

Cramming for an exam isn't the best way to learn—but if you have to do it, here's how

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Around the country, school and university students are hitting the books in preparation for exams. If you are in this position, you may find

yourself trying to memorize information that you first learned a long time ago and have completely forgotten—or that you didn't actually learn effectively in the first place.

Unfortunately, cramming is a very inefficient way to properly learn. But sometimes it's necessary to pass an exam. And you can incorporate what we know about how learning works into your revision to make it more effective.

A [great deal of research evidence](#) on how memory works over time shows that we forget new [information](#) very quickly at first, after which the process of forgetting slows down.

In practice, this means that very compressed study schedules lead to a catastrophic amount of forgetting.

A better option is to space out learning a [particular topic](#) more gradually and over a longer period. This is called the "[spacing effect](#)" and it leads to skills and knowledge being retained better, and for longer.

[Research has found](#) that we remember information better when we leave a gap of time between first studying something and revisiting it, rather than doing so straight away. This even works for short timescales—a delay of a few seconds when trying to learn a small piece of information, such as a pair of words, for instance. And it also works when the delay between study sessions is [much longer](#).

[In the classroom](#), spacing out practice could mean reviewing and practicing material the next day, or delaying homework by a couple of weeks, rather than revisiting it as soon as possible. As a rule, psychologists have suggested that the best time to re-study material is when it is on the [verge of being forgotten](#)—not before, but also not after.

But this isn't how things are learned across the [school year](#). When students get to exam time, they have forgotten much of what was previously studied.

Better cramming

When it comes to actually learning—[being able to remember information](#) over the long term and apply it to new situations—cramming doesn't work. We can hardly call it "learning" if information is forgotten a month later. But if you need to pass an exam, cramming can lead to a boost in temporary performance. What's more, you can incorporate the spacing effect into your cramming to make it more efficient.

It's better to space practicing knowledge of a particular topic out over weeks, so if you have that long before a key exam, plan your revision schedule so you cover topics more than once. Rather than allocating one block of two hours for a particular topic, study it for one hour this week and then for another hour in a week or so's time.

If you don't have that much time, it's still worth incorporating smaller gaps between practice sessions. If your exam is tomorrow, practice key topics in the morning today and then again in the evening.

Learning is also more effective if you actively retrieve information from your memory, rather than re-reading or underlining your notes. A good way to do this, incorporating the spacing effect, is to take practice tests. Revise a topic from your notes or textbook, take a half-hour break, and then take a practice test without help from your books.

An even simpler technique is a ["brain dump"](#). After studying and taking a break, write down everything you can remember about the topic on a blank sheet of paper without checking your notes.

Change the way we teach

A shift in teaching practices may be needed to avoid students having to cram material they only half-remember before exams.

But my research suggests that teachers [tend to agree](#) with the idea that consolidation of a topic should happen as soon as possible, rather than [spacing out practice](#) in ways that would actually be more effective.

Teachers are overburdened and make heroic efforts with the time they have. But incorporating the spacing effect into teaching needn't require radical changes to how teachers operate. Often, it's as simple as doing the same thing on [a different schedule](#).

[Research has shown](#) the most effective way to combine practice testing and the spacing effect is to engage in practice testing in the initial class, followed by at least three practice opportunities at widely spaced intervals. This is quite possible within the typical pattern of the school year.

For example, after the initial class, further practice could come via a homework task after a few days' delay, then some kind of test or mock [exam](#) after a further gap of time. The revision period before exams would then be the third opportunity for consolidation.

Building effective self-testing and delayed [practice](#) into education would spell less stress and less ineffective cramming. Exam time would be for consolidation, rather than re-learning things that have been forgotten. The outcome would be better long-term retention of important knowledge and skills. As a bonus, school students would also gain a better insight into how to study effectively.

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