Math News in CTTCS

What's the Big Idea?

If we could pick one big idea in our math curriculum, it would be taking numbers apart and putting them together ("**composing**" and "**decomposing**" numbers).

Students compose and decompose numbers as part of early number sense in Kindergarten and Grade One, all the way through high school and beyond. In fact, much of our "real world" math involves quick mental calculation, the basis of which is breaking numbers into parts.

In early years, children need to be able to decompose to learn the base ten system and find efficient ways to add. Almost all our strategies involve decomposition, like "make ten", or

Learning the ten-pairs

Make 10 to Add

8 + 5 =
(2)(3)

Break apart the number to make 10! Then add on the extras!

8 + 2 = 10
10 + 3 = 13

5 + 6 = **11**

5 1

Using doubles

Adding in chunks using open number line

398 + 114 = 512

2   100   12

398   400   500   512

using near doubles, or adding/subtracting in chunks.

Sometimes we **decompose numbers by place value** to add, subtract, multiply or divide:

37 + 46

30 + 7   40 + 6

(30 + 40) + (7 + 6)

70 + 13 = 83

24 x 6

20 4   144

x6   x6
120 + 24 = 144

When we split numbers apart like this to multiply, it's called "partial product"

The area model of multiplication is an example of decomposing by place value and using "partial product".   So is the multiplication algorithm:

23 x 18 = 414

20 + 3

20x10 10x3   160
200   30   30
20x8   8x3   24
160   24   414

20 + 3

23
x 18

We are really thinking about 8 x 3 then 8 x 20, and so on

Students need fluency with breaking numbers and expressions apart in high school. We decompose numbers when we factor polynomials, simplify radicals, apply exponent laws, and even prove trig identities.

"The purpose of composing and decomposing is to simplify the mathematics. It is an essential skill for making calculating easier because it is all about making and then using friendlier numbers. Learners will encounter scenarios where they may need to join or separate, to identify the parts that make up a whole, and to compare the parts. Equivalence must be maintained within each manipulation. Thinking flexibly about putting numbers together as well as taking them apart leads to a greater understanding of relationships not only between numbers and operations but in all strands of mathematics." - Saskmath.ca

Being able to decompose and compose numbers is the basis of fluency.

How can we ensure we build this understanding and skill in our students?

1. **Model it**: As we explain how we arrive at an answer, show students how we break numbers apart, jump to friendly numbers, regroup, etc.

2. **Talk about it**: A "think aloud" is an effective instructional strategy where the teacher talks through their mental process for students. We can have students practice think alouds too, which supports their development of mathematical reasoning.

Click the image to view a video

3. **Name it**: Call it *breaking up* numbers for lower elementary children, *decomposing* for middle students. It's critically important for students to know the vocabulary of mathematics. Much of the difficulty students have with math, lack of understanding and poor recall can be improved by explicitly teaching and using vocabulary. Math, after all, is a language of its own, and one of the most difficult languages to understand because every word, diagram and symbol is infused with so much meaning. Hattie lists the effect size of explicitly teaching vocabulary as 0.67 (highly effective).

4. **Connect it**: Ask students what the word "decompose" means. They will make connections to breaking down, breaking apart decaying substances, reducing material to it's molecular building blocks, and we decompose numbers into tens and ones, or into factors later on. These are the building blocks of numbers.

5. **Practice it**. Insist that students use some numbers sense, not just procedures and algorithms when they work with numbers. We can create short tasks like entrance/exit slips that instruct students to show a certain strategy.
    Even when the content is not specifically number sense, but calculations need to be done, take time to talk about different ways of arriving at the numbers rather than just allowing the calculator to provide a total. For instance, we might be calculating an area. "How did you figure out 14 x 12? (maybe 14 x 10 + 14 x 2?). Pythagorean theorem: "How did you add 196 and 324? Did anyone make a friendly number?". By coming back to this concept over and over, we help students build more powerful numeracy skills, and we improve recall of strategies.

We've been collecting screener data for three years in CTTCS. Here's what we've learned: In general, students show some fluency with addition, then struggle with subtraction. Same with multiplication vs division. Here are a few ideas to strengthen student understanding of these concepts.

1. Two sided "fact family" dry erase boards
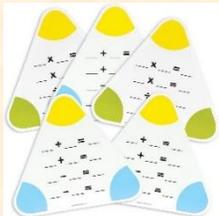
These are available at Amazon, be it's easy to make our own as well. Note that one side is the addition/subtraction fact family, and the other is multiplication/division. **We need to continually remind students that +/- are related (reverse) operations (same with x/÷).**
After we do an addition problem we can stop and ask the related subtraction fact, etc, even when we're long past these specific outcomes!

$$\begin{array}{r} \overset{1}{\underset{2}{}} \\ 37 \\ \times\ 23 \\ \hline 111 \\ 740 \\ \hline 851 \end{array}$$

After you model this for your class, or have them work on dry erase boards, stop and ask "Now what is 851÷23?" Watch how many students groan and begin a brand-new computation! We must keep reminding them to find that information *within* the multiplication computation.

When you teach doubles, work on "halves" too! (the reverse operation). This supports subtraction and division.

Graham Fletcher has great learning progression videos, that help us see how students' understanding grows:
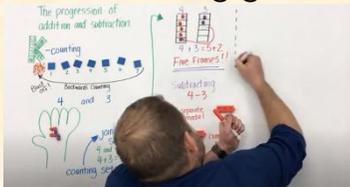
Addition/Subtraction
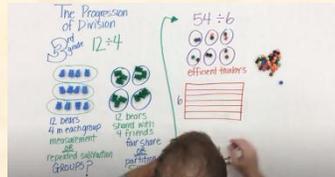
Division

<u>Ideas for Subtraction:</u>
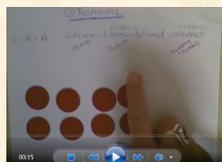Twelve Exciting Subtraction Activities to Energize Learners
https://www.prodigygame.com/main-en/blog/subtraction-activities/
Helping Students Make Sense of Subtraction
https://mathtransformations.com/helping-students-make-sense-of-subtraction/
Make an anchor chart (image at right is from https://www.etsy.com/ca/shop/CarolynsTeacherShop)

VIDEOS for CTTCS teachers made by Cindy:
Subtraction Strategies
A couple things about subtraction and screener errors
A walk-through of strategy descriptions in Sherry Parrish's books

Click here to see how Sherry Parrish describes subtraction strategies, can creates number strings!!

Number Talks allow kids to think about subtraction, discuss and apply strategies. Sherry Parrish's book "Number Talks" outlines the strategies for subtraction: Counting back, counting up, decomposing by place value, subtracting in chunks on an open number line, etc. This book is available at CTTCS Division Office central resources. Call me, I'll send it over!
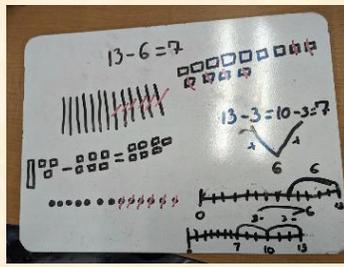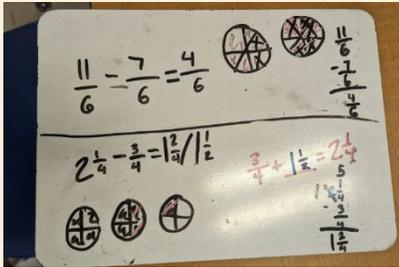

Remember to talk about and model subtraction as both *removal* and *distance on a number line*. Distance on a number line is essential as students in grade 6 and up start to make sense of positive and negative numbers. Older students can use "constant distance" to make subtraction easier (this is also a great way to explain that subtracting a negative becomes adding a positive!)

https://youtube.com/shorts/9zrlwETFmIU?si=Xelrq-fTHvRU7iG7

Here's a great web site kids can use to practice at home. I love this site because it's very visual, and it only gives a few minutes of practice and then says "Thanks, come back tomorrow for more questions".
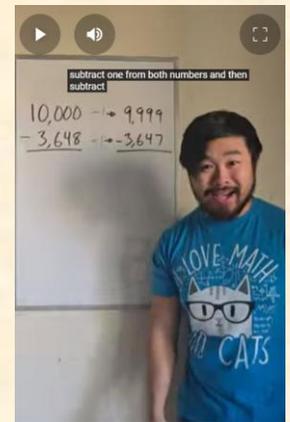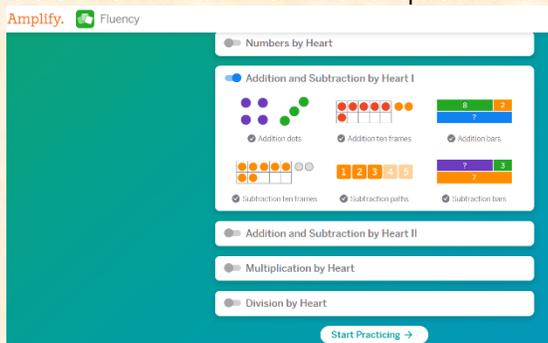
Above all, remember *spaced practice* is what helps students recall information. Sprinkle subtraction tasks throughout the school year and take a few moments to discuss strategies students applied.

I hope you got some good "take aways" from reading this article!!!!! 🤣
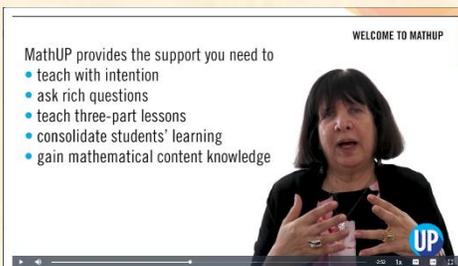
What is Math UP? This is the new K-8 digital teaching resource that will eventually become our core math resource in CTTCS, as Math Makes Sense is slowly being phased out. Math UP is the number one product used by divisions across Canada, is available in English and French, and is a resource recommended of the Sask Ministry of Ed. Written by Marian Small, the digital platform is designed to build capacity in teachers. It includes a built in library of professional development videos by Marian Small. Here's an introductory video if you'd like to take a look: https://www.youtube.com/watch?v=bEr4gE94tEA Interested in joining our team of Math UP teachers in CTTCS? Call me!

SUM 2025 Conference

Join us on April 7th and 8th, 2025 in Saskatoon for two days packed with professional learning opportunities!

Featured Speakers

Jenna Laib
X

Chris Luzniak
X

Nat Banting
X

Maegan Giroux
X

Conference Summary

The Saskatchewan Understands Math (SUM) conference is for mathematics educators teaching in Grades K-12 and all levels of educational leadership interested in mathematics curriculum, instruction, number sense, problem-solving, culturally responsive teaching, and technology integration, and will bring together international and local facilitators to work in meaningful ways with participants in a variety of formats.

You can register here: https://www.smts.ca/sum-2025/

Math Resources at Christ the Teacher School Division:

Core resources, Math Makes Sense (K – 6) and Math Links (7-9). High school texts are from McGraw-Hill, Pearson, and Nelson. Math UP is also a core resource in K-8 English and French, with 15 licenses (English and French) currently in the division (These are perpetual licenses, owned by the division, so can be transferred between teachers).

Other major resources you may not know about:

Leaps and Bounds

This is a Tier 2 resource, though it can be used in regular instruction (tier 1) or even in tier 3. Most schools in CTTCS have some of these resources. The books come in double grade bands :The Grade 1and 2 resource is a box of teaching cards as well as a digital resource. Then Gr 3 and 4, Gr 5 and 6, Gr 7 and 8 are a hard copy Teacher Resource, accompanied by a digital resource (printable pdfs) for student material. Leaps and Bounds is concept based, not outcome based, but we have alignment documents for Saskatchewan curriculum. Each concept is introduced with a brief diagnostic that students write, then the diagnostic is scored to determine which pathway of intervention the student needs, pathway 1 being closest to grade level, then 2 with more scaffolding, then pathway 3 with

the most intervention or simplest parallel tasks being presented. Authored by Marian Small, Leaps and Bounds has solid teaching instructions that foster concept development. When you need something extra for a group of students who need more support, be sure to check out Leaps and Bounds. Locate your school's copy of the resources, and find out which grade levels your school has. If you don't have the grade level you need, we can help you borrow it from another school. Our French Immersion schools have all the resources, and they are in French. Here's a video to help you see how to use Leaps and Bounds:
https://youtu.be/r0wneeHdQgc?si=uNZQfOXRCkdxxC9B
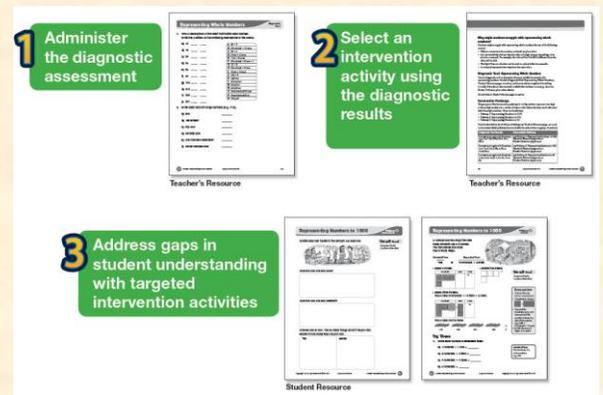
Key Math –Tier 3

All our schools have a Key Math kit. There are two parts to Key Math: First is a **diagnostic test** given by a trained SSST or Math Consultant. The test is mostly done orally, with test items presented visually. The test can take 1 to 2 hours, so we usually do it in more than one sitting. There is also a small written component that can be

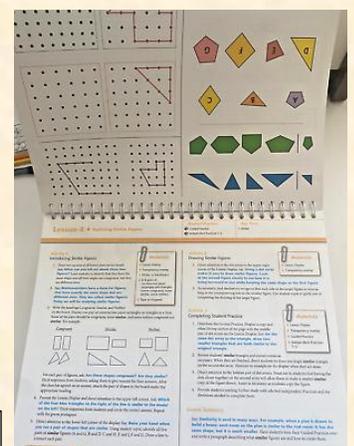An example of student profile in Key Math
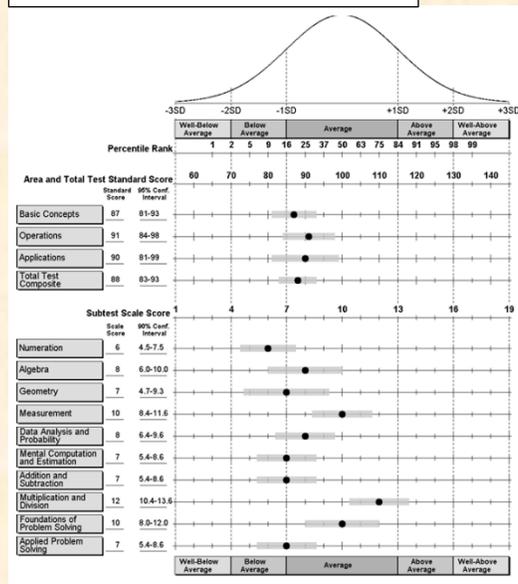
left with the teacher for the student to complete. All the data is entered into an analytical program that will create a profile of the student's understanding across several math domains (mental math and computation, measurement, problem solving, numeration, operation, data and probability, geometry, etc.) A curriculum is developed for the student, and a set of "essential resources" are printed. Key Math is very good at finding a student's "zone of proximal development", that it, presenting learning goals and materials that are challenging but not overwhelming.

The second part of Key Math is the **Essential Resources** (including the printout of tasks from the program). This includes a set of teaching easels, with visuals on one side for the student (or groups of students) to refer to, while the lesson is scripted on the other side, to be presented by an interventionist. Again, this resource is not aligned to our Saskatchewan curriculum specifically, and we do not try to coordinate Key Math lessons to the curriculum, as the resource is used for students who are on individual programs in math, or have learning needs considerably different than their grade-level curriculum outcomes. It is important that the resource is used with fidelity, with good instruction and attention to the learning, and not just as a printable "workbook".

Key Math is designed for our most challenged students, and our experience has been that kids enjoy the material and find the lessons engaging. Because the program specifically targets individual student needs, learners find they make progress and working through materials that give them opportunities for success.

Key Math Essential Resource teaching easel

CTTCS Early Numeracy Catch Up Kit

Every K-8 school has at least one copy of this kit. In it you will find resources to help with interventions for students that have gaps in K-5 basics.

The first section has an outcome chart with spaces for notes and checkboxes. Use questioning and manipulatives to probe for gaps as you work across the outcomes. Here is a video of what that can look like:

CTTCS Assessing for Interventions Video https://youtu.be/eHJyJ9ycKEs
Assessment Summary https://youtu.be/JiqauPwGcSc

Once you've identified gaps that need to be addressed, the kit provides a framework for interventions, including what to look for, teaching ideas, models, activities and games that can be supervised by an interventionist or EA, or sent home if parents are willing to support.

Most of the pages of this book exist as PDFs that you can print to recreate more copies of the resource. You can find those pages here: https://drive.google.com/drive/folders/1M-HNcQiOAxnbATc9dKDUjYO-sSH1ShtF?usp=drive_link

You can also call me to come assess a student for you, identify gaps, and leave you with some direction and materials to help support interventions.For more information, don't hesitate to call me!

Your Screener Data

Take a look in your school data folder on Sharepoint, and you will find your screener averages as well as division averages at bottom of your spreadsheet. This allows you to see where your students perform above the division average, and where they are scoring lower than average. Most importantly, talk to the teacher a grade above you to find out how your students from last year did on the screener. This may inform how you teach certain topics this year.

Provincial Math Assessment

The Ministry of Education is working with teachers to create a new provincial assessment for students in Grade 5 and 9.

Christine Bohn (St Al's School) is on the Assessment team for Grade 5, and provided this update for us:

"During the February break, 12 Math teachers from across the province met to participate in Math 5 & 9 item development. This item development is a contract between teachers and the Ministry of Education to develop curriculum-based questions for potential use on Saskatchewan Student Assessments. This contract included time for on-site training and off-site development work to be completed by teachers on their own time. Teachers are to develop and submit questions to the ministry over a twelve-week period. Items developed will be validated by teachers and field-tested prior to use on the provincial assessment. There will be many opportunities for teachers to get involved in the Saskatchewan Student Assessment program as it continues to develop."

You can read more information and see the timelines on the ministry's website, **here**:

New provincial assessment program for Saskatchewan students

Principals and Teachers:

As part of the Provincial Education Plan, the Ministry of Education is working with teachers and educational organizations to develop a Saskatchewan Student Assessment (SSA) program.

Students, parents, teachers and the public have told us they want Saskatchewan students to:
- be **prepared** for success with the skills and knowledge they need;
- be **supported** in their learning; and,
- have an education that is **globally recognized and valued**.

Saskatchewan Student Assessment will help us work together toward these goals. The assessments will be based entirely on Saskatchewan curriculum and will be developed with Saskatchewan teachers.

Assessments will be implemented in stages, beginning in the 2025-26 school year. Before each assessment is implemented, a "field test" will provide information about the quality of the questions and help teacher developers refine the assessment.
- 2025-26 school year – field test in Grades 5 and 9 mathematics and Grade 7 English language arts (ELA).
- 2026-27 school year – implementation of Grades 5 and 9 mathematics and Grade 7 ELA assessments; field test of Grades 4 and 10 ELA.

- 2027-28 school year – all assessments will be fully implemented, including Grades 5 and 9 mathematics and Grades 4, 7 and 10 ELA.

Sask Student Assessment will:
- Be based on curriculum
- Help with understanding of grade-level expectations
- Be developed and validated by teachers

Sask Student Assessment will NOT:
- Require additional teaching
- Replace classroom assessment
- Be used to rank schools or teachers

Results from the assessments will be made available to the student, parent/caregiver, classroom teacher, the school and the school division.

The results of the assessments will provide information needed at the classroom, system and provincial levels to better respond to the learning needs of Saskatchewan students. They **will not** be used to rank teachers, schools or school systems.

As the partners in Saskatchewan education who work closest with students, we look forward to working with you to develop and implement an assessment program that will benefit you and your students. For more information, please see our website https://www.saskatchewan.ca/assessment.

Saskatchewan Student Assessment

What is it?

Saskatchewan Student Assessment is a provincial assessment program that will provide a snapshot of results in core subject areas.

Why is this being implemented?

Consistent, fair and objective measures of student achievement benefit everyone in the education system. The data will be used to identify strengths and areas of opportunity, from the level of the student to the entirety of the provincial education system.

Saskatchewan is currently the only province in Canada that does not have a provincial assessment program.

Who will write the Saskatchewan Student Assessment?

All students following the regular curriculum in publicly funded schools in Grades 5 and 9 will participate in a mathematics assessment and students in Grades 4, 7 and 10 will participate in an English language arts assessment.

Students will receive the same accommodations and support on the assessment as they are accustomed to in the classroom.

When will this be implemented?

Assessments will be implemented in a staged approach, beginning in the 2025-26 school year.

Will I receive the results from this assessment?

Once Saskatchewan Student Assessments are fully implemented, you will receive information on your students' achievements. The assessment results will also help you identify students' areas of strength and where they might need extra support.

How can I get involved?

Teacher participation is essential to the success of this program. There are many opportunities for teachers to be engaged, including developing, validating and scoring assessment questions and setting provincial standards of achievement. Your educational organization will share information with you about how you can become involved.

Where can I get more information?

Please visit our website: https://www.saskatchewan.ca/assessment.

We look forward to sharing additional information with you throughout the development and implementation of this program.

saskatchewan.ca

Saskatchewan

2

Cool Stuff in our Schools

St Paul's Math Night

For the last couple years, St. Paul's has had a "Mathy January", to raise the profile of Mathematics with families. During the month, classrooms participate in math trivia competitions, families are challenged to play math games at home, and the hallways are decked out with posters, displays, and books promoting math.

The finale is a fabulous Math Night, where families come to participate in math activities with their kids. The response from families is great-- this year the sessions were packed!

You can see the CTV news coverage here:

https://www.ctvnews.ca/regina/yorkton/article/everyone-has-a-lot-of-fun-yorkton-school-promotes-numeracy-with-math-month/

One student said being part of the month-long event helped grow her interest in the subject. "I like how our school turned learning more into a game," said Ava Norton.
"This whole month has been a game and a competition, I feel that definitely helped a lot."
From CTV News

A great game for Multiplication Fluency

Thanks to Christine Bohn for sharing this gem she found online. This game uses multiples combined with the game "Trash" (or "Garbage") as a fun way to improve multiplication recall. Watch the reel here:

https://www.facebook.com/reel/9036536989806559 . Christine even found the cards ready-made -- for free!

https://drive.google.com/file/d/1-cg8HRMPHk3lpycPPfAE7ndDB3mfHn2G/view?usp=sharing

Got something cool in your classroom that we could share??
Email me smitc01@cttcs.ca or text 306-621-2248.

March Math Challenges:

$A+B=10$
$A-B=4$
$C = A^2$

$\sqrt{C+5B} = ?$

9 6   8 5   7 4
Y   Y   Y
45   39   ?

I want to fill in this grid so that each of the letters A, B, C, D, and E occurs once in each row, once in each column and once in each of the two main diagonals.

Which letter should go in the square marked with the asterisk?

In the grid: * , A, B, D, C, E

10kg (frog, sheep)   20kg (frog, horse)

24kg (sheep, horse)   ? (frog, sheep, horse)

Source: Teachstarter

170 cm (cat top, turtle bottom)

130 cm (turtle top, cat bottom)

Mind Your Decisions

24 Plus Minus

Place a **+** or a **−** in each ⬤ to make **0**.

$0 = 1 ⬤ 2 ⬤ 3 ⬤ 4$

How about...?

$0 = 1 ⬤ 2 ⬤ 3 ⬤ 4 ⬤ 5$

$0 = 1 ⬤ 2 ⬤ 3 ⬤ ... ⬤ 49 ⬤ 50$

$0 = 1 ⬤ 2 ⬤ 3 ⬤ ... ⬤ 99 ⬤ 100$

Source: Glenn Stevens   Play With Your Math.com