What will it take to achieve math success in Ontario at the junior level?

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OAME
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- It’s not about trying.
- Teachers are trying!

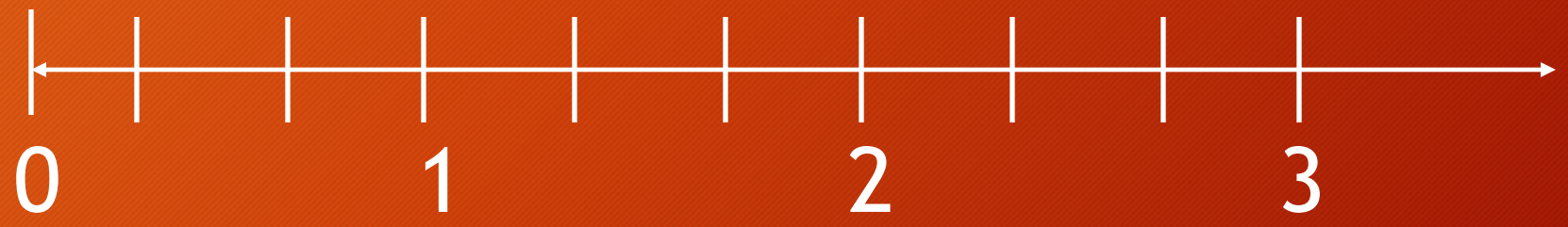
- Could it be a focus on thinking and understanding instead of primarily application and knowledge?

- For example:

- Knowledge: How much more is 152 – 59 than 312 – 257?

- Or instead:
- Understanding: **Without figuring out either answer**, tell how you know how much more 152 – 59 is than 150 – 61?

- For example
- Knowledge: Count by thirds to 3 on this number line.

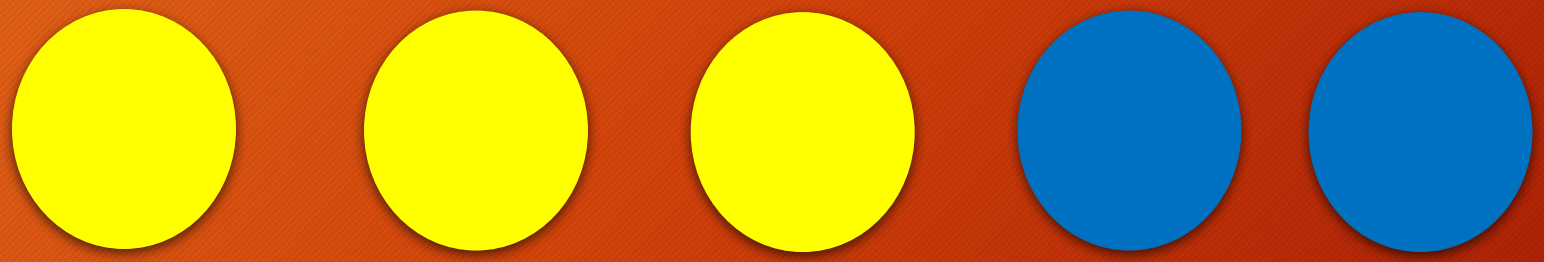


- It could be
- Understanding: You counted by 1/[] on a number line. Ten jumps got you past 2.

- What could [] be? Why?

- You try:
- How could you change this to understanding?

- What ratio of yellow counters to blue ones do you see?



- Less use of problems that are ”stand-alone”.

- Stand-alone example:

Sadie is drawing stars in her notebook. She draws 80 stars on the first page, 90 stars on the second page, 100 stars on the third page, and 110 stars on the fourth page. If this pattern continues, how many stars will Sadie draw on the fifth page?

- Richer example
- A pattern goes up by 10 each term.

- 211 comes early in the pattern.
- What could the 10th term be?

- Another stand-alone (StFX):
- A man has to be at work by 9:00 a.m. and it takes him 15 minutes to get dressed, 20 minutes to eat and 35 minutes to walk to work. What time should he get up?

- Or richer:
- You take some time to get dressed.
- You take 5 more minutes to eat than to get dressed.

- You take 15 more minutes to walk to school than to eat.
- You have to be at school by 8:50.
- By what time should you get up?

- Even computations should be more focused.

- For example, instead of: What is 5149 – 2817?, I might be asking:

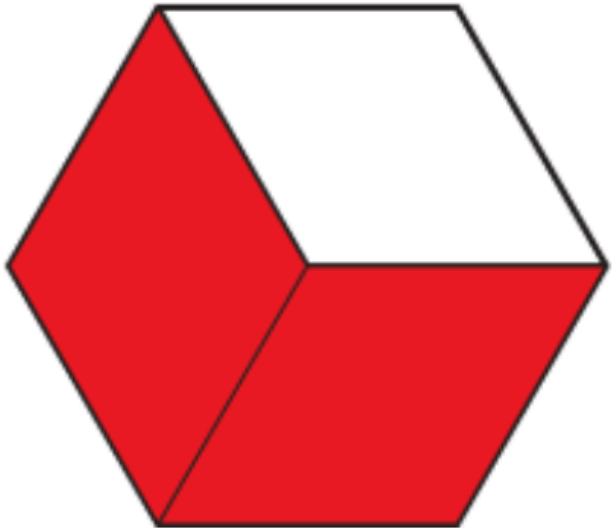
- Two numbers are about 3300 apart. How far apart could their thousands digits be? Their hundreds digits? Their ones digits?

- Use data about your students to alter your plans for them.

- It might be a diagnostic that is a short task or interview.

- For example, for grade 4 from MathUp

1. **a)** What fractions do you see in this picture?

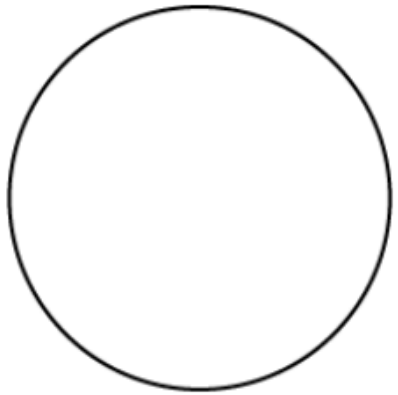


b) Choose another fraction that is the same in some way as the fractions you saw in part a).

c) Represent your fraction from part b) in two ways.

Choose from these models:

- a rectangle or circle



- a number line

- a set of counters

d) How is the fraction you chose in part b) like the fractions you saw in part a)?

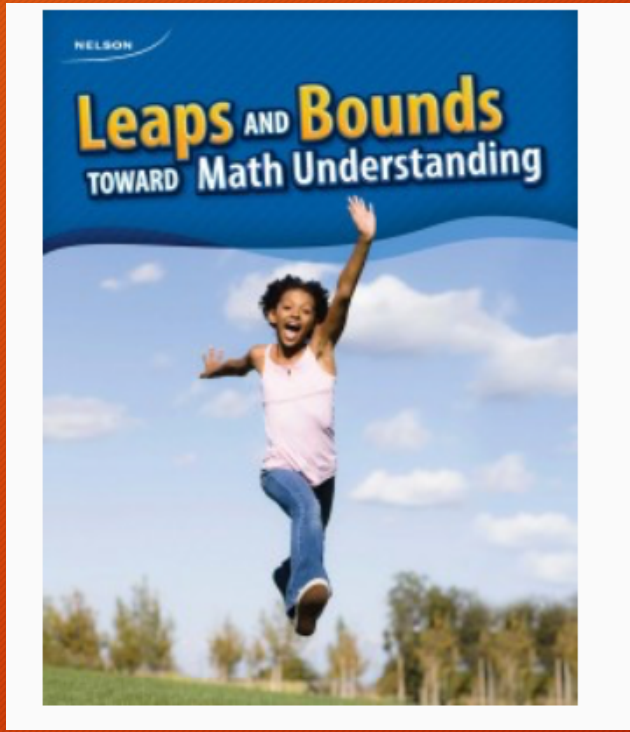
2. **a)** What fractions do you see in this picture?

b) Choose another fraction that is the same in some way as the fractions you saw in part a).

c) Represent your fraction from part b) in two ways.

d) How is the fraction you chose in part b) like the fractions you saw in part a)?

- It might be a diagnostic like from Leaps and Bounds.



- Differentiate more, not just in practice, but in problems to be solved and maybe even assessment.

- It is critical to spend the time deconstructing expectations and figuring out what really matters .

- For example: what matters here?
- Divide three-digit whole numbers by one-digit whole numbers,

- using concrete materials, estimation, student-generated algorithms, and standard algorithms

- Perhaps another way to say the same thing- a focus on essential understandings

- For example, here are a few from MathUp

WN–1 Every whole number can be represented in many ways. Each way highlights something different about that whole number.

ALGEBRA

A–1 Many of the properties that underlie operations are useful in certain circumstances to simplify calculations.

NUMBER SENSE AND NUMERATION

OPERATIONS

O–7 Performing operations with numbers is often made easier by decomposing and recomposing numbers and/or by thinking of numbers in other units.

- Intentionality

- You need purpose in your tasks. Choose them not just because they look nice or are the right topic.

- For example:
- Why might this be a good task if you want to focus on the meaning of numerator and denominator?

- Choose a number between 3 and 8.
- Represent, visually, a fraction where that number is the numerator.

- Represent, visually, a fraction where that number is the denominator.

- Let a friend guess your number.

- Changing, BIG TIME, the way we consolidate lessons.

- Same day most of the time.
- Pre-planned (for the most part) most of the time.
- A focus on the math, not how the solution is achieved.

- Include more kids in consolidation by using turn and talks or asking them why one student did whatever he/she says he/she did.

- For example, you asked kids to figure out the fraction of the old perimeter the new perimeter is if you cut a rectangle in half.

- Evan says: My fraction is 10/14.
- You ask the others to guess what Evan’s original and final rectangle looked like.

- Not viewing skill practice and problem solving as divorced.

- You might ask, for example:
- You renamed a variety of mixed numbers as improper fractions. What they all had in common was that the numerator was 8 more than the denominator.

- What might those mixed numbers have been?

- Upping the pace is worth considering.

- This might affect problem “length” and how long you wait to consolidate.

- It might affect how long you spend on number talks and/or activations (minds-ons).

- Using backwards design to plan lessons.
- Start with a meaningful learning goal and plan the kinds of questions kids should be able to answer.

- Avoid dismissing the use of problems/questions that can’t be evaluated.

- It’s not always about evaluation.

- Scaffold less and only when needed.

- In the end, kids need to care.

- And that’s all about your relationship with them.

- And all about whether you pique their curiosity.

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