

Any kid can learn math

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Melissa Marsh is a special education co-ordinator at Gwa'sala-‘Nakwaxda'xw School in Port Hardy, at the northern tip of Vancouver Island. Its students include some of the most challenged kids in Canada. Many struggle with learning disabilities, cognitive disabilities and behaviour problems. The community has its share of social issues, and parental involvement is low.

For kids like these, academic failure is depressingly familiar. “The shutdown mode comes extremely quickly,” Ms. Marsh says. But now, kids at this school are experiencing the unaccustomed taste of success in a subject that far more advantaged kids have grown to dread - math.

The JUMP program, pioneered by Toronto mathematician John Mighton, breaks almost every rule of current math pedagogy. It does not depend on the “discovery” method, group work or real-life examples. It is highly structured, relies on a great deal of direct instruction, repetition and reinforcement, and proceeds in small, incremental steps.

It also works.

“Repetition is crucial for many of our students,” says Wayne Peterson, the principal. He adds, “Your regular math texts have too much reading.” JUMP (Junior Undiscovered Math Prodigies) is structured so that every kid can solve the problems, one small step at a time. That builds their confidence and self-esteem, and keeps them motivated and engaged. It can get even low achievers excited about math. Teachers say their math skills dramatically improve - and so does their behaviour, their levels of engagement and their attitude.

“The kids aren't fighting me tooth and nail any more,” says Ms. Marsh. “They know what's expected. They have the steps set out in front of them and they know they are going to be able to achieve all of those steps. The kids in my special education class go, ‘Whoo-hoo! I did the bonus question and I got it right!’ One Grade 7 student has never been able to sit in math class without completely disrupting it. JUMP has changed that. Today, he participates in class discussion and does the written work by himself.”

The JUMP program is now being used in more than a dozen first nations schools in B.C., as well as in many regular schools in the Vancouver area. “We found that the regular textbook way wasn't reaching all the kids,” says Christine Hammond, head teacher of N'Kwala School, near Merit. The program is especially effective with her ESL students, because they don't have to wade through oceans of text. One floundering Innu boy, for example, quickly became a math whiz. The kids at her small band school are now performing at the regional average in math, she says. JUMP is also effective with adult learners, some of whom, after a lifetime of frustration, are getting their GEDs.

Liz Barrett is a South Africa-born educator who travels the province doing outreach and teacher support in first nations schools. For her, proficiency in math is a social justice issue. “These kids are falling by the wayside, and that's unacceptable. If your students aren't getting a Grade 12, the door is closed to them.” She discovered the

JUMP program four years ago, when she heard Mr. Mighton lecture in B.C., and became a passionate advocate. She's now helping to launch a JUMP pilot program in South Africa.

Mr. Mighton, 52, is an unusual man. As well as being a mathematician (currently in residence at Toronto's Fields Institute for Research in Mathematical Sciences), he is one of Canada's best playwrights. He got interested in math education because he thinks the state of numeracy in Canada is a disaster. Judging by the evidence, he's right. In Ontario, for example, a third of community college students are in danger of failing first-year math. Mr. Mighton also believes we must reverse the "culture of failure" that permeates math education. "There's no reason the vast majority of kids can't learn math."

Ten years ago, Mr. Mighton began tutoring inner-city Toronto kids in his apartment, with great success. The next task was to determine whether JUMP would scale up. He began working to persuade school boards, a far tougher task than he expected. But the initial results have been good. One British inner-city school district, in London, agreed to try it. At the start, the kids were performing an average of two years below the national level in math. After one year of JUMP, 60 per cent of them passed the national exams.

JUMP works for middle-class kids, too. One Toronto teacher used it with her Grade 5 kids, whose math skills at the start of the year ranged from Grade 3 to Grade 7. By the end of the year, every student signed up for the Pythagoras competition, which is written only by top students. Fifteen out of the 17 achieved distinction.

The JUMP program is founded on observation, evidence, teacher feedback, continuous improvement and rigour, combined with new research findings on how the brain learns. By contrast, most programs taught in school are not. For the past couple of decades, both math and reading instruction have been an ideological battlefield that pits the "progressives" - educators who favour good things such as discovery and creativity - against the traditionalists, who favour bad things such as repetition and direct instruction. The progressives have had the upper hand, which is one reason why JUMP has been regarded in some quarters - especially in progressive-minded Ontario - as positively dangerous. Last May, consultants with the Toronto District School Board dismissed JUMP as a form of "rote, procedural learning." In Ontario, that's the kiss of death.

Now the tide is turning, though not fast enough. Last spring, the U.S. National Mathematics Advisory Panel endorsed the seemingly obvious idea that, in order to succeed in math, children need to understand what they're doing.

But the school system is plagued by other barriers that actively discourage best practices. One is the widespread use of consultants, who often write the very textbooks they then are paid to recommend. Some teachers are heavily discouraged from using instructional methods or materials their school board frowns on, even though they work. Many schools and parents are beaten into submission by claims that certain programs are "evidence-based" even though they're not. There's a lot at stake in how curriculum decisions are made - but parents and teachers seldom have a clue, or a voice.

So if you're interested in JUMP for your kid, you may have to move to Vancouver or Port Hardy. You could also check out the JUMP website (jumpmath.org). And Mr. Mighton has written two books, *The Myth of Ability* and *The End of Ignorance*. The program survives on charitable support, and he is a more or less full-time volunteer.

"Teachers get so excited by this," says Liz Barrett. "Suddenly they've got the tools to reach the students, and suddenly they're all achieving."