

Memory Tips for Students

As exam time approaches, students with learning disabilities often find themselves overwhelmed with the amount of information they need to remember. Teachers tell their students to review in each subject as they go along through the semester.

Research tells us that if we review information within 24 hours of learning it, we are much more likely to remember it in the long run. Well thought out homework is designed with this kind of review in mind. Each student should choose strategies for memorization that fit their own learning styles.

- **Sort information**

Help your retrieval system by putting new information into categories. You can group by dates, people, formulas, etc. It may help to make a chart as you study.

- **Frequent review**

Studying new information the same day you heard or read it will improve memory significantly. A small review each day is essential if you have memory problems.

- **Use humor or exaggeration**

Information stays in memory longer if it is related to something novel and interesting. Make up something funny or exaggerated that ties in to what needs to be memorized.

- **Explore the senses**

Try learning the information visually, verbally, and kinesthetically (with movement) and find which sense works best for you. Some people need to combine two or more senses.

- **Color code**

By using colored pens, highlighters, post-it notes and flags, index cards, etc. you can make an impression on your memory. This is a way of sorting information for storage as you assign colors.

- **Make visual aids**

Draw pictures or cartoon characters, graphs, tables, charts, time lines, etc. to aid memory. Even simple stick figures and drawings are useful if you are a visual learner. Pay attention to pictures, charts, etc. in textbooks.

- **Rehearse aloud**

Verbal rehearsal is an effective memory tool. Study with someone or use a tape recorder to say aloud what needs to be memorized.

- **Make it physical**

Adding a physical activity such as pacing, jumping, throwing a ball, or writing enhances the memory for many people. Typing or rewriting notes is a very effective memory device for people who need to learn kinesthetically.

- **Turn memory practice into a game**

Make cards to match words and definitions, math facts to answers, etc. and play a memory game by turning over two cards at a time. Time yourself to see how long it takes to match all the cards. The act of making the game also helps memory.

From Kingsbury, 5000 14th Street, NW, Washington, DC 20011, www.kingsbury.org

By: Anne Hoover (2009)

Kingsbury is a nonprofit educational organization that provides comprehensive services to support children and adults with learning disabilities through its tutoring services, assessment services, and Kingsbury Day School.

Making It Stick: Memorable Strategies to Enhance Learning

Think about how you remember something:

- When you want to remember a phone number, do you repeat it to yourself several times until you get the whole number dialed?
- When you get to the grocery store and want to remember four items, do you hold up four fingers to cue yourself to remember?
- When someone asks you about a wedding you went to a few years ago, how do you call up the memory? Some people may first think of the food. Others may recall the bride's dress. Still others may recall the décor. Once you have a hook into the memory, each recall seems to trigger additional aspects of the event.
- What do you do to remember an important phone call you must make as you're driving home? You know that when you enter the house the dog will be barking and your children will each have something urgent to tell you. You don't have any paper to write a note. Some people may sing a little song or chant: "call so-and-so, call so-and-so." Others may visualize an association so that when they walk into the den to put down their package, that action will trigger a reminder to make the call.

Using strategies intrinsically mean slowing down when you do something. It's a process of deceleration so you can exercise quality control.

-Mel Levine at a workshop presentation, *Enabling Without Labeling*. Sponsored by Inland Empire Branch of the International Dyslexia Association, Ontario, CA, in May 2000

We all use strategies throughout our day to remember the variety of facts and ideas we need to retain. Strategy use forms a critical part of our learning experience. Strategies help us organize information into patterns and encourage purposeful learning. Our brains are selective. Brains tend to remember information that forms a memorable pattern.

It is valuable for us, as teachers, therapists, and parents, to have a basic understanding of how we remember information so we better appreciate the need for strategies. As we understand the purpose, we become better equipped to help our students understand and use strategies.

The Memory Process

Memory is a highly complex process involving multiple components working simultaneously. Our description of isolated components is only a representation because in reality our brains process information in an integrated fashion.

Everything begins as sensory input from our environment. Using our sensory systems, we see, taste, hear, or feel a sensation or stimuli. We have a mechanism to filter out and discard irrelevant or unnecessary data, such as the feel of the carpet as we walk or the sound of the air conditioner. This same filtering mechanism organizes relevant data into meaningful patterns. In figure 1, the funnel and the filter represent these processes: sensory input and sensory memory.

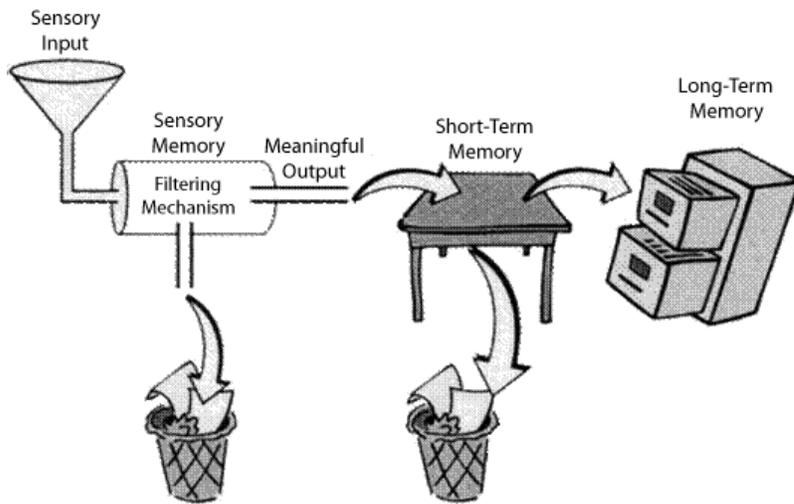


Figure 1 Memory process schema

The diagram in figure 1 is a representation of the memory system: Information moves from *Sensory Input* through *Sensory Memory* and *Short-Term Memory* and eventually into *Long-Term Memory* (Richards, 2003, p. 17).

Information "grabbed," or made meaningful, moves on to short-term memory. Our brains are programmed to pay attention to the unusual - something different. Incorporating novelty such as humor, movement, or music, into strategies helps the information attract our attention.

The use of strategies plays a very critical role in structuring input to help it move into long-term memory in a meaningful and memorable format. To establish a more durable memory, we need to prevent incoming information from being "dumped." We accomplish this by associating it meaningfully with knowledge that already exists.

If the information is important and is rehearsed, it moves to another part of the brain to be coded and then is eventually stored in long-term memory. In figure 1, a file cabinet represents long-term memory. The entire memory is not filed intact in a location, rather, the specific components of the experience are each stored as individual files.

In thinking about how memory works, it is critical to realize that each individual has a different way of processing and remembering. There is more than one way to store a given memory, just as there are often multiple routes to drive to a destination. One person may choose to go to the grocery store by route A whereas another person may prefer route B. Either is appropriate. Similarly with memory: One person may prefer to remember a list by singing it whereas another person may prefer to visualize an association. There is no one correct way.

This article presents a variety of strategy suggestions. We need to pay attention to our student's reactions to the strategies and help each child select and use strategies that are comfortable and most closely match his or her preferred learning style.

The RIP Toolbox for Memory

This toolbox contains the three key strategies to help memory: **repetition**, **imagery**, and **patterns (RIP)**. Many students believe that just reading something is enough. Often, that is not sufficient. We remember something best when it is organized and rehearsed.

Imagine if we as teachers, therapists, and parents reinforced students for their use of concrete strategies in organizing their information. Pediatrician, Dr. Mel Levine suggests: I thought that before a test, kids ought to be asked to hand in a memory plan. The same way a pilot would hand in a flight plan. In other words, how are you going to go about getting stuff into and out of your memory? And students ought to be graded on the plan as much as they are on their test (Levine and Meltzer, 1998).

The following two strategies are general reminders to encourage students to use a process when working to remember information. Each strategy is represented by a word or phrase wherein each letter represents one of the steps.

R SOW V

- R Relax & Concentrate
People who are tense and under stress are prone to memory lapses
- S Slowdown
Rushing or being impulsive reduces attention to the information or task
- O Organize
Organize the information or organize locations; keep important items in a designated place
- W Write down or repeat
A small notebook, calendar, tape recorder or PDA can be very useful
- V Visualize
Associate an image with the information to recall

TRAP

- T Translate
Translate the information or ideas into your own words
- R Repeat
Rehearse the information immediately and relate the new to the old ideas
- A A picture
A picture is worth 1000 words; visualize the information
- P Practice
The more information is practiced, the better will be the recall

Select the strategy you feel is appropriate for your students. Teach each step, one at a time. Be sure they understand each step and its meaning before moving on to the next. Then show the steps in sequence and explain how to use the mnemonic or keyword to help recall the steps.

An important criterion to keep in mind is, "don't pack and stack." This means to progress slowly and not stack too many new things on top of each other. Provide each student with time to process and consolidate one thing before moving on.

Several years ago, a *FarSide* cartoon was published showing a classroom situation. The student raised his hand and asked to be excused because his "brain was full." This highlights an important caution to remember in using strategies: go slowly. Too many strategies at once may confuse the student rather than help.

Repetition: The R in RIP



Fig. 2 - Novelty and multi-sensory learning

In figure 2, a child is jumping on a small trampoline, reviewing associations. He is also tossing the ball with each item.

Repetition and rehearsal of information enhance a process called consolidation, the process by which memories are moved from temporary storage in the hippocampus (a small structure within the brain) to more permanent storage in the cortex (the outer layer of the brain) (Richards, 2003, p. 24).

Multiple repetitions of the information provides rehearsal, but doing so may bore students. When bored, the brain can go into a pattern similar to the "screen saver" mode on your computer monitor. The student may not pay attention to what he is repeating. Therefore, using strategies with humor, movement, songs, and other forms of novelty are critical in enhancing the value of the repetition.

As an example, consider the task of learning five state capitals. Following are several different activities to use in memorizing the associations. (Richards, 2003, p. 191).

- Practice saying the capital and the state together, as in "Sacramento, California; Columbus, Ohio" etc. This helps create the association between the two words.
- Develop silly mnemonics to help remember which capital goes with the state. For Ohio, sketch a picture of a person saying, "oh, hi, oh Columbus." This associates the word "Columbus" with the word "Ohio."
- Practice matching flash cards of capitals to state names, and states to capitals.
- Perform a motor activity such as jumping on a small trampoline or playing catch while saying the city in response to hearing the state, or vice versa (see figure 2).
- Create a rap or jingle that repeats each state and its capital.

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Imagery: The I in RIP

There are many kinds of imagery, and all forms are valuable to the memory process. When thinking about imagery, most people think of the visual image. However, images can also be a motor image, sometimes called "muscle memory," or an auditory image.

Visual images

A visual picture can cue a strategy or represent a concept. For example, suppose your student needs to remember that our First Amendment rights are free speech, religion, the press, and the right of assembly. Since it is the *First* Amendment and *one* rhymes with *sun*, use a sun as a visual cue. Draw a happy sun with legs and arms, singing. Place the word RAPS in a talk bubble, as shown in figure 3. RAPS is a mnemonic to remember the freedoms of **R**eligion, **A**ssembly, **P**ress, and **S**peech. (Richards, 2003, p. 198).



Fig. 3 - A mnemonic for the 4 freedoms granted by the First Amendment

Because brains remember information that forms a memorable pattern, visual organizers are extremely useful. There are many different types of visual organizers. Some are descriptive: the main idea of a chapter section is placed in the center. Lines extend, with each representing a major concept. The representations may use pictures, icons, or keywords. The example organizer below was developed in preplanning a paragraph on dogs (Richards, 2001, p. 34).

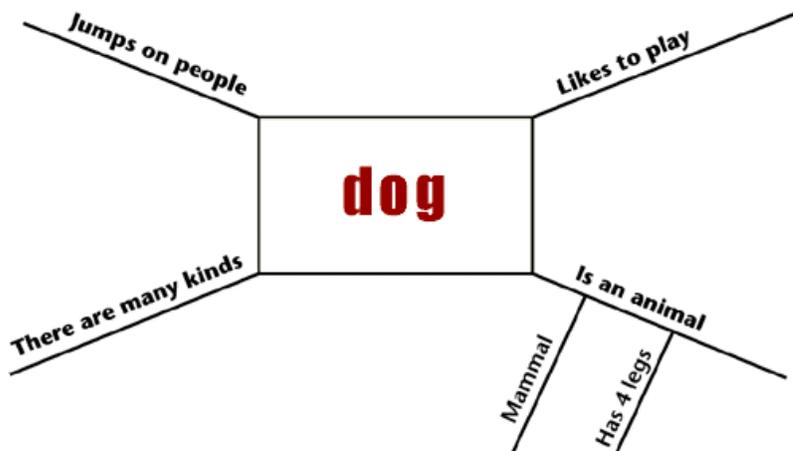


Fig. 4 - Visual organizer to identify some characteristics of "dog"

There are many uses for visual organizers. They can emphasize cause-and-effect, the sequence of an event or episode, or create a summary of what was read. Visual organizers are also useful in planning for a paragraph or report and in studying for a test.

Categorization is a critical skill for students because it forms the basis for critical thinking and inferential comprehension when reading. A Venn diagram is a valuable organizer that visually emphasizes comparisons and contrasts. A Venn diagram comparing characteristics of mammals and reptiles was presented in the article [The Writing Road](#).

Other uses for Venn diagrams include comparing two characters in a story or two different events in history. Two overlapping circles are drawn and characteristics of one item or event are listed in the left side of the circle if they differ from the other item. The characteristics of the second item are listed in the right side of the circle if they differ from the first item. Characteristics that are common to both items are placed in the middle. Figure five shows an example of a Venn diagram that comparing and contrasting *volcanoes* to *revolutions*. This information was assembled by having students brainstorm what they knew about each item.

Initially, it may appear that the concepts of a volcano and a revolution are different. Actually, there are many similarities. Suppose your student has studied volcanoes and understands the characteristics. She may then compare this knowledge to characteristics of a revolution. Doing so forms a pattern comparing new ideas to ideas already learned. Thus, your student elaborates her understanding of each concept as she connects knowledge about volcanoes to another eruption, a revolution (Richards, 2003, p. 50).

VOLCANOES

REVOLUTIONS

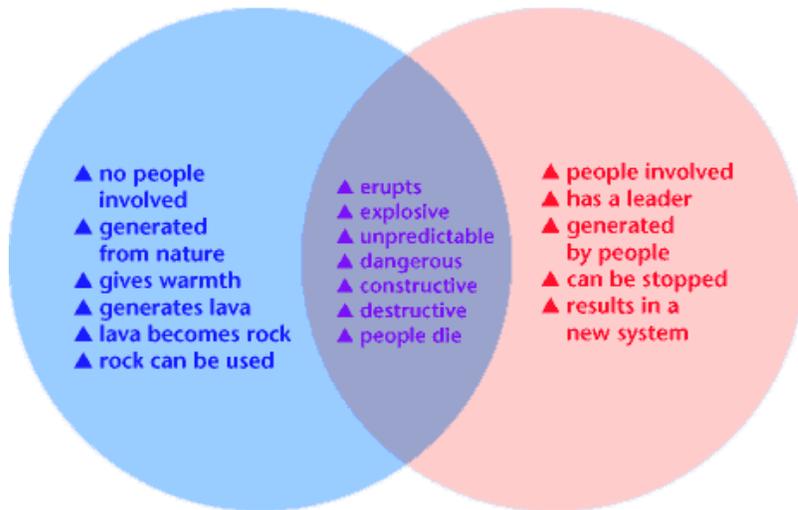


Fig. 5 - Venn diagram of volcanoes and revolutions

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Motor Images

Neurons that fire together, wire together.

To understand a motor image, think about struggling to remember a phone number. You may move your fingers in the pattern of the phone number as if dialing it and find that this helps you recall the number.

Repetition and practice trigger neurons (brain cells). When a set of neurons fire together, they develop a "habit" of firing together again. Habits as well as academic learning occur this way. Use multisensory strategies so your child simultaneously sees, hears, and touches or moves with the information.

Did you ride a bicycle when younger? Did you learn to ride your bicycle by reading a book about it? No, you needed to actually practice riding. With enough repetition, you retained a motor image of the procedure. Would you be able to now get on a bicycle and ride with relative ease? Most people will answer yes to this question. Why is that? Our muscles remember information or procedures that were practiced many times. Muscle memory is a powerful learning tool!

As an example, students may use motor images of the direction of the letters **b** and **d** by using a hand pattern or "Fonzie fists" (named after the character Fonzie in "Happy Days"). Have your child hold his hands facing his body and make a fist with each thumb sticking straight up (figure 6). The left-hand is similar to a **b** and the right hand is similar to **d**. Your child can recall the sequence by saying the alphabet "**a, b, c, d**" (Richards, 2001, p. 86).



Fig. 6 - Hands forming the shape of the letters b and d - a motor image

Practicing letter form or spelling words is enhanced by using air writing, another technique to create a motor image for the student (Richards, 1999, p. 163). Air writing (figure 7) involves writing the letters in the air

(creating a motor image) while also imagining seeing the letters (creating a visual image). The student should simultaneously say the letter as she writes it in the air (creating an auditory image).



Fig. 7 - Student writing letter o in air while visualizing the shape of the letter and saying the name of the letter*

Other motor image examples for spelling words are also easy to incorporate into a homework session: fist tapping and arm tapping. In fisting, the student taps each syllable of the word to be spelled using the side of her fists. She then spells the word syllable by syllable, this time tapping their fist to each sound within the syllable as she spells it. In arm tapping, the student follows the same procedure of first identifying each syllable and then identifying every sound within each syllable. This time the student uses two fingers of one hand to tap on the forearm of the other hand. These simple strategies involve muscle memory while also helping the student proceed systematically. These two aspects create a very powerful memory enhancer.

Many math strategies for finger calculation, especially multiplication, take advantage of motor images or muscle memory. Examples are found in other publications such as [LEARN: Playful Strategies for All Students](#) (Richards, 2001, pp. 93-97) and [The Source for Learning & Memory Strategies](#) (Richards, 2003, pp. 161-164).

Patterns: The P in RIP

The brain seeks meaning through patterns. As we receive information from our senses, we need prior knowledge and a system for organizing the information so we may assign meaning to it. When information comes in, our brain searches around for existing knowledge. If the new information is something that activates a previously used neural network, then there's a match. This is referred to as pattern recognition and is of tremendous value in enhancing memory.

Since our "thinking cap" is strongly influenced by patterns, not facts, remembering information is maximized when it is provided in contextual, event-oriented situations which include motor learning, location changes, music, rhythm, and novelty.... We do poorly when we "piecemeal" learning into linear, sequential facts and other out-of-context information lists".

Eric Jensen, Super Teaching, p. 26

The strategies discussed above all help create patterns. Additionally, the use of music and rhyming creates a pattern or organization for the information. Using music to review concepts can be very powerful. Music also supports relaxation, creativity, and motivation. Students can create their own songs or raps, or they may use existing songs to review concepts and facts. Some songs that relate to specific time periods in history are "The Ballad of David Crockett," lyrics by Tom Blackburn; "The Battle Of New Orleans," lyrics by Johnny Horton; or "When Johnny Comes Marching Home Again," lyrics by Patrick S. Gilmore.

It is also fun to change the words to a common song. In the example below, the tune of "Row, Row, Row Your Boat" is used to sing about the importance of paying attention to a period at the end of a sentence (Richards, 2003, p. 186).

Stop, stop, stop the words
With a little dot.
Use a period at the end,
So they'll know to stop.

Songs that reinforce academic concepts are also available commercially, such as [Science Explosion](#), [Sing The Science Standards](#) and [Best of Schoolhouse Rock](#).

Humor and silliness are valuable to use along with other strategies because our brains prefer to remember unusual information. A short sentence or a sequence of letters can be used to aid in the memory, with or without pictures or actual items. Remember, it is critical that your student understands and knows the information prior to using these mnemonics, the purpose of which is to serve as a **trigger** to bring up information. Following are examples of useful mnemonics.

The mnemonic

My Very Easy Method Just Speeds Up Naming Planets

My Very Eager Mother Just Served Us Nine Pizzas

A rat in the house might eat the ice cream

Dear Miss Sally Brown

Does McDonald's Sell Cheese Burgers

Roy G. Biv

Never Eat Shredded Wheat

The first letter of each word helps recall:

The planets in order: **M**ercury, **V**enus, **E**arth, **M**ars, **J**upiter, **S**aturn, **U**ranus, **N**eptune, **P**luto

The planets in order: **M**ercury, **V**enus, **E**arth, **M**ars, **J**upiter, **S**aturn, **U**ranus, **N**eptune, **P**luto

The spelling of the word **arithmetic**

The main steps in long division: **d**ivide, **m**ultiply, **s**ubtract, **b**ring down

The main steps in long division: **d**ivide, **m**ultiply, **s**ubtract, **c**ompare, **b**ring down

The colors of the rainbow in order: **r**ed, **o**range, **y**ellow, **g**reen, **b**lue, **i**ndigo, **v**iolet

The sequence of directions, going clockwise: **N**orth, **E**ast, **S**outh, **W**est

Demystification

Henry Winkler has written several books describing his experiences as a student. This series of children's novels are called *Hank Zipzer: The Mostly True Confessions of the World's Best Underachiever*. The books are available on audio tape, and students who struggle gain much by listening to the tapes. Hearing someone else, especially a famous person, describe frustrations with learning helps to validate students' own experiences. The books also describe lead character Hank Zipzer's many strengths and gifts. Students who struggle with reading benefit much more from listening to books such as this than from reading them.

In the Hank Zipzer story, *Niagara Falls, Or Does It?* Hank is in the process of trying to write an essay for class. He complains,

I'll never get out of my room. I hate my room. I hate my assignment. I hate my brain. Why couldn't I think or write or spell or add or divide? Forget about multiplying.

It's not like I don't try. I do. I go over and over and over my times tables and my vocabulary lists. My sister tests me, and I know everything. But then comes the test, and I can't remember them. It's like my mind is a chalkboard and the words just slide off it in the time it takes to walk from my apartment building to school, which is a block and a half away. It makes me so mad that sometimes I hit my head with my fist, hoping I'll start everything working again.

Hank doesn't need to hit his head. He needs someone to explain to him how memory works and why he is struggling. He needs demystification. For example, someone might say to him, "Your memory is like a closet with a sticking door. It's hard for you to remember things in school because the door keeps getting stuck. We have to figure out how to make the door open more easily!"

The way to help Hank, and other students facing a similar challenge, open the door to his closet is by using the tools in the RIP Toolbox.

Another book for students that describes learning challenges and the confusing mix of gifts and struggles is [Eli, The Boy Who Hated to Write: Understanding Dysgraphia](#). In the conclusion, Eli ponders,

Maybe I'm not so different after all. I realize that everyone was different in his or her own way. I finally understand what it meant when people tell me, 'We have all kinds of minds.' We're not all the same.

I begin to agree. Yep, it is good to have all kinds of minds - because we really are all different. It keeps life interesting.

In summary

There are many ways to praise a teen, as a student, and as a son/daughter. Some examples:

- You've discovered the secret
- Way to go
- I'm proud of you
- Fantastic
- You're on top of it
- Now you've got it
- Incredible
- You're on your way
- Good for you
- Remarkable job
- Beautiful work
- Magnificent
- Phenomenal
- Creative job
- What an imagination
- You make me laugh
- You brighten my day
- You mean the world to me
- Awesome
- Hurray for you
- A hug – a kiss - a smile