November 5, 2015

Honourable Rachel Notley, Premier of the Province of Alberta

Honourable David Eggen, Minister of Education

Office of the Premier Room 307, Legislature Building

10800-97 Avenue

Edmonton, Alberta

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Dear Premier Notley and Minister Eggen:

We are writing you this letter on behalf of our children and all of Alberta’s students. We are two mothers as well as experienced math teachers who are currently working in leadership roles in a school district in Alberta. We both have Master’s Degrees in Education. As you are aware, there has been a lot of negative media coverage and parental concern about the “new math” being taught in our schools. As you are reviewing education in Alberta, we want to make sure that you have as much information as possible from experienced teachers who have been successfully teaching the revised Mathematics Program of Studies (2007). Numeracy has been a focus in our school district since the implementation of the new curriculum and it continues to be one of our district’s educational goals. This program of studies is the beginning of an answer to the problem of traditional math education. It is research-based, child-centered, and focused on teaching for understanding. Under the current curriculum, we have seen authentic learning, deep understanding, confident problem solving, and joyfully engaged students.

**1. Why Change our Approach from the Traditional?**

We want students who are creative, flexible with number, fluent with calculation, and engaged problem-solvers. The 2007 *Alberta K-9 Mathematics Program of Studies* states,

“The main goals of mathematics education are to prepare students to:

* use mathematics confidently to solve problems
* communicate and reason mathematically
* appreciate and value mathematics
* make connections between mathematics and its applications
* commit themselves to lifelong learning
* become mathematically literate adults, using mathematics to contribute to society” (p. 2).

As differentiation is a critical part of reaching all learners, we read in our Program of Studies “First Nations, Metis and Inuit students often have a holistic view of the environment – they look for connections in learning and learn best when mathematics is contextualized” (Alberta Education, 2007, p. 2).

The traditional approaches we have been using are no longer sufficient for today’s students. We do not want teachers to instruct mathematics in the same way it was delivered 20 years ago. We do not live in a math literate society, but our students should be given this opportunity. Mathematics competency should be viewed much like reading and writing – as a basic expectation. The traditional model for teaching mathematics has proven to be unsuccessful for a significant portion of our population. We have all heard adults proclaim their dislike for math and/or their math anxiety. This is the culture we have built with mathematics.  Change needs to occur – change in competency, change in attitude, and change in instruction. It is important that we teach math for understanding while developing competencies such as innovation, communication, collaboration, critical thinking, and problem solving. As page 6 of the Alberta Program of Studies states, “Creating an environment where students openly look for, and engage in, finding a variety of strategies for solving problems empowers students to explore alternatives and develops confident, cognitive mathematical risk takers.”

**What is best for our students?**

**An approach to mathematics that grows all students into mathematical literate adults with the important life skills to be successful in society.**

**2. Our Alberta Program of Studies is Rich in Research**

This document is not about students “discovering” math – it emphasizes an approach that engages all students in mathematics. It is research-based, student-centred and focused on teaching for understanding and through problem-solving.

These same messages are currently being delivered in Mathematics Conferences across North America. Conferences such as the Psychology of Mathematics Educators, the Mathematics Council of the Alberta Teachers’ Association, the Canadian Mathematics Education Study Group and the National Council of Teachers of Mathematics.

Mathematics Educators and research were the foundation of this curriculum, and its intent is supported by many who have spent a career (and sometimes a lifetime) studying mathematics, how children learn, how the brain works, as well as working with students in classrooms.  Scholars such as:

Constance Kamii Marilyn Burns

James Tanton John van de Walle

Grayson Wheatley Peter Liljedahl

Cathy Fosnot Florence Glanfield

Dan Meyer Olive Chapman

Ralph Mason Jo Boaler

George Abshire David Sousa

It is important to remember that we are teaching ALL students in our province to be successful in mathematics, much like we expect all children to learn to read. We do not ask university professors of literature to teach children the basic mechanics of reading - that is a skill-set that requires a specific pedagogical approach and knowledge base. Hence, the same applies to mathematics – why are we asking university professors how to build number sense in our elementary children? The answer lies in math education research.

**What is best for our students?**

**A Program of Studies grounded in current research on Mathematics Education, Child Development, and Brain Research.**

**3. The Traditional Algorithm and the Memorization of Basic Facts**

Our Program of Studies stresses and emphasizes sound mathematical practices to understand the meaning behind the algorithms as well as explore other methods of calculation that might prove to be more efficient. Anybody who has been exposed to the most basic math calculation can understand that there is a more efficient way to calculate 1000 – 19 rather than the traditional algorithm.  This Program of Studies encourages one to find the most effective and efficient way of calculating and solving problems, many of which can be done using simple mental math strategies. This is sound pedagogical instruction and does not limit students to believe that the only way to find a solution is by memorizing a sequence of steps that may or may not make sense.

To include the strategy “memorization” in the Mathematics Program of Studies is problematic. It brings to mind a certain pedagogical approach that runs counter to a more effective approach – to allow students to see the “why” and the understanding behind a mathematical equation. We wouldn’t think it was sound practice to have students read and spell all the words on a page without also knowing what the words mean and how to use them in context.  Why would we expect any less when teaching our children basic facts?

“A true sense of number includes and goes beyond the skills of counting, memorizing facts and the situational rote use of algorithms. Mastery of number facts occurs when students understand and recall facts and is expected to be attained by students as they develop their number sense” (Alberta Education, 2007, p. 7).

**What do the Mathematics Educators say about basic facts and developing number sense?**

What do mathematicians do when faced with multiplication and divisional computation problems?  According to Fosnot (2002), “…only 4 percent….across all the problems and across all the mathematicians, were solved with algorithms…..[instead], they made the numbers friendly….they played with relationships….they also varied their strategies…..they searched for efficiency and elegance of solution…they made numbers friendly (often by using landmark numbers)…[and] they found the process creative and enjoyable” (p. 95).

Fosnot (2002) goes on to state that, “Algorithms….have an important place in mathematics......[but] using algorithms, the same series of steps with all problems, is antithetical to calculating with number sense…..By abandoning the rote teaching of algorithms, we are not asking children to learn less, we are asking them to learn more” (p. 106).

Wheatley and Abshire (2007) state, “There is evidence that students who first experience a skills-based approach to a mathematics topic had great difficulty giving meaning to the facts, formulas, and procedures afterwards……Mathematics is reasoning, not just memorization.  While it is useful to know certain facts and procedures, it is essential that these facts and procedures develop with understanding” (p. 2).

James Tanton writes, “Memorizing formulas, procedures and rules is a joyless way to go about things…And even after going through all the effort of memorizing, things tend not to stick…… understand a procedure rather than memorizing it.” Students need to be flexible with number and fluent with calculation. Rote memorizing does not lead us to this end.

**What is best for our students?**

**An approach that promotes flexibility, efficiency and fluency with number, as well as deep understanding of number concepts and their relationships.**

**4. How do we Support our Current Program of Studies?**

* Interpret and implement the curriculum in the way it was intended.  The mathematics education research is solid and current.
* Support teachers so they can best support their students – this may include various PD opportunities on a continuing basis, courses and resources.
* Support and educate parents; offer Parent Math Nights, online courses and resources - ensure a positive and educational media campaign.
* Engage EVERY student in our mathematic classrooms.

Jo Boaler (2011) states, “Moving from a procedural to a sense-making approach in mathematics is not straightforward for teachers; it takes commitment, training, and time. But the outcomes of students….suggest that such changes, no matter how hard they may be, are worthwhile in giving students a different and more positive start to their adult lives” (p. 15). Our students deserve nothing less than our best concerted efforts to help build their future.

**What is best for our students?**

**The assurance that teachers in Alberta are trained and confident to deliver our existing Alberta Education K-9 Mathematics Program of Studies**

We would be honoured to meet with you. Please contact us to set up a meeting to continue this conversation at jessieshirley@gpcsd.ca or (780)-532-3013.

Respectfully yours in Education,

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