
Grade 4&5 Numeracy Session

January 2019

Agenda

- Understanding First Peoples Principles of Learning in math
- Fractions - naming, ordering and comparing, improper fractions and mixed numbers using fraction circles, cuisenaire rods and number lines
- Decimals
- Assessment

Session Goals

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

First Peoples Principles of Learning

Explore this principle:

Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).

Let's unpack some of these terms. As you read the definitions, think about ways that we can foster them in our math classes...

Discuss...

holistic:

Holistic education is a philosophy of **education** based on the premise that each person finds identity, **meaning**, and purpose in life through connections to the community, to the natural world, and to humanitarian values such as compassion and peace.

(https://en.wikipedia.org/wiki/Holistic_education)

Discuss...

reflexive:

When we encourage students to be self-reflexive, we are asking them to understand what they are learning as they are learning. Additionally, self-reflexivity not only allows students to understand *what* they learned but *why* they learned it.

(<https://www.chronicle.com/blogs/profhacker/reflexive-pedagogy/22939>)

Discuss...

reflective:

Teachers who promote reflective classrooms ensure that students are fully engaged in the process of making meaning. They organize instruction so that students are the producers, not just the consumers, of knowledge. To best guide children in the habits of reflection, these teachers approach their role as that of "facilitator of meaning making."

(<http://www.ascd.org/publications/books/108008/chapters/Learning-Through-Reflection.aspx>)

Discuss...

experiential:

“In its simplest form, experiential learning means learning from experience or learning by doing. Experiential education first immerses learners in an experience and then encourages reflection about the experience to develop new skills, new attitudes, or new ways of thinking.”

(<https://www.ryerson.ca/content/dam/lt/resources/handouts/ExperientialLearningReport.pdf>)

Discuss...

relational:

Relational learning is a way of being with students from a social constructionist perspective where those involved in education--students, mentors, and professors--learn from each other through the sharing of ideas and together create the learning/teaching world....While there may be a place and time for a teacher-centered model, the relational approach lends itself to the active process of co-constructing knowledge not only in the classroom but outside in the world.

(<https://www.taosinstitute.net/relational-learning-in-education>)

First Peoples Principles of Learning

Final thoughts and reflections...

It can be overwhelming, so, can you think of ONE thing that arose from these discussions that you can feasibly implement into your math class?

Fractions

Goals: To understand fractions in multiple ways using a variety of models. To understand how to order and compare fractions.

Accessing Prior Knowledge

What is a fraction? What does it mean?

When might we use fractions other than in math class?

'Cookie Fiasco'

Fraction/Division Connection

Contextualized problems help a lot with this!

Nikki had a cake that she wanted to share equally with 12 people. What fraction of the whole will each person get?

$$\div = \frac{\square}{\square}$$

The Division symbol can be thought of as a fraction with a missing numerator and denominator

What Do You Notice? What is Similar/Different?

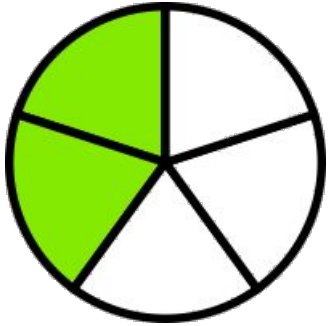


Image 1



Image 2

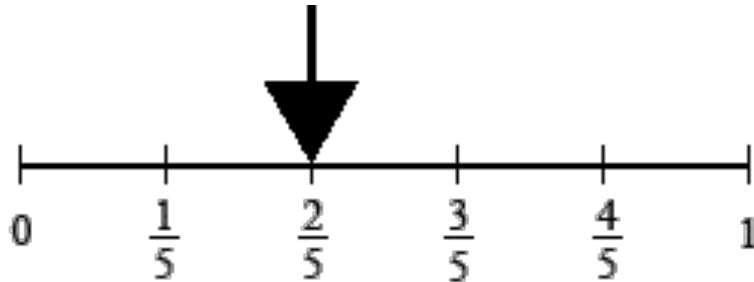


Image 3

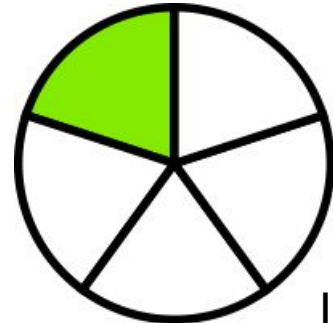
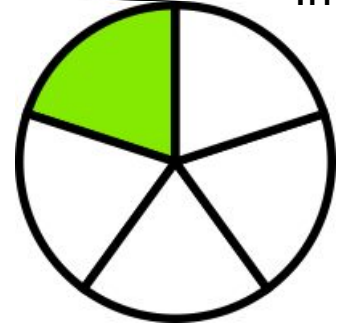


Image 4



Multiple Views:

Nikki cut her pie into 5 equal pieces and ate two, how much of her pie did she eat? Model and solve.

John has 2 pies that she wants to share equally with 5 people (including himself) Model how much each person gets. Write this as a fraction.

Laurie has a 1 meter pieces of ribbon for a sewing project but she only needs two fifths of a meter for her project. Show how much ribbon she needs. How many projects could she do with her meter of ribbon?

Two fifths of the animals are cats.

Getting Started with Fractions

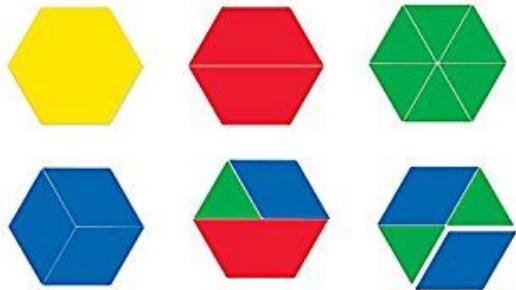
Fraction Circles:

- Name fractions, say the name and understand it as part of a whole and the sum of parts (two fifths = two one fifths)
- Understand WHY the larger the denominator, the smaller the piece and vice versa
- Order and compare fractions (grade 4 common denominators but using circles and benchmarking they can do non common denominators too)
- Benchmark to 0, $\frac{1}{2}$, 1
- Model Contextualized Problems

Progressing with Fractions

Use many different models and shapes so they don't think that fractions are always circular and that you can have fractions of any denominator

Pattern blocks



Cuisenaire Rods



Your Turn to Explore Cuisenaire Rods!

Use the Orange Rod as 1 and find all the unit fractions you can (equal sized pieces). Name them. What patterns do you notice?

Do the same with the brown as 1 whole

One more time, for the blue as 1 whole

Discuss what connections (to other operations or anything else) you've noticed through this activity.

What would you anticipate being challenging for your students? How can you scaffold for them?

Benchmark to 0, $\frac{1}{2}$, 1

Nikki finished $\frac{5}{6}$ of her piano practising. Is she closer to: not doing any practising, doing half of her practising or almost finished her practising? How do you know? Model with your blocks to check if your estimation is correct.

What about if she had finished $\frac{2}{3}$? Which do you think is more? Prove it.

Fraction War

Play a game of Fraction War:

Each player gets half the deck. Each player flips over 2 cards and makes them into a proper fraction. The player with the larger fraction **MUST** explain why they think theirs is larger and if both players agree, then they win all 4 cards. In the event of a TIE - you have a WAR.

Beginner Version = all face cards equal 10

Advanced Version = Jack = 11, Queen = 12, King = 13

Equivalence

Use the Cuisenaire Rods and the Dark Green rod as one whole and find:

- “Fractions in Disguise” solve using manipulatives or models
- A fraction equivalent to $\frac{1}{2}$
- Any other 3 equivalent fractions - write them out and be ready to explain how you know they are equivalent.

Number Lines

Cuisenaire rods are a nice scaffold for number lines because they are also a linear model.

Take time to have students draw their own number lines and ensure they understand that they need to split their line into equal sized pieces, just like what they saw with the models (this helps them to NOT count the hash marks)

You can also have them label number lines that you create once they've created some of their own. This number line generator is great (I did a vlog on how to use

it): https://www.oliverboorman.biz/projects/tools/number_lines.php

Clothesline Activity

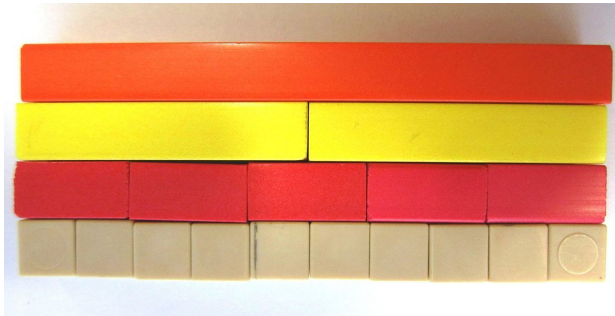
When doing clothesline activities, have blank index cards ready because students can ask for any other number to be added to the line if it helps them make their decisions.

In your partners:

- 1) Place the fractions where they belong on the clothesline and justify your choice
- 2) Examine the other fractions and decide if you agree with their placement or if you think they need to be moved (and why)

Equivalence

Make trains with the cuisenaire rods to show tenths, fifths, halves



Find at least 3 equivalent fractions

Explain how two different numbers of pieces can be equivalent

Move into using strips of paper or right to number lines

Decimals

Use the large flat as 1 whole, name the other blocks and explain the names.
Use the place mats to help you along.

Build 2.36 and say it with place value language

Build and write in numbers: One and six hundredths

Sarah says that 0.234 is bigger than 0.6 because it has more digits. Do you agree or disagree? Explain.

Fraction Decimal Connection

Using base 10 blocks and the large flat as 1 whole

- Name the other pieces
- What patterns do you notice?
- Show $\frac{1}{2}$ and find its equivalent in sticks - name it
- Show $\frac{1}{4}$ and find its equivalent in small cubes - name it
- Explain in words how tenths compare to hundredths
- What do you predict thousandths to look like? Why?

Operations with Decimals

Students need to really understand what decimals mean first!

Base 10 Blocks to start (paired with place value mats) and then move onto number lines (and clotheslines). Number lines can help reiterate the ideas of how tenths relate to hundredths and thousandths.

Use the base 10 blocks to start with adding and subtracting to see how this process is similar and different from add and subtracting whole numbers

Assessments

Journal idea: Task that was given to students after a week and a half of working with subtraction (grade 4/5) was:

Error Analysis: A student made this mistake:

$$\begin{array}{r} 612 \\ - 296 \\ \hline 484 \end{array}$$

Write to explain what the student did wrong and correct their mistake by explaining the correct way to solve this problem. Make sure you use the word 'because' when explaining WHY you do the math the way you do.

Diagnostic Assessment for Conceptual Understanding

Look through the student work: A,B,C,D,E

What are we assessing with this task?

What feedback would you give each student?

Which pieces of each sample would you use as exemplars and for what?

Where would you go from here if this were a sample from your class?

Assessment AS Learning

Students need to be an integral part of their assessment and learning.

- Set clear learning targets and expectations
- Provide students with the rubric to self-assess or provide evidence of their learning
- Conduct error analysis after assessments or assignments and set goals

Math Error Analysis: Can I tell what went wrong?

Looking at our errors and figuring out what went wrong gives us the best opportunity to learn. There are many reasons why we make mistakes!

Use this chart to identify what types of errors were made. Can you see a pattern? What can we do to correct them? Fill in the reflection below and then attach it to your SWYK.

Type of Error and code	Tally
NCH – Not checking or looking back when done.	
BF – Basic fact error.	
CE – Copying error (wrote the question or numbers down wrong)	
RU – Reading the question or instructions wrong <u>or</u> not understanding what is being asked.	
NST – Not showing your thinking.	

Some/most/all of my errors were _____.

Others were _____.

A pattern I see is _____.

Some strategies I can use to avoid making these errors are:

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...