Welcome to Math (September 2020)

GRADES 1 – 3

Three Main Suggestions for Starting in September:

1. ***Prioritized Learning Standards***
2. ***Finding Out What Your Students Know*** (strength based) – diagnostic and formative assessment
3. ***Ways to Support Your Students*** (Instructional Routines and Open tasks)
    a. Opportunities for Outdoor Learning
    b. Adaptations for At Home Learning
    c. Adaptations for Virtual Learning

1. Prioritize the Learning Standards

All mathematics curricular content and competencies are important and connected, but when having to prioritize learning standards, such as during Covid-19 times, idea of what is essential, foundational or core has emerged. In this time of varied learning, as begin the new school year we need to be mindful of what mathematics learning is essential for students to continue their learning at the next grade level.

The following questions can be considered in prioritizing essential learning standards:

- What is new curricular content at the grade level? Look at the grade levels before to see what curricular content is being introduced at the grade level. For examples, fractions, multiplication and division are all new concepts introduced in grade 3.

- What curricular content is necessary to review, practice and enhance knowledge of, that is essential for next year's mathematics learning? Some curricular topics need ongoing review and practice, such as number operations. Other content area knowledge can be enhanced by connecting or applying that mathematics in a project or connected to another area of math.

- What curricular competencies can be developed during this time of remote learning? Consider what curricular competencies students can authentically develop at-home, through Zoom meetings or portal posts, or on the phone.

- What curricular competencies are connected to your prioritized curricular content learning standards? Is it possible to include one curricular competency from each of the four curricular competency areas?

- What curricular competencies are connected to your core competencies area/s of focus? Many teachers have chosen one or two core competencies to focus on during this welcome back to maths learning. What curricular competencies are aligned with that focus?

GRADE 1

Prioritized Curricular Content	Essential Curricular Competencies	Indicators of Proficiency	Instructional and Assessment Practices
Number concepts to 20 **Ways to make 10** **Addition and subtraction of numbers to/within 20**	Develop mental math strategies Problem solving Explain and justify mathematical ideas and decisions Represent mathematical ideas in concrete, pictorial and symbolic forms Connect mathematical ideas to each other, other areas and personal interests	Represent, compare and order numbers to 20 Demonstrate understanding of ten number as ten and ones Count in various ways (by 1s, 2s, 5s, forwards and backwards, counting on from a number) Compose and decompose 10 in many ways using concrete, pictorial and symbolic forms (ie 5+5, 5+3+2, 6+3+1) Demonstrate understanding of the processes of addition and subtraction using materials, pictures and numbers/symbols Use more than one strategy to add and subtract (ie. counting all, counting on or back, making and bridging 10, decomposing, using doubles)	***Number Talks*** contributions during number talks and discussions ***Counting Collections*** task-based interviews including observations while solving problems, engaging in tasks and working with materials ***Math Games*** conferring – listening and observing ***Open Questions*** products involving representing mathematical ideas with concrete, pictorial and symbolic forms

GRADE 2

Prioritized Curricular Content	Essential Curricular Competencies	Indicators of Proficiency	Instructional and Assessment Practices
Place value understanding to 100 **Developing fluency with +/- facts to 20** **Addition and subtraction of two-digit numbers**	Develop mental math strategies Problem solving Explain and justify mathematical ideas and decisions Represent mathematical ideas in concrete, pictorial and symbolic forms Connect mathematical ideas to each other, other areas and personal interests	Represent, compare, order and decompose numbers to 100 Count in various ways (by 2s, 5s, 10s from different starting points, ascending and descending) Developing fluency and strategies for addition facts to 20 and related subtraction facts (making and bridging 10, decomposing, using doubles, counting on) Add and subtract numbers two-digit numbers using decomposing, compensating, finding the difference and regrouping strategies and with using tools such as ten frames, hundred charts and number lines	***Number Talks*** contributions during number talks and discussions ***Counting Collections*** task-based interviews including observations while solving problems, engaging in tasks and working with materials ***Math Games*** conferring – listening and observing ***Open Questions*** products involving representing mathematical ideas with concrete, pictorial and symbolic forms

GRADE 3

Prioritized Curricular Content	Essential Curricular Competencies	Indicators of Proficiency	Instructional and Assessment Practices
Place value understanding to 1000 **Fluency with +/- facts** **Addition and subtraction of two and threedigit numbers** **Introduction to multiplication, division and fraction concepts**	Develop mental math strategies Problem solving Explain and justify mathematical ideas and decisions Represent mathematical ideas in concrete, pictorial and symbolic forms Connect mathematical ideas to each other, other areas and personal interests	Represent, compare, order and decompose numbers to 1000 and count in various ways Recall of most addition facts to 20 Add and subtract numbers within 1000 using decomposing, compensating and regrouping strategies Demonstrate an understanding of the processes of multiplication and division and what fractions are, using concrete and pictorial forms and symbols	***Number Talks*** contributions during number talks and discussions ***Counting Collections*** task-based interviews including observations while solving problems, engaging in tasks and working with materials ***Math Games*** conferring – listening and observing ***Open Questions*** products involving representing mathematical ideas with concrete, pictorial and symbolic forms

Connections between Core and Curricular Competencies BC K-5 Mathematics:

https://blogs.sd38.bc.ca/sd38mathandscience/wp-content/uploads/sites/14/2020/06/JN_K-5_Connections_Math_Curricular_Core_Competencies_2020.pdf

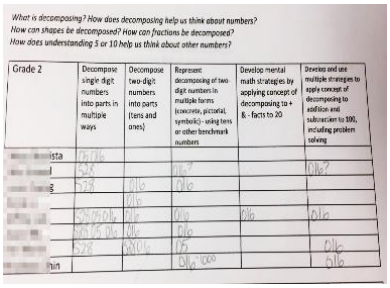
1. *Finding Out What Your Students Know* (strength based)

Using Instructional Routines

An instructional routine is a familiar structure with an open-ended task where more time is spent on the learning of mathematics. A good routine provides all students opportunities to do mathematics and gives teachers insight into student thinking. Assessment is built into the routine and allows you identify the students' strengths and level of proficiency. Instructional routines should be intentionally planned to move learning forward in response to where students are in their mathematical thinking.

Considerations:

- Decide on 'What to look for' before starting the routine and ways to record the information ~ indicating strengths (e.g. post it notes, check lists)
- Create a community atmosphere about sharing thinking and respecting one another.
- Start with an open-ended prompting question.
- Provide for student time to think, share and reflect.



What to Look for by Grade - Indicators of Proficiency

GRADE 1	GRADE 2	GRADE 3
Represent, compare and order numbers to 20 Demonstrate understanding of ten number as ten and ones Count in various ways (by 1s, 2s, 5s, forwards and backwards, counting on from a number) Compose and decompose 10 in many ways using concrete, pictorial and symbolic forms (ie 5+5, 5+3+2, 6+3+1) Demonstrate understanding of the processes of addition and subtraction using materials, pictures and numbers/symbols Use more than one strategy to add and subtract (ie. counting all, counting on or back, making and bridging 10, decomposing, using doubles)	Represent, compare, order and decompose numbers to 100 Count in various ways (by 2s, 5s, 10s from different starting points, ascending and descending) Developing fluency and strategies for addition facts to 20 and related subtraction facts (making and bridging 10, decomposing, using doubles, counting on) Add and subtract numbers two-digit numbers using decomposing, compensating, finding the difference and regrouping strategies and with using tools such as ten frames, hundred charts and number lines	Represent, compare, order and decompose numbers to 1000 and count in various ways Recall of most addition facts to 20 Add and subtract numbers within 1000 using decomposing, compensating and regrouping strategies Demonstrate an understanding of the processes of multiplication and division and what fractions are, using concrete and pictorial forms and symbols

What to Look For… Considering the Proficiency Indicators

What level of proficiency are the students demonstrating?

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.

Number Talk Images Instructional Routine

- Display an image and ask students to determine quantity of objects or pictures.
- Students discuss different ways to decompose and compose a quantity displayed.
- Students share their reasoning, visualization, communicate and explain their thinking.

Guiding Questions

- What do you notice?
- What do you wonder?
- How many _____?
- How do you know?
- How do you see them?
- Can you see them another way?

What to Look for…

What level of proficiency does the student demonstrate:

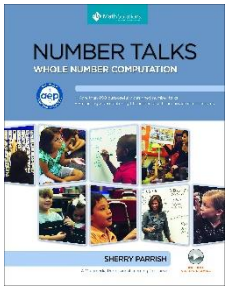
- Flexibility in thinking
- Reasoning to make sense of the math
- Sharing of strategies used to solve a problem
- Decomposition and composition of numbers
- Clear explanations of the relationship of numbers
- Ways to use multiple strategies
- Learning from others' ideas and adding on to ideas
- confidence and perseverance

Resources:

Number Talk Images website curated by Pierre Tranchemange collections of dot images, photos and strings/sets as well as instructional ideas http://ntimages.weebly.com

Steve Wyborney dot images https://stevewyborney.com/?s=dot+image

Number Talks Sherry Parrish



Counting Collections Instructional Routine

Counting Collections is an instructional routine during which a pair of students choose a collection of objects to count, choose different ways to count their collection and record and share their count.

Depending on the age and experience of the students, collections range from 10 objects to collections in the hundreds. Tools to support counting can be provided, such as ten frames, cups, bowls and small plates.

After counting their collection in multiple ways, students can record their count on a large whiteboard (math graffiti board) , mini whiteboards, on a blank piece of paper or on a structured recording sheet.

Guiding Questions

- How did you estimate how many?
- How did you count in the collection?
- How many do you have altogether?
- How might you count the collection another way?
- How will you record the count?
- How many more to make…20, 100, 300?

What to Look For

Depending on the student, the size of the appropriate collection, and curriculum focus, many concepts and competencies can be uncovered.

What level of proficiency does the student demonstrate:

- flexible counting strategies
- one-to-one correspondence
- cardinality
- stable order
- conservation
- subitizing
- connecting a count to a numeral
- skip counting
- estimating
- place value
- multiplicative thinking
- division related to multiplication

Resources:

tedd.org: visit Content Areas, Mathematics and click on Counting Collections to find planning resources, tips and videos.

Richmond School District counting collections blog posts:
https://blogs.sd38.bc.ca/sd38mathandscience/2016/10/18/introducing-counting-collectionsin-kindergarten/

https://blogs.sd38.bc.ca/sd38mathandscience/2015/11/03/counting-collections/

https://blogs.sd38.bc.ca/sd38mathandscience/2017/01/03/extending-counting-collections/

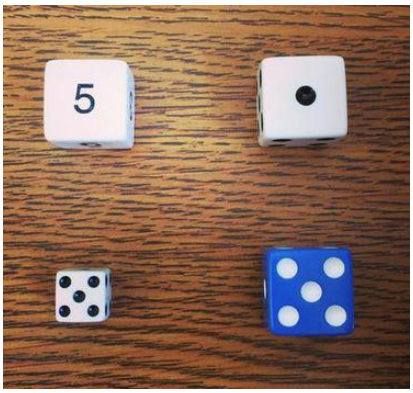
Choral Counting and Counting Collections: Transforming the preK-5 Classroom by Megan L. Franke, Elham Kazemi, & Angela Chan Turrou

‘Which One Doesn’t Belong?’ Instructional Routine

Which One Doesn’t Belong? (WODB) is an instructional routine in which four related items are presented in a quadrant format. The items are connected, they belong together in some way. For example, they may all be candies or they may all be two-digit numbers.

Students are asked to consider what is unique about each item, compared to the other items. The challenge is to choose one item that doesn’t belong. The great thing about this routine is that there are no wrong answers, as long as the student’s reasoning makes sense. The focus is not on the answer, but on the students being able to communicate their reasoning behind their choice.

Guiding Questions:
What do you notice?
What makes all the items alike?
What makes them different?
Which one doesn’t belong?
Can you share your reasoning to justify your answer?



What to look for…

Students may demonstrate:

- attention to attributes (similarities and differences)
- ability to sort and classify
- connections to number relationships
- engagement problem solving
- use of mathematical language/vocabulary
- explain and justify ideas and decisions

Resources:

http://wodb.ca/index.htmlThis website is curated by Mary Bourassa and is a collection of WODBs submitted by math educators from across the globe.

Twitter Hashtag: #wodb https://twitter.com/search?q=%23wodb&src=typd

Richmond School District WODB blog posts: https://blogs.sd38.bc.ca/sd38mathandscience/2016/10/30/introducing-wodb-in-kindergarten/

https://blogs.sd38.bc.ca/sd38mathandscience/2016/10/16/introducing-wodbs-to-grades-45-atwestwind/

Which One Doesn’t Belong?: A Shapes Book by Christopher Danielson (picture book and teacher’s guide)

Open Questions based on Prioritized Learning Standards:

Open questions that allow you to see into the students' thinking and understanding and prepare for next steps for instruction to move the learning forward.

Sample questions are from the resource: **'Open Questions For Rich Math Lessons Number Strand K- 3** by Marian Small, Rubicon Publishing 2016'. This is an amazing resource full of Open Questions that are ready to use in your classrooms.

GRADE 1

- You skip count by a number starting at 0, and you eventually say 14. What might you have been counting by? What were you not counting by? How do you know? (e.g. I am counting by 2s but not by 5s or 10s because you don't say 14)
- Choose a number less than 20. Tell as many things as you can about it. (e.g. I chose 15. That is the number of toes on 3 feet)
- Represent the number 18 in different ways to show these things:
    - 18 is greater than 15
    - 18 is almost 20
    - 18 is made up of 1 ten and 8 ones
- Choose a number between 8 and 20. Break it in three or more ways. Tell something that each representation helps you see about the number. (e.g. I chose 11. I can fill up one ten frame and have one left over.)
- Choose 2 numbers that you think are alike and different is some ways? Represent the numbers three ways and show how the numbers are the same and different.
- Choose number to complete each story.
    - _____frogs jumped into the pond. Then ___ more jumped in. There were ___ frogs in the pond.
    - I needed ___ spoons. First, I put out __ spoons. I needed ___ more spoons.
- How would you subtract 9 – 4 in your head? What other numbers could you subtract in a similar way? (e.g. I would subtract 4 from 10, and then subtract one more)

GRADE 2

- Choose 2,5, or 20. Use a number line to skip count forward to 50 or backwards from 50 by the number you chose. What patterns do you notice?
- How many handfuls do you think you would need to hold 100 buttons? Explain your thinking (e.g. If the buttons were large, I could probably get 10 in my had, so I would need about 10 handfuls.)
- Choose a number less than 100. Break it up as many ways as you can. Describe what way helps you to see about that number. (e.g. I chose 24. 20 + 4 shows that 24 is not much more than 20)
- A certain number can be modelled with 3 more ones than tens. What might the number be? Think of lots of possibilities. (e.g. 3, 14, 25)
- You write a two-digit number and switch the digits around to make a new number that is 18 more or less than the original number you wrote. What could the first number you wrote be? Is there more than one possibility? (e.g. 13 and 31…there is a difference of 18).
- Choose 2 two-digit numbers. Add them. Change the order of the numbers and add again. What do you notice about the sums? (e.g. 25 and 35. When I add these numbers I get 60. When I add 35 and 25, I get the same sum.)
- How can you add 7 + 9 in your head? What are some other ways? (e.g. add 9 + 9 to get 18 and then subtract 2.)
- How would you calculate 11 – 4 in your head? What other numbers would you subtract the same way.

GRADE 3

- You start at 100 and skip count forward by 25s. What is a number you are sure you will not say? How do you know? (e.g. I will not say 248 because I count 200, 225, 250. I will not say 248)
- There are 8 hamburger buns ins a package. How would you estimate the number of packages needed to feed 220 people? (e.g. 8 is close to 10, so I would count by 10s to 220. That's 20 packages, but there are only 8 in a package and some people might have more than one. I estimate 30 packages of buns.)
- Represent the number 300 in three or more ways. Describe what each way shows about the number. (e.g. 100 +100 + 100 shows that 300 is a triple).
- You write a three-digit number. You switch some of the digits around, and the value of your number increase by 54. What might your numbers be? What other numbers will work? (e.g. 384 and 428)
- Do you think it's easier to add 40 +46 in your head or 36 + 62? Why?
- Choose a three-digit number that is less than 400 and has the digit 8 in the ones place. What do you have to add to that number to get these sums 481, 511, and 621? (e.g. I chose 228. To get to 481, I have to add 253.)
- Draw a picture that explains why 4 X 4 is double 4 X 2. Explain your answer.
- There are lots of tricycles in the park. If you counted the wheels on all the tricycles, how many might there be? How many wheels could there not be? Think of 3 or more possibilities. (e.g. There might be 12 wheels (4 X3), but not 8 wheels.)
- Choose a multiplication fact that you are not sure of. How could you figure out the answers by using facts you are sure of? (e.g. 4 X 6. I thought I could double 4 X 3 = 12 and then add 12 + 12 = 24)
- Draw a picture to show that 12 ÷ 3 is double 6 ÷ 3. (e.g. In the picture it is easy to see that I am finding out how many 3s in 12. I can find out how many 3s are in 6 by using the left side of my drawing.)
- Trace a pattern block and divide it into equal parts. What fraction is each part? Repeat with other pattern blocks.
- What ways can you divide a square into equal parts?
- One fraction is a lot more than another fraction. What might the two fractions be? (e.g. 9/10 is a lot more than 1/10).