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Public Education Department

New Mexico Instructional S
5th Grade Fractions Gu

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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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

- Use equivalent fractions as a strategy to add and subtract fractions
  - 5.NF.A.1
  - 5.NF.A.2
- Apply and extend previous understandings of multiplication and division
  - 5.NF.B.3
  - 5.NF.B.4
  - 5.NF.B.5
  - 5.NF.B.6
  - 5.NF.B.7

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Grade	CCSS Domain	CCSS Cluster
5	Fractions	Use equivalent fractions as a strategy to add subtract fractions

Cluster Standard: 5.NF.A.1

Standard	Standards for Mathematical Practice
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.)	• **SMP 4**: Model with mathematics.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Builds on the work in fourth grade where students add fractions with like denominators. In fifth grade, the example provided in the standard 2⁄3 + 3⁄4 has students finding a common denominator by finding the product of both denominators. This process should come after students have used visual fraction models (area models, number lines, etc.) to build understanding of equivalent fractions before moving into the standard algorithm described in the standard. The use of these visual fraction models allows students to use reasonableness to find a common denominator prior to using the algorithm. Fifth grade students will need to express both fractions in terms of a new denominator with adding unlike denominators.	• Explain why fractions with unlike denominators need to be replaced with equivalent fractions with like denominators when adding or subtracting. • Generate equivalent fractions to find the like denominator. • Solve addition and subtraction problems involving fractions (including mixed numbers) with like and unlike denominators using an equivalent fraction strategy.
DOK	**Blooms**
1	Apply

Grade	CCSS Domain	CCSS Cluster
5	Fractions	Use equivalent fractions as a strategy to add subtract fractions

Cluster Standard: 5.NF.A.2

Standard	Standards for Mathematical Practice
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. Use equivalent fractions as a strategy to add and subtract fractions.	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 2:** Reason abstractly and quantitatively.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• This standard refers to number sense, which means students' understanding of fractions as numbers that lie between whole numbers on a number line. Number sense in fractions also includes moving between decimals and fractions to find equivalents, also being able to use reasoning such as 7⁄8 is greater than 3⁄4 because 7⁄8 is missing only 1⁄8 and 3⁄4 is missing 1⁄4 so 7⁄8 is closer to a whole. Also, students should use benchmark fractions to estimate and examine the reasonableness of their answers. Examples such as 5⁄8 are greater than 6⁄10 because 5⁄8 is 1⁄8 larger than 1⁄2 (4⁄8) and 6⁄10 is only 1⁄10 larger than 1⁄2 (5⁄10).	• Assess the reasonableness of answers, using mental estimation. • Add and subtract fractions, including those with unlike denominators. • Solve word problems using addition and subtraction of fractions, including those with unlike denominators.
DOK	**Blooms**
1	Apply

Common Misconceptions

• Students often mix models when adding, subtracting or comparing fractions. Students will use a circle for thirds and a rectangle for fourths when comparing fractions with thirds and fourths. Remind students that the representations need to be from the same whole models with the same shape and same size.	

Grade	*CCSS Domain*	*CCSS Cluster*
5	Fractions	Apply and extend previous understandings multiplication and division

Cluster Standard: 5.NF.B.3

Standard	**Standards for Mathematical Practice**
Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size ¾.	• **SMP 2:** Reason abstractly and quantitatively.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Fifth grade students should connect fractions with division, understanding that 5 ÷ 3 = 5⁄3 * Students should explain this by working with their understanding of division as equal sharing. Students should also create story contexts to represent problems involving division of whole numbers. This standard calls for students to extend their work of partitioning a number line from third and fourth grade. Students need ample experiences to explore the concept that a	• Interpret a fraction as division of the numerator by the denominator. • Interpret the remainder as a fractional part of the problem. • Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers.

fraction is a way to represent the division of two quantities.	
DOK	**Blooms**
1-2	Apply

Grade	*CCSS Domain*	*CCSS Cluster*
5	Fractions	Apply and extend previous understandings multiplication and division

Cluster Standard: 5.NF.B.4

Standard	**Standards for Mathematical Practice**
Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. ● 5.NF.B.4.a. Interpret the product (a/b) × q as a part of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.) ● 5.NF.B.4.b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles and represent fraction products as rectangular areas.	● **SMP 8:** Look for and express regularity in repeated reasoning.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
● Students need to develop a fundamental	● Extend previous understandings of multiplication

understanding that the multiplication of a fraction by a whole number could be represented as repeated addition of a unit fraction (e.g., 2 x (1⁄4) = 1⁄4 + 1⁄4). This standard extends student's work of multiplication from earlier grades. In fourth grade, students worked by recognizing that a fraction such as 3⁄5 could be represented as 3 pieces that are each one-fifth (3 x (1⁄5)). These standards reference both the multiplication of a fraction by a whole number and the multiplication of two fractions. Visual fraction models (area models, tape diagrams, number lines) should be used and created by students during their work with this standard. This standard extends students' work with area. In third grade students determine the area of rectangles and composite rectangles. In fourth grade students continue this work. The fifth-grade standard calls students to continue the process of covering (with tiles).	to multiply a fraction or a whole number by a fraction. ● Explain that the product (a/b) x q is the same as a x q ÷ b. ● Multiply a fraction or a whole number by a fraction. ● Create a story context to multiply a fraction or a whole number by a fraction. ● Explain that finding the area of a rectangle with fractional side lengths by filling with tiles is the same as would be found by multiplying the side lengths. ● Find the area of a rectangle by tiling it with unit squares. ● Multiply fractional side lengths to find the area of a rectangle.
DOK	**Blooms**
1-2	Apply

Grade	*CCSS Domain*	*CCSS Cluster*
5	Fractions	Apply and extend previous understandings multiplication and division

Cluster Standard: 5.NF.B.5

Standard	**Standards for Mathematical Practice**
Interpret multiplication as scaling (resizing), by: ● 5.NF.B.5.a: Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. ● 5.NF.B.5.b: Explaining why multiplying a given number by a fraction greater than 1 results in a	● **SMP 2:** Reason abstractly and quantitatively.

product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n×a)/(n×b) to the effect of multiplying a/b by 1.	
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• These standards ask students to examine how numbers change when we multiply by fractions. Students should have ample opportunities to examine both cases in the standard: a) when multiplying by a fraction greater than 1, the number increases and b) when multiplying by a fraction less than one, the number decreases. This standard should be explored and discussed while students are working with 5.NF.4, and should not be taught in isolation.	• Interpret multiplication by scaling, comparing the size of a product to the size of one factor based on the size of the other factor. • Explain why multiplying a given number by a fraction greater than one results in a product greater than the given number and why multiplying a given number by a fraction less than one results in a product smaller than the given number.
DOK	**Blooms**
1-3	Apply, Analyze

Grade	*CCSS Domain*	*CCSS Cluster*
5	Fractions	Apply and extend previous understandings multiplication and division

Cluster Standard: 5.NF.B.6

Standard	**Standards for Mathematical Practice**
Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	• **SMP 2:** Reason abstractly and quantitatively.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• This standard builds on all of the work done in	• Represent word problems involving multiplication

this cluster. Students should be given ample opportunities to use various strategies to solve word problems involving the multiplication of a fraction by a mixed number. This standard could include fraction by a fraction, fraction by a mixed number or mixed number by a mixed number.	of fractions and mixed numbers. ● Solve real world problems involving multiplication of fractions and mixed numbers
DOK	**Blooms**
1-2	Apply

Grade	*CCSS Domain*	*CCSS Cluster*
5	Fractions	Apply and extend previous understandings multiplication and division

Cluster Standard: 5.NF.B.7

Standard	Standards for Mathematical Practice
Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. ● 5.NF.B.7.a: Interpret division of a unit fraction by a non-zero whole number and compute such quotients. For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3. ● 5.NF.B.7.b: Interpret division of a whole number by a unit fraction and compute such quotients. For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between	● **SMP 1:** Make sense of problems and persevere in solving them. ● **SMP 3:** Construct viable arguments and critique the reasoning of others.

multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4. ● 5.NF.B.7.c: Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?	
Clarification Statement	**Students Who Demonstrate Understanding Can...**
● This is the first time that students are dividing fractions. In fourth grade students divided whole numbers, and multiplied a whole number by a fraction. The concept unit fraction is a fraction that has a one in the denominator. For example, the fraction 3⁄5 is 3 copies of the unit fraction 1⁄5. 1⁄5 + 1⁄5 + 1⁄5 = 3⁄5 = 1⁄5 x 3 or 3 x 1⁄5. This standard asks students to work with story contexts where a unit fraction is divided by a non-zero whole number. Students should use various fraction models and reasoning about fractions.	● Know the relationship between multiplication and division. ● Interpret division of a unit fraction by a whole number and justify your answer using the relationship between multiplication and division, by creating story problems, using visual models, and relationship to multiplication. ● Interpret division of a whole number by a unit fraction and justify your answer using the relationship between multiplication and division, and by representing the quotient with a visual fraction model. ● Solve real world problems involving division of unit fractions by whole numbers other than 0 and division of whole numbers by unit fractions using strategies such as visual fraction models and equations.
DOK	**Blooms**
1-2	Apply

Common Misconceptions

● Students may initially think that you can not divide a "smaller number" by a "bigger number" since this will be a new situation for them to consider.	● Students may believe that multiplication always results in a larger number.

ASSESSMENT GUIDE

- Use equivalent fractions as a strategy to add and subtract fractions
- Apply and extend previous understandings of multiplication and division

Grade	*CCSS Domain*	*CCSS Strand*
5	Fractions	Use equivalent fractions as a strategy to ad subtract fractions
	Sample Task #1 (Constructed Response)	
	Robin is 11 years old. Her mother, Gwen, is 2 years more than 3 times Robin's age. How old is Gwen?	
	Sample Task #2 (Multiple Choice)	
	Which expression represents the statement shown? Add 3 and 5, next add 8 and 2, then multiply the two sums. A. (3+5) + (8+2) x 2 B. 3+5+8+2x2 C. (3x5) + (8x2) D. (3+5) x (8+2)	

Grade	*CCSS Domain*	*CCSS Strand*
5	Fractions	Apply and extend previous understandings multiplication and division
	Sample Task #1 (Constructed Response)	
	Michelle has 3 kg of strawberries that she divided equally into small bags with 1/5 kg in each bag. How many bags of strawberries did she make? She gave a bag to her friend, Sarah. Sarah ate half of her strawberries. How many grams of strawberries does Sarah have left?	
	Sample Task #2 (Multiple Choice)	

Jack uses the values from two patterns to form ordered pairs.
• Both patterns start at 2.
• The rule for the x-values is to add 1 to the previous term.
• The rule for the y-values is to add 3 to the previous term.
Jack then graphs the ordered pairs. Which ordered pair is on the line that Jack graphs?

A. (3,5)
B. (4,5)
C. (4,6)
D. (5,3)

MLSS AND CLR GUIDE

- Use equivalent fractions as a strategy to add and subtract fractions
- Apply and extend previous understandings of multiplication and division

CCSS Domain	*CCSS Cluster*
Fractions	Use equivalent fractions as a strategy to add and subtract frac

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on the use of creating equivalent fractions as a strategy to add and subtract 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, connect fraction addition and subtraction to cooking within the home. Students may also be familiar with carpentry and may be able to connect this mathematical concept to this task seen within the home and/or community. By allowing students to interact with fractions on a personal level, students see the relevance to their everyday lives and can connect with the mathematical concepts.	
Cross-Curricular Connections	STEM: Students add fractions from given or collected data to find the total.	
Validate/Affirm/Build/ Bridge	• *How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and*	• 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

	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?*	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 the use of creating equivalent fractions as a strategy to add and subtract fractions the types of mathematical tasks are critical because students must connect their mathematical models to the development of procedures used to add and subtract fractions with unlike denominators, in order to fully understand the concepts that make up the procedure. Students can create models that represent items they see and interact with daily. From those models, students can connect the procedural routine of creating equivalent fractions as a strategy to add and subtract fractions. By using objects that students are familiar with, the teacher can build fluency with a connection to procedural understanding. Students who understand the reason behind the procedure are more likely to build fluency and precision when using the procedure involved in creating equivalent fractions as a strategy to add and subtract fractions.

Planning for Multilayered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• Connect to comparing fractions with different denominators by creating common denominators. **(4.NF.1,2)** • Connect to adding and subtracting fractions with like denominators. **(4.NF.3)** • Connect to making a line plot to display a data set of measurements in fractions of a unit. **(4. MD.4)**	• Connect to making a line plot to display a data set and will add and subtract fractions of a unit to solve problems involving the information presented in the line plot. **(5.MD.2)**	• Connect to solving algebraic equations and real-world problems using rational numbers. **(6.EE.7)**

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 the use of equivalent fractions as a strategy to add and subtract fractions because "to add or subtract fractions with unlike denominators, students use their understanding of equivalent fractions to create fractions with the same denominators. Start with problems that require the changing of one of the fractions and progress to changing both fractions. Allow students to add and subtract fractions using different strategies such as number lines, area models, fraction bars or strips. Have students share their strategies and discuss commonalities in them."
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	4.NF.A.1 Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × 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: This standard provides a foundation for work with the use of equivalent fractions as a strategy to add and subtract fractions because students need to understand what an equivalent fraction is, in order to understand why it is important to first create equivalent fractions when adding and subtracting 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***
• The need for common denominators when adding and subtracting fractions and mixed numbers.	• Add and subtract fractions with unlike denominators. • Solve word problems using addition and subtraction of fractions, including	• Build on students' experience with the following skills: ○ Explain why a fraction is equivalent to another fraction by using visual models (4.NF.1) ○ Recognize that comparisons are valid only when the two fractions refer to the

• Fractions and mixed numbers with unlike denominators can be replaced with equivalent fractions and mixed numbers with like denominators when adding or subtracting.	those with unlike denominators. • Analyze results using models and benchmark fractions to determine whether an answer is reasonable.	same whole. (4.NF.2) ○ Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. (4.NF.3) ○ Convert mixed fractions to standard 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: ○ Number line ○ Area Model ○ Pattern Blocks ○ Fraction Bars ○ Tangrams

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 the use of equivalent fractions as a strategy to add and subtract fractions by revisiting student thinking through a short mini-lesson because "students need to develop the understanding that when adding or subtracting fractions, the fractions must refer to the same whole. Any models used must refer to the same whole. Students may find that a circular model might not be the best model when adding or subtracting 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 on the use of equivalent fractions as a strategy to add and subtract fractions by addressing conceptual understanding

		because students need to understand what the procedure is doing in order to develop fluency and proficiency with the procedure for using equivalent fractions as a strategy for adding and subtracting fractions. Some students may need practice representing fractions visually or physically before understanding the idea of equivalent fractions and why they are needed when adding and subtracting 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 application of and development of abstract thinking skills when studying the use of equivalent fractions as a strategy to add and subtract fractions because some students may understand the concepts quickly and easily. These students will not benefit from the continued creation of models, if they already understand the reasoning behind the procedure. Allow these students to communicate their thinking through images, concepts, facts, language and procedures (ICFLP Dr. Lorenzo Gonzales). Expose these students to more complex problems involving mixed numbers, fractions with denominators that are not compatible, and problems that require changing both fractions. Allow these students to explore and create procedures for creating equivalent fractions as a strategy to add and subtract fractions. Encourage these students to explain their thinking, test hypothesis, and modify procedures as necessary. Valid their thinking and address any misconceptions that arise quickly.

CCSS Domain	*CCSS Cluster*
Fractions	Apply and extend previous understandings of multiplication and d

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on apply and extend previous understandings of multiplication and division to multiply and divide 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 create story contexts for multiplying and dividing fractions and include a visual model. For example, How much pie? After a family function, Emily has 3 equally sized pies and wants to divide them equally into eight equal portions to give to family members that want to take some home. How much pie does each family member receive?	
Cross-Curricular Connections	Social Studies: Connect fractions to studies of geography including scaling graphs and cross-sections, changes in measure (population, GDP) Health: connect fractions to food sharing, cooking, serving portions, nutrition, medical doses, heart beats per minute, steps per day. Present students with real-world problems using these topics.	
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 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?*	• Tasks: The type of mathematical tasks and instruction students receive provides the foundation for students' mathematical learning and their mathematical identity. Tasks and instructions that provide greater access to mathematics and convey the creativity of mathematics by allowing for multiple solution strategies and development of the standards for mathematical practice lead to more students viewing themselves mathematically successful capable mathematicians than tasks and instruction which define success as memorizing and repeating a procedure demonstrated by the teacher. For example, when studying Apply and extending previous understanding of multiplication and division to multiply and divide fractions the types of 47 8 mathematical tasks are critical because students are demonstrating their conceptual understanding, procedural fluency, and problem solving and reasoning. Students use a variety of problem-solving situations to develop an understanding of multiplication and division of fractions.

Planning for Multi-Layered System of Supports

Vertical Alignment

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Previous Learning	*Current Learning*	*Future Learning*
• Connect to understanding concepts of area and relate area to multiplication and to addition. **(3.MD.7)** • Connect to using the four operations with whole numbers to solve problems. **(4.OA.1,2,3)** • Connect to understanding the concept of equivalent fractions by using visual fraction models. **(4.NF.1)** • Connect to multiplying a fraction by a whole number. **(4.NF.4)**	• Connect to understanding of tenths and hundredths to perform operations with multi-digit whole numbers and with decimals to hundredths. **(5.NBT.5,6,7)** • Connect to knowledge of writing simple expressions to solve real problems with fractions. They will also interpret expressions without actually evaluating them. **(5.OA.2)** • Connect to using operations on fractions of a unit (1/2, 1/4, 1/8) to solve problems involving information presented in line plots. **(5.MD.2)**	• Connect to using ratios written as fractions and divide into decimal form 3 ÷ 4 = 3⁄4 = 0.75. **(6.RP .1,3)** • Connect to solving multiplication equations that include non-negative rational numbers. **(6.EE.7)** • Connect to multiplying and divide fractions by fractions. **(6.NS.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 apply and extend previous understandings of multiplication and division to multiply and divide fractions because use of models to multiply a fraction by a whole number will help student connect to the meaning of whole number multiplication.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	3.OA.A.1. This standard provides a foundation for work with multiplying and dividing fractions because this standard has students represent and solve problems involving multiplication and division, conceptual models of understanding multiplication and division. 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 can be interpreted as division of the numerator by the denominator.
• What is happening when they multiply a fraction by a fraction.
• Why multiplying a given number by a fraction greater than one results in a product greater than the given number and why multiplying a given number by a fraction less than one results in a product smaller than the given number.
• Connections between division with fractions and multiplication with fractions using previous understanding of the relationship between multiplication and division.
	• Solve division problems involving whole numbers that lead to answers in the form of a fraction by using a visual fraction model or equations.
	• Multiply a fraction or a whole number by a fraction.
	• Solve problems involving the multiplication of fractions and mixed numbers using visual fraction models or equations.
	• Solve division problems that include unit fractions divided by whole numbers (non-zero) and whole numbers (non-zero) divided by unit fractions.
		• Build on students' experience with the following skills:
		  ○ Using visual fractional models (4.NF.4a)
		  ○ Converting measurement units from a larger unit to a smaller unit
		  ○ Finding area by tiling dealing with whole numbers to find fractional area of a shape
		• 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:
		  ○ Area Models
		  ○ Tape Diagrams
		  ○ Drawing Models
		  ○ Number Lines
		  ○ Contextual Problems

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 connecting multiplication and division of whole numbers to multiplication and division of fractions by giving students connected situations they can model by clarifying mathematical ideas and/or concepts through a short mini-lesson because exploration using various representations including concrete and pictorial models.
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 Apply and extend previous understanding of multiplication and division to multiply and divide fractions by confronting student misconceptions because students may initially think that they cannot divide a "smaller number by a bigger number" since this will be a new situation for them to consider. It is important they understand this concept in a way that makes sense to them rather than be shown how to do it.

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 Apply and extend previous understanding of multiplication and division to multiply and divide fractions because as students work with various models of multiplication and division of whole numbers, fractions, and mixed numbers, visual representations will help them understand the size of the product/quotient when they multiply/divide a fraction by a whole number, a whole number by a fraction, or a fraction by a fraction.