Grade 6&7 Numeracy Session 1

October 2018

Agenda

- Recap of new curriculum and growth mindset
- Formative Assessment practices - how do YOU know what your students know?
- Summative Assessments - How to assess the current math curriculum
- Lesson sequence with competencies
- Culture-based math ideas

Session Goals

- To continue to deepen our understanding of the new math curriculum including place based or culturally based math
- To understand how assessment practices align with the new math curriculum and development of growth mindsets

New Math Curriculum

- Focus on skills and processes as much as content
- All areas of learning are based on a “Know-Do-Understand” model to support a **concept-based competency-driven** approach to learning.
- Three elements, the Content (Know), Curricular Competencies (Do), and Big Ideas (Understand) all work together to support deeper learning.

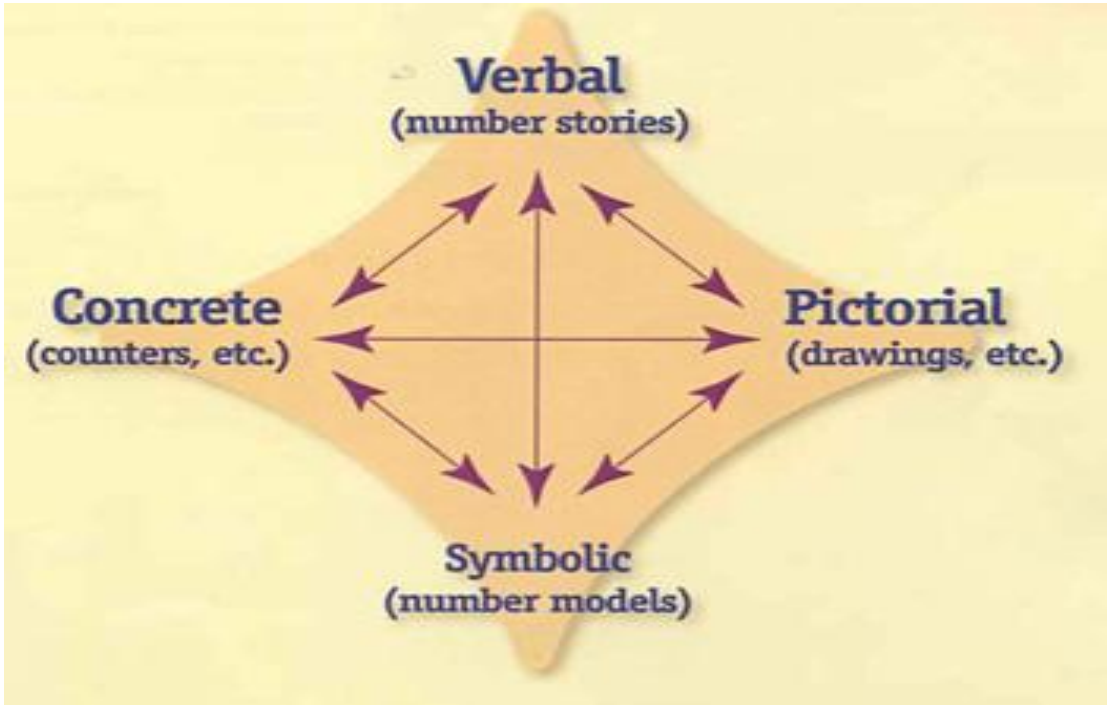
An Analogy

The Curricular competencies are the vehicle

The Curricular content are the passengers

The Big Ideas are the destination

Multi-Dimensional Mathematics



Math concepts are explored and understood in all of these ways to improve engagement, meaning and conceptual understanding

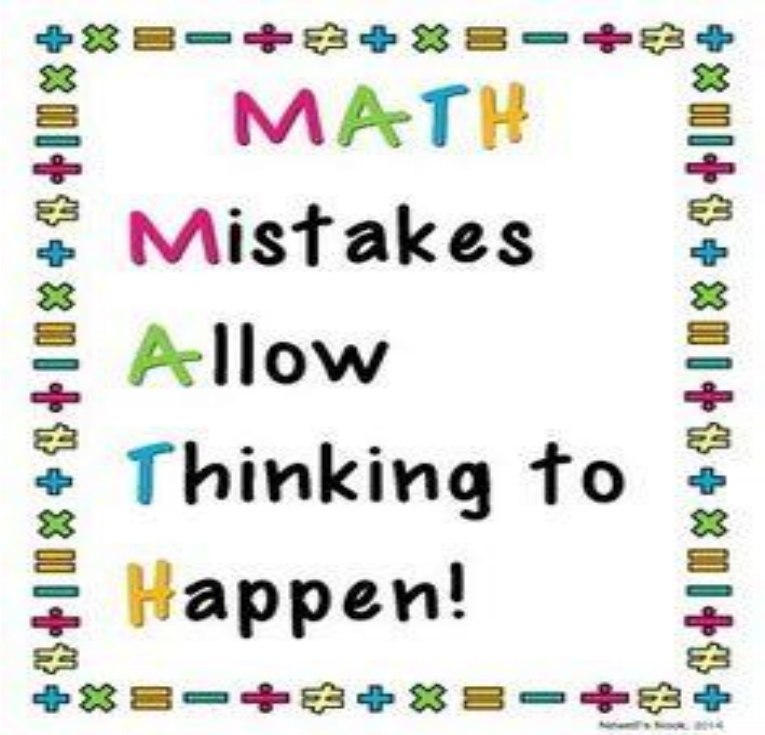
Growth Mindset

What Kind of Mindset Do You Have?

I can learn anything I want to.
When I'm frustrated, I persevere.
I want to challenge myself.
When I fail, I learn.
Tell me I try hard.
If you succeed, I'm inspired.
My effort and attitude determine everything.

I'm either good at it, or I'm not.
When I'm frustrated, I give up.
I don't like to be challenged.
When I fail, I'm no good.
Tell me I'm smart.
If you succeed, I feel threatened.
My abilities determine everything.

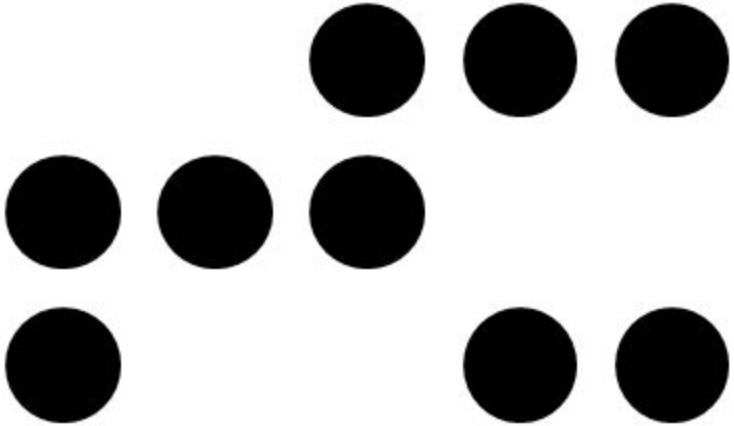
Shifting the Culture



Mistakes are an opportunity to learn

Productive struggle means that you are being challenged at the right level - if it doesn't challenge you, it doesn't change you!

Number Talk



Number String

1 x 12 =

2 x 12 =

4 x 12 =

8 x 12 =

8 x 120 =

8 x 121 =

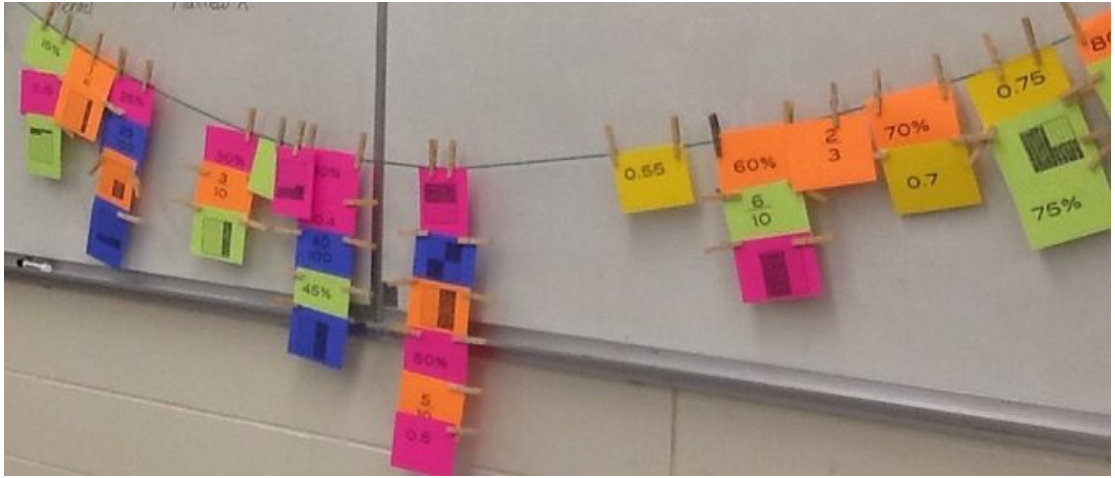
Clothesline Activities

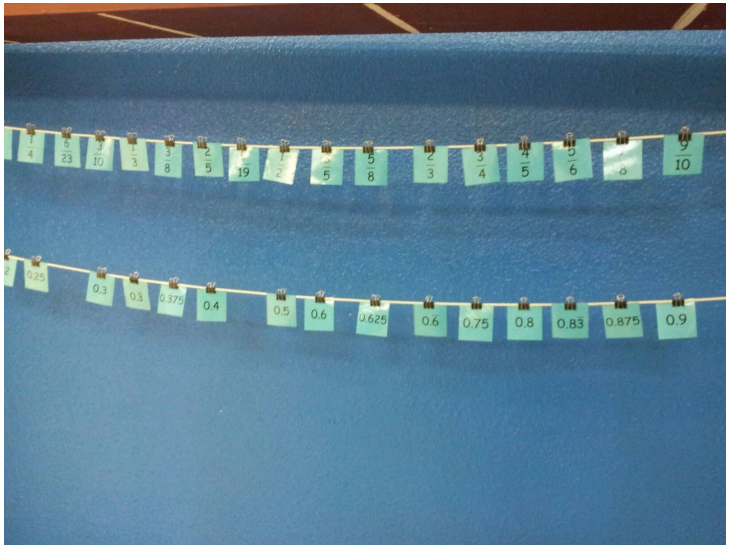
Have them up all year long as visual cues and models for students to refer to. Consider using double clotheslines for equivalency

Useful for:

- Whole numbers, rounding
- Decimals, fractions, percentages and how they are connected
- Integers

Educating now





Resources

https://clotheslinemath.com/

http://www.estimation180.com/clothesline.html

http://mrorr-isageek.com/double-clothesline-solving-equations/

Concept- Based & Competency-Driven

Nikki has 24cm of ribbon and cuts into 6cm pieces to use for a project. How many 6cm pieces will she have?

Model and solve using the Cuisenaire Rods

What if Nikki wanted each piece to be 8cm? Will there be more or less pieces than when they were 6cm long? Why? Use the rods to test your conjecture

What if Nikki wanted each piece to be 12cm? Will there be more or less pieces than when they were 8cm? Compare each and share your discoveries

What generalizations can you make about the number of the pieces and the size of the pieces?

What connections to other math concepts can you make?

Reflect

What competencies did we use?

What First Peoples Principles of Learning did we use?

What Grade 6/7 content is this a prerequisite for?

What generalization with whole numbers are we looking for?

Routines/Strategies

Formative Assessment = Minute by Minute - What do they ‘get’ and ‘not get’

- Accountability sticks
- Mouthing technique
- Individual white boards/pouches
- Thumbs up/side/down
- Red/Yellow/Green
- Think-Pair-Share
- Daily Reflections on learning - last 5-7 minutes (or homework)
- Journals - formative feedback only about 2 times a week
- Ticket out the door - into piles of “got it”, “kind of”, “not yet”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22g

Other References

Inside the Black Box:

https://www.rdc.udel.edu/wp-content/uploads/2015/04/InsideBlackBox.pdf

1 Hour Long Documentary (part 1) with Dylan Wiliam:

https://www.youtube.com/watch?v=J25d9aC1GZA

SNAP Assessments (Chilliwack):

http://snap.sd33.bc.ca/node/58

ANIE assessment (BC):

https://savagebirdlearning.files.wordpress.com/2016/08/blank-anie-aug-6-bc-version.pdf

Summative Assessments

Consider Depth of Knowledge: Level 1 is “Recall”

Example: 6.8 x 2.4

- This will show if they can execute the procedure accurately

Level 2: “Skill/Concept”

Example: Sandra is building raised garden beds and wants the measurements to be 6.8 ft by 2.4 ft for the base and 18 inches tall. Draw a sketch of the base of the bed and solve for its area. Estimate first.

Level 3 “Strategic Thinking”

Example: Sandra is building raised garden beds and wants the measurements to be 6.8 ft by 2.4 ft for the base and 18 inches tall. Draw a sketch of the base of the bed and solve for its area. If she can plant 16 carrots for every square foot, how many carrots can she plant in one bed? Estimate first and explain your estimate

Information on Depth of Knowledge:

http://static.pdesas.org/content/documents/DOK_Math_levels.pdf

Reflect

How many questions on the assessments you use are:

- Depth of knowledge 1
- Depth of knowledge 2
- Depth of knowledge 3
- Procedural only
- Conceptual only
- Procedural and conceptual
- Applied math
- Pictorial

Division with Decimals

Goals:

1) To understand how to divide decimal numbers by whole numbers and decimal numbers
2) To understand generalizations (when the quotient will be small or large, and less than and more than 1) and how it relates to whole number division

Accessing Prior Knowledge

Discuss with your partner:

What does 15 ÷ 3 mean? Give TWO ways of explaining it (equal sharing and equal grouping)

Use the large flat block as 1 and name each of the other blocks.

What Do You Notice?

What Do You Wonder?

Processing

What does $2.25 ÷ $0.25 mean?

Create a context that would match this equation

Estimate the answer - how did you estimate?

Model this equation with base 10 blocks and solve

Compare to your estimate - is your solution reasonable? How could you check your answer for accuracy?

Repeat the above process for $1.60 ÷ $0.20

Processing

Use your base 10 blocks to model and solve for each of the following. Estimate first!

1) $0.45 \div 0.05$
2) $2.2 \div 1.1$
3) $3.6 \div 0.9$
4) $3.6 \div 0.4$
5) $0.15 \div 0.03$
6) $0.18 \div 0.09$

What surprised you about the answers? What questions do you have about the answers?

Processing

Compare the decimal division questions to the whole number division questions and discuss what is the same and what is different:

1) $0.45 \div 0.05 = 9$
2) $2.2 \div 1.1 = 2$
3) $3.6 \div 0.9 = 4$
4) $3.6 \div 0.4 = 9$
5) $0.15 \div 0.03 = 5$
6) $0.18 \div 0.09 = 2$

1) $45 \div 5 = 9$
2) $22 \div 11 = 2$
3) $36 \div 9 = 4$
4) $36 \div 4 = 9$
5) $15 \div 3 = 5$
6) $18 \div 9 = 2$

How is it possible for decimal division to have whole number quotients?

Transforming

How will you know if the quotient will be greater than or less than 1? Give examples of each.

How can we use what we know about whole number division to help us solve decimal division. For example how does knowing 24 ÷ 4 = 6 help us to solve 0.24 ÷ 0.06? Or 2.4 ÷ 0.6?

How can using our language help us to determine the patterns we're seeing?

Transforming

Ms. Smith is preparing the material for a woodworking project for her students. Each student will need 0.2m of a dowel for their projects. Ms. Smith can buy doweling in these lengths: 1.2 m, 2.4 m, 4.8 m

Which doweling should she buy and why?

How many students will she have doweling for?

Extension: If the doweling costs $4.99/m, how much will it cost for a class?

Reflections

How did using the blocks affect your understanding of dividing decimal numbers?

What part do you find the most challenging?

How did you learn from others in today's class?

What did you do in today's clas that supported someone's learning?

What is this connected to? (other math problems concepts, home life, etc.)

How could we use this idea to solve other problems?

What is your learning goal for next lesson?

Competencies

Take a look at the curriculum grid and identify the competencies we engaged in while learning to understand how to divide decimal numbers.

What Big Idea are we heading towards?

Next Steps...

Explore decimal division where the divisor is smaller than the dividend and compare to what you've done so far. Example:

$0.24 \div 0.6$

we can use patterns and place value from here

Math Through An Indigenous Lens

Consider the core competencies of 'Positive Personal and Cultural Identity' and curricular competencies 'Engage in problem-solving experiences that are connected to place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures'

Culture: Culture is a pattern of behavior shared by a society, or group of people. Many different things make up a society's culture. These things include **food**, **language**, **clothing**, **tools**, **music**, **arts**, customs, beliefs, and **religion**.

https://kids.britannica.com/kids/article/culture/399913

Math and Culture

Traditional Academic math is often viewed as universal and free from culture or values....it's often 'bare naked', stripped of story, history, meaning, purpose

In order to re-humanize mathematics we need to:

- Acknowledge that every culture has mathematized in their own ways since the beginning of time
- Understand math is a tool for solving problems and thus is culturally diverse due to differing problems
- Learn more about the history of math and math in the cultures of our students

Where To Start

1. Ask each student what their cultural heritage is and if they know of any math that is specific to their heritage (this is a great assignment) and then they share about their own cultures.
2. Ask students to bring in artifacts that are important to them, or that represent them and share with the class.
3. Look for legends, stories, histories and methods related to the math concepts you plan on teaching (example: history of pi).
4. Start to consider what you (and our system) values in terms of math education and how that aligns (or doesn't) with your students' cultural values.

Celebration Project

Plan a celebration from your culture and create a budget for the cost of the event. We will co-create criteria for what should be included but at a minimum the total cost and cost per person attending should be included.

What could the celebration be?

What could the celebration be?

- Birthday party
- Coming of Age
- Potlatch
- Hanukkah
- Christmas
- Thanksgiving
- Bar/Bat Mitzvah
- Oktoberfest
- Naming Ceremony
- Eid al-Fitr

Let's Choose a Birthday Party...

What do I need to consider in terms of the cost:

How many people will be there

What food and beverages will be served

Games/activities (bowling, movie, laser tag, etc.)

Goody Bags/Gifts

Co-create criteria for the final project - what needs to be included

Criteria

Include:

- the cultural practice and its meaning, or where the tradition originates
- history of the practice and how its changed over time
- what is the most important for you and why
- the cost of the entire event - details of the where the costs come from
- the cost per person and who pays/shares the cost
- the cost to attend (bring a gift/food)

Reflection and Action Plan

“If you don’t use it, you lose it”

Action Plan:

- What are you going to implement this week?
- What are you going to share with other teachers in the next month?

Feedback sheets for reflections please...