

MATH LEADS

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My dilemma

- Many of you made suggestions.
- Again, if I took them all, we would be together for a minimum of 6 months, not 1 hour, so....

The one that came up most

- Was consolidation
- But we did address that this morning, so...

I chose

- Modelling the creation of open questions
- Helping teachers plan
- Homework/parents

Starting from existing questions

- A grade 1 teacher might ask students

Print the missing numbers.

1	2	3	4	5	6	7	8	9	10
11	12			15		17	18		20
21		23	24		26	27		29	
31	32		34	35		37	38		40
41		43		45	46		48	49	
51	52		54			57			60
61		63		65		67	68	69	70
	72	73		75		77			80
81			84		86	87		89	90
91	92	93	94	95	96		98	99	

To be more open

- A number is in the second row of a 100 chart.
- It is closer to the right than the left.
- What could it be?

To be more open

- One number is one row down and one to the left of another on a 100 chart.
- What could they be?

A grade 3 teacher might ask

5. Use a different fraction mat for each part. Each time, tell what fraction is covered and what fraction is not.
- a) Cover $\frac{4}{5}$ with pepperoni.
 - b) Cover $\frac{2}{3}$ with mushrooms.
 - c) Cover $\frac{4}{4}$ with green pepper.

Instead:

- Use fraction mats.
- Cover MOST of a pizza with pepperoni. Tell what fraction is covered.
- Cover SLIGHTLY LESS of another pizza with pepperoni. Now tell what fraction is covered.
- Cover AN ENTIRE pizza with pepperoni. Now tell what fraction is covered.

A grade 5 teacher might ask

- 8.** A bus holds 12 passengers.
How many passengers can get on 13 buses?

Instead...

- There are more than 4 buses.
- Each bus holds the same number of passengers.
- Choose how many buses and how many passengers.
- Tell how many people could fit in the buses.

Or..

- You have a bunch of groups of kids.
- The number of kids in each group is 1 more than the number of groups.
- How many kids might there be?
- Are there some numbers of kids there could not be (altogether)?

A teacher might ask

3. Write the next three terms in each sequence. Describe the pattern rule.

a) 3, 6, 9, 12, ... **c)** 1, 3, 6, 10, ...

b) 2, 6, 10, 14, ... **d)** 1, 4, 9, 16, ...

Instead

- You might ask :
- Create two different patterns where 6 is the second term.
- Tell what the 100th term would be.

Failsafe strategies

- **Start with the answer.**
- The answer is 20. What could the question be?
- The answer to a subtraction is 20. What could the question be?
- The answer is 20cm^2 . What could the question be?
- The answer is 20 edges. What could the question be?

Failsafe strategies

- **Alike and different.**
- How are these graphs alike and different?
- How are these patterns alike and different?
- How is multiplying fractions like multiplying whole numbers? How is it different?
- How are the decimals 6.001 and 6.1 alike and different?

Failsafe strategies

- **Who doesn't belong?**

- 2 4 9 12

- $5 + 8$ $7 + 8$ $11 + 2$ $4 + 9$

- $5x$ $x + 5$ $4x + 5$ $30 - x$

Failsafe strategies

- **Who belongs with us?**
- 8 28 84
- 121 144 169
- $2x = 10$ $3x - 4 = 11$ $2x + 8 = 3x + 3$

Failsafe strategies

- **Let students choose the numbers**
- Choose two 2-digit numbers to add so that the sum is more than 50. Add them.
- Choose a length and a width for a rectangle. Find the area and perimeter.
- Divide a 3-digit number by a 1-digit number so that your answer is 2-digits. Do the division.

Failsafe strategies

- Use “soft” words
- A fraction is a LITTLE MORE than $2/3$. What could it be?
- The difference of two 3-digit numbers is CLOSE TO 20. What could they be?
- You multiply two fractions and the answer is A LOT LESS than the first fraction. What could the two fractions be?

Failsafe strategies

- Use “soft” words
- You multiply two numbers that are PRETTY CLOSE and your answer is in the 200s. What could the numbers be?

Helping teachers plan

Longer term planning

- Consider what you think are the big ideas in math.
- Make sure you keep returning to them over the course of the semester/year.

For example – Gr 5

For example – Gr 3

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- **Number**
 - **composing/decomposing**
 - Place value as a specific type of decomposing/money as well
 - **Sense of size of whole numbers**
 - Serious intro to fractions

For example – Gr 5

For example – Gr 3

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- Operations: **adding and subtracting in pieces**
 - **Intro of what multiplication and division are**

For example – Gr 3

- **Measurement**
- **Length** through kilometres including perimeter
- Meaning of area
- Sense of mass (kg), capacity (L)
- Relationship of unit size to measures

For example – Gr 5

For example – Gr 3

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- **Geometry**
 - Sorting polygons, prisms and pyramids
 - 2-D parts of 3-D figures
 - Right angles
 - **Decomposing shapes into others**
 - Congruence
 - Movement on grids and symmetry

For example – Gr 3

- **Pattern and algebra**
- Repeating patterns/2 attributes
- **Growing/shrinking with models**
- **Pattern rules**
- **Relationship between + and –**
- **Unknowns in + and – equations**

For example – Gr 5

For example – Gr 3

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- **Data and Probability**
 - Two attribute sorting
 - Data collection and graphs with scales
 - **Interpreting data**
 - Predicting frequency
 - Determining fairness

So you might...

So you might

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- Go back and forth between strands, e.g.

Compose/decompose—concrete- adding and subtracting

Include relationship between + and –

Sense of size of number

Growing and shrinking patterns

Length including relating unit size to measure

Two attribute sorting

Compose/decompose- place value

Adding and subtraction including + and – equations and properties

Sense of size of number

Decomposing shapes

Angles

Repeating patterns and pattern rules

Area including relating unit size to measure

Movement on grids

Data collection and graphs and interpreting data

Fractions

Compose/decompose- money

Sorting 2-D and 3-D

**Intro mult and division; continued adding and subtracting
Including properties**

Mass/capacity including relating unit size to measure

Frequency and fairness

Sense of size of number

You might also...

- Ensure that every couple of weeks, you do at least some small activity in pattern, or data and some in geometry or measurement.
- You might use some of the open questions minds-on activities for these, e.g.

For example



Why can you use different measurements to describe how big a pumpkin is?

For example



Use square tiles to create a growing pattern. Represent the same pattern again, but use an action this time.

Revisiting concepts

Or you might use one topic as a context for another, e.g. measurement for a number activity or fractions for a geometry activity

Revisiting concepts

Some ideas are important enough to revisit, changing the task, of course, each time.

In Grade 2, this might include composing/decomposing numbers, addition and subtraction.

Revisiting concepts

You need to decide which are the biggies for each grade.

Parents

- You need to communicate with them a lot.
- They need to know what you care about and why.
- You can communicate to the whole group (not individuals) for a lot of this stuff using tweets, blogs, short you tube videos.

Parents

- For example, if you focus on process and not answer, you need to tell them why.
- If you demand multiple strategies, you need to tell them why.
- If you use alternative algorithms, you need to show them to parents and help them see where they are useful.

Parents

- Most parents respond reasonably well when they get what is going on and if you convince them that this is good for the kid.

Homework

- You need to send home only homework parents will understand.
- So you can send home skill sort of stuff once kids have learned it.
- You can also send home concepts/problems if you are sure kids really know what you're talking about.

For example

- These “problems” could go home fairly safely.
- Grade 1: Find 3 things at home that are longer than you are tall.
- Grade 3: [You provide several blank 100 charts.] Colour in the multiples of 2 on one chart. Colour in the multiples of 5 on another. Name three things you notice about the numbers you coloured each time.

For example

- These “problems” could go home fairly safely.
- Grade 4: Repeat 6 times: Choose a 2-digit number and a 1-digit number. Multiply them.
- Grade 6: Find a recipe using metric measurements (or give them a couple). Choose how many people you want to serve (It can't be the number on the recipe.) Tell what ingredients you would need and how you know.

For example

- You can provide games in small baggies with instructions to practise skills, but some parents have no time to play with their kids, so this can be problematic.
- Maybe they could be asked to play sometime within the week, rather than that night.

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