Vertical Alignment Document

Mathematics

Grade 6 – Grade 8

2011 – 2012

CSCOPE®

Texas Education Service Center Curriculum Collaborative

GRADE 6	GRADE 7	GRADE 8
§111.21. Implementation of Texas Essential Knowledge and Skills for Mathematics, Grades 6-8. *Source: The provisions of this §111.21 adopted to be effective September 1, 1998, 22 TexReg 7623; amended to be effective August 1, 2006, 30 TexReg 4479.*		
§111.22. - §112.24. Mathematics, Grade 6 – Grade 8.		
(a) Introduction.		
(1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 6 are using ratios to describe direct proportional relationships involving number, geometry, measurement, probability, and adding and subtracting decimals and fractions.	(1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 7 are using direct proportional relationships in number, geometry, measurement, and probability; applying addition, subtraction, multiplication, and division of decimals, fractions, and integers; and using statistical measures to describe data.	(1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 8 are using basic principles of algebra to analyze and represent both proportional and non-proportional linear relationships and using probability to describe data and make predictions.
(2) Throughout mathematics in Grades 6-8, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use concepts, algorithms, and properties of rational numbers to explore mathematical relationships and to describe increasingly complex situations. Students use algebraic thinking to describe how a change in one quantity in a relationship results in a change in the other; and they connect verbal, numeric, graphic, and symbolic representations of relationships. Students use geometric properties and relationships, as well as spatial reasoning, to model and analyze situations and solve problems. Students communicate information about geometric figures or situations by quantifying attributes, generalize procedures from measurement experiences, and use the procedures to solve problems. Students use appropriate statistics, representations of data, reasoning, and concepts of probability to draw conclusions, evaluate arguments, and make recommendations.		
(3) Problem solving in meaningful contexts, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 6-8, students use these processes together with graphing technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.		

	GRADE 6		GRADE 7		GRADE 8
6.1	***Number, operation, and quantitative reasoning. The student represents and uses rational numbers in a variety of equivalent forms. The student is expected to:***	***7.1***	***Number, operation, and quantitative reasoning. The student represents and uses numbers in a variety of equivalent forms. The student is expected to:***	***8.1***	***Number, operation, and quantitative reasoning. The student understands that different forms of numbers are appropriate for different situations. The student is expected to:***

6.1A	**Compare and order non-negative rational numbers.**
	
	Supporting Standard
	
	Compare, Order, Represent, Use
	
	NON-NEGATIVE RATIONAL NUMBERS
	
	Including, but not limited to:
	• Number sets
	  • Natural numbers (counting)
	  • Zero
	  • Whole numbers
	  • Non-negative rational numbers
	• Decimals (greater than or equal to zero)
	• Fractions (positive, unit, equivalent, proper, improper, and mixed numbers)
	• Relationships to benchmarks of 0, $\frac{1}{2}$, and 1
	• Percents (0% to 100%, inclusive, and greater than 100%)
	• Verbal, numerical, and written
	• Expressions to compare numbers
	• Number lines to compare numbers
		7.1A	**Compare and order integers and positive rational numbers.**
			
			Supporting Standard
			
			Compare, Order, Represent, Use
			
			INTEGERS AND POSITIVE RATIONAL NUMBERS
			
			Including, but not limited to:
			• Number sets
			  • Natural numbers (counting)
			  • Zero
			  • Whole numbers
			  • Positive rational numbers
			  • Integers
			• Decimals (greater than or equal to zero)
			• Fractions (positive, unit, equivalent, proper, improper, and mixed numbers)
			• Relationships to benchmarks of 0, $\frac{1}{2}$, and 1
			• Percents (0% to 100%, inclusive, and greater than 100%)
			• Verbal, numerical, and written expressions to compare numbers
				8.1A	**Compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals.**
					
					Readiness Standard
					
					Compare, Order, Understand
					
					RATIONAL NUMBERS
					
					Including, but not limited to:
					• Number sets
					  • Natural numbers (counting)
					  • Zero
					  • Whole numbers
					  • Integers
					  • Rational numbers
					• Decimals (greater than, less than, equal to zero)
					• Fractions (positive and negative, unit, equivalent, proper, improper, and mixed numbers)
					• Percents (0% to 100%, inclusive, and greater than 100%)
					• Squares and perfect square roots (e.g., $\sqrt{25}, \sqrt{121}$, etc.)
					• Verbal, numerical, and written

Bold, italic black: Knowledge and Skills Statement (TEKS); **Bold black: Student Expectation (TEKS)**
Bold, italic red: Student Expectation identified by TEA as a ***Readiness Standard*** for STAAR.
Bold, italic green: Student Expectation identified by TEA as a ***Supporting Standard*** for STAAR.
Blue: Supporting Information / Clarifications from CSCOPE (Specificity)
Black text: Texas College and Career Readiness Standards (TxCCRS)

	GRADE 6		GRADE 7		GRADE 8

	(non-negative rational numbers)
	• Place value
	• Various representations of a number that have the same value
	  • Ex: 5.8 is 5 ones and 8 tenths, 5 ones and 80 hundredths, or 5 ones and 800 thousandths, etc.
	• Comparative language
	  • Equality and inequality symbols (=, >, <, ≥, ≤)
	  • Equality and inequality words (equal to, greater than, less than, greater than or equal to, less than or equal to)
	• Quantifying descriptors (e.g., least to greatest, ascending/descending order, slowest to fastest, etc.)
	• Multiple forms of non-negative rational numbers within a single problem
	• Real-life problems
	
	TxCCRS Note:
	I. Numeric Reasoning A1 – Compare real numbers. (Grade 6 only requires the students to compare non-negative rational numbers.)
			• Number lines to compare numbers (integers and positive rational numbers)
			• Place value
			• Various representations of a number that have the same value
			  • Ex: 5.8 is 5 ones and 8 tenths, 5 ones and 80 hundredths, or 5 ones and 800 thousandths, etc.
			• Comparative language
			  • Equality and inequality symbols (=, >, <, ≥, ≤)
			  • Equality and inequality words (equal to, greater than, less than, greater than or equal to, less than or equal to)
			• Quantifying descriptors (e.g., least to greatest, ascending/descending order, slowest to fastest, etc.)
			• Multiple forms of positive rational numbers within a single problem
			• Real-life problems
			
			TxCCRS Note:
			I. Numeric Reasoning A1 – Compare real numbers. (Grade 7 only requires the students to compare integers and positive rational numbers.)
					expressions to compare numbers
					• Number lines to compare numbers (rational numbers)
					• Place value
					• Various representations of a number that have the same value
					  • Ex: 5.8 is 5 ones and 8 tenths, 5 ones and 80 hundredths, or 5 ones and 800 thousandths, etc.
					• Comparative language
					  • Equality and inequality symbols (=, >, <, ≥, ≤)
					  • Equality and inequality words (equal to, greater than, less than, greater than or equal to, less than or equal to)
					• Quantifying descriptors (e.g., least to greatest, ascending/descending order, slowest to fastest, etc.)
					• Multiple forms of rational numbers within a single problem
					• Real-life problems
					
					TxCCRS Note:
					I. Numeric Reasoning A1 – Compare real numbers. (Grade 8 only requires the students to compare rational numbers.)

				8.1E	**Compare and order real numbers with a calculator.** Compare, Order, Understand REAL NUMBERS

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	GRADE 6		GRADE 7		GRADE 8

					Including, but not limited to:
					• Real number sets
					  • Natural numbers (counting)
					  • Whole numbers
					  • Integers
					  • Rational numbers (e.g.,$-\frac{2}{3}$, 25, 15%, 2.375, $\frac{1}{2}$, 32, -8, $\sqrt{4}$, 52, -2.5, etc.)
					  • Irrational numbers (with a calculator) (e.g., $\sqrt{3}$, 0.121121112..., π, etc.)
					• Verbal, numerical, and written expressions to compare numbers
					  • Comparative language
					  • Equality and inequality symbols (=, >, <, ≥, ≤)
					  • Equality and inequality words (equal to, greater than, less than, greater than or equal to, less than or equal to)
					• Multiple forms of real numbers within a single problem
					• Real-life problems
					
					STAAR Note:
					• 8.1E is not tested in STAAR. However, this student expectation is foundational for supporting and readiness standards tested in this grade level and/or other grade levels.

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	GRADE 6		GRADE 7		GRADE 8
					TxCCRS Note: I. Numeric Reasoning A1 – Compare real numbers.
6.1B	**Generate equivalent forms of rational numbers including whole numbers, fractions, and decimals.** ***Readiness Standard*** Generate, Represent, Use EQUIVALENT FORMS OF NON-NEGATIVE RATIONAL NUMBERS Including, but not limited to: • Whole numbers, fractions, and decimals • Various representations of equivalent forms of non-negative rational numbers • Real-life problems Note: • Grade 5 makes connections between equivalent mixed numbers and improper fractions on an abstract level.	**7.1B**	**Convert between fractions, decimals, whole numbers, and percents mentally, on paper, or with a calculator.** ***Readiness Standard*** Convert, Represent, Use POSITIVE RATIONAL NUMBERS Including, but not limited to: • Whole numbers, fractions, decimals, and percents • Various representations of whole numbers, fractions, decimals, and percents • Terminating and repeating decimals (bar notation) • Multiple forms of rational numbers within a single problem • Mental, paper/pencil, and calculator computation • Real-life problems	**8.1B**	**Select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships.** ***Supporting Standard*** Select, Use, Understand FORMS OF RATIONAL NUMBERS IN REAL-LIFE PROBLEM SITUATIONS Including, but not limited to: • Appropriate forms of rational numbers • Operations (+, − , ×, ÷) on all rational numbers • Multiple forms of rational numbers within a single problem Solve REAL-LIFE PROBLEM SITUATIONS WITH RATIONAL NUMBERS Including, but not limited to: • Appropriate forms of rational numbers • Operations (+, − , ×, ÷) on all rational numbers • Order of operations • Multiple forms of rational numbers within a single problem

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	GRADE 6		GRADE 7		GRADE 8
					• Real-life problems, including proportional relationships

		7.1C	**Represent squares and square roots using geometric models.**
			
			Supporting Standard
			
			Represent
			
			SQUARES AND SQUARE ROOTS
			
			Including, but not limited to:
			• Geometric models of perfect squares
			• Geometric models to demonstrate examples and non-examples of squares and square roots
			• Connection of square numbers to their square roots
			
			Note:
			• Grade 7 introduces squares and square roots using geometric models.
				8.1C	**Approximate (mentally [and with calculators]) the value of irrational numbers as they arise from problem situations (such as π , $\sqrt{2}$).**
					
					Supporting Standard
					
					Approximate, Understand
					
					IRRATIONAL NUMBERS
					
					Including, but not limited to:
					• Number sets
					  • Natural numbers (counting)
					  • Whole numbers
					  • Integers
					  • Rational numbers
					  • Irrational numbers
					  • Real numbers
					• Irrational number approximations in problem situations (mentally and with calculators)
					• Geometric formulas
					• Mental approximation: use $\pi \approx 3$
					• Calculator approximation: use π and round final answer as appropriate
					
					STAAR Note:
					• 8.1C is tested in STAAR. However, the bracketed part of this student

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	GRADE 6		GRADE 7		GRADE 8
					expectation **[and with calculators]** will not be tested. Note: • Grade 8 introduces irrational numbers.
6.1	***Number, operation, and quantitative reasoning. The student represents and uses rational numbers in a variety of equivalent forms. The student is expected to:***	***7.2***	***Number, operation, and quantitative reasoning. The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to:***	***8.1***	***Number, operation, and quantitative reasoning. The student understands that different forms of numbers are appropriate for different situations. The student is expected to:***

6.1C	**Use integers to represent real-life situations.**
	
	Supporting Standard
	
	Use, Represent
	
	INTEGERS IN REAL-LIFE SITUATIONS
	
	Including, but not limited to:
	• Whole numbers and their opposites
	• Number lines (horizontal and vertical)
	• Verbal descriptions
	• Verbal actions expressed symbolically
	• Integers to quantify
	  • Ex: temperature, deposit/withdrawal, above/below sea level, up/down, elevations, etc.
	• Integers to represent changes
	  • Ex: ascend/descend, loss/gain, increase/decrease, change in temperature, etc.
	• Real-life situations
		7.2C	**Use models, such as concrete objects, pictorial models, and number lines, to add, subtract, multiply, and divide integers and connect the actions to algorithms.**
			
			Supporting Standard
			
			Use
			
			MODELS FOR INTEGER OPERATIONS
			
			Including, but not limited to:
			• Operation models
			  • Concrete objects
			  • Pictorial models
			  • Number lines (horizontal and vertical)
			
			Add, Subtract, Multiply, Divide
			
			INTEGERS
			
			Including, but not limited to:		

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Note:
• Grade 6 introduces integers.
	• Operation models
	  • Concrete objects
	  • Pictorial models
	  • Number lines (horizontal and vertical)
	• Multi-step problems
	• Operations in real-life problems
	
	Connect
	
	INTEGER OPERATIONS TO ALGORITHMS
	
	Including, but not limited to:
	• Operation models
	  • Concrete objects
	  • Pictorial models
	  • Number lines (horizontal and vertical)
	  • Actions of models to algorithms
	  • Multi-step problems
	  • Multiple operations within one problem situation
	  • Verbal actions expressed symbolically and vice versa
	
	Note:
	• Grade 7 introduces integer computation transitioning from the concrete to the abstract.
	
	TxCCRS Note:	

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			I. Numeric Reasoning B1 – Perform computations with real and complex numbers. (Grade 7 only requires the students to perform computations with integers and positive rational numbers.)		
6.1D	**Write prime factorizations using exponents.** ***Supporting Standard*** Write, Represent, Use PRIME FACTORIZATION Including, but not limited to: • Positive integers • Prime and composite numbers • Factorization representations • Ex: factor trees, factor lists, arrays, prime factor tower division, etc. • Exponential notation Note: • Grade 5 introduces factor pairs. • Grade 6 introduces prime factorization. • Grade 6 uses exponents to represent numbers in prime factorization, but exponents are not used in computation with order of operations. An example would be $2^3 \times 5^2 = 2 \times 2 \times 2 \times 5 \times 5$ and not $4^2 - 1 + (17 - 6) = 26$.			**8.1D**	**Express numbers in scientific notation, including negative exponents, in appropriate problem situations.** ***Supporting Standard*** Express, Understand SCIENTIFIC NOTATION Including, but not limited to: • Scientific notation format • Standard form to scientific notation and vice versa • Powers of ten (both positive and negative integer exponents) • Real-life problems Note: • Grade 8 is the first and only time scientific notation is introduced and addressed in mathematics. • Grade 8 introduces negative exponents and is used only as powers of ten in scientific notation. TxCCRS Note: IX. Communication and Representation A1 – Use mathematical symbols, terminology, and notation to represent given and

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