LEADING MATH III

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Agenda

- Big ideas/ Link to curriculum expectations
- Building math learning goals
- Assessment around big ideas

What a big idea might look like

- Number
- Every number can be represented in many ways. Each way reveals something different about that number.

Where it come up in curriculum

- Grade 2: represent… using a variety of tools
- Grade 4: represent… using a variety of tools
- Grade 6: represent… using a variety of tools
- Grade 8: translate between equivalent forms of a number

What it doesn’t say

- Is the part about different representations revealing different ideas, e.g.
- Let’ s each represent the number 100

So…

- Which showed best that it was 10 x 10?
- That it was even?
- That it was more than 99?
- That it was less than 1000?
- That it was 4 x 25?
- That it was a little less than 105?

What a big idea might look like

- Number
- There are different ways to compare and estimate numbers.

Where it come up in curriculum

- Grade 1: relate numbers to the anchors of 5 and 10
- Grade 3: compare and order …. using a variety of tools
- Grade 5: round….
- Also compare and order fractional amounts
- Grade 7: identify and compare integers...

So what should the focus be in all of these

- The importance of estimating and benchmarks

- I might ask:
- I am thinking of a number that is very close to ____ and much farther from ____. What might it be?

What a big idea might look like

- Number
- Any computation represents an infinite number of different situations.

Where it come up in curriculum

- Grade 2: solve problems involving the addition and subtraction of two-digit ..
- Grade 4: solve problems involving the multiplication and division of…
- Grade 6: solve problems involving the multiplication and division of...
- Grade 8: solve problems involving the addition, subtraction....

What it doesn't say…

- That any arithmetic calculation, e.g. 5 – 3 or 1.2 + 4.8 or 2/3 x 5/6 or (–3) + (–5) describes an infinite number of different situations.

What a big idea might look like

- Number
- Performing operations is made easier by composing/decomposing numbers.

Where it come up in curriculum

- Gr 1: solve problems involving + and – of single-digit.. using a variety of mental strategies
- Gr 3: solve problems involving + and – of two-digit.. using a variety of mental strategies
- Gr 5: multiply 2-digit whole numbers by two-digit whole numbers using…
- Gr 7: use a variety of mental strategies to solve problems involving....

Students need to see

- We ALWAYS break up bigger numbers to operate, e.g.
- 8 + 7
- 35 – 22
- 14 x 15
- 583 ÷ 2
- 1 ½ – 2/3

What a big idea might look like

- Measurement
- The choice of a measurement unit is affected by many factors.

Where it come up in curriculum

- Gr 2: select and justify the choice of a standard unit
- Gr 4: select and justify the most appropriate standard unit
- Gr 6: select and justify the most appropriate standard unit

Important idea

- Depends on your purpose
- So I might ask: How would you make yourself sound very tall ?

What a big idea might look like

- Measurement
- Measurements formulas allow us to use easy-to-take measurements to figure out hard-to measure values.

Where it come up in curriculum

- Gr 5: determine…the relationships between the length and width of a rectangle and its area and perimeter...
- Gr 6: develop the formulas for….
- Gr 7: determine…the relationships between the height, the area of the base and the volume of right prisms…
- Gr 8: determine…the relationships for calculating the circumference and the area of a circle…

The big point, though…

- Is that we use easy to use measures to figure out tougher ones
- Also that we can find any of one of the measurements knowing the other two (or three..)

So I might ask

- Do you know the area if the perimeter is 22 cm?

4 cm

What a big idea might look like

- Pattern
- There is no way to be certain about how a pattern continues without a rule.

Where it come up in curriculum

- Gr 1: identify a rule for a repeating pattern
- Gr 3: demonstrate…that a pattern results from repeating an action
- Gr 5: make a table of values.... given the pattern rule in words
- Gr 7: compare pattern rules that....

What the emphasis needs to be on

- Is why we need a rule
- How might you continue 3, 5, 7,….

What a big idea might look like

- Algebra
- Equality is an expression of balance.

Where it come up in curriculum

- Gr 2: demonstrate an understanding of the concept of equality by partitioning…
- Gr 4: determine the missing number in equations involving multiplication…
- Gr 6: determine the solution to a simple equation….
- Gr 8: solve linear equations of the form….

Emphasis needs to be

- On what the equation actually means.
- If you know that 4 + [] = 5 + * , what do you know about [] and *?

Connecting an expectation to a big idea

- Sometimes you can start with an expectation and look for the big idea to which it might connect.
- For example:

Grade 1

- Demonstrate an understanding of the use of non-standard units of the same size for measuring…

- Connects to
- The use of a measurement unit makes comparisons easier.

Grade 2

- Describe relationships between quantities by using whole-number addition and subtraction

- Connects to
- There are a variety of ways to compare two numbers.

Grade 4

- Identify, perform and describe reflections using a variety of tools

- Connects to
- There is always a way to move from one shape to an identical (congruent) one using a few transformations.

Grade 5

- Multiply decimal numbers by 10, 100, 1000,…

- Connects to
- The use of a place value system simplifies computations.

Grade 7

- Sort and classify triangles and quadrilaterals by geometric properties related to…

- Connects to
- There are always many ways to describe how two shapes or figures are alike or different.

Grade 8

- Determine… the appropriate measure of central tendency (i.e. Mean, median, or mode) needed to compare sets of data

- Connects to
- It is often useful to summarize a set of data with a single number.

Connecting learning goals to big ideas and curriculum expectations

- To build a learning goal, you connect a curriculum expectation to a big idea.
- For example, if I were a grade 1 teacher teaching subtraction, my goal might be:
- I can show how to use the same subtraction to describe lots of different situations.

Connecting learning goals to big ideas and curriculum expectations

- To build a learning goal, you connect a curriculum expectation to a big idea.
- For example, if I were a grade 3 teacher teaching fractions, my goal might be:
- I can choose how to represent a fraction to make it easy to compare it to both ½ and 1.

Connecting learning goals to big ideas and curriculum expectations

- To build a learning goal, you connect a curriculum expectation to a big idea.
- For example, if I were a grade 6 teacher teaching area formulas for triangles, my goal might be:
- I can show how knowing some information about a triangle's measurement can automatically give you other infromation.

Connecting learning goals to big ideas and curriculum expectations

- To build a learning goal, you connect a curriculum expectation to a big idea.
- For example, if I were a grade 8 teacher teaching how to figure out square roots:
- I can use a picture to estimate the square root of a whole number.

So how is assessment affected

- We assess what we care about/what we teach.
- If our focus is on seeing bigger picture, we assess accordingly.

So here might be, for me, a grade 3 place value assessment

- Focuses on how the place value system makes it easy to see certain relationships

So here might be, for me, a grade 3 place value assessment

- 1. List three 3-digit numbers for each situation:
- A) a number worth more than 32 tens.
- B) a number with two 4s in it so that one 4 digit is worth ten times as much as the other 4 digit

So here might be, for me, a grade 3 place value assessment

- 2, A46 < BC7 . A, B and C are digits (0, 1, 2,….9).
- Which of these can be true? Explain.
- A < B < C A= B = C
- B < A < C C < A < B

So here might be, for me, a grade 3 place value assessment

- 3. Model the number 512 on a place value chart or using base ten blocks in 3 different ways. What does each representation make it easy to see?

Or grade 6 areas of triangles

- 1. The base of a triangle is 10 cm. How could the area be less than 2 cm^2?
- 2. A triangle has an area of 20 cm^2. What could its height be? Explain.
- 3. You know that a parallelogram and triangle with the same height have the same area. What else do you know about the sizes of these shapes?
- 4. Why is it useful to have a formula for the area of triangles?

Your questions

- This obviously touches the surface.
- Are there any issues we still need to clarify?

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