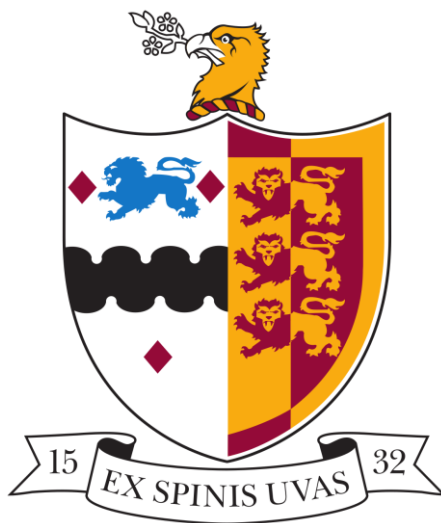


BGS

Learner's

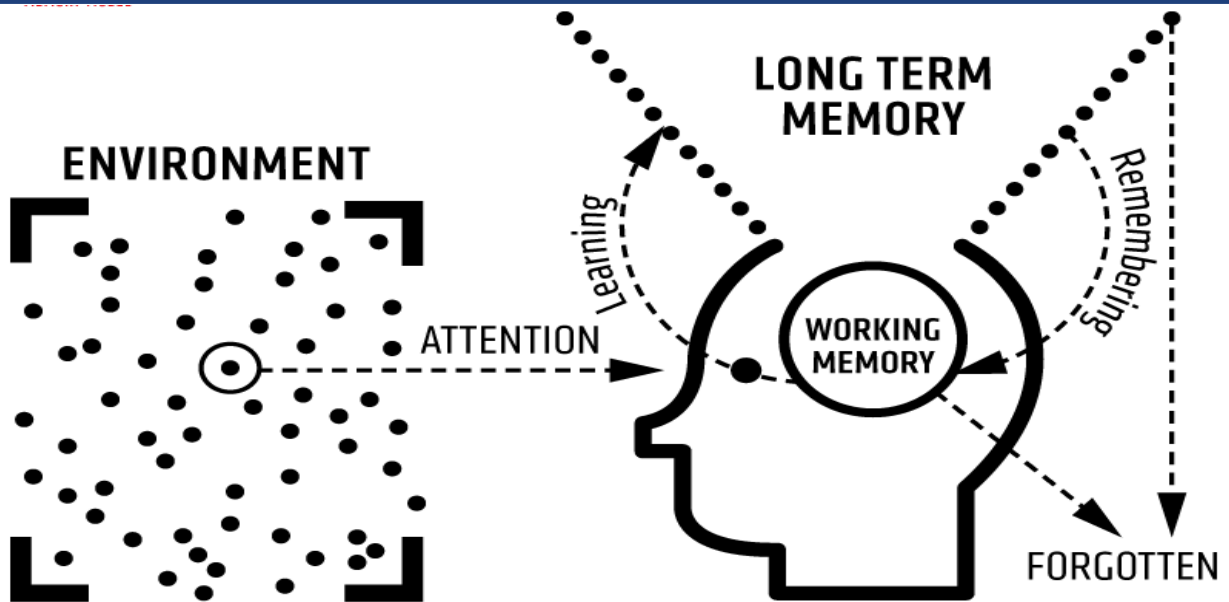
Toolkit



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The Learning Brain



1. Sensory Memory

We are bombarded by sensory information from our surroundings, but we attend to only a small amount of it. We constantly process sights, sounds, smells, taste and touch, but our attention selects only a small fraction of it for conscious thought in the working memory.

2. Working Memory

Working memory is where information is stored and processed in the short term. It is very limited and can only store around 7 things (though some researchers put this number even lower, at 3-4 items) for short periods of time (10-15 seconds)

3. Long-Term Memory

The long-term memory has a huge capacity and allows us to remember things for years. It stores all manner of memories, from a task completed a few hours ago to an event from a decade ago.

The Learning Brain

Attention

Attention is a process of selecting information that we receive from our senses; it is the gateway to what we think about and remember. The information that we direct our attention to from our surroundings is then transferred to the working memory to think and problem solve with.



Encoding

Once we think about information we encode it with other information that we already know, either writing new experiences into our mind or attaching new experience to old. This then transfers material from the working memory to be stored in the long-term memory.



Retrieval

When information is recalled from the long-term memory into the working memory this process of retrieval strengthens the memory and therefore enables us to learn information. Without retrieval over time material that we have 'learnt' will be forgotten.



What does this mean for my Learning?

Paying Attention

Attention and focus are the starting points for learning. Attention is the gateway through which information is transferred to the working memory. If we are distracted we will not be able to process and think about the topic we are studying.



Chunking

Working memory is limited. When we receive too much information it can become overloaded, which means we cannot encode it effectively into our long-term memory. Therefore, breaking down material into small sections will allow you to learn more effectively.

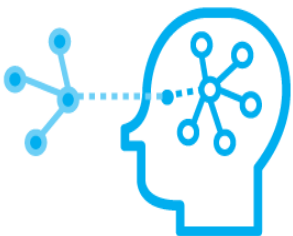
Retrieval Practice

The act of bringing information from the long-term memory back into the working memory strengthens the memory, making it easier to recall. Therefore, to learn information the best thing to do is to test yourself on your knowledge without looking at your notes.

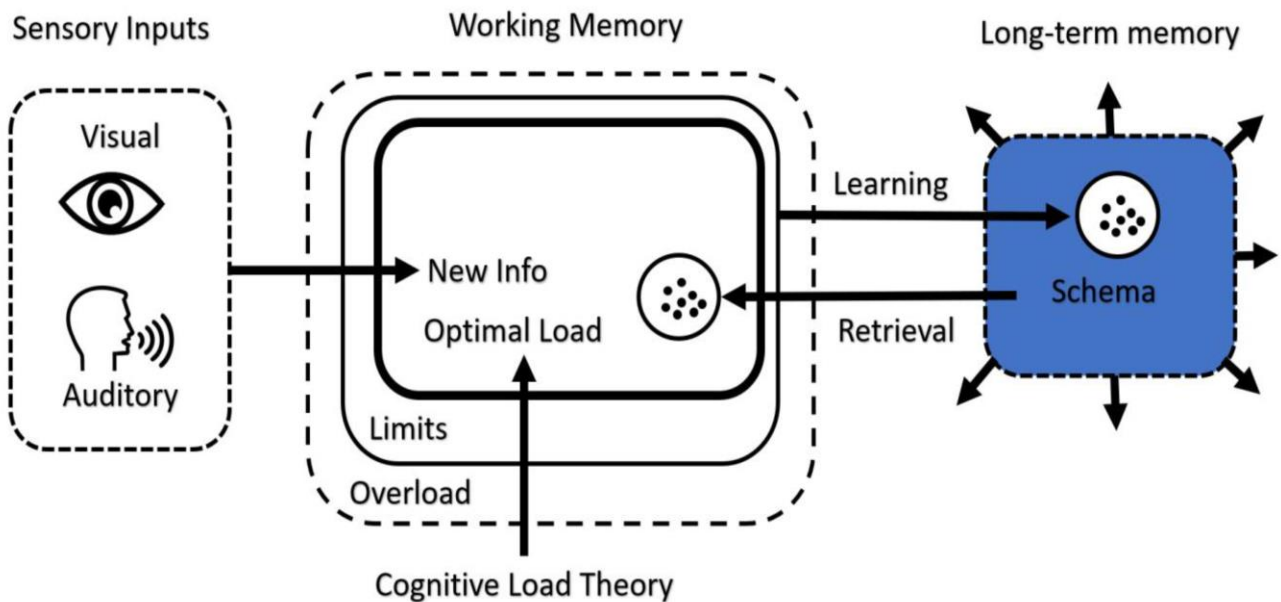


Deep Thinking

For information to be encoded into the long-term memory we need to think deeply about this information. Discussing, debating or explaining this topic to others can help with processing information so that it is transferred to the long-term memory.



Schemas and Knowledge



Schema

A schema is a mental model to help us understand how we organize knowledge. As we take in new information, we connect it to other things we know, believe, or have experienced. And those connections form a sort of structure in the brain.

Building Schemas

Schemas help you learn new information by connecting it to existing knowledge structures. When you encounter new concepts and connect them to your pre-existing schemas, you can more readily understand the new information, accelerating the learning process.

Developing Knowledge

The more knowledge you acquire the broader and more interconnected your schemas become. This enables you to undertake more complex skills like problem solving and critical thinking. Therefore we cannot think effectively without a wide knowledge base in our long-term memory.

What does this mean for my Learning?

Make Connections

Whenever you learn something new, try to connect it to some of your prior knowledge and understanding. This means relating something that you have learnt to something that you already know.



Be Mentally Active

Schema theory supports the importance of actively constructing knowledge rather than passively acquiring facts from external sources such as the internet. If knowledge is not encoded then we limit our ability to build more developed schemas.



Study Smarter

When you're revising, focus on the main concepts or ideas in a subject first. Then review the smaller strands branching off from them. This will help you build and develop your schemas and understanding more effectively.



Know Your Schemas

Pay attention to which areas of your knowledge and understanding are weaker, as you will find it harder to build new knowledge. You may need to seek help from your teacher to explain a tricky concept to move forward successfully.

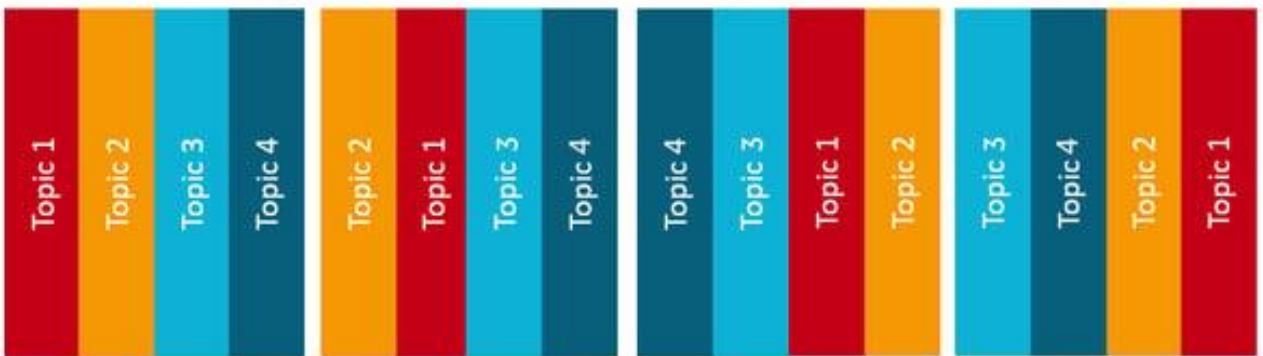


Interleaving

Blocking



Interleaving



Interleaving involves mixing up revision within a subject instead of focusing on the same topic for hours at a time (which is known as “blocking”). It can be used across almost all subjects.

Research shows that implementing interleaving benefits learning by both requiring you to access previous knowledge and helping you make links between different topics, leading to enhanced recall.

One study showed that students performed 7% better in their final exam when interleaving their revision compared to those who blocked their revision.

What does this mean for my Learning?

When Revising Mix up Concepts

Interleaving is mixing up concepts within a topic – not subjects. So rather than mixing up English, Maths and Science, mix up three types of Maths problems. This allows you to make connections within each subject and also choose the most effective strategy for that problem. This gives you a better understanding of the material, helps you form stronger connections and maximises the likelihood that the information will be remembered.

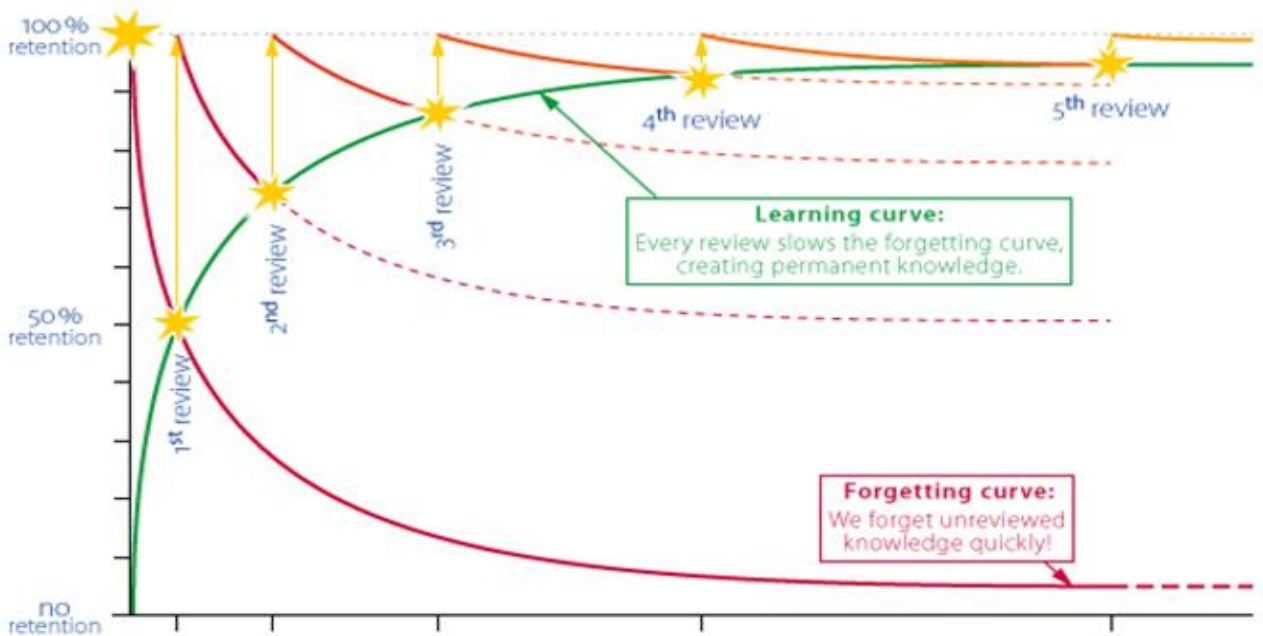
Interleaving benefits Long Term Learning

The benefits of interleaving are not immediate but instead more long-term. Recent research, in which students had to learn to solve a number of different problems, highlighted the effectiveness of interleaving as an effective strategy for assessments when you are preparing weeks or months in advance. An example would be GCSE and A Level or IB exams where you need to be able to recall vast amounts of information at the same time.

Avoid Interleaving too many Concepts

One of the benefits of interleaving is being able to distinguish and discriminate between similar concepts. If you try and contrast too many different items of information this can become too confusing. Studies indicate that limiting interleaving to three topics at anyone time is the optimal number.

Spacing



Spacing consists of spreading out your revision over a period of time instead of cramming your learning into a single revision session. Essentially, doing a little but often instead of a lot at once.

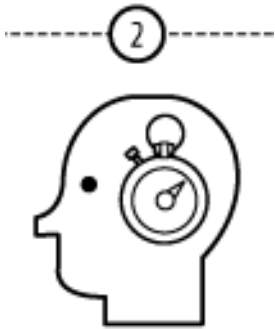
In some studies, using spacing instead of cramming has resulted in a 10% to 30% difference in final test results.

The reason this technique is so effective is because it provides an opportunity for students to forget the material and relearn it, strengthening connections in their long-term memory.

What does this mean for my Learning?

Spread out your Revision

Just as actors don't leave all their rehearsals until the day before the opening night of a play, and athletes don't only train the day before the match, so you should regularly return to previously learnt material if you want to perform at your best.



Create a Study Schedule

An easy way to implement spacing is to create a study schedule both at a weekly and monthly basis. For example, at a weekly level, you could study History on a Monday then revisit what you learnt on Thursday.

Study Smarter

Research shows that there may be an optimum gap to leave depending on when you'll need to retrieve the information. The researchers found the following timeline offers good guideline



How Far Away The Test Is	7 Days	35 Days	70 Days	350 Days
Gap Between Revision Sessions	3 Days	8 Days	12 Days	27 Days

Retrieval Practice

Retrieval practice can take many different forms. Decades worth of research, which have been consistently replicated, have found it to be a very effective method of learning information.

1. Identifies gaps in knowledge



2. Makes connections



3. Checks for misunderstandings



4. Strengthens connections



5. Makes connections robust under pressure and stress



6. Makes it easier to learn new things



When revising using retrieval practice it can help you identify areas where your knowledge is not as secure, enabling you to use your time more effectively.

Retrieving information is a cognitively demanding task, helping embed and cement information. This consolidation can build rich schemas of knowledge.

The brain is constantly editing and rewiring which means over time misunderstandings may develop. Regular retrieval practice can help guard against this.

One round of retrieval practice is not enough to secure a memory long term. Using a range of retrieval over time can help strengthen our current existing connections

When we are stressed the focus of our attention narrows, meaning we can find it harder to recall and recall information. Evidence suggests retrieval practice reduces this pressure.

The more we know, the easier it is to learn new information as we develop better schemas. Retrieval practice builds a firm foundation for future learning.

Retrieval Practice: The Big 5

There are 5 different methods of retrieval practice you could use to revise:



Summary: Dual Coding



1.

Identify knowledge

Select a topic you wish to revise.

Have your class notes or a text book to refer to.



2.

Decide on design

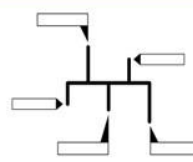
Decide on what method is an effective way to show the information, e.g. diagrams, icons, infographics or timelines.



3.

Create images

Without looking at the information create visual imagery to represent the information you are revising



4.

Add labels

Add written text to help develop the ideas in your images



5.

Self explanation

Talk through the images and diagrams you have drawn

You could explain them to a friend or parent

Dual coding can be helpful because the human mind processes information through separate systems: one for visual stimuli and another for verbal stimuli.

Summary: Flash Cards

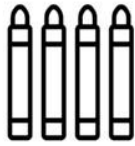


1.

Identify knowledge

What are you creating flashcards on?

Where can you find the information you need?



2.

Colour code

Use different coloured cards for different topics



3.

Design

One question per flashcard

Make them clear and concise

No extended answer questions



4.

Test

Write or say your answers before you check

Shuffle cards each time

Use the Leitner system to space



5.

Feedback

Is your knowledge secure?

Move on to applying it to extended exam questions

Avoid answering the questions in your head; research shows you will get the best results by saying the answer out loud or writing it down before checking.

Summary: Brain Dumps



1.

Identify knowledge

Identify the knowledge/topic area you want to cover.



2.

Write it down

Take a blank piece of paper and write down everything you can remember

Give yourself a time limit (e.g. 10 mins)



3.

Organise information

Once complete use different colours to highlight words into groups

This links information together



4.

Check understanding

Compare your brain dump to your book

Add any information you missed in a different colour



5.

Store and compare

Keep your brain dump safe and revisit it

Next time aim to add more information or shorten the time limit

Brain dumps are a challenging form of retrieval as you do not have any prompts to help. However, this is what makes it a particularly effective strategy.

Summary: Mind Maps



1.

Identify knowledge

Select a topic you wish to revise.

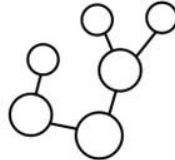
Have your class notes or a text book to refer to.



2.

Identify sub-topics

Place the main topic in the centre of your page and identify sub topics that will branch off.

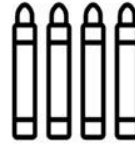


3.

Branch off

Branch off your sub topics with further detail

Try not to fill in the page with too much writing



4.

Use images and colour

Use images and colour to help topics stick in your memory



5.

Display

Place completed mind maps in places where you can see them frequently

Avoid using too much information; mind maps are designed to summarise key information and connect different areas of a topic/subject.

Summary: Self Quizzing



1.

Identify knowledge

Select a topic you wish to revise.

Have your class notes or a text book to refer to.



2.

Review and create

Spend 10-15 mins reviewing content

Create 10 questions on that content



3.

Cover and answer

Cover up the information and answer from memory

Make sure you write down your responses



4.

Self mark and reflect

Go back to the information and self mark your answers



5.

Next time

Revisit the area where there were gaps in your knowledge

Make sure you revisit them next time

Ensure that you quiz yourself on all subjects and topics – not just those you enjoy the most or find the easiest. Practice makes permanent!