

20 memory techniques

Experiment with these techniques to develop a flexible, custom-made memory system that fits your style of learning.

The 20 techniques are divided into four categories, each of which represents a general principle for improving memory. Briefly, the categories are:

Organize it. Organized information is easier to find.

Use your body. Learning is an active process; get all of your senses involved.

Use your brain. Work *with* your memory, not *against* it.

Recall it. This is easier when you use the other principles efficiently to notice and elaborate on incoming information.

The first three categories, which include techniques #1 through #16, are about storing information effectively. Most memory battles are won or lost here.

To get the most out of this article, first survey the following techniques by reading each heading. Then read the techniques. Next, skim them again, looking for the ones you like best. Mark those and use them.

Organize it

1 Be selective. There's a difference between gaining understanding and drowning in information. During your stay in higher education, you will be exposed to thousands of facts and ideas. No one expects you to memorize all of them. To a large degree, the art of memory is the art of selecting what to remember in the first place.

As you dig into your textbooks and notes, make choices about what is most important to learn. Imagine that you are going to create a test on the material and consider the questions you would ask.

When reading, look for chapter previews, summaries, and review questions. Pay attention to anything printed in bold type. Also notice visual elements—tables, charts, graphs, and illustrations. All of these are clues pointing to what's important. During lectures, notice what the instructor emphasizes. Anything that's presented visually—on the board, on overheads, or with slides—is probably key.

2 Make it meaningful. One way to create meaning is to learn from the general to the specific. Before you begin your next reading assignment, skim it to locate the main idea. You can use the same techniques you learned in Exercise #1: "Textbook reconnaissance" on page 2. If you're ever lost, step back and look at the big picture. The details might make more sense.

You can organize any list of items—even random ones—in a meaningful way to make them easier to remember. In his book *Information Anxiety*, Richard Saul Wurman proposes five principles for organizing any body of ideas, facts, or objects:³

Principle	Example
Organize by time	Events in history or in a novel flow in chronological order.
Organize by location	Addresses for a large company's regional offices are grouped by state and city.
Organize by category	Nonfiction library materials are organized by subject categories.
Organize by continuum	Products rated in <i>Consumers Guide</i> are grouped from highest in price to lowest in price, or highest in quality to lowest in quality.
Organize by alphabet	Entries in a book index are listed in ABC order.

Visualization #1: A well-worn path

Imagine what happens as a thought, in this case we'll call it an elephant, bounds across short-term memory and into the jungle.



The deer leaves

a trail of broken twigs and hoof prints that you can follow. Brain research suggests that thoughts can wear paths in the memory.² These paths are called *neural traces*. The more well-worn the neural trace, the easier it is to retrieve (find) the thought. In other words, the more often the elephant retraces the path, the clearer the path becomes. The more often you recall information, and the more often you put the same information into your memory, the easier it is to find. When you buy a new car, for example, the first few times you try to find reverse, you have to think for a moment. After you have found reverse gear every day for a week, the path is worn into your memory. After a year, the path is so well-worn that when you dream about driving your car backward, you even dream the correct motion for putting the gear in reverse.

Visualization #2: A herd of thoughts

The second picture you can use to your advantage is the picture of many animals gathering at a clearing—like thoughts gathering at a central location in the memory. It is easier to retrieve thoughts that are grouped together, just as it is easier to find a herd of animals than it is to find a single elephant.

Pieces of information are easier to recall if you can associate them with similar information. For example,



you can more readily remember a particular player's batting average if you can associate it with other baseball statistics.

Visualization #3: Turning your back

Imagine releasing the elephant into the jungle, turning your back, and counting to 10. When you turn around, the elephant is gone. This is exactly what happens to most of the information you receive.

Generally, we can recall only 50 percent of the material we have just read. Within 24 hours, most of us can recall only about 20 percent. This means that 80 percent of the material has not been encoded and is wandering around, lost in the memory jungle.

The remedy is simple: Review quickly. Do not take your eyes off the thought animal as it crosses the short-

term memory meadow, and review it soon after it enters the long-term memory jungle. Wear a path in your memory immediately.



Visualization #4: You are directing the animal traffic

The fourth picture is one with you in it. You are standing at the entrance to the short-term memory meadow, directing herds of thought animals as they file through the pass, across the meadow, and into your long-term memory. You are taking an active role in the learning process. You



are paying attention. You are doing more than sitting on a rock and watching the animals file past into your brain. You have become part of the process, and in doing so, you have taken control of your memory. ☒

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3 Create associations. The data already encoded in your neural networks is arranged according to a scheme that makes sense to you. When you introduce new data, you can remember it more effectively if you associate it with similar or related data.

Think about your favorite courses. They probably relate to subjects that you already know something about. If you know a lot about the history of twentieth-century music, you'll find it easier to remember facts about music recorded since 2000. If you've already passed an advanced algebra course, you're primed to remember calculus formulas. And if you've enjoyed several novels by your favorite author, you've already cleared a memory path for another book from that writer.

Even when you're tackling a new subject, you can build a mental store of basic background information—the raw material for creating associations. Preview reading assignments, and complete those readings before you attend lectures. Before taking upper-level courses, master the prerequisites.

Use your body

4 Learn it once, actively. Action is a great memory enhancer. You can test this theory by studying your assignments with the same energy that you bring to the dance floor or the basketball court.

This technique illustrates the practical advantage of knowing about learning styles. In Chapter One, the article "Learning styles: Discovering how you learn" explains four aspects of learning: concrete experience, abstract conceptualization, active experimentation, and reflective observation. Many courses in higher education lean heavily toward abstract conceptualization, emphasizing lectures, papers, and textbook assignments. These courses might not give you the chance to act on ideas, to experiment with them and test them in situations outside the classroom.

You can create those opportunities yourself. For example, your introductory psychology book probably offers some theories about how people remember information. Choose one of those theories and test it on yourself. See if you can turn that theory into a new memory technique.

Your English teacher might tell you that one quality of effective writing is clear organization. To test this idea, examine the texts you come in contact with daily—newspapers, popular magazines, Web sites, and textbooks. Look for examples of clear organization *and* unclear organization. Then write Intention Statements about ways to organize your own writing more clearly.

Your sociology class might include a discussion about how groups of people resolve conflict. See if you can apply any of these ideas to resolving conflict in your own family. Then write Discovery Statements about your experiences.

The point behind each of these examples is the same: To remember an idea, go beyond thinking about it. *Do* something with it.

You can use simple, direct methods to infuse your learning with action. When you sit at your desk, sit up straight. Sit on the edge of your chair, as if you were about to spring out of it and sprint across the room.

Also experiment with standing up when you study. It's harder to fall asleep in this position. Some people insist that their brains work better when they stand.

Pace back and forth and gesture as you recite material out loud. Use your hands. Get your whole body involved in studying.

5 Relax. When you're relaxed, you absorb new information quickly and recall it with greater ease and accuracy. Students who can't recall information under the stress of a final exam can often recite the same facts later when they are relaxed.

Relaxing might seem to contradict the idea of active learning as explained in technique #4, but it doesn't. Being relaxed is not the same as being drowsy, zoned out, or asleep. Relaxation is a state of alertness, free of tension, during which your mind can play with new information, roll it around, create associations with it, and apply many of the other memory techniques. You can be active *and* relaxed.

6 Create pictures. Draw diagrams. Make cartoons. Use these images to connect facts and illustrate relationships. Associations within and among abstract concepts can be "seen" and recalled more easily when they are visualized. The key is to use your imagination.

For example, Boyle's law states that at a constant temperature, the volume of a confined ideal gas varies inversely with its pressure. Simply put, cutting the volume in half doubles the pressure. To remember this concept, you might picture someone "doubled over" using a bicycle pump. As she increases the pressure in the pump by decreasing the volume in the pump cylinder, she seems to be getting angrier. By the time she has doubled the pressure (and halved the volume) she is boiling ("Boyle-ing") mad.

Another reason to create pictures is that visual information is associated with a part of the brain that is different from the part that processes verbal information. When you create a picture of a concept, you are anchoring the information in a second part of your brain. This increases your chances of recalling that information.

To visualize abstract relationships effectively, create an action-oriented image, such as the person using the pump. Make the picture vivid, too. The person's face could be bright red. And involve all of your senses. Imagine how the cold metal of the pump would feel and how the person would grunt as she struggled with it. (Most of us would have to struggle. It would take incredible strength to double the pressure in a bicycle pump, not to mention a darn sturdy pump.)

7 Recite and repeat. When you repeat something out loud, you anchor the concept in two different senses. First, you get the physical sensation in your throat, tongue, and lips when voicing the concept. Second, you hear it. The combined result is synergistic, just as it is when you create pictures. That is, the effect of using two different senses is greater than the sum of their individual effects.

The “out loud” part is important. Reciting silently in your head can be useful—in the library, for example—but it is not as effective as making noise. Your mind can trick itself into thinking it knows something when it doesn't. Your ears are harder to fool.

The repetition part is important, too. Repetition is a common memory device because it works. Repetition blazes a trail through the pathways of your brain, making the information easier to find. Repeat a concept out loud until you know it, then say it five more times.

Recitation works best when you recite concepts in your own words. For example, if you want to remember that the acceleration of a falling body due to gravity at sea level equals 32 feet per second per second, you might say, “Gravity makes an object accelerate 32 feet per second faster for each second that it's in the air at sea level.” Putting it in your own words forces you to think about it.

Have some fun with this technique. Recite by writing a song about what you're learning. Sing it in the shower. Use any style you want (“Country, jazz, rock, or rap—when you sing out loud, learning's a snap!”).

Or imitate someone. Imagine your textbook being read by Bill Cosby, Madonna, or Clint Eastwood (“Go ahead, punk. Make my density equal mass over volume”).

Recite and repeat. It's a technique you can use anywhere.

8 Write it down. This technique is obvious, yet easy to forget. Writing a note to yourself helps you remember an idea, even if you never look at the note again.

You can extend this technique by writing down an idea not just once, but many times. Let go of the old image of being forced to write “I will not throw paper wads” 100 times on the chalkboard after school. When you choose to remember something, repetitive writing is a powerful tool.

Writing engages a different kind of memory than speaking. Writing prompts us to be more logical, coherent, and complete. Written reviews reveal gaps in knowledge that oral reviews miss, just as oral reviews reveal gaps that written reviews miss.

Another advantage of written reviews is that they more closely match the way you're asked to remember materials in school. During your academic career, you'll probably take far more written exams than oral exams. Writing can be an effective way to prepare for such tests.

Finally, writing is physical. Your arm, your hand, and your fingers join in. Remember, learning is an active process—you remember what you *do*.

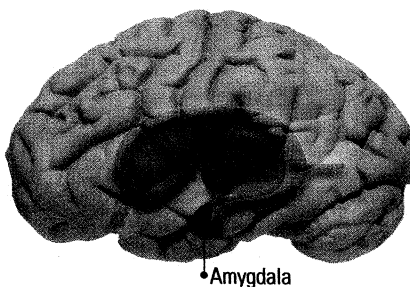
Use your brain

9 Engage your emotions. One powerful way to enhance your memory is to make friends with your amygdala. This is an area of your brain that lights up with extra neural activity each time you feel a strong emotion. When a topic excites love, laughter, or fear, the amygdala sends a flurry of chemical messages that say, in effect: *This information is important and useful. Don't forget it.*

You're more likely to remember course material when you relate it to a goal—whether academic, personal, or career—that you feel strongly about. This is one reason why it pays to be specific about what you want. The more goals you have and the more clearly they are defined, the more channels you create for incoming information.

You can use this strategy even when a subject seems boring at first. If you're not naturally interested in a topic, then create interest. Find a study partner in the class—if possible, someone you know and like—or form a study group. Also consider getting to know the instructor personally. When a course creates a bridge to human relationships, you engage the content in a more emotional way.

10 Overlearn. One way to fight mental fuzziness is to learn more than you need to know about a



The amygdala, highlighted in this illustration, is an area of your brain that sends neural messages associated with strong emotions. When you link new material to something that you feel strongly about, you activate this part of your brain. In turn, you're more likely to remember that material.

subject simply to pass a test. You can pick a subject apart, examine it, add to it, and go over it until it becomes second nature.

This technique is especially effective for problem solving. Do the assigned problems, and then do more problems. Find another textbook and work similar problems. Then make up your own problems and solve them. When you pretest yourself in this way, the potential rewards are speed, accuracy, and greater confidence at exam time.

11 Escape the short-term memory trap. Short-term memory is different from the kind of memory you'll need during exam week. For example, most of us can look at an unfamiliar seven-digit phone number once and remember it long enough to dial it. See if you can recall that number the next day.

Short-term memory can fade after a few minutes, and it rarely lasts more than several hours. A short review within minutes or hours of a study session can move material from short-term memory into long-term memory. That quick minireview can save you hours of study time when exams roll around.

12 Use your times of peak energy. Study your most difficult subjects during the times when your energy peaks. Many people can concentrate more effectively during daylight hours. The early morning hours can be especially productive, even for those who hate to get up with the sun. Observe the peaks and valleys in your energy flow during the day and adjust study times accordingly. Perhaps you will experience surges in memory power during the late afternoon or evening.

13 Distribute learning. As an alternative to marathon study sessions, experiment with shorter, spaced-out sessions. You might find that you can get far more done in three two-hour sessions than in one six-hour session.

For example, when you are studying for your American history exam, study for an hour or two and then wash the dishes. While you are washing the dishes, part of your mind will be reviewing what you studied. Return to American history for a while, then call a friend. Even when you are deep in conversation, part of your mind will be reviewing history.

You can get more done if you take regular breaks. You can even use the breaks as minirewards. After a productive study session, give yourself permission to log on and check your e-mail, listen to a song, or play 10 minutes of hide-and-seek with your kids.

Distributing your learning is a brain-friendly thing to do. You cannot absorb new information and ideas during all of your waking hours. If you overload your brain, it

will find a way to shut down for a rest—whether you plan for it or not. By taking periodic breaks while studying, you allow information to sink in. During these breaks, your brain is taking the time to literally rewire itself by growing new connections between cells. Psychologists call this process *consolidation*.⁴

There is an exception to this idea of allowing time for consolidation. When you are so engrossed in a textbook that you cannot put it down, when you are consumed by an idea for a term paper and cannot think of anything else—keep going. The master student within you has taken over. Enjoy the ride.

14 Be aware of attitudes. People who think history is boring tend to have trouble remembering dates and historical events. People who believe math is difficult often have a hard time recalling mathematical equations and formulas. All of us can forget information that contradicts our opinions.

If you think a subject is boring, remind yourself that everything is related to everything else. Look for connections that relate to your own interests.

For example, consider a person who is fanatical about cars. She can rebuild a motor in a weekend and has a good time doing so. From this apparently specialized interest, she can explore a wide realm of knowledge. She can relate the workings of an engine to principles of physics, math, and chemistry. Computerized parts in newer cars can lead her to the study of data processing. She can research how the automobile industry has changed our cities and helped create suburbs, a topic that includes urban planning, sociology, business, economics, psychology, and history.

Being aware of attitudes is not the same as fighting them or struggling to give them up. Acknowledge them. Notice them. Simple awareness can deflate an attitude that is blocking your memory.

15 Give your “secret brain” a chance. Sometimes the way you combine studying with other activities can affect how well you remember information. The trick is to avoid what psychologists call *retroactive inhibition*, something that happens when a new or unrelated activity interferes with previous learning. Say that you've just left your evening psychology class, which included a fascinating lecture on Sigmund Freud's theory of dreams. When you arrive home, you decide to sneak in a few pages of that mystery novel you've wanted to finish. After you find out who poisoned the butler, you settle in for a well-deserved rest. In this scenario, the key concepts of the psychology lecture are pushed aside by the gripping drama of the whodunit. Consider another scenario instead. You have arranged to car-pool with a

classmate, and on the way home, you talk about the lecture. The discussion ignites into a debate as you and your friend take opposite stands on a principle of Freud's theory. Later, just before going to sleep, you mull over the conversation. While you sleep, your brain can now process the key points of the lecture—something that will come in handy for the mid-term exam.

16 Combine techniques. All of these memory techniques work even better in combination. Choose two or three techniques to use on a particular assignment and experiment for yourself. For example, after you take a few minutes to get an overview of a reading assignment, you could draw a quick picture or diagram to represent the main point. Or you could overlearn a chemistry equation by singing a jingle about it all the way to work. If you have an attitude that calculus is difficult, you could acknowledge that. Then you could distribute your study time in short, easy-to-handle sessions. Combining memory techniques involves using sight, sound, and touch when you study. The effect is synergistic.

Recall it

17 Remember something else. When you are stuck and can't remember something that you're sure you know, remember something else that is related to it.

If you can't remember your great-aunt's name, remember your great-uncle's name. During an economics exam, if you can't remember anything about the aggregate demand curve, recall what you do know about the aggregate supply curve. If you cannot recall specific facts, remember the example that the instructor used during her lecture. Information is encoded in the same area of the brain as similar information. You can unblock your recall by stimulating that area of your memory.

You can take this technique one step further with a process that psychologists call *elaboration*.⁵ The key is to ask questions that prompt you to create more associations. For example, when you meet someone new, ask yourself: What are the distinctive features of this person's face? Does she remind me of someone else?

A brainstorm is a good memory jog. If you are stumped when taking a test, start writing down lots of answers to related questions, and—pop!—the answer you need is likely to appear.

18 Notice when you do remember. Everyone has a different memory style. Some people are best at

recalling information they've read. Others have an easier time remembering what they've heard, seen, or done.

To develop your memory, notice when you recall information easily and ask yourself what memory techniques you're using naturally. Also notice when it's difficult to recall information. Be a reporter. Get the facts and then adjust your learning techniques. And remember to congratulate yourself when you remember.

19 Use it before you lose it. Even information encoded in long-term memory becomes difficult to recall when we don't use it regularly. The pathways to the information become faint with disuse. For example, you can probably remember your current phone number. What was your phone number 10 years ago?

This points to a powerful memory technique. To remember something, access it a lot. Read it, write it, speak it, listen to it, apply it—find some way to make contact with the material regularly. Each time you do so, you widen the neural pathway to the material and make it easier to recall the next time.

Another way to make contact with the material is to teach it. Teaching demands mastery. When you explain the function of the pancreas to a

fellow student, you discover quickly whether you really understand it yourself.

Study groups are especially effective because they put you on stage. The friendly pressure of knowing that you'll teach the group helps focus your attention.

20 Adopt the attitude that you never forget. You might not believe that an idea or a thought never leaves your memory. That's OK. In fact, it doesn't matter whether you agree with the idea or not. It can work for you anyway.

Test the concept. Instead of saying, "I don't remember," you can say, "It will come to me." The latter statement implies that the information you want is encoded in your brain and that you can retrieve it—just not right now.

People who use the flip side of this technique often get the opposite results. "I never remember anything," they say over and over again. "I've always had a poor memory. I'm such a scatterbrain." That kind of negative talk is self-fulfilling.

Instead, use positive affirmations that support you in developing your memory: "I recall information easily and accurately." "At any time I choose, I will be able to recall key facts and ideas." "My memory serves me well."

Or even "I never forget!" ❧

