

Welcome to Math (September 2020)

GRADES 4 - 7

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. **Prioritizing 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 return to classroom/hybrid learning. What curricular competencies are aligned with that focus?
- With the math processes in mind, which will be the focus of learning? How might the prioritized content support the development of students' mathematical processes development. What strengths will be built upon? What areas of development are needed or next?

Curricular competencies:

- ❖ Reasoning and analyzing
- ❖ Understanding and solving
- ❖ Communicating and representing
- ❖ Connecting and reflecting

2. 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 the 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 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 concepts of decomposing to $+$ & $-$ facts to 20	Develop and use multiple strategies to solve problems involving addition and subtraction to 100, including problem solving
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What to Look for by Grade - Indicators of Proficiency

GRADE 4	GRADE 5
Represent, compare, order and decompose numbers to 10 000 and count in various ways (by various multiples, starting points, increasing/decreasing)	Represent, compare, order and decompose numbers to 1 000 000 and count in various ways (by various multiples, starting points, increasing/decreasing)
Recall of addition facts and related subtraction facts to 20	Recall of addition facts and related subtraction facts to 20
Recall of 2x, 5x and 10x multiplication facts to 100 with developing fluency of other multiples	Recall of many multiplication facts to 100 such as 2s, 3s, 4s, 5s and 10s
Add and subtract numbers within 10000 using decomposing, compensating and regrouping strategies	Add and subtract numbers within 1 000 000 using decomposing, compensating and regrouping strategies
Compare and order fractions with common denominators, using benchmarks of 0, $\frac{1}{2}$ and 1 on a number line	Multiply and divide numbers with three digits, using more than one strategy - decomposing, distributive property, commutative property, repeated addition or subtraction (including division with remainders)
Represent decimal tenths and hundredths with concrete materials, pictures and symbols; show equivalence between fraction and decimal notation; add and subtract decimals numbers (tenths and hundredths)	Represent equivalent fractions ($\frac{1}{2} = \frac{3}{6} = \frac{5}{10}$) using concrete materials, pictures and symbols Add and subtract decimals numbers to the thousandths using related strategies used for whole numbers

GRADE 6	GRADE 7
<p>Represent, compare, order and decompose numbers from thousandths to billions and count in various ways (by various multiples, starting points, increasing/decreasing)</p> <p>Recall of most multiplication facts and related division facts</p> <p>Identify common factors and multiples</p> <p>Multiply and divide decimal numbers using related strategies used for whole numbers</p> <p>Solve equations including multiple operations and brackets/parentheses, applying order of operations</p> <p>Use materials, pictures and symbols to compare and order fractions, including improper fractions and mixed numbers, using benchmarks such as 0, $\frac{1}{2}$ and 1 along a number line</p> <p>Represent ratios and percents in different forms and relate to fractions and decimal numbers</p> <p>Describe visual patterns with words, numbers, expressions, tables, and graphs</p> <p>Solve one-step equations with whole number co-efficients such as $3x=12$ or $x+5=11$</p>	<p>Apply place value understanding and fluency with all number operations to problem-solving contexts, numeracy tasks and interdisciplinary projects</p> <p>Recall of multiplication facts and related division facts and application of this facts when multiplying and dividing greater numbers</p> <p>Fluency with all operations using decimal numbers, including order of operations</p> <p>Represent positive and negative integers using concrete, pictorial and symbolic forms; add, subtract, multiply and divide with integers and represent these processes</p> <p>Demonstrate understanding of relationship between fractions, decimals, ratios and percents through equivalency; represent in different forms (concrete, pictorial, symbolic)</p> <p>Solve two-step equations with whole number co-efficients and constants such as $3x + 4 = 19$</p> <p>Graph coordinate pairs from an expression on a Cartesian grid and predict and explain the resulting graph</p> <p>Identify and calculate properties of circle (radius, diameter, area and perimeter)</p>

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.

“How much time are we noticing what our students are wondering?”

Guiding Questions

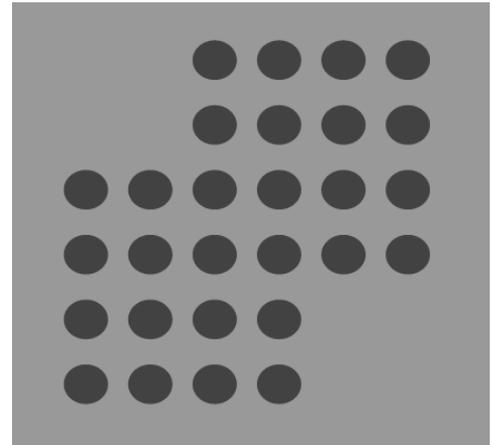
- What do you notice?
- What do you wonder?
- How many _____?
- How do you see them?
- How do you know?
- How do you see them *now*?
- Can you see them another way?



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 composing 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>

Steve Wyborney massive spaces to notice: <https://stevewyborney.com/2016/03/provide-massive-space-to-notice/>

Choral Counting Instructional Routine

Choral Counting is an instructional routine during which all students count together, looking for patterns. A big part of this routine is the *oral lexical* entry point for all: “What does the pattern sound like?”

Students count in unison and you write down the numbers as they chant, and then pause students to ask them questions about the numbers.

Chart sequences of numbers (not starting from 1) that follow the pattern you will be skip counting including fractions and decimals. Draw with colour to represent the patterns the students notice.

Guiding Questions

- What number to start?
- What interval will we use?
- What patterns do you notice?
- What do you notice? Wonder? What would end up in this column?

What to Look For

What level of proficiency does the student demonstrate:

- discovering patterns (in counting)
- sequencing
- counting by or in groups (multiplication)
- sorting by groups or attribute (division)
- skip counting forward and backward (fluently add and subtract, multiply and divide multi-digit whole numbers, in the 10,000 to 100,000)
- counting forwards and backwards using fractions, understanding equivalent fractions using 2, 3, 4, 5, 6, 8, 10, 12, and 100 as denominators
- understanding decimal notation as fractions and compare 2 decimals to hundredths
- noticing, discussing, describing and recording observations of patterns
- cooperative learning (when choral counting whole class or in partners/groups)

Resources:

theresawills.com ~ Choral Counting interactive template: https://docs.google.com/presentation/d/1Qn-e4Tmua3VRPFiGPC_wNK2uFuEYellAym9cEv0uFr8/edit#slide=id.g74bc03ba98_0_359

tedd.org: visit Content Areas, Mathematics and click on Choral Counting to find planning resources, tips and videos. (examples of 3rd grade and 5th grade in Fall).

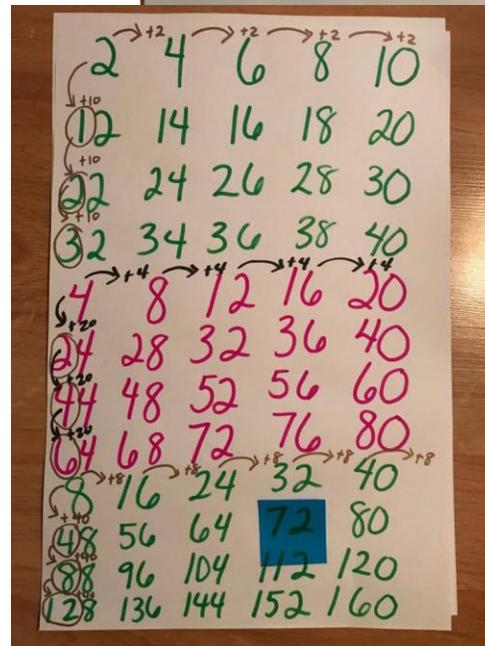
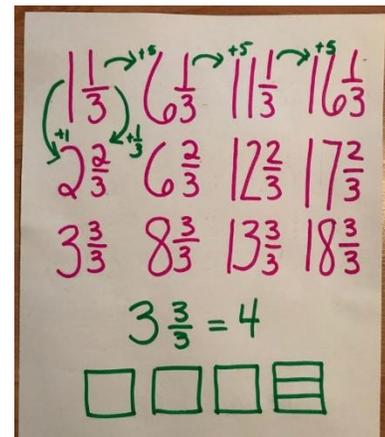
Kristen Gray videos series *Math Routines*: <https://learn.teachingchannel.com/>

Number Sense Routines: Building Mathematical Understanding Every Day in Grades 3-5 Jessica F. Schumway

Chapter 4: Counting routines understanding the number system and number relationships.

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

Stenhouse publishing has a **free choral counting tool**. Create an account & sign in. Click NEXT, print and annotate observations. Integers, decimals, fraction and mixed numbers.



'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 quadrant format. The items are connected, they belong together in some way. For example, they may all be rocks or they may all be fractions. 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 not 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 for their choice.



"Ask about ideas, not answers." Annie Fetter and Joe Schwartz

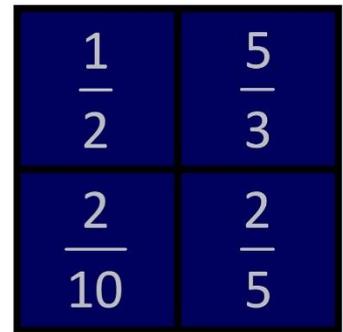
Guiding Questions

- 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...

What level of proficiency does the student 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
- reasoning and communication



Resources:

<http://wodb.ca/index.html> : This 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>

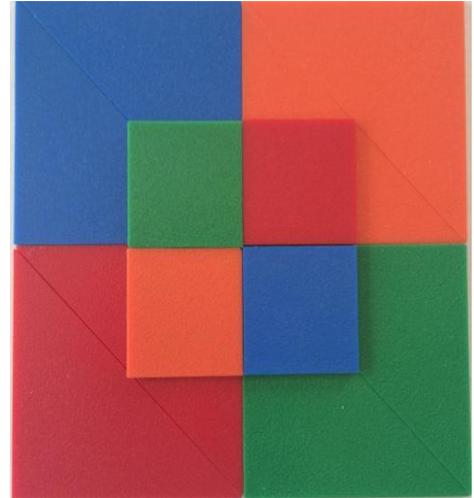
Kristen Gray videos series *Math Routines*: <https://learn.teachingchannel.com/>

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/>

Fraction Talks Instructional Routine

A fraction talk is similar to a number talk routine but focuses on fractions. An image is displayed that represents a fractional relationship. Students think about and describe the fraction that they see and justify their reasoning. The discussion may be extended to identify other possible fractions in the image, comparing fractions, finding equivalent fractions, adding, subtracting, multiplying or dividing fractions, and creating new representations of the fraction.



Guiding Questions:

- What fraction do you see?
- How do you see the fraction?
- Are there other sections that are the same size as ___?
- What other fractions do you notice?
- If the total area of the shape is ____, what is the area of the shaded section?
- Can you find two sections that, when combined, equal ___?
- How might you change the section to create exactly ___?

What to Look for...

What level of proficiency does the student demonstrate:

- ability to compare and order fractions
- representing equivalent fractions using concrete (or virtual) materials, pictures and symbols
- uses materials, pictures and symbols to represent mixed numbers and fractions greater than one
- uses benchmarks such as 0, 1, $\frac{1}{2}$ along a number line
- demonstrates understanding of relationship between decimal numbers and fractions

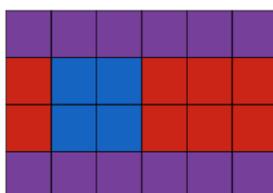
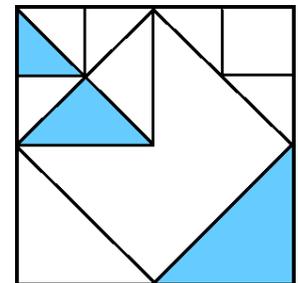
Resources:

Dan Finkel : mathforlove.com

Twitter hashtag: [#fraction talks](https://twitter.com/fractiontalks)

Nat Banting: fractiontalks.com

Math Learning Center: <https://apps.mathlearningcenter.org/fractions/>



3. Ways to Support Your Students (Instructional Routines and Open tasks)

Open Questions based on Prioritized Learning Standards:

Open question suggestions for discovering what students know and preparing next steps for instruction:

(Source Marian Small: <http://www.onetwoinfinity.ca/>)

1. Place Value
How is the number 1005 like 205? How is it different?
Is a million always a big amount? Explain.
Do you think you've lived a million minutes? A billion minutes?
You read a whole number and said exactly five words. What could that number be?
2. Fluency with $+$ / $-$ and \times / \div
How does knowing 3×7 help you figure out 9×7 ?
Why do $24 \div 6$ and $12 \div 3$ HAVE to have the same answer?
3. Addition and subtraction
Which One Doesn't Belong? $6 + 4$, $7 + 1$, $5 + 5$, $15 - 5$
The answer to a subtraction question is -2 . What might be the question?
The sum of two numbers is almost triple the difference. What could the numbers be?
You add a two-digit even number to a two digit odd number. What could the answer be?
4. Comparing and ordering fractions
One fraction is just slightly more than another. They have different denominators. What might they be?
A fraction could be a little more than $\frac{1}{2}$. What could it be?
5. Multiplication/division
How do you know that $113 \div 6$ cannot be a whole number?
Write 3000 as the product of three numbers.
Now write it as the product of four numbers.
You divide two numbers and the answer is almost 8. What numbers might you have divided?
Make up a story where you would multiply 22×25 .
Make up a story where you would divide 150 by 3.
Make up a story where you would multiply 135×4 .
6. Equivalent Fractions
Some fractions are quick to compare and others take work. Which might be easy for you to compare?
Maybe $\frac{2}{5}$ and $\frac{4}{5}$
Maybe $\frac{2}{5}$ and $\frac{2}{3}$
Maybe $\frac{1}{10}$ and $\frac{5}{6}$
Determine if two fractions are equivalent, using concrete materials or pictorial representations
7. Decimals to thousandths
How is reading decimals like reading whole numbers? How is it different?
Draw a picture to show why $0.12 < 0.4$.
8. Operations with decimal numbers
What whole numbers could you subtract to help you figure out $4.5 - 2.14$?
What would you have to add to 3.8 to get to 5.13? How could you write that as an equation?
9. Describe visual patterns with words, numbers, expressions, tables, and graphs
What is the equation? <http://www.visualpatterns.org/>

Robert Kaplinsky's **Open Middle** Activities ppt adaptations to support in class and virtual learning available on BCNumeracynetwork.ca

Connections between Core and Curricular Competencies:

K-5

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

Grade 6-9

https://blogs.sd38.bc.ca/sd38mathandscience/wp-content/uploads/sites/14/2020/06/JN_6-9_Connections_Math_Curricular_Core_Competencies_2020.pdf

Grade 4

Essential Curricular Content	Essential Curricular Competencies	Indicators of Proficiency	Instructional and Assessment Practices
<p>Place value understanding to 10 000</p> <p>Fluency with +/- and \times/\div facts</p> <p>Addition and subtraction to within 10 000</p> <p>Comparing and ordering fractions</p> <p>Introduction to decimals – tenths and hundredths</p>	<p>Develop mental math strategies</p> <p>Problem-solving</p> <p>Explain and justify mathematical ideas and decisions</p> <p>Represent mathematical ideas in concrete, pictorial and symbolic forms</p> <p>Connect mathematical ideas to each other, other areas and personal interests</p>	<p>Represent, compare, order and decompose numbers to 10 000 and count in various ways (by various multiples, starting points, increasing/decreasing)</p> <p>Recall of addition facts and related subtraction facts to 20</p> <p>Recall of 2x, 5x and 10x multiplication facts to 100 with developing fluency of other multiples</p> <p>Add and subtract numbers within 10000 using decomposing, compensating and regrouping strategies</p> <p>Compare and order fractions with common denominators, using benchmarks of 0, $\frac{1}{2}$ and 1 on a numberline</p> <p>Represent decimal tenths and hundredths with concrete materials, pictures and symbols; show equivalence between fraction and decimal notation; add and subtract decimals numbers (tenths and hundredths)</p>	<p>Number Talks <i>contributions during number talks and discussions</i></p> <p>Ways to Represent Fractions & Decimals <i>task-based interviews including observations engaging in tasks and working with materials</i></p> <p>Math Games <i>conferring – listening and observing</i></p> <p>Open Questions <i>products involving solving problems and representing mathematical ideas with concrete, pictorial and symbolic forms</i></p>

Grade 5

Essential Curricular Content	Essential Curricular Competencies	Indicators of Proficiency	Instructional and Assessment Practices
Place value understanding to 1 000 000	Develop mental math strategies	Represent, compare, order and decompose numbers to 1 000 000 and count in various ways (by various multiples, starting points, increasing/decreasing)	Number Talks (whole numbers and decimal numbers) <i>contributions during number talks and discussions</i>
Fluency with +/- and \times/\div facts	Problem-solving	Recall of addition facts and related subtraction facts to 20	Ways to Represent Equivalent Fractions <i>task-based interviews including observations engaging in tasks and working with materials</i>
Addition and subtraction within 1 000 000	Explain and justify mathematical ideas and decisions	Recall of many multiplication facts to 100 such as 2s, 3s, 4s, 5s and 10s	
Multiplication and division with three digits	Represent mathematical ideas in concrete, pictorial and symbolic forms	Add and subtract numbers within 1 000 000 using decomposing, compensating and regrouping strategies	Math Games <i>conferring – listening and observing</i>
Equivalent fractions	Connect mathematical ideas to each other, other areas and personal interests	Multiply and divide numbers with three digits, using more than one strategy - decomposing, distributive property, commutative property, repeated addition or subtraction (including division with remainders)	Open Questions <i>products involving solving problems and representing mathematical ideas with concrete, pictorial and symbolic forms</i>
Decimals – to thousandths		Represent equivalent fractions ($\frac{1}{2}=\frac{3}{6}=\frac{5}{10}$) using concrete materials, pictures and symbols	
		Add and subtract decimals numbers to the thousandths using related strategies used for whole numbers	

Grade 6

Essential Curricular Content	Essential Curricular Competencies	Indicators of Proficiency	Instructional and Assessment Practices
Place value understanding from thousandths to billions	Develop mental math strategies	Represent, compare, order and decompose numbers from thousandths to billions and count in various ways (by various multiples, starting points, increasing/decreasing)	Number Talks (whole numbers and decimal numbers) <i>contributions during number talks and discussions</i>
Fluency with \times and \div facts	Problem-solving	Recall of most multiplication facts and related division facts	
Factors and multiples	Explain and justify mathematical ideas and decisions	Identify common factors and multiples	Visual Patterns <i>observations engaging in tasks and working with symbols, pictures and materials</i>
Multiplication and division of decimal numbers	Represent mathematical ideas in concrete, pictorial and symbolic forms	Multiply and divide decimal numbers using related strategies used for whole numbers	
Order of operations		Solve equations including multiple operations and brackets/parentheses, applying order of operations	Math Games <i>conferring – listening and observing</i>
Improper fractions and mixed numbers	Connect mathematical ideas to each other, other areas and personal interests	Use materials, pictures and symbols to compare and order fractions, including improper fractions and mixed numbers, using benchmarks such as 0, $\frac{1}{2}$ and 1 along a numberline	Open Questions <i>products involving solving problems and representing mathematical ideas with concrete, pictorial and symbolic forms</i>
Introduction to ratios and percents		Represent ratios and percents in different forms and relate to fractions and decimal numbers	
Patterns – algebraic relationships		Describe visual patterns with words, numbers, expressions, tables, and graphs	
One-step equations		Solve one-step equations with whole number co-efficients such as $3x=12$ or $x+5=11$	

created by Janice Novakowski for the Richmond School District.
May 2020

Grade 7

Essential Curricular Content	Essential Curricular Competencies	Indicators of Proficiency	Instructional and Assessment Practices
Place value understanding and number operations with whole numbers	Develop mental math strategies	Apply place value understanding and fluency with all number operations to problem-solving contexts, numeracy tasks and interdisciplinary projects	Number Talks (whole numbers and decimal numbers)
Fluency with \times and \div facts	Problem-solving	Recall of multiplication facts and related division facts and application of this facts when multiplying and dividing greater numbers	<i>contributions during number talks and discussions</i>
Operations with decimal numbers	Explain and justify mathematical ideas and decisions	Fluency with all operations using decimal numbers, including order of operations	Math Tasks observations <i>engaging in tasks and representing with symbols, pictures and materials</i>
Integers	Represent mathematical ideas in concrete, pictorial and symbolic forms	Represent positive and negative integers using concrete, pictorial and symbolic forms; add, subtract, multiply and divide with integers and represent these processes	Math Games <i>conferring – listening and observing</i>
Relationship between fractions, decimals, ratios and percents	Connect mathematical ideas to each other, other areas and personal interests	Demonstrate understanding of relationship between fractions, decimals, ratios and percents through equivalency; represent in different forms (concrete, pictorial, symbolic)	Open Questions <i>products involving solving problems and representing mathematical ideas with concrete, pictorial and symbolic forms</i>
Two-step equations		Solve two-step equations with whole number co-efficients and constants such as $3x + 4 = 19$	
Cartesian coordinates and graphing		Graph coordinate pairs from an expression on a Cartesian grid and predict and explain the resulting graph	
Circle properties and measurement		Identify and calculate properties of circle (radius, diameter, area and perimeter)	