

Tips to Improve Memory and Learning

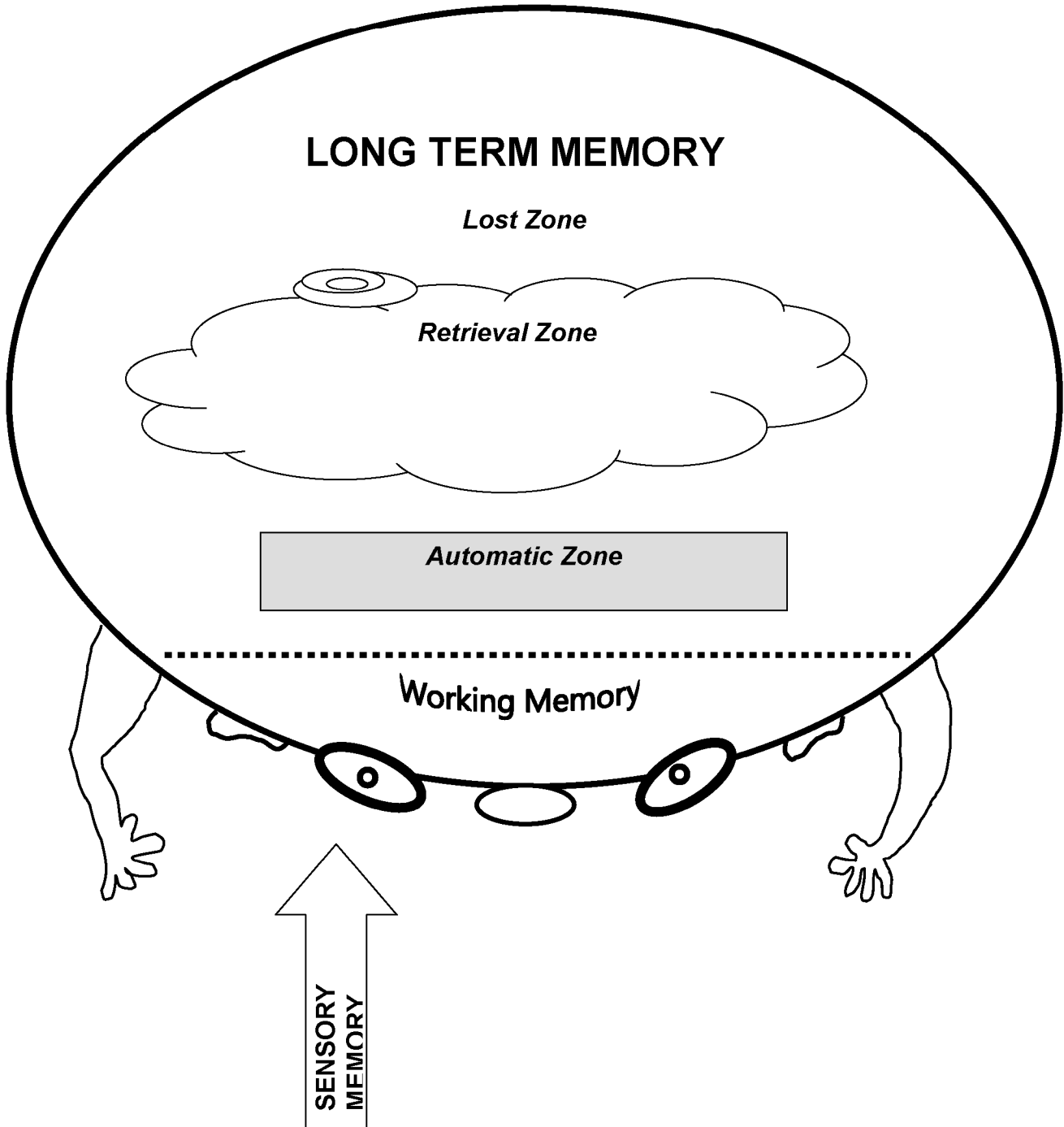
Memory can be improved by using strategies that enhance storage and retrieval of information.

- Learn from the **general to the specific**. Start by reading the chapter heading, section headings, introduction and summary. You may also want to skim charts and diagrams and other bolded material. Then go back and read for detail.
- **Review often**, trying to vary the way that you review so that you create more connections to your long-term memory. At a minimum, do daily review and weekly review.
- Make sure you **understand** the material. Comprehension vastly improves memory.
- **Visualize** what you are reading or studying. Pictures, shapes and colors are remembered longer than words. Making images colorful, absurd and humorous can help with memory retention.
- Make the **material meaningful**. Think about how it is relevant to your life or to your future career. Think of examples. Consider how new material fits with what you already know.
- Use **mnemonics** (memory tricks) but use them sparingly as they don't substitute for comprehension and will likely not help with long-term memory.
- **Learn actively**. Read a small amount, then recite the main points, write notes, do related problems, or organize the material.
- **Test yourself** as you study. One of the biggest mistakes students make is thinking they 'know' the material just because they understand it as they are reading.

- Study the **most important material first**. Our minds remember best what they were first and last exposed to and tend to forget material in the middle.
- Put material into your **own words**. We remember best using our own words rather than those of instructors or textbook authors.
- Put yourself on an **information diet**. Use course objectives, instructor focus and homework assignments to choose the most important areas to study.
- Break material into small, manageable chunks and learn one chunk at a time.
- Create pictures or diagrams.
- If your course involves a lot of memory work commit to memorizing a few points every day.
- Take short (approximately 10 minute) **frequent breaks**, every 45 to 50 minutes or so. Changing study technique and subject area can also help relieve boredom and increase focus.
- **Tutor** another student who is having difficulty. Teaching someone else reinforces your own knowledge.

Memory and Recall

The picture below is a conceptual top down view of the human brain, divided into the stages of memory described on the previous page. While these stages and zones are not real anatomical divisions in the brain, they help us understand the process of learning.



Most students feel that they are not able to remember as much information as they would like as quickly as they would like to. But the brain is a very powerful information processing tool that holds more bytes of information than the Library of Congress. What matters, of course, is being able to find or retrieve the information you need when you need it. Understanding how memory works can help students store information in a way that it can be retrieved as needed by ensuring its placement into the Automatic or Retrieval zones.

Memory can be divided into three stages:

Stage One: Sensory Memory

Information is first gathered through the senses (auditory, visual, and kinesthetic) where it is stored before moving on the next stage of memory. Sensory memory is brief but can hold an expansive amount of information.

Stage Two: Working Memory

Working memory is the brain's filter. It is brief (only seconds in duration) and holds between five and nine pieces of information on average. It is more than just short term memory, but requires the individual to retain information in memory while utilizing the learned information to complete a task. This is an active process. If attention is not focused on the relevant information, the information will likely be lost, and will not be stored in long-term memory.

Stage Three: Long Term Memory

Long Term memory is, at least theoretically, infinite in both capacity and duration. Unfortunately, information is not always easy to find because of the way it was stored. Students need to ensure that they are engaged in regular review and that they understand what they are learning, but must also test themselves to establish where in the long term memory information has been stored:

Automatic zone - information in this zone is recalled automatically, without hesitation.

Retrieval zone - this is information students can recall with only brief (i.e. up to 20 seconds) hesitation.

Lost zone - students require reminders or cues from others to find this information, but cannot easily recall it on their own.

When preparing for exams, students should use visual, auditory, and hands-on strategies to ensure that information is placed in either the Automatic zone or the Retrieval zone. Information in the Lost zone requires ***elaborate rehearsal***. Elaborate rehearsal is the process of ongoing practice along with efforts to relate new information to previously acquired knowledge. An example of this is when a student is required to learn a new mathematical formula. Not only does the student need to practice the formula to know how and when to use it, but by comparing the new formula to formulas studied previously, both recall and understanding are ensured.

Memory Principles *(That will help boost your brain power!)*

Regular review and practice are necessary for learning, but these elements alone do not result in real learning. The human brain is a powerful tool that learns information by making connections with previously learned knowledge. Regular review and practice are tools that we use to ensure that new information is mastered and is readily available when we need to use it. The following are descriptions of various memory principles that you can use to make connections between new information and previously learned information.

Multisensory Effect

The more senses you use to learn (visual, auditory, hands-on) the greater your brainpower. Not only will you remember information better when you have learned it with multiple senses, but it will be easier to retrieve when you need it on an exam, in class, or in daily life. So, when you can, practice what you are learning by saying, seeing and doing something.

Recency and Primacy Effects

We remember information better if it is at the beginning or at the end of an event or situation. For example, when you are reading a paragraph you will recall the beginning and end better than the middle. Therefore it is the middle information that we often have to pay the most attention to because it is the hardest to remember. This also reinforces that we should be studying for brief periods of time rather than one long time period, so that lots of beginning and endings are created.

Power of Association

The brain is an associative tool; it remembers information best when ideas are related to each other, or when new learning is linked with old learning. So when learning something new, ask yourself, "How does this information relate to what I already know?"

Humor and Absurdity

We recall information that is strange, unique, absurd or just plain funny. So adding humor to what you are learning by drawing goofy pictures, making strange associations, or creating bizarre acronyms will all capitalize on the fact that the brain will recall information that is outrageous or out of place.

Similarity Effect

It is easier to remember information that is similar, so grouping information into categories is a good way to maximize your brainpower. This is called “chunking”. For example, try memorizing the following list of words:

mixer
pencil crayon
Ferrari
blender
Ford
stapler
Chrysler
sharpener
toaster

Now, try it again when the information is chunked or divided into similar groups or categories:

Cars

Ferrari
Ford
Chrysler

Kitchen Appliances

mixer
blender
toaster

School Supplies

pencil crayon
stapler
sharpener

For most people, it is easier to learn the list when the words are grouped together.

Learn from General to Specific

For most people, it is easier to learn from general to specific, or whole to part, than from specific to general. This means that you should first understand the main idea or general concept and then the details. Take advantage of this by previewing chapters before reading, taking note of class objectives and topics, and reviewing previous notes prior to class to refresh your recall of what you have already covered.

Daily and Weekly Review

Daily Review

Begin daily review on the first day of class, allowing at least 15 minutes per subject. Reviewing your notes within 24 hours moves the material from short-term to long-term memory. **Up to 80% of material is forgotten within 24 hours unless it is reviewed.**

Quickly read through your notes, highlighting the main points and marking any points that need clarification. Mark material that you need to spend more time on. If you have a lot of points to remember, commit to memorizing something every day. Use the PAS study technique described on page 50 to ensure that reading is active and that appropriate review strategies are used early in the semester rather than just before exams.

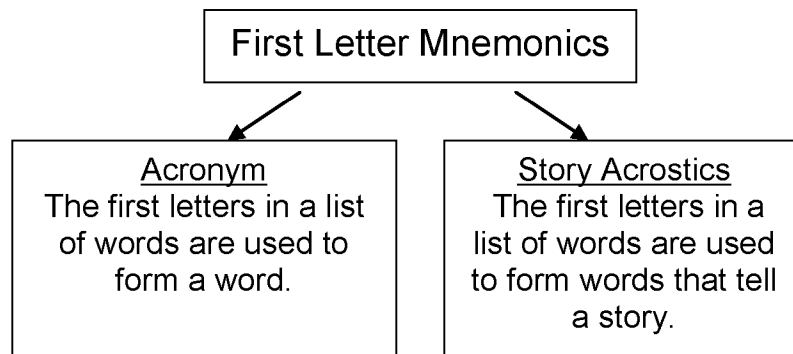
Weekly Review

Schedule in a regular weekly review to go through all of your notes. You should allow approximately one hour per subject for your weekly review. As you review, **test yourself** on the knowledge and **practice answering questions and problems.**

Mnemonics (Memory Tricks)

Both memory and understanding are essential to learning. In order to apply information on exams, one must have instant recall of information along with understanding of that information. **Mnemonic techniques** are specific memory aids. **First Letter Mnemonics** and **The Method of Loci** are mnemonic strategies that you can use when you need to recall specific, detailed information.

1. **First letter mnemonics** - This strategy involves the use of first letters in a list of information. It is useful when there are multiple pieces of information presented in a list or sequence. First Letter mnemonics can be accomplished in two ways:



The following provides an example of an acronym and a story acrostic for the **three trigonometry functions** (S=O/H, C=A/H, T=O/A):

| Acronym | Story Acrostic |
|----------------|----------------|
| S (Sine) | Some |
| O (Opposite) | Old |
| H (Hypotenuse) | Hags |
| C (Cosine) | Can't |
| A (Adjacent) | Attain |
| H (Hypotenuse) | Husbands |
| T (Tangent) | Till |
| O (Opposite) | Old |
| A (Adjacent) | Age |

The **acronym** “SOHCAHTOA” (pronounced “soak a toe a”) is used to remember which function to use when calculating the size of the angle depending on the sides provided.

Alternatively, some students find it easier to remember the story acrostic, “Some old hags can’t attain husbands till old age.” Remember, the more meaningful the acronym or story, the easier it will be to remember.

2. Method of Loci - This memory technique is one of the oldest recorded strategies and is the most powerful strategy for memory and recall. It is powerful because it uses auditory, visual and kinesthetic modalities to associate what you do not know (whatever you are learning) to what you do know (location in a room). It is appropriate for information presented in a list such as sequences, steps, processes, events, stages, cycles...

For example, if you needed to know the eight steps in the accounting cycle, you could use the Method of Loci by associating each step with a location in a room:

| Steps in accounting cycle | Location in room | Association |
|-----------------------------|------------------|--|
| 1. Analyze transactions | book | We must analyze the contents of the book |
| 2. Journalize | newspaper | Edmonton Journal |
| 3. Post | Pillar | Pillar is like a post |
| 4. Unadjusted trial balance | Coat rack | Trial balance of coat on rack |
| 5. Make adjustments | Chair | Adjust the height of seat |
| 6. Balance (trial) | Sit on the chair | After adjustment, try balancing on chair |
| 7. Financial statements | Computer | Type statements |
| 8. Close the books | Binder | Close the binder |

Steps to the Method of Loci

Step One: Chose a familiar room (e.g., kitchen, living room, study) and begin to make associations between the objects or locations in the room and the information you need to know. In this example, we chose the office or den. Because the first step in the accounting cycle was “Analyze transactions” we chose a book as the first object/location in the room. The association that we used to remember the step was, “We must analyze the contents of the book.”

Step Two: Choose another object/location in close proximity to the book and find a way to associate it to the second step in the accounting cycle. We chose a newspaper (Edmonton Journal) that was lying next to the book to remember the second step, “Journalize.” This was a logical choice and an easy association to make.

Step Three: Continue in a similar fashion, choosing objects/locations within the room using your imagination to make associations. While some associations are easy to make, others require creativity and a sense of humor. You must, however, select objects in order. For example, if a book was the first location and the newspaper was to the left of the book, you would continue to choose objects in a counterclockwise fashion. If objects or locations are chosen randomly, it will be harder to recall the information.

Step Four: Build in plenty of practice.

Step Five: When retrieving or recalling the steps during an exam, it is important to first picture the room in your mind, visualize the locations, and then recall the association you have made. For example, to recall the accounting cycle during an exam, you would picture the room, visualize the locations you chose, and then try to recall the associations you made to the accounting cycle.