

ASSESSMENT IN ELEMENTARY MATHEMATICS DURING REMOTE TEACHING & LEARNING

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SD38 District Pro-D Day, May 15 2020

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RICHMOND
SCHOOL DISTRICT NO.38

SESSION INTENTIONS

Some math together: A Corona Conundrum

Prioritizing essential learning standards

Formative Assessment Techniques

Core Competency Reflection & Self-Assessment

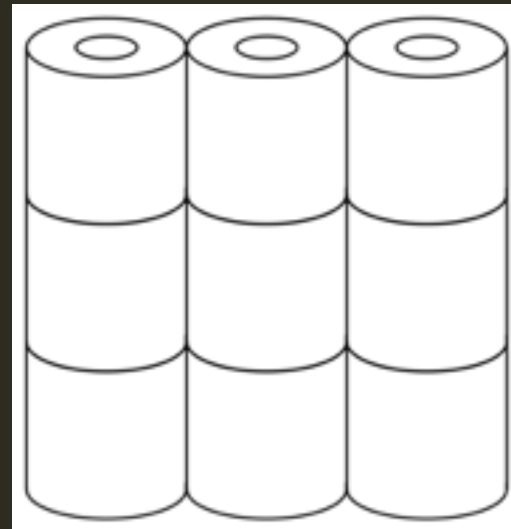
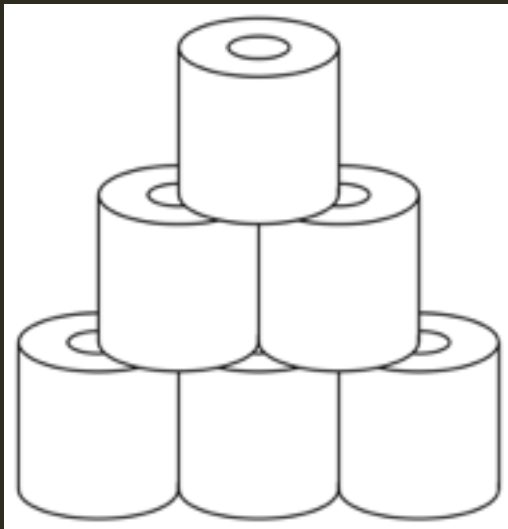
Reporting in June



<https://youtu.be/NO7wIHpCffI>

I CAN STACK TOILET PAPER TO FORM A TRIANGLE OR A SQUARE.

**IS IT POSSIBLE TO MAKE TWO TOWERS
LIKE THIS THAT HAVE THE SAME NUMBER
OF ROLLS IN EACH? (NOT INCLUDING
TOWERS OF ONE ROLL)**



Source: Corona Conundrums on YouTube by Chris Smith

LEARNING STANDARDS: CURRICULAR COMPETENCIES & CONTENT

The infographic is titled "Learning Standards" and is divided into two main columns. The left column, "Curricular Competencies", lists four categories: Reasoning and analyzing, Understanding and solving, Communicating and representing, and Connecting and reflecting. Each category has a list of specific skills. The right column, "Content", lists specific mathematical topics such as number concepts, decimals, fractions, addition and subtraction, multiplication and division, and patterns. The infographic uses a blue and white color scheme with various icons like arrows and diamonds.

Learning Standards

Curricular Competencies

Students are expected to be able to do the following:

Reasoning and analyzing

- ▶ Estimate reasonably
- ▶ Develop mental math strategies and abilities to make sense of quantities
- ▶ Use reasoning and logic to explore and make connections

Understanding and solving

- ▶ Using **multiple strategies** to engage in problem solving
- ▶ Develop, construct, and apply mathematical understanding through role-play, inquiry, and problem solving
- ▶ Engage in problem-solving experiences that are connected to place, story, and cultural practices relevant to the local community

Communicating and representing

- ▶ Communicate in many ways
- ▶ Describe, create, and interpret relationships through concrete, pictorial, and symbolic representations
- ▶ Use **technology** appropriately to explore mathematics, solve problems, record, communicate, and represent thinking

Connecting and reflecting

- ▶ Visualize and describe mathematical concepts
- ▶ Connect mathematical concepts to each other and make **mathematical connections** to the real world
- ▶ Share and reflect upon mathematical thinking
- ▶ Draw upon local First Peoples knowledge and/or expertise of local Elders to make connections to mathematical topics and concepts

Content

Students are expected to know the following:

- ◆ number concepts to 10 000
- ◆ decimals to hundredths
- ◆ ordering and comparing fractions
- ◆ addition and subtraction to 10 000
- ◆ multiplication and division of two- or three-digit numbers by one-digit numbers
- ◆ addition and subtraction of decimals to hundredths
- ◆ addition and subtraction facts to 20 (developing **computational fluency**)
- ◆ multiplication and division facts to 100 (introductory **computational strategies**)
- ◆ **increasing and decreasing patterns**, using tables and charts
- ◆ **algebraic relationships** among quantities
- ◆ one-step equations with an unknown number using all operations
- ◆ how to **tell time** with analog and digital clocks, using 12- and 24-hour clocks
- ◆ **regular and irregular polygons**

HOW ARE WE PRIORITIZING AND DETERMINING WHAT LEARNING STANDARDS ARE ESSENTIAL DURING THIS TIME OF REMOTE TEACHING AND LEARNING?

What is new curricular content at the grade level?

What curricular content is necessary to review, practice and enhance knowledge of, that is essential for next year's mathematics learning?

What curricular competencies can be developed during this time of remote learning?

What curricular competencies are connected to your prioritized curricular content learning standards?

What curricular competencies are connected to your core competencies areas of focus?

GRADE 3

By request, I will create these for K-7 as well as provide a blank template by May 22.

Curricular Content	Curricular Competencies	Indicators of Proficiency	Instructional Practices
Place value understanding to 1000	Develop mental math strategies	Can represent, compare, order and decompose numbers to 1000 and count in various ways	Number Talks
Fluency with $+/ -$ facts	Problem-solving	Recall of most addition facts to 20	Counting Collections
Addition and subtraction of two and three-digit numbers	Explain and justify mathematical ideas and decisions	Can add and subtract numbers within 1000 using decomposing, compensating and regrouping strategies	Math Games
Introduction to multiplication, division and fraction concepts	Represent mathematical ideas in concrete, pictorial and symbolic forms	Can demonstrate an understanding of the processes of multiplication and division and what fractions are, using concrete and pictorial forms and symbols	Open Questions

BREAKOUT ROOM CHAT

How are you thinking about prioritized learning standards?

How will focusing on prioritized learning standards shift your assessment practices?

What other areas of the mathematics curricular content could you connect to your prioritized learning standards as a way to practice and apply understanding?

observations

from Rethinking Letter Grades
by Caren Cameron &
Kathleen Gregory



product

talk

(discussions, conversations,
interviews)

“Formative assessment is the process of finding out where students are in their learning while they are learning.”

Munson, 2018

Assessment that is not a separate event but is embedded in the practices of teaching and learning:

- learning intentions
- subtle scanning
- pedagogy of listening and noticing
- conferring
- self-reflection and assessment
- responsive cycle of teaching and learning

FORMATIVE ASSESSMENT

What forms of authentic assessment will help move learning forward for our students during this time of remote learning and prioritized/essential learning standards?

How will we do this through the lenses of compassion, equity and fairness?



THE FORMATIVE FIVE

**Everyday Assessment Techniques for Every Math Classroom
by Francis (Skip) Fennell, Beth McCord Korbett and Jonathan A. Wray, 2017**

**some ideas for utilizing technology to support formative assessment
during this period of emergency remote learning**





OBSERVATIONS

During Zoom videoconferencing and in breakout rooms, you can observe students' contributions to discussions, additions to whiteboards and how they communicate their thinking during screen sharing.

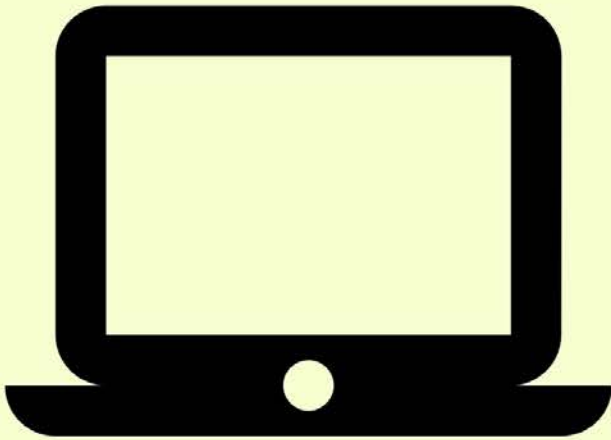
Observations can also be made with students' submissions via emails or video, and on platforms such as Scholantis, Moodle and My Blueprint.

INTERVIEWS

During one-on-one or small group Zoom videoconferencing, emails or phone calls, specific questions focused on content or competency can be asked and student responses and questions can be collected.



SHOW ME

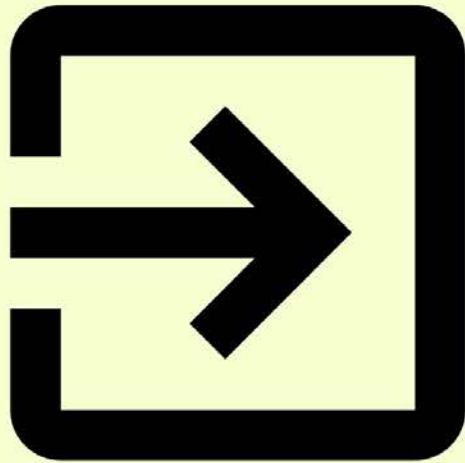


Students can be provided with different options to create, represent and share what they know, can do and understand about a math concept or competency using photo, video, drawing and text compilations with apps such as Clips, PicCollage, Book Creator, etc. or through a learning log.

HINGE QUESTIONS

The poll feature can be used during a Zoom session to ask a hinge question around a math concept or process. Teacher choice of responses for the poll are designed to reveal and provide feedback about student understanding. Student self-assessments, collected through various ways, can also be focused on a hinge question that informs further instruction.





EXIT TASKS


Padlet is a collaborative online tool that you can use to collect information about where students are in their understanding as they leave a Zoom session and also create a class profile for your group. A shared document on the portal could also be created for students to add to, or an email follow-up with an exit slip task attached.

IN THE CHAT BOX:

What new formative assessment technique might you try in the next month?

What digital tool or other form of communication will you use to support formative assessment?

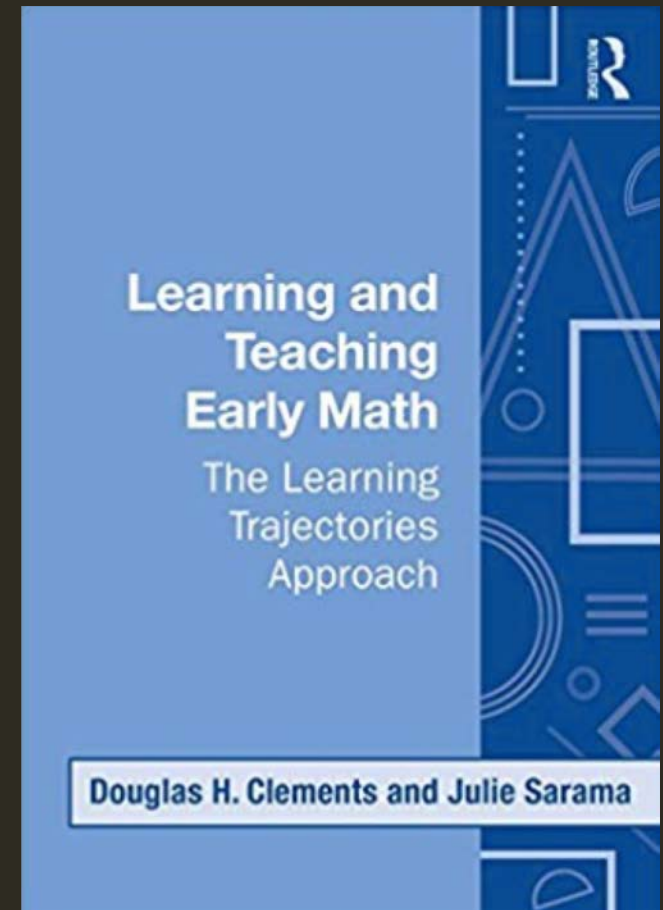
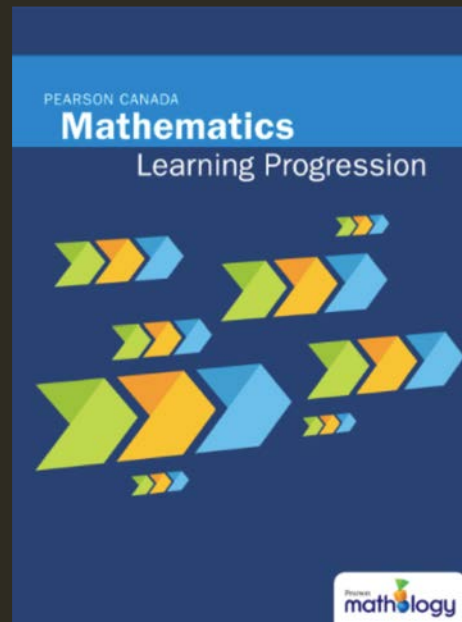
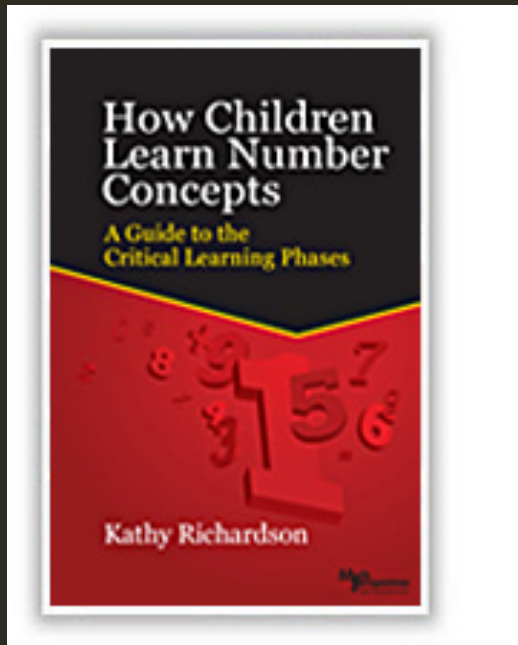
How are we collecting evidence of proficiency?



Proficiency Scale	Emerging	Developing	Proficient	Extending
	The student demonstrates an initial understanding of the concepts and competencies relevant to the expected learning.	The student demonstrates a partial understanding of the concepts and competencies relevant to the expected learning.	The student demonstrates a complete understanding of the concepts and competencies relevant to the expected learning.	The student demonstrates a sophisticated understanding of the concepts and competencies relevant to the expected learning.

WHAT DOES IT MEAN TO BE PROFICIENT?

- understanding of learning trajectories/progressions
- common understanding/coherence in schools/districts



<https://gfletchy.com/progression-videos/>
(US graded)



Grauer Division 5
 Grades 2 & 3 2017-2018

Term 1
 Big Idea: Number represents and describes quantity.
 Grade 2 Big Idea: Numbers to 100 represent quantities that can be decomposed into tens and ones.
 Grade 3 Big Idea: Numbers to 1000 represent quantities that can be decomposed into hundreds, tens and ones.
 What is decomposing? How does decomposing help us think about numbers?
 How can shapes be decomposed? How can fractions be decomposed?
 How does understanding 5 or 10 help us think about other numbers?

Grade 2	Decompose single digit numbers into parts in multiple ways	Decompose two-digit numbers into parts (tens and ones)	Represent decomposing of two-digit numbers in multiple forms (concrete, pictorial, symbolic) - using tens or other benchmark numbers	Develop mental math strategies by applying concept of decomposing to + & - facts to 20	Develop and use multiple strategies to apply concept of decomposing to addition and subtraction to 100, including problem solving
ing	10, 016 528				
	528	016	016?		
	528	016	016		
	528	016	016		016?
	528	016	016	016	016
	528	016	05		016
	528	016	016-1000		016
					016
					016

	Decompose two-digit and three-digit numbers in flexible ways	Represent decomposing of three-digit numbers into multiple forms (concrete, pictorial, symbolic) - hundreds, tens & ones and (ie 50)	Develop mental math strategies by applying concept of decomposing to + & - facts to 20 - increasing flexibility	Develop and use multiple strategies to apply concept of decomposing to addition and subtraction to 1000 - including problem solving	Apply concept of decomposing to understanding of multiplication - grouping, arrays
mdi	016				
ova	016?				
ig	528, 05	05			
	528				
tro	016		016		
	528, 05	016		016, 100	
	528, 05	016, 100		016, 100	
	016				
	016		016		
	016?			016, 100	
	016?			016, 100	
				016?	
				016	

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ista	05 016				
l	528		016?		016?
g	528	016	016		
		016			
	528 05 016	016	016	016	016
	528 05 016	016	016		
	528	528 016	05		016
hin			016-1000		016

Grade 3	Decompose two-digit and three-digit numbers in	Represent decomposing of three-digit numbers into parts by place value in multiple forms (concrete, pictorial, symbolic) - hundreds, tens & ones and other benchmark numbers	Develop mental math strategies by applying concept of decomposing to + & - facts to 20 - increasing	Develop and use multiple strategies to apply concept of decomposing to addition and subtraction to 1000 - including problem	Apply concept of decomposing to understanding of multiplication - grouping, arrays

Tomsett
 Kindergarten
 February 7 2018

Counting collections – different ways to count in partners, ways to record count
 Learning Standard: Number concepts to 10

Guided math focus: counting collections from 5-15, subitizing sets from 3-5, recording one count

Kindergarten	One-to-one correspondence	Cardinality	Conservation	Representing mathematical ideas in concrete, pictorial and symbolic forms by linking sets to numerals	Communicate mathematical thinking by showing and explaining how when subitizing quantities to five
	✓	✓	✓	✓	23 ✓
	✓	✓	✓	✓	2345 ✓
	✓	✓	✓	dev	2345 ✓
	✓	✓	✓	✓	234 ✓
	✓	✓	✓	✓	2345 ✓
	✓	✓	✓	made 11 for 1 dev	2345 ✓
	✓	✓	dev	dev	23 ✓
	✓	✓	✓	dev	234 ✓
	✓	✓	✓	✓	19 2345 ✓
	✓	✓	✓	✓	16 2345 ✓
	✓	✓	dev	dev	8 234 ✓
	✓	✓	dev	dev	8 234 ✓
	✓	✓	dev	dev	16-6 234 ✓
	✓	✓	dev	dev	19-9 2345 ✓
	✓	✓	✓	✓	2345 ✓
	✓	✓	dev	dev	18 2345 ✓
	✓	✓	dev	✓ dev	15 234 ✓
	✓	✓	✓	✓	2345 ✓

February 13 2018


Fraction talk – wodb 4 parts, part of a square fraction image

Learning Standards: equivalent fractions, whole number and fraction benchmarks, improper fractions (grade 6)

Guided math focus: ways to make $\frac{1}{2}$, comparing and ordering fraction based on $\frac{1}{2}$, greater/less than

Grade 5	Use mathematical language and vocabulary during fraction talks	Representing fractions and equivalent fractions in concrete, pictorial and symbolic forms	Explain and justify mathematical ideas when ordering and comparing fractions using benchmarks

Grade 6	Use mathematical language and vocabulary during fraction talks	Representing fractions and equivalent fractions in concrete, pictorial and symbolic forms	Explain and justify mathematical ideas when ordering and comparing fractions using benchmarks	Use reasoning to explore and make connections while showing understanding of improper fractions



12:20

Tomsett
 Grades 5&6
 February 13 2018

Fraction talk – wodb 4 parts, part of a square fraction image
 Learning Standards: equivalent fractions, whole number and fraction benchmarks, improper fractions (grade 6)

Guided math focus: ways to make $\frac{1}{2}$, comparing and ordering fraction based on $\frac{1}{2}$, greater/less than

Grade 5	Use mathematical language and vocabulary during fraction talks	Representing fractions and equivalent fractions in concrete, pictorial and symbolic forms	Explain and justify mathematical ideas when ordering and comparing fractions using benchmarks
	N/A	$\frac{1}{2}$ beg $3/6 = \frac{1}{2}$ ✓	$\frac{1}{2}$ ✓ dev $3/6$
	N/A	$\frac{1}{2}$ dev	yes but can't explain
	N/A	$\frac{1}{2}$ $2/4$ $3/6$ ✓	yes $0/10$
	N/A	$\frac{1}{2}$ $0/10$	N/A
	✓	$\frac{1}{2}$ $2/4$ $3/6$ ✓	$2/3$ ✓
	✓	fluent	$2/3$ dev ✓
	✓	fluent	$3/4$ ✓
	✓	fluent	$0/10$ ✓
	Use mathematical language and vocabulary during fraction talks	Representing fractions and equivalent fractions in concrete, pictorial and symbolic forms	Explain and justify mathematical ideas when ordering and comparing fractions using benchmarks
	N/A	$\frac{1}{2}$	dev N/A
	N/A	$\frac{1}{2}$	dev N/A
	✓	$\frac{1}{2}$ $3/6$ ✓	dev N/A
	N/A	$\frac{1}{2}$ dev	dev N/A
	N/A	$\frac{1}{2}$ $3/6$ ✓	yes but can't explain
	✓	$\frac{1}{2}$ $2/4$ $3/6$ ✓	dev N/A
	✓	$\frac{1}{2}$ $2/4$	dev N/A
	N/A	$\frac{1}{2}$ not ind.	dev N/A
	N/A	$\frac{1}{2}$ $2/4$ $3/6$	dev N/A
	✓	fluent	used pictures ✓
	✓	fluent	$2/3$ ✓
	N/A	dev	$\frac{1}{2} \times 3$ dev
	✓	fluent	$\frac{1}{2} \times 3$ dev
	✓	fluent	$\frac{1}{3}$ ✓
	N/A	fluent	$\frac{1}{4}$ ✓

improper

dev/ers

* explain & justify

WHAT INSTRUCTIONAL PRACTICES SUPPORT PRIORITIZED LEARNING STANDARDS DURING THIS TIME?

Learning Standards

Curricular Competencies

Students are expected to be able to do the following:

Reasoning and analyzing

- ▶ Estimate reasonably
- ▶ Develop mental math strategies and abilities to make sense of quantities
- ▶ Use reasoning and logic to explore and make connections

Understanding and solving

- ▶ Using multiple strategies to engage in problem solving
- ▶ Develop, construct, and apply mathematical understanding through role-play, inquiry, and problem solving
- ▶ Engage in problem-solving experiences that are connected to place, story, and cultural practices relevant to the local community

Communicating and representing

- ▶ Communicate in many ways
- ▶ Describe, create, and interpret relationships through concrete, pictorial, and symbolic representations
- ▶ Use technology appropriately to explore mathematics, solve problems, record, communicate, and represent thinking

Connecting and reflecting

- ▶ Visualize and describe mathematical concepts
- ▶ Connect mathematical concepts to each other and make mathematical connections to the real world
- ▶ Share and reflect upon mathematical thinking
- ▶ Draw upon local First Peoples knowledge and/or expertise of local Elders to make connections to mathematical topics and concepts

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Students are expected to know the following:

- ◆ number concepts to 10 000
- ◆ decimals to hundredths
- ◆ ordering and comparing fractions
- ◆ addition and subtraction to 10 000
- ◆ multiplication and division of two- or three-digit numbers by one-digit numbers
- ◆ addition and subtraction of decimals to hundredths
- ◆ addition and subtraction facts to 20 (developing computational fluency)
- ◆ multiplication and division facts to 100 (introductory computational strategies)
- ◆ increasing and decreasing patterns, using tables and charts
- ◆ algebraic relationships among quantities
- ◆ one-step equations with an unknown number using all operations
- ◆ how to tell time with analog and digital clocks, using 12- and 24-hour clocks
- ◆ regular and irregular polygons

NUMBER TALKS

Handwritten mathematical work on a whiteboard illustrating different strategies for solving $48 + 37$.

Top Left: A number line strategy showing a jump from 48 to 50 (labeled 2), then a jump from 50 to 85 (labeled 35). The final sum is $50 + 35 = 85$.

Middle Left: A decomposition strategy showing $48 + 37$ broken down into $48 + 7 = 55$ and $55 + 30 = 85$.

Bottom Left: A number line with jumps of 7, 10, 10, and 10, starting at 48 and ending at 85.

Center: A large equation $48 + 37$ with tens and ones separated. Below it, the decomposition steps are shown: $40 + 30 = 70$ and $7 + 8 = 15$.

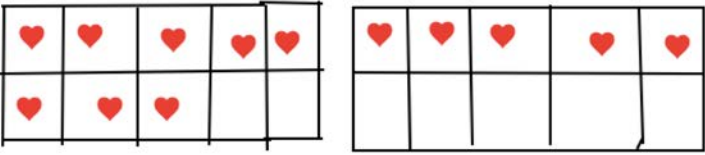
Right: The final sum is calculated as $70 + 15 = 85$.

Bottom: Two ten-frames are drawn. The first ten-frame contains 8 green dots (two rows of four). The second ten-frame contains 7 blue dots (two rows of four).

$2+3+5+3=13$ $5 \begin{smallmatrix} \leftarrow 2 \\ \leftarrow 3 \end{smallmatrix}$
 $8+2=10$
 $10+3=13$
 decompose make a 10
 $8+5=$
 $7+5=12$
 $12+1=13$
 known fact
 $8+1=9$
 $9+4=13$
 decompose compensate known fact
 doubles making 10
 $5+5=10$
 $10+3=13$
 $8+5=$
 $8-9, 10, 11, 12, 13$
 count on
 11
 12
 13 ✓✓
 14
 21

$28+5=$
 about and what and reread first letter
 for parts of and you know read and make that it makes se.
 with Mrs. [unclear]
 DEAR!
 Agenda
 Recess
 Math
 Lunch
 Quiet Reading
 Mind-Up
 Centers
 Helping Hands
 Home
 HENRY THE FOURTH
 Everybody Did That?
 HOP POP
 DIARY SPIDER
 Social Respons

HOW MIGHT YOU ENGAGE IN NUMBER TALKS WITH YOUR STUDENTS DURING THIS TIME?



12
13 ✓✓✓

$8 + 5 = \underline{\quad}$

decomposing
making 10

5
2 3
 $8 + 2 = 10$
 $10 + 3 = 13$

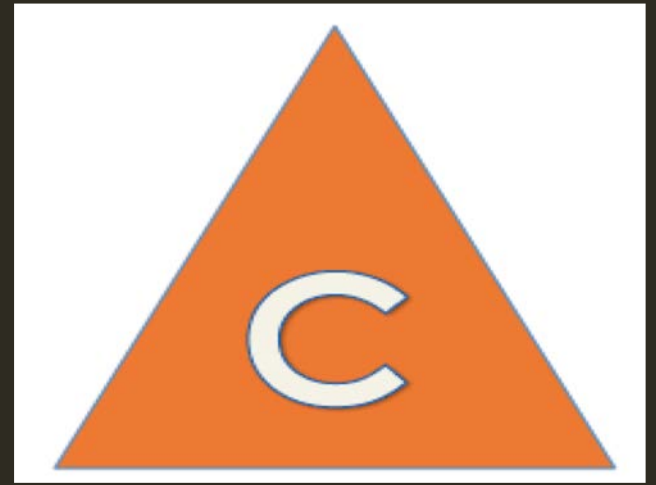
$5 + 5 = 10$
 $10 + 3 = 13$
doubles

counting on

8, 9, 10, 11, 12, 13

Using the Zoom whiteboard feature and breakout rooms

Communication Core Competency



Facets:

- Connecting and engaging with others
- Focusing on intent and purpose
- Acquiring and presenting information

*Choosing one or two Core Competencies to focus on that aligns with your prioritized learning standards.

Same content and competency focus for the week to align assessment practices with learning opportunities

Core Competencies focus embedded in the learning tasks

SD 38 K-12 Mathematics & Numeracy

Grades 3-5: Week Eight

Big Ideas: Number represents and describes quantity. We use patterns to represent identified regularities and to make generalizations.

Curricular Content: algebraic thinking – one-step addition, subtraction, multiplication and division equations with an unknown number, algebraic relationships among quantities, beginning use of variables

Curricular Competencies: use reasoning to explore and make connections, develop, demonstrate and apply mathematical understanding through play, inquiry and problem solving, develop mental math strategies, communicate mathematical thinking in many ways, represent mathematical ideas in concrete, pictorial, and symbolic forms

Core Competencies focus: Communication, Creative Thinking

Teachers and Families: The following are five problems/tasks to choose from for this week, based on the above curricular areas of focus.

Choose at least three of these math equations to solve:
 $58 + \underline{\quad} = 73$, $214 + \underline{\quad} = 522$, $\underline{\quad} + 17 = 144$, $92 - \underline{\quad} = 65$, $481 - \underline{\quad} = 297$, $748 + \underline{\quad} = 2020$
Use items to move around, drawings or mental math strategies.
How will you record and share your thinking?

Choose at least three of these math equations to solve:
 $4 \times \underline{\quad} = 20$, $8 \times \underline{\quad} = 72$, $9 \times \underline{\quad} = 108$, $15 \times \underline{\quad} = 180$, $20 \times \underline{\quad} = 500$, $25 \times \underline{\quad} = 2000$
Use items to move around, drawings or mental math strategies.
How will you record and share your thinking?

Create a math story in which the quantity (number of something) in the story grows or changes. What is the math sentence or equation that represents what happens in your math story? What symbol could you use to share the part of the equation that changes? For example, your math story could be based on the equation $488 + n = 812$. How will you share and present your math story?

Here is a Splat! problem to solve.
There are 22 blue dots altogether.
Each black splat has the same number of blue dots under it.
How many blue dots are under each splat?
Share how you solved this with a drawing or a video.

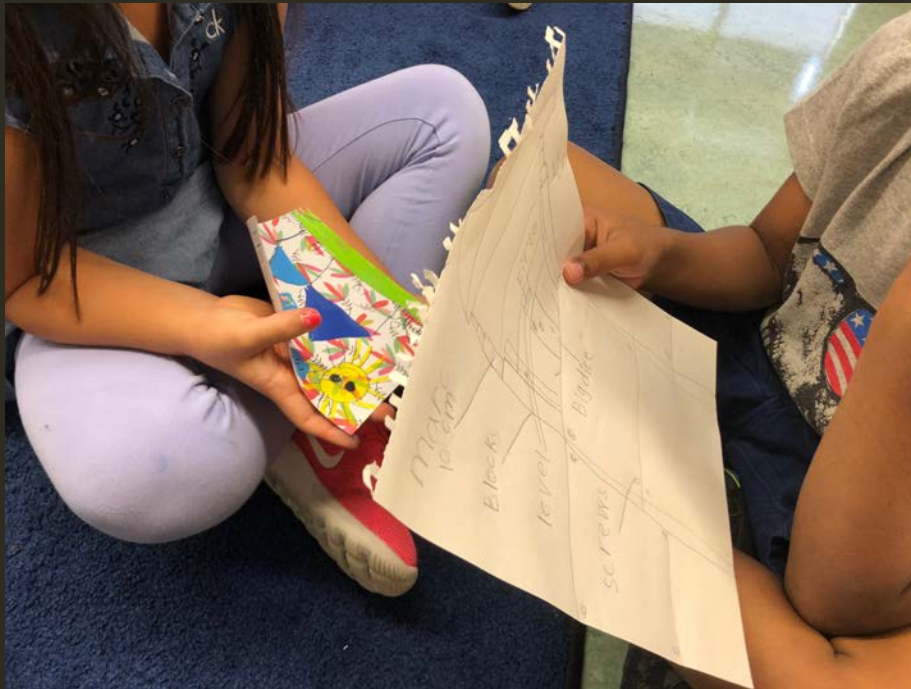


Numeracy Task:

What is the temperature outside each day? Write down the low and high temperatures for each day for three days in a row. How do the temperatures change? How could you describe these changes?

Record your findings with pictures, numbers and words.

- What did you do?
- What did you learn, practice, think about?
- What is next for your learning?




How do we foster reflection and self-assessment during this time of remote learning?

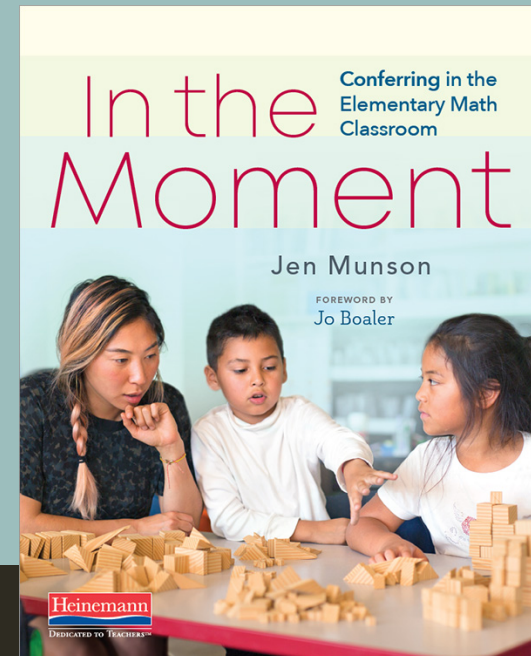
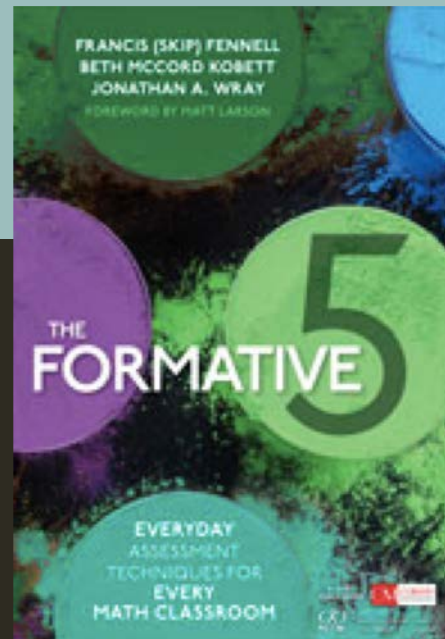
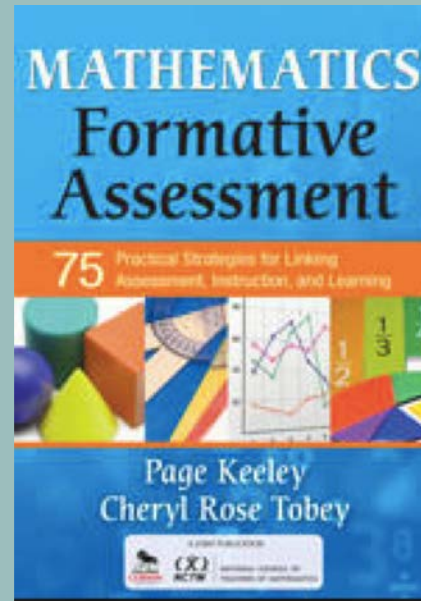
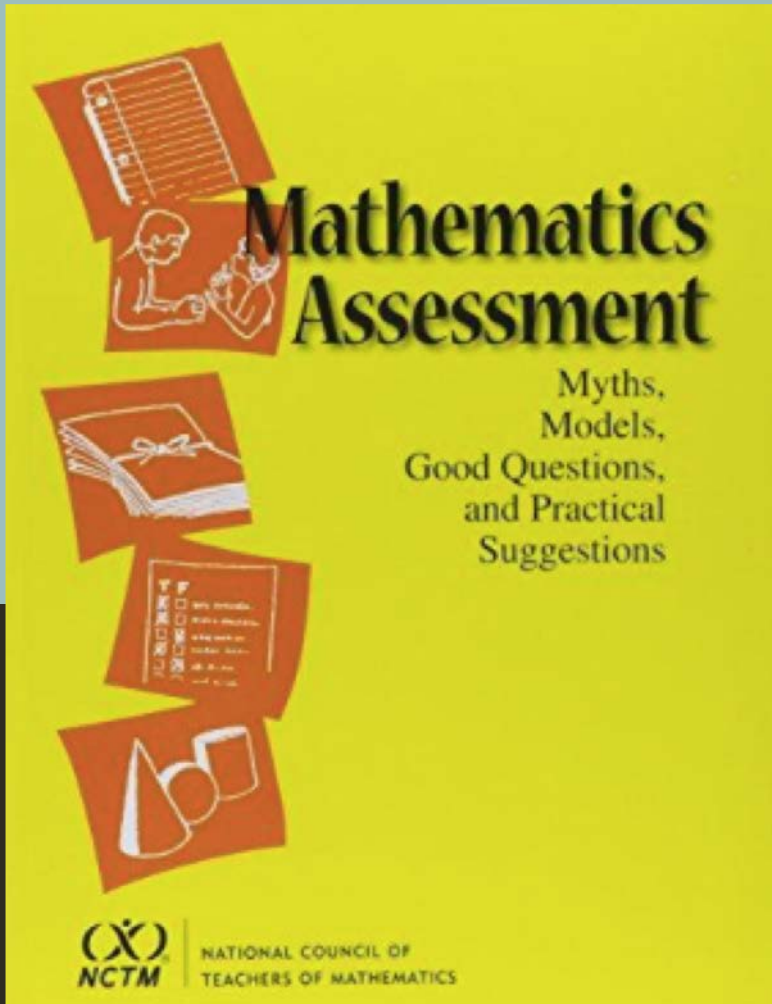
Core Competencies

Reflection and Self-Assessment

As you think about math stories involving algebraic thinking about how quantities change, we have asked you to think about how you will share and present your thinking. This is an important part of developing your competency in Communication.

 <p>Communication</p>	<p><i>How do you present and share your mathematical thinking and learning using different forms, such as pictures, numbers, words and symbols?</i></p>
<p>Share an example of how you can communicate your understanding of mathematics.</p>	
<p>What is an area of communication in your mathematics learning that you would like improve? What could you do to work towards this?</p>	

Recommended Resources



JUNE: COMMUNICATING STUDENT LEARNING

What we do know:

The June report card is summative, not a term three report card

- All content areas will be reported on
- Much of the assessment evidence will be from in-school instruction from September – March
- Only authentic assessment evidence from this period of remote learning will be included, and that may not be the same for all students

Students will need to complete some sort of Core Competency Self-Assessment

More information will be coming from the district next week

THANK YOU!

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on Twitter @jnovakowski38

on Instagram @jnovakowski

BC Numeracy Network –
bcnumeracynetwork.ca

Reggio-Inspired Mathematics blog

http://janicenovkam.typepad.com/reggioinspired_mathematic/

SD38 district blog:

<http://blogs.sd38.bc.ca/sd38mathandscience/>