



RICH ROUTINES

SUPPORTING NUMERACY IN THE EARLY YEARS

Our classrooms are full of routines, which students quickly learn to help them navigate their learning. The creation and implementation of routines brings a sense of predictability and comfort to our classrooms. Routines help with organization and classroom management, and they help make transitions smooth. It is essential to establish a community of learners who take ownership of their own learning. These routines can be used in whole group, small group and ‘extra dose’ groupings.

Rich Numeracy Routines will provide opportunities:

- to include regular practice of foundational Numeracy concepts
- to build a community of learners
- for teachers to focus on ‘noticing and listening’ and be responsive to the learners
- to provide a focus on the curricular competencies

Curricular Competencies

Students are expected to do the following:

Reasoning and analyzing

- Use reasoning to explore and make connections
- Estimate reasonably
- Develop mental math strategies and abilities to make sense of quantities
- Use technology to explore mathematics
- Model mathematics in contextualized experiences

Understanding and solving

- Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving
- Visualize to explore mathematical concepts
- Develop and use multiple strategies to engage in problem solving
- Engage in problem-solving experiences that are connected to place, story, cultural practices, and perspectives relevant to local FP communities, the local community, and other cultures

Communicating and representing

- Communicate mathematical thinking in many ways
- Use mathematical vocabulary and language to contribute to mathematical discussions
- Explain and justify mathematical ideas and decisions
- Represent mathematical ideas in concrete, pictorial, and symbolic forms

Connecting and reflecting

- Reflect on mathematical thinking
- Connect mathematical concepts to each other and to other areas and personal interests
- Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts

These Rich Routines serve as ‘warm ups’- quick 5, 10 or maybe 15 minute experiences to develop foundational numeracy skills. Children need these kinds of daily experiences and everyday interactions to develop a firm foundation.

NOTE: They don’t have to be related to the numeracy focus for that day, but they do need to be repeated over and over again.

Although, we often think of routines as being used for organization, routines can also be used to enhance instruction. The following routines are structured activities that, when used consistently, can help students gain proficiency with a range of concepts and strategies. In this resource, we will present five easily implemented routines:

1. What Do You See? (Quick Images)
2. It Counts (Counting)
3. Let's Talk About It
4. Pattern Seekers
5. Use the Line (Number lines)

Each of these routines may be used effectively with any of the foundational Numeracy concepts:

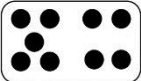
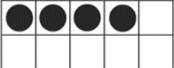
- Subitizing
- Counting
- Decomposing numbers
- Patterning
- Estimating

Remember: For instructional purpose, these components comprise overlapping areas of skill development, and are intended to be taught simultaneously.

All students are individual learners, who learn in different ways and move along the developmental continuum at different times.

These routines can be easily and quickly implemented, but will require taking time to explicitly teach the procedures and build a community of learners with the students. Every student needs to feel they have access to the routines and can contribute ideas without hesitation. Multiple exposure to the essential numeracy skills will lead all students to become successful mathematicians.

The intent of the routines are to focus on a concept through a predictable practice for 5 – 15 minutes. This resource will provide some ideas and suggestions to infuse routines into your daily schedules.

<h2 style="text-align: center;">Rich Routines</h2>	<p style="text-align: center;">Activities</p> <p>Note: These activities can be adapted to support all of the essential numeracy components:</p> <ul style="list-style-type: none"> • Subitizing • Counting • Decomposing Numbers • Patterning • Estimating
<p>What Do You See? (Subitizing)</p> <p>Focuses on using 'quick images' to develop perceptual (recognize a small amount without counting) and conceptual (recognizing small amounts and combine them to see them as a unit) subitizing.</p> <p>Probing Questions: How many do you see? How do you see them?</p>	<ul style="list-style-type: none"> • Dazzling Dot Cards – using cards with dots arranged in various groupings. Flash the card for 3 -5 seconds to visualize the amount. See 'What to do with Dot Cards' handout. http://bit.ly/2uUCsol   <ul style="list-style-type: none"> • Terrific Ten Frames – using ten frames for 'quick image flash' cards. The difference in using the 5 or 10 frames structures are highlighted by the configuration of the frame. See 'What to do with Ten Frames' handout. http://bit.ly/2fdv0yr Links to a page with 3 blank ten frames - add your own circle stickers. Video example here http://bit.ly/1rMwIWj

Did you need to count?
 So what did you do?
 Why are you able to know the amount so quickly?

Ten Wands – using a combination of 5 of one colour and five of a different colour of unifix cubes to make a wand. The teacher (or student) breaks the wand into two parts and asks probing questions. See video example <http://bit.ly/2hbCWNs>



• **Ways to Make...** - focus on decomposing and recomposing numbers. Ask students to identify ways to make (10).



• **Photo Search** – present a photograph and ask probing questions. Ideas for images can be found at the following link: <http://ntimages.weebly.com/photos.html>

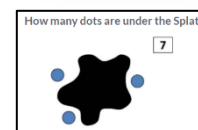


• **Missing Parts** – focus is on visualizing the missing part to make the whole. Using ‘part-part whole’ cards (see handout) show the students a part of the whole and then ask them to determine the other part. Part-whole cards to 9 <http://bit.ly/2wnkGLi> Part-whole cards 10 - 20 <http://bit.ly/2xr9AnO>

• **Awesome Arrays** –using arrays (photographs or real objects). Display the array and ask without counting: *How many are there? Can you see it a different way? What number story (equation) would match the way you see it?* You could show an array with missing parts and ask: *How many would be there if you could see them all?*



• **SPLATS** – show the students a collection of dots. Cover some of the dots with a ‘Splat’. Ask: How many dots are covered by the ‘Splat’? How do you know? What can we learn from this picture? Check out Steve Wyborney’s blog for great ideas.



<http://www.stevewyborney.com/?p=893>

It Counts (Counting)

Counting is putting a name to a quantity, understanding the way our number system is organized and using patterns. Counting sequences help students to understand relationships among numbers and further develop their abilities to apply these understandings to problem solving situations.

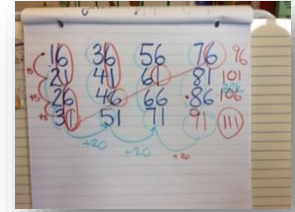
• **Count Around the Circle** – choose a counting sequence (e.g. count by ones starting at 5) and go around the circle as each person says the number. To facilitate understanding of the patterns, write the numbers on the board as students say them.

- Variations may include:
 - counting by 1s, 5s, 2s, or 10s, starting at 0
 - starting at various numbers
 - counting backwards

<http://bit.ly/2y5C1s3><http://bit.ly/2y5C1s3>

• **Stop and Start Counting** - the class counts a numbers sequence altogether, with a starting number and a stopping number (e.g. ask class count starting with 1 and stopping at 10). Ask questions to facilitate discussions about counting patterns (e.g. *If we start at 21 and count by 2s, would we be able to stop at the number 32?*)

- **Backwards Count** – counting backwards by 1s, 2s, 5s, or 10s. Have the students start from a number and count backwards. Teachers could record the numbers as the students say them to help facilitate questions about counting patterns.
- **Choral Counting** – in this routine, the class counts aloud a number sequence altogether and the teacher records the numbers. This is a good routine to use if the majority of students are struggling with the counting sequence. To facilitate higher level thinking and spark discussion about the counting sequence, ask: *What do you notice about the pattern? What patterns do you see?*
<https://tedd.org/activities/choral-counting/>



Let's Talk About It (Decomposing)

Focuses on students discussing and communicating their mathematical thinking and learning strategies and ideas from each other to develop number sense.

Number sense is the ability to play with numbers meaning students can visualize problem solving, perform calculations quickly, and are flexible in their mathematical strategy

Prompting Questions:

What do you notice?

What strategies did you use?

- **Mystery Number** – the students work as a class to identify a 'mystery number' using a set of clues. Each clue is given one at a time (e.g. *The number is between 5 and 13. It is a double. It is more than 10? What might the mystery number be?*)
<http://bit.ly/2fXYSPv>

- **Tell Me Everything** - choose a number and ask the students to tell you everything they know about the number (e.g. 10...it fills up a ten frame, is 2 more than 8, it has 2 digits, it is the number of fingers I have...). Students are given the opportunity to share their understandings around a common idea, serving as a powerful formative assessment for the teacher.

<https://www.teachingchannel.org/videos/k-math-routine-tell-me>

- **Today's Number** –choose a number for a specific reason (e.g. you might choose the number 10 because you want to provide opportunities for the students to use 10 as an anchor). In order to help students understand numbers in various contexts, ask questions: *When is 10 a large number? Why did you think of that as an example of when ten is a large number? When is 10 a small number? Why does 10 mean different things?*

- **Number Talks** – Number Talks are short (5- 15 minutes), frequent opportunities aimed at building number sense. During a number talk, students are thinking, asking their peers questions, and explaining their own thinking all while the teacher records the thinking.

Present an equation or problem and ask students to solve it in their heads (without paper and pencil or manipulatives). The emphasis is on visualizing the then verbalizing the strategies used. To facilitate students verbalizing their mental math ask: *What did your brain do? Why does that work? Who can tell us what ...said? What strategy might you try next time?* See handouts and articles.



<https://elementarynumbertalks.wordpress.com/>

	<ul style="list-style-type: none"> • Reverse Number Talks– instead of giving the students a ‘quick image’, present a quantity of manipulatives and ask: <i>How might you arrange (13) dots in interesting ways?</i> Record the various ways the students create and discuss the commonalities and differences. Have the students represent the structure they see. • Number Ladders – show an equation and ask students to solve. Add a related equation that can build on the first one. Continue adding equations that build a ladder of related equations that focus on applying strategies to determine answers. $5 + 5 =$ $5 + 6 =$ $5 + 7 =$ • Open Questions – present a question/problem that is framed in such a way that a variety of responses or strategies are possible. Have students think about the question and share their thinking. Students gain confidence because they have an answer that makes sense to them right from the start. There is not a single right answer. (e.g. What makes 5 a special number?). Marion Small shares her ideas about open questions in the following presentation: http://bit.ly/2kw5iXN
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Pattern Seekers – (Patterning)

Focus on identifying, describing and creating patterns. Students will need to identify a pattern core, repeat and name it.

Probing Questions:
 What is the unit (core) that repeats over and over again?
 How might we change the pattern?
 What other patterns can you create?
 How would you describe the pattern?
 How are they the same? Different?

<ul style="list-style-type: none"> • People Patterns – create patterns with students by sorting and then creating a pattern and ask probing questions. • Hear the Pattern (sound patterns) - Students make sound patterns with musical instruments. Half of the class might have bells and half of the class might have shakers. • Colourful Cubes – ask the student to create a pattern using unifix cubes. Have them show them to someone else and identify the unit that repeats. http://bit.ly/2xmeKmv • Number Patterns - using numbers create a pattern (e.g. 2,4,6,8...) Ask the prompting questions. • What’s the Core? –create a pattern. Ask students to identify the unit that repeats (the core). Have students create their own patterns and identify the unit that repeats. • Is it a Pattern? – present a selection of photos and ask the students to give reasoning if it is a pattern or not be a pattern. • Fix It Patterns – present a pattern that has a mistake in the pattern. Ask: <i>What do you notice? How might we fix the pattern?</i> Ideas can be found at the link: https://startingwiththebeginning.wordpress.com/daily-math-investigations/ 	 
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- **Same? Different?** - present students with photos and have them think about ways they are the same and different. Great images can be found at the following link:

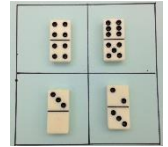
<https://samedifferentimages.wordpress.com/>



- **Which One Doesn't Belong?** – present students with thought-provoking puzzles that have many different and correct ways of choosing 'Which one doesn't belong?'

Great images can be found at the following link:

<http://wodb.ca/>



Use the Line – (number lines/clothesline)

The number line is a powerful, coherent, and unifying model use to develop number sense and computational fluency.

- **Build the Line** (compare and order numbers) – show the clothesline (or a blank number line) and present a collection of numbers to compare and order. Have the student build the number line together. 0 – 10 Tent Cards <http://bit.ly/2wzxrOh>



- **What's Missing?** – pass out a set of numbers for the students to build a number line with a clothesline with some missing numbers. Have the students identify the numbers that are missing.



- **Fix It** – show the students a clothesline that has mixed up numbers. Ask: *What can we do to 'fix up the mix up'?*

- **Open Number Line** - using an open number line to find answers using various strategies.

