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New Mexico Instructional Scope

4th Grade Fractions Guide

The purpose of this tool is to help educators understand each of the grade level standards and how those standards connect to the students' overall preparation for college and career readiness.

The NMIS is a teacher-influenced tool, designed to provide instructional planning support at the programmatic level for districts and instructional level for teachers. Its foundation stems from the vision and mission of the PED and came into existence to assure that students in NM will be engaged in a culturally and linguistically responsive educational system that meets the social, emotional, and academic needs of ALL students. This is also rooted in the belief that all students must have access to on-grade-level standards, focusing on acceleration. The purpose of this tool is to help educators understand each of the grade level standards and how those standards connect to the students' overall preparation for college and career readiness.

Standards are defined as the most critical prerequisite skills and knowledge. This document is color-coded to reflect both anchor and priority standards. Though previous emphasis was placed on priority standards to address lost learning due to COVID-19, New Mexico teachers should note that moving forward, while priority standards allow for acceleration of learning, all standards should be addressed in instruction throughout the school year.

In this guide you will find:

- A breakdown of each of the grade level standards within the cluster, including:
  - Standards of Mathematical Practice
  - Common Misconceptions
  - Identification of Priority Standards, as identified by NMPED.
  - Level of Rigor Identification
- Sample aligned assessment items
- Suggested Student Discourse Guide
- A multilayered system of supports (MLSS) and culturally and linguistically responsive instruction (CLR) guide

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New Mexico Instructional Scope
4th Grade Fractions Guide

Key		
	Priority Standard	Priority standards, as identified by NMPED, are denoted with red highlighting. Priority standards are the most critical prerequisite skills and knowledge a student needs. This does not mean that these are only standards required to be taught, just these are the standards that will allow for the acceleration the students of New Mexico need during this time.
	*Conceptual Understanding*	Conceptual Understanding standards help students build a deep understanding of the **how** and **why** of mathematics.
	*Application*	Application standards help students identify the appropriate concepts and skills to tackle **novel real-world problems.**
	*Procedural Skill and Fluency*	Procedural standards help students develop **efficiency** and **accuracy** in computations.

Standards Breakdown

- Extend understanding of fraction equivalence and ordering
  - 4.NF.A.1
  - 4.NF.A.2
- Build fractions from unit fractions
  - 4.NF.B.3
  - 4.NF.B.4
- Understand decimal notation for fractions, and compare decimal fractions
  - 4.NF.C.5
  - 4.NF.C.6
  - 4.NF.C.7

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Grade	*CCSS Domain*	*CCSS Cluster*
4	**Fractions**	**Extend understanding of fraction equivalence and ordering**

Cluster Standard: 4.NF.A.1

Standard	**Standards for Mathematical Practice**
Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	• **SMP 4:** Model with mathematics. • **SMP 8:** Look for and express regularity in repeated reasoning.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Equivalent fractions are fractions that represent equal value. They are numerals that name the same fractional number. Equivalent fractions have wholes that are the same size, students need to understand this concept. Upon generating a rule for finding equivalent fractions, students should understand how that connects to the identity property of multiplication or division (5/5 = 1, therefore any fraction multiplied by 5/5 would be the equivalent or equal). Students should generate and justify why their fractions are equivalent. This lends to the generation of the rule (or procedure) for equivalent fractions. Upon discovering the rule, students should be able to explain why the rule works.	• Use models to show the value of a fraction. • Explain how a fraction model represents the quantity of a fraction. • Use models to demonstrate that two fractions are equivalent. • Represent equivalent fractions using models. • Multiply and divide to find equivalent fractions.
DOK	**Blooms**
1-2	Understand

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Grade	*CCSS Domain*	*CCSS Cluster*
4	**Fractions**	**Extend understanding of fraction equivalence and ordering**

Cluster Standard: 4.NF.A.2

Standard	**Standards for Mathematical Practice**
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.	• **SMP 3:** Construct viable arguments and critique the reasoning of others. • **SMP 4:** Model with mathematics.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Equivalent fractions are fractions that represent equal value. They are numerals that name the same fractional number. Equivalent fractions have wholes that are the same size, students need to understand this concept. Upon generating a rule for finding equivalent fractions, students should understand how that connects to the identity property of multiplication or division (5/5 = 1, therefore any fraction multiplied by 5/5 would be the equivalent or equal). Students should generate and justify why their fractions are equivalent. This lends to the generation of the rule (or procedure) for equivalent fractions. Upon discovering the rule, students should be able to explain why the rule works.	• Explain how to convert two fractions to have common denominators. • Explain how to convert two fractions to have common numerators. • Convert fractions to have common denominators. • Convert fractions to have common numerators. • Compare two fractions with different numerators and denominators. • Use symbols (<, >, =) to compare two fractions
DOK	**Blooms**
1-2	Apply

Common Misconceptions

• Students may be confused by "reducing" since it implies that the number is getting smaller.	

Grade	*CCSS Domain*	*CCSS Cluster*
4	**Fractions**	**Build fractions from unit fractions**

Cluster Standard: 4.NF.B.3

Standard	Standards for Mathematical Practice
4.NF.B.3 Understand a fraction a/b with a > 1 as a sum of fractions $1/b$. • 4.NF.B.3.A: Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. • 4.NF.B.3.B: Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8 . • 4.NF.B.3.C: Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. • 4.NF.B.3.D: Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	• **SMP 2:** Reason abstractly and quantitatively. • **SMP 4:** Model with mathematics.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• This standard builds on prior work with unit fractions where students will now investigate	• Explain why a fraction is the sum of multiple fractions.

fractions other than unit fractions such as 2/3, they should then be able to join (compose) AND separate (decompose) the fraction of the same whole. In order to gain conceptual understanding of this standard, students must be able to visualize the composition and decomposition into unit fractions. This skill will aid in the development needed to then move into adding and subtracting fractions. For students to visualize they must have multiple opportunities to model this concept by using hands on manipulatives and other appropriate tools such as creating an original drawing to develop the skill. The models should not be limited to area models only (vary the type of area model), and should include length models such as number lines, folded paper, rulers, fraction strips, and set models as well.	• Explain why addition and subtraction of fractions with the same denominator is joining or separating parts referring to the same whole. • Explain why a fraction can be a sum of different like denominator fractions. • Explain why mixed numbers can be added or subtracted. • Add and subtract fractions and mixed numbers with like denominators. • Write an equation when decomposing fractions. • Solve addition word problems involving fractions with like denominators using models and equations. • Solve subtraction word problems involving fractions with like denominators using models and equations.
DOK	**Blooms**
1-2	Apply

Grade	*CCSS Domain*	*CCSS Cluster*
4	**Fractions**	**Build fractions from unit fractions**

Cluster Standard: 4.NF.B.4

Standard	Standards for Mathematical Practice
Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. • 4.NF.B.4.A: Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5 4 = 5 × (1/4). • 4.NF.B.4.B: Understand a multiple of a b as a multiple of	• **SMP 6:** Attend to precision. • **SMP 7:** Look for and make use of structure.

$1/b$, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6 5 . (In general, n × (a/b) = (n × a/b .) • 4.NF.B.4.C: Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?	
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students will be able to model multiplication of whole numbers by unit fraction. Building on ideas of decomposing fraction into unit fractions, students will apply knowledge and work with multiplying whole numbers to this work. Using similar language, such as “groups of” or “jumps” on a number line. Students will be able to explain this using models, words and numbers. Students will also be able to look at a given picture and describe multiplication that is present, in essence working backwards. b. Students will be able to apply patterns from multiplying whole numbers by a unit fraction to multiplying whole numbers by any fractions. Students are still using models and manipulatives for this work. Students will be able to explain this using models, words and numbers. This work includes fractions that are greater than 1 or mixed numbers. Students can apply previous work with whole number multiplication to multiplication with fractions, such as area model, distributive property, etc. c. Students will be able to solve multiplication word problems that include the whole number by a fraction or mixed number. Students are still using models and manipulatives for this work. Students will be able to explain this using models, words and numbers.	• Extend the understanding of multiplication to problems that have fractions. • Multiply a unit fraction (numerator of 1) by a whole number. • Multiply a fraction with a numerator greater than 1 by a whole number. • Use a number line to represent fraction multiplication. • Explain why a fraction is a multiple of a unit fraction. • Explain why multiplying a whole number times a fraction can be changed to a whole number times a unit fraction. • Solve multiplication word problems involving whole numbers and fractions using models and equations. • Restate word problems involving multiplication of a whole number and a fraction. • Draw a diagram and write an equation to represent and solve a word problem involving multiplication of a whole number and a fraction.
DOK	**Blooms**
1-2	Apply

Common Misconceptions

• Students may misunderstand and believe that when you multiply a fraction by a whole number, first you multiply the numerator by the whole number and then you multiply the denominator by the whole number. Students that are taught to put a 1 under the whole number and multiply straight across may lack an understanding of why this algorithm works.	

Grade	*CCSS Domain*	*CCSS Cluster*
4	**Fractions**	**Understand decimal notation for fractions, and compare decimal fractions**

Cluster Standard: 4.NF.C.5

Standard	**Standards for Mathematical Practice**
Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. For example, express 3/10 as 30/100 , and add 3/10 + 4/100 = 34/100	• **SMP 1**: Make sense of problems and persevere in solving them. • **SMP 8**: Look for and express regularity in repeated reasoning.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• This standard explores the relationship between fractions and decimals. Students use previous learning of equivalent fractions to apply to denominators of 10 and 100. This includes finding equivalence, adding and subtracting tenths and hundredths using models and explanations.	• Explain how a fraction with a denominator of 10 is equal to a fraction with a denominator of 100. • Convert a fraction with a denominator of 10 to an equivalent fraction with a denominator of 100. • Add two fractions with denominators of 10 or 100.
DOK	**Blooms**

1-2	Apply

Grade	*CCSS Domain*	*CCSS Cluster*
4	**Fractions**	**Understand decimal notation for fractions, and compare decimal fractions**

Cluster Standard: 4.NF.C.6

Standard	**Standards for Mathematical Practice**
Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100 ; describe a length as 0.62 meters; locate 0.62 on a number line diagram.	• **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Decimals are introduced for the first time. Students should have ample opportunities to explore and reason about the idea that a number can be represented as both a fraction and a decimal. Decimals and fractions both represent parts of a whole	• Write fractions with denominators of 10 or 100 as decimals. • Write decimals as fractions with denominators of 10 or 100. • Write a money amount given in words as a whole dollar and fraction amount. • Write a measurement using decimals. • Write two fractions and two decimals that represent the same amount. • Develop strategies to write decimals as equivalent fractions.
DOK	**Blooms**
1-2	Understand, Apply

Grade	*CCSS Domain*	*CCSS Cluster*
4	**Fractions**	**Understand decimal notation for fractions, and compare decimal fractions**

Cluster Standard: 4.NF.C.7

Standard	Standards for Mathematical Practice
Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.	• **SMP 3**: Construct viable arguments and critique the reasoning of others.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• This standard requires students to compare decimals to the hundredths when those two decimals refer to the same whole. Students compare using the symbols <, >, = and justify their response by creating a visual model. When comparing decimals, students should use models (such as hundredths grids) and number lines. When locating decimals on a number line the smaller numbers are farther to the left and the greater number is farther to the right. Students need to understand that some decimals are equivalent. Sharing examples with models to show that .4 = .40 will help students see the equivalency. Decimal numbers are rational numbers and so we can use them to indicate quantities that are less than one or between any two whole numbers. In between any two decimal numbers, there is always another decimal number.	• Reason about the size of two decimals to the hundredths place. • Use symbols (>, <, or =) when comparing decimals.
DOK	**Blooms**
1-2	Understand, Apply

Common Misconceptions

• Some students might think the longer the	

decimal, the greater the value, so 2.146 would be greater than 2.4. The shorter the decimal, the greater the value, so 6.31 would be greater than 6.482.	

Student Discourse Guide

- **Purposeful, rich classroom discourse offers students the opportunity to express their ideas, thinking, and to critique the reasoning of others in a variety of ways (writing, drawing, verbal). Purposeful implementation of classroom discourse allows students to activate funds of knowledge and to refine their mathematical understanding. When students have frequent opportunities for discourse they find various paths to solutions and reveal knowledge or misunderstandings to educators. The process also allows educators to honor students' culture, lived experiences and evolving math identities.**
- **Discourse that focuses on tasks that promote reasoning and problem solving is a primary mechanism for developing conceptual understanding and meaningful learning of mathematics (Michaels, O'Connor, and Resnick, 2008)**

Domain: **Fractions**	Strand: **Extend understanding of fraction equivalence and ordering**

Suggested Student Discourse Questions

• Explain why these fractions are equivalent. • How can you use a model to show that these fractions are equivalent?	• Why is it important to have a common denominator when comparing fractions? • Explain the error in the problem and show how you would solve it.

Domain: **Fractions**	Strand: **Understand decimal notation for fractions, and compare decimal fractions**

Suggested Student Discourse Questions

• Explain how a fraction with a denominator of 10 can be equal to a fraction with a	• How can your knowledge of money help you understand fractions with denominators of

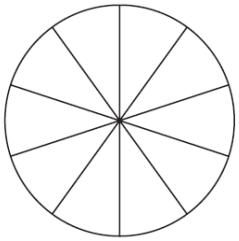
denominator of 100. (with models and manipulatives) ● What happens to the numerator when the denominator changes from a 10 to a 100?	10 and 100?

ASSESSMENT GUIDE

- Extend understanding of fraction equivalence and ordering.
- Build fractions from unit fractions.
- Understand decimal notation for fractions, and compare decimal fractions

Grade	*CCSS Domain*	*CCSS Strand*
4	**Fractions**	**Extend understanding of fraction equivalence and ordering**
	Sample Task #1 (Constructed Response)	
	On Monday, Lisa made a batch of cookies. She put frosting on ⅔ of this batch of cookies. What is a different fraction that is equivalent to ⅔?	
	Sample Task #2 (Multiple Choice)	

. A circle divided into equal parts is shown.



Which fraction is equivalent to $\frac{6}{10}$?

Ⓐ $\frac{3}{4}$

Ⓑ $\frac{3}{5}$

Ⓒ $\frac{5}{6}$

Ⓓ $\frac{5}{8}$

Grade	*CCSS Domain*	*CCSS Strand*
4	**Fractions**	**Build fractions from unit fractions**

Sample Task #1 (Constructed Response)

Use a number bond to show the relationship between 2/6 , 3/6 , and 5/6 . Then, use the fractions to write two addition and two subtraction sentences.

Sample Task #2 (Multiple Choice)

A recipe for meatballs uses ⅔ cup of breadcrumbs for 1 batch of meatballs. Anna is using this recipe to make 4 batches of meatballs. What is the total amount of bread crumbs, in cups, Anna will need to make 4 batches of meatballs?

A. 2/7 cup
B. 8/12 cup
C. 8/3 cups
D. 12/2 cups

Grade	*CCSS Domain*	*CCSS Strand*

4	Fractions	Understand decimal notation for fractions, and compare decimal fractions
	Sample Task #1 (Constructed Response)	
	Bella is finding the value of this expression. 5/10 + 6/100. What is the sum of the two fractions? Explain your thinking.	
	Sample Task #2 (Multiple Choice)	
	In Patrick's class, 4/10 of the students have brown hair. Which number is equal to 4/10? A. 0.04 B. 0.4 C. 0.410 D. 4.10	

MLSS AND CLR GUIDE

- Extend understanding of fraction equivalence and ordering.
- Build fractions from unit fractions.
- Understand decimal notation for fractions, and compare decimal fractions

CCSS Domain	*CCSS Cluster*
Fractions	**Extend understanding of fraction equivalence and ordering**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on extending understanding of fraction equivalence and ordering fractions, consider options for learning from your families and communities the cultural and linguistic ways this mathematics exists outside of school to create stronger home to school connections for students, students can look for ways they use fractions at home and share their findings with the classroom community.	
Cross-Curricular Connections	Science: Students may track precipitation levels in fractional amounts using a graduated cylinder or rain gage.	
Validate/Affirm/Build /Bridge	• *How can you design your mathematics classroom*	• Equity Based Practice (Using and Connecting Mathematical Representations): The standard for

	to intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures and languages? • *How can you create connections between the cultural and linguistic behaviors of your students' home culture and language, the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?*	mathematical practice, use appropriate tools strategically, provides a strong foundation to validate and bridge for students. Mathematical representations are mathematical tools. The linguistic and cultural experiences of students provide different and varied types of representations for solving mathematical problems. By explicitly encouraging students to use multiple mathematical representations students can draw on their "mathematical, social, and cultural competence". By valuing these representations and discussing them we can connect student representations to the representations of school mathematics and build a bridge for students to position them as competent and capable mathematicians. For example, when studying extending understanding of fraction equivalence and ordering fractions the use of mathematical representations within the classroom is critical because students need to work with fractions presentations in many ways, many times in order to develop a strong sense of benchmark fraction knowledge in order to help when rationalizing about fraction equivalents and ordering fractions.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• Connect to partitioning shapes into halves, thirds, and fourths in 2nd grade. • Connect to finding equivalent fractions and using symbols to compare fractions in 3rd grade.	• Connect to learning about multiplicative comparison. **(4.OA. A2)** • Connect to learning about using an understanding of relative size to convert between units of measurement. **(4.MD. A1)**	• Connect to adding and subtracting fractions and mixed numbers with unlike denominators. **(5.NF. A1)** • Connect to solving fraction addition and subtraction word problems. **(5.NF. A2)**

Suggested Instructional Strategies

Pre-Teach

Level of Intensity	*Essential Question*	*Examples*

Targeted	*What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?*	For example, some learners may benefit from targeted pre-teaching that rehearses prior learning when studying to extend understanding of fraction equivalence and ordering because students have worked with simple equivalent fractions and comparing fractions with denominators of 2, 3, 4, 6, and 8.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	3.NF.A.3: This standard provides a foundation for work with extended understanding of fraction equivalence and ordering because in this third grade standard students begin to work with simple equivalent fractions and comparing using similar numerator and denominator. This is foundational work with equivalent and ordering fractions. If students have unfinished learning within this standard, based on assessment data, consider ways to provide intensive pre-teaching support prior to the start of the unit to ensure students are ready to access grade level instruction and assignments.

Universal Support Framework

A student should know/understand...	A student should be able to do...	***Potential Scaffolds***

• Connections between visual and numerical representations of equivalent fractions.
• How number and size of the fraction parts can differ but are still equal
• How to convert two fractions to have common denominators.
• How to convert two fractions to have common numerators.
	• Recognize equivalent fractions.
	• Convert fractions to have common denominators.
	• Convert fractions to have common numerators.
	• Compare two fractions with different numerators and denominators.
		• Build on students' experience with the following skills:
		  ○ Compare fractions
		  ○ Ability to explain what a numerator and a denominator represent
		  ○ Represent fractions visually and on a number line
		  ○ Identify and represent unit fractions
		• Cognitive Strategies
		  ○ Repeatedly model the strategies
		  ○ Monitor the students' use of the strategies
		  ○ Provide feedback to students
		  ○ Teach self-questioning and self-monitoring strategies
		  ○ Introduce multiple means of representation for mathematical ideas
		• Encourage students to use alternative tools to better access the grade level content. Examples include:

		○ Fraction tiles/circles ○ Equivalent fractions reference sheets
Re-Teach		
Level of Intensity	***Essential Question***	***Examples***
Targeted	What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisited during a unit?	For example, students may benefit from re-engaging with content during a unit on extending understanding of fraction equivalence and ordering by revisiting student thinking through a short mini-lesson because teachers can assess what students already know and build on their thinking. Teachers can also see misconceptions in student thinking and correct them during a mini-lesson.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, some students may benefit from intensive extra time during and after a unit extending understanding of fraction equivalence and ordering by addressing conceptual understanding because students need understanding in fractions. Students who struggle with fractions tend to look at numbers within fractions and try to generalize them. Students with these types of misconceptions will need concrete work with manipulatives to build conceptual understanding. They will need to physically see that ½ bar is bigger than ¼ bar, even though in whole numbers a 4 is greater than 2.
Extension		
Essential Question		***Examples***
What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics developed within your HQIM?		For example, some learners may benefit from an extension such as the opportunity to understand concepts more quickly and explore them in greater depth than other students when studying extend understanding of fraction equivalence and ordering because students need extensive work in equivalent fractions to become fluent with simple fractions (2/4 is equal to ½, etc.). This work will help them become flexible with equivalent fractions (reducing) and build foundational understanding for 5th grade work.

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CCSS Domain	*CCSS Cluster*
Fractions	**Build fractions from unit fractions**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on building fractions from unit fractions by applying and extending previous understandings of operations with whole numbers, consider options for learning from your families and communities the cultural and linguistic ways this mathematics exists outside of school to create stronger home to school connections for students, for example, examining fractions of students in the classroom and fractions of members in a family to help students work within decomposing one whole. The one whole is the classroom, family, team, or other group a student is connected to outside of school. This will help students understand that a whole can vary in size.	
Cross-Curricular Connections	STEM Connection: Students can create a measuring cup for a science experiment. As they do, have students pay attention to precision and remind them the parts must be equal. The act of partitioning reinforces an understanding of the relationship between the unit fraction and the whole. Reinforce the relationship between mixed numbers and their fraction equivalent. Music: Students can partition a unit fraction (or beat) into smaller unit fractions (e.g., subdividing each fourth note to create 2 eighth notes). This helps students see mathematical and musical relationships among: ● the denominator (the type of note) ● the number of parts in the whole quantity (how many fit into a bar) ● the size of the part (the duration of that note) https://thelearningexchange.ca/wp-content/uploads/2018/04/cbs-fraction-across-curiculum-en.pdf	
Validate/Affirm/Build/ Bridge	● *How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures*	● Equity Based Practice (Building Procedural Fluency from Conceptual Understanding): Instruction should build from conceptual understanding to allow students opportunities to make meaning of mathematics before focusing on procedures. When new learning begins with procedures it privileges those with strong prior familiarity with school mathematics procedures for solving problems and does not allow learning to build for more methods for solving tasks that occur outside of school mathematics. For example, when studying building

	and languages? • *How can you create connections between the cultural and linguistic behaviors of your students' home culture and language, the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?*	fractions from unit fractions by applying and extending previous understandings of operations with whole numbers the types of mathematical tasks are critical because we are connecting to previous work with decomposing whole numbers and to work with "groups of" used in multiplication.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• Connect to understanding a 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a part of size 1/b. **(3.NF.A1)** • Connect fraction and decimal notation to measuring the length of an object to ½ and 1/4 inches. **(3.MD.B4)** • Connect to multiplication and division within 100 involving arrays, equal groups, and measurement quantities. **(3.OA.A.3)**	• Connect converting fractions and decomposing fractions to converting measurements from a larger unit to a smaller unit. **(4.MD A2)**	• Connect to extending and applying multiplication to multiply a fraction or whole number by a fraction. **(5.NF.B4)** • Connect to interpreting multiplication as scaling/ resizing. **(5.NF.B5)**

Suggested Instructional Strategies

Pre-Teach

Level of Intensity	*Essential Question*	*Examples*

Targeted	*What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?*	For example, some learners may benefit from targeted pre-teaching that analyzes common misconceptions when studying building fractions from unit fractions by applying and extending previous understandings of operations on whole numbers because it allows the teacher to plan in order to meet individual student needs, small group needs, and whole class needs.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	3.NF.A: These standards provide a foundation for work with building fractions from unit fractions by applying and extending previous understandings of operations on whole numbers because it helps students understand what the parts of a fraction represent and see fractions as numbers. If students have unfinished learning within this standard, based on assessment data, consider ways to provide intensive pre-teaching support prior to the start of the unit to ensure students are ready to access grade level instruction and assignments.

Universal Support Framework

A student should know/understand...	A student should be able to do...	***Potential Scaffolds***

• A fraction is the sum of multiple fractions.
• Addition and subtraction of fractions with the same denominator is joining or separating parts referring to the same whole.
• All fractions are multiples of a unit fraction.
• Multiplying a whole number times a fraction can be changed to a whole number times a unit fraction.
	• Add fractions with like denominators.
	• Add mixed numbers with like denominators.
	• Write an equation when decomposing fractions.
	• Multiply a fraction with a whole number.
		• Build on students' experience with the following skills:
		  ○ Partitioning, identifying, and labeling unit fractions
		  ○ Understanding the difference between numerator and denominator
		  ○ Using visual fraction models and equations
		• Cognitive Strategies
		  ○ Repeatedly model the strategies
		  ○ Monitor the students' use of the strategies
		  ○ Provide feedback to students
		  ○ Teach self-questioning and self-monitoring strategies
		  ○ Introduce multiple means of representation for mathematical ideas
		• Encourage students to use alternative tools to better access the grade level content. Examples include:
		  ○ Fraction tiles/circles

		○ Equivalent fractions reference sheets

Re-Teach		
Level of Intensity	***Essential Question***	***Examples***
Targeted	What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisited during a unit?	For example, students may benefit from re-engaging with content during a unit on building fractions from unit fractions by applying and extending previous understandings of operations on whole numbers by providing specific feedback to students on their work through a short mini-lesson because specific feedback during a one-on-one or small group mini-lesson helps students see the mistake. Working through a few more problems where the student can immediately apply the feedback strengthens their understanding of building from unit fractions and/or decomposing a fraction into unit fractions.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, some students may benefit from intensive extra time during and after a unit building fractions from unit fractions by applying and extending previous understandings of operations on whole numbers by addressing conceptual understanding because students need to work with concrete manipulatives when struggling with fractions. This can include area models, fraction strips, number lines, and other visual models. This will build conceptual understanding and mental pictures for student work with fractions.

Extension	
Essential Question	***Examples***
What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics developed within your HQIM?	For example, some learners may benefit from an extension such as the opportunity to understand concepts more quickly and explore them in greater depth than other students when studying building fractions from unit fractions by applying and extending previous understandings of operations on whole numbers because students need extended work with fractions. They need to reason about fractions and part of a whole. Students can use extended work to make generalizations and

	reasonings about work with fractions. For example, the denominator stays the same because the fractional pieces are equivalent. This also includes connections between addition, multiplying, and properties of operations that apply here as well.

CCSS Domain	*CCSS Cluster*
Fractions	**Understand decimal notation for fractions, and compare decimal fractions**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on understanding decimal notations for fractions and compare decimal fractions, consider options for learning from your families and communities the cultural and linguistic ways this mathematics exists outside of school to create stronger home to school connections for students, for example, students learn about the ways decimals are used in the real world, both at home and in the community. Students connect to the Imperial and Metric systems of measurement to make global connections. Students could examine ways decimals are used in various occupations which could connect to families and/or the world in general.	
Cross-Curricular Connections	STEM Connection: Students can create a measuring cup for a science experiment using the metric system. As they do, have students pay attention to precision and remind them the parts must be equal. The act of partitioning reinforces an understanding of the relationship between the decimal fraction and the whole.	
Validate/Affirm/Build/ Bridge	• *How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures and languages?* • *How can you create connections between the cultural and linguistic behaviors of your students' home culture*	• Equity Based Practice (Eliciting and Using Evidence of Student Thinking): Eliciting and using student thinking can promote a classroom culture in which mistakes or errors are viewed as opportunities for learning. When student thinking is at the center of classroom activity, "it is more likely that students who have felt evaluated or judged in their past mathematical experiences will make meaningful contributions to the classroom over time." For example, when studying understanding decimal notations for fractions and compare decimal fractions eliciting and using student thinking is critical because when working with expressing fractions with a denominator of 10 as a fraction with a denominator of 100 in order to add two fractions (or the opposite) turning decimals into fractions (or the opposite), and comparing decimals all require a solid

	and language, the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?	understanding of part to whole relationships, renaming using equivalents based on place value, and overall place value understanding. When students habitually explain their thinking, they find successes and mistakes. These mistakes become learning opportunities as opposed to failures.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• Connect to exploring fractions on a number line in third grade. • Connect to explaining equivalence and generating equivalent fractions. **(3.NF.3)** • Connect to understanding that the three digits of a three-digit number represent amounts of hundreds, tens, and ones. **(2.NBT.1)** • Connect to comparing two fractions with the same numerator or the same denominator by reasoning about their size. **(3.NF.3)**	• Connect to adding and subtracting fractions with like denominators. **(4.NF.3)** • Connect to solving measurement word problems involving decimals. **(4.MD.2)** • Connect to reading, writing, and comparing multi-digit whole numbers. **(4.NBT.2)** • Connect to comparing fractions with different numerators and denominators. **(4.NF.2)**	• Connect to recognizing that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. **(5.NBT.1)**

Suggested Instructional Strategies

Pre-Teach

Level of Intensity	*Essential Question*	*Examples*
Targeted	*What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?*	For example, some learners may benefit from targeted pre-teaching that rehearses prior learning when studying, understanding decimal notation for fractions, and comparing decimal fractions because teachers will need to review equivalent fractions and comparing fractions from 3rd and 4th grade standards. Students can also use

		base ten blocks to represent decimals. Previous work with base ten blocks will depend on student experience.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	3.NF.A.3: This standard provides a foundation for work with understanding decimal notation for fractions and comparing decimal fractions because this third grade standard is the first traditional work with equivalent fractions for students. If students have unfinished learning within this standard, based on assessment data, consider ways to provide intensive pre-teaching support prior to the start of the unit to ensure students are ready to access grade level instruction and assignments.

Universal Support Framework

A student should know/understand...	A student should be able to do...	***Potential Scaffolds***

• How a fraction with a denominator of 10 is equal to a fraction with a denominator of 100.
• Fractions with denominators of 10 or 100 can be written as decimals.
• The relationship among decimal places.
	• Change a fraction with a denominator of 10 to an equivalent fraction with a denominator of 100.
	• Add two fractions with denominators of 10 or 100.
	• Model, read, and write a fraction with denominators of 10 or 100 as decimals.
	• Compare decimals with denominators of 10 or 100 using a strategy that makes sense, including fraction numbers, base-ten blocks, or the number line.
		• Build on students' experience with the following skills:
		  ○ Knowledge of money (1/100, 1/10)
		• Cognitive Strategies
		  ○ Repeatedly model the strategies
		  ○ Monitor the students' use of the strategies
		  ○ Provide feedback to students
		  ○ Teach self-questioning and self-monitoring strategies
		  ○ Introduce multiple means of representation for mathematical ideas
		• Encourage students to use alternative tools to better access the grade level content. Examples include:
		  ○ Money

Re-Teach

Level of Intensity	*Essential Question*	*Examples*
Targeted	What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisited during a unit?	For example, students may benefit from re-engaging with content during a unit on understanding decimal notation for fractions and comparing decimal fractions by clarifying mathematical ideas and/or concepts through a short mini-lesson because students will need mathematical ideas clarified. Students tend to generalize numbers. For example, they might think 1/100 is greater than 1/10 because 100 is greater than 10. Revisiting these ideas and making clarification of these concepts will help students.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, some students may benefit from intensive extra time during and after a unit understanding decimal notation for fractions and comparing decimal fractions by addressing conceptual understanding because students who struggle with fractions need support with concrete models. Using base ten blocks, place value charts, or hundreds blocks that students can color in to show the fractions help students build visual pictures and strengthen conceptual understanding.

Extension	
Essential Question	*Examples*
What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics developed within your HQIM?	For example, some learners may benefit from an extension such as the opportunity to understand concepts more quickly and explore them in greater depth than other students when studying understanding decimal notation for fractions and comparing decimal fractions because students who have extensive practice with fractional decimals can quickly move from fraction to decimal form (and vice versa). This can extend to adding and subtracting fractional decimals within word or real-world problems. This type of work would not extend students into different standards but build fluency for later work with decimals and fractions.

4th Grade Fractions Guide