

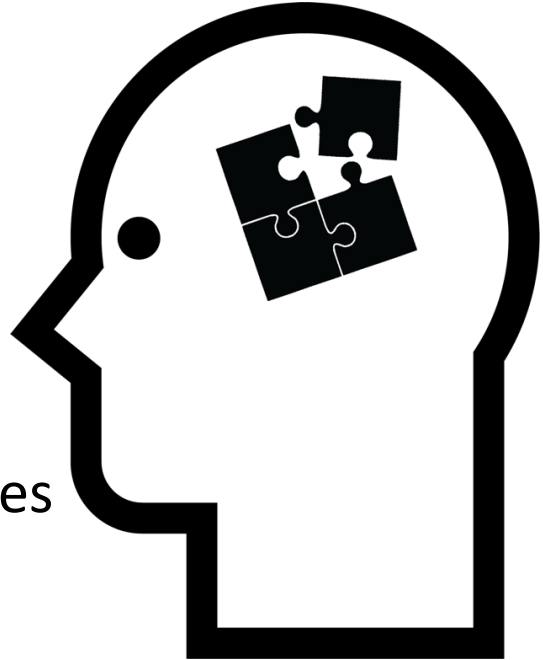


AUCKLAND
GRAMMAR SCHOOL

Effective Revision:

What does the science of learning tell us?

1. Start early
2. Revise in short bursts
3. Space and interleave
4. Practise retrieval
5. Dual code
6. Learn concrete examples
7. Elaborate





Pre-Revision Checklist

1. Find a copy of the course outline.
2. Organise your class materials.
3. Make efforts to identify and fill any gaps in your class materials:
 - a. Ask your teacher
 - b. Ask your classmates
 - c. Check your textbook
 - d. Check on Grammarnet
4. Get some revision materials
 - a. Pens, pencils, eraser, ruler
 - b. Subject-specific equipment (i.e. calculator)
 - c. Blank refill or revision exercise book
5. Prepare a space for your revision. It should:
 - a. Be quiet
 - b. Be free from distractions
 - c. Only contain digital devices/resources that are essential for your study
6. Plan your study
 - a. Use the revision timetable overleaf
 - b. Make sure you can cover all the course material in the time you have available
 - c. Remember to make time for breaks
7. Make sure you are:
 - a. Rested: you need sleep in order to learn
 - b. Nourished: you need good nutrition in order to learn



Many students get their revision wrong without realising

- *Starting revision late*
- *Revising for long periods at a time*
- *Cramming*
- *Re-reading notes*
- *Highlighting notes*
- *Watching YouTube videos¹*



These revision approaches are used commonly, but they are proven to be less effective than other methods!

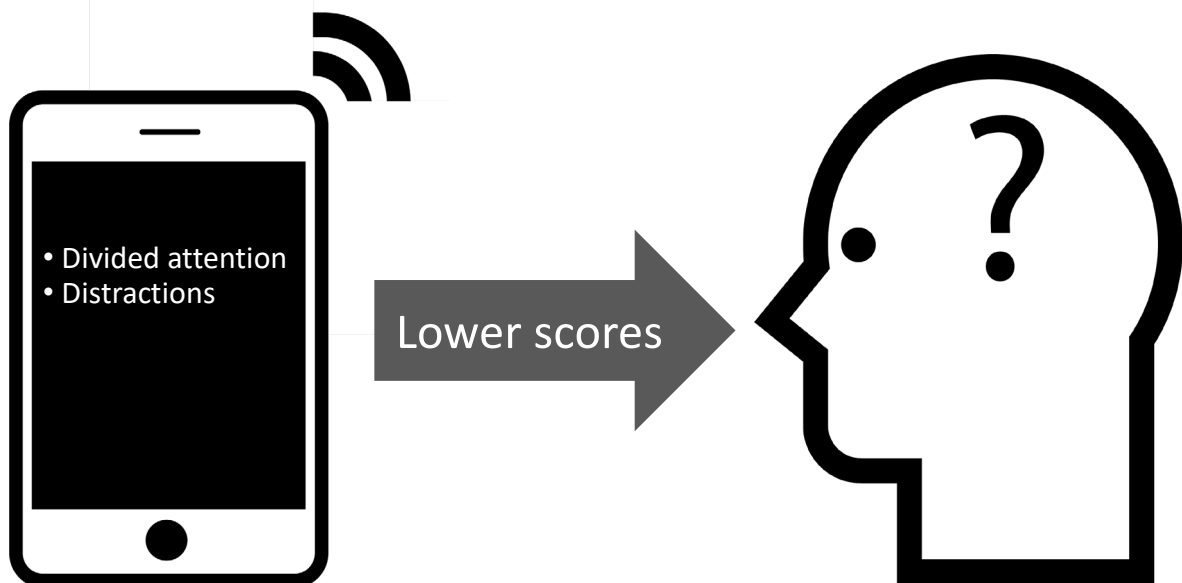
There are several revision strategies you can use that take into account the way the brain learns. This booklet tells you more about them.

The research articles on which the advice in this booklet is based are listed on the back page.

¹ While watching videos selected by a teacher can be a valuable learning activity, there is no evidence to suggest that students should revise by choosing videos to watch online. Little research has been conducted in this area, but some evidence suggests that poorly-chosen videos may have a detrimental impact.



Effective revision means avoiding ineffective techniques and distractions.



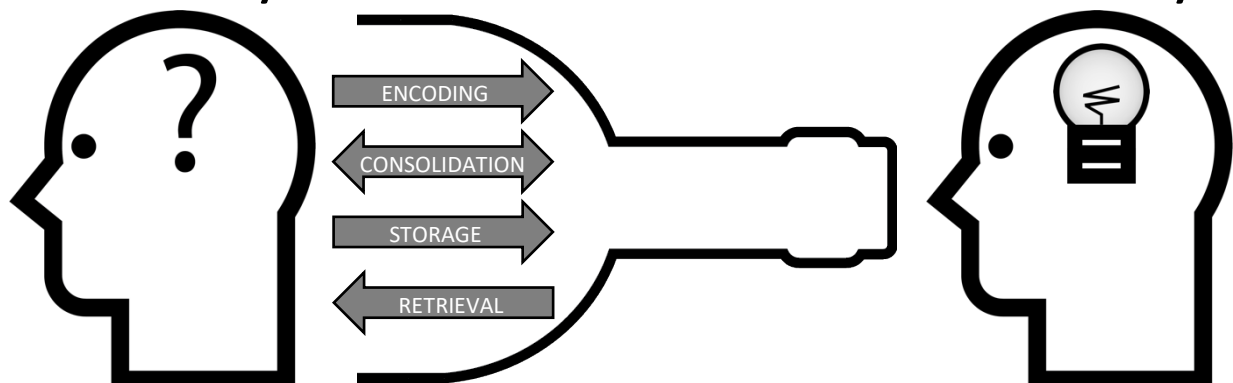
Ward, A., Duke, K., Gneezy, A. & Bos, M.W. 2017. Brain Drain: The Mere Presence of One's Own Smartphone Reduces Available Cognitive Capacity. *Journal of the Association for Consumer Research*, 2:2, 140-154.

It also means understanding some of the science of learning

Working memory

acts as a bottleneck on new knowledge entering

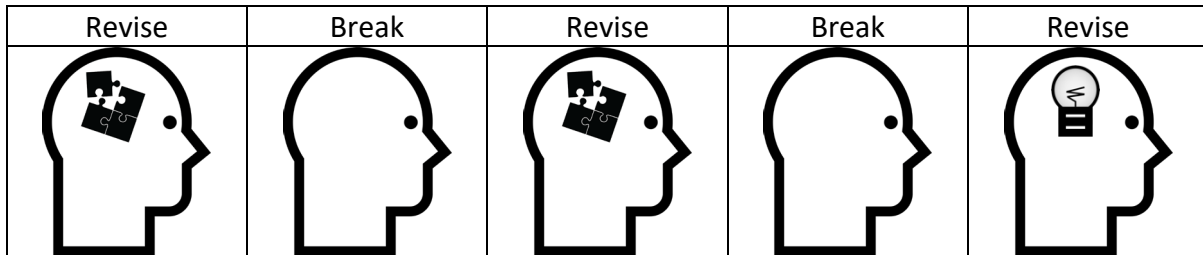
long-term memory





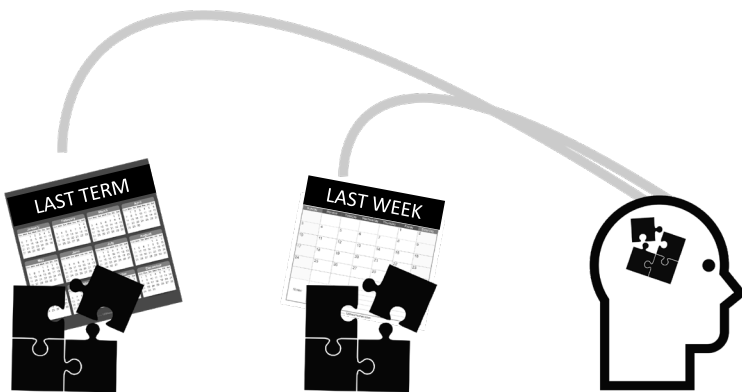
Spacing

Revise for short periods, and take shorter breaks in between.



Leave gaps between revision sessions. Forgetting is part of learning!

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
11	12	13	14	15	16	17
18	19	20	21	22	23	24

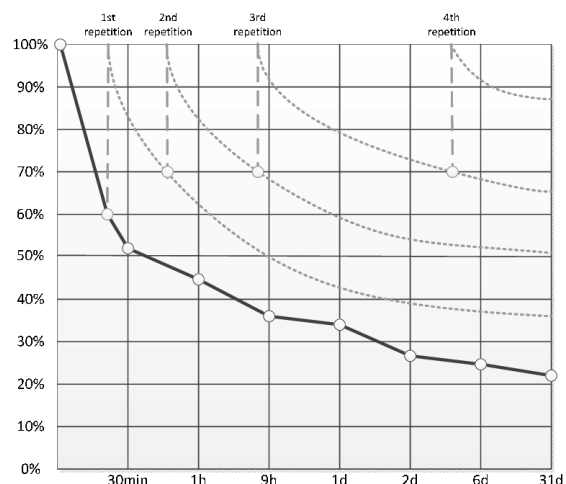


Revise all your course content, and make sure you re-study material from months ago and weeks ago, as well as more recent learning.

Numerous studies have shown that repeated learning sessions lead to better knowledge in the long-term than cramming.

Don't worry if you forget some of the material between revision sessions—this is a normal part of the learning process. What's important is that you re-study and re-learn.

Re-encountering and re-learning the material over time strengthens your knowledge.



Alteration of the forgetting curve through repetition Ebbinghaus (1885) and Paul (2007)

Schimanke, Florian & Mertens, Robert & Hallay, Florian & Enders, Arkadij & Vornberger, Oliver. (2015). Using a Spaced-Repetition-Based Mobile Learning Game in Database Lectures.



Interleaving

Switch between subjects and topics, and make links between topics as you go. Check back over previous topics regularly, making links between them.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
11	12	13	14	15	16	17
18	19	20	21	22	23	24

In any study session, mix different ideas or problem types, and switch between them.

'Massed' practice

Topic 4, problem type 1, task a)
Topic 4, problem type 1, task b)
Topic 4, problem type 1, task c)
Topic 4, problem type 1, task d)
Topic 4, problem type 1, task e)
Topic 4, problem type 1, task f)

'Interleaved' practice

Topic 4, problem type 1, task a)
Topic 12, problem type 6, task a)
Topic 4, problem type 1, task b)
Topic 12, problem type 6, task b)
Topic 4, problem type 1, task c)
Topic 12, problem type 6, task c)

Revising this way feels harder

- ✗ You may make more mistakes
- ✗ You may get fewer answers right
- ✗ You may struggle to recall

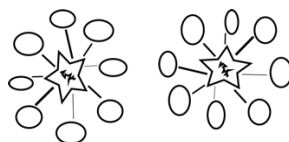
- ✓ You will develop a more secure understanding
- ✓ Your skills will improve

...but it's more effective in the long-run.

Interleaving works best when you plan it in advance, persevere when it gets difficult, and combine it with other techniques.



Plan your revision so that you space out your study, and interleave different problem-types.



Think about and elaborate on the similarities and differences between problem types as you revise them.



Quiz yourself on one topic, and then design a new quiz for a different topic. Think about the connections as you go.



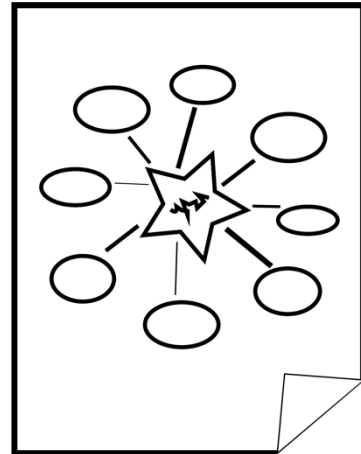
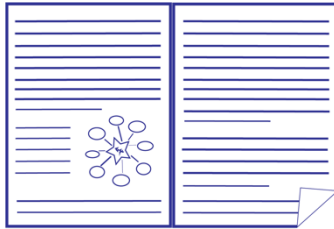
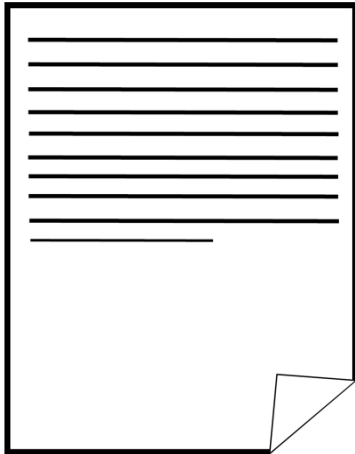
Write notes on a topic in one session, and then produce a brainstorm on the same topic in the next session.



Retrieval Practice

Retrieving previously learned material from your long-term memory helps you learn the material more securely. Testing yourself is revising!

Use your class notes and textbook to create flashcards, revision notes and diagrams.



Designing quizzes for yourself is useful revision—as long as you go back to your class materials to check for accuracy and spend time correcting any wrong answers.

Revising like this is hard!

Don't be put off if you struggle—break it down and concentrate on the information you find hardest!

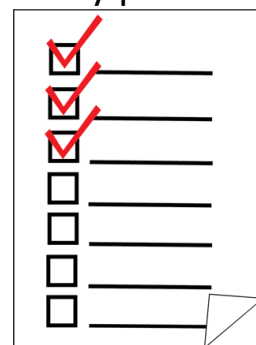
- Swap quizzes with your friends.
- Make sure your quizzes test the most important information:
 - Test how ideas are similar or different
 - Test relationships between ideas
 - Test examples of concepts

Put your study materials away, then try to write or sketch everything you know.



Correct any errors, and add anything important that you missed.

Test yourself with quizzes that check knowledge and understanding of the key points.

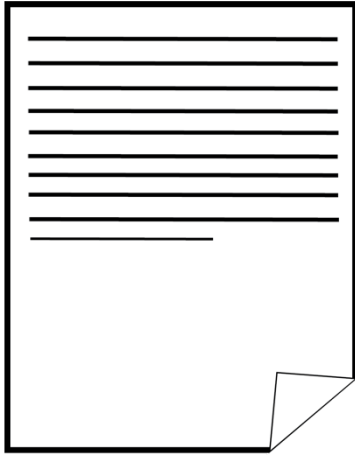


Any good quiz will help you learn, but setting, sitting, marking and correcting your own quizzes is best!

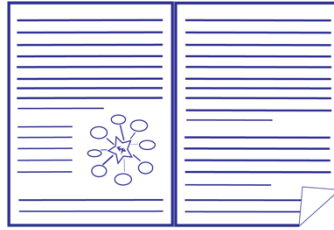


Dual Coding

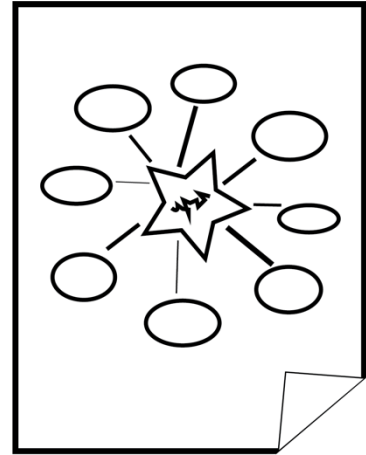
Look back through your class materials: find the diagrams and compare them with the words.



Study the visuals, and then explain them in your own words.



Study the text, and then find a way to represent the words in a visual.

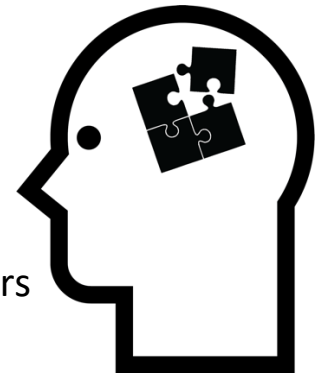


Information is encoded and learned via two different 'channels': the visual and verbal.²



'dog'

- Diagrams
- Maps
- Timelines
- Cartoon strips
- Infographics
- Graphic organisers
- Brainstorms



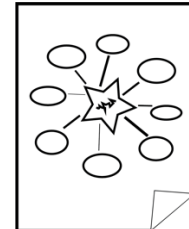
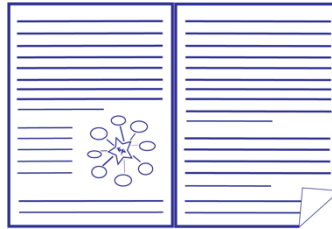
² This is true for everyone and does not imply that students have different 'learning styles'. In fact, there is no evidence to support the existence of different 'learning styles'.

<https://www.psychologicalscience.org/news/releases/learning-styles-debunked-there-is-no-evidence-supporting-auditory-and-visual-learning-psychologists-say.html>



Concrete Examples

For each of the main ideas you study, collect specific examples from your study material.

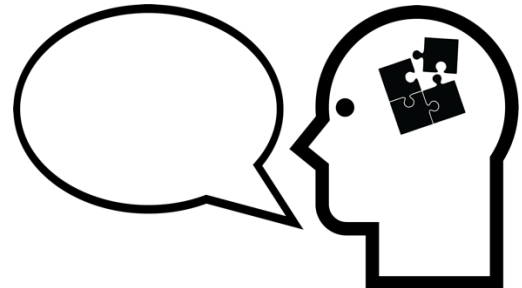
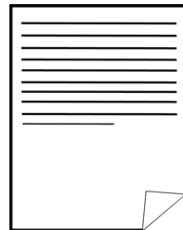


Make links between each example and the main idea, so you understand how they are linked together.

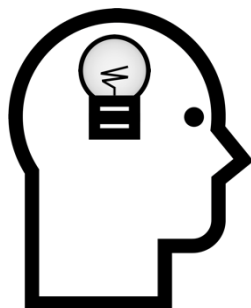
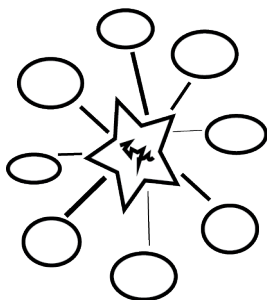
Elaboration

Elaboration involves explaining

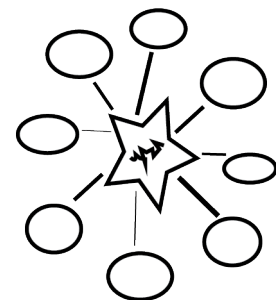
- how things work,
- why they work that way,
- how you know about them.



Write a list of questions about how things work and why as you revise. Include them in your quizzes, or practise answering those questions.



Take two ideas and explain why they are similar and/or different.





Putting this into action

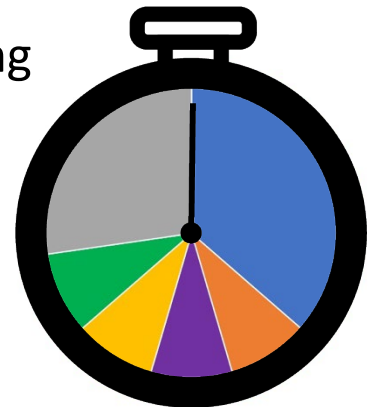
- Start your revision early
- Revise in 45-min bursts, with a 15-min break
- Space your revision out over time, remembering to switch between topics

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	ENG MAT SOC	OPT SCI OPT	ENG MAT SOC	OPT SCI OPT	ENG MAT SOC	OPT SCI OPT	ENG MAT SOC

- Interleave revision of different subjects and topics within subjects

In any period of revision, remember to make time for the different effective revision techniques outlined in this booklet:

- Revise new material using dual coding
- Find concrete examples
- Sit, mark, correct retrieval practice quizzes
- Write new retrieval practice quizzes
- Elaborate—in speech and/or in writing



When revising:



LEAVE your phone in a different room, on silent or off



DO NOT watch videos online, unless they're recommended by your teacher



Notes:



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Form 4 2019 Term 2 Personal Revision Timetable

Exam Dates:

Revision sessions tally:

English Maths	Science Social Studies	Option 1 Option 2	English Maths	Science Social Studies	Option 1 Option 2
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Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
7	10 June	11 June	12 June	13 June	14 June	15 June	16 June
	1.	1.	1.	1.	1.	1.	1.
	2.	2.	2.	2.	2.	2.	2.
	3.	3.	3.	3.	3.	3.	3.
8	17 June	18 June	19 June	20 June	21 June	22 June	23 June
	1.	1.	1.	1.	1.	1.	1.
	2.	2.	2.	2.	2.	2.	2.
	3.	3.	3.	3.	3.	3.	3.
9	24 June	25 June	26 June	27 June	28 June: EXAMS	29 June	30 June
	1.	1.	1.	1.	AM EXAM:	1.	1.
	2.	2.	2.	2.	PM EXAM:	2.	2.
	3.	3.	3.	3.	1.	3.	3.
10	1 July: EXAMS	2 July: EXAMS	3 JULY: EXAMS	4 JULY: EXAMS	5 JULY: EXAMS	6 JULY: HOLIDAY	7 JULY: HOLIDAY
	AM EXAM:	AM EXAM:	AM EXAM:	AM EXAM:	AM EXAM:		
	PM EXAM:	PM EXAM:	PM EXAM:	PM EXAM:	PM EXAM:		
	1.	1.	1.	1.	1.		
	2.	2.	2.	2.			
	3.	3.	3.	3.			

Revision Timetable

Exam Dates:

Revision sessions tally:

Subject 1:	Subject 3:	Subject 5:	Subject 1:	Subject 3:	Subject 5:
Subject 2:	Subject 4:	Subject 6:	Subject 2:	Subject 4:	Subject 6:

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
7	1.	1.	1.	1.	1.	1.	1.
	2.	2.	2.	2.	2.	2.	2.
	3.	3.	3.	3.	3.	3.	3.
						4.	4.
						5.	5.
8	1.	1.	1.	1.	1.	1.	1.
	2.	2.	2.	2.	2.	2.	2.
	3.	3.	3.	3.	3.	3.	3.
						4.	4.
						5.	5.
9	1.	1.	1.	1.	1.	1.	1.
	2.	2.	2.	2.	2.	2.	2.
	3.	3.	3.	3.	3.	3.	3.
						4.	4.
						5.	5.
10							
		AM EXAM:	AM EXAM:	AM EXAM:	AM EXAM:		
		PM EXAM:	PM EXAM:	PM EXAM:	PM EXAM:		
	1.	1.	1.	1.	1.		
	2.	2.	2.	2.	2.		
3.	3.	3.	3.	3.			