Instructional Focus Document
Grade 6 Mathematics

TITLE : Unit 06: Equivalent Expressions and One-Variable Equations **SUGGESTED DURATION :** 13 days

UNIT OVERVIEW

Introduction

This unit bundles student expectations that address generating equivalent numerical expressions as well as modeling, writing, solving, and representing solutions for one-variable, one-step equations. According to the Texas Education Agency, mathematical process standards including application, a problem-solving model, tools and techniques, communication, representations, relationships, and justifications should be integrated (when applicable) with content knowledge and skills so that students are prepared to use mathematics in everyday life, society, and the workplace. The introduction to the grade level standards state, “While the use of all types of technology is important, the emphasis on algebra readiness skills necessitates the implementation of graphing technology.”

Prior to this Unit

In Grade 5, students identified prime and composite numbers, described the meaning of parentheses and brackets in a numeric expression, and simplified numerical expressions that did not involve exponents, including up to two levels of grouping. They also represented and solved multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity. In Grade 6 Unit 05, students represented and solved proportions using a letter standing for an unknown quantity.

During this Unit

Students transition from using order of operations without exponents to simplifying numerical expressions using order of operations with exponents and to generating equivalent numerical expressions. Previous work with prime and composite numbers is extended to introduce prime factorization as a means to generate equivalent numerical expressions. Students should recognize that when a number is decomposed into prime and composite factors, the product of the factors is equivalent to the original number. Previously, students have only utilized numerical expressions, but in this unit they are formally introduced to algebraic expressions. Students investigate generating equivalent numerical and algebraic expressions using the properties of operations that include the inverse, identity, commutative, associative, and distributive properties. Concrete models, pictorial models, and algebraic representations are used to determine if two expressions are equivalent. Although students have experienced equations in previous coursework, they are now expected to bridge their understandings of expressions and equations in order to differentiate between the two. Students will be expected to explain the defining characteristics of an expression and the defining characteristics of an equation. Previously, students have used a letter for an unknown quantity. In this unit, students transition to using the term variable when referencing a letter that represents an unknown quantity. Equations within this unit are limited to one-variable, one-step equations. Constants or coefficients of one-variable, one-step equations include positive rational numbers or integers. Students are expected to analyze constraints or conditions within a problem situation and write a one-variable, one-step equation as well as write a corresponding real-word problem when given a one-variable, one-step equation. Concrete models, pictorial models, and algebraic representations are used again as students model and solve one-variable, one-step equations that represent problems, including geometric concepts. Although certain models, such as algebra tiles, may limit a student’s ability to model solving equations with whole number or integer constants or coefficients, students should also solve equations with positive rational number constants or coefficients with an algebraic model. Students are expected to represent their solution on a number line as well as determine if a given value(s) make(s) the one-variable, one-step equation true.

Other considerations: Reference the Mathematics COVID-19 Gap Implementation Tool Grade 6

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After this Unit

In Unit 07, students will transition from one-variable, one-step equations to modeling, writing, solving, and representing solutions of one-variable, one-step inequalities. In Unit 08, students will examine two-variable relationships within algebraic representations. In Grade 7, students will model, write, solve, and represent solutions for one-variable, two step equations and inequalities. In Algebra I, work with exponents will be extended as students will add, subtract, and multiply polynomials of degree one and degree two. Students will also rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property.

Additional Notes

In Grade 6, generating equivalent numerical expressions using order of operations, including whole number exponents and prime factorization, and using the properties of operations are identified as STAAR Readiness Standards 6.7A and 6.7D. Distinguishing between expressions and equations verbally, numerically, and algebraically, and determining if two expressions are equivalent using multiple representations are identified as STAAR Supporting Standards 6.7B and 6.7C. These standards are part of the Grade 6 STAAR Reporting Category: Numerical Representations and Relationships. Writing one-variable equations to represent constraints or conditions within problems and representing solutions on a number line, and writing corresponding real-world problems given a one-variable, one-step equations is identified as are identified as STAAR Supporting Standard 6.9A, 6.9B, and 6.9C. Modeling and solving one-variable, one-step equations and determining if given values make an equation true are identified as STAAR Readiness Standard 6.10A and STAAR Supporting Standard 6.10B. These standards are part of the Grade 6 STAAR Reporting Category: Computations and Algebraic Relationships. All of these standards are subsumed under Grade 6 *Texas Response to Curriculum Focal Points* (TxRCFP): Using expressions and equations to represent relationships in a variety of contexts. This unit is supporting the development of the *Texas College and Career Readiness Standards* (TxCCRS): I. Numeric Reasoning A2, B1, B2; II. Algebraic Reasoning A1, B1, C1, C2, C3, D1, D2; III. Geometric and Spatial Reasoning C1; V. Statistical Reasoning A1, C2; VII. Problem Solving and Reasoning A1, A2, A3, A4, A5, B1, C1, D1, D2; VIII. Communication and Representation A1, A2, A3, B1, B2, C1, C2, C3; IX. Connections A1, A2, B1, B2, B3.

Research

According to the National Research Council (2001), “Students’ notion of equality and equivalence, as well as their deepening understanding of the relationship between operations and their inverses, are developed through transformational activities of algebra, especially those related to simplifying expressions and solving equations” (p. 272). When encountering transformational activities of algebra, students transition from concrete and pictorial models to abstract algebraic solution processes. According to *Principles and Standards for School Mathematics* (2001) by the National Council of Teachers of Mathematics (NCTM), “Student’s facility with symbol manipulation can be enhanced if it is based on extensive experience with quantities in contexts through which students develop an initial understanding of the meanings and uses of variables and an ability to associate symbolic expressions within problem contexts” (p. 227). Equivalency is central to the development of algebraic reasoning. “Fluency in manipulating symbolic expressions can be further enhanced if students understand equivalence and are facile with the order of operations and the distributive, associative, and commutative properties” (NCTM, 2001 p. 227).

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics.* Reston, VA: National Council of Teachers of Mathematics, Inc.
National Research Council. (2001). *Adding it up: Helping children learn mathematics.* Kilpatrick, J., Swafford, J., and Findell, B. (Eds.) Mathematics Learning Study Committee, Center for Education Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.

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Texas Education Agency & Texas Higher Education Coordinating Board. (2009). *Texas college and career readiness standards.* Retrieved from http://www.thecb.state.tx.us/institutional-resources-programs/public-community-technical-state-colleges/texas-college-and-career-readiness-standards/
Texas Education Agency. (2013). *Texas response to curriculum focal points for kindergarten through grade 8 mathematics.* Retrieved from https://www.texasgateway.org/resource/txrcfp-texas-response-curriculum-focal-points-k-8-mathematics-revised-2013

OVERARCHING UNDERSTANDINGS AND QUESTIONS

Quantitative relationships model problem situations efficiently and can be used to make generalizations, predictions, and critical judgements in everyday life.

- What patterns exist within different types of quantitative relationships and where are they found in everyday life?
- Why is the ability to model quantitative relationships in a variety of ways essential to solving problems in everyday life?

UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)

The ability to represent quantities in various forms develops the understanding of equivalence and allows for working flexibly with numeric and algebraic expressions in order to communicate and reason about quantities.
• How are constraints or conditions within a problem situation represented in an expression?
• What generalizations can be made about order of operations and its purpose?
• How does understanding …
	Expressions, Equations, and Relationships
	• Numeric and Algebraic Representation
	  • Expressions
	  • Equivalence
	• Operations
	  • Properties of operations
	  • Order of operations
	  • Prime factorization
	• Representations
		Mathematics Grade 6 Unit 06 PA 01
		Click on the PA title to view related rubric.
		Analyze the problem situation(s) described below. Organize and record your work for each of the following tasks. Using precise mathematical language, justify and explain each solution process.
		1. Chris is conducting a science experiment with fruit flies to see how the population increases over a three-week

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
◦ relationships within and between operations ◦ properties of operations … aid in writing an expression to represent and solve a problem situation? • What does it mean for two expressions to be equivalent? • How can … ◦ the inverse property ◦ the identity property ◦ the commutative property ◦ the associative property ◦ the distributive property ◦ prime factorization … be used to generate equivalent expressions? • How can two expressions be checked for equivalency using … ◦ concrete models? ◦ pictorial models? ◦ algebraic representations? • Why can it be useful to simplify expressions?	<u>Associated Mathematical Processes</u> • Application • Problem Solving Model • Tools and Techniques • Communication • Representations • Relationships • Justification	period. Chris begins his project with 6 fruit flies and notices that the number of fruit flies triples each week. At the end of the third week, 18 of the fruit flies have died. a. Write and simplify a numeric expression that can be used to represent the number of fruit flies remaining after 3 weeks. b. Use prime factorization to generate two equivalent numerical expressions representing the number of fruit flies remaining after 3 weeks. c. Use order of operations to simplify each numerical expression to validate their equivalence. 2. Carissa conducted a similar experiment involving fruit flies. She began the experiment with 8 fruit flies whose population doubled each week over the three-week period. Carissa wrote two numerical expressions to represent her experiment and concluded that the expressions are equivalent. Her expressions are listed below. $8 \times 2 \times 2 \times 2$ and 8×6 a. Use concrete and/or pictorial models to determine if the two expressions Clarissa wrote are equivalent. Justify your determination with an algebraic representation. b. Use at least three properties of operations to generate two equivalent expressions that

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
		represent Carissa's science experiment. Standard(s): 6.1A, 6.1B, 6.1C, 6.1D, 6.1E, 6.1F, 6.1G, 6.7A, 6.7C, 6.7D, ELPS.c.1A, ELPS.c.2D, ELPS.c.3C, ELPS.c.3D, ELPS.c.3H, ELPS.c.4D, ELPS.c.4F, ELPS.c.4H

OVERARCHING UNDERSTANDINGS AND QUESTIONS

Quantitative relationships model problem situations efficiently and can be used to make generalizations, predictions, and critical judgements in everyday life.

- What patterns exist within different types of quantitative relationships and where are they found in everyday life?
- Why is the ability to model quantitative relationships in a variety of ways essential to solving problems in everyday life?

UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)

Equations can be modeled, written, and solved using various methods to gain insight into the context of the situation and make critical judgments about algebraic relationships and efficient strategies.	Expressions, Equations, and Relationships
	• Geometric relationships
	  • Measure relationships
	  • Geometric properties
		Mathematics Grade 6 Unit 06 PA 02
		Click on the PA title to view related rubric.
		
		Analyze the problem situation(s) described below. Organize

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)

• Why are expressions considered foundational to equations?
• How can an …
  ◦ expression
  ◦ equation
  … be represented verbally, numerically, and algebraically?
• What is the difference between an expression and an equation?
• How are constraints or conditions within a problem situation represented in an equation?
• How does the context of a problem situation, relationships within and between operations, and properties of operations aid in writing an equation to represent the problem situation?
• How can a(n) …
  ◦ concrete model
  ◦ pictorial model
  ◦ algebraic representation
  … be used to represent and solve an equation?
• What models effectively and efficiently represent how to solve equations?
• What is the process for solving an equation, and how can the process be …
  ◦ described verbally?
	• Operations
	  • Properties of operations
	  • Order of operations
	• Numeric and Algebraic Representation
	  • Expressions
	  • Equations
	  • Equivalence
	• Representations
	
	<u>Associated Mathematical Processes</u>
	• Application
	• Problem Solving Model
	• Tools and Techniques
	• Communication
	• Representations
	• Relationships
	• Justification
		and record your work for each of the following tasks. Using precise mathematical language, justify and explain each solution process.
		
		Jennifer works at a stained glass factory and makes stained glass sun catchers that hang on windows.
		
		1. Each piece of stained glass used to make a sun catcher costs $2, and the total cost of each sun catcher is $18.
		  a. Write an expression that can be used to determine the cost of a sun catcher from the number of pieces of stained glass, *x,* used.
		  b. Write an equation that can be used to determine the number of pieces of stained glass, *x,* used in a sun catcher that costs $18.
		  c. Explain the similarities and differences between the expression and equation.
		  d. Use concrete and pictorial models to solve the equation and represent the solution on a number line.
		2. A piece of stained glass falls out of a sun catcher that Jennifer made. Jennifer needs to replace the piece with a new piece of stained glass but needs to know the exact angle measure of the glass in order for it to fit properly. Jennifer knows that the angle from the piece of glass that fell out, Angle *A*, and its adjacent angle within

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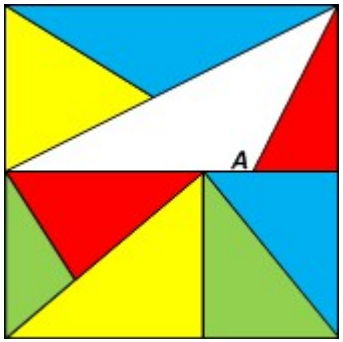
UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
◦ represented algebraically? • When considering equations, … ◦ why is the variable isolated in order to solve? ◦ how are negative values represented in concrete and pictorial models? ◦ why must the solution be justified in terms of the problem situation? ◦ why does equivalence play an important role in the solving process? • Why is it important to understand when and how to use standard algorithms? • How does knowing more than one solution strategy build mathematical flexibility? • How can a solution to an equation be represented on a number line? • What is the process for writing a real-world problem to represent constraints or conditions within an equation? • What is the process for determining if an equation is true for a given value? Illustrating and analyzing geometric relationships in models and diagrams aid in representing attributes of geometric figures with quantifiable measures and equations in order to generalize geometric relationships and solve problems. • How can problem situations involving … ◦ complementary angles		the sun catcher form a supplementary angle. The adjacent angle measure is 63°.  a. Write an equation that can be used to determine the measure of Angle *A*. b. Solve the equation algebraically. c. Blake, another worker, says that the measure of Angle *A* needs to be 27°. Algebraically determine if Blake's suggested measure makes the equation true. 3. Melinda is a customer of the stained glass factory. She is conducting a home improvement project and provides Jennifer the following equation: $9.75h = 58.50$ a. Write a real-world problem based on the equation in the context of a home improvement. Standard(s): 6.1A, 6.1B, 6.1C, 6.1D, 6.1E, 6.1F, 6.1G,

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UNIT UNDERSTANDINGS AND QUESTIONS	OVERARCHING CONCEPTS AND UNIT CONCEPTS	PERFORMANCE ASSESSMENT(S)
◦ supplementary angles ◦ the sum of the angles in a triangle ◦ the sum of the angles in a quadrilateral … be represented and solved using an equation? • What model(s) can be used to represent … ◦ complementary angles ◦ supplementary angles ◦ the sum of the angles in a triangle ◦ the sum of the angles in a quadrilateral …, and how can the model lead to a generalization that can be represented with an equation? • When angles are complementary, why does the sum always equal 90°? • When angles are supplementary, why does the sum always equal 180°? • When finding the sum of the angles in a triangle, why does the sum always equal 180°? • When finding the sum of the angles in a quadrilateral, why does the sum always equal 360°?		6.7B, 6.9A, 6.9B, 6.9C, 6.10A, 6.10B, ELPS.c.1A, ELPS.c.2D, ELPS.c.2E, ELPS.c.3C, ELPS.c.3D, ELPS.c.3H, ELPS.c.4D, ELPS.c.4F, ELPS.c.4H, ELPS.c.5B, ELPS.c.5F, ELPS.c.5G

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MISCONCEPTIONS / UNDERDEVELOPED CONCEPTS

Misconceptions:

- Some students may think that a constant term can be combined with a variable term (e.g., $x + 5 = 6x$).
- Some students may think variables are letters representing an object as opposed to representing a number or quantity of objects.
- Some students think of exponents as the multiplication of the base with the exponent (e.g. $4^3 = 4(3)$) rather than powers of the base (e.g., $4^3 = (4)(4)(4)$).
- Some students may think that the order of the terms is not important in subtraction expressions (e.g., $x - 7$ is not equal to $7 - x$ unless $x = 7$).
- Some students may think that the order of the terms is not important in divsion expresions (e.g., $20 \div y$ is not equal to $y \div 20$ unless $y = 20$).

Underdeveloped Concepts:

- Some students may confuse the order of solving problems involving order of operations (e.g., multiplication/division is done from left to right, and addition/subtraction is done from left to right).
- Some students may think the equals sign means “solve this” or “the answer is” rather than understanding that equal sign represents a quantitative and balanced relationship.

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UNIT VOCABULARY

- **Coefficient** – a number that is multiplied by a variable(s)
- **Complementary angles** – two angles whose degree measures have a sum of 90°
- **Constant** – a fixed value that does not appear with a variable(s)
- **Equation** – a mathematical statement composed of algebraic and/or numeric expressions set equal to each other
- **Exponent** – in the expression x^y, x is called the base and y is called the exponent. The exponent determines the number of times the base is multiplied by itself.
- **Expression** – a mathematical phrase, with no equal sign or inequality symbol, that may contain a number(s), a variable(s), and/or an operator(s)
- **Order of operations** – the rules of which calculations are performed first when simplifying an expression
- **Prime factorization** – the process of decomposing a composite number as a unique product of prime factors
- **Rational numbers** – the set of numbers that can be expressed as a fraction $\frac{a}{b}$, where a and b are integers and $b \neq 0$. The set of rational numbers is denoted by the symbol Q.
- **Solution set** – a set of all values of the variable(s) that satisfy the equation
- **Supplementary angles** – two angles whose degree measures have a sum of 180°
- **Variable** – a letter or symbol that represents a number

Related Vocabulary:

- Condition
- Constraint
- Equivalent
- Evaluate
- Properties of operations
- Simplify
- Solution
- Solve

UNIT ASSESSMENT ITEMS	SYSTEM RESOURCES	OTHER RESOURCES
Unit Assessment Items that have been published by your district may be accessed through **Search All Components** in the District Resources tab. Assessment items may also be found using the Assessment Center if your district has granted access to that tool.	**Mathematics Concepts Charts** **Mathematics COVID-19 Gap Implementation Tool Grade 6** **Mathematics COVID-19 Gap Implementation Tool**	Texas Higher Education Coordinating Board – **Texas College and Career Readiness Standards** Texas Education Agency – **Texas Response to Curriculum Focal Points for K-8 Mathematics Revised 2013**

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	Instructions **Mathematics Grade 6 Backward Design Document** **Mathematics Grade 6 Enhanced TEKS Clarification** **Mathematics Grade 6 Focal Points with Aligned Standards and TEKS Introduction** **Mathematics Grade 6 STAAR Analysis Resources** **Mathematics Grade 6 STAAR Blueprint and Item Percentages** **Mathematics Grade 6 STAAR Enhanced Blueprint** **Mathematics Grade 6 Vertical Alignment** **Mathematics Grade 6_Unit 06_TEKS System STAAR Analysis** **Mathematics K-HS Overarching Understandings and Questions** **Mathematics Long Term Transfer Goals** **Mathematics Suggested Basic Manipulatives by Grade Level** **Mathematics Suggested Engaging Literature** **Mathematics Texas Education Agency Grade 6**	Texas Education Agency – **Mathematics Curriculum** Texas Education Agency – **STAAR Mathematics Resources** Texas Education Agency Texas Gateway – **Revised Mathematics TEKS: Vertical Alignment Charts** Texas Education Agency Texas Gateway – **Mathematics TEKS: Supporting Information** Texas Education Agency Texas Gateway – **Interactive Mathematics Glossary** Texas Education Agency Texas Gateway – **Resources Aligned to Grade 6 Mathematics TEKS** Texas Instruments – **Graphing Calculator Tutorials**

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	TEKS Supporting Information (with TEKS Resource System Comments) **Mathematics Vertical Quick Guide**	

TAUGHT DIRECTLY TEKS

TEKS INTENDED TO BE EXPLICITLY TAUGHT IN THIS UNIT.

TEKS/SE Legend:

- ***Knowledge and Skills Statements (TEKS) identified by TEA are in italicized, bolded, black text.***
- **Student Expectations (TEKS) identified by TEA are in bolded, black text.**
- ***Student Expectations (TEKS) are labeled Readiness as identified by TEA of the assessed curriculum.***
- ***Student Expectations (TEKS) are labeled Supporting as identified by TEA of the assessed curriculum.***
- ***Student Expectations (TEKS) are labeled Process standards as identified by TEA of the assessed curriculum.***
- Portions of the Student Expectations (TEKS) that are not included in this unit but are taught in previous or future units are indicated by a ~~strike-through~~.

Specificity Legend:

- Supporting information / clarifications (specificity) written by TEKS Resource System are in blue text.
- *Unit-specific clarifications are in italicized, blue text.*
- Information from Texas Education Agency (TEA), Texas College and Career Readiness Standards (TxCCRS), Texas Response to Curriculum Focal Points (TxRCFP) is labeled.
- A Partial Specificity label indicates that a portion of the specificity not aligned to this unit has been removed.

TEKS# / SE#	TEKS	SPECIFICITY

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TEKS# / SE#	TEKS	SPECIFICITY
6.1	***Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:***	

6.1A	**Apply mathematics to problems arising in everyday life, society, and the workplace.** ***Process Standard***	Apply
		
		MATHEMATICS TO PROBLEMS ARISING IN EVERYDAY LIFE, SOCIETY, AND THE WORKPLACE
		
		Including, but not limited to:
		
		• Mathematical problem situations within and between disciplines
		  ◦ Everyday life
		  ◦ Society
		  ◦ Workplace
		
		Note(s):
		
		• The mathematical process standards may be applied to all content standards as appropriate.
		• TxRCFP:
		  ◦ Using operations with integers and positive rational numbers to solve problems
		  ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ VII.D. Problem Solving and Reasoning – Real-world problem solving
		  • VII.D.1. Interpret results of the mathematical problem in terms of the original real-world situation.
		  ◦ IX.A. Connections – Connections among the strands of mathematics

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		• IX.A.1. Connect and use multiple key concepts of mathematics in situations and problems. • IX.A.2. Connect mathematics to the study of other disciplines. ◦ IX.B. Connections – Connections of mathematics to nature, real-world situations, and everyday life • IX.B.1. Use multiple representations to demonstrate links between mathematical and real-world situations. • IX.B.2. Understand and use appropriate mathematical models in the natural, physical, and social sciences. • IX.B.3. Know and understand the use of mathematics in a variety of careers and professions.
6.1B	**Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.** ***Process Standard***	Use A PROBLEM-SOLVING MODEL THAT INCORPORATES ANALYZING GIVEN INFORMATION, FORMULATING A PLAN OR STRATEGY, DETERMINING A SOLUTION, JUSTIFYING THE SOLUTION, AND EVALUATING THE PROBLEM-SOLVING PROCESS AND THE REASONABLENESS OF THE SOLUTION Including, but not limited to: • Problem-solving model ◦ Analyze given information ◦ Formulate a plan or strategy ◦ Determine a solution ◦ Justify the solution ◦ Evaluate the problem-solving process and the reasonableness of the solution Note(s):

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		• The mathematical process standards may be applied to all content standards as appropriate.
		• TxRCFP:
		  ◦ Using operations with integers and positive rational numbers to solve problems
		  ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ I.B. Numeric Reasoning – Number sense and number concepts
		  • I.B.1. Use estimation to check for errors and reasonableness of solutions.
		  ◦ V.A. Statistical Reasoning – Design a study
		  • V.A.1. Formulate a statistical question, plan an investigation, and collect data.
		  ◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving
		  • VII.A.1. Analyze given information.
		  • VII.A.2. Formulate a plan or strategy.
		  • VII.A.3. Determine a solution.
		  • VII.A.4. Justify the solution.
		  • VII.A.5. Evaluate the problem-solving process.
		  ◦ VII.D. Problem Solving and Reasoning – Real-world problem solving
		  • VII.D.2. Evaluate the problem-solving process.

6.1C	**Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.** ***Process Standard***	Select TOOLS, INCLUDING REAL OBJECTS, MANIPULATIVES, PAPER AND PENCIL, AND TECHNOLOGY AS APPROPRIATE, AND TECHNIQUES, INCLUDING MENTAL MATH, ESTIMATION, AND NUMBER SENSE AS APPROPRIATE, TO SOLVE PROBLEMS Including, but not limited to:

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TEKS# / SE#	TEKS	SPECIFICITY

		• Appropriate selection of tool(s) and techniques to apply in order to solve problems
		  ◦ Tools
		  • Real objects
		  • Manipulatives
		  • Paper and pencil
		  • Technology
		  ◦ Techniques
		  • Mental math
		  • Estimation
		  • Number sense
		
		Note(s):
		
		• The mathematical process standards may be applied to all content standards as appropriate.
		• TxRCFP:
		  ◦ Using operations with integers and positive rational numbers to solve problems
		  ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ I.B. Numeric Reasoning – Number sense and number concepts
		  • I.B.1. Use estimation to check for errors and reasonableness of solutions.
		  ◦ V.C. Statistical Reasoning – Analyze, interpret, and draw conclusions from data
		  • V.C.2. Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software.

6.1D	**Communicate mathematical ideas, reasoning, and their implications using multiple**	Communicate Partial Specificity

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	representations, including symbols, diagrams, ~~graphs,~~ and language as appropriate. ***Process Standard***	MATHEMATICAL IDEAS, REASONING, AND THEIR IMPLICATIONS USING MULTIPLE REPRESENTATIONS, INCLUDING SYMBOLS, DIAGRAMS, AND LANGUAGE AS APPROPRIATE Including, but not limited to: • Mathematical ideas, reasoning, and their implications ◦ Multiple representations, as appropriate • Symbols • Diagrams • Language Note(s): • The mathematical process standards may be applied to all content standards as appropriate. • TxRCFP: ◦ Using operations with integers and positive rational numbers to solve problems ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships ◦ Using expressions and equations to represent relationships in a variety of contexts ◦ Understanding data representation • TxCCRS: ◦ II.D. Algebraic Reasoning – Representing relationships • II.D.1. Interpret multiple representations of equations, inequalities, and relationships. • II.D.2. Convert among multiple representations of equations, inequalities, and relationships. ◦ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics • VIII.A.1. Use mathematical symbols, terminology, and notation to represent given

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		and unknown information in a problem. • VIII.A.2. Use mathematical language to represent and communicate the mathematical concepts in a problem. • VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations. • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context. ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words. • VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas. • VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications. ◦ IX.B. Connections – Connections of mathematics to nature, real-world situations, and everyday life • IX.B.1. Use multiple representations to demonstrate links between mathematical and real-world situations.
6.1E	**Create and use representations to organize, record, and communicate mathematical ideas.** ***Process Standard***	Create, Use REPRESENTATIONS TO ORGANIZE, RECORD, AND COMMUNICATE MATHEMATICAL IDEAS Including, but not limited to:

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		• Representations of mathematical ideas
		  ◦ Organize
		  ◦ Record
		  ◦ Communicate
		• Evaluation of the effectiveness of representations to ensure clarity of mathematical ideas being communicated
		• Appropriate mathematical vocabulary and phrasing when communicating mathematical ideas
		
		Note(s):
		
		• The mathematical process standards may be applied to all content standards as appropriate.
		• TxRCFP:
		  ◦ Using operations with integers and positive rational numbers to solve problems
		  ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ VIII.B. Communication and Representation – Interpretation of mathematical work
		  • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations.
		  • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.
		  ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work
		  • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.
		  • VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas.

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6.1F	**Analyze mathematical relationships to connect and communicate mathematical ideas.** ***Process Standard***	Analyze
		
		MATHEMATICAL RELATIONSHIPS TO CONNECT AND COMMUNICATE MATHEMATICAL IDEAS
		
		Including, but not limited to:
		
		• Mathematical relationships
		  ◦ Connect and communicate mathematical ideas
		  • Conjectures and generalizations from sets of examples and non-examples, patterns, etc.
		  • Current knowledge to new learning
		
		Note(s):
		
		• The mathematical process standards may be applied to all content standards as appropriate.
		• TxRCFP:
		  ◦ Using operations with integers and positive rational numbers to solve problems
		  ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving
		  • VII.A.1. Analyze given information.
		  ◦ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics
		  • VIII.A.1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.
		  • VIII.A.2. Use mathematical language to represent and communicate the mathematical concepts in a problem.

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		• VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations. ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words. • VIII.C.2. Create and use representations to organize, record, and communicate mathematical ideas. • VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications. ◦ IX.A. Connections – Connections among the strands of mathematics • IX.A.1. Connect and use multiple key concepts of mathematics in situations and problems. • IX.A.2. Connect mathematics to the study of other disciplines.
6.1G	**Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.** ***Process Standard***	Display, Explain, Justify MATHEMATICAL IDEAS AND ARGUMENTS USING PRECISE MATHEMATICAL LANGUAGE IN WRITTEN OR ORAL COMMUNICATION Including, but not limited to: • Mathematical ideas and arguments ◦ Validation of conclusions • Displays to make work visible to others ◦ Diagrams, visual aids, written work, etc.

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		• Explanations and justifications
		  ◦ Precise mathematical language in written or oral communication
		
		Note(s):
		
		• The mathematical process standards may be applied to all content standards as appropriate.
		• TxRCFP:
		  ◦ Using operations with integers and positive rational numbers to solve problems
		  ◦ Understanding and applying ratios and rates and using equivalent ratios to represent proportional relationships
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		  ◦ Understanding data representation
		• TxCCRS:
		  ◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving
		  • VII.A.4. Justify the solution.
		  ◦ VII.B. Problem Solving and Reasoning – Proportional reasoning
		  • VII.B.1. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations.
		  ◦ VII.C. Problem Solving and Reasoning – Logical reasoning
		  • VII.C.1. Develop and evaluate convincing arguments.
		  ◦ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics
		  • VIII.A.3. Use mathematical language for reasoning, problem solving, making connections, and generalizing.
		  ◦ VIII.B. Communication and Representation – Interpretation of mathematical work
		  • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations.
		  • VIII.B.2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.

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		◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.
6.7	***Expressions, equations, and relationships. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:***	
6.7A	**Generate equivalent numerical expressions using order of operations, including whole number exponents and prime factorization.** ***Readiness Standard***	Generate EQUIVALENT NUMERICAL EXPRESSIONS USING ORDER OF OPERATIONS, INCLUDING WHOLE NUMBER EXPONENTS AND PRIME FACTORIZATION Including, but not limited to: • Rational numbers – the set of numbers that can be expressed as a fraction $\frac{a}{b}$, where a and b are integers and $b \neq 0$. The set of rational numbers is denoted by the symbol Q. • Various forms of positive and negative rational numbers, including absolute values ◦ Integers • Products of integers limited to an integer multiplied by an integer • Quotients of integers limited to an integer divided by an integer ◦ Decimals • Products of decimals limited to a positive decimal value multiplied by a positive decimal value • Quotients of decimals limited to a positive decimal value divided by a positive decimal value

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		◦ Fractions • Products of fractions limited to a positive fractional value multiplied by a positive fractional value • Quotients of fractions limited to a positive fractional value divided by a positive fractional value • Expression – a mathematical phrase, with no equal sign or inequality symbol, that may contain a number(s), a variable(s), and/or an operator(s) • Exponent – in the expression x^y, x is called the base and y is called the exponent. The exponent determines the number of times the base is multiplied by itself. • Equivalent numerical expressions ◦ Each step in the simplification process generates an equivalent expression • Order of operations – the rules of which calculations are performed first when simplifying an expression ◦ Parentheses/brackets: simplify expressions inside parentheses or brackets in order from left to right ◦ Exponents: rewrite in standard numerical form and simplify from left to right • Limited to whole number positive exponents ◦ Multiplication/division: simplify expressions involving multiplication and/or division in order from left to right ◦ Addition/subtraction: simplify expressions involving addition and/or subtraction in order from left to right ◦ Prime factorization – the process of decomposing a composite number as a unique product of prime factors Note(s): • Grade Level(s): ◦ Grade 5 described the meaning of parentheses and brackets in a numeric expression. ◦ Grade 5 simplified numerical expressions that do not involve exponents, including up to two levels of grouping.

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		◦ Algebra I will add and subtract polynomials of degree one and degree two. ◦ Algebra I will multiply polynomials of degree one and degree two. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Using expressions and equations to represent relationships in a variety of contexts • TxCCRS: ◦ I.A. Numeric Reasoning – Number representations and operations • I.A.2. Perform computations with rational and irrational numbers. ◦ I.B. Numeric Reasoning – Number sense and number concepts • I.B.2. Interpret the relationships between the different representations of numbers. ◦ II.B. Algebraic Reasoning – Manipulating expressions • II.B.1. Recognize and use algebraic properties, concepts, and algorithms to combine, transform, and evaluate expressions (e.g., polynomials, radicals, rational expressions). ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.
6.7B	**Distinguish between expressions and equations verbally, numerically, and algebraically.** ***Supporting Standard***	Distinguish BETWEEN EXPRESSIONS AND EQUATIONS VERBALLY, NUMERICALLY, AND ALGEBRAICALLY Including, but not limited to: • Expression – a mathematical phrase, with no equal sign or inequality symbol, that may contain a number(s), a variable(s), and/or an operator(s) ◦ Expressions that contain a variable may represent different numbers depending on the

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		value assigned to the variable. • Equation – a mathematical statement composed of algebraic and/or numeric expressions set equal to each other ◦ Equations that contain a variable may be proven true or false by replacing the variable with a number. • Various representations of expressions and equations ◦ Verbally ◦ Numerically ◦ Algebraically Note(s): • Grade Level(s): ◦ Grade 5 represented and solved multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Using expressions and equations to represent relationships in a variety of contexts • TxCCRS: ◦ II.A. Algebraic Reasoning – Identifying expressions and equations • II.A.1. Explain the difference between expressions and equations. ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.
6.7C	**Determine if two expressions are equivalent using concrete models, pictorial models, and algebraic**	Determine

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	representations.
	Supporting Standard
		IF TWO EXPRESSIONS ARE EQUIVALENT USING CONCRETE MODELS, PICTORIAL MODELS, AND ALGEBRAIC REPRESENTATIONS
		
		Including, but not limited to:
		
		• Rational numbers – the set of numbers that can be expressed as a fraction $\frac{a}{b}$, where *a* and *b* are integers and $b \neq 0$. The set of rational numbers is denoted by the symbol Q.
		• Various forms of positive and negative rational numbers
		  ◦ Integers
		  • Products of integers limited to an integer multiplied by an integer
		  • Quotients of integers limited to an integer divided by an integer
		  ◦ Decimals
		  • Products of decimals limited to a positive decimal value multiplied by a positive decimal value
		  • Quotients of decimals limited to a positive decimal value divided by a positive decimal value
		  ◦ Fractions
		  • Products of fractions limited to a positive fractional value multiplied by a positive fractional value
		  • Quotients of fractions limited to a positive fractional value divided by a positive fractional value
		• Expression – a mathematical phrase, with no equal sign or inequality symbol, that may contain a number(s), a variable(s), and/or an operator(s)
		  ◦ Expressions with and without a variable
		• Order of operations – the rules of which calculations are performed first when simplifying an expression
		  ◦ Parentheses/brackets: simplify expressions inside parentheses or brackets in order from left to right

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		◦ Exponents: rewrite in standard numerical form and simplify from left to right • Limited to whole number positive exponents ◦ Multiplication/division: simplify expressions involving multiplication and/or division in order from left to right ◦ Addition/subtraction: simplify expressions involving addition and/or subtraction in order from left to right • Equivalence of various representations of numerical expressions (concrete, pictorial, algebraic) • Equivalence of various representations of algebraic expressions (concrete, pictorial, algebraic) Note(s): • Grade Level(s): ◦ Grade 6 introduces determining if two expressions are equivalent using concrete models, pictorial models, and algebraic representations. ◦ Algebra I will rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Using expressions and equations to represent relationships in a variety of contexts • TxCCRS: ◦ II.B. Algebraic Reasoning – Manipulating expressions • II.B.1. Recognize and use algebraic properties, concepts, and algorithms to combine, transform, and evaluate expressions (e.g., polynomials, radicals, rational expressions). ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations.

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6.7D	**Generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties.** ***Readiness Standard***	Generate
		
		EQUIVALENT EXPRESSIONS USING THE PROPERTIES OF OPERATIONS: INVERSE, IDENTITY, COMMUTATIVE, ASSOCIATIVE, AND DISTRIBUTIVE PROPERTIES
		
		Including, but not limited to:
		
		• Rational numbers – the set of numbers that can be expressed as a fraction $\frac{a}{b}$, where *a* and *b* are integers and $b \neq 0$. The set of rational numbers is denoted by the symbol Q.
		• Various forms of positive and negative rational numbers
		  ◦ Integers
		  • Products of integers limited to an integer multiplied by an integer
		  • Quotients of integers limited to an integer divided by an integer
		  ◦ Decimals
		  • Products of decimals limited to a positive decimal value multiplied by a positive decimal value
		  • Quotients of decimals limited to a positive decimal value divided by a positive decimal value
		  ◦ Fractions
		  • Products of fractions limited to a positive fractional value multiplied by a positive fractional value
		  • Quotients of fractions limited to a positive fractional value divided by a positive fractional value
		• Expression – a mathematical phrase, with no equal sign or inequality symbol, that may contain a number(s), a variable(s), and/or an operator(s)
		  ◦ Expressions with and without a variable
		• Properties of operations
		  ◦ Identity (Additive)

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		• Rule $a + 0 = a = 0 + a$ ◦ Identity (Multiplicative) • Rule $a \times 1 = a = 1 \times a$ ◦ Commutative (Addition) • Rule $a + b = b + a$ ◦ Commutative (Multiplication) • Rule $a \times b = b \times a$ ◦ Associative (Addition) • Rule $(a + b) + c = a + (b + c)$ ◦ Associative (Multiplication) • Rule $(a \cdot b) \cdot c = a \cdot (b \cdot c)$ ◦ Distributive • Rule $a(b + c) = ab + ac$ ◦ Inverse (Additive) • Rule $a + (-a) = 0$ ◦ Inverse (Multiplicative) • Rule $a \cdot \frac{1}{a} = 1$ • Equivalent expressions using the properties of operations, including the combining of like terms Note(s): • Grade Level(s): ◦ Grade 6 introduces generating equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties. ◦ Algebra I will rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP:

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		◦ Using expressions and equations to represent relationships in a variety of contexts • TxCCRS: ◦ II.B. Algebraic Reasoning – Manipulating expressions • II.B.1. Recognize and use algebraic properties, concepts, and algorithms to combine, transform, and evaluate expressions (e.g., polynomials, radicals, rational expressions). ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.
6.9	***Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:***	
6.9A	**Write one-variable, one-step equations ~~and inequalities~~ to represent constraints or conditions within problems.** ***Supporting Standard***	Partial Specificity Write ONE-VARIABLE, ONE-STEP EQUATIONS TO REPRESENT CONSTRAINTS OR CONDITIONS WITHIN PROBLEMS Including, but not limited to: • Equation – a mathematical statement composed of algebraic and/or numeric expressions set equal to each other • Variable – a letter or symbol that represents a number ◦ One variable on one side of the equation • Coefficient – a number that is multiplied by a variable(s) ◦ Integers

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		• Products of integers limited to an integer multiplied by an integer ◦ Decimals • Limited to positive decimal values ◦ Fractions • Limited to positive fractional values • Constant – a fixed value that does not appear with a variable(s) ◦ Integers ◦ Decimals • Limited to positive decimal values ◦ Fractions • Limited to positive fractional values • One-step equations ◦ A "step" only refers to an action involving both sides of the equation (combining like terms on a single side of the equation does not constitute a step). • Solution set – a set of all values of the variable(s) that satisfy the equation ◦ Constraints or conditions • Equality words and symbols ◦ Equal to, = • Relationship of order of operations within an equation ◦ Order of operations – the rules of which calculations are performed first when simplifying an expression • Parentheses/brackets: simplify expressions inside parentheses or brackets in order from left to right • Exponents: rewrite in standard numerical form and simplify from left to right ◦ Limited to positive whole number exponents • Multiplication/division: simplify expressions involving multiplication and/or division in order from left to right • Addition/subtraction: simplify expressions involving addition and/or subtraction in order from left to right

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		• One-variable, one-step equations from a problem situation
		
		Note(s):
		
		• Grade Level(s):
		  ◦ Grade 6 introduces writing one-variable, one-step equations and inequalities to represent constraints or conditions within problems.
		  ◦ Grade 7 will write one-variable, two-step equations and inequalities to represent constraints or conditions within problems.
		  ◦ Various mathematical process standards will be applied to this student expectation as appropriate.
		• TxRCFP:
		  ◦ Using expressions and equations to represent relationships in a variety of contexts
		• TxCCRS:
		  ◦ II.D. Algebraic Reasoning – Representing relationships
		  • II.D.1. Interpret multiple representations of equations, inequalities, and relationships.
		  ◦ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics
		  • VIII.A.1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.
		  ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work
		  • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.

6.9B	**Represent solutions for one-variable, one-step equations ~~and inequalities~~ on number lines.**	Represent Partial Specificity

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	Supporting Standard	SOLUTIONS FOR ONE-VARIABLE, ONE-STEP EQUATIONS ON NUMBER LINES
		
		Including, but not limited to:
		
		• Equation – a mathematical statement composed of algebraic and/or numeric expressions set equal to each other
		• Variable – a letter or symbol that represents a number
		  ◦ One variable on one side of the equation
		• Coefficient – a number that is multiplied by a variable(s)
		  ◦ Integers
		  • Products of integers limited to an integer multiplied by an integer
		  ◦ Decimals
		  • Limited to positive decimal values
		  ◦ Fractions
		  • Limited to positive fractional values
		• Constant – a fixed value that does not appear with a variable(s)
		  ◦ Integers
		  ◦ Decimals
		  • Limited to positive decimal values
		  ◦ Fractions
		  • Limited to positive fractional values
		• One-step equations
		  ◦ A "step" only refers to an action involving both sides of the equation (combining like terms on a single side of the equation does not constitute a step).
		• Solution set – a set of all values of the variable(s) that satisfy the equation
		  ◦ Constraints or conditions
		• Equality words and symbols
		  ◦ Equal to, =
		• Representations of solutions to one-step equations on a number line
		  ◦ Closed circle

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		• Equal to, = • Solutions to real-world situations represented on a number line ◦ Situations may require determining if a particular value is part of the solution set • Value is considered part of the solution if the value makes the equation true. Note(s): • Grade Level(s): ◦ Grade 6 introduces representing solutions for one-variable, one-step equations and inequalities on number lines. ◦ Grade 7 will represent solutions for one-variable, two step equations and inequalities on number lines. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Using expressions and equations to represent relationships in a variety of contexts • TxCCRS: ◦ I.A. Numeric Reasoning – Number representations and operations • I.A.2. Perform computations with rational and irrational numbers. ◦ II.C. Algebraic Reasoning – Solving equations, inequalities, and systems of equations and inequalities • II.C.1. Describe and interpret solution sets of equalities and inequalities. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations. ◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words.

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6.9C	**Write corresponding real-world problems given one-variable, one-step equations ~~or inequalities~~.**
	
	Supporting Standard
		Partial Specificity
		
		Write
		
		CORRESPONDING REAL-WORLD PROBLEMS GIVEN ONE-VARIABLE, ONE-STEP EQUATIONS
		
		Including, but not limited to:
		
		• Equation – a mathematical statement composed of algebraic and/or numeric expressions set equal to each other
		• Variable – a letter or symbol that represents a number
		  ◦ One variable on one side of the equation
		• Coefficient – a number that is multiplied by a variable(s)
		  ◦ Integers
		  • Products of integers limited to an integer multiplied by an integer
		  ◦ Decimals
		  • Limited to positive decimal values
		  ◦ Fractions
		  • Limited to positive fractional values
		• Constant – a fixed value that does not appear with a variable(s)
		  ◦ Integers
		  ◦ Decimals
		  • Limited to positive decimal values
		  ◦ Fractions
		  • Limited to positive fractional values
		• One-step equations
		  ◦ A "step" only refers to an action involving both sides of the equation (combining like terms on a single side of the equation does not constitute a step).
		• Solution set – a set of all values of the variable(s) that satisfy the equation
		  ◦ Constraints or conditions
		• Equality words and symbols

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		◦ Equal to, = • Relationship of order of operations within an equation ◦ Order of operations – the rules of which calculations are performed first when simplifying an expression • Parentheses/brackets: simplify expressions inside parentheses or brackets in order from left to right • Exponents: rewrite in standard numerical form and simplify from left to right ◦ Limited to positive whole number exponents • Multiplication/division: simplify expressions involving multiplication and/or division in order from left to right • Addition/subtraction: simplify expressions involving addition and/or subtraction in order from left to right • Corresponding real-world problem situation from a one-variable, one-step equation Note(s): • Grade Level(s): ◦ Grade 6 introduces writing corresponding real-world problems given one-variable, one-step equations or inequalities. ◦ Grade 7 will write a corresponding real-world problem given a one-variable, two-step equation or inequality. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Using expressions and equations to represent relationships in a variety of contexts • TxCCRS: ◦ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics • VIII.A.2. Use mathematical language to represent and communicate the mathematical concepts in a problem.

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		◦ VIII.C. Communication and Representation – Presentation and representation of mathematical work • VIII.C.1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, models, graphs, and words. ◦ IX.B. Connections – Connections of mathematics to nature, real-world situations, and everyday life • IX.B.1. Use multiple representations to demonstrate links between mathematical and real-world situations.
6.10	***Expressions, equations, and relationships. The student applies mathematical process standards to use equations and inequalities to solve problems. The student is expected to:***	
6.10A	**Model and solve one-variable, one-step equations ~~and inequalities~~ that represent problems, including geometric concepts.** ***Readiness Standard***	Partial Specificity Model, Solve ONE-VARIABLE, ONE-STEP EQUATIONS THAT REPRESENT PROBLEMS, INCLUDING GEOMETRIC CONCEPTS Including, but not limited to: • Equation – a mathematical statement composed of algebraic and/or numeric expressions set equal to each other • Variable – a letter or symbol that represents a number ◦ One variable on one side of the equation • Coefficient – a number that is multiplied by a variable(s) ◦ Integers • Products of integers limited to an integer multiplied by an integer ◦ Decimals

TITLE : Unit 06: Equivalent Expressions and One-Variable Equations **SUGGESTED DURATION :** 13 days

TEKS# / SE#	TEKS	SPECIFICITY
		• Limited to positive decimal values ◦ Fractions • Limited to positive fractional values • Constant – a fixed value that does not appear with a variable(s) ◦ Integers ◦ Decimals • Limited to positive decimal values ◦ Fractions • Limited to positive fractional values • One-step equations ◦ A "step" only refers to an action involving both sides of the equation (combining like terms on a single side of the equation does not constitute a step) • Solution set – a set of all values of the variable(s) that satisfy the equation ◦ Constraints or conditions • Equality words and symbols ◦ Equal to, = • Relationship of order of operations within an equation ◦ Order of operations – the rules of which calculations are performed first when simplifying an expression • Parentheses/brackets: simplify expressions inside parentheses or brackets in order from left to right • Exponents: rewrite in standard numerical form and simplify from left to right ◦ Limited to positive whole number exponents • Multiplication/division: simplify expressions involving multiplication and/or division in order from left to right • Addition/subtraction: simplify expressions involving addition and/or subtraction in order from left to right • Models and solutions to one-variable, one-step equations from problem situations (concrete, pictorial, algebraic)

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TEKS# / SE#	TEKS	SPECIFICITY
		• Solutions to one-variable, one-step equations from geometric concepts ◦ Sum of the angles in a triangle, complementary angles, supplementary angles, sum of angles in a quadrilateral, etc. ◦ Supplementary angles – two angles whose degree measures have a sum of 180° ◦ Complementary angles – two angles whose degree measures have a sum of 90° Note(s): • Grade Level(s): ◦ Grade 4 introduced geometric concepts such as geometric attributes, parallel and perpendicular lines, and angle measures including complementary and supplementary angles. ◦ Grade 5 represented and solved multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity. ◦ Grade 7 will model and solve one-variable, two-step equations and inequalities. ◦ Grade 7 will write and solve equations using geometry concepts, including the sum of the angles in a triangle, and angle relationships. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Using expressions and equations to represent relationships in a variety of contexts • TxCCRS: ◦ II.A. Algebraic Reasoning – Identifying expressions and equations • II.A.1. Explain the difference between expressions and equations. ◦ II.C. Algebraic Reasoning – Solving equations, inequalities, and systems of equations and inequalities • II.C.1. Describe and interpret solution sets of equalities and inequalities. • II.C.3. Recognize and use algebraic properties, concepts, and algorithms to solve equations, inequalities, and systems of linear equations and inequalities. ◦ III.C. Geometric and Spatial Reasoning – Connections between geometry and other

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		mathematical content strands • III.C.1. Make connections between geometry and algebraic equations. ◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving • VII.A.3. Determine a solution. ◦ VIII.A. Communication and Representation – Language, terms, and symbols of mathematics • VIII.A.1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem. ◦ VIII.B. Communication and Representation – Interpretation of mathematical work • VIII.B.1. Model and interpret mathematical ideas and concepts using multiple representations. ◦ IX.A. Connections – Connections among the strands of mathematics • IX.A.1. Connect and use multiple key concepts of mathematics in situations and problems.
6.10B	**Determine if the given value(s) make(s) one-variable, one-step equations ~~or inequalities~~ true.** ***Supporting Standard***	Partial Specificity Determine IF THE GIVEN VALUE(S) MAKE(S) ONE-VARIABLE, ONE-STEP EQUATIONS TRUE Including, but not limited to: • Equation – a mathematical statement composed of algebraic and/or numeric expressions set equal to each other • Variable – a letter or symbol that represents a number ◦ One variable on one side of the equation • Coefficient – a number that is multiplied by a variable(s) ◦ Integers • Products of integers limited to an integer multiplied by an integer ◦ Decimals

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		• Limited to positive decimal values ◦ Fractions • Limited to positive fractional values • Constant – a fixed value that does not appear with a variable(s) ◦ Integers ◦ Decimals • Limited to positive decimal values ◦ Fractions • Limited to positive fractional values • One-step equations ◦ A "step" only refers to an action involving both sides of the equation (combining like terms on a single side of the equation does not constitute a step) • Solution set – a set of all values of the variable(s) that satisfy the equation ◦ Constraints or conditions • Equality words and symbols ◦ Equal to, = • Relationship of order of operations within an equation ◦ Order of operations – the rules of which calculations are performed first when simplifying an expression • Parentheses/brackets: simplify expressions inside parentheses or brackets in order from left to right • Exponents: rewrite in standard numerical form and simplify from left to right ◦ Limited to positive whole number exponents • Multiplication/division: simplify expressions involving multiplication and/or division in order from left to right • Addition/subtraction: simplify expressions involving addition and/or subtraction in order from left to right • Evaluation of given value(s) as possible solutions of one-variable, one-step equations ◦ Value is considered part of the solution if the value makes the equation true.

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		Note(s): • Grade Level(s): ◦ Grade 5 represented and solved multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity. ◦ Grade 7 will determine if the given value(s) make(s) one-variable, two-step equations and inequalities true. ◦ Various mathematical process standards will be applied to this student expectation as appropriate. • TxRCFP: ◦ Using expressions and equations to represent relationships in a variety of contexts • TxCCRS: ◦ II.A. Algebraic Reasoning – Identifying expressions and equations • II.A.1. Explain the difference between expressions and equations. ◦ II.C. Algebraic Reasoning – Solving equations, inequalities, and systems of equations and inequalities • II.C.2. Explain the difference between the solution set of an equation and the solution set of an inequality. ◦ VII.A. Problem Solving and Reasoning – Mathematical problem solving • VII.A.4. Justify the solution.

Instructional Focus Document
Grade 6 Mathematics

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ELPS#	SUBSECTION C: CROSS-CURRICULAR SECOND LANGUAGE ACQUISITION ESSENTIAL KNOWLEDGE AND SKILLS.

The English Language Proficiency Standards (ELPS), as required by 19 Texas Administrative Code, Chapter 74, Subchapter A, §74.4, outline English language proficiency level descriptors and student expectations for English language learners (ELLs). School districts are required to implement ELPS as an integral part of each subject in the required curriculum.

School districts shall provide instruction in the knowledge and skills of the foundation and enrichment curriculum in a manner that is linguistically accommodated commensurate with the student's levels of English language proficiency to ensure that the student learns the knowledge and skills in the required curriculum.

School districts shall provide content-based instruction including the cross-curricular second language acquisition essential knowledge and skills in subsection (c) of the ELPS in a manner that is linguistically accommodated to help the student acquire English language proficiency.
http://ritter.tea.state.tx.us/rules/tac/chapter074/ch074a.html#74.4

Choose appropriate ELPS to support instruction.

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