Video Transcript

Hi guys, Patrick Sherratt here. In this topic I want to give you a better understanding of how your brain works because this is the engine that drives your classroom learning and memory retention for examinations.

Over the last forty years, there has been more research and development into how the brain works than in the previous 400 years. Educators and brain scientists have been trying to take this new knowledge and apply it in the classroom so that you can find ways to improve your learning ability and ultimately exam performance. You see, learning is brain-based which means that if you understand what happens in the brain when you are learning something new, you can find ways to improve the process.

First off, learning requires attention, so that information can be relayed through your senses to your brain: An interest in the topic will help keep your attention, so your attitude towards what you are learning makes all the difference.

In fact, your brain is actually built with a device that screens out information that you think is not important. It's called the Reticular Activating System or RAS and because your brain is literally bombarded with information through your senses, it has to be selective in what it allows you to notice. Your attitudes have a big impact on the RAS, so if you are doing a subject in class that you think is boring, it will screen out the information. It just won't get through. Your teacher could be trying really hard to teach a topic but if you are sitting there saying: 'what time is lunch' back to class because you are not interested, your RAS will not allow the information to be processed in the cells of your brain.

The best way to get your RAS working for you is to tell your brain what is important. The best way to do this is to simply set a goal. If you are really clear and focused on achieving a certain goal, it switches on your brain. It tells your RAS what to let through and so enhances your learning potential.

Your RAS will also shut out information when you are anxious or stressed. If you are not feeling at ease in class, perhaps you have started a new school and you're feeling nervous your RAS will make it very difficult for you to learn. Interestingly, the RAS works both ways – preventing information coming out. You may have experienced that feeling of memory-block when you were in an exam. This nervousness or anxiety created by the exam caused your RAS to prevent information coming out. The remedy for this is relaxation. When you relax, you will remember.

Moving on: the information that you see, hear, taste, touch or smell is transferred from your senses through your RAS and into your brain through an electrical and chemical process. Over 100 billion neural and supporting glial cells start communicating with each other. Neurons are a lot like little tree branches sprouting out and forming connections. The supporting neural glial cells, one type of which are called astrocytes, are star shaped and also play an active role in how our neurons communicate.

Brain researchers suggest that the stronger and more permanent the connections, the easier the electrical and chemical communication between cells, and the more likely you are to store your learning in long term memory. It is currently believed that short-term memory has weaker connections that tend to fall away and the learning is forgotten.

Researchers know that this process of forming connections is incredibly adaptable. The science around it is now called neuroplasticity: neuro meaning brain cell development, plasticity meaning flexible, adaptable. You can have direct input into how your brain wires so that your past experience does not have to equal your future experience. You can literally rewire your brain to learn more effectively, particularly in those subjects you have found difficult.

With this understanding there are a number of useful points that can help your learning and memory retention.

Firstly, the main reason why you need to rehearse information is to strengthen the neural and astrocyte connections. Every time you go over the content, (revising before exams) it helps to strengthen the communication between these brain cells and also enhances our memory. But you don't have to wait for exams to start revising. Researchers suggest that reviewing the material you covered in class within 24 hours makes a big difference to your ability to remember it. If you review it again within a week – it's even better!

Because this process of forming connections happens through an electrical and chemical process, you can improve the process by being aware of how you look after your brain. Your brain requires a lot of energy to keep you able to think clearly and to concentrate in class. It tires very quickly causing you to loose concentration. This is known as neural system fatigue but you can help reduce the impact of this in some simple ways.

Your brain is maintained through the nutrients and oxygen in your blood supply. Its energy comes from glucose which is converted from natural sugars derived from the foods you eat. A good breakfast, for instance, is really important. Foods with high refined sugar content like chocolate bars are not helpful for sustained brain energy. You may get a short hit, (sugar rush) but then this falls away quickly, leaving you feeling lethargic or tired.

Your brain also needs water. Usually when we wake up in the morning, we are dehydrated. Not enough water or dehydration is believed to be a major cause of concentration problems as our blood, being 83% water, needs the water to keep the blood carrying the nutrients effectively to the brain. Again, like high sugar foods, high sugar fizzy drinks are not good for sustained good brain functioning. You get a short burst of energy but then feel tired before long.

Finally, your brain needs oxygen to function well. Making sure you get regular exercise is helpful, as is simply taking some deep breaths while you study. In fact, a good breathing technique you could do right now is to take a deep breath in through your nose, and then exhale through your mouth for as long as you have air in your lunges. Doing this for 30 seconds helps to give your brain a good hit of oxygen. In a few moments, you will feel yourself feeling more alert.

I will leave you now with a short overview of the key points mentioned here. See you in the next topic.

Overview

Positive attitudes and goals towards learning will help your RAS allow your brain to notice information to be learned.

Neuroplasticity means you can rewire your brain to learn things previously found difficult to learn.

All learning takes place through neural and astrocyte communication. Repetition of learning content helps strengthen the connections between cells, therefore improving memory.

Good nutrition, plenty of water and oxygen helps your brain to sustain good functioning.