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THE DAILY SPECIAL

MATH MATTERS

How to conquer your math phobia

Numeracy is a basic skill you can improve like any other, and games make it fun to do it

BY ARVIND GUPTA

Do your palms start to sweat when your child comes to you with math homework? Does your mind turn blank or fuzzy when you look at all those strange symbols? Did you select your career in part due to how little math would be required?

If you answered yes to any of these questions, there's a good chance that you are among the 20 per cent of people who are prone to math anxiety. Math anxiety prevents many people — regardless of intellectual ability — from developing and using the skills they need for numerical confidence in school and in life. But it doesn't have to. If you can shift your focus off your anxiety and onto the math itself, you can replace your anxiety with confidence.

The reality is that basic mathematical ability is not a special talent. It is a skill like any other that can be improved over time. And practice can be fun! If textbooks and worksheets give you a nervous stomach, set them aside for a while. Instead, try some of the many engaging and entertaining alternatives that are now available online, in daily newspapers or in your local toys and games store.

If you have trouble with a particular area of math, review the basics by using an online program such as Math.com, Coolmath.com, or Mathplayground.com. Sites like these offer lessons, games, puzzles and information that you and your children may enjoy. For more diverse explanations, try searching YouTube for your topic, for example "triangle proofs," "linear equations," "How to solve a Rubik's cube," or "Sudoku tips."

My favourite painless way to build problem-solving skills is through games and puzzles. The card game Set is a great way for all ages to strengthen visual perception and the ability to find patterns. Students in Grade 1 can play and beat adults, even mathematicians.

Any activity that exercises logic will improve your ability to do math. Sudoku, played by tens of millions, is simply a form of a logic puzzle where you have to fit the numbers one through nine into a grid according to a set of rules. In the same vein as Sudoku, Kakuro combines logic and addition,



JASON SCOTT/STAFF

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and Kenken incorporates all four basic arithmetic operations.

Electronic games such as Minesweeper (or Lemmings, a game I used to play) might not look like math at first glance, but they sharpen your cognitive abilities while you play. Regular and repeated problem-solving strengthens the neural pathways that flow between the areas of your brain that are involved with doing math.

There are lots of great books to help you get comfortable with math at any level. For all manner of interesting problems, pick up a copy of one of Martin Gardner's collections of math puzzles, for example *The Colossal Book of Mathematics*, or *The Colossal Book of Short Puzzles and Problems*. Phillip Hefner's *Great Book of Math Puzzles* is a good title for kids aged nine to 12.

To increase your problem-solving confidence, it's essential to focus on how you get an answer, not just whether it is right or wrong. At all levels, don't be afraid to take risks with

your thinking, so that even if the final answer is incorrect, you can feel ownership of the process and proud that you came up with a method that got partway to the solution.

By the time you reach the next problem, you might have all the mental muscle you need to get it right, and even enjoy the attempt.

Arvind Gupta is a father of three, a mathematician and scientific director of MITACS, a national research network focused on connecting universi-

ty-based math researchers with companies and other organizations to solve real-world challenges. For more information on MITACS, visit www.mitacs.ca.

Next week: Math for toddlers. We know we are supposed to talk, sing, and read with our children to support their early literacy. But developing early numeracy is just as important. You can do so read our article in the coming weeks about good math maintenance for students who are doing well in math class. Have fun with it!

ARVIND GUPTA ANSWERS YOUR MATH QUESTIONS

Going beyond the math textbook



THE STRESS OF HOMEWORK IS GETTING TO ZACHARY DREVER, A GRADE 3 STUDENT.

DARLENE COUWENBERGHS:

I am a math teacher for the Delta school district. I was so excited when I opened the paper this morning and found this lovely piece of journalism. I have been trying to make math more relevant by incorporating math projects into my classroom. I have been having difficulty with Math 10 Principles. I have only found one to go with the linear relations unit. The Applications projects don't cross over easily. I was wondering if you would know of any relevant projects, or if you could point me in the right direction.

Hello, Darlene.

Kudos to you for going beyond the textbook to introduce your students to applications of mathematics.

While there are many physical phenomena that provide the opportunity to explore linear relationships, here is an in-class activity your students can do with just a tape measure.

In Leonardo Da Vinci's drawing of an idealized figure, the Vitruvian Man, the man's height is the same as his arm span.

Have your students test the hypothesis that these values are linearly related by having everyone in the class measure their height and their arm span with a tape measure. Plot these

values on a graph with height along one axis, arm span along another. What do they observe?

This activity combines measurement, graphing and statistical interpretation and can be extended in many ways. Can the students predict their height from their forearm length? Let your students use their creativity to come up with more ideas. Visit the Math Matters web page to find links to lots more math activities.

Good luck, and I hope this helps!

DIANA SCHMIDT:

What are your recommendations for the child in elementary school in Vancouver who loves math but finds all the materials provided in class "too easy"? The child may not necessarily be a math prodigy but grasps concepts quickly and wants more challenging material than the curriculum has provided so far, even when given material from higher grades.

Hello, Diana.

I don't know if you are writing this question as a parent or teacher, but my answer would be the same either way.

To keep the child engaged and excited about math, the student, parent, and teacher all need to agree on a plan

to stimulate the child both in the classroom and at home.

Becoming bored with math by not being challenged puts the child at risk of losing his or her passion for the subject. My recommendation: go deeper, not higher.

First, the teacher needs to be certain the child thoroughly understands a concept and can transfer the understanding to new situations rather than just memorizing "how to get the right answer".

For example, does the child think that 74 is an odd number because there is an odd digit in the 10's place? This kind of misconception is common if children just memorize a rule about 0, 2, 4, 6, 8 representing even numbers.

If the child has truly mastered a concept, the teacher and family need to decide if they want to move on to learning outcomes from higher grades to fulfill the child's need for challenge.

This may or may not be appropriate depending on the individual, but even if it is, the child may still need further challenge.

In either case, I would encourage some in-depth problem solving or logic puzzles on the topic of study to take the child to some higher level, deeper thinking.

A great site to look at is www.nrich.maths.org which provides

free mathematics enrichment materials (problems, articles and games) for teachers and learners from ages five to 19 years. All the resources are designed to develop subject knowledge, problem solving and mathematical thinking skills. Sudoku, Kakuro and Kenken games are other quick ideas for now.

You will find many more suggestions for math games, puzzles, and activities to stimulate, improve, and challenge mathematical thinking in our week 2 article about math phobia. You can also read our article in the coming weeks about good math maintenance for students who are doing well in math class. Have fun with it!

Math Matters

This series on math will run every week for the next six weeks in The Vancouver Sun.

Do you have math troubles? Maybe your child has difficulty with a particular math concept. Or perhaps you are after new study techniques. Go to vancouver.sun.com/math to submit your questions. Dr. Arvind Gupta and his SFU research team will provide as many answers as possible online, and we will publish some with next week's column.

MATH TIPS | For parents

Breathe. Your past experiences with math are not the same as your child's, and your own experiences with mathematics now can be different from those you had in school. You may be surprised at how much easier it is to understand math away from the social pressures or performance expectations of the classroom.

Try looking at a math concept as you might watch a play or read a book. Give yourself time to understand the whole story. Come back to it multiple times and look at it from different perspectives. Give yourself as much time as it takes to solve the problem in front of you. Remember, this isn't a

race or a competition.

Treat math like yoga, cooking, playing an instrument or a doing a martial art: realize that with practice, you can master the parts that are purely skills. The parts that are not skills can be appreciated even if they cannot be mastered. Set aside some time for practising math every day.

Work with your kids on math starting in Grade 1, and relearn math as they learn. This way, when they come to you with Grade 8 homework, you will be prepared. Don't assume that your child is learning a math skill the same way you learned it in school; chances are that she's not. Have her explain

how they tackled a problem in class and try to support her in that strategy. The goals of mathematics education may have changed since you stumbled through learning the steps of long division. The focus in today's classrooms is on understanding and using the concepts, not just memorizing the how-to steps. Progressive educators take students from the concrete to the abstract. Think kinesthetic (hands-on), verbal, or visual learning first, paper and pencil later. Move those blocks, dice, or paper clips around before you write down the math equation on paper. Remember, numbers are just symbols we use to represent what hap-

pens around us. As often as you can, help your child see mathematics as skills about ideas, logic, problem solving, patterns, and tools to make sense out of our world.

Be positive and encouraging. Really believe that your child can learn to love math and your confidence will be contagious. If your child is struggling, do not say, "I always hated math, too." Or, "I wasn't good at math, either." Or, "I know it's useless, but you have to do it." Children will take on their parents' attitudes. If Mom says she couldn't do it, then a child may believe her fate is already spelled out the same. It is never too late for you to learn.

Work out math problems together. Don't be embarrassed! Contact your child's teacher for guidance. Search online for a video about the topic in question.

It may be difficult for you to go through this process if you have your own emotional baggage about math, but it would provide excellent modeling of self-confidence, perseverance, and problem-solving. If sticking it out isn't possible for you when your child gets into higher grades, look for outside support for your child. Find a relative or friend who is comfortable with math, or a professional tutor.