

# School math to be proud of

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2011 November 19

# What we'll do today

- Let's imagine a mathematics for middle years *worth* striving for.

I'll share 3 main ideals, each with details.

- There are examples of where we want to go.

I'll share 3 activities, too briefly.

- Practically, what next?

I'll share what I intend to do.

Before we decide what to do, maybe we should discuss what we really want.

- 1. Engagement, sustained and voluntary.
- 2. Success for all students. Real success.
- 3. Support for us teachers. Real support.

# Ideal 1: Student engagement

- All of our children can engage with the math we offer. And they do!
  - The different backgrounds and beliefs of our kids are taken into account in the design and enactment of lessons. Math backgrounds. Math beliefs. Personal backgrounds. Personal beliefs.
  - Our kids feel rewarded for their engagement in the activities we design and lead.

# E.g. 1a The 64 square and the 4 square

The idea of foundational experiences.

0. Square root as edge:

$$\sqrt{64} = \underline{\quad}$$

$$\sqrt{4} = \underline{\quad}$$

1. What shape of *half* can you make by folding a square?

2. Can you fold a half that is *square*?

Do it!

E.g. 1b The 32 square and the 2 square

How many twos are in 32? (squares)

$$\underline{\quad}(2) = 32$$

How many  $\sqrt{\quad}$  twos are in  $\sqrt{32}$ ? (square roots)

$$\underline{\quad}\sqrt{2} = \sqrt{32}$$

Before kids learn the *arithmetic*, ...

# Ideal 2: Success for *all* students.

1. Success for most students means developing mathematically, fully. They learn
  - procedures;
  - to learn;
  - concepts;
  - that they are capable.
2. Over time, more students succeed by extending their inquiry within the activities we provide.
3. Many students have deficits of different kinds. The activities enable them to 'backfill' or even 'heal', over time.

# E.g. 2a Deci-square fractions

Middle years math doesn't need to be sequential  
or narrow!

Arithmetic is about *our* actions on quantities.

0. The deci-square as *1*, and parts of 1.  
Strips. Bits.
1. Making fifths. Red yellow green blue orange.
2. Making fourths. Red yellow green blue.
3. Making thirds. Red yellow green.

Imagine it!



# E.g. 2b Deci-square fractions

Did you make your thirds this way?

**Red:**  $1/3 = 3\text{tenths and } 3 \text{ hundredths and a bit}$

# E.g. 2c Deci-square fractions

Or this way?

**Red:**  $1/3 = 33$  hundredths and a third of the last hundredth

# E.g. 2d Deci-square fractions

Or this way?

**Red:**  $1/3 = 1/4$ , and then  $1/4$  of the fourth fourth, and then  $1/4$  of that fourth (which is a sixteenth), and so on.

# E.g. 2e Deci-square fractions

Or this way?

**Red:**  $1/3 = 3$  tenths and 3 hundredths and 3 \_\_\_\_\_ and 3 \_\_\_\_\_ and ...

# Ideal 3: We educators succeed.

1. We design our lessons to provide windows into the learning of our kids. We get better at what we do.
2. The next generation of teachers will come to us with their ideals alive, and practical starting points too.
3. Before becoming teachers and in our p d, we will have opportunities to understand deeply the math we teach.
4. Administrators and professors will offer *support* with *our* goals, both practical and ideal. They will discuss with us what *they* can do to help us teach better by *our* standards

We are professionals, and we will be treated as such, *especially when there are things we want to improve!*

# What am I going to do about this?

- I'm not going to tell others what's wrong, or tell others how to improve what they do.
- I will continue to develop activities true to my ideals and true to the realities of the classroom.
- I am constructing principles to describe what math in middle years could mean, if we thought first of the experiences our students should have, then the activities and leadership to occasion such experiences.
- I will continue to listen to and collaborate with and learn with teachers, preservice and practicing.

# E.g. 3 The PennyFlowers activities

Middle years math is part of a continuum.

The foundations for all math is not prior content. It's experiences.

0. PennyFlowers

1. Race to 50.

2. The Seventh Street Bus.

3, 4, 5, 6, 7. (to be continued)

# Thank you.

>to Anna Stokke and all the math professors.

>to The Winnipeg Foundation, University of Winnipeg, JUMP Math.

>to the Imperial Oil Academy and the NSERC CRYSTAL.

>to the kids and teachers and fellow researchers who have helped me learn.

>to the kids and teachers who will help me in the future.