

# Intelligence MEMOS



From: Anna Stokke  
To: Canadian Ministers of Education  
Date: November 1, 2018  
Re: **WHAT TO DO ABOUT CANADA'S DECLINING MATH SCORES**

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The declining performance of Canadian students on international math assessments should worry Canadians and their provincial governments and has been a continuing matter of public concern.

Last week, Ontario moved to require a basic math test for new teachers.

In my C.D. Howe Institute [report](#), I laid out the problem and the case for action.

Strong mathematics knowledge is required for success in the workforce, and early achievement in math is one of the best predictors of later academic success and future career options. Ever since 2003 the majority of Canadian jurisdictions have showed statistically significant declines in math scores on international exams administered by the Organization for Economic Cooperation and Development. Scores on provincial math tests such as Ontario's Education Quality and Accountability Office tests are also in decline.

In several provinces, the percentage of students performing at the lowest levels in math significantly increased while the percentage of students performing at the highest levels significantly decreased, suggesting that more students are struggling and fewer students are excelling in math.

It should be a policy priority to halt these trends and to improve math achievement for Canadian children. In my report, I examined domestic and international evidence regarding three areas of provincial education programs that could play an important role in halting the downward trend in math scores. I make three main recommendations regarding best teaching practices in math, the math curriculum, and the math knowledge of future teachers.

Best teaching practices in math have been at the forefront of discussions regarding declining math scores in Canada. Discovery-based instruction – also called problem-based, inquiry, experiential, and constructivist learning – has become popular in North America in recent years, pushing aside direct instruction techniques, like times table memorization, explicit teacher instruction, pencil-and-paper practice, and mastery of standard mathematical procedures. Based on international and domestic evidence, I found that studies consistently show direct instruction is much more effective than discovery-based instruction, which leads to straightforward recommendations on how to tilt the balance toward best instructional techniques.

Student fluency with particular math concepts, such as fraction arithmetic, in early and middle years has been shown to predict future math success. I recommended that provincial math curricula be rewritten to remove ineffective pedagogical directives and to stress specific topics, at appropriate grade levels, that are known to lead to later success in math.

Evidence shows that teachers who are most comfortable and knowledgeable with the content they are required to teach tend to transmit that knowledge best to students. I further suggested that provincial governments require future early and middle-years teachers to pass a math-content licensure exam prior to receiving certification to teach mathematics.

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