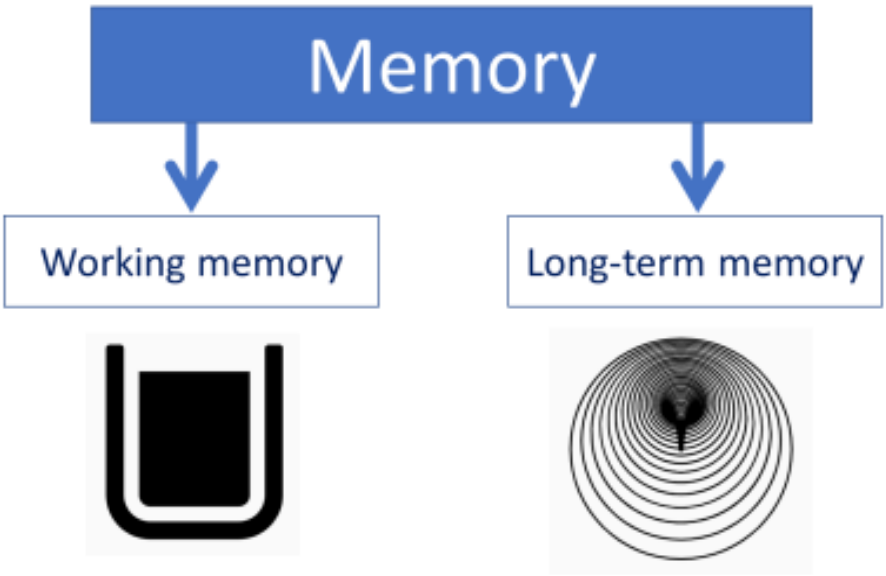
Effective learning

"Learning happens when people have to think hard." *Professor Coe*

There has been a lot of research in recent years that has given us a greater understanding of the way memory works and how we can use that knowledge to learn effectively.

- ❑ Learning takes effort
- ❑ It takes time
- ❑ It's an active process
- ❑ It requires recalling information from memory

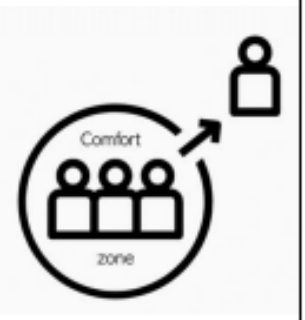


Working memory has limited capacity and can be overloaded, whereas our long-term memory has huge capacity to retain information.

Effective learning requires information to be committed to long-term memory.

Every time we draw on a memory, we increase its strength and extend its longevity.

Common pitfalls



Firstly, students can spend a lot of time making revision resources rather than actually using the time to learn.

Students can also spend a lot of time going over what they already feel confident about, and putting the 'hard stuff' to one side.

To avoid this, it's important you come out of your comfort zone and ensure you are spend time on all subjects and topics at some point.

The three techniques below are a really good **starting point** to identify key information and become familiar with the content, but they don't activate much thinking.

Without a lot of thinking, there isn't a lot of learning.

Highlighting

Use different colours for different pieces of information in the text that you want to learn. The next step is to start practising retrieving this information from memory.

Re-reading

To activate thinking, close the book or cover the information and say what you have just read aloud. Check. Repeat.

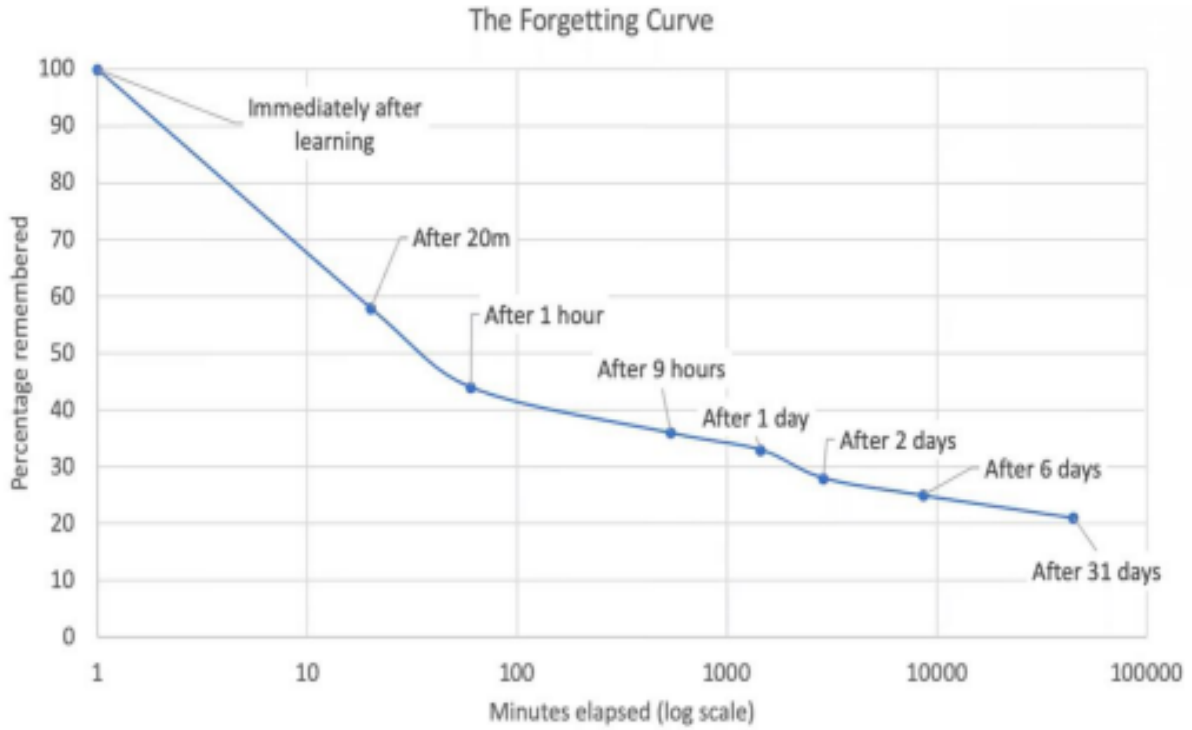
Note taking

To activate thinking, do the same as with re-reading or ask someone to immediately quiz you on the notes you have made.

The forgetting curve

Learners can often feel great frustration when they forget something they feel they have spent a long revising but forgetting is a normal and actually very important step in learning for the long-term.

Research has led to greater understanding about *the forgetting curve*. It shows us how quickly memory starts to fade immediately after we learn something new.



We have to actively work at remembering the information we need.

New information needs to be processed several times before it is transferred to long-term memory and becomes easier to recall.

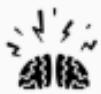
Planning revision sessions

A revision timetable needs to be manageable.

It is important to include time for hobbies and breaks.

Equal amounts of time need to be allocated for all subjects.

The most effective way to learn is by ensuring revision sessions include:

- ❑ **Retrieval practice** 
- ❑ **Spaced practice** 
- ❑ **Interleaving** 

Retrieval practice

Retrieval practice is a learning strategy that focuses on getting information out of our memory.

Through the act of retrieval, or calling information to mind, our memory for that information is strengthened and forgetting is less likely to occur.

It is not complicated to use retrieval practice. We just need to remember for the most powerful learning to happen we need to use our **memory**. There are examples in this booklet of strategies you can use when revising to ensure you are retrieving the information.

Spaced practice

As well as ensuring that revision strategies activate thinking, learners also need to revisit content **numerous times** over **a period of time**. This is spaced practice.

In your revision plan, ensure you are revisiting items several times to help you remember the information long-term.

Spending 10 minutes on the content on a Monday, Wednesday and Friday is more effective than just one 30 minute slot on a Tuesday.

When information is quickly acquired, it is quickly forgotten.

Cramming may feel successful in the short-term, but the information will be quickly forgotten.
On average, we have to actively think about an item 4 times before it starts to move to long-term memory.

Interleaving

The most effective revision involves **mixing up** the content you are trying to retrieve. This is called **interleaving**.
Revision sessions will be more impactful if learners switch between different types of problem or different topics.

Blocked	Mixed ✓
Fractions	Fractions
Fractions	Algebra
Fractions	Geometry
Algebra	Fractions
Algebra	Algebra
Algebra	Geometry
Geometry	Fractions
Geometry	Algebra
Geometry	Geometry

Plan your time so you are actively using your **memory**, you are **revisiting** content numerous times and you are **mixing up** the content.



We learn what we think about

Retrieval strategies

This section includes a variety of strategies that ensure you have to recall information **from memory.**

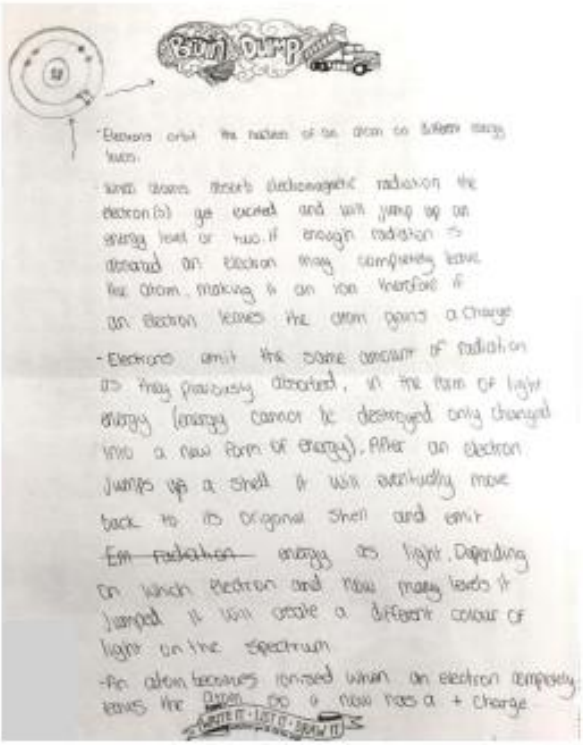
Brain dump

All you need for this retrieval task is a blank piece of paper.

Write down everything you can remember on a topic.

This is a good follow up task after re-reading and note taking.

An important step is to compare the brain dump with your original notes to identify gaps that need further work.



Word removal

To use this technique, slowly remove some of the information but continue to repeat the whole thing. The more words you remove, the more you are relying on your memory.

This retrieval strategy works well on a whiteboard so you can easily remove a few words at a time.

It works well for revision where you have to learn the information exactly as it is.

Mercutio
If love be rough with you, be rough with love,
Prick love for the pricking and beat love down.

Mercutio
If ..... be rough with you, be ..... with love,
Prick love for the ..... and beat love .....

Mercutio
If ..... be ..... with you, be ..... with love,
..... love for the ..... and beat love .....

Mercutio
If ..... be ..... with you, be ..... with .....,
..... love for the ..... and ..... love .....

_____
If ....., be .....
Prick ..... and .....

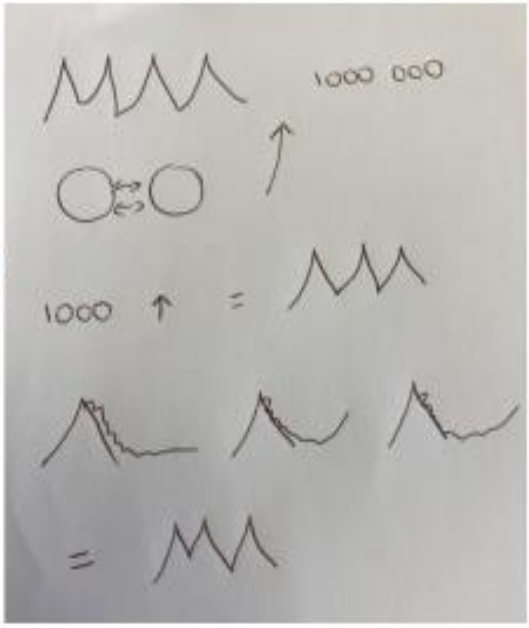
Text mapping

With this technique, reduce a text into images and a few words.

You can then cover up the text and use the images as prompts to pull the information out of your memory.

You do not need to be an amazing artist. You just need images that will activate thinking.

Most mountain ranges are millions of years old. They are made when two plates beneath the Earth's crust collide, causing the land to buckle and rise.
Any land mass that rises 1,000 feet above the surrounding area is considered a mountain.
Some mountains are caused by volcanoes spewing lava over and over again. The lava cools and hardens and builds up to form a mountain.



Quizzes

Retrieval grids

A simple but very effective technique is to turn notes into quizzes.

This works very well if you ask someone to quiz you.

Questions can be varied. Some might just require a simple answer, whilst others might require further elaboration.

A slight alternative is to create a retrieval grid with lots of questions.

You can revisit the questions several times over the course of your revision sessions.

Flashcards

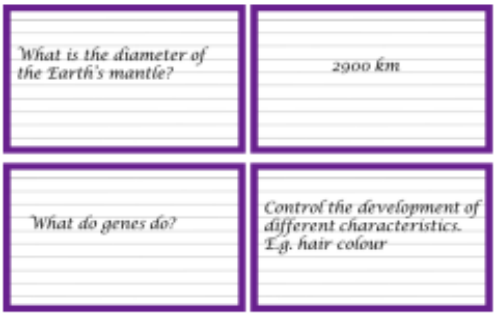
Flashcards work best for straight-forward, factual knowledge.

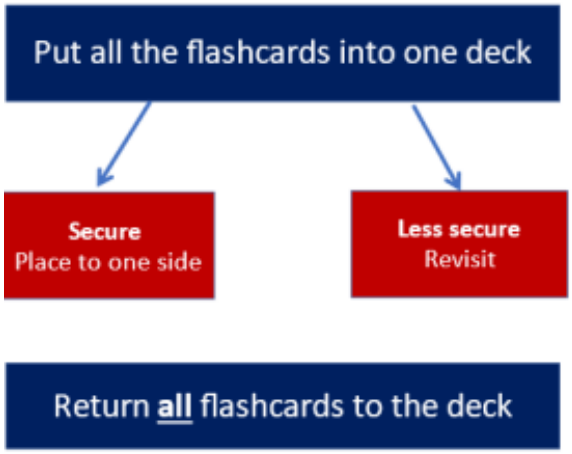
They should be simple and numerous.

Have one idea per flashcard.

They don't need to be flashy, expensive or laborious to make.

When you practise, ensure you question yourself in both directions on the card. This will really strengthen your ability to recall important information no matter how the question is phrased in the exam.





Another effective way to interleave is to mix up all the flashcards into one deck.

This could be from across numerous topics for one subject or a mixture of subjects.

As you revise, place the questions you answer first time to one side. You should then shuffle the rest and re-practise

Another pitfall for learners is they often drop flashcards from their revision too early because they feel overconfident that the knowledge is secure.

As we have seen, it's important to revisit items several times so at the end of the session **all** the flashcards should go back in the deck for next

Past papers/practice questions

It is crucial you also practise applying the knowledge you have been learning to demonstrate your understanding.

Exploring worked examples or practising exam answers, helps you to process, practise and refine your revision and understand the requirements of the exam.

The Face It Revision Model

The Face It revision model reminds us that it's not enough to just learn isolated facts. The next step is to the apply that knowledge in different scenarios and make links. It's a good idea to use a timer to replicate how quickly you might be expected to answer questions.

F	**Facts:** Identify the key facts that need to be known and learn them.
A	**Apply in context**: Test that knowledge in different scenarios using questions in books and past papers.
C	**Connect to other ideas:** Make links between topics.
E	**Exam practice**: Rehearse the process of responding under time pressure, demonstrating your knowledge and understanding, taking account of the marks available.

Preparing to learn

As we have seen, your working memory is limited.
When you try to process too many things at once that can cause cognitive overload.
This seriously reduces your thinking capacity.
Distractions in your study environment can cause cognitive overload, and therefore reduce thinking capacity.

Research shows that technology lowers concentration.

Social media and text messages can distract you from a task and make it nearly impossible to process information.

- ✓ Ensure your study area is quiet.
- ✓ Turn off music and TV during revision sessions.
- ✓ Turn off your phone when you are studying or leave it in another room.
- ✓ Keep your revision resources organised.
- ✓ Use plastic wallets or envelopes to bundle up your flashcards etc.

  That way you can find them easily and use them again over the coming months.