New Mexico Instructional Scope

6th Grade Expressions and Equations 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 Instructional Scope

6th Grade Expressions and Equations 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 arithmetic to algebraic expressions.
  - 6.EE.A.1
  - 6.EE.A.2
  - 6.EE.A.3
  - 6.EE.A.4
- Reason about and solve one-variable equations and inequalities.
  - 6.EE.B.5
  - 6.EE.B.6
  - 6.EE.B.7
  - 6.EE.B.8
- Represent and analyze quantitative relationships between dependent and independent variables.
  - 6.EE.C.9

Grade	CCSS Domain	CCSS Cluster
6	EXPRESSIONS & EQUATIONS	Apply and extend previous understandings of arithmetic to algebraic expressions.

Cluster Standard: 6.EE.A.1

Standard	Standards for Mathematical Practice
Write and evaluate numerical expressions involving whole-number exponents	• **SMP 6:** Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• The focus for this cluster is writing and evaluating numerical expressions involving whole number exponents, finding the value of an expression using exponential notation such as 42= 4 x 4 or d 3 = d x d x d, and using the appropriate terminology to explain how to evaluate an expression. Students are applying the properties of operations to generate equivalent expressions including the distributive property to produce equivalent representation.	• Write and evaluate numerical expressions involving whole number exponents using the correct terminology • Evaluate numerical expressions using their knowledge of order of operations from previous years.
DOK	**Blooms**
2	Understand, Apply

Grade	CCSS Domain	CCSS Cluster
6	EXPRESSIONS & EQUATIONS	Apply and extend previous understandings of arithmetic to algebraic expressions.

Cluster Standard: 6.EE.A.2

Standard	Standards for Mathematical Practice
Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 - y **A:** Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 - y **B:** Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms **C:** Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = ½	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 6**: Attend to precision.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• The focus for this cluster is writing and evaluating numerical expressions involving whole number exponents, finding the value of an expression using exponential notation such as 42= 4 x 4 or d 3 = d x d x d, and using the appropriate terminology to explain how to evaluate an	• Express orally and in writing that variables represent unknown quantities. • Write expressions using variables that represent unknown numbers. • Identify context to write algebraic expressions. • Translate verbal expressions into numerical

expression. Students are applying the properties of operations to generate equivalent expressions including the distributive property to produce equivalent representation.	expressions. ● Use information from real world examples to evaluate expressions with variables
DOK	**Blooms**
1-2	Understand, Apply

Grade	CCSS Domain	CCSS Cluster
6	EXPRESSIONS & EQUATIONS	Apply and extend previous understandings of arithmetic to algebraic expressions

Cluster Standard: 6.EE.A.3

Standard	Standards for Mathematical Practice
Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y	• **SMP 2:** Reason abstractly and quantitatively.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• The focus for this cluster is writing and evaluating numerical expressions involving whole number exponents, finding the value of an expression using exponential notation such as 42= 4 x 4 or d 3 = d x d x d, and using the appropriate terminology to explain how to evaluate an expression. Students are applying the properties of operations to generate equivalent expressions including the distributive property to produce equivalent representation.	• Create an equivalent expression through the use of properties of operations • Apply the distributive, commutative, identity, and distributives properties to expressions that include variables
DOK	**Blooms**
1-2	Understand, Apply

Grade	CCSS Domain	CCSS Cluster
6	EXPRESSIONS & EQUATIONS	Apply and extend previous understandings of arithmetic to algebraic expressions

Cluster Standard: 6.EE.A.4

Standard	Standards for Mathematical Practice
Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for	• **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• The focus for this cluster is writing and evaluating numerical expressions involving whole number exponents, finding the value of an expression using exponential notation such as 42= 4 x 4 or d 3 = d x d x d, and using the appropriate terminology to explain how to evaluate an expression. Students are applying the properties of operations to generate equivalent expressions including the distributive property to produce equivalent representation.	• Identify equivalent expressions. • Combine like terms • Reason that two expressions are equivalent through the use of substitution
DOK	**Blooms**
1-2	Understand, Apply

Common Misconceptions

• When given an expression with an exponent, students may misinterpret the base and the exponent as factors and multiply the two numbers. For example, show that 5 x 3=15, which is much smaller than 5x5x5 which equals 125. • Students may use distributive property	• Students may misuse the commutative property by applying it to subtraction and/or division problems. • Students confuse variables with letters for units of measure.

incorrectly in that students will often multiply the first term, but forget to do the same to the second term.	

6	EXPRESSIONS & EQUATIONS	Reason about and solve one-variable equations and inequalities.

Cluster Standard: 6.EE.B.5

Standard	Standards for Mathematical Practice
Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.	• **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 focus on the meaning of an equation and use reasoning and prior knowledge to solve it. They use variables to represent numbers and write expressions when solving problems. Students learn to write inequalities in the form of $x > c$, $x \geq c$, $x < c$ or $x \leq c$ and use number line representation to show the solutions of inequalities.	• Reason to find the single value that makes an equation true • Explain what a variable is representing in a particular situation or context • Use substitution to simplify numerical expressions and determine if the solution is true.
DOK	**Blooms**
2	Understand, Apply

6	EXPRESSIONS & EQUATIONS	Reason about and solve one-variable equations and inequalities.

Cluster Standard: 6.EE.B.6

Standard	Standards for Mathematical Practice
Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 2**: Reason abstractly and quantitatively. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students focus on the meaning of an equation and use reasoning and prior knowledge to solve it. They use variables to represent numbers and write expressions when solving problems. Students learn to write inequalities in the form of $x > c$, $x \geq c$, $x < c$ or $x \leq c$ and use number line representation to show the solutions of inequalities.	• Explain that a variable represents a number or a specified set of numbers. • Identify what the variable represents quantitatively and in context. • Represent real world scenarios with variable expressions.
DOK	**Blooms**
1-2	Understand, Apply

6	EXPRESSIONS & EQUATIONS	Reason about and solve one-variable equations and inequalities.

Cluster Standard: 6.EE.B.7

Standard	Standards for Mathematical Practice
Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.	• **SMP 1:** Make sense of problems and persevere in solving them. • **SMP 2:** Reason abstractly and quantitatively. • **SMP 7:** Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students focus on the meaning of an equation and use reasoning and prior knowledge to solve it. They use variables to represent numbers and write expressions when solving problems. Students learn to write inequalities in the form of $x > c$, $x \geq c$, $x < c$ or $x \leq c$ and use number line representation to show the solutions of inequalities.	• Write and solve one step addition equations (x + p= q) when x, p and q are positive • Write and solve one step multiplication equations (px=q) form when x, p and q are positive. • Model real-world situations with equations
DOK	**Blooms**
1-2	Apply

6	EXPRESSIONS & EQUATIONS	Reason about and solve one-variable equations and inequalities.

Cluster Standard: 6.EE.B.8

Standard	Standards for Mathematical Practice
Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.	• **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. • **SMP 4:** Model with mathematics.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• Students focus on the meaning of an equation and use reasoning and prior knowledge to solve it. They use variables to represent numbers and write expressions when solving problems. Students learn to write inequalities in the form of x > c, x ≥ c, x < c or x ≤ c and use number line representation to show the solutions of inequalities.	• Represent a real-world problem with an inequality (x > c or x < c) • Explain that an inequality can have infinite solutions and show it on a number line. • Understand the difference between >, ≥, and <, ≤ and graphing with the appropriate open or closed circle.
DOK	**Blooms**
1-2	Apply

Common Misconceptions

• Students may have difficulty conceptualizing that an inequality can have more than one solution.	• Students may assume if there is no coefficient in front of the variable, then the variable does not have a value. They do not see that y=1y.

Grade	CCSS Domain	CCSS Cluster
6	EXPRESSIONS & EQUATIONS	Represent and analyze quantitative relationships between dependent and independent variables.

Cluster Standard: 6.EE.C.9

Standard	Standards for Mathematical Practice
Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time	• **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. • **SMP 4:** Model with mathematics. • **SMP 7**: Look for and make use of structure.
Clarification Statement	**Students Who Demonstrate Understanding Can...**
• The focus for this cluster is using variables to represent two quantities in a real-world problem that change in relationship to one another. Students write an equation and analyze the relationship between the dependent and independent variables using graphs and tables.	• Use variables to represent unknowns in a real-world problem and write an equation to show the relationship between two changing quantities. • Describe the variables in context of dependent and independent • Analyze the relationship between the dependent and independent variables using tables, graphs and equations
DOK	**Blooms**
1-3	Apply, Analyze

Common Misconceptions

• Students may confuse what the graph represents in context. For example, that moving up or down on a graph does not necessarily mean that a	• Students may reverse the independent and dependent variable in an equation, graph or table.

person is moving up or down.	

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: **Expressions and Equations**	Strand: **Apply and extend previous understandings of arithmetic to algebraic expressions.**
Suggested Student Discourse Questions	
• Why do we use variables to represent different situations? • What would be the steps to create the algebraic expression?	• Can you create a real life or real world word problem to express understanding of algebraic expression? • What is an algebraic expression?

Domain: **Expressions and Equations**	Strand: **Reason about and solve one-variable equations and inequalities**
Suggested Student Discourse Questions	
• How can I formulate and use different strategies to solve one-step equations? • Would a one-step equation yield the same solution if you reversed the inverse operations when solving it?	• What real life connections can you make to reasoning and solving one variable equations and inequalities? • What are the similarities and differences between the terms equations and inequalities?

Domain: **Expressions and Equations**	Strand: **Represent and analyze qualitative relationships between dependent and independent variables**
Suggested Student Discourse Questions	
• How would you describe the relationship between dependent and independent variables? How might a situation change if the variables were switched? • What approaches or strategies could you use to determine which variable is independent and which variable is dependent?	• How can you relate representing and analyzing qualitative relationships between independent and dependent variables to your real life? • What is your definition of qualitative relationships?

ASSESSMENT GUIDE

- Apply and extend previous understandings of arithmetic to algebraic expressions
- Reason about and solve one-variable equations and inequalities
- Represent and analyze quantitative relationships between dependent and independent variables

Grade	*CCSS Domain*	*CCSS Strand*
6	Expressions and Equations	Reason about and solve one-variable equations and inequalities

Sample Task #1 (Constructed Response)

Noomi earned $40.50 by working 4.5 hours at a store.

a. Write an equation that can be used to find how much Noomi earns per hour, *p*, at the store.

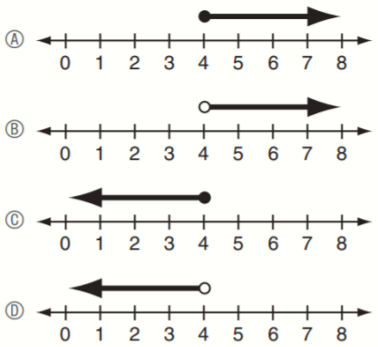
b. How much money does Noomi earn, in dollars, per hour at the store?

Noomi wants to earn at least $540 this month.

c. What is the **least** number of hours Noomi can work this month to meet her goal? Show your work or explain how you know.

Sample Task #2 (Multiple Choice)

. Ms. Kelsey is planning to start a math club at her school. To start the club, at least 4 students must join. Which number line represents the number of students who could join Ms. Kelsey's math club?



Grade	CCSS Domain	CCSS Strand
6	Expressions and Equations	Apply and extend previous understanding of arithmetic to algebraic expressions

Sample Task #1 (Constructed Response)

Brandon simplified this expression.

Expression: $4y+7\times3+4(3y+5)$

Step 1: $4y+7\times3+4(8y)$

Step 2: $4y+21+32y$

Step 3: $36y+21$

Step 4: $3(12y+7)$

Brandon made a mistake. What is his mistake?

Ⓐ In Step 1, he added the terms in the parentheses.

Ⓑ In Step 2, he did not follow the order of operations.

Ⓒ In Step 3, he did not combine like terms.

Ⓓ In Step 4, he factored incorrectly.

Sample Task #2 (Multiple Choice)

Which expressions are equivalent to $12x+8x+6$? Select the **three** equivalent expressions.

Ⓐ $4(5x)+6$

Ⓑ $18x+8x$

Ⓒ $20x+6$

Ⓓ $8x(4+6)$

Ⓔ $2(10x)+6$

Grade	CCSS Domain	CCSS Strand
6	Expressions and Equations	Represent and analyze quantitative relationships between dependent and independent variables

Sample Task #1 (Constructed Response)

A scientist measures the amount of water collected in a tub at different times during the day. This table shows the time the water had been running and the amount of water in the tub.

Time (minutes)	Amount of Water (liters)
12	18
16	24
20	30

a. Based on the information in the table, write an equation that can be used to find t, the number of minutes it took to collect w liters of water in the tub.

b. How many liters will be in the tub after 32 minutes?

Sample Task #2 (Multiple Choice)

The weight of the gasoline in a container is described by the equation $W = 6a$, where a is the number of gallons and W is the weight in pounds. Which table shows this relationship?

Ⓐ

a	W
0	6
1	7
2	8
3	9
4	10

Ⓑ

a	W
0	6
1	12
2	18
3	24
4	30

Ⓒ

a	W
0	0
1	6
2	12
3	24
4	48

Ⓓ

a	W
0	0
1	6
2	12
3	18
4	24

MLSS AND CLR GUIDE

- Apply and extend previous understandings of arithmetic to algebraic expressions
- Reason about and solve one-variable equations and inequalities
- Represent and analyze quantitative relationships between dependent and independent variables

CCSS Domain	*CCSS Cluster*
Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on writing, reading, evaluating algebraic expressions and identifying/generating equivalent expressions, 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, learn about the habits and experiences that your students have at home or other settings away from school. Create or modify tasks to reflect situations or topics that will be interesting or familiar to your students and their concept of the world around them.	
Cross-Curricular Connections	**Science:** • Students can work to create, read, and evaluate expressions that result from the forces at work. Students will have to be able to create and support their argument. (MS-PS2-1, Motion and Stability: Forces and Interactions) • https://www.nextgenscience.org/pe/ms-ps2-1-motion-and-stability-forces-and-interactions **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.	
Validate/Affirm/Build/Bridge	• *How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and languages of students*	• 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 representations are mathematical tools. The linguistic and cultural

	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?*	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 41 7 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 writing, reading, evaluating algebraic expressions and identifying/generating equivalent expressions the use of mathematical representations within the classroom is critical because it allows students to use various strategies or representations that are familiar or logical to them, in order to make sense of verbal expressions and algebraic expressions. Many students need the support of physical or visual representations to connect their understanding of mathematical concepts and language that are new and foreign to them. This cluster introduces students to what will be the critical foundation to their conceptual understanding of algebraic concepts and patterns/relationships applied within the properties of operations, so it is important to allow students time and opportunities to connect these concepts to various mathematical representations.

Planning for Multi-Layered System of Supports

Vertical Alignment		
Previous Learning	***Current Learning***	***Future Learning***
● Students will connect their prior knowledge on using whole-number exponents to denote the powers of 10 in order to properly set-up exponents and identify the base. Additionally, in 5th grade learners have already been taught the commutative and associative property of	● Students will connect what they were previously taught in 6th grade finding the greatest common factor of two whole numbers and using the distributive property to express sums of whole numbers to this cluster. These skills will be needed when students create and identify	● In 7th grade, learners will learn to apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. Learners will develop an understanding of operations with rational numbers when working with expressions and

both addition and multiplication.	equivalent expressions.	linear equations. In 8th grade, students will know and apply the properties of integer exponents to generate equivalent numerical expressions. In high school, students will need to interpret parts of an expression, such as terms, factors, and coefficients.

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 new mathematical language when studying writing, reading, evaluating algebraic expressions and identifying/generating equivalent expressions because this cluster requires the acquisition of a considerable amount of new vocabulary. The terms that are used to identify the parts and types of expressions will support students in becoming proficient in explaining and discussing many new concepts encompassed in expressions, equations, and inequalities. This is the first formal experience students have with variables, coefficients, and constants. Students will also be extending previous learning of exponents, order of operations, sums, differences products, quotients, equivalent, like and unlike terms.
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	5.NBT.B.7:This standard provides a foundation for work with writing, reading, evaluating algebraic expressions and identifying/generating equivalent expressions because it ensures that students have a mastery of all operations with whole numbers and decimals. In addition, this standard focuses on the properties of operations and the relationship between addition and subtraction. If students understand that relationship, they can then make the connection to the relationship between multiplication and division. For students to

		successfully evaluate algebraic expressions and generate equivalent expressions, they need to have a mastery of all parts of this standard to use as an anchor for new learning. 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 concept of exponents and exponential notation. (e.g.4^2 = 4 x 4 o r d^3 = d x d x d)
• Variables represent unknown quantities.
• The distributive, commutative, associative, and identity properties and that these apply to expressions also.
• Two expressions can be shown to be equivalent through substitution.
• A variable represents a number or a specified set of numbers.
• The solution to an equation is the value that makes the equation true.
• Solutions to inequalities represent a range of possible values rather than a single
	• Evaluate numerical expressions that include exponents using the order of operations.
	• Translate between numerical and verbal expressions.
	• Use information from real world examples to evaluate expressions with variables.
	• Combine like terms
	• Use reasoning to find the value or values that make an equation or inequality true and select from a given set of values.
	• Use substitution to simplify numerical expressions.
	• Graph solutions of inequalities on a numberline.
	• Model real world situations with equations and inequalities.
	• Determine independent and
		• Build on students' experience with the following skills:
		  ○ Understand whole-number exponents to denote the powers of 10 in order.
		  ○ Understand the commutative and associative property for both addition and multiplication.
		  ○ Understand equal sign is and that it shows equivalence.
		  ○ Understand equivalence
		  ○ Understand visual fraction models
		  ○ Understand the basic properties of operations
		  ○ Generate patterns from rules that are given.
		  ○ Understand what a dependent and independent means.
		  ○ Analyze the relationship between the dependent and independent variables
		
		• 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:

solution. ● The difference between >, ≥, and <, ≤ and graphing with the appropriate open or closed circle ● A change in the independent variable creates a change in the dependent variable. (e.g. as x increases y increases)	dependent variables and write an equation that represents the relationship of both. ● Represent two quantities that change in relationship with one another in real-world situations. ● Identify relationships between variables using tables, graphs, and equations.	○ Graphic organizer with grade appropriate math symbols ○ Colored pencils ○ Algebra tiles ○ Graphic Organizer with Dependent and Independent variables ○ Graphic Organizer (Rule of Four- Table, Equation, Verbal, Graph)

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 writing, reading, evaluating algebraic expressions and identifying/generating equivalent expressions by examining tasks from a different perspective through a short mini-lesson because students often need to see multiple representations or approaches to interpreting and generating algebraic expressions. The conceptual way of thinking about mathematics is new to them, and many of them need opportunities to engage with their peers who may offer a different perspective or approach to understanding.
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 writing, reading, evaluating algebraic expressions and identifying/generating equivalent expressions by addressing conceptual understanding because some students will need explicit instruction, in order to make connections between their prior knowledge and experiences working with numerical expressions and the conceptual way of understanding algebraic expressions

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 writing, reading, evaluating algebraic expressions because students can extend their learning of evaluating algebraic expressions by applying it to Geometry topics. They should be given tasks and opportunities to apply the concept of evaluating using geometric formulas. They can make the connection between the variables represented in the formulas for Volume, Area, and Surface Area with the conceptual way of calculating them without the use of concrete objects

CCSS Domain	*CCSS Cluster*
Expressions and Equations	Reason about and solve one-variable equations and inequalities

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on reasoning about and solving one-variable equations and inequalities, 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, learn about the habits and experiences that your students have at home or other settings away from school. Create or modify tasks to reflect situations or topics that will be interesting or familiar to your students and their concept of the world around them.	
Cross-Curricular Connections	**Science:** • https://www.nextgenscience.org/pe/ms-ess2-2-earths-systems https://www.nextgenscience.org/pe/ms-ess1-4-earths-place-universe Students can apply their study of geosciences to math by creating expressions and variables to represent the changes that have occurred on Earth. As the Earth has changed, the rate at which it changed as well as the changes to the environment can be modeled with mathematics. This can be used to study the time, space, energy phenomena that may be too small or large to observe. Students can use their expressions to conduct experiments or analysis of the above phenomena. (MS ESS2-2, Earth's Systems, MS-ESS1-4, Earth's Place in the Universe) **English:** ● RST.6.8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. ● RST.6.8.4 Determine 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 grades 6-8 texts and topics. ● RST.6.8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). ● 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 others' ideas and expressing their own clearly.	
Validate/Affirm/Build/Bridge	● *How can you design your mathematics classroom to intentionally and*	● Building Procedural Fluency from Conceptual Understanding: Instruction should build from conceptual understanding to allow students

	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?*	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 other methods of solving tasks that occur outside of school mathematics. For example, when studying reasoning about and solving one-variable equations and inequalities the types of mathematical tasks are critical because as students are introduced to new algebraic concepts using variables, they will need to think of ways to use strategies to connect to their prior knowledge of operations and number sense. Since students are beginning to transition from a literal understanding of numbers to a conceptual one, giving them opportunities to make connections and build meaning with the use of variables conceptually first will serve to strengthen their subsequent mastery of the procedural fluency that will be critical to their success in future experiences with algebraic topics. Deepening students' conceptual understanding will also aid in their ability to fluently apply equations and inequalities in a variety of real-world contexts.

Planning for Multi-Layered System of Supports

Vertical Alignment		
Previous Learning	***Current Learning***	***Future Learning***
• Students connect their previous understandings of what the equal sign is and that it shows equivalence to this cluster. The idea of equivalence is most aligned to their work in grades 4 and 5 with visual fraction models and understanding basic properties of operations to solve	• This cluster really expands on the previous cluster of 6.EE.A.2 where students learned how to read, write and evaluate expressions in which letters stand for numbers.	• In Grade 7, students begin to formally apply the properties of operations. They will solve two step equations in the form of $px + q = r$ and $p(x + q) = r$. In Grade 8, students solve linear equations in one variable that include one solution, no solution, or infinitely many solutions. They include equations that require the distributive property or combining like terms. In Grade 8, the

		variable can be on both sides of the equation. In high school, students further their knowledge of solving equations with multistep equations that require the distributive property or combining like terms

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. keeping equations balanced when solving, displaying solutions to equations and inequalities on a number line) when studying reasoning about and solving one-variable equations and inequalities because students have experience solving one step numerical equations, but this is the first time they will be introduced to the concept of solving equations and inequalities using inverse operations. This is also the first introduction to solving inequalities that have a solution set containing infinitely many solutions. Although students have used number lines in the past, this will be their first experience with displaying solutions and solution sets on a number line. When reading a number line, students will need to be pre-taught how to read and interpret the circles and arrows
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	*6.EE.A2: This standard provides a foundation for working with reasoning about and solving one-variable equations and inequalities because students need to have a firm grasp of how to read, interpret, write, and evaluate algebraic expressions containing variables before they will be able to clearly understand the connection between the parts of an equation or inequality. Students won't understand that an equation is two equivalent expressions if they don't have a clear understanding of expressions. In order for students to be able to interpret, explain, and discuss algebraic expressions, equations, and inequalities, they need to have a proficient understanding of the parts of expressions and different types of*

		expressions (e.g. sum, difference, product, quotient, or a combination). 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 variable represents a number or a specified set of numbers.
• The solution to an equation is the value that makes the equation true.
• Solutions to inequalities represent a range of possible values rather than a single solution.
• The difference between >, ≥, and <, ≤ and graphing with the appropriate open or closed circle.
	• Use reasoning to find the value or values that make an equation or inequality true and select from a given set of values.
	• Use substitution to simplify numerical expressions.
	• Graph solutions of inequalities on a numberline.
	• Model real world situations with equations and inequalities.
		• Build on students' experience with the following skills:
		  ○ Understand equal sign is and that it shows equivalence.
		  ○ Understand equivalence
		  ○ Understand visual fraction models
		  ○ Understand the basic properties of operations
		
		• 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:
		  ○ Graphic Organization with inequality symbols

Re-Teach		
Level of Intensity	***Essential Question***	***Examples***
Targeted	What formative assessment data (e.g., tasks, exit tickets, observations) will help	For example, students may benefit from re-engaging with content during a unit on reasoning about and solving one-variable equations and inequalities by clarifying

	identify content needing to be revisited during a unit?	mathematical ideas and/or concepts through a short mini-lesson because the algebraic concepts that are introduced in this cluster are a necessary foundation for students' success in all subsequent math courses. When examining the coherence map, this cluster has a direct correlation to major clusters in Math 7, Math 8, Algebra I, Geometry, and Algebra II. Taking the time to revisit, reteach, or practice the 6.EE.B cluster, will support students in becoming proficient in foundational concepts and skills that will improve their chances of success as mathematical thinkers and 9 problem solvers
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 about and solving one-variable equations and inequalities by confronting student misconceptions because if students have a misconception about the correct way to solve, check or represent a one-step equation or inequality, that will cause them more confusion when they are introduced to more complex equations and inequalities in the future. If they have a misconception about when to apply a particular operation or in what order to write the parts of an equation or inequality from a word problem, addressing and reteaching that can help students master this major cluster and its concepts to a higher degree. Students can be guided through scaffolding or collaborative discussions to examine a multitude of similar problems, in order to reflect, analyze errors, and create generalizations that will correct their misconceptions.

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?	Students are NOT learning how to solve one step equations using the properties of operations yet. To make it more difficult for students, add in fractions and decimals. The cluster is truly about reasoning. Students need to understand how to maintain equivalence when working with equations. They may use the properties of operations to solve but are not explicitly being told that is what they are doing.

CCSS Domain	*CCSS Cluster*
Expressions and Equations	Represent and analyze quantitative relationships between dependent and independent variables

Culturally and Linguistically Responsive Instruction

Relevance to Families and Communities	During a unit focused on representing and analyzing quantitative relationships between dependent and independent variables, 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, the cost of making one Navajo ceremonial basket is $150. Students create an equation, a table of values and graphical representations of the situation. From the context, equation, or graph, students determine which variable is in a dependent relationship and independent relationship.	
Cross-Curricular Connections	**Science:** ● Students can create expressions to anticipate the real-world events that happen. Students must understand that events that occur at one scale, may not occur at a larger/smaller scale. Students will be able to create expressions about the scale of cells and molecules as well as create a visual representation of the phenomena that occur within these smaller structures. They will analyze the independent and dependent variables in these situations. ● https://www.nextgenscience.org/pe/ms-ls1-1-moleculesorganisms-structures-and-processes **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	
Validate/Affirm/Build/Bridge	● *How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and*	● 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 representations are mathematical tools. The linguistic and cultural

	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?*	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 how to represent and analyze quantitative relationships between dependent and independent variables the use of mathematical representations within the classroom is critical because students can use many forms to represent relationships between quantities. Multiple representations include describing the relationship using language, a table, an equation, or a graph. Translating between multiple representations helps students understand that each form represents the same relationship and provides a different perspective.

Planning for Multi-Layered System of Supports

Vertical Alignment		
Previous Learning	***Current Learning***	***Future Learning***
● In Grade 5, learners are taught how to generate patterns from rules that are given to them. This will connect when students are analyzing the relationship between the dependent and independent variables in this cluster.	● The students will expand their knowledge of 6.EE.7 in this cluster by continuing practice of writing equations in real world situations. The students will expand their knowledge of 6.RP.3 by continuing to find relationships with numbers through rate reasoning.	● The students will continue using dependent and independent variables and noticing patterns throughout the rest of their mathematical career, showing up mainly in the RP clusters and as they dive in to linear and non-linear relationships. In high school, they will be using this knowledge as they construct and compare linear, quadratic, and exponential

		models. r

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 previews new contexts for tasks within the unit when studying relationships between dependent and independent variables because this standard introduces new information i.e., to understand the relationship between dependent and independent variables. The dependent variable is the variable that can be changed; one that is affected by the change in the independent variables
Intensive	*What critical understandings will prepare students to access the mathematics for this cluster?*	5.O.A.B.3. This standard provides a foundation for work with summarizing and analyzing relationships between dependent and independent variables because representing two quantities in a real-world problem can be generated from a pattern using given rules. Students represent quantitative relationships in different ways. 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 change in the independent variable creates a change in the dependent variable. (e.g. as x increases y increases)	• Determine independent and dependent variables and write an equation that represents the relationship of both. • Represent two quantities that change in	• Build on students' experience with the following skills: ○ Generate patterns from rules that are given. ○ Understand what a dependent and independent means. ○ Analyze the relationship between the dependent and independent variables. • Cognitive Strategies ○ Repeatedly model the strategies

	relationship with one another in real-world situations. ● Identify relationships between variables using tables, graphs, and equations.	○ 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: ○ Graphic Organizer with Dependent and Independent variables ○ Graphic Organizer (Rule of Four- Table, Equation, Verbal, Graph)

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 relationships of dependent and independent variables by critiquing student approaches/solutions to make connections through a short mini lesson because it allows students to receive immediate feedback of their work. It may even make sense for a student's critique of their peer's work to be part of making connections. It is important that it doesn't simply focus on the right or wrong solutions but presents a balanced view that allows improvement and redirection of students' learning.
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 summarizing and analyzing dependent and independent variables by offering opportunities to understand and explore different strategies because quantitative relationships can be presented in different forms. Students mastery of identifying the dependent variable and the independent variable from real-world problems leads to a deeper understanding of the connections between the equation to a graph, table or written description that show the same relationship

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 relationships between the dependent and independent variables because providing multiple situations for the student to analyze and determine what unknown is dependent on the other components allows students' thinking and creativity to happen. One example is the use of technology, including computer apps and other hand-held technology that allows the collection of real-time data to create tables and charts. It is important for students to realize that although real-world data often is not linear, a line sometimes can model the data.