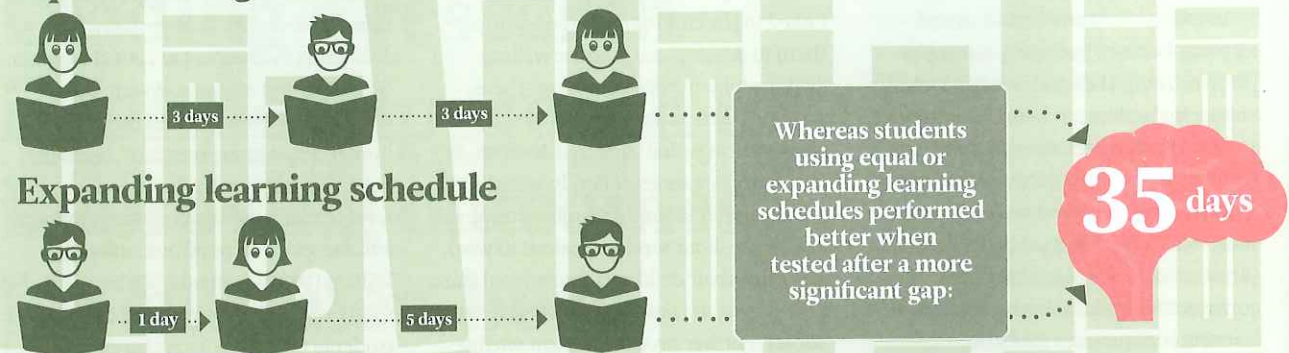


## Contracting learning schedule



## Equal learning schedule



## Expanding learning schedule



# Spaced learning: The final frontier in revision

Stephen Lockyer, Enrichment Leader, Lumen Learning Trust, delves into the world of cognitive science to explore what is known about strategies for improving memory retention.

I was disappointed as a child that there wasn't a GCSE in revision timetabling, as I was that pupil who spent a week making elaborate multi-coloured revision schedules, only to then ignore them and cram at the last minute. They, unlike my actual results, were a thing of beauty. The strange thing is, the

cognitive science behind optimal revision times and patterns supports my system. There are three basic models of revision (almost all research in this case operates on the basis that there is a test at the end), and in cognitive research, revision is actually termed relearning, which is a distinct but important difference.

A lot of what we advocate as revision is exactly that – looking again – whereas relearning puts a subtle emphasis on the fact that learning takes both time and depth, not simply repetition.

The model of relearning that I inadvertently used during my GCSEs (and which I guess is quite common) is known as a 'contracting learning schedule'. The time between initial learning and relearning is reduced each time, so that learning episodes occur closer together. This has



very similar strains to the type of cramming that happens across the country, just before Key Stage 2 SATs, yet feels very much like jelly-flinging at times – hoping enough of it sticks, even for a few weeks. Cramming has itself built a reputation, whether fairly or not, as an intensive way of studying without any long-term benefits.

The two other models of relearning also base themselves on time periods: an equal learning schedule is one with regular relearning sessions (such as learning a speech during a weekly coaching session, for example), while the expanding learning schedule is one where the space between learning episodes increases each time.

So which model was right? Which did I want to use as a primary teacher? I have a pedagogical desire that I should help the children relearn for life, rather than for tests, and over the years I have designed a 10:10:10 measure for learning (how can I get the children to recall this in 10 minutes, 10 months and 10 years?). So what should my schedule be for revisiting material, if I want to relearn it for life? And were my intentions too ambitious?

One seminal paper for me came from a book recommended at the #PrimaryRocks conference, called *How We Learn* by Benedict Carey (2015). In it, the author discussed

### 10:10:10 learning


Over the years, I've come to realise that we need to learn facts and skills to three specific levels: for the lesson itself, for the inevitable test at the end, and so that this new information can be accessed in ten years' time.

To that end, I have tried hard to condense learning down into one element (one activity sheet, one slide, one piece of targeted work), using mnemonics for greater recall (see Coffman, 2008) and, where possible, enriched experiences to cement for the long-term retention. If you think back to how you remember something, either in everyday life or in a pub quiz, it can highlight a rich context that forms the basis of that memory. I challenge myself daily to do the same for my own pupils.

one paper that found that there were actually optimum times for revisiting material in order to remember it, and this led me to the 'Contracting, equal and expanding learning schedules' paper by Küpper-Tetzel, Kapler and Wiseheart (2014), which explored the three models mentioned above.

Like many research papers, it told me that empirical data painted a complex picture in relation to which method was best (thanks a lot, empirical data), and in fact the best method depended on how long after the learning sessions the students were tested. The research pitted the three schedules against each other, with students completing three learning episodes on either a contracting, equal or expanding schedule, then being tested either immediately, after one day, after seven days, or after 35 days. It found that contracting schedules – where the gaps between learning episodes reduced – led to improved performance for students in tests carried out after one day and after seven days; however, equal and expanding learning schedules led to improved performance in tests carried out after 35 days. Put simply, contracting schedules improved short-term retention, but equal or expanding schedules improved longer-term retention – an important point given my aim of relearning for life.

I took this back to my classroom via a very simple spreadsheet. I simply put what I was teaching in a cell, and it reminded me to cover this again (to help the children relearn it) every week. As more subjects are added, previous items are reduced to every fortnight and I simply look at it when planning to build in a starter or small activity to refresh children's learning.

I've found that this drip-feed of reminders is an excellent way of nudging the children's memories of the lesson. Robert Bjork, who is the expert in this area, recognises that the best point to relearn is at the point of almost forgetting (Storm, Bjork and Bjork, 2008). How we identify this point, however, is currently a very complex matter, so for now I'm sticking with the equal and expanding learning schedule, with all its benefits. 

### REFERENCES

- Carey B (2015) *How We Learn: Throw Out the Rule Book and Unlock your Brain's Potential*. London: Pan Macmillan.
- Coffman JL, Ornstein PA, McCall LE and Curran PJ (2008) Linking teachers' memory-relevant language and the development of children's memory skills. *Developmental Psychology* 44(6): 1640–1654.
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### FURTHER READING

For further discussion of the research behind these ideas you might like to dip into these two research papers:

- Bairick HP and Hall LK (2005) The importance of retrieval failures to long-term retention: A metacognitive explanation of the spacing effect. *Journal of Memory and Language* 52: 566–577.
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