

# Strengthen your memory

## Improve your memory with Brain Hack Ideas (Newman, 2023)

	Tip	Explanation
<b>B</b>	Brain	Learn about the brain and how we learn and remember.
<b>R</b>	Reflection	Take down time for reflection and processing.
<b>A</b>	Attention	Learn how to focus and make learning effortful. You only remember what you pay attention to.
<b>I</b>	Imagery	Visualise in your head. Everyone is a visual learner.
<b>N</b>	No multi-tasking	Do one thing at a time. Single talking uses less fuel.
<b>H</b>	Habits	Create daily organisational rituals and memory techniques.
<b>A</b>	Associate	Associate the new learning with something you already know.
<b>C</b>	Chunk	Break it down into smaller pieces. Use acronyms.
<b>K</b>	Keep it relevant	If it is relevant and meaningful you are more likely to retain it because you have an emotional investment in the new learning and it connects to prior learning and existing neural networks.
<b>I</b>	Intellectual struggle	Make errors, ask questions, seek feedback and go into the learning dip. Use error detection tables.
<b>D</b>	Dopamine	Learning soaked in dopamine is retained better. Reveal the joyful emotions.
<b>E</b>	Explain	Explain it to and teach someone else. Every time we recall we relearn.
<b>A</b>	Acknowledge emotional state	State how you are feeling, change shark thoughts into bunny thoughts and be learning ready.
<b>S</b>	Spaced recall	Learn and recall over time intervals with sleep in between.

The table above shows a summary of memory retention strategies for learners, using a acronym called BRAIN HACK IDEAS. The higher the density and connectivity of the neuron networks the easier the retrieval of information. If you can't remember it, you haven't learnt it.

### How many things at once can I remember?

George Miller's (1956) work on memory documented the popular principle that we can remember 7 items + or – 2. Although this fact is still a fair guide for simple things (a phone number) it is an “out-dated notion for anything remotely more complex” (Jansen, 2005). Neuroscientist's think that it is a lot less. In fact, around 1-3 things at a time (Jansen, 2005) is all our brain can retain at the same time. For complex tasks, we typically can only remember one thing at a time. Every time we multi task our attention is going from one task to another and we tend to use more brain fuel to switch our attention in this way. Every time you are distracted and not focussed on what you are trying to remember you risk poor retrieval ability in the long term and may miss something while your brain is switching its focus.

## Memory techniques

### Primacy-Recency Effect and the Pomodoro Technique

Hermann Ebbinghaus (1880's) discovered the **forgetting curve**. He showed that our memory faded with the passing of time. More recent studies have shown that we forget around 50% of what we learn within an hour, an average of 70% within 24 hours, (Nikhil, 2018) and around 90% after a month (Medina; Sousa, 2018).

**The Primacy/Recency Effect** is the observation that information presented at the beginning (**Primacy**) and end (**Recency**) of a learning episode tends to be retained better than information presented in the middle. Solomon Asch (1964) first examined the primacy-recency effect in a study using a number of sentences that were recalled by participants. Murdock (1960's) used a list of 10-40 words in a follow up study. The studies showed that the probability of recalling information on a list, depended on their position on the list.

The implication for teachers is that students are more likely to remember material that was covered in the first few minutes of the lesson and the last few minutes of the lesson. This would be a strong argument to highlight the learning intent upfront and use this time as a way to raise the learner's curiosity and to revisit the learning intent at the end of the lesson to assess if students learnt what they have been taught.

Further studies have shown that the first memory peak has a downtime after 20 minutes and our concentration wanes between 20-40min. The human brain is not designed to process a continuous flow of information without a break. So, it would seem logical that classroom lessons might benefit from chunking off a block of learning every 25 minutes. In fact, the **Pomodoro technique** developed by Francesco Cirillo, suggests 25minutes of uninterrupted, high focus time, followed by five minutes brain break time. Each 25 minute chunk is called a Pomodoro. A brain break is any activity that is joyful and does not involve any new learning. The down time after the intense focus period of learning, is necessary to refuel a brain which is at risk of **cognitive overload**. **If the lesson is chunked into a series of Pomodoro's, a teacher is able to build in more beginnings and endings to maximise memory retention.** This theory could also be applied to staff meetings when teachers are undertaking professional development and training after a long day of teaching.

## Survival memories are the strongest

### We are good at survival memories

In the Paleolithic times when we were hunter-gatherers we did not rely on the memory of numbers and words but needed to know how to find things. **The brain is good at remembering things that relate to our survival.** These types of memories kept us alive thousands of years ago. There are two key types of survival memories. (i) How to get home. This is called an **episodic memory**. Episodic memories involve 'events in time and place' such as, what we remember from a family wedding: when and where it was and what happened. Another survival memory is, (ii) How to do something, for example, how to drive a car. Once we have learnt to drive a car we don't have to relearn every time we get in the car. Once we master driving, our learning is hard wired and feels automated. This is called a **procedural memory**.

## **We are not good at recalling semantic memory.**

**Semantic memory** means recalling facts, names, words, or things. Much of the learning in school or university will involve this type of learning and involves textbooks and Web searchers. We are not good at remembering semantic memories because we didn't need to know large calculations or how to read when we were hunters and gatherers. On the other hand, as stated above we are good at recalling episodic memories. Episodic memories are stronger and deeper because they are emotionally charged. The correlation between the strength of the original emotive state and the likelihood of retrieval of that event is around 90% (Christianson & Loftus, 1990). The release of Norepinephrine is activated in high excitement or traumatic events and acts as a memory fixative (Cahill et al, 1994).

## **Baker Baker paradox**

People who attach an association to the thing they want to remember are more likely to recall it. Gillian Cohen coined the phrase Baker-Baker Paradox. In a study, participants were shown photographs of faces, given the names of the people and other details including their occupation. He found that people were more likely to remember the occupation than the surname, even if the person was a baker and had the surname Baker. When we see a face and we learn that the person is a baker our mind connects with all the things that we know about being a baker and visualises a story in our head. For example, he wears a white apron, is cranky, has a big hot oven, smells like bread and makes yummy buns. The name Baker on the other hand, is linked in our mind only to a person's face which we have never seen before. That link is weak in regard to neuron activity and the link activates only a small part of the brain so the memory fades fast. When we try to remember the man's job, our brain has a number of different neural pathways to fire up and therefore retrieval is easier and memory stronger. **The implication for all learners is that creating associations around a story is likely to turbocharge our memory significantly.** Anchor new learning into something you are familiar with.

## **Four powerful memory tools in combination**

Using association, visualisation, story and recall (AVSR) is the combination of four powerful memory tools outlined as follows:

1. **Associate** the graphic to link to something you already know
2. **Visualise** a key word with an exaggerated graphic in my head. (E.g., A yellow duck with big feet in fluffy pink slippers)
3. Link in order all the graphics into one **story** or anchoring them into a **place** you know.
4. Writing the story out. Repeat and **recall** in your head many times over time.

Students can be taught this technique at any age to help them to learn essential knowledge. With practice, it becomes very easy and anyone can do it.

“In order to think, we must speculate with images.”  
Aristotle.

## Palaces

If you do have a list of unrelated facts to remember, you can utilise a survival memory technique called ‘The Palace’. This powerful memory method has been called ‘method of loci’ and has its origins in Ancient Greece 500 B. C. The Greek poet Simonides of Ceos survived a building collapse that killed everyone else present at the time. Simonides was remembered for recalling who was in attendance by thinking about where everyone was standing at the time of the accident. This led to a memory tool that is called ‘The Palace’. The fundamental idea is to associate what you want to learn with a location you are familiar with, such as walking through your home or a particular room or street. Use this to remember a list of items such as: Frame, keys, white, chicken, ill, car, caravan, horse, dog, rabbit. Imagine walking in the front door of your own house or unit, putting your keys down in your special place; see the big white refrigerator in the kitchen; take some chicken out to eat; you feel sick; walk into your garage and see the car and caravan; you walk into the office and look at the horse painting on the wall and your dog comes running to you to say hello, with a toy rabbit in his mouth. This is called creating a ‘palace’ in your mind. If you have a long list to remember, it is more effective if you divide the list into groups of five for each room.

Try learning the countries of world by creating a palace in your head. Take a walk through your home. Associate each country with a specific location in your home. Once you have these embedded in your memory, you can associate each country’s capital city with a cue in the location you have chosen for that country. For example, Australia is in my home entrance and the cue for Canberra is a painting on the wall. Or you can imagine a huge parliament house in the foyer.

## Using mnemonics (ni-MON-iks)

A mnemonic is creating a pattern of letters or ideas to associate with something you already know which assist in remembering things. Types of mnemonics are acronyms, rhymes, chunking and imagery. A student should always strive to UNDERSTAND rather than just MEMORISE, however sometimes in order to understand complex concepts we need to first remember essential information. Mnemonics can help you do this. Gerald R Miller (1967) reported that mnemonics increased recall and found that students who used them regularly increased test scores significantly.

## Acronyms

The first letter of every word is used to make one familiar word.

Acronym	To remember
HOMES	The five great lakes of America
POSH	If you were buying a ticket on the ship from England to Australia around 1900 the most comfortable passage was Port Out and Starboard Home.
FACTS	Symptoms of the flu: Fever, Aches, Chills, Tiredness, and Sudden onset.

THINK	A communication tip. Think before you speak: Is it Truthful? Is it Helpful? Is it Interesting? Is it Necessary? Is it Kind?
LICORICES	Factors that impact on taking data from short-term to long-term memory. Link to prior learning, Important, Chucking, Order, Repetition and recall, Imagery, Calm, Emotive state, Sleep
FUUNDIIP	Funny, Unusual, Unexpected, Novel, Dangerous, Important, Interesting, Pleasurable

## Acrostics

Acrostics are sentences in which the first letter of each word forms a new word.

Acrostic	To remember
My Very Excellent Mother Just Served Us Nine Pizzas	The planets in order in terms of distanced from the sun.
Every Good Boy Deserves Food.	Notes on the treble clef.
All Cows Eat Grass	Notes on the bass staff.
Every Person Plays Dead When a Panda Runs, Jumps and Plays.	The function of the Prefrontal cortex: Empathy, Problem solving, prioritising, decision making, working memory, personality, relation of emotion, judgement and planning
Big Elephants Can't Always Understand Small Elephants	How to spell BECAUSE
Dining in a Rolls Royce Having Over Eaten Again	How to spell DIARRHOEA
Remember Affect is Verb and Effect is a Noun	RAVEN
King Philip Comes Over For Great Sweets	The categories of life: Kingdom, Phylum, Class, Order, Family, Genus, Species

## Types of memory

There are three types of memory:

1. **Instant:** Lasts only a few seconds or less. Refers to all the data coming into our senses e.g. light, sound, what we see, smell and feel.
2. **Working memory:** Lasts for less than a minute to about twenty minutes. Usually for a minute. Refers to the short-term memory. It evaporates if not linked into existing circuits.
3. **Long-term memory:** Lasts for days or years and some memories forever. Refers to what we remember after twenty-four hours but can take up to ten years to consolidate.

## Categories of memory

Explicit  Conscious learning AKA: Declarative memories	Semantic	Facts, things, words, names, text.
	Episodic	Events at locations. E.g., The day you won first prize. Your wedding day. Your first kiss. Your first party. How to get home.
	Narrative	Telling stories.
Implicit AKA: Nondeclarative memories  Unconscious learning – hard wired  Skills and habits	Priming	Exposure without knowing. Being more likely to use a word you heard recently.
	Procedural	How to do things. Driving a car Making a cake Using the microwave
	Conditioned	Over learnt drills E.g. Two times tables, spelling, habits Shaping: Rewarding desired behaviours
	Instinctive	Instinctive responses that your nervous system will attend to quickly without conscious thought. E.g., Hand off a hot stove, Step back as we see a snake, Salivating when you see food.
	Motor	Motor memory is muscle memory. If you learn how to ride a bike, or how to play the piano you will remember easily.

## Retrieval

When we recall memories they are retrieved from all over the brain so our brain has to reconstruct the fragmented 'Humpty-Dumpty' memory pieces (Shimamura, 2002) and make sense of them. Many factors impact on the accuracy of that recall and that is one reason why several people can see the same event but report on it differently. The other key reason is that people focus on different things and we only remember what we focus on. **However, the more locations in the brain that are engaged in learning and memory, the better the learning and vivid the recall** 🌟 (Schaeter, 1992). If you can't remember something, you haven't learnt it. The aim of all learning is to learn in such a way that it can be retrieved later.