

Head's Up!

Dear Parents and Carers,

This week we have seen our Race for Life total rise to just under £8000 – an astonishing amount of money, to support the work in finding a cure for Cancer, a disease that will probably affect all of us in some way. It has been a truly remarkable display of community - so THANK YOU, you are awesome. If you follow me on twitter you will see that my username has changed and is now @ALTsecondary. The @HeadteacherJMS feed is now run by Mr Rees, so follow him, and I, for updates about the many rich activities and opportunities your children are taking part in. Twitter isn't everyone's cup of tea, but we find it quick and easy to share life for #TeamJMS.

One of the things that has driven improvement at John Mason School over the last few years has been the work of the Director of Research and Innovation, Robin Conway, in establishing what makes a difference and has the most impact for our children. This week, I asked him to share with you his findings on memory, as we have worked hard on retrieval practice and interleaving of knowledge in school, but it has the most impact if the work at home is done too. So, here it is; enjoy.

Sarah Brinkley

The Power of Memory

At the heart of his book "Why Don't Students Like School?" the psychologist Daniel Willingham offers some very simple insights. He argues that thinking is hard and draining and that our brains are therefore programmed to do as little of it as possible. We use a wide range of short-cuts and rules-of-thumb to cut down the amount of actual thinking we have to do. He points out that our working memory, the part of our mind that actually processes information (and thinks) is very limited in terms of what it can handle and can easily be overwhelmed.

A vital tool in thinking is our long-term memory. This is the store of information we have learned: properly learned and retained. Current evidence suggests that there is no limit to the quantity of information we can store in our long term memory. Nor do we ever lose stored memories once they have been learned, barring accidents or certain tragic illnesses. As we all know, retrieving the memories we have can be a challenge, but it is one that becomes easier with regular use (or 'rehearsal'). What we call "forgetting" often simply means one of two things. Either we hadn't really learned the information (it just stayed in our "short term" memory). Or it is in there but we haven't used it for a while, so it is difficult to get to ("retrieval").

When we have learned information, concepts and ideas really well and can retrieve them readily we find it much easier to:

- Assimilate new information by attaching it to the old,
- Use that information for new purposes e.g. answering an unfamiliar question or writing an essay, and
- Solve unfamiliar problems.

Not to mention win *Trivial Pursuit*.

For our students, remembering information is incredibly important – more so than it has been for at least a generation. The current GCSEs and A-levels require a detailed command of a large amount of information. In most cases the quantity of information to be learned has dramatically increased in the most recent specifications. The demands that they can use this information in flexible and challenging ways to solve unfamiliar problems have also increased a lot.

As such we, like many schools, are putting an increased emphasis on supporting students to learn the information and ideas they encounter in lessons: not just in the exam years, but throughout their schooling. By this we mean that they:

- Work with information over time to ensure that it is properly stored **in** their long-term memory.
- Practise retrieving [using] the information to ensure that they can get it **out** of their long-term memory whenever it is needed.

How Does John Mason School Help Students to Learn When There is So Much to Master?

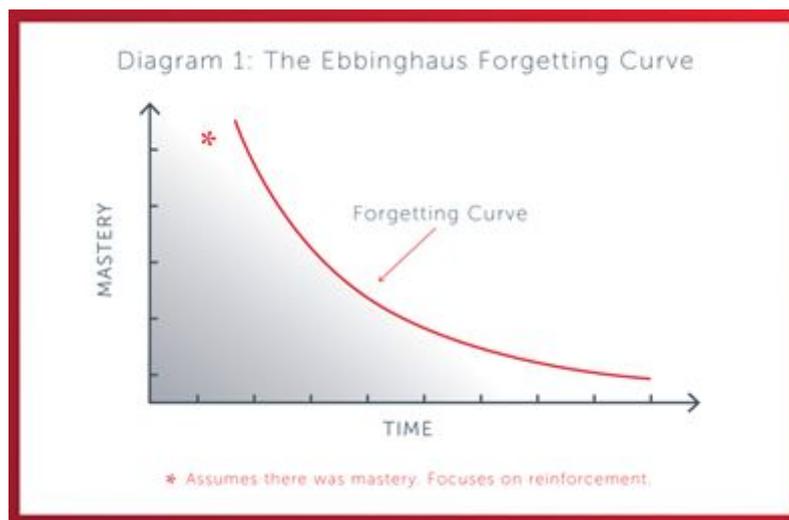
There is a great deal of evidence on what helps students to learn. Some of the key principles we deploy are these:

Regular low-stakes “retrieval practice” supports students learning.

Revisiting information, trying to recall what they learned in previous lessons and correcting answers that are wrong helps students to retain information and remember it more easily in the future. **As a result, in many of our lessons we start with short quizzes on material previously covered.** Marks are not necessarily taken in from these quizzes as this would raise the stakes and the anxiety, which is not helpful to their memory. But students are expected to attempt all the questions, even if they don't remember everything, before correcting their answers. The process of attempting answers and correcting them is also helpful to improving future retrieval. They may not have learned the correct answer yet; but the next time or the time after that they will find it much easier to recall the information they need.

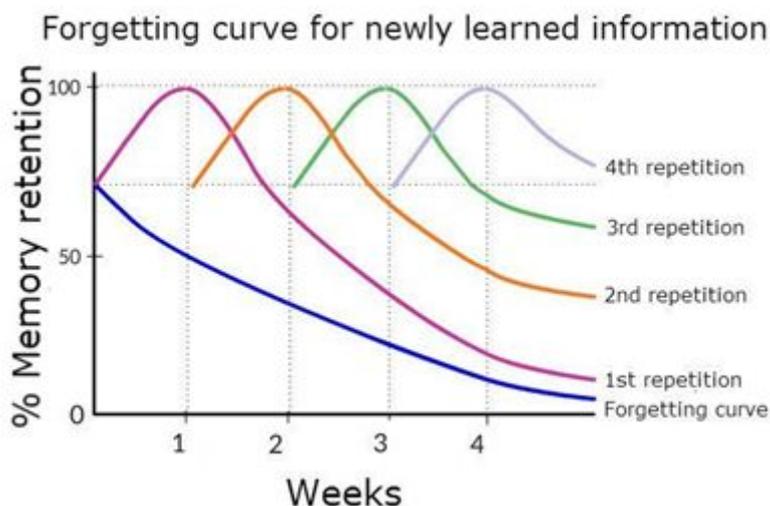
Material needs to be revisited at intervals.

It better supports memory if students go back to learned information at regular intervals.



Ebbinghaus' forgetting curve shows us that we “forget” information over time. This does not mean that it is truly gone from our long-term memory, but it becomes very hard to recall easily and may need to be relearned almost from scratch, which is a lot of effort.

Revisiting information can act to “top up” our retention and help to keep it secure.



As a result we therefore regularly revisit information from past units in our mini-quizzes and in other parts of our teaching. This helps it to stay fresh in students' minds and reduce the intensity and volume of revision as they approach their exams. **You may find your child is given a homework quiz on something that is not what they are studying at the moment but that they learned in a previous term or even before.** This is not a mistake but a deliberate strategy to get them to revisit old topics whilst learning new material, rather than just focusing on the new and forgetting the old.

Memory is stronger if the task is challenging.

Students need to practise retrieving and using information in ways that relate to how they will need to use it in the future – both in real life and in their exams. When they do this they find they are better able to retrieve information that is fit for purpose. Many of us are tempted to “revise” information by reading through notes, perhaps highlighting some key concepts. This feels quite easy: but that is precisely why it does not work as well as active more challenging revision methods. This means that, to learn the same amount, you're going to have to put in a lot more hours.

By completing challenging tasks such as practice questions, essays, and using what they have learned to solve problems, students have to dig deep on their memory and understanding. In this way they embed the memories more deeply and become skilled at finding and using the information they need. **As a result we aim to set tasks that challenge students to practise using information as they will need to in their exams and their life beyond school.** When learning information we encourage them to make flashcards, to test themselves with short quizzes, to explain concepts to others including their parents or to use tools such as mind maps to connect and organise information. You may hear that they have been discouraged from using a technique that they “like” such as highlighting or copying out pages of notes because teachers are trying to encourage them to process their learning in different, and more time-efficient ways. These are likely to be more challenging, but will be worthwhile overall.

How Can You Help Your Children At Home?

The most important way to support your children is to help ensure they are completing their homework regularly as set on Show My Homework. Here you will find they are being set a mixture of quizzes that they can complete online, tasks that practise deploying key skills (often exam questions) or tasks that help them to summarise and revise information they have learned.

Beyond this you can help them to learn material in the conversations you have about school in and around your busy lives. Of course your first questions will be about whether they have had a good day, and whether they were happy. However, after that, here are some learning questions you could ask that will help them to revisit and retain the core learning from the day:

- 1) What were the main things that you learned in that lesson?
- 2) What do you think you might be tested on next lesson?
- 3) How does that link to what you were learning last term? How does that link to what you were learning last year?
- 4) What quiz/test questions did you have today? Which ones did you correct? How will you remember that next time?
- 5) What did you learn today that you might forget if you don't go over it?

Revisit material with your children. Don't just ask them about what they learned today, but revisit things you were discussing last week or last term and check what they still remember or what they might need to go over.

When students do revise information and notes they can be tempted to do something they feel comfortable with. Lots of students spend time making neat notes, or reading (their own) copies of the textbooks and highlighting parts. Cognitive science also teaches us that these are quite ineffective as revision techniques. This doesn't mean they don't work at all, just that they are inefficient and take a long time. So when a student says that the "learn" from these methods, they may well be right ... but they're going to have to do a lot of hours.

This is because the technique is not very taxing. The simple fact is that we learn more when we have to think hard. 15 minutes' of really challenging learning can have more impact than an hour of something relatively "easy". That is why, in class, we don't spend lots of time having students **copy** chunks of information. We teach them new material and then have them make diagrams, answer questions, engage in discussions ... things which stretch their brain and challenge them.

You can support them at home with the same principle in mind. Instead of lots of copying/highlighting encourage them to do activities that involve challenging the brain more. They could:

- Make flashcards that consist of a stimulus question, word or image on one side and some information on the other. Then they can test themselves on their recall so they really have to **think** about what they remember – or you can test them to help their learning.
- Make mind maps or diagrams to reorganise information from the textbook. This makes them **think** about what information goes together and how information connects.
- Answer practice questions so they are **thinking** about how to use the information rather than doing something more passive.

Subject teachers will be happy to provide resources, further suggestions and questions to help you support your children at home.

For the foreseeable future our students' success is going to rely heavily on the information they can retain from their learning. This can seem daunting to them, when they look at it as a huge mass of things to be learned. But we are planning lessons and homework that help them break this down and manage their learning. You can support them with this at home by encouraging them to use helpful revision techniques and in the conversations you have about their learning. Working together we can help ensure they know what they need to be flexible, adaptive thinkers who can solve problems and deploy what they have learned in a variety of situations when they leave John Mason School.

Robin Conway
Director of Research and Innovation
