



Revision Guidance for Pupils and Parents

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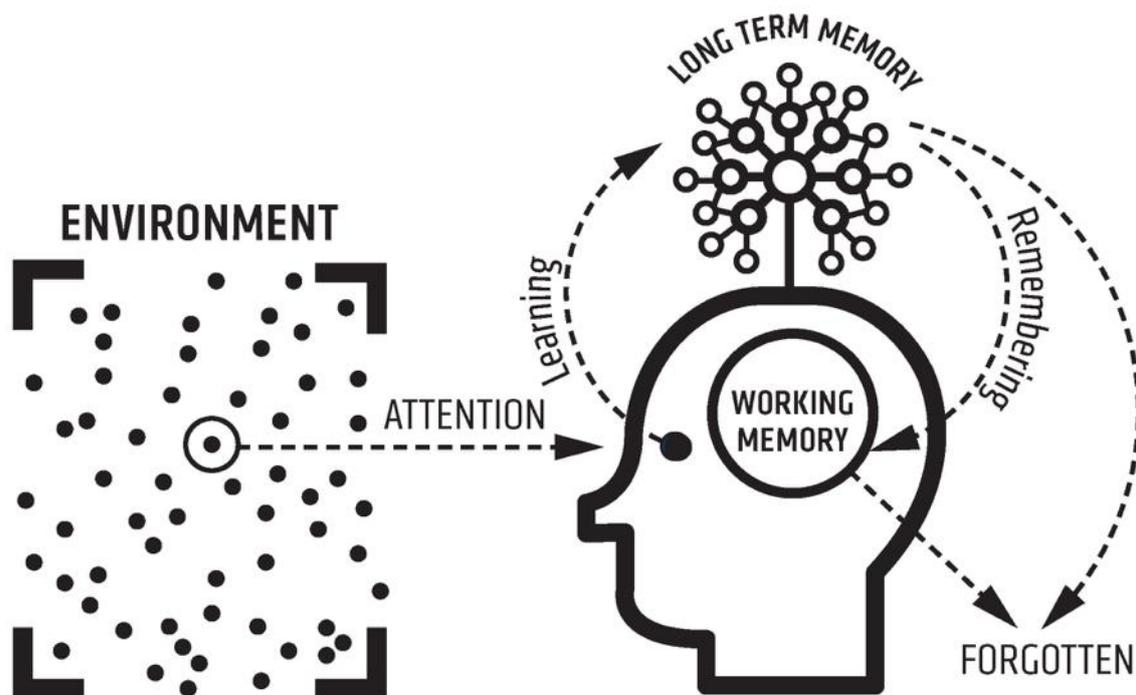
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This handbook is designed to support pupils and parents with effective strategies and techniques for revision.

Memory – the science of learning

In recent years, there has been lots of research around the science of learning and how we learn and retain information.

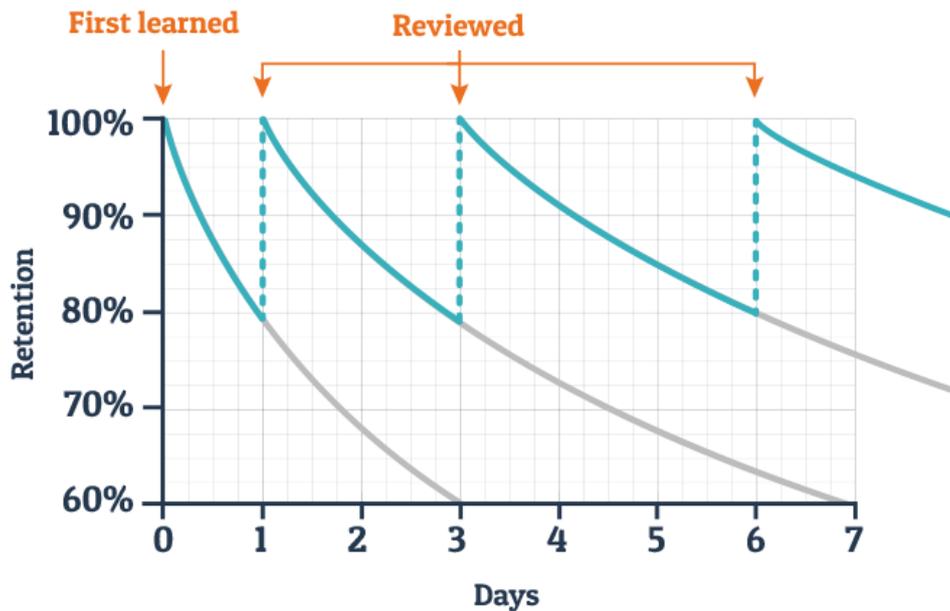
In summary, if we think of the learning process using the following diagram, it will help us have a greater awareness of the most effective revision strategies based upon the available research.



1. We have a certain amount of attention to pay and this can be limited and can dramatically vary depending on the individual or the environment. In the diagram above, '**attention**' means we acknowledge new information and this is then transferred into our working memory.
2. Our **working memory** is finite and we can only absorb a limited amount of information at a given time. This may be up to 30 seconds. *As an example, if you write down a 'long number' and try and remember it every 30 seconds, you will be surprised how difficult this is to do!*
3. Information is processed into our **long-term memory** through '**learning**'. This long-term memory is effectively unlimited, and we can retrieve information from here back into our working memory as needed in a given moment. *As an example, this might be your phone number or address. We don't walk around thinking about those two things every second of the day but it is in our long-term memory ready to be used and retrieved when needed.*
4. Information in our **long-term memory** is interconnected and linked with prior knowledge. Anything that is not connected or not successfully stored well enough in our long-term memory is forgotten and this is completely natural.
5. If students undertake enough **retrieval practice**, generating the information in our long-term memory, it increases a level of fluency within the subject. Practice makes perfect!

As stated above, forgetting is completely natural. The following diagram outlines this process and is called the **Ebbinghaus Forgetting Curve** (1885).

Typical Forgetting Curve for Newly Learned Information



Ebbinghaus proposed that humans start losing ‘memory of knowledge’ over time unless the knowledge is consciously reviewed time and time again. He conducted a series of tests on himself which included the memorization of a meaningless set of words. He tested himself consistently across a period of time to see if he could retain the information. He found that:

- **Memory retention is 100% at the time of learning any particular piece of information (in the moment). However, this drops to 60% after three days.**
- A range of factors affect the rate of forgetting including motivation, the meaningful nature of the information, the strategies for revision and also psychological factors (sleep for example).
- **If each day, repetition of learning occurs and students take time to repeat information then the effects of forgetting are decreased.** According to research, information should be repeated within the first 24 hours of learning to reduce the rate of memory loss.

In summary, what do we know about memory?

- Consistent practice and revisiting previous material strengthens memory and boosts learning.
- Information, if not revisited, is ‘lost’ from our memory.
- Our working memory is finite and limited and so overloading this or cramming for revision doesn’t work.

The key principles of effective revision

Therefore, let's explore a number of different strategies to ensure your revision is as effective as it can be.

Retrieval Practice

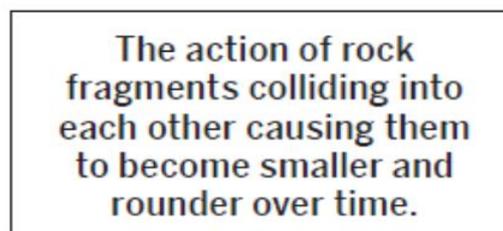
Simply put, recalling information from memory is simple and powerful. Retrieval practice is a learning strategy which makes you think hard and brings information to mind. It is the action of actively retrieving knowledge that boosts learning and strengthens memory. **It means trying to remember previously learned information as opposed to simply re-reading it.** Examples include:

- Knowledge quizzing and low stakes testing.
- Multiple choice tests.
- Completing past paper questions or practice answers.
- Answering verbal questions asked by teacher/peers/parents.
- Creating flashcards or revision materials where you can 'test' yourself.

One particularly effective strategy is the creation and use of **flashcards**. Flashcards are generally a card containing a small amount of information as an aid to learning. The use of flashcards are for low stakes testing to improve recall and to strengthen memory.

An effective flashcard may include the following (*in each subject they will be used in a different way*):

- A key term/key word with definition on the back.
- A key date with the event on the back.
- A key equation with its use in practice on the back.
- A past paper question and a model answer on the back.



In order to use flashcards most effectively, the **Leitner System** is a desired strategy. Once you have created a set of flashcards, create three boxes/areas marked as the following.

BOX 1: Every day	BOX 2: Twice a week	BOX 3: Once a week
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- Test yourself on the flashcards in the Box 1 pile. If you get the answer correct on the flashcard, move it to the Box 2 pile. If you get it incorrect, it stays in Box 1.
- Twice a week, test yourself on the flashcards in Box 2. If you get the answer correct on the flashcard, move it to the Box 3 pile. If you get it incorrect, it stays in Box 2. The aim is to get all of the flashcards to Box 3.

This video will help support you in using the Leitner system:

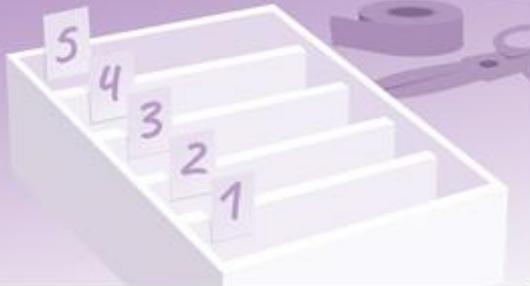
<https://www.youtube.com/watch?v=C20EvKtdJwQ>

This diagram will also further support your implementation of the **Leitner System**.

USING FLASHCARDS TO REVISE

by @inner_drive | www.innerdrive.co.uk

1 Split a box into 5 different compartments and label them 1 to 5.



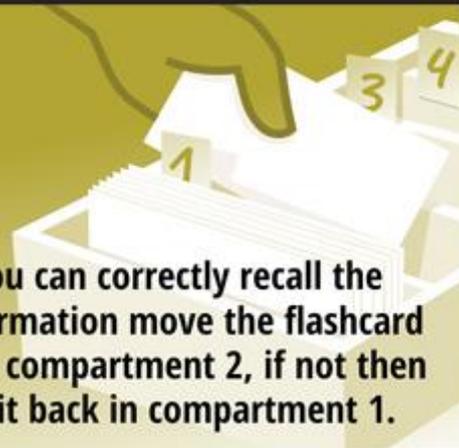
2 Place all your flashcards in compartment 1.



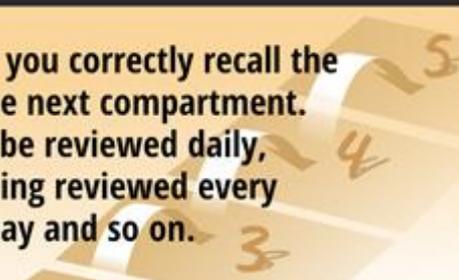
3 Test yourself on a flashcard



4 If you can correctly recall the information move the flashcard into compartment 2, if not then put it back in compartment 1.

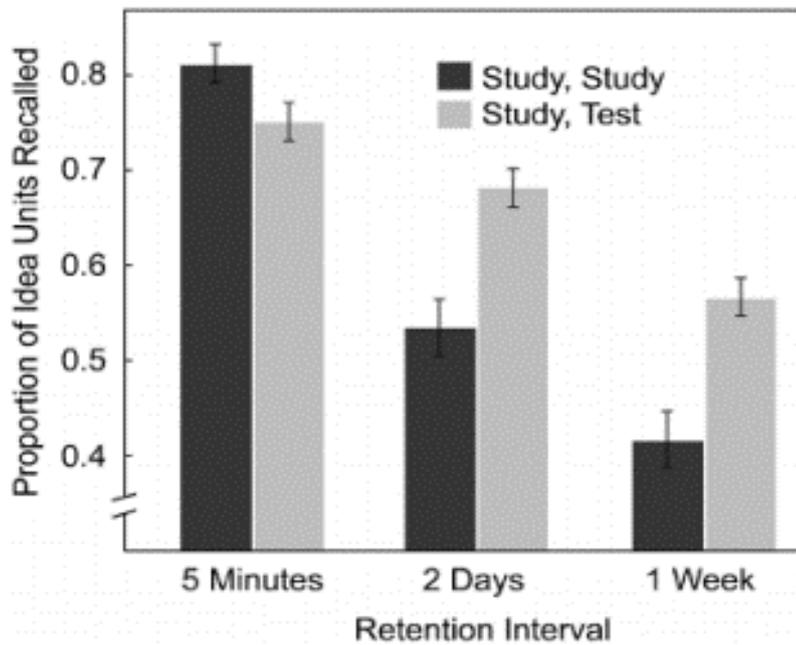


5 Continue to test yourself and each time you correctly recall the information, move the flashcard into the next compartment. Flashcards from compartment 1 should be reviewed daily, with flashcards from compartment 2 being reviewed every other day, compartment 3 every third day and so on.



6 Eventually, all your flashcards will have been transferred to compartment 5 and the information they contain stored in your long-term memory.





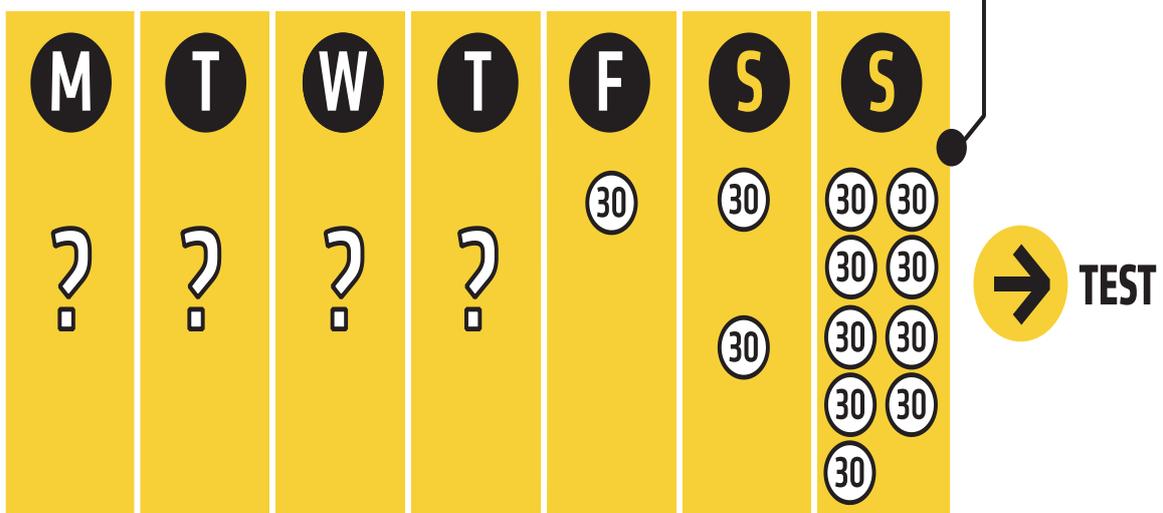
Roediger HL, Karpicke JD. Test-enhanced learning: taking memory tests improves long-term retention. *Psychol Sci.* 2006 Mar;17(3):249-55. doi: 10.1111/j.1467-9280.2006.01693.x. PMID: 16507066.

This chart shows how merely studying without subsequent testing has a much lower impact long term than combining study with testing.

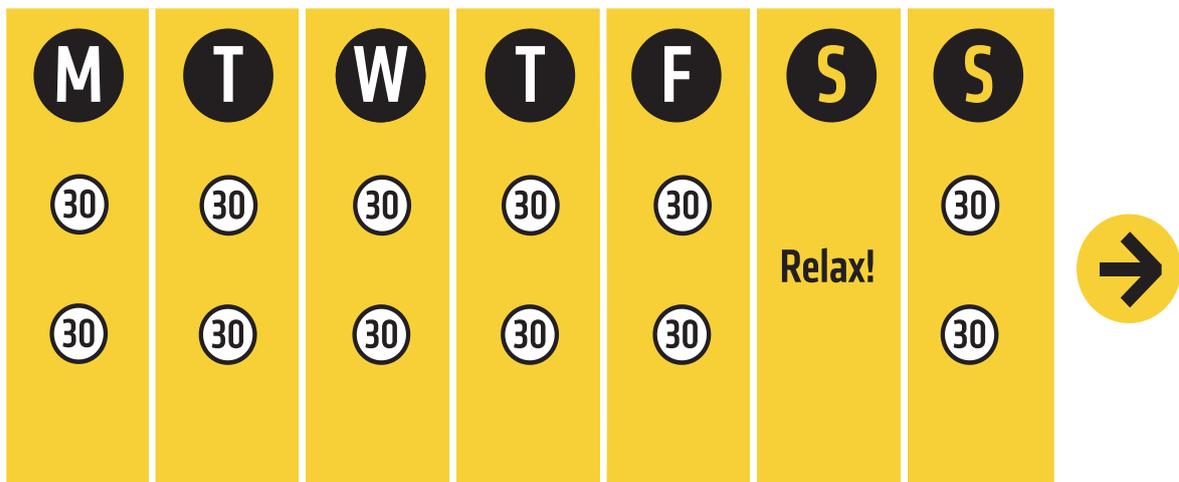
Spacing and Interleaving

Spacing out your revision into smaller chunks over a period of time helps you to remember the material better and ensures you are less stressed with your revision.

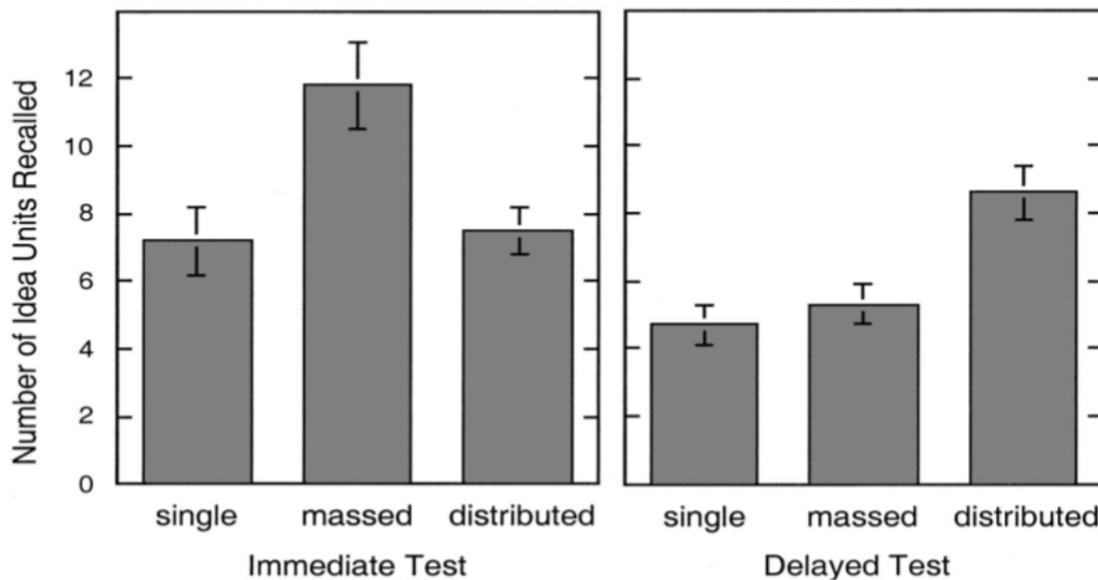
Let's say you have a test one week and you have 5 hours to prepare for it broken down into 30 minute chunks. Very often that process looks like this.



Instead of mass practice, a much more effective way of revising is to space out your revision like this:



By breaking up your revision into 30 minute chunks and spacing out the time between revision, you will consolidate what you have learned and retain the material much more effectively.



The above diagram shows how spaced practice can have a much better long-term impact than blocked (or massed) practice.

- Forgetting some material between sessions helps items stick in long term memory – the difficulty forces you to engage with the process
- Visiting after an appropriate gap is therefore better than immediately revisiting.
- For a test **immediately** afterwards blocked (or massed) practice is more effective ... but spaced practice is more beneficial if the test is more than one day away and better supports long term memory.

Interleaving involves switching between ideas and topics during a study session. This ensures that you are not studying one idea or topic for too long. Mixing up your revision and chunking it supports learning and strengthens your memory. However, this works best if the ideas and topics have some connections and similarities in terms of skills or knowledge.

As we have seen with spaced practice, leaving gaps between studying is very effective but what if you are studying multiple topics within a subject? Interleaving means mixing it up and not studying all the material at once.

For example, instead of organising your revision week like this:

M	T	W	T	F
MACBETH	AN INSPECTOR CALLS	CREATIVE WRITING	UNSEEN POETRY	JEKYLL AND HYDE
MACBETH	AN INSPECTOR CALLS	CREATIVE WRITING	UNSEEN POETRY	JEKYLL AND HYDE
MACBETH	AN INSPECTOR CALLS	CREATIVE WRITING	UNSEEN POETRY	JEKYLL AND HYDE

A much more effective way of organising your revision would be like this:

M	T	W	T	F
MACBETH	UNSEEN POETRY	AN INSPECTOR CALLS	JEKYLL AND HYDE	CREATIVE WRITING
AN INSPECTOR CALLS	JEKYLL AND HYDE	CREATIVE WRITING	MACBETH	UNSEEN POETRY
CREATIVE WRITING	MACBETH	UNSEEN POETRY	AN INSPECTOR CALLS	JEKYLL AND HYDE

As you are doing this, another highly effective strategy is to try to think of connections between topics you are studying considering similarities and differences.

Studying one topic for a long time can give them impression you have mastered it but often this can be misleading.

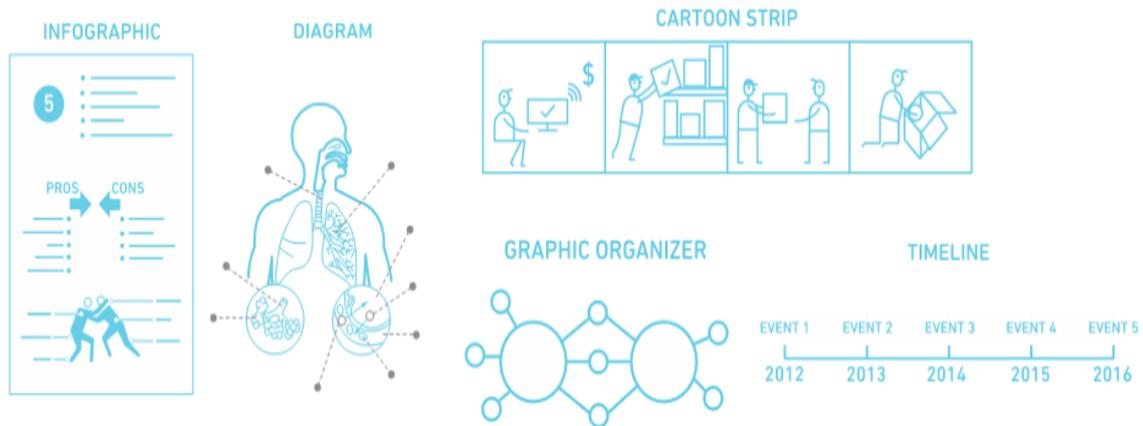
Deliberate Practice

This follows a simple process to support your revision. Start by spending time reviewing a topic/unit before quizzing/testing yourself **with no notes and from your memory (this is vital for revision)**. Once you have finished, check your answers. **This will support you in showing where your 'knowledge gaps' are and where focus needs to be in your future revision.** Revision shouldn't keep you in your comfort zone, you need to be thinking hard and identifying your own areas for development. Avoid simply revising topics you enjoy. A technique to support deliberate practice is the **Pomodoro Technique**.

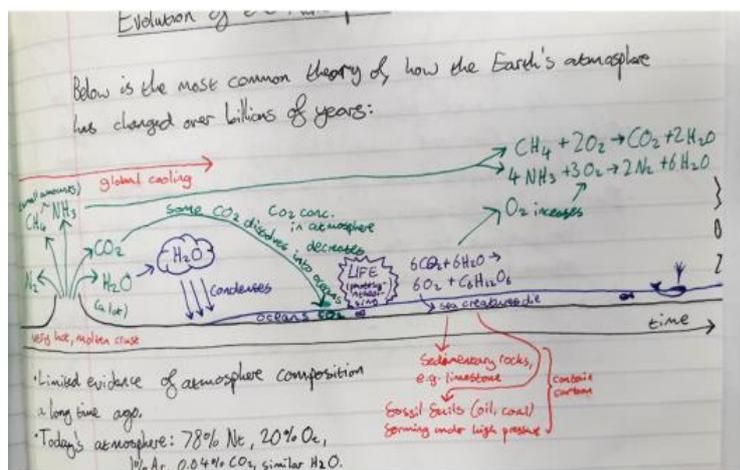


Dual Coding

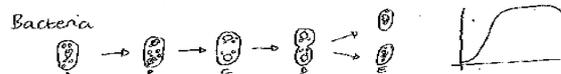
When reviewing something you have learnt, combining words and pictures can be powerful.



Here are some examples of dual coding in practice:



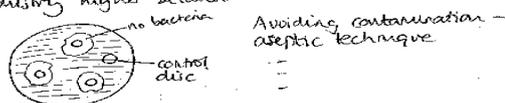
Chromosomes, Cells and Reproduction



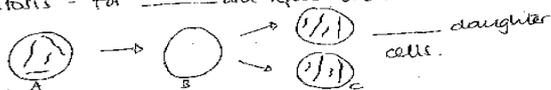
mean division time eg 30 mins
in 2hrs how many bacteria?

Culturing microorganisms

In school 25°C or less because...
In industry higher because...



Plant and animal cells - making new cells
Mitosis - for _____ and repair and asexual _____



How long in each stage of mitosis
120 cells in one field of view
42 cells in the replication phase of the cell cycle
Cell cycle lasts 24 hours

Chromosomes - long lengths of _____ coiled up
_____ pairs of genes in human body cells.

Ineffective revision strategies

With the above in mind, it is vitally important to think about strategies that have a limited or no real benefit on learning or memory. These include:

- Simply writing out notes or copying from a textbook/exercise book.
- Reading and doing nothing with the information. Trying to focus on ‘too much information’ on a single page and cramming revision.
- Highlighting information for the sake of it.
- Not enough silent work or attention to a given task. Attempting to revise while multi-tasking and doing other things.
- Comfort zone revision of easy material that pupils have already mastered because it makes you ‘feel good’.

The importance of Habits and Routines

Within your revision, it is vitally important to establish a strong routine. Having goals are good for setting a direction. What do you want to achieve in *this* revision session?

In order to support the forming of good revision habits, there are a number of areas to consider:

- **Start small and build up.** Reduce distractions where and when you revise and get your family to encourage the creation of a revision timetable and placing it somewhere visual in your house. Ensure someone else is knowledgeable of this timetable to enable accountability and aid support.
- **Make it attractive.** Collaborative focused revision is beneficial (alongside attending interventions or revision sessions) but you could also ensure there is a ‘reward’ at the end of a revision session. *If I complete this, I can do this.*
- **Make it satisfying.** Challenge yourself, track your own revision progress and ensure you stick to your revision timetable. Small steps build success and motivation. Use checklists to support.
- **Make it obvious.** Revise in one area, leave your materials out ready to support organisation and ensure you stick to routines. Ensure your environment is clear, uncluttered and comfortable.

Avoid stress

- **One job at a time.** Don’t worry about what you aren’t doing. Stay focused on the task in hand.
- **Break large tasks into their smaller components.** This will make them seem more manageable and will give you a sense of achievement. Set realistic goals and deadlines for projects. Honestly assess the amount of time you waste.
- **Set a schedule for the week.** Plan segments of time for study, but within this make sure you have also planned time for family, exercise, and other tasks that need to get done.
- **Remember that you are only human.** Nothing will be done well if you are emotionally or physically drained. Try to avoid perfectionism which will put unnecessary demands on yourself.
- **Learn techniques to calm the mind.** Stay positive. Try to focus on things that make you happy. Tell yourself that “this, too, shall pass” or “I can handle this”. Recognise processes that you control and those you don’t.
- **Ask for help.** Parents, teachers and your friends are all there to support. It helps to talk about how you are feeling as well as your work.

The Five Step Study Plan

- 1. Make a list** - What do you need to know?



- 2. Timetable a spaced schedule** - Study each topic little but often, and leave yourself enough time.



- 3. Use effective study strategies** - Test yourself and keep the re-reading and highlighting to a minimum.



- 4. Identify the gaps in your knowledge**
What do you need to study more?
What can you move on from?



- 5. Close the gaps** - Repeat steps 3 & 4 as many times as you need until you are comfortable with everything.



References

All charts taken from “Dual Coding” by Oliver Caviglioli unless otherwise stated underneath.
<https://www.futurelearn.com/info/courses/technology-teaching-learning/0/steps/53322>