

4. **Pay attention, listen, and watch for clues** – Don't only focus on the instructor's words, focus on the message being communicated by the words. Listen for meaning and adjust your note-taking accordingly. Watch for clues your instructor might provide about possible test questions and formats. Participate in test review sessions and ask questions about unclear concepts. Never be ashamed to ask questions.

5. **Review notes after each class** – Review class notes within 24 hours. Edit the notes, if necessary, and if something doesn't make sense, correct or clarify it. Review all highlighting or underlined notes. Studies show that nearly 50% of what a student learns in class is forgotten within the first twenty minutes and over 60% is forgotten after one day. Reviewing notes is just as important as taking good notes.

6. **Ask the instructor for direction** – Don't hesitate to ask your instructor about what subjects or topics will be on the exam – even what types of questions may be in it. Ask directly about the best way to study for the test. Most faculty members are open to sharing with students suggestions as to how best to prepare for their exams.

7. **Don't Cram. Begin reviewing a week before the test** – Good reviewing is no substitute for poor studying. **The key to improving test performance is to employ effective study habits and techniques all semester and then employ effective reviewing techniques about a week before a test**. Put together a test preparation plan to review all lecture notes, reading assignments, and other class materials. Key components of a review plan:
   - Identify the most important study materials and techniques for the test (i.e., reviewing notes, practice problems, etc.)
   - Prepare an outline of the main topics and concepts that will be covered during an exam, then use this sheet to study. This will help you memorize key facts and other information you will be tested on.
   - Include visual aids like charts, diagrams, and graphs to condense and simplify information, and improve recall at test time. These resources are especially important if you're a visual learner.
   - Decide how many hours will be needed to study and how to allocate those hours.

8. **Review with a group if you can** – Reviewing in preparation for a test as part of a study group will allow you to improve your notes, fill in any gaps in your understanding, more fully explore complex concepts, cover more material, gain additional knowledge about what might be on the test, and provide you with a support system.
9. **Self-Test** – Test yourself using old tests, practice tests provided by your instructor, or by making your own practice test. If you make your own practice test, it is recommended to develop the test with the

help of study group members to provide a greater array of problems likely to appear on the test. An important part of self-testing is to take your practice test under actual test-like conditions. Completing your practice test under the same conditions as the actual test (for example, timed, not open book, no use of notes, etc.) will ensure knowing the material well enough to perform well come test day.

10. **Stay healthy** – Getting plenty of rest and exercising regularly will enhance your ability to perform well on a test. Eat a nutritious meal before taking a test to be alert and focused. Stay away from junk food. Eating junk food or sugar before a test will cause your energy levels to deplete quickly and can impact your ability to focus.

11. **Get plenty of sleep** – Sleep is critical for academic success. It is counterproductive to stay up all night cramming before test day because it causes students to sacrifice sleep time and it increases their anxiety. Both lack of sleep and anxiety negatively affect recall. Studies show that students who spend more time upfront studying and less time cramming the night before typically perform better on tests

12. **Employ proven test-taking strategies during the test** – After preparing adequately for the test, employ the following test-taking strategies to improve test performance:
    - Arrive early
    - Practice relaxation
    - Budget your time
    - Do a memory dump
    - Read directions carefully
    - Look for cues
    - Answer all questions
    - Rely on your first impression
    - Review your answers

For more information about test-taking, go to the Effective Test-Taking Strategies section on page 55 of this handbook.

Effective Test-Taking Strategies

1. **Be prepared –** No test-taking strategies in the world will save the student who didn't study regularly weeks in advance and review before test day. Preparation is key.

2. **Arrive early on test day and take a moment to relax**
   - Having time to take a deep calming breath increases confidence
   - The teacher may provide any additional tips, instructions, or insight just before the test
   - Having time to settle shifts focus to the test and away from the surrounding environment.

3. **Listen attentively to last-minute instructions given by the instructor**
   - It is not uncommon for teachers to alter test details at the last minute.
   - Missing the instructions will increase test-taking anxiety. If you missed them, don't be afraid to ask that the instructions be repeated.

4. **Do a memory dump**
   - As soon as you begin the test, write down information that you will likely need to know for the test and you fear you may forget. (i.e., formulas, equations, dates, lists, etc.)

5. **Read the test directions very carefully and watch for details**
   - Always read all directions and questions carefully to ensure you understand what is being asked.

6. **Plan how you will use the allotted time**
   - Take a moment to estimate how much time you'll have for each section of the test and each question. Allow enough time for more difficult sections or sections that are weighted more heavily in the test grade.
   - Pace yourself so you can complete the test in the allotted time frame.
   - Complete the questions you know first then come back and tackle the problems you're not sure about after.

7. Maintain a positive attitude

- Do not lose confidence or waste time if you encounter difficult questions. Answer the questions you know first and then come back and tackle the questions you are not sure about.
- If you have no clue about the correct answer, make an educated guess if it will not count against your score.
- Disregard patterns. It is probably a coincidence if a string of multiple choice answers that you know are correct are "a."

8. Look for cues

- If two answers are similar, they're usually not the correct answer.
- Pay attention to grammatical matching between the question being asked and the answers. If an answer seems right but doesn't match grammatically with the question, it probably isn't the correct answer.
- Look for cues from other questions.

9. Answer all the questions

- Even if you're running out of time, try answering all the questions even if you have to guess except if the instructions indicate docking points for guessing. More often than not, teachers will give partial credit for partially completed questions or if you're able to show your work.

10. Rely on your first impressions

- The first answer that pops into your mind is usually the correct answer. Don't change answers unless you're sure the answer you've chosen is wrong.
- It may be counterproductive to review answers and make changes – especially if you're struggling to get through the test.

11. Plan to finish early and have time for review

- Go back and answer difficult questions after answering easy ones.
- If you are required to complete an essay, review it for spelling and grammatical errors.
- Check to make sure you have completed the entire test. It is not uncommon for questions to be listed on the back side of a page.

12. Consider every test a practice session – analyze your performance

- It takes time and practice to develop effective test-taking skills.
- To determine whether your test-taking strategies are working, take time to evaluate your performance after each test.
- Be sure to take note of where you're struggling. Are you struggling with essays or multiple-choice questions?
- Arrange to meet with the teacher to discuss a low test score and determine what you can do to improve.
- Seek help from the teacher, or tutoring, and examine if your study habits – from class preparation to reading, listening, time management, and note-taking need improvement.
- Doing better is mostly not about studying harder, but smarter.

Test-Taking Strategies for Essay Exams

Unlike other types of exams (i.e., multiple choice, true or false, etc.) essay tests allow for the development of an answer based on the student's understanding or knowledge.

1. **Read the directions** – Before answering an essay question, thoroughly read the instructions. Never assume to know what is being asked until you've read the entire question. Do not jump to the answer without being sure of what exactly the question is asking

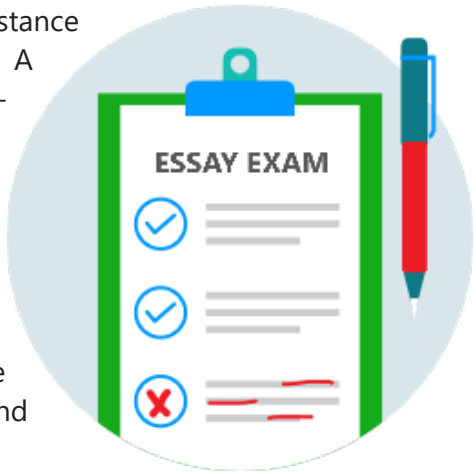
2. **Ask for clarification** – Read essay questions in their entirety before preparing an answer. If the instructions are unclear, ask the teacher for clarification, and don't be scared to do so.

3. **Provide detail** – Provide as many details and specific examples as possible. Avoid irrelevant "fillers" that don't support the answers.

4. **Budget time –** Manage time wisely to be able to answer all questions. Go back and review answers and provide additional details if you finish the test before time is up. Answer most familiar essay questions first and then tackle more challenging ones. **Make sure to allocate more time to those questions that are worth the most.**

5. **Follow the instructions** – Provide an answer that matches the type of essay question being asked (Compare, list, contracts, etc.).

6. **Get to the point and focus on substance** – Focus on substance over quantity, answer the question thoroughly and clearly. A typical essay answer should be between 200 and 800 words (2-8 paragraphs) but more isn't necessarily better.



7. **Write clearly and legibly** – Always employ correct grammar.

8. **Get organized** – Organize thoughts before answering an essay question. It is highly recommended to develop a short outline before preparing the answer. This strategy helps save time and keep the essay organized, writing more clearly and concisely.

9. **Use paragraphs to separate ideas** – Keep the main ideas and other important details separated with paragraphs. An essay response should have three parts: the introduction; the body; and the conclusion. The introduction is typically one paragraph, as is the conclusion. The body of the essay usually consists of 2 to 6 paragraphs depending on the type of essay and the information being presented.

10. **Go back and review** – If time permits, review answers and make changes if necessary.

11. **Approximate –** When unsure of specific dates, approximate dates.

Common Question Types on Essay Exams

The following are 5 of the most common question types you'll find on essay exams:

1. Identify - Asks for short, concise answers and typically does not require a fully developed essay.

- Keywords to look for: Summarize, List, Describe, Define, Enumerate, State
- Example question: "Define what is meant by 'separation of church and state.'" Ask yourself: "What is the idea or concept in question?", "What are the main characteristics?", "What does this mean?"

2. Explain - Requires a full-length essay with a fully developed response that provides ample supporting detail.

- Keywords to look for: Discuss, Explain, Analyze, Illustrate
- Ask yourself: "What are the main points?", "Why is this the case?"
- Example question: "Discuss the differences between the political views of democrats and republicans. Use specific examples from each party's 2017 presidential campaign to argue which views are more in line with U.S. national interests."

3. Compare - Requires an analysis that focuses on similarities, differences, and connections between specific ideas or concepts.

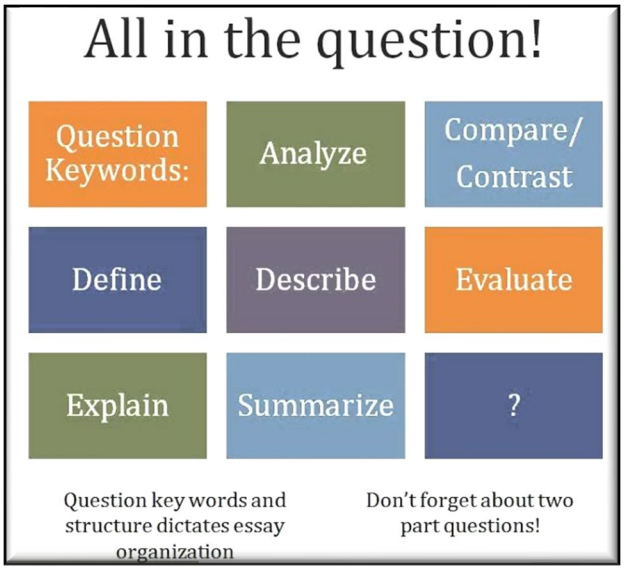
- Keywords to look for: Compare, Contrast, Relate
- Ask yourself: "What are the main concepts or ideas?", "What are the similarities?", "What are the differences?"
- Example question: "Compare the value of attending a community college to the value of attending a 4-year university. Which would you rather attend?"

4. Argue - Requires the formation of an opinion or taking a position on an issue and defending the position against alternative positions using arguments backed by analysis and information.

- Keywords to look for: Prove, Justify
- Ask yourself: "Is this position correct?", "Why is this issue true?"
- Example question: "Argue whether robotics will replace blue-collar manufacturing jobs in the next ten years."

5. Assess – It involves assessing an issue, idea, or question by describing acceptable criteria and defending a position/judgment on the issue.

- Keywords to look for: Evaluate, Criticize, Evaluate, Interpret
- Ask yourself: "What is the main idea/issue and what does it mean?", "Why is the issue important?", "What are its strengths?", "What are the weaknesses?"

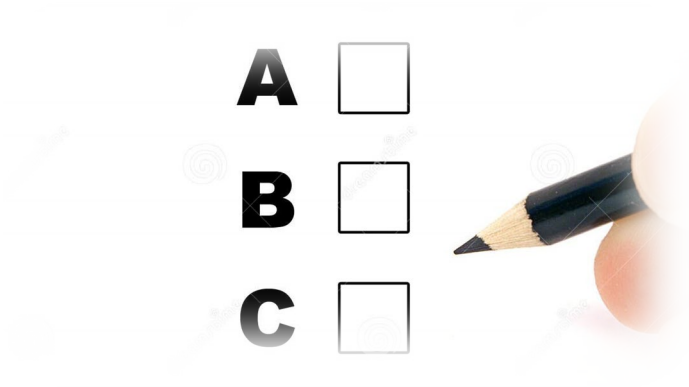


Test-Taking Strategies for Multiple-Choice Exams

1. **Read the entire question** – Read a multi-choice question in its entirety before glancing over the answer options. Read each question thoroughly before reviewing answer options.

2. **Answer it in your mind first** – After reading a question, answer it in your mind before reviewing the answer options. This will help prevent you from talking yourself out of the correct answer.

3. **Eliminate wrong answers** – Eliminate answer options that you're 100 percent sure are incorrect before selecting the answer you believe is correct. Even when you believe you know the right answer, first eliminating those answers you know are incorrect will ensure your answer choice is the correct choice.



4. **Use the process of elimination** – Using the process of elimination, cross out all the answers you know are incorrect, then focus on the remaining answers. This strategy greatly increases your likelihood of selecting the correct answer.

5. **Select the best answer** – It's important to select the best answer to the question being asked, not just an answer that seems correct. Often many answers will seem correct, but there is typically a best answer to the question that your professors are looking for.

6. **Read every answer option** – Read every answer option before choosing a final answer. It is a common mistake students make. There is usually a best answer to every multiple-choice question. Quickly assuming the correct answer, without first reading every answer option may end up in not selecting the best answer.

7. **Answer the questions you know first** – If having difficulty answering a question, move on and come back to tackle it once you've answered all the questions you know. Sometimes answering easier questions first can offer insight into answering more challenging questions.

8. **Make an educated guess** – If it will not count against your score, make an educated guess for any question you're unsure about.

9. **Pay attention to the words "not", "sometimes", "always", and "never"** – An answer that includes always must be irrefutable. If you can find a single counterexample, then the answer is not correct. The same holds for the word never. If an answer option includes never a single counterexample will indicate the answer is not correct.

10. **It's usually best to stick with your first choice–but not always** – However, this doesn't mean your first answer choice is necessarily the correct answer choice. Multiple-choice are designed to test students' knowledge and ability. To this end, the answer options provided will often include the most common wrong answer among the choices or answers that seem logical but are ultimately incorrect, or the best answer.

11. **"All of the above" and "None of the above"** – When you encounter "All of the above" and "None of the above" answer choices, do not select "All of the above" if you are pretty sure any one of the answers provided is incorrect. The same applies to "None of the above" if you are confident that at least one of the answer choices is true.

12. **When there are seemingly two correct answers** – When two answers are correct in a multiple-choice question with an "All of the above" option, then it's probably the correct choice.

13. **Place your bet on the positive option** – In most cases, a positive option is probably true if there is also a negative one.

14. **The more information… the better** – More often than not, the correct answer usually contains more information than the other options. This is good to know if you must guess.

Test-Taking Strategies for Nursing Exams

1. **Anatomy of a Multiple-Choice Question** – Multiple-choice questions are the standard question format on nursing tests and exams. Understanding the various parts of a multiple choice question, as presented on nursing exams, is essential for improving your test-taking ability.
   The following are four basic parts of the multiple-choice question.
   - **Case** – Description of the patient's situation. Presents the scenario of what is happening.
   - **Stem** – The part of the question that presents the specific question being asked.
   - **Distractors** – Answer choices that are feasible but ultimately incorrect. They do not provide the best answer.
   - **Correct Response** – The response that best answers the question.

Sample multiple-choice questions in a nursing exam:

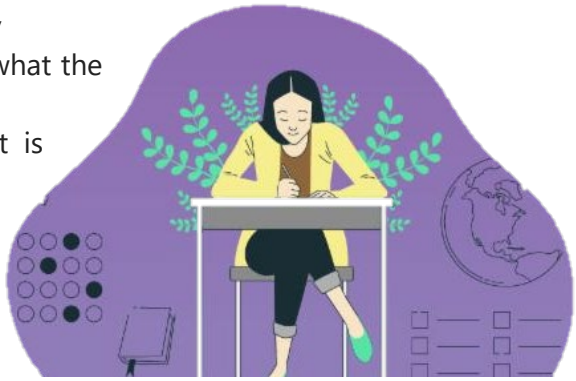
Case Scenario	A young man is admitted to the emergency room with pain in his right lower quadrant. Acute appendicitis is suspected. Which healthcare provider prescription should the nurse implement **first**?
Stem	Which healthcare provider prescription should the nurse implement **first**?
Distractors (Incorrect Answers)	1. Administer 5-325 mg hydrocodone/acetaminophen PO for pain 2. Draw blood for complete blood count and electrolyte levels 3. Obtain urine specimen for urinalysis
Correct Answer	4. Start intravenous (IV) line with normal saline 100 mL/hr.

Rationale:
This above question tests a student's knowledge and understanding of prioritization of care. While answer choices 1, 2, and 3 are feasible options, there is only the best option for the question being asked in the stem based on prioritization of care.
When prioritizing multiple prescriptions, the nurse should first address issues of airway, breathing, circulation, and then vitals. For acute appendicitis, initial interventions would include the following:

- First, ensure patent **airway** and administer oxygen if hypoxic
- Second, obtain **IV access** and administer prescribed fluids **(Option 4)**
- Third, draw **blood samples** for complete blood count (CBC), electrolyte levels, clotting studies, and type and cross as prescribed **(Option 2)**
- Fourth, insert the indwelling **urinary catheter** and obtain a urine sample for urinalysis, if prescribed **(Option 3)**
- Finally, insert a **nasogastric (NG) tube** if necessary

Patients who are experiencing acute appendicitis are at risk for **rupture of the appendix** and often require **emergency surgery**. In such cases, the nurse must maintain **NPO status**. Pain medications are to be administered intravenously. Based on the prioritization of care protocols, and the answer choices presented, option 4 is the best, and ultimately correct, answer to the question.

Basic Rules of Test-taking, including in Nursing:



- Read all instructions provided thoroughly and carefully
- Read each test question (stem) carefully and identify what the question is seeking.
- Do not read into a question anything beyond what is stated. Only answer what is being asked.
- Pace yourself. Don't take too long on any one question, but give yourself time.
- Answer all questions on the exam, even if it requires educated guessing.

1. **Reading the Question** – In reading the entire question:
   - Restate the question in your own words. What is the question (stem) asking for?
   - What are the keywords in the question?
   - What are the answer options?

   NOTE: Keywords are any words that identify or describe the patient, problem, or details of the problem. Keywords may identify factors such as age, sex, marital status, disease/condition, symptoms, or duration of any of the aforementioned.

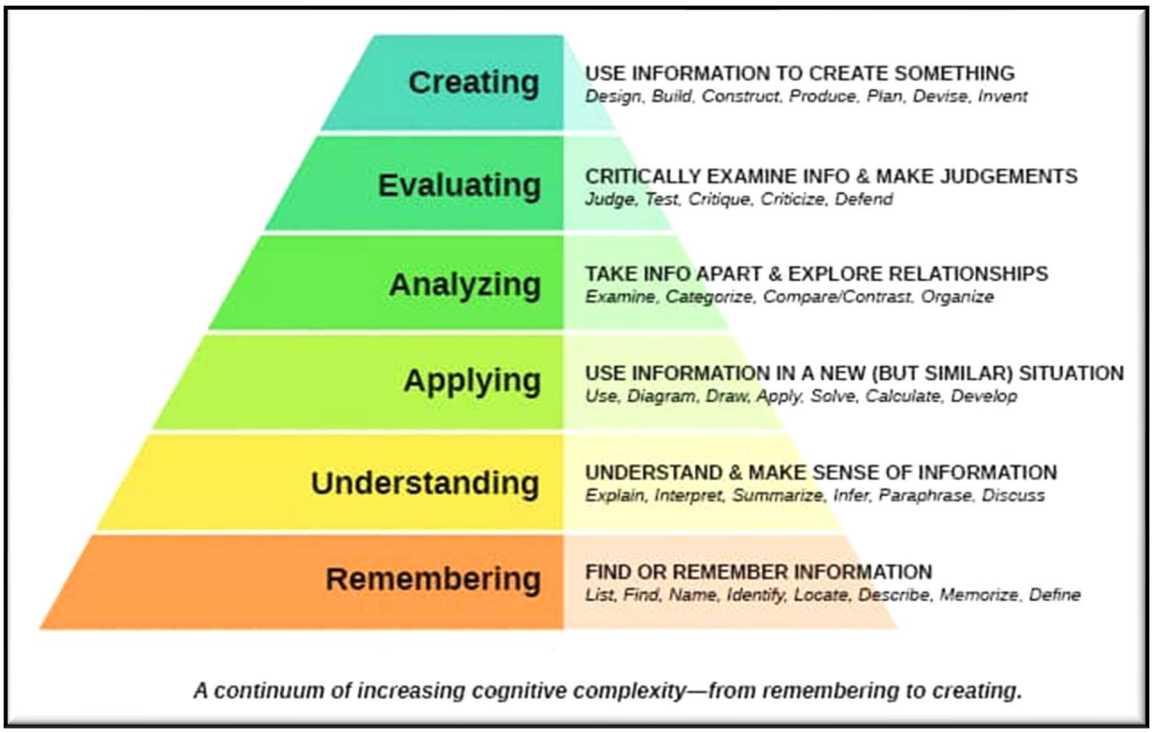
2. **Identify the Time Frame** – Time is relevant to answering many nursing test questions. If time is mentioned in the case scenario or stem, it's important, so pay attention. Examples, of time in test questions include:
   - Early vs. Late
   - Pre Operative vs. Post Operative
   - Surgical Day

3. **Identifying the Correct Answer:**
   - Answer the question in your head before looking at the answer options.
   - Read all the answer choices before selecting an answer.
   - While several answer options may be feasible, there is only one best answer. The best answer is the correct answer.
   - Identify the central person in the question. The correct answer will always focus on the central person.
   - Sometimes the same words will appear in both the question and the correct answer.
   - When two answer choices are the opposite of one another, one is usually the correct answer.
   - When multiple answer choices are substantially similar, they're usually incorrect.
   - Answers with false words (i.e., except, least likely, never, not, etc.) indicate a wrong nursing action is the correct choice.
   - Answer choices that include absolutes, such as always, every, must, never, none, etc., are usually incorrect.
   - Answer choices with inappropriately patient-focused care (not focused on the physical and emotional needs of the patient) are usually incorrect.
   - When a stem includes *initial*, *first*, or *best* as part of the question, there will likely be several feasible answer options, but only one best answer. To find the *best* answer option, you'll need to

use nursing prioritization techniques.

4. **Strategies for Making Educated Guesses** – When you're uncertain which is the correct, or "best", answer option, make an educated guess. The following are strategies for making an educated guess.
    - Use the process of elimination.
    - Eliminate any answer choice that does not respond to the question being asked in the stem, even if it provides a correct answer.
    - Absolute terms such as *never*, *always*, *all*, *must*, *every* and *none* often indicate an incorrect answer you can eliminate.
    - When undecided between two answers, try to express each in your own words, and then compare the two. Try to determine which of the two best answers to the question being asked.
    - Eliminate answers that are clearly incorrect, including answers that are duplicates, unrelated to the question, etc.
    - Every time you eliminate an answer option, you increase your chances of selecting the correct answer by 25%.

5. **Preparing for Nursing Exams** – Nursing exams are designed to test the ability to *apply*, *analyze*, and *evaluate* acquired knowledge and understanding. In essence, nursing tests are designed to test the student's ability to think and function as an entry-level competent nurse.
   Nursing exams are designed to test six cognitive levels of thinking: remembering, understanding, applying, analyzing, evaluating, and creating
   Based on Bloom's Taxonomy below, nursing students are expected to progress through the following six cognitive levels of thinking:



1) **Remembering:** The normal lab value range for sodium is 135-145.
2) **Understanding:** Sodium in the body helps regulate electrolyte levels.

3) **Applying:** Conditions sensitive to electrolyte levels, such as neurology, are affected by sodium levels.
4) **Analyzing:** Regulation of sodium levels is necessary to provide the best patient care.
5) **Evaluating:** Is sodium regulation the best and only way to regulate electrolyte levels and treat neuro conditions? What other medications and treatments?
6) **Creating:** Development of a patient plan to recognize signs of SIADH and prompt medical response before neuro patient starts declining due to hyponatremia.

Nursing students must strive to think critically. Don't just memorize. How is what you're learning relevant? Why does it matter? How does every piece of knowledge acquired as a nursing student lead to better patient care and make for a better nurse?

Stop thinking like a student and start thinking like a nurse. Do this… and you'll start acing your exams.

Other Nursing Resources – The following resources will help improve study habits and test-taking skills as a nursing student:

- NCLEX Test Preparation Study Guide @ https://www.educationcorner.com/nclex-test-preparation/
- Effective Strategies for Studying Nursing on page 39 of this handbook.

Test-Taking Strategies for Short Answer Exams

1. **Read all instructions** – It's critical to carefully read before answering. What exactly is the question asking? Often short answer questions will ask to describe, list, compare, contrast, identify, analyze, summarize, or a combination of these. Summarizing when instructed to analyze, for example, will decrease test performance.

2. **If in doubt, make an educated guess** – If completely unsure about a question, make an educated guess and show the work since usually there is no penalty for attempting to answer.

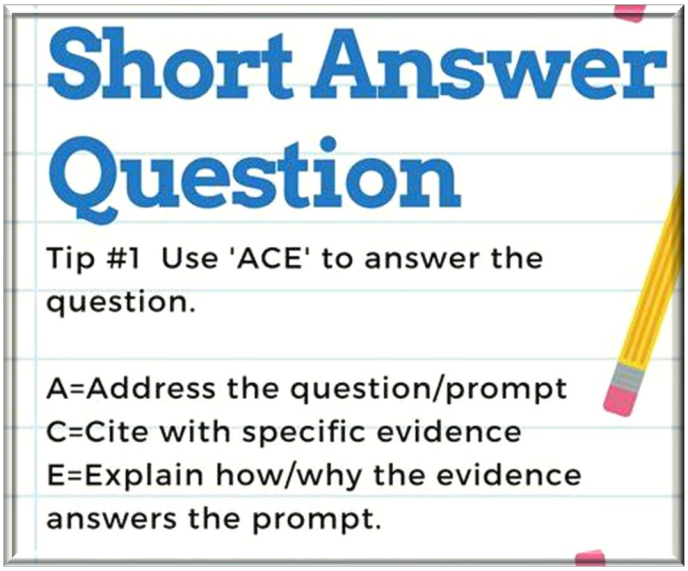
3. **Answer the easy questions first** – Return to tackle more challenging questions once you've answered all the questions for which you know the answer. In some cases, clues to answers to difficult questions can be deciphered from questions already answered.

4. **Budget time** – At the beginning of the test check to see how many questions are on the test and if the test is divided up into sections. Allocate a specific amount of time per section and for each question. Allocate more time to those questions that are worth the most.

5. **Reread each question** – Always reread the question after answering it; as questions may have multiple parts. Answering only part of the question will result in only partial credit.

6. **Ask for clarification** if a question is confusing or unclear. Don't be scared to ask.

7. **Be thorough. But be concise** – Answers to short answer questions do not mean they lack depth analysis or information. It simply means an answer that is concise and includes just enough information to accurately and fully answer the question being asked.



The 6 Basic Types of Short-Answer Questions

Understanding the six basic types of short-answer questions will improve performance. The question format and the type of answer provided must match.

1. **Definition questions –** Require defining a concept.
    - *Question:* "What is a supply curve?"
    - *Answer:* "A supply curve shows the relationship between the price of a good or service and the quantity supplied. Typically, the price appears on the left vertical axis and the quality supplied on the horizontal axis."

2. **Explanation questions –** Require explaining *why* something is true or *how* something functions.
    - *Question:* "Why is the supply curve upward-sloping for most goods and services?"
    - *Answer:* "The supply curve is upward-sloping because as the price the market pays increases for goods and services the volume that suppliers are willing to produce increases."

3. **Example questions –** Require a specific example of a concept or phenomenon.
    - *Question:* "Provide two examples of pairs of goods that are substitutes."
    - *Answer:* "Margarine and butter, and tea and coffee are examples of pairs of goods that are substitutes."

4. **Relationship questions –** These can be challenging and require showing how two or more things relate to one another. Are they complementary? Are they the same? Are they different? Are they opposites? How does the existence of one affect the other? Etc.
    - *Question:* "In a competitive market, what is the relationship between supply and demand?"
    - *Answer:* "Demand refers to the quality of a good or service consumers are willing to buy at a given price. Supply represents the quantity of a good supplied by producers at various prices. The price resulting from where supply and demand meet is referred to as the equilibrium price."

5. **Calculation questions –** Require the calculation or computation of a numerical answer or response.
    - *Question*: "If the demand for used motorcycle purchases in the United States is represented by P = 1000 – .2Q and the supply of used motorcycles is represented by P = 400 + .2Q what is the market equilibrium price and quantity?"
    - *Answer*: "The market equilibrium price (P) is 700. The market equilibrium quantity (Q) is 1,500."

6. **Graphing questions –** Require an answer in the form of a graph.

Short-Answer Vs. Short-Essay Questions

Short-answer questions are different from short essay questions, and knowing the difference is a critical test-taking skill.

1. **Length of answer**
    - *Short Answer:* Typically, very short, no more than 3 to 4 sentences.
    - *Short Essay:* The answer may vary in length, but ranges from 200-800 words or more.
2. **Content**
    - *Short Answer*: Typically comes from a very narrow arena of fact-based knowledge. Details and examples provided in answers are usually limited to assigned/required readings.
    - *Short Essay:* Even though the short essay typically focuses on one specific issue or topic, the information presented in the essay may come from a variety of sources.

3. **Answer format**
    - *Short Answer:* The answer format for a short answer will usually be a single sentence or paragraph. Short answers are concise and word selection is important to maximize effect.
    - *Short Essay*: The answer format for short essays typically includes at minimum three paragraphs: the introduction; the body; and the conclusion. The introduction provides a general overview. The body provides the details of the essay and varies from 1-8 paragraphs (200-800+ words). The conclusion is the wrap-up of the essay and reiterates the main points being communicated. It may also suggest an action.

Test-Taking Strategies for True/False Exams

These types of questions can be tricky.

1. **Approach each statement as if it were true** and then determine if any part of the statement is false. Just one false part in a statement will make the entire statement false.

2. **For a sentence to be true, every part must be "true"** – A sentence may be mostly true because it contains correct information but it is ultimately false if it contains any incorrect information. Pay attention to "qualifiers" that restrict the possibility of making accurate statements. **Qualifier words like**:

   - sometimes
   - seldom
   - few
   - always
   - every
   - often
   - frequently
   - never
   - generally
   - ordinarily

   - **Stricter qualifiers**, such as "always" or "never", often reflect a false statement, sentence, or answer.
   - More *modest qualifiers*, such as "sometimes, often, many, few, generally, etc.", are more likely to reflect a true statement, sentence, or answer.

3. **Pay special attention to "absolute" qualifiers** – Qualifiers open up or restrict the possibility of a statement being true or false. Absolute qualifiers, such as:
   - all
   - always
   - never
   - entirely
   - completely
   - best
   - worst
   - none
   - absolutely

   do not allow for exceptions and imply that the statement must be true 100% of the time. In most cases, statements that contain absolute qualifiers are false.

4. **Don't let "negatives" cause confusion** – If a true/false sentence contains a negative, drop the negative word and then read what remains. Without the negative, determine whether the sentence is true or false. If the sentence (without the negative) is true, then the correct answer would be "false".

5. **Watch for statements with double negatives** – Statements with two negative words are positive.

For example, "It is *unlikely* the car will *not* win the race." is the same as "It is *likely* the car *will* win the race. Negative words include *not* and *cannot* along with words beginning with the prefixes dis-, il-, im-, in-, ir-, non-, and un-.

6. **Thoroughly examine long sentences and statements** – Long sentences often contain groups of words and phrases separated or organized by punctuation. Read each word set and phrase individually and carefully. If a one-word set or phrase in the statement is false (even if the rest are true) then the entire statement is false.

7. **Make an educated guess** – If it will not negatively impact the score, make an educated guess if unsure of the answer. However, often true/false tests contain more true answers than false answers. So, if completely unsure, guess "true".

8. **Longer statements may be false** – The longer a true/false statement, the greater the likelihood the statement will be false. As a reminder, it only takes one part of a statement being false to make the entire statement false. The longer the statement, the more chance one part will be false. Questions that state a reason tend to be false. Words including "because, reason, since, etc." often indicate a "reason" statement.

9. **Budget test time –** Before tackling the test, take a look at the entire test to see how many questions there are. If the test has 60 true/false questions, and there is a 1-hour time limit, spend no more than 1 minute on each question.