THE MATHS ANXIETY TRUST

Guide for Parents of children with Maths Anxiety.

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Maths Anxiety Tips for Parents

Does your child get anxious before a maths lesson? Do they struggle over their maths homework? Have you noticed them fret when there's a maths exam?

Maths anxiety is now a well-recognised, measurable and quantified syndrome. Neuroscientists are able to record and measure changes in the pain and fear circuits of the brain in those children who suffer from it. These pupils may well be as intelligent as others in their peer group but the way fear impacts the brain prevents them from accessing their ability to calculate and learn. Stress pushes your child's system into fight or flight which may be helpful if they are facing a physical threat but is unhelpful when sitting at a desk trying to work out a maths problem. In fact stress stops the thinking brain from working.

As parents you no doubt want to help your child succeed in maths, academic work and in life. This is natural. There is no perfect parent and no perfect way in which a parent can guarantee that the support they give their child will succeed but we aim in this booklet to provide you with some insight into how to alleviate the anxiety your child suffers. We also aim to share with you the research into how stress hinders your child's ability to learn and offer practical steps that you can take to help them feel confident as they approach a mathematical problem.

Becoming an explorer

Negative messages and bad grades undermine a child's ability to think clearly. It is very discouraging to struggle and can lead to feelings of hopelessness.

Open up your child's brain to the fact that it is ok to make mistakes. All of human history has taken the shape of someone having an idea, testing it and discovering whether it works or not. Many successful people failed before they succeeded – Edison and Turing among them. Making mistakes is not something to fear. It is an essential part of learning, provided the child analyses where they went wrong and seeks to discover a better system.

So why not suggest that your child thinks of themselves as an explorer in the uncharted territory of numbers. They can seek to find effective pathways, patterns and methods that help them. They will take wrong routes occasionally but that is ok as long as they then seek to find a better way through.

How to overcome perfectionism within a perfect mathematical system

A maths problem set by a school, university or business will have a correct answer. However, the method of reaching that answer may vary from one brain to another. Alan Turing was frequently in trouble with his school-teachers for the mess he made of his books and for his method of calculating answers. But he was a genius!

The problem with perfectionism is that it makes a child rigid. It prevents the brain being open to possibilities that may take them to the right conclusion. The search for perfection will often lead to disappointment as even in maths there is no '100% perfect' mathematician. The search for excellence is rational and motivating. Look at the table below and see if you can encourage your child to move away from a fear of failure and become motivated towards the pursuit of excellence.

The Paralysis of Perfectionism	**The Pursuit of Excellence**
You're driven by the fear of failure	You're motivated by enthusiasm
You work out of a sense of duty	You enjoy the challenge of new tasks
None of your accomplishments are ever good enough	You achieve a sense of satisfaction from your efforts even if not perfect
Your self esteem depends on external results	You feel you have intrinsic value in yourself outside your external achievements
If you don't achieve an important goal you feel like a failure	You realise that everyone makes mistakes occasionally and while you don't seek to fail you accept that you can learn from experience
You give up on a task if you don't feel it is perfectly correct	You are willing to continue with a task even if you're not sure if it is perfect because you realise that you will learn from your efforts

Helping your child understand that perfectionism is often an irrational pursuit whereas the pursuit of excellence is rational and achievable can help them in many different areas of life and work. An explorer mentality can help them

understand that we all struggle through challenges during our lifetimes. We all try our best at a task, potentially make a mistake, learn and analyse what went wrong and then hopefully come to the right solution or conclusion. Mistakes are just a part of life; not to be sought but to be accepted.

A mistake or a failure of an exam is an event. How your child responds to that event means that they either take that event as a moment to learn and consolidate better strategies or just carry on without realising that they have an option to choose their response. Where something goes wrong, take the time compassionately to unpack what happened, what went right, what went wrong and how they might change their approach the next time, building on the learning.

Making maths relevant

Children often see maths as a pointless skill. They have calculators, mobile phones, tablets and laptops that will do the calculation work for them. "Why do I need it?" can be a question they might ask you.

Explain to them how you use maths everyday at the check-out, to calculate your mobile phone bills and make sure you aren't paying more than you should, to budget for nice toys, holidays and experiences for them. You might choose to do a maths calculation together to demonstrate how, if you budget well in one area of your own life, you are able to give them a treat. Maths not only enhances your quality of life and the fun you can have but when you save money or invest it well you can become wealthy. Managing numbers in your daily life enables you not only to enjoy a good life but also give your money to charity to those who need it more, or even become a philanthropist, like Bill Gates.

Share any stories you may have about where you made a mistake by not taking maths seriously enough, or where it made a difference in your life, good or bad, perhaps by getting into debt or making a mistake on a bill or invoice. Consider explaining how you personally use maths for budgeting your department's annual profit and loss, or to calculate how much you will have left from your income once you have deducted tax and expenses. Try to bring their experience of learning maths into the everyday world of living.

You can make it more fun, too, by using examples. Go into a real or imaginary car park and use cars as units, or animals, whatever reflects your child's interests. Make the numbers into images to make them more interesting. If your child has pocket money you can help them work out how to save for a new toy, gadget or item of clothing. An incentive can, of course, be a major motivator. I am reminded of walking through an Egyptian souk where a young boy of about 11, who may never have received formal education, could do mental arithmetic speedily to get the best deal from foreign currency!
In today's world, data scientists are producing algorithms to calculate financial models, to work out how to make roads and railways more efficient, to manage and model the statistics for pandemics like the Coronavirus, to predict numbers of beds needed in hospitals for maternity and other care, to work out the engineering on buildings and bridges. A better question might be where do we NOT use maths in daily life.

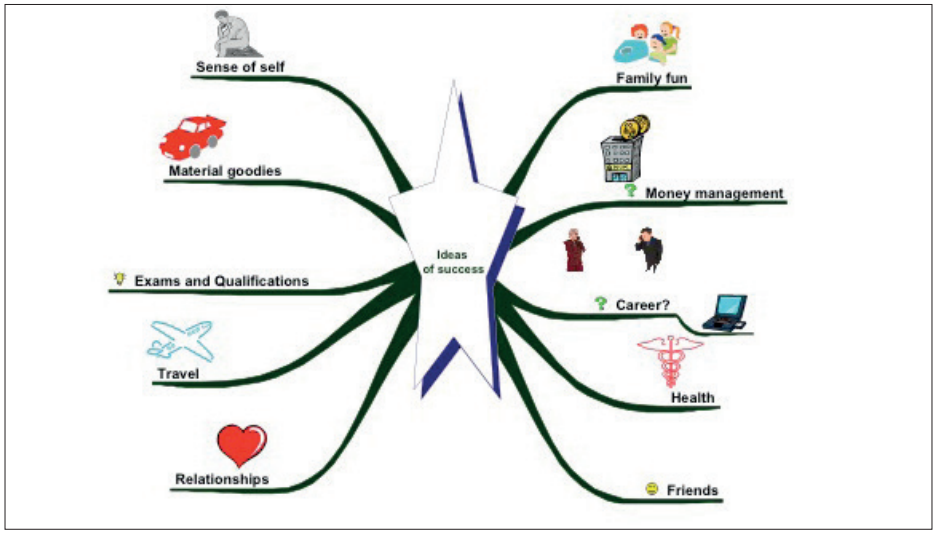
Ask for help

If you can help your child with problems they don't understand, take the time to show them how you are calculating the solution. If you don't feel confident in maths then try to learn with them, or alternatively think about other people within your family, or friends, who might be able to spare a little time to help your child understand the principles of certain applications.
There is a great deal of information on the internet and in apps now that provide tips on mathematics.

Setting Goals

One way of making maths relevant is to encourage your child to work out their goals. Depending on your child's age, ask them to think of the achievements they want to gain, the nice things they want to do in their lives, whether they want to go to university, whether they want to save for a holiday with friends, what kind of career they might want to have.

There is research that has proven that those people who set goals, write them down, share them with others, then visualise themselves being successful are, indeed, more likely to achieve those goals.



It can be a fun exercise to work with your child to help them consider what success means to them and then develop some goals. They can draw these or write them down using the prompts below:

My Short-term goals are ...
Eg. To do well in my mock SATS/GCSE/A levels

What could stop me getting these goals?
Eg. Wasting time on Instagram instead of revising

How can I troubleshoot these problems?
Eg. Set my alarm so that I complete my homework in time to relax before bedtime

My first step towards these goals is ...
Eg. Tonight I shall make a revision plan and start the first step

My long-term Goals are:
Eg. I want to train and become a vet

What could stop me getting these goals?
Eg. Not taking action to arrange work experience at the local vet next holidays

How can I troubleshoot these problems?
Eg. Find out the telephone number of the local vet

My first step towards these goals is ...
Eg. Give them a call tomorrow after school

If your child says they want to go camping, or travel, or go on holiday with a friend you can encourage them to sit down and work out what they have to plan and how much it might cost them. They can then tell you how they will manage this – by working or saving their pocketmoney, organising a camp site or requirements, etc.

Creating a calm study space

Are you able to provide a space for your child where they can sit at a desk or table and calmly work through their homework or revise for exams?

Encourage them to create an organised routine. Planning and prioritising is a real skill and will pay dividends for them now and for the rest of their lives. It is best for your child to try to work out a plan for themselves so ask them questions such as:

- What is the most important task for you to do first?
- What do you need to achieve?
- How long might it take for you to do this?
- When will you allocate time for this?
- Do you have all the books you need close by?
- Have you turned off your mobile phone and other distractions?
- Does music help you learn?

Your role is then to turn off other distractions and keep siblings away from the child having to do homework.

Managing Study Time

A healthy routine for study becomes second nature when repeated often enough. Maintaining good habits of study helps a child's brain develop the automatic patterns of thinking and behaving to create good study skills. I suspect you might relate to this should you, for example, be someone who

exercises first thing in the morning. It becomes second nature. However, if you get out of your routine it can be much harder to get back into it again. Assert the boundaries you, as a parent, believe to be healthy for you and your child, negotiating the best time that works for them and the family. You might encourage your child to create a poster with some of the bullet-points below, or create their own messages to themselves:

- Think positive! I can approach my desk in positive frame of mind!
- Collect together all the necessary books, notes and information and have them easily accessible, with pens, pencils and rubbers
- If working on a laptop or iPad make sure distraction applications like email are closed down
- Set goal and objective for study
  - what is the task to be done?
  - what problems need answering?
  - how can I break down the study periods into chunks
  - set goals for each chunk of time you allocate
- How can I break down the study periods into chunks?
- Include short breaks every 20 minutes but set an alarm to return to your desk

Recognise that your own attitude as a parent is infectious

Do you suffer from maths anxiety yourself? If so, you will need to be careful that you don't pass this on to your child. You may think that you are being mindful about this but just become aware of how your own lack of confidence in maths might pass on to your child. Equally, if you are very good at maths, endeavour to step into their shoes rather than becoming the possibly daunting fount-of-all-knowledge.

Take a quiet moment alone to work out your own attitude towards maths. It is so easy to make a simple comment such as "oh poor you" when your child tells you they have a double maths period in front of them. No comment is better than a negative comment.

Somehow people are not ashamed to say "I am hopeless at maths" but would rarely be happy to say "I am hopeless at reading".

You don't have to fib that you are marvellous at maths if you found or find it challenging but you don't want to say things that might reinforce their own fears. Where possible, share the methods that help you work things out.

What is key is that you have positive expectations of your child. Not that they are intrinsically brilliant but that they have the capacity and ability to learn and achieve results through their focus, attention and effort. There has been research to show that if an adult believes a child is stupid that child becomes more stupid – because they pick up the undercurrent of expectation from their parent or teacher. Equally if a parent or teacher has positive expectations that a child can achieve a result, the child is more likely to do so. Your expectations are motivational and infectious.

On the other hand, do watch out for your own need to have a brilliantly successful child. Parents are obviously invested in their child's successful future but this can put pressure on your child. I have known boys, especially, switch off from trying because they don't believe they can live up to their parent's ambitions. As much as possible, make sure your expectations are realistic and achievable. Become the rational optimist and help your child to do so too!

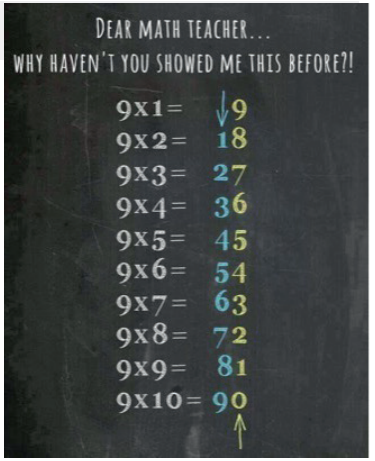
There can be a great deal of competition among parents at some schools - "my little Jonny is doing x" "Anya is doing y". You don't have to engage in this. Be careful not to label your child as 'bad at maths' or 'struggling'. It can cause stigmatisation, leading to those around them to treat your child as if they are bad at maths. You can allow your child to develop at their own pace.

Share Tips

I spotted this on the internet recently.

Did your teacher tell you this?

I became aware as an adult that my French teacher never explained to us that it is estimated that around 70% of the words used in the English language are the same or very similar to the French equivalent words. So if you know some handy hints to share with your child about how to make sense of numbers or tables or problem-solving do share them.

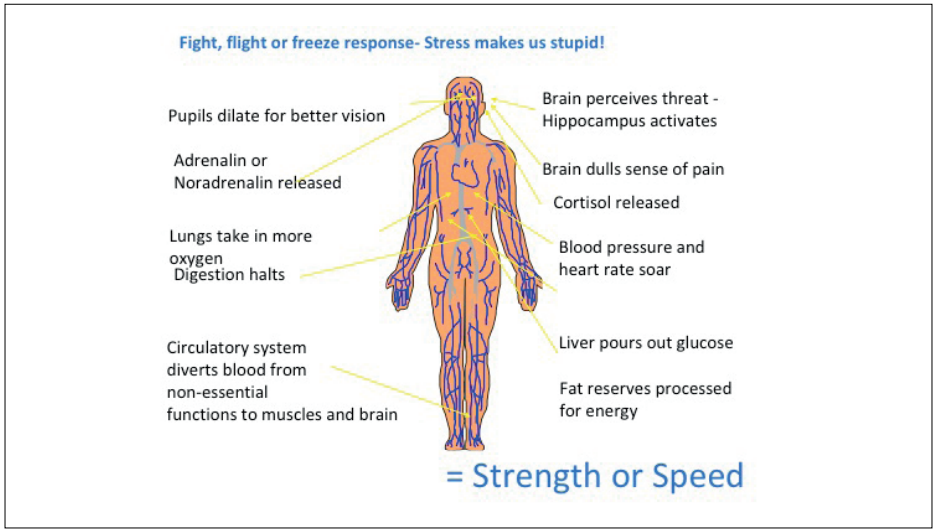


Encourage the child to work out the solution for themselves as much as possible. If they get it right it builds their confidence. Should your child need help with their homework, try not to show your fear or feelings on your face or in your body language. Use this as a time to re-learn or learn with them. Asking them to explain it to you can often enable the child to remind themselves of what the teacher told them, thereby reinforcing the method and the learning. When your child adopts the role of teacher it gives them status. They are explaining a method to you, an adult. This can boost confidence and also aid their ability to articulate a problem, method or solution.

Reinforce success and effort. The message needs to be rewarding effort rather than telling your child they are clever. Why? Because most achievement comes from effort and determination and should a child imagine that maths is an innate skill, they might end up thinking that some people have it and others don't. Making the conclusion that they don't possess this skill could result in them giving up. Reward effort should you feel this appropriate, with words for sure, keeping any physical reward for special feats of effort or determination.

Overcoming anxiety

"The only man who never makes a mistake is the man who never does anything." Theodore Roosevelt.



The mindset of your child is absolutely key. You have begun to help them accept that everyone makes mistakes. Now you need to help them tune into the thoughts running through their minds when they think about maths. A fixed mindset of "I'm bad at maths" will stop their brain from working and will set up the fight-or-flight stress response I mentioned earlier, which freezes the thinking brain while releasing the physical body to act as if under threat.

Whilst you can challenge your child's statement of "I'm bad at maths" it is even more effective if they become aware that they can challenge their own thinking. This enables them to recognise that they have control of their thoughts. And the most important question they can ask themselves is:

"HOW IS MY THINKING HELPING ME ACHIEVE MY GOAL?"

And if it isn't then the thought needs to be changed to a more positive and helpful thought. You can show your child the table below and support them as they list the negative thoughts that come into their mind when they face a maths lesson or problem. These thoughts have probably been unconsciously building up over time, so it will take some work to develop more constructive and helpful ways of thinking in future. For ease of awareness I have called this table Transforming NATS into CATS:

If you notice your child using negative language around their capabilities, then do challenge them and remind them that they can develop a more positive way of thinking about themselves, the subject and their ability to overcome difficulties. Developing resilience in this way will have benefits in many areas of their lives.

NATS (Negative automatic thoughts)	CATS (Constructive automatic thoughts)
I'll never be able to do this sum	I can work through this sum step by step
I'm hopeless	Let me write down the times I have succeeded
I'm bad at maths	Just because I don't get everything right doesn't mean I am totally bad at maths
My teacher thinks I am useless at maths	Let me show her I can do it after all
Everyone else is so much better than I am	Where's the evidence for this? I can work at my own pace.

Listen out for big generalisations in words such as "never" "always" "everyone" "no-one". They are rarely factual, more often emotionally negative.

For example "I never get things right". Challenge this with "has there ever been a time when you have got things right?" Build up these examples.

Or "I'm always bottom of the class". Challenge this with "give me one example of when you have achieved a good mark".

Overcoming catastrophising: switching off horror-movies in the head:

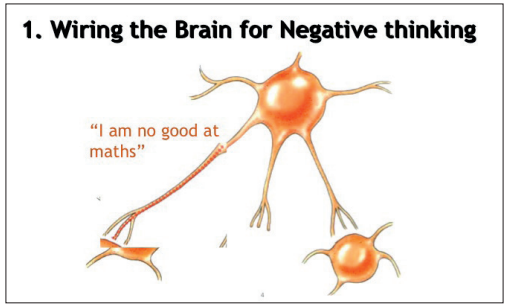
Help your child to recognise how their minds can create a horror movie in their head of everything going wrong, when in fact it has not yet done so. The mind is ace at imagining the worst, especially in the middle of the night or before exams. Help your child observe their thoughts and notice what is factual in the moment and what is fiction in their imagination. This can help them to calm down and not panic. The worst may never happen, so it does not help to catastrophise.

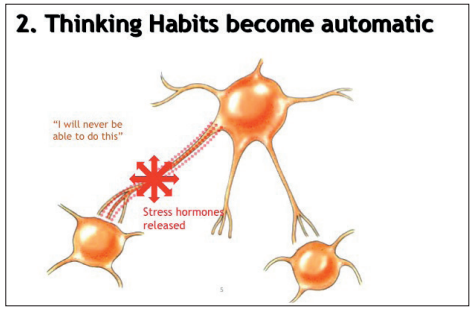
The more your child can become aware of the games their brain can play on them, the more they come to realise that they can take control of these images and, literally, switch channels to focus on something more constructive.

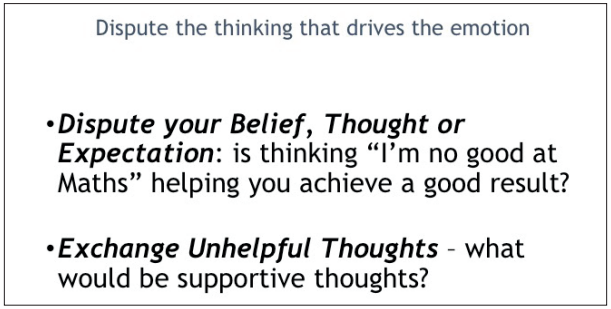
I have used the metaphor of a radio to help young people switch off negative thinking, moving from Horror FM to Positive FM. As young people become aware of how their thinking impacts their mind, body, emotions and physiology, they realise they have an 'executive brain' that is like a wise observer. They can stop, reflect, observe their own behaviour, and analyse whether their thoughts and behaviours are helping them achieve their goals. They can be in control.

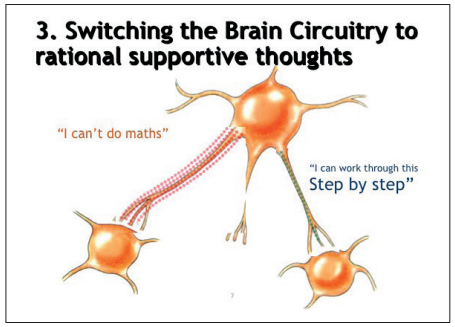
Neuroscience is demonstrating that the brain has plasticity, which means that it can rewire itself from old negative thoughts patterns, which set up an automatic stress response when they are faced with a maths class or exam. Stress freezes the thinking brain. We forget things and can't think straight when we panic.

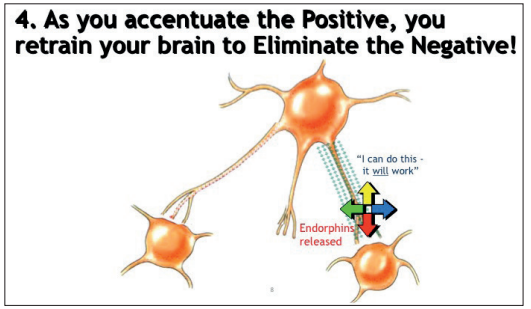
The illustrations below can help your child understand how the brain wires neural pathways into default reactivity. The brain's plasticity means that they can switch their thoughts and create new pathways and habits of thinking that are more resourceful. Stress blocks intellectual thought. Positive and self-affirming thoughts can release endorphins, which boosts our immune system and aids clear thinking.











The important thing to realise here is that overriding the negative and incapacitating thoughts to develop constructive thoughts is quite hard work. It is like learning a new language. Imagine moving to China: you would have to learn new vocabulary and repeat new words frequently until you become fluent. Choosing to change emotional state is similar. The brain has wired itself automatically to think negatively. Changing a thinking habit is as hard as learning Chinese or Russian. Repetition is key. Remember what it feels like to change a habit (think about getting a new mobile phone or app. Your fingers have got used to everything being in one place and then you have to learn a whole new system).

It can help for your child to put post-it notes around their bedroom or desk with positive messages to themselves about how they can achieve results through determination, hard work and repetition.

Fighting back

"Yes but ..." is a classic block to action. Your child might well challenge your encouraging statements. It helps if you can recognise that this may mean they are fearful and therefore defensive. They may tell you that someone else might be able to achieve this but he/she can't.

Be patient and help them work out for themselves what they are feeling if possible. Some questions are:

- "what are the emotions you're feeling when you say that?"
- "would you be able to give it a try?"
- "what is stopping you?"
- "what might be the consequence of not taking action?"
- "what is the worst that could happen if you did take action?"
- "what skills might enable you to do this?"
- "what or who could help you?"

How your child thinks shapes their day

It can help your child to understand that they can "do" hopelessness or "do" stress by consciously or unconsciously getting into a particular mood or state of mind. This can lead to them blaming others or the outside world for their problems. Help them notice how their inner state of mind leads to their emotional state. If they are thinking "I'm fed up and I don't want to go to maths class" they will tense up and their mind will latch on to negative experiences. If they can think "I'd rather I didn't have to go to class but I will go and make the best of it" their body is likely to feel lighter and their emotional mood more open and positive.

Take them back over a day when they were feeling in a bad mood and let them remember the impact it had on their experience of school. Then ask them to consider another day where they did exactly the same activities but they enjoyed them and did well because they were focusing on the positive. How they experience an event reflects how they are thinking. The more they can understand this, the more they can realize they are in the driving seat of their responses to situations.

This doesn't mean to say that if bad things are happening they should not feel sad. It does mean that they can begin to notice the link between thoughts and feelings and what helps them to make the most of the situations they face. Observe their behaviours. Share your own experiences of how your state of mind influences your behaviours and responses. Help them learn to observe their thoughts and become familiar with the places their mind takes them. This enables them to switch on an empowered state of mind or mood by making a decision to do so.

The confident student

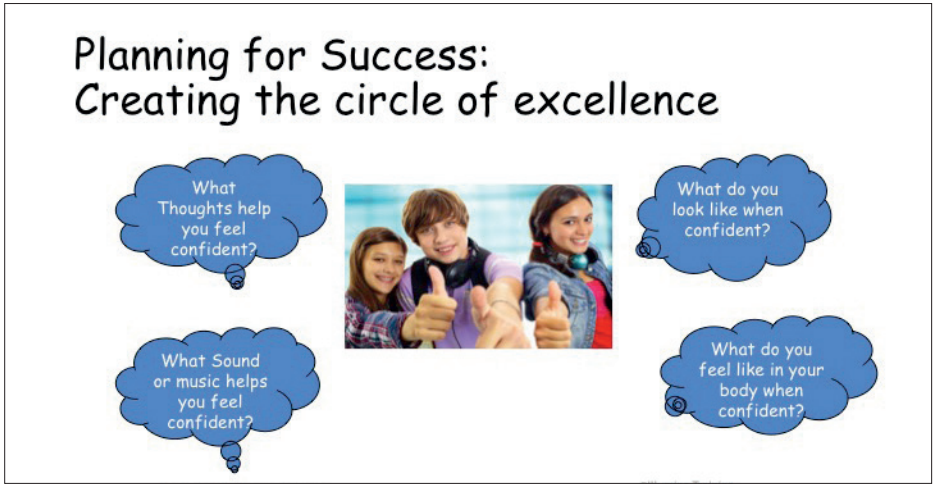
Confidence is an essential ingredient to success. If you think you can't succeed, it is unlikely that you will succeed. Take time to sit down with your child and help them to build their confidence by identifying their skills and successes, however big or small. You could share some of your own experiences of school or college with them. Talk about the friends you remember in your class and what worked and what didn't. Anything to prompt them to share their own experiences of success.

Every achievement in any part of life will promote their confidence in their ability to learn and achieve in maths too. Skills like organisation or teamwork or kindness are important too. It's about a child's sense of themselves in general, all of which adds up and contributes to their general confidence.

Learning depends on their ability to concentrate and pay attention to one thing at a time. Listening skills are important as otherwise they may miss out on essential information and tips from their teachers. The more they can switch off distractions, the better their chances of studying well.

Active engagement in the topic is important so suggest they apply their 'explorer' mindset to interact with the information they are being taught and gain knowledge. Bring them back to their short and long-term goals in order that they find relevance and interest in the subject. Teaching is a two-way process. The teacher can only do so much in sharing the topic. The pupil has to actively seek to engage with that topic in order to learn.

The circle of excellence



During the build-up to the exam help your child identify how they feel when they feel confident. Depending on your child's learning preference, suggest they draw a picture, like a photograph, of their confident self, or maybe create a tune and add a short motivating caption or phrase:

- What thoughts help them feel confident?
- What images (a past success or a picture of a powerful hero/heroine or role model, or animal)?
- What clothes and what body language make them feel powerful?
- Ask them to pose as the confident student as you do this.
- What music makes them feel upbeat and powerful (a song in their head as they enter the exam room can remind them of their powerful state)
- Give this snapshot a caption or mantra so they can manage it. "I can do my best".
- Imagine stepping into this picture and feeling what it's like to be there.
- Suggest they repeat and build up this process day by day before an exam.

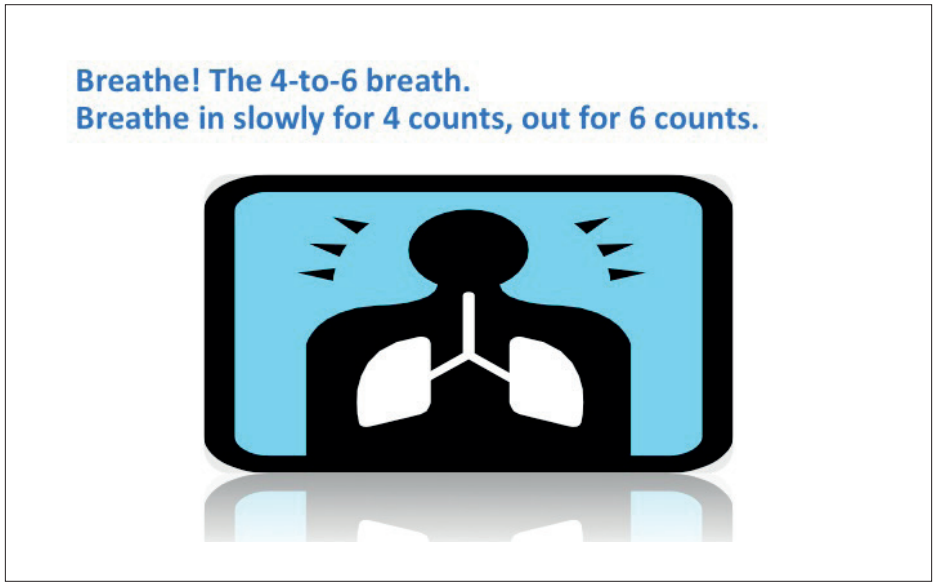
Revision and Exams

- Children can wind themselves up into panic over exams. Their panic becomes infectious and is often misplaced. It certainly doesn't help them achieve or revise well.
- Competition can sometimes be helpful but can also be destructive. Schools can use grades as punishments and children pick up how important it is to do well. Sadly bad grades have very negative effects on the emotional systems of a child so help your child to develop a 'growth mindset' where they believe that even if they have done badly in an exam in the past they can change, progress and do well now and in the future.
- Encourage your child to make a revision timetable and give themselves extra time with a difficult subject such as maths. Old exam papers can be really useful practice.
- The exam itself can be an opportunity to prove to themselves and their teachers that they can do better than they thought.
- ''I'd rather this wasn't happening but I can manage it now it is

Sleep, rest and consolidation

- Sleep is essential to the brain's and body's health. The brain consolidates all it has learned during the day and lays down neural pathways. Good sleep promotes health and learning.
- Help your child have a good bedtime routine where they calm down and empty their mind of worries. Encourage reading or quiet play before bed. Limit screen time and help your child to calm down.

• One way is through mindful breathing – bringing their attention to their breath, noticing whether the breath is in their upper chest, which signals that they are stressed or anxious, and then suggesting to them that they take the breath down to their belly. You can explain that this is like filling up a balloon so that their belly will rise when they breathe in and fall as they breathe out. Encourage them to breathe slowly in for 4 counts and gently out for 6 counts. Suggest they loosen their jaw and drop their shoulders while they count their breaths. This can reduce anxiety and lowers blood pressure too.



• Maybe play a meditation tape or calm classical music in their room as they prepare for bed.

• Exercise is also important. They may well be participating in games or PE in the daytime at school but a healthy body equals a healthy and agile mind. If you have a teenager who is lazing around at home, try to encourage them to go out to get fresh air, to swim, bike, scoot, skateboard, run or walk to get their body moving. Their mind will work better when they are fit.

• Good nutrition is also important – fresh fruit and vegetables, plenty of water to drink. You know it all, I am sure, but fresh food and hydration are essential to good thinking.

In the exam room:

• Stop to settle in as they arrive in the exam room.

• Centre and ground themselves with a slow mindful breath or two as they sit down at the exam desk

• Read through the paper and the exam questions carefully. Don't rush in.

• Keep control of anxious or negative thoughts as they go through the exam

• Take time, not rushing and taking the exam step by step. Pause from time to time to centre themselves and feel strong.

• Remember what advice their teacher has given them as to whether to stay on a difficult maths question or skip to the next if they can't answer a question.

• Keeping calm thoughts of "I can do this step by step"

• Don't look at other people. Work at your own pace.

• Check through your answers if you have time.

• Enjoy the challenge and visualise yourself succeeding.

Tools and Actions

• How would I prefer to think and feel?
• When did I feel like that?
• Remember and visualize this experience
• Create new thoughts, breathe, and control physiology
• Create a video in your mind and see yourself feeling good
• Notice intuitive signals about situations
• Be in the moment: only worry about what is essential now

Suggested list of references:

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