

Interleaving and spacing

THE ONE ABOUT SPACING AND INTERLEAVING

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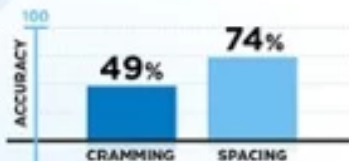
THE STUDY

How much impact does the order or type of questions that students answer have on how well they learn the material, and then on their ability to remember the answers later? Is spacing, which is doing little and often, better than cramming? Does interleaving, which is mixing up the type of problems, help more than blocking?

In the first study, researchers explored the difference between spacing out maths revision sessions over the course of a week compared to doing them all in one sitting. In their second study they also measured the impact of working on the same sort of maths problems for the whole session against mixing up the type of questions the students had to answer.

THE MAIN FINDINGS

1 In the final test, students who spaced out their revision sessions got an average mark of 74%, whereas those who crammed their revision got 49%.



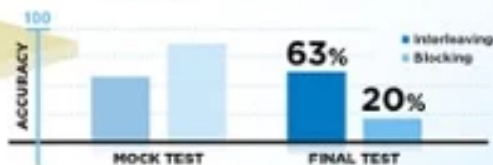
2 In the mock test straight after the revision session, block learning was better than interleaving.

However, in the final test one week later, students who interleaved the type of questions they answered got on average of

63%

...whilst those that had answered the same sort of problem (i.e. blocking) got on average

20%



Spacing and Interleaving

create a desirable difficulty

Interleaving is when you mix up the subjects/units rather than blocking a single subject/unit. **Long-term**

retention and the ability to apply your knowledge improves.

Interleaving forces your brain to continually retrieve because each subject/unit is different from the last. Challenging your brain with different subjects/units will **strengthen your memory**.

The **spacing** effect boosts memory as the revision of material is more effective if spread out and revisited regularly over time.

To **revise successfully** you should interleave and space different subject content throughout each study session, within the same week and across subsequent weeks.

The **MOST**
EFFECTIVE way to
revise!!

Overcoming the Curve

Remembered %

Class 10 min. 24 hrs. 1 wk. 1 mo.

Immediately after class 24 hours later 1 week later (or sooner) 1 month later (or sooner)


— Forgetting Curve
— Review 1
— Review 2
— Review 3

Notice how less is forgotten after each review!!

How can
I improve
my
memory?

1. By regularly revisiting the same content (spacing)
2. By mixing up (interleaving) your revision topics
3. By testing yourself

YOU **SHOULDN'T**
STUDY
ONE
IDEA
FOR TOO
LONG

A cartoon squirrel with grey fur, a white belly, and purple-rimmed glasses is sitting and holding a brown book. It is positioned to the right of the text, appearing to be reading or presenting the message.

Use interleaved practice

Four vertical strips showing the evolution of a 4x4 grid. Each strip has four columns with different color backgrounds (blue, green, yellow, red). The grid contains the letters T, O, P, I, C in white. Below each strip is a sequence of numbers.

- Strip 1: 1 2 3 4
- Strip 2: 4 2 1 3
- Strip 3: 1 3 2 4
- Strip 4: 4 2 3 1

SPACING

Each of your 3 subject sessions per week should have a different focus...

OPT: ORGANISE - PRACTISE - TEST

1st session on a subject

- **ORGANISE** = 30 minutes for you to get your resources together -the revision guide, exercise books, resources from the teacher, paper, post-its, flash cards, pens, a folder and past papers/questions for the testing session. Give everything a read through, highlight key things/use post-its/ flash cards and re-familiarise yourself with the unit.

2nd weekly session on a subject

- **PRACTISE** = 30 minutes for you to revise the subject/unit. Make the process active by creating flash cards, mind maps, Cornell Notes or any other memory techniques.

3rd weekly session on a subject

- **TESTING** = 30 minutes for you to test what you are now able to successfully retrieve. Use a recognised testing method like answering questions verbally to a parents, answering practise questions and doing past papers. Finish by self-marking by using the revision, model answers and mark schemes. Make sure you brief your teacher on your progress.

Always doing a mixture of subjects on any one day (interleaving)

NAME:							
Week A	Interleaved and Spaced Revision Schedule (O-Organise, P-Practice, T-Test)						
30 sessions	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Session 1	Chemistry (O)	ICT (O)	RE (O)	ICT (P)	German (T)	Chemistry (T)	RE(T)
Session 2	Maths (O)	Eng Lang (O)	Biology (O)	Maths (P)	Eng Lang (P)	History (T)	Physics (T)
Session 3	History (O)	Music (O)	History (P)	German (P)	Music (P)	Eng Lang (P)	Biology (T)
Session 4	German (O)	Physics (O)	Eng Lit (O)	Eng Lit (P)	Chemistry (P)	RE (P)	Music(T)
Session 5						Biology (P)	Maths (T)
Session 6	Different focus for each of the 3 sessions (OPT)					Physics (T)	ICT (T)
Session 7						Eng Lit (T)	Chemistry (T)
WEEK B	Interleaved and Spaced Revision Schedule (O-Organise, P-Practice, T-Test)						
30 sessions	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Session 1	Maths (O)	Eng Lit(O)	Chemistry (P)	Physics (P)	Biology (P)	ICT(T)	Maths (T)
Session 2	Chemistry (O)	Physics (O)	Biology (O)	Eng Lit(P)	Music (P)	German (T)	RE(T)
Session 3	Eng Lang(O)	Music (O)	Eng Lang(P)	History (P)	Eng Lang (T)	Chemistry (T)	Physics (T)
Session 4	History (O)	German (O)	ICT(P)	RE(O)	German (P)	Eng Lit (T)	Biology (T)
Session 5	ICT(O)			Maths (P)		History (T)	Music (T)
Session 6						RE (P)	
Session 7							

Spaced throughout the week

Done more sessions in the week so less to do at the weekend

**Personalise your timetable to suit yourself. You could
Add times to your timetable (see below)**

NAME:							
Week A	Interleaved and Spaced Revision Schedule (O=Organise, P=Practice, T=Test)						
WEEKDAY 30 min sessions	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8 – 8.30	Chemistry (O)	ICT (O)			German (T)	Chemistry (T)	RE(T)
12.15 – 12.30	Maths (O)	Eng Lang (O)		Maths (P)	Eng Lang (P)	History (T)	Physics (T)
4 – 4.30			History (P)		Music (P)	Eng Lang (P)	Biology (T)
4.45 – 5.15	History (O)		Eng Lit (O)	Eng Lit (P)	Chemistry (P)	RE (P)	Music(T)
6.30 – 7		Music (O)	RE (O)	German (P)		Biology (P)	Maths (T)
7.15 – 7.45	German (O)	Physics (O)	Biology (O)			Physics (T)	ICT (T)
8 – 8.30				ICT (P)		Eng Lit (T)	Chemistry (T)

**Do more revision on weekdays to avoid filling your weekends
Give yourself some nights off (but transfer the sessions to other days)**

As long as you fill the slots your need (no. of GCSEs × 3 = slots needed per week) then your can make the timetable fit your preferences.

Creating prioritised revision

- On the Master Subject/Unit sheet delete/cross out the subjects that you do not study.
- For each of your subjects colour code (e.g. red/yellow/green) each unit to show how confident you are that you will achieve the highest marks.
- Be relative in your categorisation - for each subject you should have 5 red (the hardest), 5 yellow (fairly tough) and 5 green (the easiest)
- When you start to follow your revision timetable start with your weakest topics in each subject.

My Subject and Units										
PHYSICS	BIOLOGY	CHEMISTRY	P.E	R.E	ENG. LANG.	ENG. LIT.	GERMAN	MATHS (H)	HISTORY	ICT
FOR EXTRA INFO SEE 'EXPANDED TOPICS'	FOR EXTRA INFO SEE 'EXPANDED TOPICS'	FOR EXTRA INFO SEE 'EXPANDED TOPICS'	FOR EXTRA INFO SEE 'EXPANDED TOPICS'		FOR EXTRA INFO SEE 'EXPANDED TOPICS'	FOR EXTRA INFO SEE 'EXPANDED TOPICS'	4 ASSESSMENT ELEMENTS; SPEAKING, LISTENING, READING & WRITING			COURSEWORK COMPLETION
Physics 1: Energy. Specific heat capacity required practical	Biology 1: B1 Cell biology	Chemistry 1: C1a Atomic structure	P.E 1: Anatomy and Physiology 1	RE1 : Buddhist beliefs	English Lang 1: Component 1 Reading: question type	English Lit 1: An Inspector Calls: plot	German 1: School	Maths Higher 1: Number fractions, decimals, percentages, HCF, LCM	History 1: Medicine 1 - Medieval medicine c1200-1499	ICT 1:
Physics 2: Energy. Ek and Ep	Biology 2: B1 Cell biology	Chemistry 2: C1b Periodic table	P.E 2: Anatomy and Physiology 2	RE2: Buddhist practises	English Lang 2: Component 1 Reading: the 'HOW' question	English Lit 2: An Inspector Calls: theme	German 2: Hobbies and free time activities	Maths Higher 2: Algebra - expressions, formulae, linear equations, linear simultaneous equations, sequences and proof	History 2: Medicine 2 - Renaissance medicine c1500-1699	ICT 2:
Physics 3: Energy use in the home	Biology 3: B2 Organisation	Chemistry 3: C2 Bonding and structure - Ionic	P.E 3: Anatomy and Physiology 3	RE3: Christian beliefs	English Lang 3: Component 1 Reading: the Evaluation question (5)	English Lit 3: An Inspector Calls: characters	German 3: family and relationships	Maths Higher 3: Ratio	History 3: Medicine 3 - 18th & 19th century medicine c1700-1899	ICT 3:
Physics 4: Electricity. Circuits	Biology 4: B2 Organisation	Chemistry 4: C2 Bonding and structure - Covalent	P.E 4: Levers	RE4: Christian practises	English Lang 4: Component 1 Writing: what makes a good story	English Lit 4: An Inspector Calls: past exam questions	German 4: House and home	Maths Higher 4: Perimeter, area and volume	History 4: Medicine 4 - Modern medicine c1900-Present	ICT 4:

**Condensed
subject
list**

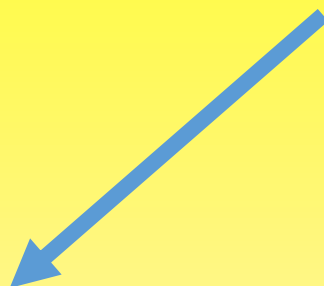
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Physics 1: Energy. Specific heat capacity required practical	Biology 1: B1 Cell biology	Chemistry 1: C1a Atomic structure	P.E 1: Anatomy and Physiology 1	RE1: Buddhist beliefs	English Lang 1: Component 1 Reading: question type	English Lit 1: An Inspector Calls: plot	German 1: School	Maths Higher 1: Number fractions, decimals, percentages, HCF, LCM	History 1: Medicine 1 - Medieval medicine c1200 - 1499	ICT 1:
Physics 2: Energy. Ek and Ep	Biology 2: B1 Cell biology	Chemistry 2: C1b Periodic table	P.E 2: Anatomy and Physiology 2	RE2: Buddhist practises	English Lang 2: Component 1 Reading: the 'HQW' question	English Lit 2: An Inspector Calls: theme	German 2: Hobbies and free time activities	Maths Higher 2: Algebra - expressions, formulae, linear equations, linear simultaneous equations, sequences and proof	History 2: Medicine 2 - Renaissance medicine c1500 - 1699	ICT 2:
Physics 3: Energy use in the home	Biology 3: B2 Organisation	Chemistry 3: C2 Bonding and structure - Ionic	P.E 3: Anatomy and Physiology 3	RE3: Christian beliefs	English Lang 3: Component 1 Reading: the Evaluation question (5)	English Lit 3: An Inspector Calls: characters	German 3: family and relationships	Maths Higher 3: Ratio	History 3: Medicine 3 - 18th & 19th century medicine c1700 - 1899	ICT 3:
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Physics 5: Electricity required practical	Biology 5: B3 Infection and response	Chemistry 5: C2 Bonding and structure - metallic	P.E 5: Effects of exercise	RE5: Causes of war, reasons for war, Just War	English Lang 5: Component 1 Writing: how to structure a story	English Lit 5: A Christmas Carol: plot	German 5: food and drink	Maths Higher 5: Probability	History 5: Historic environment; Surgery on the Western Front c.1914 - 1917	ICT 5:
Physics 6: Particles of matter	Biology 6: B3 Infection and response	Chemistry 6: C3 Qualitative chemistry	P.E 6: Components of fitness	RE6: Terrorism, weapons of mass	English Lang 6: Component 1 Writing: title types	English Lit 6: A Christmas Carol: theme	German 6: Digital Technology	Maths Higher 6: Number - surds, bounds, estimation	History 6: American West 1 - Early settlement of	ICT 6:

Colour coded topics

- At the end of your testing session **amend** the colour for the units you have revised according to how confident you now feel/ what your test marks indicate.

1				
2	PHYSICS	BIOLOGY	CHEMISTRY	
3	FOR EXTRA INFO SEE 'EXPANDED TOPICS'	FOR EXTRA INFO SEE 'EXPANDED TOPICS'	FOR EXTRA INFO SEE 'EXPANDED TOPICS'	FOR 'EX
4	Physics 1: Energy. Specific heat capacity required practical	Biology 1: B1 Cell biology	Chemistry 1: C1a Atomic structure	P.E. Phy
	Physics 2: Energy. Ek and Ep	Biology 2: B1 Cell biology	Chemistry 2: C1b Periodic table	P.E. Phy

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- Keep recolouring your Master Subject/Unit tab to keep track of your progress during the course of your revision.
- Hopefully, by the time your exams begin you will have mainly greens and perhaps just a few yellow topics