SCIENCE OF LEARNING

ELEVATE

FOXFORD

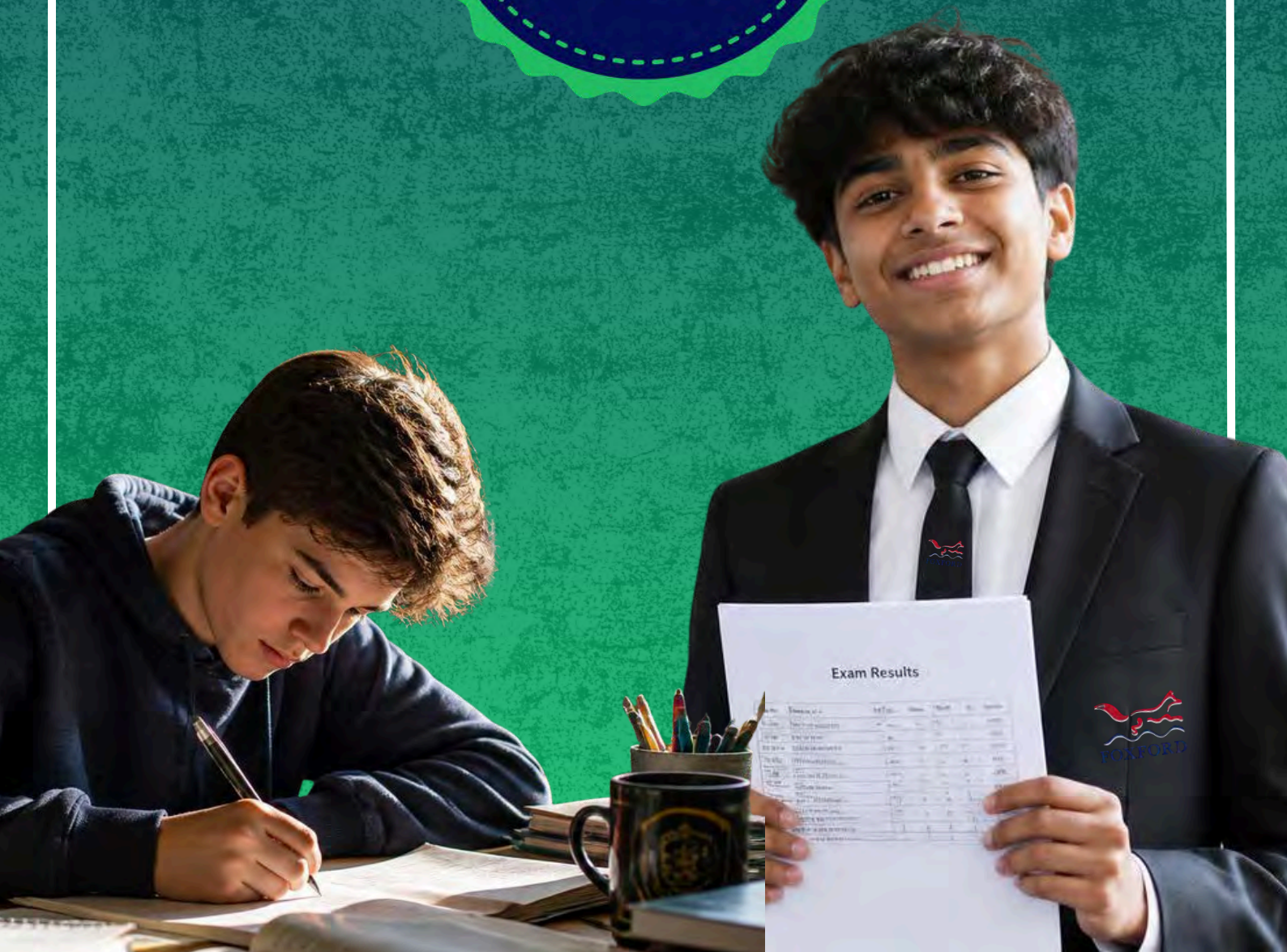


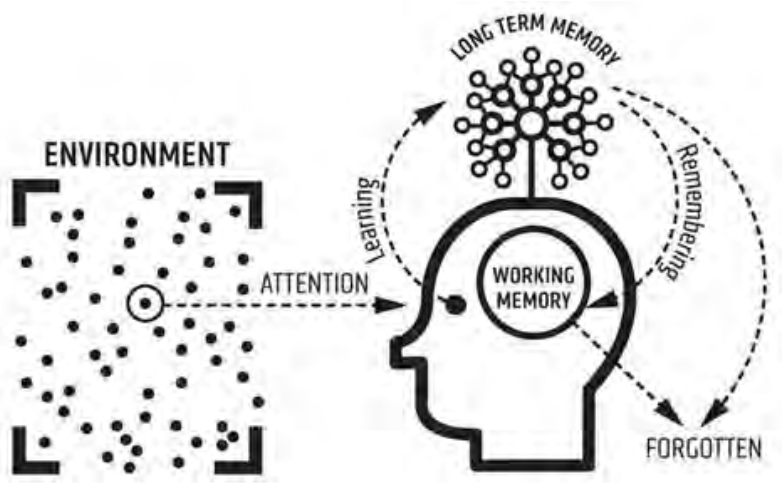
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MEMORY

Scan here to see how to master memory via retrieval practice

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.



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.**

Our **working memory** is where you do your thinking and where you take in new information. It is finite and we can only absorb a limited amount of information at a given time otherwise it gets crowded (research suggests we can hold 5 things in our working memory at one 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!

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. When we remember something, it comes from here. 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. However, if we don't use the information it fades (is forgotten). **Learning is therefore a change in your long-term memory.** Whatever you think about, that's what you remember. Therefore, revision activities must require you to think hard.

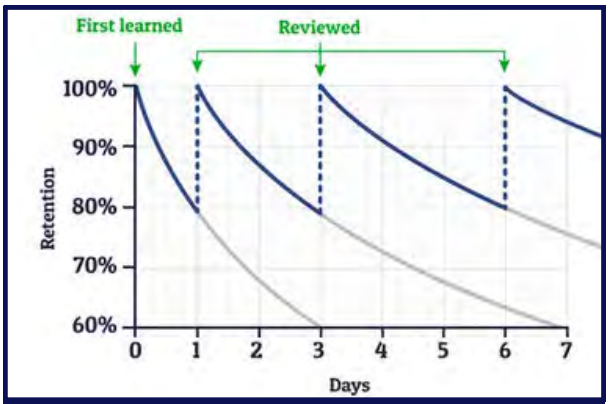
Information in our **long-term memory** is interconnected and linked with prior knowledge. Anything that is not connected or not successfully stored well enough in our long-term memory is forgotten and this is completely natural.

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 permenant!

WHY DO WE FORGET WHAT WE LEARN?

The Forgetting Curve - How to Beat it

Forgetting is a normal part of learning. In fact, research shows that we start to forget new information very quickly after we first learn it. Over time, if we do not revisit that information, we are likely to forget much of it. This idea is shown in a model called the Ebbinghaus Forgetting Curve, created by psychologist Hermann Ebbinghaus in 1885.



THE FOGETTING CURVE

Key Points

- We remember information best when we first learn it.
- Without review, memory can drop to around 60% after just three days.
- We forget most quickly in the first few days after learning.
- Memory is improved when information is reviewed and practised regularly.
- Factors such as motivation, revision methods, and sleep can affect how well we remember.
- Research suggests that revisiting learning within the first 24 hours is especially important for reducing forgetting.

What This Means for Your Child

Forgetting does not mean your child has failed to learn. It is a natural process. The key to long-term success is regularly returning to and practising what they have learned.

How Parents Can Help

You do not need to be a subject expert. Encourage your child to:

- Review new learning on the same day or within 24 hours.
- Spend short periods revisiting topics throughout the week.
- Test themselves using flashcards or quizzes.
- Get enough sleep, as this supports memory and learning.

Practice and retrieval help to break this 'forgetting curve' as it strengthens the long-term memory and stops information from fading.

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

SPACING

Spaced Repetition in Learning Theory

Spacing means spreading revision into smaller, regular study sessions over time, rather than trying to learn everything at once.

Key Points

- Break revision into short, manageable chunks and spread it over days and weeks.
- Regular review helps information move into long-term memory.
- Avoid cramming (trying to learn large amounts in one session), as this can overload memory and increase stress.
- Leaving time between revising and testing yourself improves memory and recall.
- When the brain has to work harder to remember info, learning becomes more secure.

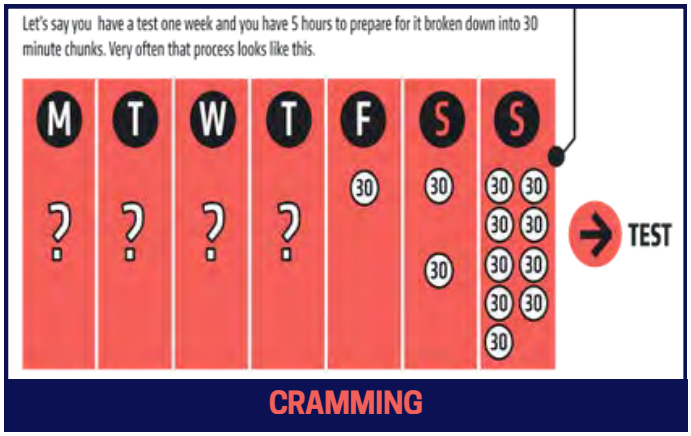
What This Means for Your Child

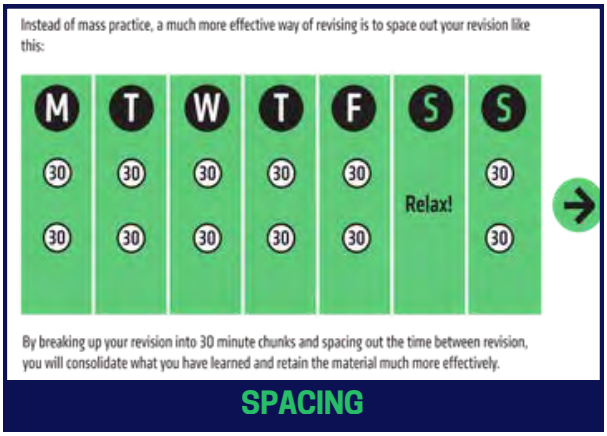
Students are more likely to remember information when they revisit it regularly over time. Although spaced revision can feel more challenging than cramming, it leads to stronger learning and better exam preparation.

How Parents Can Help

- Encourage your child to start revising early rather than waiting until just before exams.
- Help them create a revision timetable with regular, short study sessions.
- Encourage them to revisit topics several times over a number of weeks.
- Support them in testing themselves on topics they revised a few days or weeks earlier.

Remember: Short, regular revision sessions are more effective, less stressful, and lead to better long-term memory than last-minute cramming.





INTERLEAVING

The Forgetting Curve - How to Beat it

Interleaving is a revision technique that involves mixing different topics or types of questions during a study session, rather than spending a long time on just one topic.

Key Points

- Switch between different topics or skills when revising.
- Avoid revising one topic for too long in a single session.
- Mixing topics helps your child think more carefully and strengthens memory.
- Revisiting different topics over time helps reinforce learning and improve long-term recall.
- Break revision into manageable chunks and return to topics regularly.

Note: If a subject involves a continuous story or sequence of events (for example, a novel, play, or historical narrative), it is often best to revise that section as a whole so the overall meaning and connections are not lost.

What This Means for Your Child

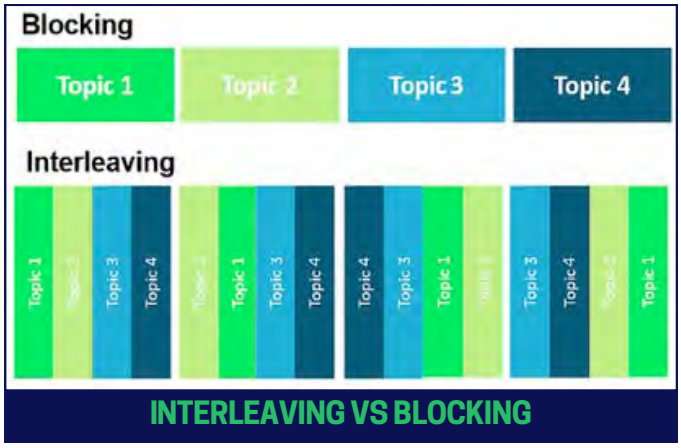
Interleaving helps students remember more by encouraging them to regularly revisit and connect different areas of learning, rather than focusing on one topic at a time.

How Parents Can Help

Encourage your child to include a mix of subjects or topics in each revision session.

Help them create a revision timetable that revisits topics regularly.

Encourage short, focused study periods rather than lengthy sessions on a single topic.



Remember: Mixing up revision may feel more challenging, but it is often more effective for building lasting knowledge and exam confidence.

WHY INTERLEAVING WORKS

by **@Inner_Drive**
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What it is:

Blocking



Blocking involves doing topic 1, then topic 2, then topic 3.

Interleaving



Interleaving involves mixing up topics within a subject.

Why it works:

1. Discrimination learning: Spotting **differences between similar things**



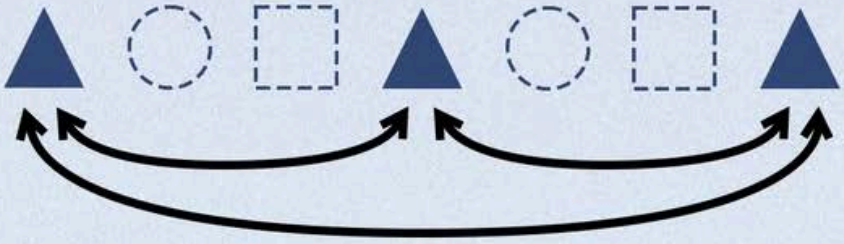
When students think about differences, we prompt them to think harder. Contrasting information is more likely to stick in our mind.

2. Involves remembering **similarities between different things**



By highlighting similarities between different things, we provide more "anchor points" for students to hook new information onto.

3. Involves the **benefits of spacing**



Each time the information is revisited, it helps ingrain and cement it into our long-term memory.

DELIBERATE PRACTICE

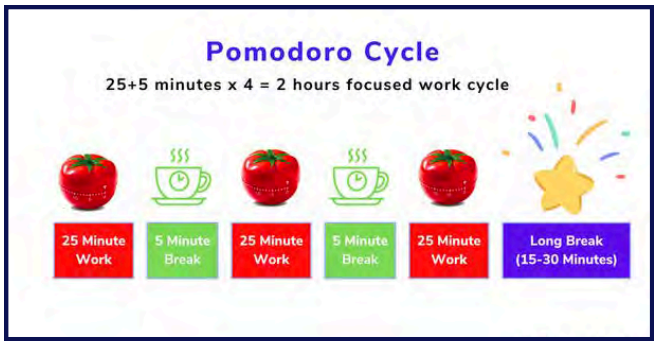
Practice is essential. You can revise all you like but without practice, it is wasted.

1. Start by spending time reviewing a topic/unit before quizzing/testing yourself with no notes and from your memory (this is vital for revision).

2. 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. The Pomodoro Technique is a time management method that uses 25-minute focused work intervals followed by short breaks to boost productivity and reduce mental fatigue.



Practice should be applying the knowledge and skills you need to succeed so may involve exam questions or planning answers.

✓	✗
Do	**Don't**
• Spend time practising what you will be tested on. • Practice the areas you struggle and need to improve on. • Make sure you review your practice – get a teacher to check it or review your notes and answers against mark schemes.	• Use notes, the point is you are doing it from memory! • Only practice areas you find easy or do well at. • Spend too long on a question – stick to timing and practicing what it will look like in exam conditions.

8 REVISION PITFALLS



Revision is about learning, not just looking busy. **Avoid these common mistakes that make revision less effective:**

1. Copying notes or textbooks
- Simply rewriting information does not help you remember it for long.

2. Last-minute cramming
- Trying to learn everything at once overloads your memory and increases stress.

3. Re-reading without testing yourself
- Looking at information repeatedly can feel productive, but it does not guarantee learning.

4. Highlighting everything
- Highlighting alone is passive and often gives a false sense of progress.

5. Multitasking while revising
- Revision needs your full attention. Avoid trying to work while watching TV, listening to music, chatting, or scrolling.

6. Staying in your comfort zone
- Spending all your time on topics you already know feels good but does little to improve performance.

7. Revising for too long
- Long, uninterrupted sessions reduce concentration and effectiveness. Take regular breaks.

8. Pushing yourself too hard
- Too much revision without rest can lead to burnout and lower motivation.

Instead, Try...
- Active recall (testing yourself from memory)
- Flashcards and quizzes
- Practice questions and past papers
- Short, focused revision sessions
- Revisiting topics regularly over time (spaced practice)