New Mexico Instructional Scope

3rd Grade Operations and Algebraic Thinking Guide

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
- Student Discourse Guide **(only provided for clusters with Conceptual Understanding standards)**
- A multilayered system of supports (MLSS) and culturally and linguistically responsive instruction (CLR) guide

New Mexico Instructional Scope

3rd Grade Operations and Algebraic Thinking 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

- Represent and solve problems involving multiplication and division
  - CCSS.3.OA.A.1
  - CCSS.3.OA.A.2
  - CCSS.3.OA.A.3
  - CCSS.3.OA.A.4
- Understand properties of multiplication and the relationship between multiplication and division
  - CCSS.3.OA.B.5
  - CCSS.3.OA.B.6
- Multiply and divide within 100
  - CCSS.3.OA.C.7
- Solve problems involving the four operations, and identify and explain patterns in arithmetic
  - CCSS.3.OA.D.8
  - CCSS.3.OA.D.9

New Mexico Instructional Scope

3rd Grade Operations and Algebraic Thinking Guide

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Operations and Algebraic Thinking**	**Represent and solve problems involving multiplication and division**

Cluster Standard: 3.OA.A.1

Standard	Standards for Mathematical Practice
Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.	• **SMP2:** Reason abstractly and quantitatively. • **SMP3:** Construct viable arguments and critique the reasoning of others.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students need to explore and understand the relationship between multiplication and division. • Equations in the form of a x b = c and c = a x b should be used interchangeably, with the unknown in different positions.	• Demonstrate understanding by representing multiplication with equal groups. • Represent multiplication with arrays. • Use repeated addition to represent multiplication. • Utilize the number line to represent multiplication with equal jumps • Analysis of operational patterns, grouping patterns, grouping of numbers, arrays, and area-based strategies. • Apply the standard algorithms and their conceptual basis utilizing drawings and equations. • Demonstrate algorithms to provide computational efficiency utilizing problem solving and solving problems
DOK	**Blooms**
1	Remember, Understand

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Grade	*CCSS Domain*	*CCSS Cluster*
3	**Operations and Algebraic Thinking**	**Represent and solve problems involving multiplication and division**

Cluster Standard: 3.OA.A.2

Standard	Standards for Mathematical Practice
Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.	• **SMP 2:** Reason abstractly and quantitatively. • **SMP 3:** Construct viable arguments and critique the reasoning of others.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students need to explore and understand the relationship between multiplication and division.	• Explain the meaning of division and what the numbers in a division problem represent. • Explain that a dividend is the number of objects to be shared equally. The divisor is the number of equal shares or the number in each equal share. The quotient is an answer to a division problem. • Describe the meaning of division and quotients of whole numbers. • Interpret whole-number quotients of whole numbers. • Utilize partition division in which you divide an amount into a given number of groups. • Utilize measurement division which is repeated subtraction division in which you divide an amount into groups of a given size. • Demonstrate division with manipulatives and other visuals
DOK	**Blooms**
1	Remember, Understand

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3rd Grade Operations and Algebraic Thinking Guide

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Operations and Algebraic Thinking**	**Represent and solve problems involving multiplication and division**

Cluster Standard: 3.OA.A.3

Standard	Standards for Mathematical Practice
Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 2:** Reason abstractly and quantitatively.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students will apply their understanding of multiplication and division to identify an unknown in an equation or word problem. This means they will need to apply their understanding of the meaning of the equal sign as "the same as" to interpret an equation with an unknown. The standard requires them to see the solution to an equation on both sides of the equal sign.	• Utilize visuals to represent, interpret, and solve one-step problems involving multiplication and division. • Solve multiplication word problems by utilizing models, drawings, and equations. • Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem. • Solve division word problems with a divisor and quotient utilizing models, drawings, and equations. • Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem. • Explain connections of equations solved with their models or drawings to reinforce multiplication and division within 100. • Develop strategies using models, drawings, and equations to demonstrate student understanding.
DOK	**Blooms**

2-3	Apply, Analyze

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Operations and Algebraic Thinking**	**Represent and solve problems involving multiplication and division**

Cluster Standard: 3.OA.A.4

Standard	Standards for Mathematical Practice
Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = _ ÷ 3, 6 × 6 = ?	• **SMP 2:** Reason abstractly and quantitatively. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students will need to determine the unknown number in multiplication and division problems such as the following examples: 8 x 9 = ?, 8 x ? = 48, ? x 3 = 27, 28 ÷ 7 = ?, ? ÷ 6 = 3, 35 ÷ ? = 7	• Explain connections between an equation to a problem. • Multiply and divide within 100. • Determine which operation (multiplication or division) is needed to determine the unknown whole number and solve to find the unknown whole number in a multiplication or division equation. • Apply their understanding to demonstrate their knowledge of the relationship between multiplication and division. • Examine patterns and use manipulatives as well as drawings to demonstrate their understanding of determining the unknown whole number in a multiplication or division equation.
DOK	**Blooms**
1-2	Remember, Understand

Common Misconceptions

• Students may think that 3 ÷ 15 = 5 and 15 ÷ 3 = 5 are the same equations. The use of models is essential in helping students eliminate this misunderstanding. • Students may think a symbol used to represent a number once cannot be used to represent another number in a different problem/situation.	• The use of a symbol to represent a number once cannot be used to represent another number in a different problem/situation. Presenting students with multiple situations in which they select the symbol and explain what it represents will counter this misconception.

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Operations and Algebraic Thinking**	**Understand properties of multiplication and the relationship between multiplication and division**

Cluster Standard: 3.OA.B.5

Standard	Standards for Mathematical Practice
Apply properties of operations as strategies to multiply and divide. Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)	• **SMP 2:** Reason abstractly and quantitatively. • **SMP 8:** Look for and express regularity in repeated reasoning.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Requires students to apply properties of operations as strategies to multiply and divide. • Requires students to explain and represent the commutative property (two factors can be multiplied in either order and still have the same product. • Students need to explain and represent the	• Explain the commutative property of multiplication where two factors can be multiplied in either order and have the same product. • Explain the associative property of multiplication states that the position of three or more factors grouped before multiplying does not affect the

associative property (the way in which three or more factors are grouped before multiplying does not affect the product).	product. ● Explain that the distributive property allows you to separate numbers into parts so that the numbers are easier to work with, and apply properties to use with basic facts or multiply with multiples.. ● Multiply and divide within 100 and explain how the properties of operations work. Apply properties of operations as strategies to multiply or divide. ● Utilize visuals that support their understanding of the application of properties as strategies to multiply and divide.
DOK	**Blooms**
2-3	Apply

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Operations and Algebraic Thinking**	**Understand properties of multiplication and the relationship between multiplication and division**

Cluster Standard: 3.OA.B.6

Standard	**Standards for Mathematical Practice**
Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.	● **SMP 5:** Use appropriate tools strategically. ● **SMP 6:** Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
● Students need to explain and represent the distributive property (breaking numbers into parts so that the numbers are easier to work	● Describe how multiplication and division are related. ● Identify the unknown factor in the related

with) • Students need to apply properties to recall basic facts or multiply with multiples of 10 • Students need to use multiplication to find an unknown in a division equation, as well as use division to find an unknown in a multiplication equation. • Students need to understand the relationship between multiplication and division and explain their processes of solving multiplication and division problems using an inverse operation.	multiplication problem. • Identify the multiplication problem related to the division problem. • Use multiplication and division to solve division problems. • Recognize multiplication and division as related operations and explain how they are related. • Solve an unknown-factor problem, by using division strategies and/or changing it to a multiplication problem. • Use visuals such as an array with related multiplication problems to demonstrate their understanding of division as an unknown factor problem.
DOK	**Blooms**
1-2	Remember, Understand

Common Misconceptions

• Students may think that division is commutative. 5 ÷ 3 = 3 ÷ 5	• Students may see multiplication and division as different and unrelated operations.

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Operations and Algebraic Thinking**	**Multiply and divide within 100**
Cluster Standard: 3.OA.C.7		
Standard		**Standards for Mathematical Practice**

Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.	• **SMP 5:** Use appropriate tools strategically. • **SMP 6:** Attend to precision. • **SMP 8:** Look for and express regularity in repeated reasoning.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• This standard requires students to be fluent with multiplication and division facts • They need to use strategies, knowledge of relationships between multiplication and division, and the properties of operations, to recall basic facts quickly and accurately. • It is not enough for students to recall facts from memory from timed tests alone, but from experiences with manipulatives, pictures, arrays, and word problems to internalize the basic facts.	• Solve problems using models and drawings as visuals as examples that represent multiplication and division facts. • Relate models to written equations. • Utilize strategies based on properties and patterns of multiplication to learn multiplication facts. • Use multiplication facts in terms of missing factors to learn division facts.
DOK	**Blooms**
1-2	Remember, Understand

Common Misconceptions

• Students may struggle with fully comprehending the strategies that will help them achieve fluency. It is critical for each of these strategies to be taught explicitly. • Students think a symbol (? or []) is always the place for the answer. This is especially true when the problem is written as 15 ÷ 3 =? or 15 = x 3.	• Students may think that 3 ÷ 15 = 5 and 15 ÷ 3 = 5 are the same equations.

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Operations and Algebraic Thinking**	**Solve problems involving the four operations, and identify and explain patterns in arithmetic.**

Cluster Standard: 3.OA.D.8

Standard	Standards for Mathematical Practice
Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 3:** Construct viable arguments and critique the reasoning of others.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• This standard requires students to use their knowledge of the four operations to solve two-step word problems. They need to be able to determine the first and second step in a two-step word problem. • They need to be able to represent a two-step word problem with models, pictures, and equations (two equations can be used in place of an equation with two operations). They also need to write an equation using a letter for the unknown.	• Solve two-step word problems using addition, subtraction, and multiplication. • Determine the first step in a two-step word problem. Students then are able to determine the second step in a two-step word problem. • Utilize models, drawings, and equations to represent the equation. • Represent problems using equations with a symbol for the unknown number. • Develop their skills and assess the answer that it makes sense and correlates with visual equations
DOK	**Blooms**
2-3	Apply, Analyze

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Operations and Algebraic Thinking**	**Solve problems involving the four operations, and identify and explain patterns in arithmetic.**

Cluster Standard: 3.OA.D.9

Standard	Standards for Mathematical Practice

Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.	• **SMP 5:** Use appropriate tools strategically. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students will determine if a solution to a two-step problem is reasonable using mental computation and estimation strategies including rounding. • This standard requires students to examine patterns of multiplication. The ability to recognize and explain patterns in mathematics leads students to developing the ability to make generalizations, a foundational concept in algebraic thinking.	• Identify patterns in addition and multiplication charts. • Explain patterns when adjusting addends (any number that is added together in an addition problem). • Explain doubling a factor doubles the product. • Explain that a factor can be decomposed and the partial products can be put back together. • Interpret patterns of multiplication on a hundreds board and/or multiplication table. • Use visuals that represent their thinking when identifying arithmetic patterns.
DOK	**Blooms**
1-2	Remember, Understand

Common Misconceptions

- Many students may think a pattern occurs if it only happens twice.

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: **Operations and Algebraic Thinking**	Strand: **Represent and solve problems involving multiplication and division**
Suggested Student Discourse Questions	
• How are equal groups related to the quotient in a division equation? • Explain how your partner's strategy could be used to reach an acceptable solution.	• Which strategy to solve multiplication is more effective, tape diagrams or arrays? Explain • Where do you normally see arrays outside of school (in your home? In your community?)

Domain: **Operations and Algebraic Thinking**	Strand: **Understand properties of multiplication and the relationship between multiplication and division**
Suggested Student Discourse Questions	
• How are multiplication and division related to each other? • How does the distributive property help you solve complex multiplication equations? • Why are multiplication and division inverse operations?	• How do fact families help you solve equations? • How is the commutative property of addition related to the commutative property of multiplication? • How can arrays help with multiplication and division?

Domain: **Operations and Algebraic Thinking**	Strand: **Multiply and divide within 100.**
Suggested Student Discourse Questions	
• How can we use models to represent multiplication and division facts? • How does skip counting help you solve	• What strategies help you memorize multiplication and division facts? • Why is it important to memorize our math

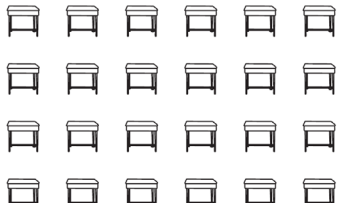
multiplication? • How can multiplication help you solve division?	facts?

Domain: **Operations and Algebraic Thinking**	Strand: **Solve problems involving the four operations. Identify and explain patterns in arithmetic.**
Suggested Student Discourse Questions	
• How do you know where to begin a word problem? • How do you check what the problem is asking? • What strategies do you use to break apart word problems?	• How can we use models, drawings, and equations to represent a problem? • Is your answer reasonable and how can you determine that it is? • What resources can you use to find patterns? (charts, tables, input and output diagrams, etc.)

ASSESSMENT GUIDE

- Represent and solve problems involving multiplication and division
- Understand properties of multiplication and the relationship between multiplication and division
- Multiply and divide within 100
- Solve problems involving the four operations, and identify and explain patterns in arithmetic

Grade	*CCSS Domain*	*CCSS Strand*
3	**Operations and Algebraic Thinking**	**Represent and solve problems involving multiplication and division**
	Sample Task #1 (Constructed Response)	
	These are the desks in Ms. Green's classroom.	



There is one desk for each student in Ms. Green's class.
a. Write a multiplication number sentence that can be used to find the number of students in the class.

Ms. Green wants to arrange the desks so that there are 3 equal rows.
b. How many desks will be in each row?

Ms. Green wants to arrange the desks so that there are 9 desks in each of the 3 rows.
c. How many more desks will Ms. Green need so that each row can have 9 desks? Show your work or explain how you know.

Sample Task #2 (Multiple Choice)

Tom writes this expression on his paper.

$28 \div 4$

Which situation could Tom's expression represent?

A. Tom has 28 books and gives 4 of them to his friend.
B. Tom gives 28 books to each of his 4 friends.
C. Tom has 28 books and buys 4 more books.
D. Tom puts 28 books equally on 4 shelves.

Grade	*CCSS Domain*	*CCSS Strand*
3	**Operations and Algebraic Thinking**	**Understand properties of multiplication and the relationship between multiplication and division**

Sample Task #1 (Constructed Response)

Charlie picks 20 apples. He divides them equally between 5 baskets. How many apples are in each basket? Explain your thinking.

	Sample Task #2 (Multiple Choice)
	Which expression can be used to find 6 x 8? A. (3 x 2) + (4 x 2) B. (6 x 4) + (6 x 2) C. (6 x 4) + (6 x 4) D. (8 x 6) + (8 x 8)

Grade	*CCSS Domain*	*CCSS Strand*
3	**Operations and Algebraic Thinking**	**Multiply and divide within 100**
	Sample Task #1 (Constructed Response)	
	Ms. Lee puts all the students in her class into 6 groups. There are 4 students in each group. A. What is a multiplication sentence that can be used to determine the number of students in Ms. Lee's class? Show your work or explain how you know. B. Ms. Lee has 48 markers. She will give each group of students the same number of markers.What is a division sentence that can be used to determine the number of markers each group of students will get? Show your work or explain how you know.	
	Sample Task #2 (Multiple Choice)	
	Which two equations are true? Select the two correct answers. A. 6 x 8 = 42 B. 7 x 9 = 63 C. 8 x 3 = 28 D. 18 ÷ 3 = 6 E. 32 ÷ 4 = 9 F. 54 ÷ 7= 8	

Grade	*CCSS Domain*	*CCSS Strand*

3	Operations and Algebraic Thinking	Solve problems involving the four operations, and identify and explain patterns in arithmetic

Sample Task #1 (Constructed Response)

Sandra keeps her sticker collection in 7 albums. Each album has 40 stickers in it. She starts a new album that has 9 stickers in it. How many total stickers does she have in her collection? Explain your thinking.

Sample Task #2 (Multiple Choice)

Emily's coach has 54 orange slices. The coach gives the same number of orange slices to each of the 9 players. Emily eats 3 of her orange slices. Which number sentence can be used to find the number of orange slices Emily has left?

A. 54 - 3 - 9 = n
B. 54 ÷ 3 ÷ 9 = n
C. 54 - 9 ÷ 3 = n
D. 54 ÷ 9 - 3 = n

MLSS AND CLR GUIDE

- Represent and solve problems involving multiplication and division
- Understand properties of multiplication and the relationship between multiplication and division
- Multiply and divide within 100
- Solve problems involving the four operations, and identify and explain patterns in arithmetic

CCSS Domain	*CCSS Cluster*
Operations and Algebraic Thinking	Represent and solve problems involving multiplication and division

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on representing and solving problems involving multiplication and division, 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, when cooking a meal or dessert your child could figure out how much each family member should get which will be an introduction to fractions.

Cross-Curricular Connections	• **Language Arts:** Essential vocabulary: multiplication, factor, array, equal groups, and repeated addition. Writing math word problems utilizing punctuation and spelling. Also include a five square graphic organizer that includes 1. The question, 2. Important information from the problem, 3. visual representation of the important information to solve the problem, 4. Solve the problem, 5. Students explain in writing what they did to solve the problem and why they used their method to solve the problem.	
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?*	• **Using and Connecting Mathematical Representations:** The standard for mathematical practice, use appropriate tools strategically, provides a strong foundation to validate and bridge for students. Mathematical 7 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 representing and solving problems involving multiplication and division the use of mathematical representations within the classroom is critical because it aids students in understanding the reasoning or the WHY behind the mathematics. Although procedural knowledge of multiplication and division is quicker, they are just steps without the understanding of the concepts and the procedure. Visual representations how students better visualize and quantify the numbers and concepts.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	***Current Learning***	***Future Learning***
• Connect to understanding of equal groups, skip counting by 2,	• Connect to division as an unknown-factor problem. **(3.OA.6)**	• Connect to understanding of multiplication and division, using

5, 10, 100's, work with arrays up to 5 rows and 5 columns. **(2.OA.4)** • Connect to whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends. **(2.OA.3)** • Connect to counting within 1000; skip-counting by 5s, 10s, and 100s. **(2.NBT.2)** • Connect to using addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends. **(2.OA.4)**	• Connect to multiply and divide within 100, using strategies such as the relationship between multiplication and division. **(3.OA.7)** • Connect to apply properties of operations as strategies to multiply and divide. **(3.OA.5)** • Connect the area to the operations of multiplication and addition. **(3.MD.7)**	various strategies to help with larger numbers. Learners will interpret a multiplication equation as a comparison. **(4.OA.1)** • Connect to apply and extend previous understandings of multiplication to multiply a fraction by a whole number. **(4.NF.4)** • Connect to multiply or divide to solve word problems involving multiplicative comparison. **(4.OA.2)** • Connect to apply the area and perimeter formulas for rectangles in real world and mathematical problems. **(4.MC.3)**

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 introduces new representations (e.g., number lines) when studying representing and solving problems involving 5 multiplication and division because understanding the visual representations will help students understand the concept. Understanding the visual representations will also help provide students with a strategy to record their understanding.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	2.OA.C.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends. This standard provides a foundation for work with representing and solving problems involving multiplication and division because it provides students with the foundation and understanding of the visual representation of arrays. It also provides the basis of the understanding of multiplication being repeated addition. 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***

• Multiplication is repeated addition
• Division is repeated subtraction
• Arrays can be used to model multiplication and division problems
• The rows and columns of an array differ based on orientation of the array
• Multiplication and division are inverse operations of each other and either can be used to "undo" the other operation
	• Find products of whole numbers as the total number of objects in *n* groups of *n* objects each.
	• Solve multiplication problems by using equal groups, arrays, area, and/or measurement quantities.
	• Represent a real-world multiplication/division problem as a mathematical equation.
	• Represent a word problem using multiple methods, such as a picture, an equation with a symbol for the unknown number, etc.
		• Build on students' experience with the following skills:
		  ○ Rectangular arrays and repeated addition (2.OA.4)
		  ○ Skip counting by 2s, 5s 10s, and 100s (2.NBT.2)
		  ○ Partitioning shapes and groups of objects into equal shares (2.G.2, 2.G.3)
		  ○ Solving one- and two step addition and subtraction word problems (2.OA.1)
		  ○ Solving equations for the unknown
		
		• 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. This can include tools like:
		  ○ Graphic organizers
		  ○ Unifix cubes
		  ○ Counters

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 representing and solving problems involving multiplication and division by critiquing student approaches/solutions to make connections through a short mini-lesson because if students are able to critique student approaches and solutions they can then examine their own thinking and approach to determine if it is reasonable and accurate.
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 representing and solving problems involving multiplication and division by offering opportunities to understand and explore different strategies because the more opportunities a student has to explore different strategies the more likely they will be able to find a strategy that makes sense to them and develop an understanding of a concept.

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 representing and solving problems involving multiplication and division because this will allow students to dive deeper into the concept and begin to explore the next steps of the standard. It also allows students to begin thinking about application of the concept.

New Mexico Instructional Scope

3rd Grade Operations and Algebraic Thinking Guide

CCSS Domain	*CCSS Cluster*
Operations and Algebraic Thinking	**Understand properties of multiplication and the relationship between multiplication and division**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on multiplication, 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, when making a quilt or blanket of a certain size, with a certain size of squares, how many squares would you need to create or make a quilt/blanket.	
Cross-Curricular Connections	Science: Students could learn about Science by implementing information from plants, earth and space, cycles of life, animals, electricity and magnetism, and motion and sound to solve word problems.	
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?*	• 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 understanding properties of multiplication and the relationship between multiplication and division the types of mathematical tasks are critical because if procedural knowledge is built without conceptual understanding students are only learning a process or steps, however they are not learning the WHY or the meaning of the math. Without conceptual knowledge students are basically doing what a calculator or computer could accomplish. Through building a conceptual understanding of the properties of multiplication and the relationship of multiplication and division students do not have to rely merely on a procedure to get an answer. Students can think through the math and use the procedure as a tool for calculating their answer. Students should also then be able to assess the reasonableness of their procedural answer when

		they have a conceptual understanding of the concept.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• Connect to previous work understanding equal groups, skip counting by 2, 5, 10, 100's, work with arrays up to 5 rows and 5 columns. **(2.OA.3, 2.OA. 4 and 2.NBT.2)**	• Connections to multiplication and division exist across the standards in third grade. **(3.OA.1) (3.OA.2)(3.OA.3) (3.MD.7) (3.OA.5) (3.OA.6) (3.NBT.3) (3.OA.4) (3.OA.7) (3.OA.8) (3.OA.9)**	• Connect to 4th grade, where students use multiplication and division with larger numbers. **(4.NBT.5) (4.NBT.6)**

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 properties of multiplication and the relationship between multiplication and division because when students review their understanding of arrays and multiplication as repeated addition, then they can begin to connect the concepts. Also, when students review their understanding of addition and subtraction as inverse operations, they can apply this knowledge to multiplication and division being inverse operations.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	3.OA.4 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7. This standard provides a foundation for work with understanding properties of multiplication and the relationship between multiplication and division because once students are able to understand and interpret products, they can begin to build the understanding of

		the properties of multiplication as well as the relationship of 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***

• Important multiplication properties.
• Connections between multiplication models, written multiplication equations, and related division equations.
• The solution to a division problem as a missing factor.
	• Describe multiplication patterns and make generalizations.
	• Write equations that represent multiplication models.
	• Describe information in problem situations and relate that information to multiplication and division equations.
		• Build on students' experience with the following skills:
		  ○ Using repeated addition (2.OA.C.4)
		  ○ Arranging objects in rectangular arrays (2.OA.C.4)
		  ○ Write an equation to express the total as a sum of equal addends. (2.OA.C.4)
		  ○ Skip counting by grouping objects (2.OA.C.3)
		
		• 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:
		  ○ Graph and/or array paper
		  ○ Counters
		  ○ Number lines
		  ○ Snap cubes
		  ○ Number bond templates

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 properties of multiplication and the relationship between multiplication and division by revisiting student thinking through a short mini-lesson because through resisting their thinking students will need to think deeper about the ideals they have formed. Often through revisiting their thinking students will begin to find misconceptions or errors in their reasoning that they must re-examine in order to explain.
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 properties of multiplication and the relationship between multiplication and division by helping students move from specific answers to generalizations for certain types of problems because this allows students to develop patterns and understand what the product is and how it relates to division. Rather than just a memorization of the facts, students need an understanding of what the product represents in order to understand multiplication and its relationship to division. Through understanding the properties of multiplication students will better understand how it is related to division.
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 explore links between various topics when studying understanding properties of multiplication and the relationship between multiplication and division because it allows students to extend their understanding of multiplication and division and relate it to the relationship of other operations. It also helps students begin to explore the relationship of larger numbers.

New Mexico Instructional Scope

3rd Grade Operations and Algebraic Thinking Guide

CCSS Domain	*CCSS Cluster*
Operations and Algebraic Thinking	**Multiply and divide within 100.**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on multiplying and dividing within 100 fluently, 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, learning about the different ways multiplying is used in the home and community for planning, shopping and cooking can a be a great way to connect schools tasks with home tasks.	
Cross-Curricular Connections	Social Studies: Calculations related to populations, supply, goods, costs.	
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?*	• Goal Setting: Setting challenging but attainable goals with students can communicate the belief and expectation that all students can engage with interesting and rigorous mathematical content and achieve in mathematics. Unfortunately, the reverse is also true, when students encounter low expectations through their interactions with adults and the media, they may see little reason to persist in mathematics, which can create a vicious cycle of low expectations and low achievement. For example, when studying multiplying and dividing within 100 fluently, goal setting is critical because students will need short term goals for learning facts clusters from memory because there are too many facts which would be overwhelming for students to memorize without having them broken down into smaller achievable pieces. • 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 multiplying and dividing within 100 fluently the types of mathematical tasks are critical because students need to rely on a multitude of strategies to be able to understand and find products and quotients before they can commit the facts to memory.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	***Current Learning***	***Future Learning***
• Connect to previous work understanding equal groups, skip counting by 2, 5, 10, 100's, work with arrays up to 5 rows and 5 columns**. (2.OA.3, 2.OA. 4 and 2.NBT.2)**	• Connections to multiplication and division exist across the standards in third grade. **(3.OA.1) (3.OA.2)(3.OA.3) (3.MD.7) (3.OA.5) (3.OA.6) (3.NBT.3) (3.OA.4) (3.OA.7) (3.OA.8) (3.OA.9)**	• Connect to 4th grade, where students use multiplication and division with larger numbers. **(4.NBT.5) (4.NBT.6)**

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 uses images/resources (especially those being used the first time) when studying multiplying and dividing within 100 fluently because students will need to use many different strategies and properties for understanding multiplication and division in order to find products & quotients for both smaller and larger numbers.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	3.OA.A.1 & 2.OA.A.2: These standards provide a foundation for work with representing and solving problems involving multiplication and division by interpreting products of whole numbers & interpreting whole-number quotients of whole numbers because

		students need to have a clear understanding of what multiplication & division means (using arrays, equal groups, area models, and repeated addition) before they would be able to find products, quotients, and become fluent . 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 relationship between multiplication and division.
• How to use strategies for multiplication and division, including doubling, the Commutative Property, multiplying by nine as related to multiplication by ten, and thinking of division as an unknown factor problem.
• What it means to compose and decompose numbers.
• How to use known facts to help learn unknown facts.
	• Use strategies to mentally/fluently multiply and divide numbers within 100.
	• Solve all products of two one-digit numbers effectively and efficiently.
		• Build on students' experience with the following skills:
		  ○ Thinking about multiplication as equal groups and numbers in groups (interpret 5 x 7 as 5 groups of 7 objects each). (3.OA.A.1)
		  ○ Understanding that division is partitioning objects into equal shares (interpret 35 ÷ 5 as 5 equal shares of 7 objects each). (3.OA.A.2)
		  ○ Applying the commutative property in addition. (1.OA.B.3)
		  ○ Using number bonds/fact families from addition and subtraction to explain the inverse relationship between multiplication and division.
		
		• 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:
		  ○ Graph and/or array paper

		○ Counters ○ Number lines ○ Snap cubes ○ Number bond templates ○ Distributive property templates
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 3.OA.B Understanding properties of multiplication and the relationship between multiplication and division by clarifying mathematical ideas and/or concepts through a short mini-lesson because applying properties like the commutative property, associative property, distributive property, and fact family knowledge of multiplication & division and their relationship is crucial for students to use to access multiple strategies for finding products & quotients before becoming fluent with facts.
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 3.OA.A Represent and solve problems involving multiplication and division by addressing conceptual understanding because students need to concretely understand the meaning of multiplication concretely using arrays, equal groups, area models, tape diagrams, and repeated addition before they can become proficient at fact knowledge and retrieval.
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 open ended tasks linking multiple disciplines when studying multiplying and dividing within 100 fluently because students could see the application of multiplying & dividing as well as be provided with a realistic opportunity to extend their ability to multiply by a double digit number based on prior strategies when

	learning to multiply (such as decomposing numbers).

CCSS Domain	*CCSS Cluster*
Operations and Algebraic Thinking	**Solve problems involving the four operations, and identify and explain patterns in arithmetic.**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on Solving problems involving the four operations, and identifying and explaining patterns in arithmetic, 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, learning about the different examples of problem solving that occurs in the home and community can be a great connection to school. The problem solving can involve shopping, project costs, gardening resources, home repairs, building, and other home maintenance. Local jobs can also provide an opportunity to see the types of problem solving and pattern recognition that community workers are experiencing.	
Cross-Curricular Connections	Language Arts: Students can write down step by step instruction guides on arithmetic patterns using the addition table or multiplication table and explain how to use them using the properties of operation. Students can publish their guides and keep them in a resource writing center.	
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*	• Supporting Productive Struggle in Learning Mathematics: The standard for mathematical practice, makes sense of mathematics and persevere in solving them is the foundation for supporting productive struggle in the mathematics classroom. "Too frequently, historically marginalized students are overrepresented in classes that focus on memorizing and practicing procedures and rarely provide opportunities for students to think and figure things out for themselves. When students in these classes struggle, the teacher often tells them what to do without building their capacity for persistence." Teachers need to provide tasks that challenge students and maintain that challenge while encouraging them to persist. This encouragement or "warm-demander" requires a strong relationship with students and an understanding of the culture of the students. For example, when studying Solving

	culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?	problems involving the four operations, and identifying and explaining patterns in arithmetic. Supporting productive struggle is critical because students need to be able to access (low entrance) to the problem so they feel they are capable of solving the problem using their repertoire of skills whether it is using manipulatives, drawing pictures, or jumping to formulas. They need to receive support at whatever level they begin to continue through and have expectations that they can solve the problem with their current skills whether or not it is the most efficient. Their thinking and processes need to be validated for correctness and shared as are more efficient methods of peers. Perseverance and comprehension should be celebrated.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	***Current Learning***	***Future Learning***
• Connect to addition and subtraction problems, skip counting and adding equal groups. Learners used addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. **(2.MD.5) (2.OA.1) (2.NBT.5) (2.OA.3) (2.NBT.2)**	• Connect to the work throughout third grade with multiplication and division problems. **(3.OA.3) (3.OA.6) (3.MD.8) (3.OA.3) (3.OA.7) (3.MD.7) (3.OA.5) (3.OA.4) (3.OA.8) (3.OA.9)**	• Connect to future work with solving multi-step word problems using the four operations and generating patterns which follow a given rule. **(4.OA.3) (4.MD.2) (4.OA.5)**

Suggested Instructional Strategies

Pre-Teach

Level of Intensity	***Essential Question***	***Examples***
Targeted	*What pre-teaching will*	For example, some learners may benefit from targeted

	prepare students to productively struggle with the mathematics for this cluster within your HQIM?	pre-teaching that rehearses prior learning when studying Solving problems involving the four operations, and identifying and explaining patterns in arithmetic because students will need to apply the prior knowledge of addition and subtraction in conjunction with the newer knowledge of multiplying and dividing when solving multi-step problems involving a combination of the four operations and identifying patterns.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	2.OA.A.1: Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions: This standard provides a foundation for work with representing and solving problems involving addition and subtraction because using and understanding addition and subtraction to solve one & two steps problems is foundational to solving more complex problems involving any combination of the 4 operations. 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***

• Whether answers are reasonable by using number sense.
• Connections between representations and equations that model a problem.
• Why a number is rounded to the nearest 10 or 100.
• The properties of operations.
	• Use a variety of problem-solving strategies, including relating the problem in their own words, making models, and drawing pictures to represent their thinking.
	• Use letters to represent unknown quantities.
	• Recognize patterns in the addition and multiplication tables.
		• Build on students' experience with the following skills:
		  ○ Solving word problems involving addition and subtraction (2.MD.5)
		  ○ Fluently add and subtract up to 20 (2.OA.1)
		
		• 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:
		  ○ Counters
		  ○ Unifix cubes
		  ○ Geometric pattern blocks
		  ○ Multiplication Charts

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 representing and solving problems involving multiplication and division by revisiting student thinking through a short mini-lesson because understanding and representing multiplication and division appropriately to solve one & two steps problems is foundational to solving more complex problems dependent on a mix of the 4 operations.
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 understanding properties of multiplication and the relationship between multiplication and division by offering opportunities to understand and explore different strategies because students may need to see, draw, and use manipulatives to better clarify their understanding of properties of multiplication (distributive, commutative, associative) with arrays, equal groups and number lines to concretely solidify their understanding of the properties.
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 Solving problems involving the four operations, and identify and explain patterns in arithmetic because students can be provided

	the opportunity of solving more complex questions, problems, and patterns without scaffolding assistance.

New Mexico Instructional Scope

3rd Grade Fractions Guide

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 **(only provided for clusters with Conceptual Understanding standards)**
- A multilayered system of supports (MLSS) and culturally and linguistically responsive instruction (CLR) guide

New Mexico Instructional Scope

3rd 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

- Develop understanding of fractions as numbers
  - 3.NF.A.1
  - 3.NF.A.2
  - 3.NF.A.3

New Mexico Instructional Scope

3rd Grade Fractions Guide

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Number & Operations-Fractions**	**Develop understanding of fractions as numbers.**

Cluster Standard: 3.NF.A.1

Standard	**Standards for Mathematical Practice**
Understand a fraction $1/b$ 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 parts of size $1/b$.	• **SMP 4:** Model with mathematics. • **SMP 6:** Attend to precision. • **SMP 7**: Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students use area and length models to compose and decompose fractions into equivalent fractions using related fractions: halves, fourths, eighths, thirds, and sixths. • Related fractions are fractions in which one denominator is a multiple of the others; thirds and sixths are related fractions, while fourths and sixths are not related fractions.	• Recognize a unit fraction such as ¼ as the quantity formed when the whole is portioned into 4 equal parts. • Identify a fraction such as 2/3 and explain that the quantity formed is 2 equal parts of the whole portioned into 3 equal parts (1/3 and 1/3 of the whole 3/3). • Express a fraction as the number of unit fractions • Use accumulated unit fractions to represent numbers equal to, less than, and greater than one (1/3 and 1/3 is 2/3; 1/3,⅓, 1/3, and 1/3 is 4/3). • Explain and represent a unit fraction. • Explain and represent a non-unit fraction. • Identify the numerator and denominator and understand the meaning of each in a fraction. • Explain how fraction representations are related (*1/b* relates to *a/b*). • Identify a unit fraction and build other fractions from the unit fraction.
DOK	**Blooms**
1	Remember, Understand

New Mexico Instructional Scope

3rd Grade Fractions Guide

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Fractions**	**Develop understanding of fractions as numbers**

Cluster Standard: 3.NF.A.2

Standard	Standards for Mathematical Practice
3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. • 3.NF.A.2.A: Represent a fraction *1/b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size *1/b* and that the endpoint of the part based at 0 locates the number *1/b* on the number line. • 3.NF.A.2.B: Represent a fraction *a/b* on a number line diagram by marking off a length *1/b* from 0. Recognize that the resulting interval has size *a/b* and that its endpoint locates the number *a/b* on the number line.	• **SMP 2**: Reason abstractly and quantitatively. • **SMP 4**: Model with mathematics. • **SMP 5**: Use appropriate tools strategically.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students should be able to explain that fractions with the same numerator and denominator equal one whole. • Renaming fractions with the same numerator and denominator as one whole without a model is not sufficient for this standard.	• Understand fractions as numbers. • Interpret fractions with denominators of 2,3,4,6, and 8 using area and length models. • Using an area model, explain that the numerator of a fraction represents the number of equal parts of the unit fraction. • Using a number line, explain that the numerator of a fraction represents the number of lengths of the unit fraction from 0. • Recognize a unit fraction such as ¼ as the quantity formed when the whole is partitioned into 4 equal parts. • Express a fraction as the number of unit fractions. • Define the interval from 0 to 1 on a number line

	as the whole. ● Divide a whole on a number line into equal parts. ● Recognize that the equal parts between 0 and 1 have a fractional representation. ● Represent each equal part on a number line with a fraction. ● Explain that the endpoint of each equal part represents the total number of equal parts.
DOK	**Blooms**
1-2	Understand, Apply

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Fractions**	**Develop understanding of fractions as numbers**

Cluster Standard: 3.NF.A.3

Standard	Standards for Mathematical Practice
3.NF.A.3 Explain equivalence of fractions in special cases and compare fractions by reasoning about their size. ● 3.NF.A.3.A: Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. ● 3.NF.A.3.B: Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4 , 4/6 = 2/3 . Explain why the fractions are equivalent, e.g., by using a visual fraction model. ● 3.NF.A.3.C: Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1 ; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram. ● 3.NF.A.3.D: Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	● **SMP 2**: Reason abstractly and quantitatively. ● **SMP 3:** Construct viable arguments and critique the reasoning of others.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
● The standard expects students to express whole numbers as fractions. This work is limited to whole numbers less than 4. ● Expressing whole numbers as fractions lays the groundwork for seeing a fraction as a division	● Compare fractions by reasoning about their size to determine equivalence. ● Use number lines, size, visual fraction models, etc. to find equivalent fractions. ● Recognize whole numbers written in fractional

problem. e.g. The fraction 4/2 represents 4 pieces that are a half each and that equals 2 wholes. ● This standard is the building block for later work in Grade 5 where students divide a set of objects into a specific number of groups.	parts on a number line. ● Recognize the difference in a whole number and a fraction. ● Explain how a fraction is equivalent to a whole number. ● Explain what the numerator in a fraction represents and identify its location. ● Explain what the denominator in a fraction represents and identify its location. ● Explain that a fraction with the same numerator and denominator equals one whole. ● Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. ● Recognize whether two or more fractions refer to the same whole. ● Determine if comparisons of fractions can be made (if they refer to the same whole). ● Compare two fractions with the same numerator by reasoning about their size. ● Compare two fractions with the same denominator by reasoning about their size. ● Compose and decompose fractions into equivalent fractions using fractions: halves, fourths and eighths; thirds and sixths ● Record the results of comparisons using symbols <, =, or >. ● Justify conclusions about the equivalence of fractions.
DOK	**Blooms**
2-3	Apply, Analyze

Common Misconceptions

● Students may not use benchmark numbers like 0, 1/2, and 1 to compare fractions because they have restricted their understanding of fractions to part-whole situations and do not think of the fractions as numbers. ● Students may overgeneralize and think that “all 1/4 s (for example) are equal”.	● Students may not understand that the size of the whole determines the size of the fractional part. ● Students may struggle with the idea that the smaller the denominator, the smaller the piece or part of the set, or the larger the denominator, the larger the piece or part of the set.

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. This process 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: **Develop understanding of fractions as numbers**
Suggested Student Discourse Questions	
• What are the different ways we can represent fractions? • What do numerators and denominators represent? • What strategies can you use to find equivalent fractions and compare fractions?	• Why is a fraction a number? • When do we use fractions in everyday life?

ASSESSMENT GUIDE

- Develop understanding of fractions as numbers

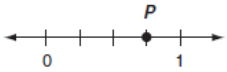
Grade	*CCSS Domain*	*CCSS Strand*
3	**Fractions**	**Develop understanding of fractions as numbers**

Sample Task #1 (Constructed Response)

Chloe's dad partitions his garden into 4 equal-sized sections to plant tomatoes, squash, peppers, and cucumbers. What fraction of the garden is available for growing tomatoes?

Sample Task #2 (Multiple Choice)

. A number line is shown.



Which fraction represents point *P* on the number line?

Ⓐ $\frac{1}{4}$

Ⓑ $\frac{2}{3}$

Ⓒ $\frac{3}{4}$

Ⓓ $\frac{4}{5}$

MLSS AND CLR GUIDE

- Develop understanding of fractions as numbers

CCSS Domain	*CCSS Cluster*
Fractions	**Develop understanding of fractions as numbers**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on understanding fractions as 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: increasing or decreasing ingredients in a recipe; using statistics from current events, relevant to a family or community, to determine their impact (converting a whole number statistic into a fraction to show its impact as part of a greater whole population); using a given amount of time, determining how it is used, and comparing the portions of that time for time management goals, using a given amount of money, determining how it is used, and comparing the portions of that money to set a budget; dividing a plot of land into equal portions to plan and plant a garden, etc.	
Cross-Curricular Connections	Social Studies: Based on current events and topics, create a survey, collect data, and represent results in each category as fractions of the whole survey population. Music: Reading the value of musical notes 1/4, 1/2, 3/4, 1 and the relation of note count to measure.	
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*	• Supporting Productive Struggle in Learning Mathematics: The standard for mathematical practice, makes sense of mathematics and persevere in solving them is the foundation for supporting productive struggle in the mathematics classroom. "Too frequently, historically marginalized students are overrepresented in classes that focus on memorizing and practicing procedures and rarely provide opportunities for students to think and figure

	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?*	things out for themselves. When students in these classes struggle, the teacher often tells them what to do without building their capacity for persistence." Teachers need to provide tasks that challenge students and maintain that challenge while encouraging them to persist. This encouragement or "warm-demander" requires a strong relationship with students and an understanding of the culture of the students. For example, when studying understanding fractions as numbers supporting productive struggle is critical because building and internalizing fractions as parts of a whole that can be represented by numbers is foundational to all future comprehension of fraction math problems. It is through productive struggle that students develop their own understanding of math concepts in a mental context that they own, that has meaning to them, and that they can easily access and manipulate for future procedural tasks and problem solving.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	***Current Learning***	***Future Learning***
• Connect to partition shapes, measure length and solve problems using addition and subtraction**.** • Connect to equally partitioned circles and rectangles into halves, thirds and fourths, and recognize that equal shares of identical wholes need not have the same shape. **(2.G.3)** • Connect to measure the length of an object twice, using length units of different lengths for the two measurements; described how the two measurements relate to the size of the unit chosen **(2.MD.2).** • Connect to use addition and subtraction within 100 to solve	• Connect the partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole **(3.G.2).** • Connect to generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters **(3.MD.4)**	• Connect to understanding of fraction equivalence, build fractions from unit fractions and understand and compare decimal fractions. Learners will understand a fraction a/b with a>1 as a sum of fractions 1/b **(4.NF.3).** • Connect to make a line plot to display a data set of measurements in fractions of a unit (½, ¼, ⅛). Solve problems involving addition and subtraction of fractions by using information presented in line plots **(4.MD.4).** • Connect to apply and extend previous understanding of multiplication to multiply a

word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. **(2.MD.5)** • Connect to represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0,1, 2..., and represent whole-number sums and differences within 100 on a number line diagram **(2.MD.6).** • Connect to generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units **(2.MD.9).**		fraction by a whole number **(4.NF.4).** • Connect to 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. Use this principle to recognize and generate equivalent fractions. **(4.NF.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 uses images/resources (especially those being used the first time) when studying to develop understanding of fractions as numbers because while using different representations, such as pictures, students are introduced to appropriate labels to communicate the meaning of their representation.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	1.G.A.3: This standard provides a foundation for work with develop understanding of fractions as numbers because student need the foundational understanding of equal share partitioning, how to accurately describe the shares, and the understanding that decomposing into more equal shares creates smaller shares in order to

		make the connection between concrete (e.g., pictures) and abstract (e.g., 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***

• Given the same size whole, the larger the denominator the smaller the size of the pieces because there are more pieces in the whole.
• It is possible for fractional parts of a whole to be the same size, but not the same shape.
• Points on the number line represent the distance from 0 to that specific point and are made up of the number of unit fraction intervals.
• The meaning of fraction equivalence, including that whole numbers are equivalent to fractions.
	• Make models of fractions (with denominators 2, 3, 4, 6, and 8) using fraction strips.
	• Represent unit fractions on a number line and construct a number line based on a unit fraction, including fractions greater than 1.
	• Compare fractions using symbols (<, >, =).
	• Use various representations, including area models, fraction strips, and the number line to find equivalent fractions that name the same quantity or point.
		• Build on students' experience with the following skills:
		  ○ Thinking about a fraction as a whole partitioned into equal parts
		  ○ Use number lines to represent whole numbers (2.MD.B.6)
		  ○ Recognizing and applying inequality symbols to compare whole numbers
		
		• 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 lines
		  ○ Fraction tiles
		  ○ Snap cubes
		  ○ Real world objects (eg pizza, chocolate bars, etc.)
		  ○ Reference material for equivalent fractions (eg equivalent fraction strips)
		  ○ Cooking tools and measuring cups

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 developing understanding of fractions as numbers by revisiting student thinking through a short mini-lesson because when students can explain their thought process, they also understand the possibility of different interpretations and therefore the necessity for precision in their work.
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 developing understanding of fractions as numbers by confronting student misconceptions because it takes time and multiple passes to develop understanding, so students need regular opportunities to think about, talk through, and refine ideas.

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 open ended tasks linking multiple disciplines when studying develop understanding of fractions as numbers because in order to develop and solidify ideas, students need to be able to connect what they are learning to multiple disciplines and real-world connections through the productive struggle of open-ended tasks.

New Mexico Instructional Scope

3rd Grade Geometry Guide

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 **(only provided for clusters with Conceptual Understanding standards)**
- A multilayered system of supports (MLSS) and culturally and linguistically responsive instruction (CLR) guide

New Mexico Instructional Scope

3rd Grade Geometry 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

- Reason with shapes and their attributes
  - 3.G.A.1
  - 3.G.A.2

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Geometry**	**Reason with shapes and their attributes**

Cluster Standard: 3.G.A.1

Standard	**Standards for Mathematical Practice**
Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories	• **SMP 3:** Construct viable arguments and critique the reasoning of others. • **SMP 6**: Attend to precision. • **SMP7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students should categorize shapes by attribute. They can name rhombuses, squares, and rectangles as types of quadrilaterals. They can also draw an example of a quadrilateral that is not a rhombus, rectangle, or square.	• Investigate characteristics of and compose triangles and quadrilaterals. • Decompose quadrilaterals. • Recognize and draw both examples and non-examples of a variety of quadrilaterals including rhombuses, rectangles, squares, parallelograms, and trapezoids. • Communicate their reasoning by explaining their thinking and sharing their solutions • Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals).
DOK	**Blooms**
2	Understand, Apply

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Geometry**	**Reason with shapes and their attributes**

Cluster Standard: 3.G.A.2

Standard	Standards for Mathematical Practice
Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as ¼ of the area of the shape.	• **SMP 4**: Model with mathematics. • **SMP 6:** Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students should break shapes into equal parts to illustrate fractions. They can tell you that one part of that shape is a part of a whole. For example: A student may have a circle. They will draw lines in that circle to break it into 3 equal parts. The student can tell you that one of the four pieces is 1/3 of the circle.	• Partition shapes into equal parts understanding that the parts have equal areas. • Write a unit-fraction or a non-unit fraction for partitioned shapes. • Know that shapes can be partitioned into equal areas. • Describe the area of each part as a fractional part of the whole. • Relate fractions to geometry by expressing the area of part of a shape as a unit fraction of the whole.
DOK	**Blooms**
1-2	Remember, Understand

Common Misconceptions

• Students may have difficulty recognizing the subtle differences between shapes such as the size of angle where two sides meet. • Students might mistakenly mislabel types of quadrilaterals due to vocabulary difficulty. • Students may be able to tell that squares and	• Students might be confused with the concept that equal shares of identical wholes may not have the same shape. • Students may also not understand an area model represents one out of two or three or four fractional parts without the understanding the

rectangles are related shapes but they may mistakenly label a rectangle as a kind of square rather than the other way around.	parts are equal shares.

ASSESSMENT GUIDE

- Reason with shapes and their attributes

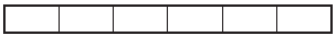
Grade	*CCSS Domain*	*CCSS Strand*
3	**Geometry**	**Reason with shapes and their attributes**

Sample Task #1 (Constructed Response)

Name at least two attributes that a trapezoid, a square, and a parallelogram all have in common. Draw a diagram to support your ideas.

Sample Task #2 (Multiple Choice)

This rectangle is divided into equal parts.



What fraction of the whole rectangle is each part?

Ⓐ $\frac{1}{6}$

Ⓑ $\frac{1}{5}$

Ⓒ $\frac{5}{1}$

Ⓓ $\frac{6}{1}$

MLSS AND CLR GUIDE

- Reason with shapes and their attributes

CCSS Domain	*CCSS Cluster*

Geometry	Reason with shapes and their attributes

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on reasoning with shapes and their attributes, 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, studying the architecture of different cultures to investigate how shapes and their attributes are utilized in different ways.	
Cross-Curricular Connections	Language Arts: Read Keeping Quilt by Patricia Polacco. Explore geometry of quilt designs. Students create a quilt design using plane shapes. Art: Architecture/design by finding shapes in buildings.	
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?*	• Task: When planning with your HQIM, consider how to modify tasks to represent the prior experiences, culture, language and interests of your students to "portray mathematics as useful and important in students' lives and promote students' lived experiences as important in mathematics class." Tasks can also be designed to "promote social justice [to] engage students in using mathematics to understand and eradicate social inequities (Gutstein 2006)." For example, when studying reasoning with shapes and their attributes the types of mathematical tasks are critical because there are a great many concrete ways in which this area of study can be applied to students' lives and experiences therefore there is a rich groundwork on which to build understanding of the content through tasks that are aimed at student experiences.

Planning for Multi-Layered System of Supports

Vertical Alignment		
Previous Learning	***Current Learning***	***Future Learning***
• Connect to the many experiences with specific attributes of shapes such as triangles, hexagons and cubes. They have learned the difference between defining attributes and non-defining attributes. • Connect to drawing shapes having specified attributes, such as a given number of angles or a given number of equal faces. They identified triangles, quadrilaterals, pentagons, hexagons, and cubes**. (2.G.1)**	• Connect to understanding a fraction 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.1)** • Connect to understanding a fraction as a number on the number line; represent fractions on a number line diagram. **(3.NF.2)** • Connect the partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape. **(3.G.2)**	• Connect to understanding angles of geometric shapes and angle measurements. • Connect to drawing points, lines, line segments, rays, angles (right, obtuse, acute) and perpendicular and parallel lines in 2-D figures. **(4.G.1)** • Connect to angles as geometric shapes which are formed when two rays share a common endpoint and understand concepts of angle measurement. **(4.MD.5)**

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 uses images/resources (especially those being used the first time when studying reasoning with shapes and their attributes because this will engage visual learners and help students to relate vocabulary of shapes and their attributes to concrete examples.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	2.G.A.1: This standard provides a foundation for work with reasoning with shapes and their attributes because this standard asks students to begin reasoning with shapes as well as laying the groundwork for key vocabulary that will be repeated in the current work of the grade. 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.
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 reasoning with shapes and their attributes by clarifying mathematical ideas and/or concepts through a short mini-lesson because this standard is heavy with mathematical vocabulary and allowing students time to clarify their understanding of these ideas will be key in helping them to meet the standard.
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 reasoning with shapes and their attributes by offering opportunities to understand and explore different strategies because this will allow students to find methods for reasoning with shapes that fit their mental schema as individual learners.
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 reasoning with shapes and their attributes because this allows them to explore higher level applications of reasoning with shapes and to move at a pace that is more appropriate for them rather than working with the rest of the class and then receiving "extra" work.

New Mexico Instructional Scope

3rd Grade Measurement and Data Guide

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New Mexico Instructional Scope

3rd Grade Measurement and Data Guide

Key		
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	*Procedural Skill and Fluency*	Procedural standards help students develop **efficiency** and **accuracy** in computations.

Standards Breakdown

- Solve problems involving measurement and estimation.
  - 3.MD.A.1
  - 3.MD.A.2
- Represent and Interpret Data
  - 3.MD.B.3
  - 3.MD.B.4
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
  - 3.MD.C.5
  - 3.MD.C.6
  - 3.MD.C.7
- Geometric measurement: recognize perimeter.
  - 3.MD.D.8

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Measurement and Data**	**Solve problems involving measurement and estimation.**

Cluster Standard: 3.MD.A.1

Standard	Standards for Mathematical Practice
Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 6:** Attend to precision. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can:**
• In this standard, students reason about the units of length, capacity and weight using customary units. Students need to develop a basic understanding of the size and weight of customary units and apply this understanding when estimating and measuring. • Students are not expected to convert between units. The focus is on measuring and also reasoning as they estimate, using benchmarks to measure length, weight, and capacity. • Word problems should only be one-step and include the same unit. The number range for these tasks should match the number size described in the OA and NBT standards	• Recognize minute marks on an analog clock and minute position on a digital clock. • Write time to the nearest minute. • Tell time to the nearest minute. • Find elapsed time in minutes using a number line diagram. • Solve word problems involving elapsed time in minutes by using a number line diagram.
DOK	**Blooms**
1-2	Remember, Understand and Apply

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Measurement and Data**	**Solve problems involving measurement and estimation.**

Cluster Standard: 3.MD.A.2

Standard	Standards for Mathematical Practice
Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.	• **SMP 1**: Make sense of problems and persevere in solving them. • **SMP 5**: Use appropriate tools strategically. • **SMP 6:** Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can:**
• In this standard, students reason about the units of length, capacity and weight using customary units. Students need to develop a basic understanding of the size and weight of customary units and apply this understanding when estimating and measuring. • Students are not expected to convert between units. The focus is on measuring and also reasoning as they estimate, using benchmarks to measure length, weight, and capacity. • Word problems should only be one-step and include the same unit. The number range for these tasks should match the number size described in the OA and NBT standards.	• Estimate and measure liquid volumes using standard units of liters (l) • Solve one-step word problems involving liquid volume given in the same units • Estimate and measure masses of objects using standard units of grams(g) and kilograms (kg) • Solve one-step word problems involving masses given in the same units • Represent a word problem involving liquid volume or mass using various strategies
DOK	**Blooms**
1-2	Understand, Apply and Analyze

Common Misconceptions

• Students might overgeneralize the base-10	• Students may believe that a larger object

structure and apply it to time, such as changing 1 hour 15 minutes to minutes as 115 minutes or 25 minutes.	automatically has more mass.

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Measurement and Data**	**Represent and Interpret Data**

Cluster Standard: 3.MD.B.3

Standard	Standards for Mathematical Practice
Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 4:** Model with mathematics. • **SMP 6:** Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can:**
• In Grade 3, the most important development in **data** representation for **categorical data** is that students now draw **picture graphs** in which each picture represents more than one object, and they draw **bar graphs** in which the **height** of a given bar in **tick marks** must be multiplied by the **scale factor** in order to yield the number of objects in the given category. These developments connect with the emphasis on **multiplication** in this grade.	• Interpret data in a scaled picture and bar graphs (e.g., one box equals 4 students). • Collect data by asking a question that yields data in several categories. • Draw a scaled picture graph and a scaled bar graph (with axes provided) to represent a data set with several categories. • Solve one and two-step “how many more” and “how many less” problems using information from these graphs.
DOK	**Blooms**
1, 2	Understand, apply, and analyze

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Measurement and Data**	**Represent and Interpret Data**

Cluster Standard: 3.MD.B.4

Standard	Standards for Mathematical Practice
Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.	• **SMP 5**: Use appropriate tools strategically. • **SMP 6:** Attend to precision. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can:**
• In Grade 3, students are beginning to learn fraction concepts (3.NF). They understand fraction equivalence in simple cases, and they use visual fraction models to represent and order fractions. Grade 3 students also measure lengths using rulers marked with halves and fourths of an inch. They use their developing knowledge of fractions and number lines to extend their work from the previous grade by working with measurement data involving fractional measurement values.	• Generate measurement data by measuring lengths using rules marked with whole inches and halves and fourths of an inch. • Create a line plot where the horizontal scale is marked off in appropriate units-whole numbers, halves, or quarters. • Analyze data from a line plot.
DOK	**Blooms**
2	Apply and analyze

Common Misconceptions

• Students may not count each square or tick mark on a scaled graph as one (rather than one unit).	• Students may confuse the axes on a graph.

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Measurement and Data**	**Geometric measurement: understand concepts of area and relate area to multiplication and to addition.**

Cluster Standard: 3.MD.C.5

Standard	Standards for Mathematical Practice
3.MD.C.5: Recognize area as an attribute of plane figures and understand concepts of area measurement. • **3.MD.C.5.A:** A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. • **3.MD.C.5.B**: A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.	• **SMP 6:** Attend to precision. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can:**
• Students need to learn to conceptualize **area** as the amount of **two-dimensional space** in a bounded region and to measure it by choosing a **unit of area**, often a **square**. A **two-dimensional geometric figure** that is covered by a certain number of squares without **gaps** or **overlaps** can be said to have an area of that number of **square units**.	• Recognize that area is the measurement as the space occupied by a flat shape or the surface of an object. • Recognize a unit square has 1 square unit of area and is used to measure area of two-dimensional shapes. • Recognize any plane figure covered without gaps or overlaps and filled with n unit squares indicates the total square units or area.
DOK	**Blooms**
1, 2, 3	Remember, Understand, Apply, and Analyze

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Measurement and Data**	**Geometric measurement: understand concepts of area and relate area to multiplication and to addition.**

Cluster Standard: 3.MD.C.6

Standard	Standards for Mathematical Practice
Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	• **SMP 5:** Use appropriate tools strategically. • **SMP 6**: Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can:**
• To begin an explicit focus on area, teachers might then ask students which of three rectangles covers the most area. Students may first solve the problem with decomposition (cutting and/or folding) and re-composition, and eventually analyses with area-units, by covering each with unit squares (tiles).	• Measure areas by counting unit squares of cm, m, in, ft, and other sizes.
DOK	**Blooms**
1-2	Understand, Apply

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Measurement and Data**	**Geometric measurement: understand concepts of area and relate area to multiplication and to addition.**

Cluster Standard: 3.MD.C.7

Standard	Standards for Mathematical Practice
Relate area to the operations of multiplication and addition. • **3.MD.C.7.A**: Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. • **3.MD.C.7.B:** Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. • **3.MD.C.7.C**: Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning. • **3.MD.C.7.D:** Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 4**: Model with mathematics. • **SMP 8:** Look for and express regularity in repeated reasoning.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students can be taught to multiply length measurements to find the area of a rectangular region. But, in order to make sense of these quantities, they first learn to interpret measurement of rectangular regions as a multiplicative relationship between the number of square units in a row and the number of rows. Students learn to understand and explain that the area of a rectangular region of, for example, 12 length-units by 5 length-units can be found either	• Relate area to the operations of multiplication and addition. • Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. • Apply their knowledge of the area of rectangles with whole-number side lengths in the context of problem solving. • Illustrate and explain that the area of a rectangle

by multiplying 12 x 5 or by adding two products, e.g., 10 x 5 and 2 x 5, illustrating the distributive property.	can be found by partitioning it into two smaller rectangles using tiles and/or arrays and that the area of the larger rectangle is the sum of the two smaller rectangles.
DOK	**Blooms**
2-3	Understand, Apply, Analyze

Common Misconceptions

● Students may not understand how to find the number of square units for non-rectangular shapes, such as combining two half-square units to make a whole square unit. ● Students may confuse perimeter and area.	● Students may believe that all shapes with a given perimeter have the same area.

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Measurement and Data**	**Geometric measurement: recognize perimeter.**

Cluster Standard: 3.MD.D.8

Standard	**Standards for Mathematical Practice**
Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.	● **SMP 1:** Make sense of problems and persevere in solving them. ● **SMP 4:** Model with mathematics.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
● Perimeter problems for rectangles and parallelograms often give only the lengths of two adjacent sides or only show numbers for these sides in a drawing of the shape. The common	● Solve problems involving perimeters of polygons. ● Determine the perimeter given the side lengths. ● Determine an unknown side length given the perimeter.

error is to add just those two numbers. Having students first label the lengths of the other two sides as a reminder is helpful. Students then find unknown side lengths in more difficult "missing measurements" problems and other types of perimeter problems.	• Illustrate how multiple rectangles can have the same perimeters and different areas or vice-versa.
DOK	**Blooms**
1-2	Understand, Apply, Analyze

Common Misconceptions

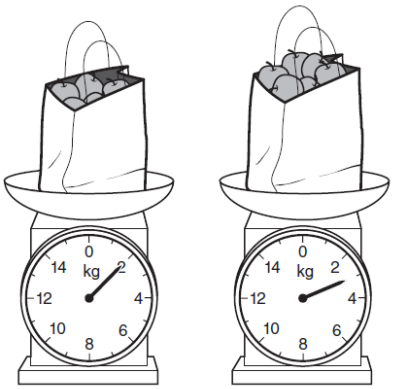
• Students may confuse area and perimeter.	• Students may not recognize that all rectangles have four sides, especially when only two side lengths are shown or provided.

ASSESSMENT GUIDE

- Solve problems involving measurement and data
- Represent and interpret data
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition
- Geometric measurement: Recognize perimeter

Grade	*CCSS Domain*	*CCSS Strand*
3	**Measurement and Data**	**Solve problems involving measurement and data.**
	Sample Task #1 (Constructed Response)	
	Carlos gets to class at 9:08 a.m. He has to write down homework assignments and complete morning work before math begins at 9:30 a.m. How many minutes does Carlos have to complete his tasks before math begins?	
	Sample Task #2 (Multiple Choice)	

. Maria buys the two bags of apples shown on the two scales.



What is the total mass of the apples Maria buys?

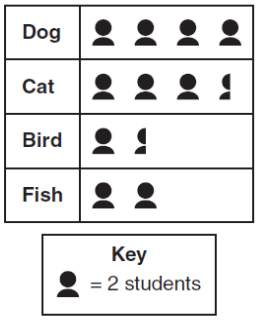
Ⓐ 1 kilogram
Ⓑ 2 kilograms
Ⓒ 5 kilograms
Ⓓ 6 kilograms

Grade	*CCSS Domain*	*CCSS Strand*
3	**Measurement and Data**	**Represent and Interpret Data**

Sample Task #1 (Constructed Response)

. The students in Mrs. Klein's class voted for their favorite pets. This picture graph shows the results.

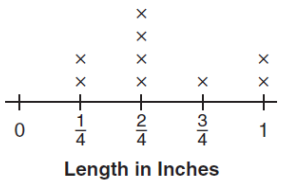
Favorite Pet



a. What is the total number of students who voted for a favorite pet? Show your work or explain how you know.

Sample Task #2 (Multiple Choice)

. This line plot shows the lengths of some bugs, in inches.



How many **more** bugs have a length of $\frac{2}{4}$ inch than a length of $\frac{3}{4}$ inch?

Ⓐ 1
Ⓑ 2
Ⓒ 3
Ⓓ 4

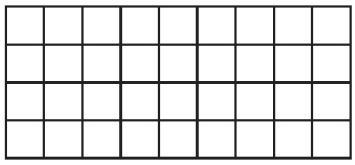
Grade	*CCSS Domain*	*CCSS Strand*
3	**Measurement and Data**	**Geometric measurement: understand concepts of area and relate area to multiplication and to addition.**

Sample Task #1 (Constructed Response)

1. Mara uses 15 square-centimeter tiles to make a rectangle. Ashton uses 9 square-centimeter tiles to make a rectangle.
   a. Draw what Mara and Ashton's rectangles might look like.
   b. Whose rectangle has a bigger area? How do you know?

Sample Task #2 (Multiple Choice)

This rectangle is made up of small squares. Each square is 1 square unit.



Which expression can be used to find the area, in square units, of the rectangle?

Ⓐ $9-4$
Ⓑ $9+4$
Ⓒ $9\div4$
Ⓓ 9×4

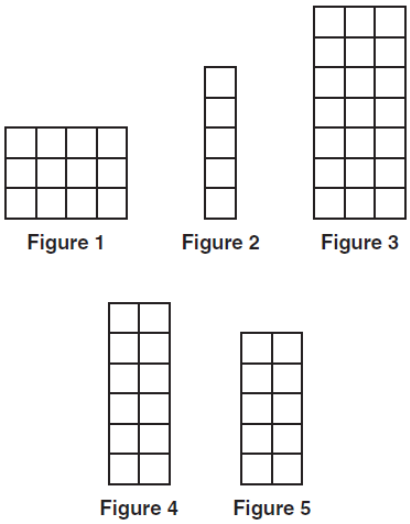
Grade	*CCSS Domain*	*CCSS Strand*
3	**Measurement and Data**	**Geometric measurement: recognize perimeter.**

Sample Task #1 (Constructed Response)

Gale makes a miniature stop sign, a regular octagon, with a perimeter of 48 centimeters for the town he built with blocks. What is the length of each side of the stop sign?

Sample Task #2 (Multiple Choice)

2. These are 5 different-sized rectangles.



Which two rectangles have the same perimeter? Select the **two** correct answers.

Ⓐ Figure 1
Ⓑ Figure 2
Ⓒ Figure 3
Ⓓ Figure 4
Ⓔ Figure 5

New Mexico Instructional Scope

3rd Grade Measurement and Data Guide

MLSS AND CLR GUIDE

- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects
- Represent and interpret data
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition
- Geometric measurement: Recognize perimeter

CCSS Domain	*CCSS Cluster*
Measurement and Data	**Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on measurement, 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, learning about the different structures for the different units of measurement across the languages in your classroom can lead to a more robust understanding of units used for measurement for all students by making connections to the different structures of units of measurement used in other countries. Relate the metric system to the countries of origin of your students.	
Cross-Curricular Connections	Science: In third grade the NGSS recommends students work with data related to weather conditions. Consider providing a connection for students to collect and measure the amount of rain during different seasons. Language Arts**:** When students have independent reading time during school or at home, consider having them track when they started, when they ended, and use this as the context for elapsed time problems.	
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*	• Posing Purposeful Questions: CLRI requires intentional planning around the questions posed in a mathematics classroom. It is critical to consider "who is being positioned as competent, and whose ideas are featured and privileged" within the classroom through both the types of questioning and who is being questioned. Mathematics classrooms traditionally ask short answer questions and reward

	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?*	students that can respond quickly and correctly. When questioning seeks to understand students' thinking by taking their ideas seriously and asking the community to build upon one another's ideas a greater sense of belonging in mathematics is created for students from marginalized cultures and languages. For example, when studying solving problems involving measurement and estimation of intervals of time, liquid volumes, and mass of objects the pattern of questions within the classroom is critical because these purposeful questions are used to guide students and advance students' reasoning and make sense about important mathematical ideas and relationships. Students having access to funneling and focusing questions gives them the support they need to be successful. When students have access to purposeful questions in the classroom, students understand that the teacher or their peers are seeking to understand their thinking by taking their ideas seriously and asking the community to build upon one another's ideas. A greater sense of belonging in mathematics is created for students from marginalized cultures and languages.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	***Current Learning***	***Future Learning***
• Connect to telling and writing time from analog and digital clocks to the nearest 5 minutes using AM and PM. **(2.MD.7)**	• Connect to understanding a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; and understanding a fraction a/b as the quantity formed by a part of size 1/b. **(3.NF.1)** • Connect to solving two-step word problems using the four operations; and **r**epresenting these problems using equations with a letter standing for the unknown	• Connect to recording measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36). **(4.MD.1)** • Connect to multiplying or dividing to solve word problems involving multiplicative comparison,

	quantity. Connect to assessing the reasonableness of answers using mental computation and estimation strategies including rounding. **(3.OA.8)**	e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. **(4.OA.2)** ● Connect to using the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Connect to representing measurement quantities using diagrams such as number line diagrams that feature a measurement scale. **(4.MD.2)**

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*	For example, some learners may benefit from targeted pre-teaching that rehearses prior learning when studying solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of

	cluster within your HQIM?	objects because students are building on previous knowledge from earlier grades where they described, measured, estimated, and compared amounts, using standard units of measurement as well as non-standard units such as scoops or cups to measure liquids. Students are also building on previous knowledge from earlier grades in telling and writing time to the nearest hour and half hour.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	2.MD.a.1: This standard provides a foundation for work with solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects because students will be using measurement and estimation to solve problems. 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:	***Potential Scaffolds***

• The smaller the unit, the more units will be needed to measure an object.
• Larger units (such as feet) can be subdivided into equivalent smaller units.
• How to select an efficient tool for measurement.
• A unit square, within a shape, is the same as one square unit and measures as 1 and unit squares will not overlap or have gaps.
• Area is the measurement of a
	• Line up a measuring tool with the end of the object and measure with no gaps or overlaps.
	• Compare and explain two measurements and how they are affected by the size of the unit chosen.
	• Measure two objects using the same standard length unit to determine their difference in length.
	• Use tiles to find the area of a rectangle using whole numbers.
	• Decompose rectilinear figures into rectangles, and
		• Build on students' experience with the following skills:
		  ○ Using standard and non-standard tools to measure objects
		  ○ Comparing numbers (<, >, =)
		
		• 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:
		  ○ Customary and metric rulers, yardsticks, meter sticks, and measuring tapes
		  ○ Graduated cylinders and beakers\

two-dimensional figure. ● Why multiplying side lengths of a rectangle is the same as counting the tiles. ● The area of a rectangular region can be found either by multiplying the side lengths or by adding two products which illustrate the distributive property.	find the area of each part then add the areas of the various rectangles together. ● Find the perimeter of a rectangle given the side lengths and find an unknown side length of a rectangle given the perimeter. ● Find rectangles with the same perimeter and different areas and rectangles with the same area and different perimeter.	○ Scales and weights ○ Cooking tools ○ Measuring cups ○ Stop watches ○ Analog clocks with moveable hands ● Build on students' experience with the following skills: ○ Adding all sides of a closed figure ○ Use arrays to reinforce concepts of area as well as area equations ○ Apply understanding of the distributive property to find area of composite figures ● 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: ○ Graph paper ○ Counting tiles ○ Counters
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 solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects by providing specific feedback to students on their work through a short mini-lesson because students may need more time exploring measurement and working with what units they are using to measure objects and why. Students also may need more time exploring reading time. As the students explore, the teacher gives them specific feedback to help clear up misconceptions.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, students may benefit from re-engaging with content during a unit on solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects by confronting student misconceptions in a small group setting or pull out if needed. In a smaller group setting, the teacher will be able to monitor students' progress on a biweekly basis to assess student growth and their responses to intensive interventions.

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 explore links between various topics when studying solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects because students can make connections between different types of measurement and how they are used in the real world and across different topics.

CCSS Domain	*CCSS Cluster*
Measurement and Data	**Represent and interpret data.**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on representing and interpret data, 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, discussing data that is relevant to the lives of students in the class such as exploring data trends regarding human migration, population growth, and language usage.	
Cross-Curricular Connections	Science: In third grade the NGSS recommends students work with data related to weather conditions. Consider providing opportunities to make a picture graph or bar graph to display and analyze weather data. Social Studies: In third grade one of ideas the New Mexico Social Studies Standards state focuses on is the rights of citizens. Consider providing opportunities to use and interpret data within this context, such as the growth of the civil rights movement in the 1950s-60s.	
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*	• Posing Purposeful Questions: CLRI requires intentional planning around the questions posed in a mathematics classroom. It is critical to consider "who is being positioned as competent, and whose ideas are featured and privileged" within the classroom through both the types of questioning and who is being questioned. Mathematics classrooms traditionally ask short answer questions and reward students that can respond quickly and correctly. When questioning seeks to understand students' thinking by taking their ideas seriously and asking the community to build upon one another's ideas a greater sense of belonging in mathematics is created for students from marginalized cultures and languages. For example, when studying representing and interpreting data the pattern of questions within the classroom is critical because in data interpretation there are always various perspectives that play into what that data set reflects and asking deep questions allows students to explore those perspectives together as a class.

	use mathematics within school and society?	

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	***Current Learning***	***Future Learning***
• Connect to practice measuring objects and inputting data on picture and bar graphs to represent data and answering questions relating and comparing the data represented on the graphs. **(2.MD.1-4, 10)** 5 minutes using AM and PM. **(2.MD.7)**	• Connect to solving two-step word problems using the four operations and representing these problems using equations with a letter standing for the unknown quantity. **(3.OA.8)** • Connect to understanding a fraction as a number on the number line and representing fractions on a number line diagram. **(3.NF.2)**	• Connect to making a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8) and solving problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection. **(4.MD.4)** • Connect to understanding a fraction a/b with a > 1 as a sum of fractions 1/b. **(4.NF.3)**

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 provides additional time for confusion to happen with new mathematical ideas when studying representing and interpreting data because this will allow students time to practice new concepts without fear and to experiment with ideas that they may not otherwise explore.

Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	1.MD.C.4: This standard provides a foundation for working with representing and interpreting data because this standard introduces the idea of collecting data and representing as well as analyzing “one more” and “one less”, thus connecting to the comparative aspect of interpreting data in 3rd grade . 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. problems. 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.

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 solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects by providing specific feedback to students on their work through a short mini-lesson because students may need more time exploring measurement and working with what units they are using to measure objects and why. Students also may need more time exploring reading time. As the students explore, the teacher gives them specific feedback to help clear up misconceptions.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, students may benefit from re-engaging with content during a unit on solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects by confronting student misconceptions in a small group setting or pull out if needed. In a smaller group setting, the teacher will be able to monitor students' progress on a biweekly basis to assess student growth and their responses to intensive interventions.

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 in-depth, self-directed exploration of self-selected topics when studying representing and interpreting data because this would allow students to explore how they can apply this learning as individuals.

CCSS Domain	*CCSS Cluster*
Measurement and Data	**Geometric measurement: understand concepts of area and relate area to multiplication and to addition**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on area, 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, learning about the different ways area is used in the home and community can a be a great way to connect schools tasks with home tasks. Students can talk with their family members about the concept of the area. They can make connections to buying and laying flooring or carpet, planning and building a garden, or planning and laying bricks to build a rectangular patio floor.	
Cross-Curricular Connections	Science: In third grade the NGSS states students should be able to "make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard." Consider providing a connection where students look at how an area can relate to the impact of weather-related hazards, such as tsunamis and stilt houses. Art: Painting a wall requires knowing the area of the wall and also how much area each paint can cover. Consider providing an opportunity for students to apply their knowledge of area to a real-life application within the school, such as painting an outside wall used during recess.	
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*	• Goal Setting: Setting challenging but attainable goals with students can communicate the belief and expectation that all students can engage with interesting and rigorous mathematical content and achieve in mathematics. Unfortunately, the reverse is also true, when students encounter low expectations through their interactions with adults and the media, they may see little reason to persist in mathematics, which can create a vicious cycle of low expectations

	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?*	and low achievement. For example, when studying understanding concepts of area and related areas to multiplication and addition goal setting is critical because students understand and know the learning goals and expectations for the lesson. When using both content and language objectives, the students are able to clearly understand the expectations and learning goals for the lesson, feel comfortable in the classroom setting, and are immersed in a classroom culture where ALL students can engage with interesting and rigorous mathematical content and achieve in mathematics to high levels.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	***Current Learning***	***Future Learning***
• Connect to measuring the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. **(2.MD.1)** • Connect to partitioning a rectangle into rows and columns of same-size squares and counting to find the total number of them. **(2.G.2)** • Connect to using addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns and writing an equation to express the total as a sum of equal addends. **(2.OA.4)**	• Connect to understanding division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8. **(3.OA.6)** • Connect to solving two-step word problems using the four operations and representing these problems using equations with a letter standing for the unknown quantity. **(3.OA.8)** • Connect to applying properties of operations as strategies to multiply and divide. **(3.OA.5)**	• Connect to applying the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor. **(4.MD.3)**

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 concepts of area and relating area to multiplication and addition because students are building on prior understanding of linear measurement, tiling rectangles, and partitioning a rectangle into rows and columns of same-size squares and count to find the total number of them.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	2.G.A.2: This standard provides a foundation for work with understanding concepts of area and relating area to multiplication and addition because this standard focuses on reasoning with shapes and their attributes and partitioning a rectangle into rows and columns of same-size squares and counting to find the total number of them. This prior knowledge and understanding is important because students can make connections from tiling rectangles and decomposing them into rows and columns of same-sized squares to using square units to measure the amount of space covered by a rectangle. 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 unit square, within a shape, is the same as one square unit and measures as 1 and unit squares will not overlap or have gaps. • Area is the	• Use tiles to find the area of a rectangle using whole numbers. • Decompose rectilinear figures into rectangles, and find the area of each part then add the	• Build on students' experience with the following skills: ○ Adding all sides of a closed figure ○ Use arrays to reinforce concepts of area as well as area equations ○ Apply understanding of the distributive property to find area of composite figures

measurement of a two-dimensional figure.
• Why multiplying side lengths of a rectangle is the same as counting the tiles.
• The area of a rectangular region can be found either by multiplying the side lengths or by adding two products which illustrate the distributive property.
	areas of the various rectangles together.
	• Find the perimeter of a rectangle given the side lengths and find an unknown side length of a rectangle given the perimeter.
	• Find rectangles with the same perimeter and different areas and rectangles with the same area and different perimeter.
		• 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:
		  ○ Graph paper
		  ○ Counting tiles
		  ○ Counters

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 concepts of area and relating area to multiplication and addition by critiquing student approaches/solutions to make connections through a short mini-lesson because being able to see different strategies and solutions and make connections between those strategies and solutions will promote discourse between students and helps to clear up misconceptions and give students the opportunity to reflect on where they are in their learning and what they might still be struggling with.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, students may benefit from re-engaging with content during a unit on understanding concepts of area and relating area to multiplication and addition by offering students opportunities to understand and explore different strategies in a small group setting or pull out if needed. In a smaller group setting, the teacher will be able to monitor students' progress on a biweekly basis to assess student growth and their responses to intensive interventions.

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 concepts of area and relating area to multiplication and addition because it gives students the opportunity to explore with measuring efficiently and effectively using standard units, their learning experiences can be directed to situations that encourage them to "discover" measurement formula. Students can also make connections to what types of jobs might utilize area and why it is important to be accurate and efficient.

CCSS Domain	*CCSS Cluster*
Measurement and Data	**Geometric measurement: recognize perimeter**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures, 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. Example 1: During a unit focused on perimeter, 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, learning about the different structures for the different units of measurement across the languages in your classroom can lead to a more robust understanding of units used for measurement for all students by making connections to the different structures of units of measurement used in other countries. Relate the metric system to the countries of origin of your students. Example 2: During a unit focused on perimeter, 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, learning about the different ways perimeter is used in the home and community can a be a great way to connect schools' tasks with home tasks. Students can talk with their families about the perimeter. What are some items in your home that have a perimeter? What units of measure would you use? Example 3: During a unit focused on perimeter, 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, learning about the mathematics used within the different careers of your family and community can provide a strong connection between school and careers. What careers in their family or community would utilize perimeter? Maybe landscapers, interior designers, what about sports fields? Have you ever noticed the lines on the field or the court?	
Cross-Curricular Connections	Science: In third grade the NGSS states students should be able to "make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard." Consider providing a connection where students look at how perimeter can relate to the impact of weather-related hazards, such as wildfires and leaving containers of water around the perimeter of a property. Social Studies: In third grade the New Mexico Social Studies Standards recommend students "identify the components of the Earth's biosystems and their makeup (e.g., air, land, water, plants, and animals)." Consider providing opportunities for students to think about farmland and animals and how to best construct a fence for them within the context of perimeter.	
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*	• 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 recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures the types of mathematical tasks are critical because they should be accessible to ALL students. Choosing floor to ceiling tasks gives each student an opportunity to access the task at their level and build on and deepen their understanding of the mathematics being explored. Tasks should promote reasoning and problem

	creating mathematical identities as capable mathematicians that can use mathematics within school and society?	solving, promote student discourse, and support students in productive struggle.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	***Current Learning***	***Future Learning***
• Connect to measuring the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes. **(2.MD.1)** • Connect to using addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. **(2.MD.5)**	• Connect to solving two-step word problems using the four operations and representing these problems using equations with a letter standing for the unknown quantity. **(3.OA.8)**	• Connect to applying the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor. **(4.MD.3)**

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 recognizing perimeter as an attribute of plane figures and distinguishes between linear and area measures because students build on prior knowledge of recognizing polygons and knowing their attributes and measuring and estimating lengths in standard units.

Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	2.MD.A.1: This standard provides a foundation for work with recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures because students will be measuring the distance around polygons using standard units and using these measurements to find the perimeter. 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.

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 recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures by clarifying mathematical ideas and/or concepts through a short mini-lesson because this gives students time to explore more with perimeter and clear up their misconceptions. Students may need time to explore that perimeter is the distance around the shape, which is different from area.
Intensive	What assessment data will help identify content needing to be revisited for intensive interventions?	For example, students may benefit from re-engaging with content during a unit on recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures by addressing conceptual understanding in a small group setting or pull out if needed. In a smaller group setting, the teacher will be able to monitor students' progress on a biweekly basis to assess student growth and their responses to intensive interventions.

Extension

Essential Question	***Examples***
What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics	For example, some learners may benefit from an extension such as open-ended tasks linking multiple

developed within your HQIM?	disciplines when studying recognizing perimeter as an attribute of plane figures and distinguishing between linear and area measures because students can explore tasks that involve “Big Ideas” and spend time reasoning and making connections which the students can visualize, play, and investigate. This leads to a deeper understanding of the mathematical content.

New Mexico Instructional Scope

3rd Grade Numbers and Operations in Base Ten 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 **(only provided for clusters with Conceptual Understanding standards)**
- A multilayered system of supports (MLSS) and culturally and linguistically responsive instruction (CLR) guide

New Mexico Instructional Scope

3rd Grade Numbers and Operations in Base Ten 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

- Use place value understanding and properties of operations to perform multi-digit arithmetic.
  - 3.NBT.A.1
  - 3.NBT.A.2
  - 3.NBT.A.3

New Mexico Instructional Scope

3rd Grade Numbers and Operations in Base Ten Guide

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Numbers and Operations in Base Ten**	**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

Cluster Standard: 3.NBT.A.1

Standard	**Standards for Mathematical Practice**
Use place value understanding to round whole numbers to the nearest 10 or 100.	• **SMP 6:** Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• The expectation is that students have a deep understanding of place value and number sense and can explain and reason about the answers they get when they round. • Students build on work in previous grades regarding strategies based on place value, the properties of operations, and relating addition to subtraction.	• Identifying the place value of digits in the ones, tens, hundred, and thousands place. • Round up a two-digit number in the tens place by looking at the place value of the ones. • Round up a three-digit number in the hundreds place by looking at the place value of the tens place. • Explain why and how they rounded with accuracy. • Demonstrate their understanding through visuals that correlate to place value understanding to round whole numbers
DOK	**Blooms**
1-2	Apply

New Mexico Instructional Scope

3rd Grade Numbers and Operations in Base Ten Guide

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Numbers and Operations in Base Ten**	**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

Cluster Standard: 3.NBT.A.2

Standard	Standards for Mathematical Practice
Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	• **SMP 4:** Model with mathematics. • **SMP 6:** Attend to precision. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students continue adding and subtracting within 1,000, extending their understanding of place value by composing and decomposing tens and hundreds. • Students explain their thinking and show their work and verify that their answer is reasonable. Problems should include both vertical and horizontal forms, including opportunities for students to apply the commutative and associative properties.	• Demonstrate their understanding by fluently using place value to add and subtract. • Add and subtract whole numbers up to and including 1,000. • Use estimation strategies to assess reasonableness of answers. • Model and explain how the relationship between addition and subtraction can be applied to solve addition and subtraction problems. • Use expanded form to decompose numbers and then find sums and differences. • Utilize visuals that represent their understanding of place value to round whole numbers to the nearest 10 or 100.
DOK	**Blooms**
1-2	Understand, Apply

New Mexico Instructional Scope

3rd Grade Numbers and Operations in Base Ten Guide

Grade	*CCSS Domain*	*CCSS Cluster*
3	**Numbers and Operations in Base Ten**	**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

Cluster Standard: 3.NBT.A.3

Standard	Standards for Mathematical Practice
Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.	• **SMP 2:** Reason abstractly and quantitatively. • **SMP 4:** Model with mathematics. • **SMP 6:** Attend to precision. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Estimation strategies include identifying when estimation is appropriate, determining the level of accuracy needed, selecting the appropriate method of estimation, and verifying solutions or determining the reasonableness of situations. Estimation strategies include, but are not limited to: front-end estimation with adjusting (using the highest place value and estimating from the front end, making adjustments to the estimate by taking into account the remaining amounts), rounding and adjusting (students round down or round up and then adjust their estimate depending on how much the rounding affected the original values), using friendly or compatible numbers such as factors • Students extend on their work in multiplication by applying understanding of place value. • The special role of 10 in the base-ten system is important in understanding multiplication of one-digit numbers with multiples of 10. • Using the properties of operations (commutative, associative, and distributive) and place value,	• Using strategies based on place value knowledge and the utilization of the properties of operations. • Use concrete and pictorial models, based on place value and the properties of operations to find the product of a one-digit whole number by a multiple of 10 in the range 10–90.

students are able to explain their reasoning.	
DOK	**Blooms**
1-2	Understand, Apply

Common Misconceptions

• Students may misunderstand “rounding down” and actually lower the value of the digit in the designated place. • Students may misunderstand “rounding up” and change the digit in the designated place while leaving digits in smaller places as they are. • Students who learn to add and subtract procedurally without a deep understanding of place value and regrouping will struggle to determine whether their answers are reasonable.	• Students may not understand that multiplying 3 X 40 means you have 3 groups of 4 tens and that is 12 tens or 120 (rather than multiply 4 X 3 and “add a zero at the end”).

New Mexico Instructional Scope

3rd Grade Numbers and Operations in Base Ten Guide

NEW MEXICO Public Education Department

ASSESSMENT GUIDE

- Use place value understanding and properties of operations to perform multi-digit arithmetic.

Grade	*CCSS Domain*	*CCSS Strand*
3	**Numbers and Operations in Base Ten**	**Use place value understanding and properties of operations to perform multi-digit arithmetic**
	Sample Task #1 (Constructed Response)	
	Jolene brings an apple and an orange with her to school. The weight of both pieces of fruit together is 417 grams. The apple weighs 223 grams. What is the weight of Jolene's orange?	
	Sample Task #2 (Multiple Choice)	
	The city zoo orders 472 pounds of meat to feed the animals. What is 472 rounded to the nearest ten? A. 400 B. 470 C. 480 D. 500	

MLSS AND CLR GUIDE

- Use place value understanding and properties of operations to perform multi-digit arithmetic.

CCSS Domain	*CCSS Cluster*
Numbers and Operations in Base Ten	**Use place value understanding and properties of operations to perform multi-digit arithmetic**
Culturally and Linguistically Responsive Instruction	
Relevance to Families and Communities	During a unit focused on rounding, adding, and subtraction 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, learning about how families determine how much and what type of cloth to make various textiles for their family and the community.

Cross-Curricular Connections	Language Arts: Expository writing to describe scientific or statistical data. Social Studies: Understanding statistical data in current events	
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?*	• Goal Setting: Setting challenging but attainable goals with students can communicate the belief and expectation that all students can engage with interesting and rigorous mathematical content and achieve in mathematics. Unfortunately, the reverse is also true, when students encounter low expectations through their interactions with adults and the media, they may see little reason to persist in mathematics, which can create a vicious cycle of low expectations and low achievement. For example, when studying using place value understanding and 37 7 properties of operations to perform multi-digit arithmetic goal setting is critical because it allows students the opportunity to think about and evaluate where they are at in their learning. It helps students focus on where they need to go and helps them develop a plan to get where they need to be.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• In 2nd grade, learners used place value understanding and properties of operations to add and subtract. • Connect to understanding that the three digits of a three-digit	• Connect to apply properties of operations as strategies to multiply and divide. **(3.OA.5)** • Connect to fluently add and subtract within 1000 using strategies and algorithms based on	• Connect to use place value understanding and properties of operations to perform multi-digit arithmetic. Learners use place value understanding to round multi-digit whole numbers to any

number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases. **(2.NBT.1)** • Connect to numbers within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method**.** **(2.NBT.7)** • Connect to why addition and subtraction strategies work, using place value and the properties of operations. **(2.NBT.9)** • Connect to mentally added 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900. **(2.NBT.8)**	place value, properties of operations, and/or the relationship between addition and subtraction. **(3.NBT.2)** • Connect the area to the operations of multiplication and addition. **(3.MD.7)** • Connect to multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations. **(3.NBT.3)**	place. **(4.NBT.3)** • Connect to fluently add and subtract multi-digit whole numbers using the standard algorithm. **(4.NBT.4)** • Connect to multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **(4.NBT.5)** • Connect to find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models. **(4.NBT.6)**

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 using place value understanding and properties of operations to perform multi-digit arithmetic because understanding place value is the foundation of understanding numbers. Through understanding place value students will be able to easily manipulate numbers to help with mental math strategies. Understanding of place value also helps students to understand addition and subtraction.

Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	2.NBT.A.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. This standard provides a foundation for work using place value understanding and properties of operations to perform multi-digit arithmetic because it helps students understand the process of regrouping and the reasoning of why we regroup when adding/subtracting. It also provides the basis of the place value system so students can expand their understanding to larger 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.
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 using place value understanding and properties of operations to perform multi-digit arithmetic by clarifying mathematical ideas and/or concepts through a short mini-lesson because it will provide students the opportunity to rethink about the value of numbers and digits in numbers. Understanding the value of digits and numbers provides students the foundation to understand addition and subtraction of numbers.
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 using place value understanding and properties of operations to perform multi-digit arithmetic by clarifying mathematical ideas and/or concepts by addressing conceptual understanding because students need to understand and internalize the value of numbers. The more students understand the value of numbers the more they will be able to manipulate numbers and begin to understand addition and subtraction of numbers.
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 open-ended tasks linking multiple disciplines when studying using place value understanding and properties of operations to perform multi-digit arithmetic because when students are allowed to apply their understanding to real world tasks, they develop a deeper understanding of the concept. Through applying their understanding of place value as well as adding and subtracting numbers to a real world, multi-disciplinary tasks students must take their possibly isolated understanding of a concept and integrate and apply it to their own interests and lives.