NEW MEXICO
Public Education Department

New Mexico Instructional Scope

6th Grade Number System Guide

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

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

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

In this guide you will find:

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

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System 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

- Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
  - 6.NS.A.1
- Compute fluently with multi-digit numbers and find common factors and multiples.
  - 6.NS.B.2
  - 6.NS.B.3
  - 6.NS.B.4
- Apply and extend previous understandings of numbers to the system of rational numbers.
  - 6.NS.C.5
  - 6.NS.C.6
  - 6.NS.C.7

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

Grade	*CCSS Domain*	*CCSS Cluster*
6	**THE NUMBER SYSTEM**	**Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**

Cluster Standard: 6.NS.A.1

Standard	**Standards for Mathematical Practice**
Interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi.?	• **SMP 2:** Reason abstractly and quantitatively. • **SMP 6:** Attend to precision. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students will continue their previous understanding of the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to explain why the procedures for dividing fractions make sense. They use visual models and equations to divide whole numbers by fractions and fractions by fractions to solve word problems	• Describing, writing, or verbally explaining the relationship between multiplication and division of fractions. • Interpret and compute quotients of fractions using visual models and equations. • Create visual fraction models and equations to represent the problem. • Solve word problems involving division of fractions by fractions.
DOK	**Blooms**
1-2	Understand, Apply

Common Misconceptions

- Students may think dividing by 1/2 is the same as dividing something in half. Dividing by 1/2 means to find how many one halves there are in a quantity. Dividing in half means to take a quantity and divide it into two equal parts. Thus 6 divided by 1/2 = 12 and 6 divided in half equals 3.

From: Ruth Harbin Miles and Lois A. Williams "Your Mathematics Standards Companion, Grade 6-8: What They Mean and How to Teach" 2018 and *http://www.katm.org/flipbooks/6%20FlipBook%20Final%20CCSS%202014.pdf*

- Students may not realize how to apply the problem to a real-life situation in which they must know which quantity represents which part of the division problem.

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

Grade	*CCSS Domain*	*CCSS Cluster*
6	**THE NUMBER SYSTEM**	**Compute fluently with multi-digit numbers and find common factors and multiples**

Cluster Standard: 6.NS.B.2

Standard	**Standards for Mathematical Practice**
Fluently divide multi-digit numbers using the standard algorithm.	• **SMP 6:** Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students will continue to build on their previous understanding of adding, subtracting, multiplying, and dividing to fluently use algorithms to solve problems. They will also work with finding the GCF to begin the early stages of factoring.	• Fluently divide multi-digit numbers.
DOK	**Blooms**
1-2	Apply

Grade	*CCSS Domain*	*CCSS Cluster*
6	**THE NUMBER SYSTEM**	**Compute fluently with multi-digit numbers and find common factors and multiples**

Cluster Standard: 6.NS.B.3

Standard	**Standards for Mathematical Practice**
Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	• **SMP 6:** Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can...**

• Students will continue to build on their previous understanding of adding, subtracting, multiplying, and dividing to fluently use algorithms to solve problems. They will also work with finding the GCF to begin the early stages of factoring.	• Fluently add, subtract, multiply and divide multi-digit decimals.
DOK	**Blooms**
1-2	Apply

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

Grade	*CCSS Domain*	*CCSS Cluster*
6	**THE NUMBER SYSTEM**	**Compute fluently with multi-digit numbers and find common factors and multiples**

Cluster Standard: 6.NS.B.4

Standard	Standards for Mathematical Practice
Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2)	• **SMP 6:** Attend to precision. • **SMP 7**: Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students will continue to build on their previous understanding of adding, subtracting, multiplying, and dividing to fluently use algorithms to solve problems. They will also work with finding the GCF to begin the early stages of factoring.	• Find the GCF of two whole numbers less than or equal to 100. • Find the LCM of two whole numbers less than or equal to 12. • Use the distributive property to express a sum of two whole numbers (1-100) with a common factor as a multiple of a sum of two whole numbers with no common factor .
DOK	**Blooms**
1-2	Understand, Apply

Common Misconceptions

• Students may misplace the decimal point when representing the product or quotient of decimals. • Students may confuse the concepts of factors and multiples.	• Students may have difficulty in finding LCM and GCFs. They may misunderstand when to apply LCM and when to apply GCF to solve a problem. *From: Ruth Harbin Miles and Lois A. Williams "Your Mathematics Standards Companion, Grade 6-8: What They Mean and How to Teach" 2018 and*

	http://www.katm.org/flipbooks/6%20FlipBook%20Final%20CCSS%202014.pdf

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

Grade	*CCSS Domain*	*CCSS Cluster*
6	**THE NUMBER SYSTEM**	**Apply and extend previous understandings of numbers to the system of rational**

Cluster Standard: 6.NS.C.5

Standard	**Standards for Mathematical Practice**
Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 2:** Reason abstractly and quantitatively. • **SMP 4:** Model with mathematics.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students will extend the number line to represent all rational numbers and recognize that number lines may be either horizontal or vertical. Horizontal and vertical number lines help students move from number lines to coordinate grids. They will focus on the relationship between negative and positive numbers and the meaning of absolute value. This cluster will lay the foundation for working with rational numbers, algebraic expressions and equations, functions and the coordinate plane in seventh and eighth grade.	• Understand that positive and negative numbers are used to describe amounts having opposite values. • Represent quantities in real-world contexts and explain the meaning of 0 in each situation.
DOK	**Blooms**
2	Understand, Apply

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

Grade	*CCSS Domain*	*CCSS Cluster*
6	**THE NUMBER SYSTEM**	**Apply and extend previous understandings of numbers to the system of rational**

Cluster Standard: 6.NS.C.6

Standard	Standards for Mathematical Practice
Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. **A:** Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., -(-3) = 3, and that 0 is its own opposite **B:** Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. **C:** Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.	• **SMP 4**: Model with mathematics. • **SMP 6:** Attend to precision. • **SMP 8:** Look for and express regularity in repeated reasoning.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
Students will extend the number line to represent all rational numbers and recognize that number lines may be either horizontal or vertical. Horizontal and vertical number lines help students move from number lines to coordinate grids. They will focus on the relationship between negative and positive numbers and the meaning of absolute value. This cluster will lay the foundation for working with rational numbers, algebraic expressions and	• Explain the concept of rational numbers by understanding that a rational number is a point on a number line and extending number line diagrams to show positive and negative numbers on the line and in the coordinate plane. • Express orally and in writing that opposite signs of a number indicate opposite places on a number line.

equations, functions and the coordinate plane in seventh and eighth grade.	• Understand where positive and negative numbers in an ordered pair appear on a coordinate plane and identify quadrants.
DOK	**Blooms**
2	Understand

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

Grade	*CCSS Domain*	*CCSS Cluster*
6	**THE NUMBER SYSTEM**	**Understand ordering and absolute value of rational numbers**

Cluster Standard: 6.NS.C.7

Standard	Standards for Mathematical Practice
Understand ordering and absolute value of rational numbers **A:** Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret -3 > -7 as a statement that -3 is located to the right of -7 on a number line oriented from left to right **B:** Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write - 3°C > -7°C to express the fact that -3°C is warmer than -7°C **C:** Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real world situation. For example, for an account balance of -30 dollars, write |-30| = 30 to describe the size of the debt in dollars. **D:** Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than -30 dollars represents a debt greater than 30 dollars.	• **SMP 1:** Make sense of problems and persevere in solving them. • **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 will extend the number line to represent all rational numbers and recognize that number lines may be either horizontal or vertical. Horizontal and vertical number lines help students move from number lines to coordinate grids. They will focus on the relationship between	• Understand the absolute value of rational numbers. • Interpret and explain the meanings behind inequality statements. • Show understanding of rational numbers by giving them context in a real-life situation.

negative and positive numbers and the meaning of absolute value. This cluster will lay the foundation for working with rational numbers, algebraic expressions and equations, functions and the coordinate plane in seventh and eighth grade.	• Understand that absolute value is a number's distance from zero on a number line. • Understand the difference between absolute value from order statements. • Explain the reasoning that as a value of a negative rational number decreases its absolute value increases.
DOK	**Blooms**
2	Understand, Apply

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

Grade	*CCSS Domain*	*CCSS Cluster*
6	**THE NUMBER SYSTEM**	**Apply and extend previous understandings of numbers to the system of rational numbers.**

Cluster Standard: 6.NS.C.8

Standard	Standards for Mathematical Practice
Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 2:** Reason abstractly and quantitatively. • **SMP 4:** Model with mathematics.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students will extend the number line to represent all rational numbers and recognize that number lines may be either horizontal or vertical. Horizontal and vertical number lines help students move from number lines to coordinate grids. They will focus on the relationship between negative and positive numbers and the meaning of absolute value. This cluster will lay the foundation for working with rational numbers, algebraic expressions and equations, functions and the coordinate plane in seventh and eighth grade.	• Graph points in all four quadrants solving real-world problems. • Find distance between points using coordinates and absolute value.
DOK	**Blooms**
1-2	Understand

Common Misconceptions

• Students may confuse the idea that greater the magnitude of a negative number the greater the number.	• Students may confuse the absolute value bar with parenthesis. • Students may think that absolute value makes

• Students may confuse the placement of rational numbers on the number line. • Students may confuse the absolute value bar with the number 1.	things positive and not understand it is about distance from 0 *From: Ruth Harbin Miles and Lois A. Williams "Your Mathematics Standards Companion, Grade 6-8: What They Mean and How to Teach" 2018 and http://www.katm.org/flipbooks/6%20FlipBook%20Final%20CCSS%202014.pdf*

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

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: **The Number System**	Strand: **Apply and extend previous understanding of multiplication and division to divide fractions by fractions**

Suggested Student Discourse Questions

- Is there more than one appropriate strategy to solve the problem and which one will you choose?
- How does your strategy differentiate from another student's approach to the problem?
- What are the advantages and disadvantages of using a fraction bar to represent division?
- Where in your personal life do you normally see the use of multiplication and division of fractions?
- Explain why the denominator changes as you multiply and divide fractions. What does the new denominator mean in terms of the solution?

Domain: **The Number System**	Strand: **Compute fluently with multi-digit numbers and find common factors and multiples**
Suggested Student Discourse Questions	
• Do you feel your strategy was the best one chosen or could you have done better solving the problem with another strategy? Explain. • What are the different approaches you might consider when solving this problem?	• Create a word problem of using common factors to solve problems of dividing, such as the same number of candies and cookies evenly in each group. • What is a common factor and how do we calculate a common factor?

Domain: **The Number System**	Strand: **Apply and extend previous understandings of numbers to the system of rational numbers**
Suggested Student Discourse Questions	
• What are the similarities and differences between the positive and negative rational numbers? • Did the strategy you use adequately help you to determine a solution for the problem?	• How are positive and negative numbers applied, such as weather forecasting, banking, and sports? • What are different terms that are used to describe positive and negative numbers?

ASSESSMENT GUIDE

- Apply and extend previous understandings of multiplication and division to divide fractions by fractions
- Compute fluently with multi-digit numbers and find common factors and multiples
- Apply and extend previous understandings of numbers to the system of rational numbers

Grade	*CCSS Domain*	*CCSS Strand*
6	The Number System	Apply and extend previous understanding of multiplication and division to divide fractions by fractions

Sample Task #1 (Constructed Response)

Consider the expression 2^3.

a. Write an equivalent expression without exponents. Calculate the value of this expression.

The expression 2^3 is multiplied by 16, resulting in a new expression, 2^x.

b. What is the value of x in this new expression? Show your work or explain how you know.

Sample Task #2 (Multiple Choice)

Which expressions have a value less than 1? Select the **three** correct expressions.

Ⓐ 8.2×0.06

Ⓑ 1.8×0.75

Ⓒ $28.3 \div 36.7$

Ⓓ $0.48 \div 0.12$

Ⓔ $3.8 - 3.576 + 0.2$

Ⓕ $2.27 + 3.68 - 4.625$

Grade	*CCSS Domain*	*CCSS Strand*

6	The Number System	Compute fluently with multi-digit numbers and find common factors and multiples

Sample Task #1 (Constructed Response)

A company manufactures kitchen equipment.

- The company redesigns its coffee maker every 6 years.
- The company redesigns its microwave every 4 years.
- Both the coffee maker and the microwave were redesigned this year.

a. How many years will it be before both the coffee maker and the microwave are redesigned in the same year again? Show your work or explain how you know.

The manufacturer is shipping coffee makers to stores.

- Each coffee maker is the same weight.
- Different shipments contain different numbers of coffee makers.

The weights of three shipments of coffee makers are:

- 56 pounds
- 70 pounds
- 49 pounds

b. What is the amount, in pounds, one coffee maker could weigh? Show your work or explain how you know.

Sample Task #2 (Multiple Choice)

Ling records the temperature four different times in one day.

- At 5:00 a.m., the temperature was 3°C.
- At 8:00 a.m., the temperature was −5°C.
- At 11:00 a.m., the temperature was −3°C.
- At 2:00 p.m., the temperature was 2°C.

Which statements about the temperatures are true? Select the **three** correct answers.

Ⓐ $-3°C < -5°C$

Ⓑ $3°C > -3°C$

Ⓒ $2°C < -5°C$

Ⓓ The temperature gets warmer between 5:00 a.m. and 8:00 a.m.

Ⓔ The temperature gets warmer between 8:00 a.m. and 11:00 a.m.

Ⓕ The temperature gets warmer between 11:00 a.m. and 2:00 p.m.

Grade	*CCSS Domain*	*CCSS Strand*
6	**The Number System**	**Apply and extend previous understandings of numbers to the system of rational numbers**

Sample Task #1 (Constructed Response)

1. Points *A*, *B*, *C*, and *D* create a rectangle.

- Point *A* is located at $(-5, -5)$.
- Point *B* is located at $(-5, 7)$.

a. What is the length, in units, of side *AB*? Show your work or explain how you know.

- Point *C* is a reflection of point *B* across the *y*-axis.
- Point *D* is a reflection of point *A* across the *y*-axis.

b. What is the perimeter (the distance around the rectangle), in units, of rectangle *ABCD*? Show your work or explain how you know.

Sample Task #2 (Multiple Choice)

, Which numerical expression represents the phrase "the product of 8 and z, increased by 2"?

Ⓐ $2(8z)$

Ⓑ $8z+2$

Ⓒ $2(8+z)$

Ⓓ $8+z+2$

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

MLSS AND CLR GUIDE

- Apply and extend previous understandings of multiplication and division to divide fractions by fractions
- Compute fluently with multi-digit numbers and find common factors and multiples
- Apply and extend previous understandings of numbers to the system of rational numbers

CCSS Domain	*CCSS Cluster*
The Number System	**Apply and extend previous understandings of multiplication and division to divide fractions by fractions**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on the application and extension of previous understandings of multiplication and division to divide fractions by fractions, consider options for learning from your families and communities the cultural and linguistic ways this mathematics exists outside of school to create stronger home to school connections for students. For example, learning about the different ways division of fractions is used in the home and community (cooking, sharing, distance problems) can be a great way to connect school tasks with home tasks.
Cross-Curricular Connections	**English**: ● RST.6.8.3- following precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. ● RST.6.8.4- demonstrating the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grade 6-8 texts and topics. ● RST.6.8.7- distinguish among facts, reasoned judgment based on research findings, and speculations in a text. ● SL.6.1- engage effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse partners on grade 6 topics, texts, and issues building on other's ideas and expressing their own clearly. **Social Studies:** ● CCSS.ELA-LITERACY.RH.6-8.1/CCSS.ELA-LITERACY.RH.6- 8.7-Students can determine growth in different contexts related to social studies. Students can apply their knowledge of number operations to create a claim for a question ● CCSS.ELA-LITERACY.RH.6-8.7-Students can use this idea of plotting points in a coordinate plane to adjust it to the longitude and latitude lines on a map. They can use this to track a traveling pattern and discuss it further. They can track a voyage over time.

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?*	• Eliciting and Using Evidence of Student Thinking: Eliciting and using student thinking can promote a classroom culture in which mistakes or errors are viewed as opportunities for learning. When student thinking is at the center of classroom activity, "it is more likely that students who have felt evaluated or judged in their past mathematical experiences will make meaningful contributions to the classroom over time." For example, when studying the application and extension of previous understandings of multiplication and division to divide fractions by fractions eliciting and using student thinking is critical because as students apply and extend from previous learning it is natural for them to develop errors or make mistakes in thinking and at the same time have solid thinking that needs to be built upon. It is important to develop and create a culture within the classroom that not only allows for these mistakes but values them and finds pathways for students and teachers to affirm ideas while building correct conceptual understanding.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	***Current Learning***	***Future Learning***
• Connect student's 3 rd and 5th grade understandings of division as an unknown factor problem. A student's ability to interpret whole number by whole number quotients and whole number by fraction quotients will be applied within this cluster. (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	• Students will need to understand how to complete operations with rational numbers to help demonstrate their conceptual understanding of the distributive property	• Connect the understandings from this cluster to the 7.NS standards in 7th grade when students are required to demonstrate understanding of multiplication and division and of fractions to multiply and divide rational numbers. In Grade 7, learners solve real-world and mathematical problems involving the four operations with rational numbers. In HS Algebra standards, learners continue to

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.)		use their understanding of division of fraction knowledge when solving more complex algebraic equations.

Suggested Instructional Strategies

Pre-Teach

Level of Intensity	***Essential Question***	***Examples***
Targeted	*What pre-teaching will prepare students to productively struggle with the mathematics for this cluster within your HQIM?*	For example, some learners may benefit from targeted pre-teaching that rehearses prior learning when studying the application and extension of previous understandings of multiplication and division to divide fractions by fractions because as students work in interpreting quotients and solving real world problems involving dividing fractions, it will help to have a solid understanding in multiplying and dividing fractions.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	This standard provides a foundation for work with the application and extension of previous understandings of multiplication and division to divide fractions by fractions because in 5th grade students extend their knowledge of multiplication and division to work with fractions. This major work prepares them to be able to solve real world problems with fractions and interpret quotients. 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 meaning behind dividing fractions by fractions (e.g. by using visual models and equations).
• That multiplication
	• Compute division of fraction by fraction problems.
	• Solve real-world and mathematical problems involving division of fractions
		• Build on students' experience with the following skills:
		  ○ Understand division as an unknown factor problem.
		  ○ Interpret whole number by whole number quotients
		  ○ Interpret whole number by fraction

and division are inverse operations • The meaning behind positive and negative numbers and how they are used to represent quantities. • How opposites are located on a number line and zero is its own opposite. • As the number line moves to the left (into the negative) the numbers continue to get smaller even though the absolute value of the number is larger. • The meaning of absolute value as the distance from 0 on a number line.	by fractions. • Interpret what the quotient represents in mathematical and real-world problems. • Represent real-world contexts using positive and negative numbers. • Find and position integers and other rational numbers on both horizontal and vertical number lines and use position and absolute value to order rational numbers. • Interpret inequalities as comparing two numbers on a number line. • Find distances between points with the same first or the same second coordinate using the idea of absolute value.	quotients ○ Understand the marks and units on a horizontal scale or number line. ○ Understand graphed points on a coordinate plane. ○ Interpreted what the graphed points represent. ○ • 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: ○ Algebra tiles ○ Multiplication chart ○ Real World manipulatives, such as football field, ocean, temperature, etc ○ Coordinate Plane

Re-Teach		
Level of Intensity	***Essential Question***	***Examples***
Targeted	What formative assessment data (e.g., tasks, exit tickets, observations) will help identify content needing to be revisited during a unit?	For example, students may benefit from re-engaging with content during a unit on the application and extension of previous understandings of multiplication and division to divide fractions by fractions by critiquing student approaches/solutions to make connections through a short mini-lesson because as students think through and process their own work and work of others they form a deeper understanding of the concept. This would be a good opportunity to have kids work in groups to solve problems and present solutions for discussion.

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 in the application and extension of previous understandings of multiplication and division to divide fractions by fractions by addressing conceptual understanding because students need to have a good foundation in both multiplication and division as well as fraction concepts to be able to apply these skills to solving real world problems and truly being able to understand what the solution means .

Extension	
Essential Question	***Examples***
What type of extension will offer additional challenges to 'broaden' your student's knowledge of the mathematics developed within your HQIM?	For example, some learners may benefit from an extension such as the application of and development of abstract thinking skills when studying the application and extension of previous understandings of multiplication and division to divide fractions by fractions because students benefit from visual representations such as a model showing division of a fraction by a fraction and what the model actually represents. An activity where students can apply a visual representation with a real world problem and interpret the solution would help students make important connections.

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

CCSS Domain	*CCSS Cluster*
The Number System	**Compute fluently with multi-digit numbers and find common factors and multiples**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on computing fluently with multi-digit numbers and finding common factors and multiples, 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 decimals, factors or multiples are used in the home and community can a be a great way to connect schools tasks with home tasks.	
Cross-Curricular Connections	**English**: ● RST.6.8.3- following precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. ● RST.6.8.4- demonstrating the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grade 6-8 texts and topics. ● RST.6.8.7- distinguish among facts, reasoned judgment based on research findings, and speculations in a text. ● SL.6.1- engage effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse partners on grade 6 topics, texts, and issues building on other's ideas and expressing their own clearly. **Social Studies**: ● CCSS.ELA-LITERACY.RH.6-8.1/CCSS.ELA-LITERACY.RH.6- 8.7-Students can determine growth in different contexts	
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*	● 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 computing fluently with multi-digit numbers and finding common factors and multiples the types of mathematical tasks are critical because all students need a well-developed conceptual understanding of operations with decimals, factors

	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 multiples. It is important to make sure that opportunities are given to develop this understanding so that some students are not at a disadvantage when using the algorithm and developing fluency.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• Students will need to reflect on their previous understanding of factor pairs from 4th grade. They will connect their previous learning around multiples to finding LCMs and GCFs in this cluster. • This cluster also connects to instruction from Grade 5 where students found whole number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value. These same skills will be utilized when dividing decimals	• In this cluster students use the distributive property to express a sum of whole numbers. This connects to future 6th grade learning when they explore the conceptual understanding of the distributive property in the 6.EE.A cluster.	• Students will connect their skills with the standard algorithm in order to successfully multiply and divide rational numbers. This will be connected in the standard algorithm as well as in application to real-world contexts. In high school, learners continue to use the distributive property to express a sum of two whole numbers with a common factor as a multiple of a sum of two whole numbers with no common factor as they learn factorization.

Suggested Instructional Strategies

Pre-Teach

Level of Intensity	*Essential Question*	*Examples*
Targeted	*What pre-teaching will prepare students to*	For example, some learners may benefit from targeted pre-teaching that rehearses prior learning when studying

	productively struggle with the mathematics for this cluster within your HQIM?	computing fluently with multi-digit numbers and finding common factors and multiples because students were asked in 5th grade to perform operations with multi-digit whole numbers and decimals to hundredths and in 4th grade to gain familiarity with factors and multiples. The basic work of both grades will be vital to developing fluency.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	4.OA.B.4: This standard provides a foundation for working with computing fluently with multi-digit numbers and finding common factors and multiples because students are asked to determine factors and if a number is composite or prime. This will help them in their grade level work of expressing factors in different ways using the distributive property. 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 computing fluently with multi-digit numbers and finding common factors and multiples by clarifying mathematical ideas and/or concepts through a short mini lesson because students may confuse operations with decimals and need a reminder of how to work within the algorithm and/or look at different models for factors to determine if they could both be correct.
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 computing fluently with multi-digit numbers and finding common factors and multiples by addressing conceptual understanding because it is important for students to understand why an algorithm works if they are going to use it with fluency. This helps students to catch mistakes and understand if a solution is reasonable or not
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 computing fluently with multi-digit numbers and finding common factors and multiples because problem solving and modeling using a variety of interesting topics can be used to give students experience in applying the skills they are now fluent with.

NEW MEXICO
Public Education Department

New Mexico Instructional Scope
6th Grade Number System Guide

CCSS Domain	*CCSS Cluster*
The Number System	**Apply and extend previous understandings of numbers to the system of rational numbers**

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on applying and extending previous understandings of numbers to the system of rational 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, learning about the different representations of positive numbers, negative numbers, and the meaning of zero across the languages in the classroom brings about a wide array of conceptual understanding that can be referenced in diverse cultures.	
Cross-Curricular Connections	**English:** ● RST.6.8.3- following precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. ● RST.6.8.4- demonstrating the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grade 6-8 texts and topics. ● RST.6.8.7- distinguish among facts, reasoned judgment based on research findings, and speculations in a text. ● SL.6.1- engage effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse partners on grade 6 topics, texts, and issues building on other's ideas and expressing their own clearly. **Social Studies**: ● CCSS.ELA-LITERACY.RH.6-8.7-Students can use this idea of plotting points in a coordinate plane to adjust it to the longitude and latitude lines on a map. They can use this to track a traveling pattern and discuss it further. They can track a voyage over time.	
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?*	● 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 how to apply and extend previous understandings of numbers to the system of rational numbers the types of

	• *How can you create connections between the cultural and linguistic behaviors of your students' home culture and language, the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?*	mathematical tasks are critical because it allows students to work on their specific interests and strengths. For example, differentiated tasks can be Banking and Finance (deposits and withdrawals), Is it hot or cold? (temperatures), The Extra Mile (moving forward or backward), etc. Assigning different tasks is important and crucial because it is directly linked to students' learning. Also, the level of task complexity can vary by creating or adapting materials to the students' level of thinking and understanding. Teachers should at first know and understand the uniqueness of every student and plan accordingly.

Planning for Multi-Layered System of Supports

Vertical Alignment

Previous Learning	*Current Learning*	*Future Learning*
• This cluster is connected to what students previously learned in third grade, when they marked off units on a horizontal scale or number line. Students will recall that a fraction can be represented on a number line, in the space between whole numbers. They will also recall the skills from Grade 5 when they graphed points on a coordinate plane and interpreted what the points represent	• There are connections between this cluster and the 6.EE.B cluster when learners recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams. Also, in 6.G.3, there are connections made when students use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate	• The skills from this cluster are applied in 7th grade when students make connections between their 6^{th} grade understanding of what rational numbers are to include the addition and subtraction of integers. Students will need to represent addition and subtraction of integers on a horizontal and/or vertical number line.

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 apply and extend previous understandings of numbers to the system of rational numbers because students can build understanding of positive and negative integers, reinforce concepts of distance and location on number lines
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	6.NS.C. 5 - This standard provides a foundation for work with applying and extending previous understandings of numbers to the system of rational numbers because it establishes the foundation of conceptual understanding of positive and negative numbers including zero. Ordering and comparing numbers can be easily done when visualized on a number line. 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 meaning behind positive and negative numbers and how they are used to represent quantities.
• How opposites are located on a number line and zero is its own opposite.
• As the number line moves to the left (into the negative) the numbers continue to get smaller even though the absolute value of the number is larger.
	• Represent real-world contexts using positive and negative numbers.
	• Find and position integers and other rational numbers on both horizontal and vertical number lines and use position and absolute value to order rational numbers.
	• Interpret inequalities as comparing two numbers on a number line.
	• Find distances between points with the same first or the same second
		• Build on students' experience with the following skills:
		  ○ Understand the marks and units on a horizontal scale or number line.
		  ○ Understand graphed points on a coordinate plane.
		  ○ Interpreted what the graphed points represent.
		
		• 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

• The meaning of absolute value as the distance from 0 on a number line.	coordinate using the idea of absolute value.	include: ○ Real World manipulatives, such as football field, ocean, temperature, etc. ○ Coordinate Plane

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 applying and extending previous understanding of numbers to the system of rational numbers by critiquing student approaches/solutions to make connections through a short mini lesson because starting from what they know will make connections easier to approach like the concepts of losing and winning, going backward and moving forward, below freezing and above freezing. r
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 applying and extending previous understanding of numbers to the system of rational numbers by addressing conceptual understanding because the idea of positive numbers, negative numbers and zero are abstract in nature

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, applying and extending previous understanding of numbers to the system of rational numbers because students are expected to use their conceptual understanding in solving word problems.

NEW MEXICO
Public Education Department

New Mexico Instructional Scope

6th Grade Number System Guide