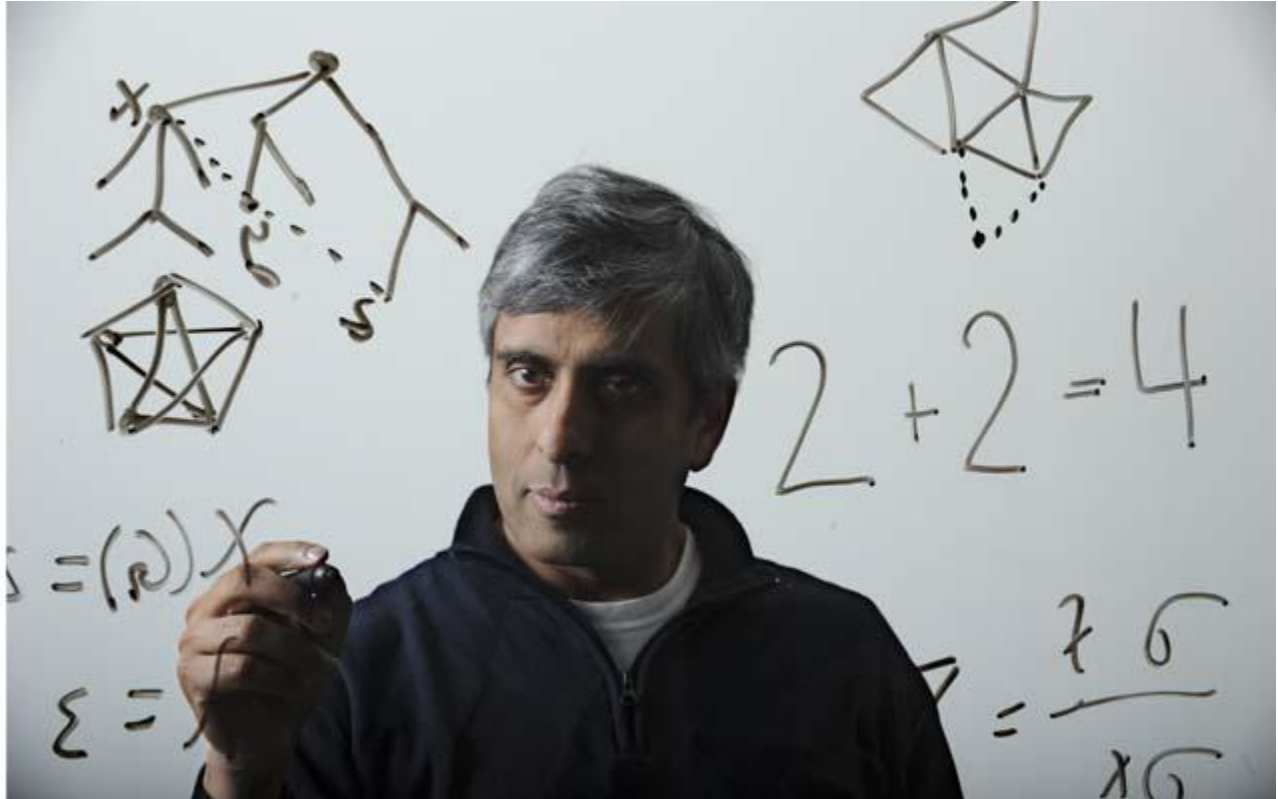


THE VANCOUVER SUN

A DIVISION OF CANWEST PUBLISHING INC



Mathematician Arvind Gupta at Simon Fraser University in Burnaby.

Photograph by: Glenn Baglo, Vancouver Sun

“Why do I need to learn math?” This is a question that virtually every parent will be asked at some point during the nightly homework battle. And the worrisome thing is that most parents don’t really know how to answer this. I remember when the father from the comic strip Calvin & Hobbes was asked this very question. His response: “Because it builds character.”

As a mathematician, I could tell you a thousand really great reasons why math is important. I could tell you why math is amazing and beautiful! (Yes, I did just say math is beautiful.) But for those non-mathematician parents out there, how do you comfortably and truthfully answer this question?

I firmly believe that the key is to show children that math is everywhere in their world. And I mean everywhere.

Understanding numbers and how they work is necessary for our everyday life: when you go to the grocery store, make dinner, plan your monthly budget and dozens of other tasks. But it is beyond this basic arithmetic where the disconnect really occurs. Once a child has mastered addition, subtraction, multiplication and division, we, as parents, also need to know the reasons why math is so important.

The bottom line is that math is applicable to every field of human endeavour, activity and industry. From helping us to understand the impacts of climate change, to predicting the future of our economy, to developing the latest MP3 player or the coolest new video game, the element linking all of these is math. And the list does not stop there.

Mathematical models are used by the forest service and governments to help them figure out, before a fire starts, how the flames are most likely to spread. The models look at different wind speeds, how close the area in question is to water and the type of surrounding terrain. In essence, the models paint a picture for fire fighters so they can plan in advance the best way to attack a stubborn blaze.

In medicine, math helps scientists to understand how diseases such as diabetes, Alzheimer's, and HIV work in cells and organs. Scientists have discovered that there are tens of thousands of genes in the human body which play a role in virtually every disease known today. Imagine trying to sort through all those genes to determine how one gene, or a combination of several genes, plays a role in someone developing a certain disease. Math is the master of data-management. Math can help find patterns in seeming randomness and reveal information that scientists didn't know was there in the first place.

In the world of Internet security, mathematics is at the root of all the new strategies and technologies that keep your computer free of spyware, viruses, and worms. Your hard drive didn't get hit by the latest Internet beastie? You can thank math.

In search-and-rescue operations, mathematics-based planning tools enable searchers to assess the surrounding area to decide where to look, and how best to get there.

The overriding message here: Math is in every part of your life. When children question why they need to learn math, they need to know that it is relevant for them. It is important to take it out of the abstract and into the everyday. Math keeps planes in the air, makes credit card transactions secure and powers your Google search engine. And all of these innovations are built on a foundation that begins with the mastery of mathematical concepts from elementary school onward.

Of course it may not be obvious how math contributes to all these things — after all, this is one reason for this column. But just as most of us don't know how to perform a heart transplant, we do understand that the basic knowledge about life (oxygen, food, water etc.), cell organization and the circulatory system that we learn in elementary school are the foundation for eventually

becoming a cardiovascular surgeon. We may have trouble visualizing a mathematical model but the process of learning what is necessary starts with the basics — and then you build from there.

Over the coming weeks, I will introduce you to the world of math and provide tips to keep, or get, your children engaged. I won't make the claim that everything will be easy, but the journey to getting your kids interested in math may not be as difficult as you think.

Dr. Arvind Gupta is a father of three, a mathematician and scientific director of MITACS, a national research network focused on connecting university-based math researchers with companies and other organizations to solve real-world challenges. For more information on MITACS, visit www.mitacs.ca

Next week: How you answer the question, “Why do I need to learn math?” reveals a lot about a parent's own experiences in school. For readers with a painful mathematical past, next week Dr. Gupta will talk about conquering your math phobia.

Math tips for parents

Start a conversation with your child over dinner about how she thinks she might use certain math skills in her life. It doesn't matter how old your child is. A four-year-old or a 17-year-old will answer you at the appropriate level.

Some possible topics to help your child see how math is important:

1. Why do we need to know how to count?

Help your young child think of ideas: counting toy pieces when cleaning up, playing board games, sharing cookies with friends, etc.

2. How can you make sure you are getting the correct change from the store clerk when you buy something? Chances are you won't have your calculator in your pocket (or if you do, you won't want your friends to know). Tell me how you figure it out.

Give an example, and help your child to see that there are a number of ways to calculate change: Subtract the cost from the amount you give the clerk, count up from the cost to the amount you give the clerk, count by coins and bills (5, 10, 25, loonie, toonie, etc.) instead of by individual digits, and any other way that makes sense and works!

3. When do you think you might need to know the area or length of something? Which units would you use to measure it? mm? cm²? m? km?

Discuss how to calculate how to buy enough paint to cover the walls of your bedroom. Discuss the process of planning, visualizing, and calculating where to position bike jumps in the cul de sac. Discuss calculating how much lime to buy to line the soccer (or baseball, or football) field, or how much fertilizer to buy to green up the lawn.

4. Where do you think using a bar graph, circle graph, or line graph to show some information would be helpful? Have you ever seen these graphs at home, in a magazine or newspaper, or around town?

Show your electricity consumption history on your monthly bill as an example. “What does this bar graph tell our family about how we use electricity over the year and how we could be more environmentally responsible?”

Show your investment report or a construction site poster around town. “What does this pie graph tell us about how we’ve split up our investments in our portfolio? What does this pie graph at the skatepark tell us about who contributed the funding to pay for it?”

Show the financial section in the paper, look in a pamphlet, watch the news channel, or search online. “What does the zigzag of this line tell us about interest rates (or unemployment rates, stock market returns) over the last year (or whatever the time frame is that is graphed)?”

5. Why are polls so important during an election campaign?

Discuss how pollsters forecast the probability that one person will be elected by asking only a small sample of the population. Who should they ask? Why is it important that the results of their polls be accurate? What effect could those results have on the election campaign of the candidates?

6. What math do you think you will need to use when you are a (fill in your child’s dream job)? How does a dentist use math? A garbage collector? A physiotherapist? An engineer?

Discuss careers that your child is familiar with or possibly interested in. If your child is in the middle years, discussing the upcoming Math 10-12 pathways would be appropriate. If your child is in high school already, look up the math requirements for entry into programs your child might be interested in pursuing.

Dr. Arvind Gupta is a father of three, a mathematician and scientific director of MITACS, a national research network focused on connecting university-based math researchers with companies and other organizations to solve real-world challenges. For more information on MITACS, visit www.mitacs.ca

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 www.vancouversun/math to submit your questions. Dr. Gupta and his SFU research team will provide as many answers as many as possible online, and we will publish some with next week’s column.