Core Textbook UNIT INTERNALIZATION: Leader Guide
Grade 5, Unit 2

Purpose: This document serves 2 purposes: 1) to provide deep content knowledge for your grade level and subject, which you may process and internalize for yourself, and 2) to provide guidance around facilitation moves that will push teachers to that necessary depth of understanding. While this document includes some helpful information, it is a tool and aid for your own preparation and processing - take the time to understand the content in order to flexibly respond and center participant voice - just as we want teachers to do for their students.

<table>
<tr><td>Materials for Internalization</td><td colspan="2">Unit Overview
Gr. 5 Unit 2 Overview (Schoology)
Scope and Sequence
Accelerating Unfinished Learning
Unit Assessment pg. 40-42 in pdf # 7-10
Interim Assessment: # 9, 10, 15, 16
● Student
● Teacher
optional: play racing fractions digitally, considering how the game board itself can be a support for students, along with fraction models using the number pieces app, clock app and fraction app.</td></tr>
<tr><td></td><td>Exemplar Work</td><td>Notes for Facilitation</td></tr>
<tr><td>CRE Mindsets</td><td>What beliefs about students and educator mindsets are most important to keep at the forefront of our planning? How will you stay connected to these beliefs & mindsets today?</td><td></td></tr>
<tr><td>Orient to Unit's Essential Learning

-Big ideas
-Unpack standards
-Debrief assessments
-Reflect on culturally responsive instructional practices</td><td>Big Ideas of the Unit
<table><tr><td>What mathematics is being learned?</td><td>Compare, add, and subtract fractions and mixed numbers with unlike denominators.

● Rewrite fractions with unlike denominators as equivalent fractions with a common denominator in order to find their sum or difference.

● Solve story problems involving addition/subtraction of fractions referring to the same whole, with like and unlike denominators.

● Mentally estimate the answers to story problems involving addition of fractions with like and unlike denominators.

● Assess the reasonableness of answers to story problems involving addition of fractions with like and unlike denominators.</td></tr></table></td><td></td></tr>
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Check thinking with Draft Learning Goals in DPS Unit Overview "Establishing goals such as these, helps us focus not just on what students will know and do, but what they will come to understand." P. 18 of *Taking Action*	• Students will understand that any fraction can be represented in an infinite number of equivalent fractions. • Students will understand the is a double multiplicative nature to fraction (or ratio) equivalence; the multiplication between the original fraction and its equivalent of numerator to numerator is the same as denominator to denominator and the multiplication between the numerator and denominator of the original fraction and its equivalent is the same. • Students will understand that the identity property of multiplication applies to fractions in this way; An equivalent fraction can be found by multiplying or dividing the numerator and denominator by 1 (i.e., 2/2, 3/3. 4/4). • Students will understand that numbers in a ratio table share a constant multiplicative relationship. • Students understand that to add and subtract fractions or mixed numbers, one must join or separate like units. Therefore, if fractions with unlike denominators are to be added or subtracted, equivalent fractions with the same denominator must be identified prior to computing. • Students will understand that fractions can be decomposed into a sum of fractions with the same denominator in more than one way to support addition and subtraction of fractions. • Students will understand that, just as with two whole numbers, multiplication of a fraction by a whole number is interpreted as a quantity of equal size groups. • Students will understand that, just as repeated addition of a whole number is the same as multiplication (2+2+2=3*2=6), repeated addition of a unit fraction is the same as multiplication (3/2+3/2+3/2=3*3/2=9/2). • Students will understand that a fraction can be interpreted as division of the numerator by the denominator because of the inverse relationship between multiplication & division.	
How does it relate to what's already been learned?	4.NF.A.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. 5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)	

Where are these mathematical ideas going?	**5.NF.A.2 maps to:** 5.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Unpack priority standards: CCSS Flip Book- 5th

1. Read the standards and explanation & examples in the flipbook, or another resource, to fill out the know, show, language chart.
2. Have teachers engage in 1-2 student activities to experience how the concepts and skills come alive in instruction.
3. Continue adding to the chart and highlighting concepts and skills that are examples of the type of learning students will engage in related to the standard.

Suggested Activities:

5.NF.A.2
Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.

Conceptual Understanding (Know)	Procedural Skill and Application (Show)	Academic Language
● Understanding of fractions as numbers that lie between whole numbers on a number line. ● To compute with fractions, they must refer to the same whole. ● Benchmark fractions enable us to assess the reasonableness of answers. ● Identify various models to represent,	● Use a variety of models to solve problems involving addition and subtraction of fractions with like and unlike denominators. ● Solve story problems involving addition and/or subtraction of fractions referring to the same whole, with like and unlike denominators.	Vocabulary: ● Fraction ● Mixed number ● Fraction greater than 1/ Improper fraction ● Estimate ● Benchmark fraction ● Area model

compare, add, and subtract fractions: bar model, area model, clocks, double number line, ratio table ● *Students have to know that melted means taken away/subtracted*	● Mentally estimate the answers to story problems involving addition of fractions with like and unlike denominators. ● Assess the reasonableness of answers to story problems involving addition of fractions with like and unlike denominators ● Compare values of fractions ● *Add and subtract fractions with unlike denominators up to four times within the context of a story problem.*	● Bar model ● Linear model- double number line ● Ratio table ● Reasonableness Language: ● The language of estimation...I know ⅗ is less than ½ because 3/6 is equivalent to ½ and ⅗ is less than 3/6 ● *The language of context, for example snow melting would be subtracting from the total*

Debrief Unit and Interim Assessments:

1. How do the prompts align to the standard and our unpacking so far?	**Unit Assessment (**not shown) **Interim Assessment** (not shown)

2. Do the prompts ask students to know/do anything that's missing from our unpacking chart?	

Culturally Responsive Instruction

How will we engage students so that they "go deep" with the mathematics?	● Establish clear learning goals/objectives and consistently communicate these with students ● Implement tasks that promote reasoning and problem solving ● Pose higher order thinking questions to connect conceptual understanding to procedural skill ● Opportunities to use manipulatives and various models to represent the mathematics ● Prompting students to represent in a variety of ways and to explain their thinking ● Providing opportunities for collaboration with peers ● Elicit and use evidence of student thinking to drive instruction ● Support productive struggle in learning the content.
How will we ensure all students have access to rigorous grade level content?	● All students will have the opportunity to engage in the grade level lesson and aligned tasks. Students have been strategically partnered to engage in discourse with a peer about the mathematics. ● Teachers will differentiate instruction by the levels of support provided to students and questioning techniques that are implemented. The grade level of the work will not look differently but the scaffolds administered to provide student access will.

Internalize the scope + sequence

-Understand each Module
-Determine key times to provide just in time support

Understand each Module:

Module	Key mathematical ideas of the Module (Read module overviews linked in first column)	Tell the Story of this Module		
		How does this module build toward the mathematical understanding of the unit?	How is rigor developed throughout each Module? IQA Rigor Rubric; Rigor Supports for English Language Development	What models and representations will support building conceptual understanding?
Module 1	• Add and subtract fractions with unlike denominators, including mixed numbers. • Rewrite fractions with unlike denominators as equivalent fractions with a common denominator in order to find their sum of difference. • Solve story problems involving addition and subtraction of fractions referring to the same whole, with like and unlike denominators • Mentally estimate the answers to story problems involving addition of fractions with like and unlike denominators • Assess the reasonableness of answers to story	In Module 1, money and clocks serve to help students develop intuitions about finding common denominators in order to compare, add, and subtract fractions.	-Students discuss the connections between fractions and money while using money as a model to find equivalent fractions. Students engage in a problem string in which the addition of fractions with unlike denominators is framed in the context of money amounts. - Continued practice with money-related fraction problems. -Students begin to explore fractions on a clock, another model that helps deepen understanding of fractions, equivalence, and addition and subtraction of fractions. -Continued practice +/- fractions with the clock model. -Students solve story problems involving +/- fractions using models	• Money value pieces • Bar models • Number lines • Clocks

Consider how you want to facilitate this - if the group isn't too large, you might do a jigsaw and have each group take 1 module - they can fill out their module in the participant handout, and then in their group they can fill out their section of the table in a shared document.

Possible Prompts:
-Let's go back to the big ideas of the unit - how does each module connect?
-Thinking about our standard and exemplars, what does rigor look like in this unit? How does each module connect and build towards that?
-What is the overall story or purpose of this unit as a whole, what are we trying to build?
-What role(s) do the models and representations play in this unit?

Helpful resource during this component: Unit 2 Introduction & Planner

	problems involving addition of fractions with like and unlike denominators		and have to explain which model fits best.	
Module 2	• Multiplication of whole numbers by fractions • Add and subtract fractions with unlike denominators • Investigate ratios as quotients • Use ratio tables to find equivalent fractions in order to add and subtract fractions	In Module 2, students are introduced to the use of double number lines and tables to rewrite fractions with common denominators.	-A problem string uses the multiplication of whole numbers by fractions. -A problem string that helps students think about common denominators by multiplying whole numbers by fractions. They learn to use the double number line model to add and subtract fractions with unlike denominators. -The teacher introduces a better buy scenario. After the context is established, student pairs work to solve the problem and represent their work on large paper. -Students present their work from the previous session in a math forum. The teacher emphasizes using proportional reasoning to justify the better buy -A problem string revisits using money and clock models to find equivalencies.	• Array • Bar model • Double number line • Ratio tables
Module 3:	• Finding common denominators to add and subtract fractions	In Module 3, they extend these strategies and models to solving a variety of story	-Students represent different fractions visually and numerically using a	• Ratio tables • Clock models

	with unlike denominators ● Generate equivalent fractions that share a common denominator. ● Rewrite fractions with a common denominator in order to add or subtract them within the context of a story problem.	problems and make generalizations about finding common denominators.	clock face that can be divided into 12, 6, 4, 3, or 2 equal parts. -Students discuss the strategies they used to solve fraction addition and subtraction story problems. -Students make generalizations about finding common denominators in order to add and subtract fractions.	● Money ● Double number line
Module 4	● Use the least common multiple to generate equivalent fractions with common denominators ● Use the greatest common factor to simplify fractions to the simplest, or simplified, form ● Solve, share, and discuss a variety of story problems	Module 4 gives students more explicit experience with greatest common factors and least common multiples as they find common denominators and learn to simplify fractions.	-Students learn how to generate equivalent fractions by finding the least common multiple of the denominators of both fractions. Students practice comparing fractions and discuss their work. -Students learn how to simplify fractions by dividing both the numerator and the denominator by their greatest common factor. Then they practice using the greatest common factor to simplify fractions. -Students review finding the least common multiple and the greatest common factor and work with a partner to apply what they have learned to	● Bar model ● Multiples lists ● Factors lists

			solve a variety of problems.	

Culturally Responsive Instruction

What will I do to ensure black students successfully engage in productive struggle during the investigation? (5 equity-based math practices)	I will challenge spaces of marginality by encouraging student-to-student interaction and broad-based participation.
What mathematics instructional practices will support the purpose of each Module? (8 effective teaching practices)	Use and Connect Mathematical Representations ● Matching fractions with models ● Connecting models- bar models, ratio tables, double number line, clock models, money Facilitate meaningful mathematical discourse ● Problem strings ● Math forums ● Partner work ● Connecting multiple representations

Use the Representative Lesson, Assessment Considerations, and/or Questions for Reflection column, in the 5 equity-based math practices table. to plan specifically for marginalized students.

Reference the 8 Effective Teaching Practices and your previous reading and unpacking to select at least one focus practice for the unit.

- Ensuring ALL students have opportunity to engage in grade level tasks
- Normalize creating errors and making mistakes (Z. Hammond)
- Create rituals and routines around “Intellectual Curiosity” (Z. Hammond)
- Be aware of students’ academic and mathematical identities
  - Do my students have a strong academic identity?
  - Do any students need help in rebuilding their academic identity?
  - What type of things will I need to validate and model to build up my students’ academic identities to be prepared to engage in productive struggle?
  - What type of things will I need to be listening for to indicate where students' mathematical identities are

currently falling?

- i.e., “I am not a math person”, “I don’t do math” may indicate that a student does not have a positive math identity, and that that student may need help building up their mathematical and academic identity to prepare them to go through the learning pit and engage in productive struggle.

Accelerating Unfinished Learning-Determine key times to provide just in time support: Unit

Accelerating Unfinished Learning Unit 2

Priority Instructional Content: 5.NF.A 5.NF.B.3, 5.NF.B.4a

Understand What are the critical prerequisite knowledge and skills students need to access the grade level content?	**Diagnose** What do your students currently know and understand? Unit 2 Screener and/or suggestions below:	**Take Action** What just in time interventions will support students in engaging with grade level content?	
		Actions to select from, if necessary What does assessment and observation tell me students need in order to access the unit's content	**Student & teacher supports**
4.NF.A.1 Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models…	5th gr. NCBL Items 9 & 14	**During Module 1:** Students who would benefit from additional models to understand equivalent fractions, may benefit from re-engaging with one or more of these activities • 4th WP 3A "Dozens of Eggs" • 4th WP 3B "Racing Fractions" • Bridges Intervention Volume 8, Module 6, selected activities	**Student scaffolds:** • Anchor chart for adding & subtracting fractions strategies. Make in U2, M3, S4 • Fractions App • Student clocks **Teacher resources:** • Models for Adding and Subtracting Fractions, p.9 • Clock Fractions video • Concrete River Trail • Utilize Academic Rigor: Supports for English Learners • Supports for English Learners • Additional Unit 2 Support & Intervention information. **Re-engagement** opportunities for standards, 5.NF. A.1-2, 5.NF.B.3-4 see Unit 2 "Skills Across the Grade Levels"
4.NF.A.2 Compare two fractions with different numerators and different denominators…	5th gr. NCBL Items 10-11	**During Module 1**: Students who are understanding the meaning of the numerator and denominator may benefit from • Bridges Intervention Volume 8, Module 6, selected activities	
4.NF.B.3 Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$.	5th gr. NCBL Items 12 & 15	**Prior to Module 1:** Students who are not adding and subtracting fractions and mixed numbers, with like denominators, may benefit from • Bridges Intervention Volume 8, Modules 7-9, selected activities	
4.OA.A.1 Interpret a multiplication equation as a comparison…	4th gr. CGA items 1-2	**Prior to Module 2:** Students who are not yet interpreting & representing multiplicative equations with whole numbers, may benefit from playing • 4th WP 1F "Dragon's Gold"	
4.OA.A.2 Multiply or divide to solve word problems involving multiplicative comparison…	5th gr. NCBL Item 7	**Prior to Module 2:** Students who do not understand multiplicative comparisons with whole numbers, may not understand the meaning of multiplication of a fraction and a whole number. Revisiting the concept of multiplicative comparisons can shore up that reasoning. • Bridges Intervention, Volume 7, Module 3, selected activities	

Looking at this document for unit, what do we want to take note of or keep in mind for mapping out our planning, assessment, and data analysis?

The unit 2 specific accelerating unfinished learning tablet is part of the DPS Unit Overview.

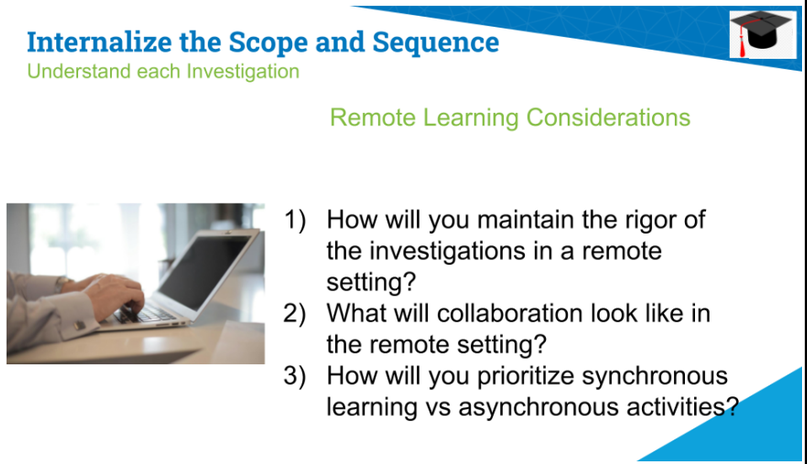
This conversation can be kept at the higher unit level, identifying things to keep in mind, to calendar, and opportunities to incorporate as teachers move into lesson and module level planning.

Emphasize that we don't want to over-assess students and we can take advantage of existing opportunities to observe students' understanding.

Emphasize the importance of models as scaffolds, tools for equitable access, and ways to center students as authorities and contributors in the classroom. All of the models are critical to develop number sense.

This slide is not in the template deck but may be something to consider adding given the current context. Adjust the participant hand out to reflect the addition if you choose to use it.

(Optional) Slide for Remote Considerations:



Use of breakout rooms (coming with google meets update) - training and norms.

Creating a consistent activity structure for the math block in Seesaw

Structuring lessons to reflect a launch - explore - summarize format, just like the text lessons do

Importance of creating small group time and office hours to support for asynchronous work

Timing asynchronous work so that I can review to select and sequence student work for classroom discussion - that is the priority for synchronous

Taking time to train students on the features of the seesaw platform - allowing voice overs as accessibility

Incorporating Math Learning Center Apps and drawing tools to show models (Number rack app, Number Frames App)

Teachers will have a LOT of amazing ideas for this. Key things to stamp:

- Synchronous time should prioritize discussion and student voice
- We need to focus on the most rigorous parts of the lessons, we won't get through everything.
- Model and think-aloud may be better as recorded videos (Ed Puzzle) so that students can watch and re-watch them.
- A google meet might start with a launch and review, then use breakout rooms to work on a problem, then come together for a discussion of that work and to stamp key ideas before moving to asynchronous work.

More details can be found in the remote learning guidance for elementary math document

Follow Up

Reflect

- What are your key take-aways and new learnings from today's internalization?
- What will be most critical for ensuring culturally responsive practices are used to engage learners?

Next Steps

- What are the team's next steps for preparing to teach the unit?

Stamp: Unit internalization focuses on how to craft the right conditions to foster independent learners in our classroom. This requires a deep understanding of the mathematics and a vision of how students will grow and engage in the unit.
-The text is very intentional in how it sequences lessons and modules to do this.
-CRE depends on us knowing the math in order to facilitate experiences that center on students as mathematicians, rather than just conveying information.

*Next steps might include:

- Calendar time to look at each module and identify the key tasks that we want to prioritize and how they will align to synchronous/small group and asynchronous work
- Determine when and how to administer diagnostic and when to analyze and make action plan
- Dig into remote learning resources and tech