



**Fort
Vermilion**
School Division

Numeracy Framework



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WHAT IS NUMERACY?

Mathematics is a subject in which students study patterns and relationships to understand various aspects of the world. **Mathematical understanding is connected to many branches of mathematics, including arithmetic, algebra, geometry, data, statistics, and probability.**

The procedures associated with mathematics range from counting, calculating, and measuring to analyzing, modeling, and generalizing. Communication is also fundamental to mathematics. The language of mathematics has its own system of symbolic notation and a specific vocabulary with

which to communicate mathematical thinking concisely.

Mathematical skills and knowledge support the interpretation of diverse quantitative and spatial information and can be applied to solving both theoretical and practical problems. With mathematics, abstract ideas can be visualized, represented, and explained.

Mathematics is a powerful tool that can be used to simplify and solve complicated real-life problems.

Learn More: [New Learn Alberta](#)

NUMERACY FRAMEWORK & STRATEGIC PLAN

Fort Vermilion School Division Priority

1.6.3 All students will improve numeracy skills

Framework

1. To guide instruction
2. Align with division numeracy priority
3. Improve student performance in math competencies, practical math knowledge, and mental math skills

Guiding Principles

1. Students make sense of the world in regards to math use in their lives.
2. Students identify what they know, how to apply this knowledge to tasks and what new knowledge and skills they need to learn.
3. Students will use knowledge to explain patterns and phenomena found in our world.
4. Students learn in different ways and rates.
5. All students can do math.



WHY IS NUMERACY IMPORTANT?

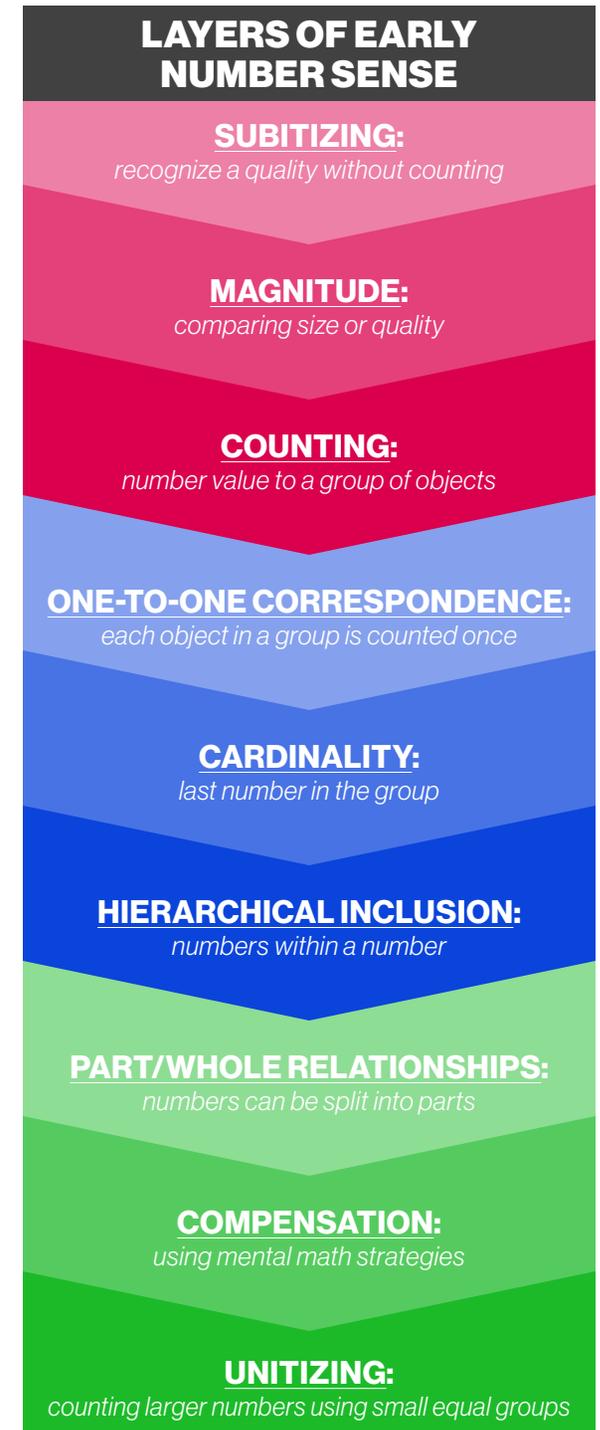
Mathematics is central to the development of numeracy: the ability to work with number values and spatial information in a variety of situations.

Mathematics is necessary in many pursuits of daily life, including comparing costs, locating a destination, interpreting a schedule, or adapting a recipe. Students become numerate as they learn the basic math skills and knowledge of mathematics that are useful both in and beyond their learning environments.

As students learn and apply mathematics, they build critical thinking skills. Students will continue to use their mathematical learning as they contemplate new ideas in their schools, communities, and future workplaces.

CONCRETE, REPRESENTATIONAL AND ABSTRACT (CRA)

A **sequential instructional approach** during which students move from working with concrete materials to creating representational drawings to using abstract symbols. Using this concrete-representational-abstract sequence helps students develop the thorough mental representations that are foundational for conceptual understanding.



LAYERS OF EARLY NUMBER SENSE 1/3

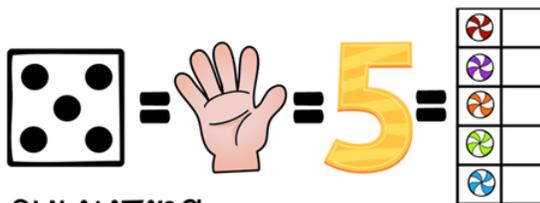
SUBITIZING

Perceptual Subitizing Perceiving the number without counting.

Conceptual Subitizing students perceptually subitize two or more amounts, then combine amounts automatically.

I CAN look at a group of objects and know how many without counting.

Support this concept at home: Play a board game with dice and ask, "How many do you see?". Domino games are also a great way to teach subitizing.



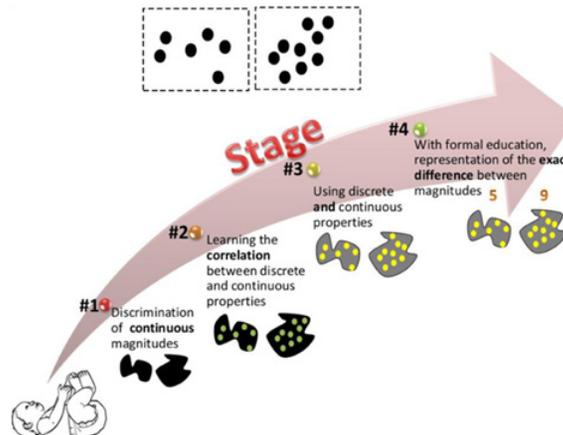
Subitizing is the ability to identify a quantity quickly, without counting.

MAGNITUDE

In mathematics, the magnitude or **size of a mathematical object** is a property which determines whether the object is larger or smaller than other objects of the same kind.

I CAN compare two objects and know which one has more.

Support this concept at home: Building towers with blocks, grouping objects - which has more.



COUNTING

The main property of counting is so fundamental to our perception of quantity that it is seldom enunciated explicitly.

The purpose of counting is to **assign a numeric value to a group of objects.**

I CAN count how many.

Support this concept at home: Use everyday opportunities to ask how many (*ie. shopping, setting the table, etc.*).

1 One		
2 Two		
3 Three		
4 Four		
5 Five		

RECOMMENDED ASSESSMENTS: [Nelson Pre-Assessment](#) / [Leaps & Bounds](#)

(To find in your school's SharePoint: Go to the **Faculty** folder, click **Documents** in the menu on the left then click **Numeracy Assessments**.)

ONE-TO-ONE CORRESPONDENCE

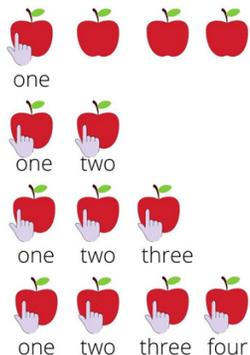
One-to-One Correspondence is the counting and quantity principle referring to the understanding that **each object in a group can be counted once and only once.**

It is useful in the early stages for children to actually tag or touch each item being counted and to move it out of the way as it is counted.

I CAN assign a number to each item I count.

Support this concept at home:
Play board games that use a token to count spaces.

Examples of One-to-One



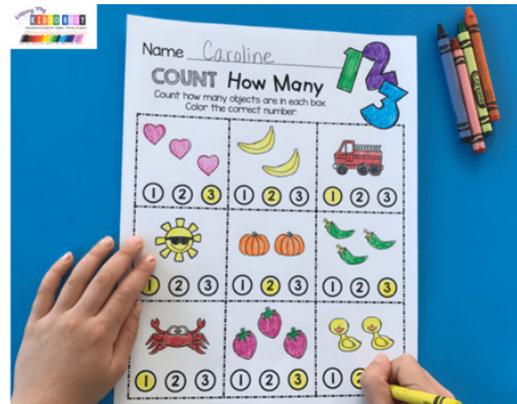
CARDINALITY

Cardinality is the counting and quantity principle referring to the understanding that **the last number used to count a group of objects represents how many are in the group.**

A student who must recount when asked how many candies are in the set that they just counted, may not understand the cardinality principle.

I CAN count and know the final number is how many.

Support this concept at home:
Ask your child, "How many in total?"

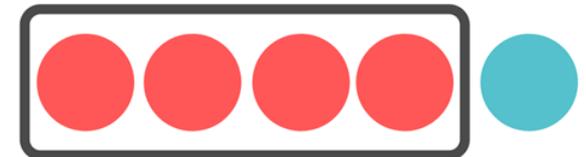


HIERARCHICAL INCLUSION

Hierarchical Inclusion is the counting and quantity principle that refers to understanding that **all numbers preceding a number can be or are systematically included in the value of another selected number.**

I CAN understand preceding numbers nest inside of each other (ie. 4 nests inside of 5).

Support this concept at home:
Ask your child if the number is less than a given number.



4 is inside the number 5.

RECOMMENDED ASSESSMENTS: [Nelson Pre-Assessment](#) / [Leaps & Bounds](#)

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LAYERS OF EARLY NUMBER SENSE 3/3

PART/WHOLE
RELATIONSHIPS

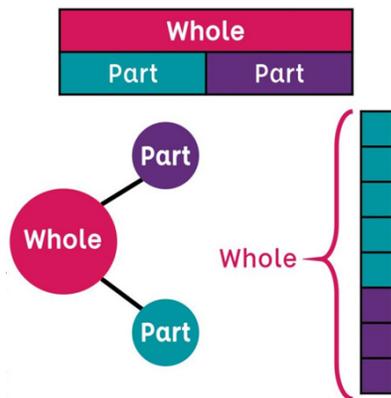
Part-part-whole reasoning or the part-whole model is the idea that **numbers can be split into parts**, which can be used in maths learning.

Children using this model will see the relationship between the whole number and its component parts, helping learners to make the connections between addition and subtraction.

I CAN show that (for example), five is composed of 4 and 1 and 3 and 2, OR 1 and 4 and 2 and 3.

Support this concept at home:

Break a whole group into multiple groups in different ways using blocks.



COMPENSATION

Compensation in math **is the process of reformulating** an addition, subtraction, multiplication, or division problem to one that can be computed more easily mentally.

I CAN use what I already know to solve something new (ie. $9+7$ OR use 10, add 7 and subtract 1).

Support this concept at home:

Roll a die and double it, then add one.

$$\begin{array}{r}
 7 + 8 = 15 \\
 \uparrow \quad \uparrow \\
 -2 \quad -2 \\
 \uparrow \quad \uparrow \\
 7 + 10 = 17
 \end{array}$$

UNITIZING

Unitizing is the counting and quantity principle that refers to the understanding that you can **count a large group of items by counting smaller, equal groups of items from within the large group.**

I CAN group objects into smaller equal groups to count the larger group.

Support this concept at home:

Take a large group of items and have your child sort them into equal groups.

There are 4 fish bowls with 5 fish in each.
How many fish in total are there?



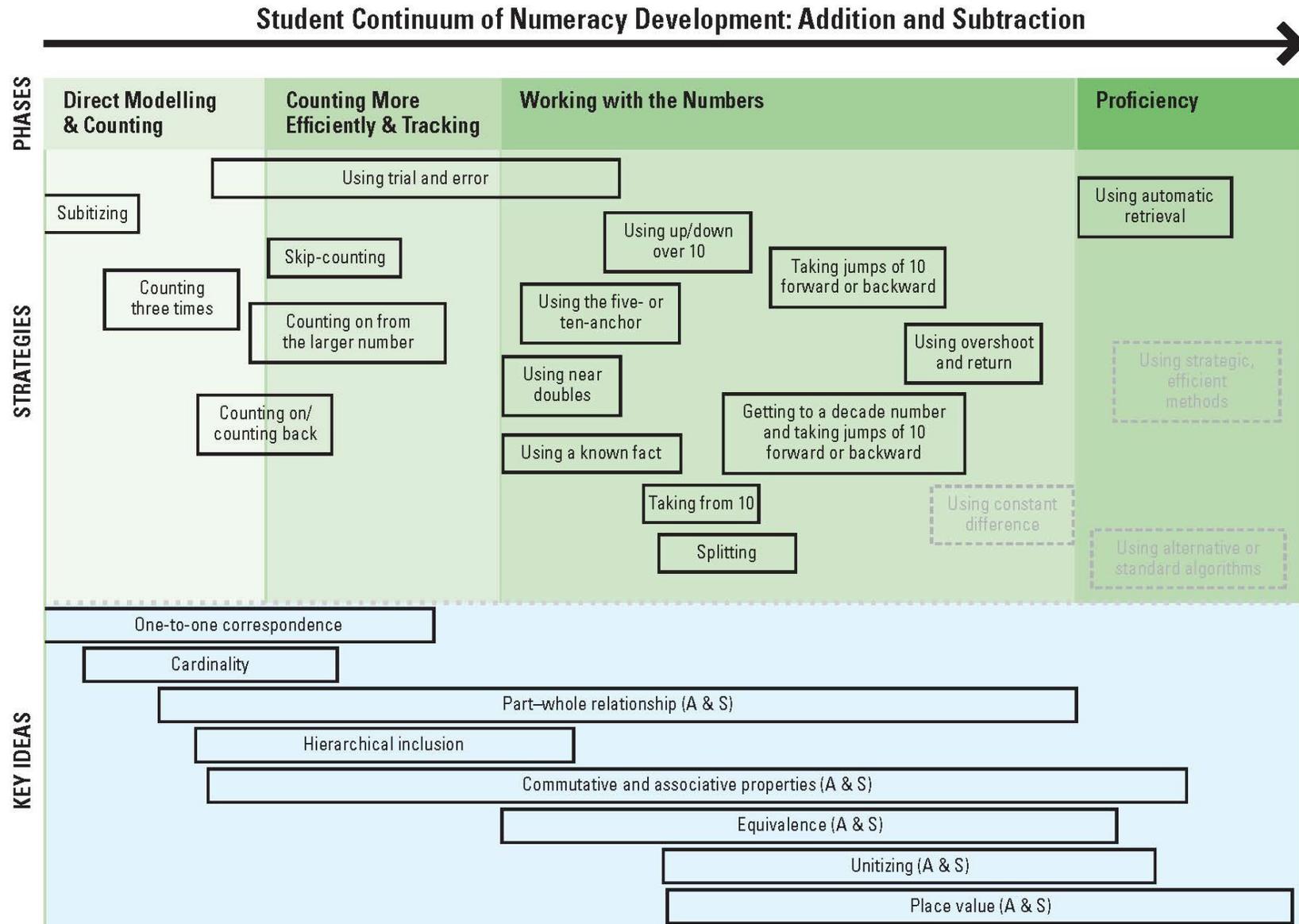
Each bowl can be considered as both 1 bowl (unit) or 5 fish, simultaneously.

RECOMMENDED ASSESSMENTS: Nelson Pre-Assessment / Leaps & Bounds

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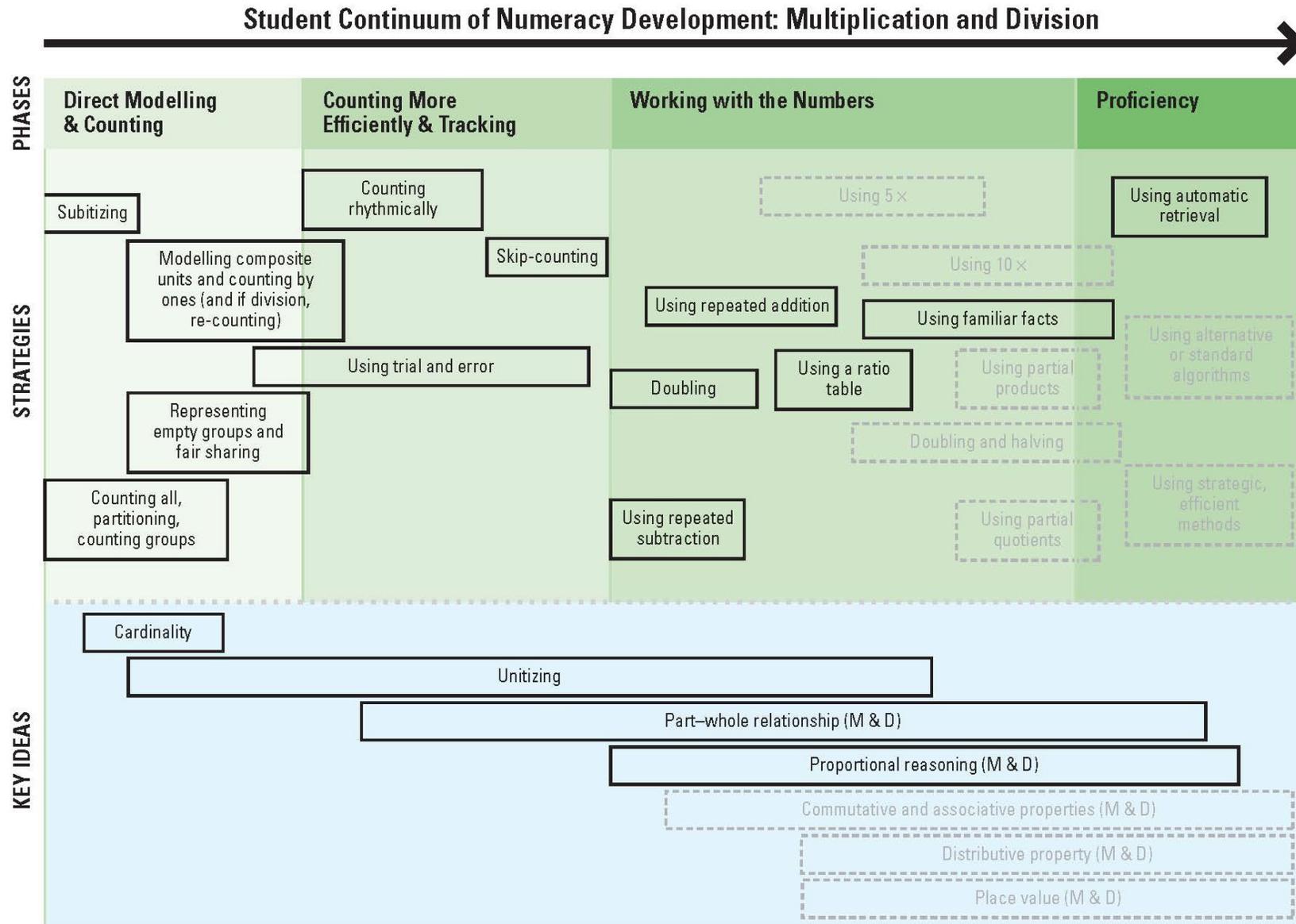
STUDENT CONTINUUM OF NUMERACY DEVELOPMENT +/-

The continuum represents student development of number sense in the early grades. The phases show deepening understanding of numbers as the shades of green get darker. This also applies to the strategies which follow the progression of the phases. The key ideas of number develop over time as the depth of understanding grows.



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NELSON PRE-ASSESSMENT NUMBER STRAND

STRAND: NUMBER

Developmental trajectory for each strand.

Foundational Understandings

The 'big ideas' of the strand.

Numbers are used to describe quantities.

A number can be represented concretely, pictorially, and symbolically.

A number can be represented in various, equivalent ways.

Our number system is based on 10.

Benchmarks and referents can be used to relate numbers and estimate.

Addition results in a total. Subtraction results in a difference.

Multiplication is repeated addition. Division is repeated subtraction.

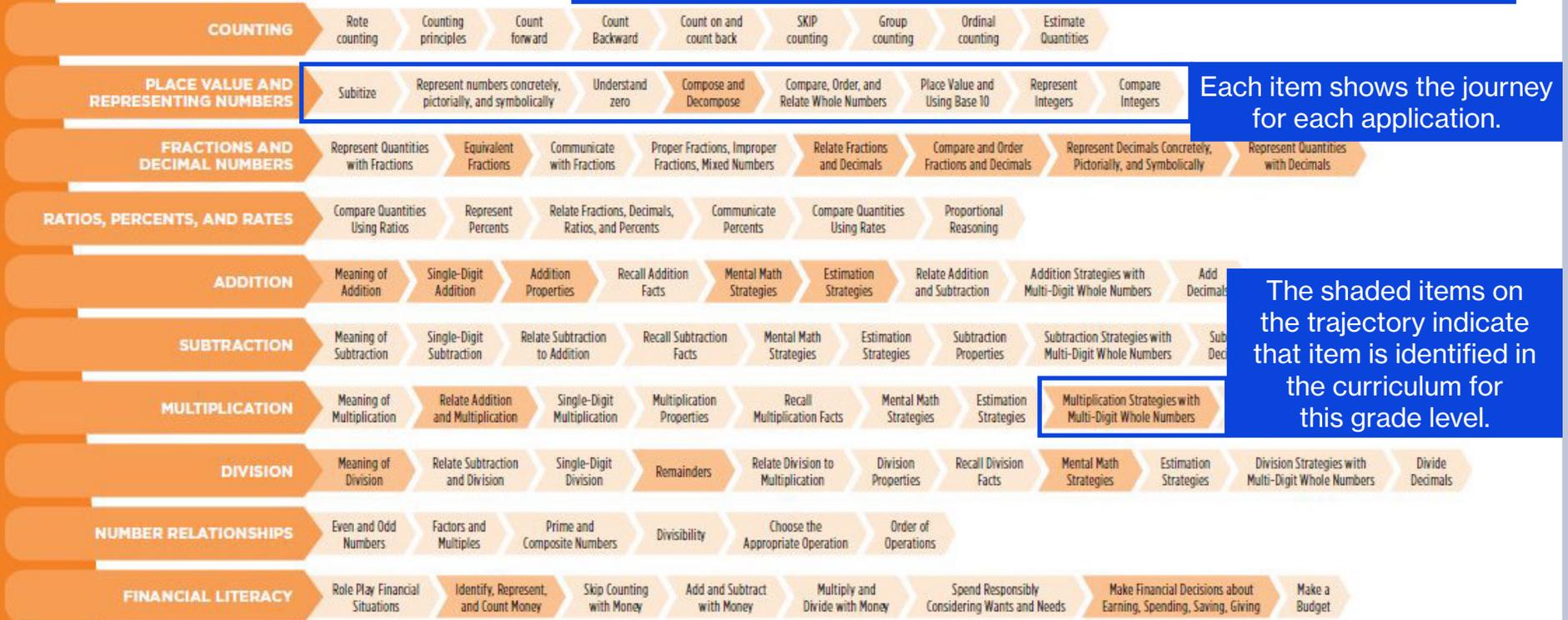
Operations can be performed concretely, pictorially, symbolically, and algorithmically.

The operations of addition, subtraction, multiplication, and division are interrelated.

Solving problems helps students learn about numbers and operations both inside and outside the classroom.

Applications

Applications identify particular aspects of the foundational understandings.



Each item shows the journey for each application.

The shaded items on the trajectory indicate that item is identified in the curriculum for this grade level.

LEAPS AND BOUNDS IN THE CLASSROOM

What can ***Leaps and Bounds*** look like in a math classroom?

STEP 1

DIAGNOSTIC



Administer and assess the diagnostic

STEP 2

PATHWAY



Choose the **intervention pathway** based on diagnostic results

STEP 3

INTERVENTION



Choose an **open-ended** or **guided lesson, connect** students' learnings, and **assign** student resource pages

- **Designed for classroom teachers, special education teachers, and/or after-school tutors**
- Designed for students in **Grades 1-8, (+/- 1)** but remediation activities go as far back as Grade K
- **Grade bands** – ideal for combined grades and special education students

Leaps AND Bounds TOWARD Math Understanding

- Based on research into **how students learn** and typical gaps in understanding of concepts and skills (*PRIME research and beyond*)
- **Curriculum-based:** outcome/expectation; problem solving teaching strategies; communication; 3-part lessons

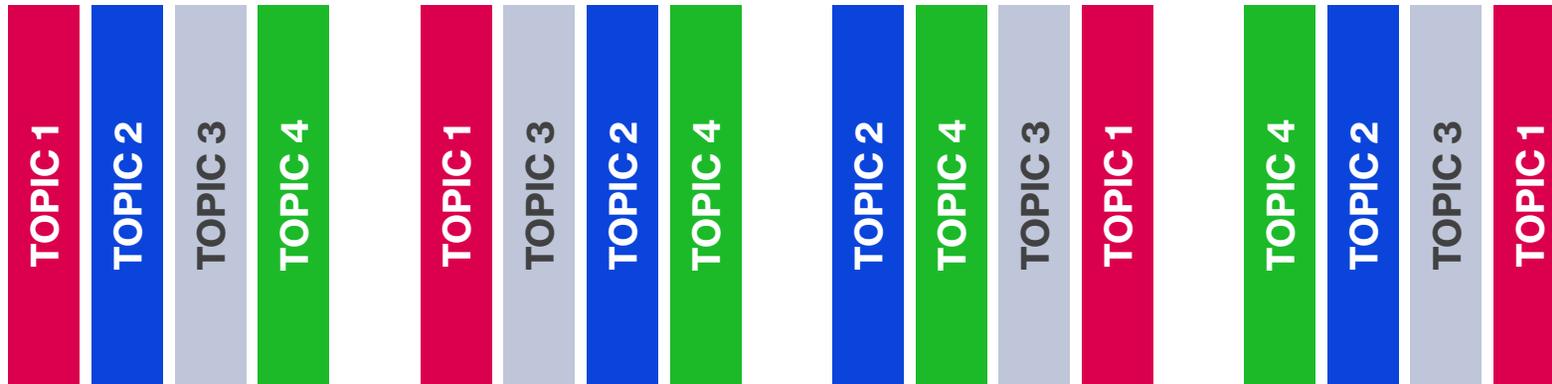
A **mathematics diagnostic and series of interventions** that offers incremental remediation steps – as well as opportunities for students to leap forward – keeping in mind that not every student needs the same remediation at the same pace.

(As opposed to a step-by-step program.)

INTERLEAVING vs BLOKED STUDY

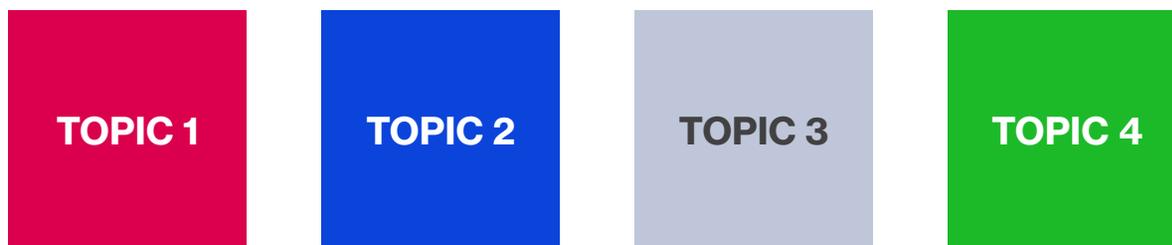
INTERLEAVING consists of students switching between topics whilst revising in order to improve their learning.

The reason behind this is that it helps students make connections between topics and forces them to think harder about which strategies need to be applied to which problems. Both of these things help improve later recall, especially in the long-term.



BLOKED STUDY, on the other hand, involves studying a topic in its entirety before moving on to another.

A great example of blocking your revision is what sadly typically happens the night before a test. Some students cram all of their studying into a few hours and go over their notes for an entire module at once. Many students believe this is useful, with one survey reporting that 99% of students admit to cramming.



WHAT IS THE JUMP MATH APPROACH?

JUMP Math is a balanced approach to teaching mathematics that supports differentiated instruction. JUMP Math covers the full curriculum for both Ontario and Western Canada through the Assessment & Practice Books, lesson plans, and a range of support materials.

The JUMP Math Assessment & Practice Books are not intended to be used without instruction. Teachers should use the Assessment & Practice Books and accompanying lesson plans in the Teacher Resources for dynamic lessons in which students are allowed to discover and explore ideas on their own. The careful scaffolding of the mathematics in the Assessment & Practice Books make them an excellent tool for teachers to use for guided practice and continuous assessment.

THE JUMP MATH APPROACH TO TEACHING MATHEMATICS EMPHASIZES:

- Confidence-building
- Guided practice
- Guided discovery
- Continuous assessment
- Rigorously scaffolded instruction
- Mental math
- Deep conceptual understanding



KEY COMPONENTS OF THE JUMP MATH RESOURCES

ASSESSMENT & PRACTICE BOOKS

Parts 1 & 2: Grades K-8

- Solid foundation for each of the strands in the curriculum at grade level
- Extensive review going back up to two grades
- All strands complete the curriculum at grade level

TEACHER RESOURCES: Grades K-8

Overview of JUMP Math

Mental Math Unit

Detailed Table of Contents (*Parts 1 & 2*)

Blackline Masters (*extra practice, games, manipulatives*)

Advanced Problem-Solving Lessons

Answer Keys (*for Assessment & Practice Books and Unit Tests*), Grades 3-8

Unit Tests, Grades 3-8

Curriculum Correlations (WNCP, ON)

SMART Board-compatible interactive whiteboard lessons, Grades 1-8 (*available separately*)

Lesson plans provide clear explanations and explicit guidance on how to:

- introduce one concept at a time;
- explore concepts and make connections in a variety of ways;
- assess students quickly;
- extend learning with extra bonus questions and activities;
- develop problem solving skills; and
- support material for each strand.

NUMBER TALKS & GUIDED MATH

WHAT ARE NUMBER TALKS?

Number talks (or “math talks”) are short discussions among a teacher and students about how to solve a particular **mental math problem**. The focus is not on the correct answer, but on **all the possible methods** of finding the answer.

Each student has a chance to explain their method, and everyone else will learn from other people’s methods!

Math Solutions

NUMBER TALKS

WHOLE NUMBER COMPUTATION

2017 WINNER
AEP
ADVANCED EDUCATION PROJECT

- More than 850 purposefully designed number talks
- Streaming video featuring 19 number talks filmed in actual classrooms

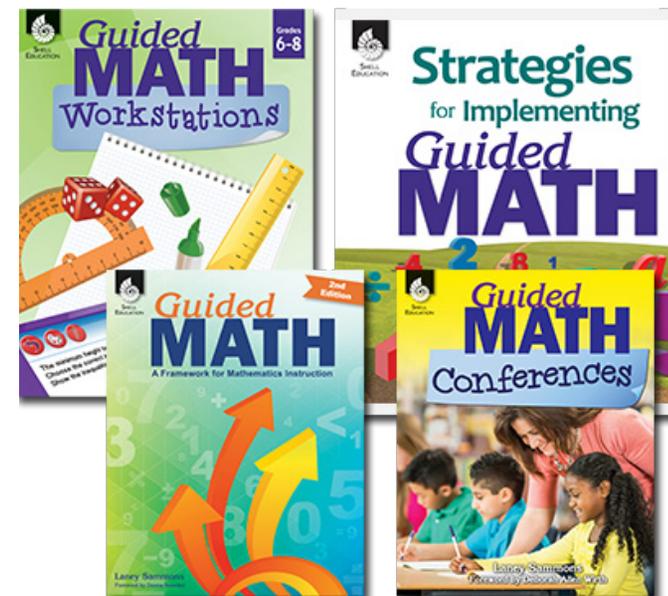
SHERRY PARRISH
A Multimedia Professional Learning Resource

INCLUDES VIDEO STREAMING

WHAT IS GUIDED MATH?

Guided Math is a structure for teaching whereby a teacher supports each child’s development of mathematical proficiency at increasing levels of difficulty, within the context of a small group. It is premised on the idea that working with children in small groups, provides powerful possibilities for reaching all children where they enter and taking them to the next level.

In Guided Math groups, students engage in standards based, rigorous, engaging meaning making learning opportunities where the teacher focuses on a particular concept, strategy or skill. Teachers facilitate this learning through hands-on, scaffolded conversations and intensive questioning.



OPEN MIDDLE MATH, MATHLETICS, AND EQUALS

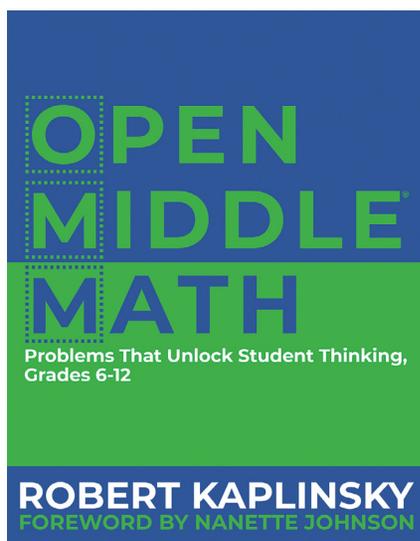
WHAT IS OPEN MIDDLE?

The name “**Open Middle**” might sound like a strange name for a website about math problems. However, it references a very specific type of problem we try to encourage here.

Most of the problems on this site have:

- a “closed beginning” meaning that they all start with the same initial problem.
- a “closed end” meaning that they all end with the same answer.
- an “open middle” meaning that there are multiple ways to approach and ultimately solve the problem.

Open middle problems generally require a higher **depth of knowledge** than most problems that assess procedural and conceptual understanding and provide students with opportunities for discussing their thinking.



WHAT IS MATHLETICS?

Mathletics is the engaging online math program made for hybrid classrooms and home learning.

Set your students fun practice and fluency activities, challenge their thinking with problem-solving and reasoning questions, and reward their learning with certificates and points – wherever they might be.

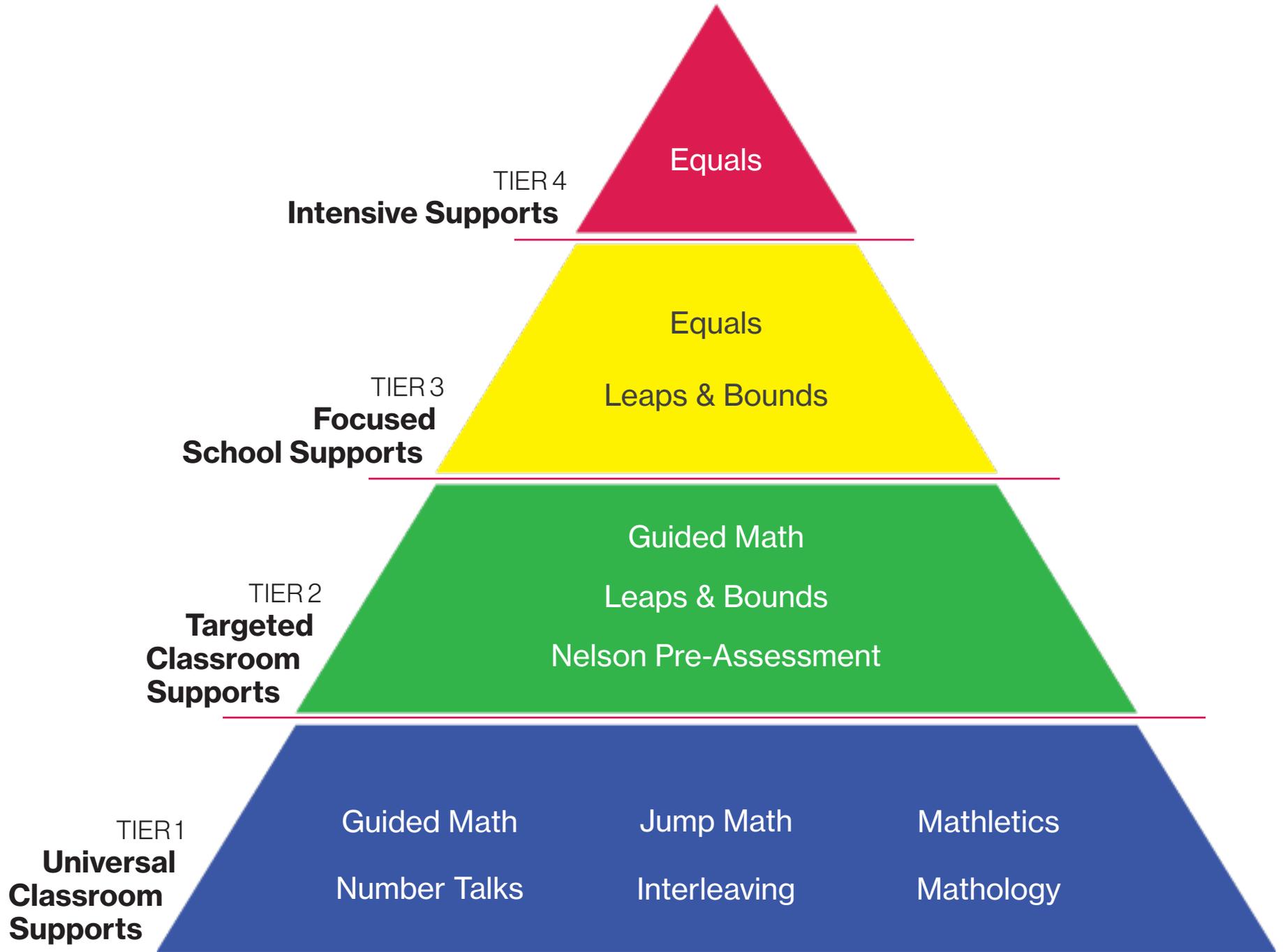


WHAT IS EQUALS?

Equals is an age-neutral, multi-sensory special education math curriculum that connects functional math to abstract ideas. By basing each lesson in real-life themes of homes, community, and/or school, students using Equals have shown significant gains while building essential life skills. It comes complete with manipulatives, adapted tools, vocab cards, worksheets and other materials making it ideal for a contained classroom or resource room.

Equals Math
Canadian Edition

TIERED APPROACH



ADDITIONAL RESOURCES

FVSD Engage:

MATH RESOURCES

[Intervention Lessons / Jump Math](#)

[Leaps and Bounds / Nelson Pre-Assessment](#)

FVSD Microsoft Stream:

[PD Session Numeracy Videos](#)

FVSD Google Drive:

[Indigenous Games](#)

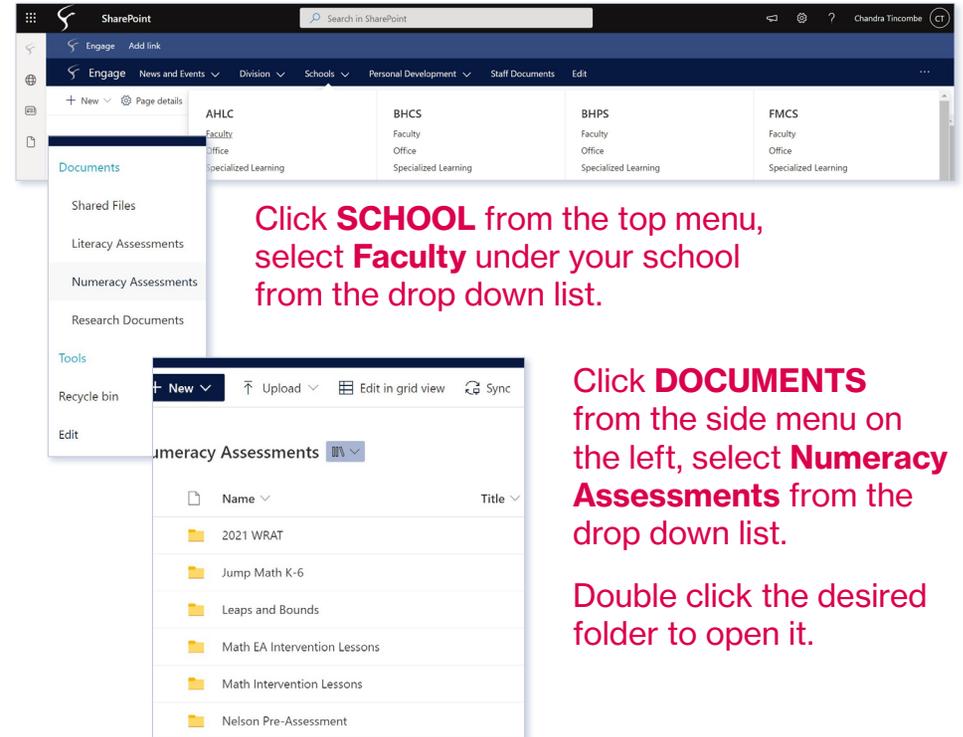
More Teacher Resources:

[What to Look For - BOOK](#)

[Progression VIDEOS](#)

[Getting Started with Guided Math Groups VIDEO](#)

From **FVSD Engage**:



Click **SCHOOL** from the top menu, select **Faculty** under your school from the drop down list.

Click **DOCUMENTS** from the side menu on the left, select **Numeracy Assessments** from the drop down list.

Double click the desired folder to open it.

NUMERACY ASSESSMENT TIMELINE

	Kindergarten-Gr 1	Grades 2-9	Grades 10-12
SEPTEMBER		Sept 6-10: Screen1 (Gr 2-3) Sept 30: Screen1 (Gr 4-9)	
JANUARY / FEBRUARY	Jan 21: Screen1 (Gr 1)	Feb 7-11: Screen2 (Gr 2-3) Feb 16: Screen2 (Gr 4-9)	
MAY / JUNE	May 30 - Jun 3: Screen2 (Gr 1)	May 30 - Jun 3: Screen3 (Gr 2-9)	

WRAT5: Part A is the **oral test** and Part B is the **math computation**.