STAAR
FIELD GUIDE
FOR TEACHERS

GRADE 5 LEVEL

MATH

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STAAR

The State of Texas of Assessment of Academic Readiness (STAAR) is based on the Texas Essential Knowledge and Skills (TEKS). Most of the state standards, if they are eligible for assessment in a multiple choice/short answer format, will be assessed on STAAR.

STAAR is designed as a **vertical** system. Just as the TEKS are structured in a vertically aligned manner, so is STAAR. Learning from one grade level is aligned with learning at the next grade level. Some skills are developed over the course of a student's educational career from kindergarten through high school, while other skills and learning may begin at a particular grade level and serve as the foundation for later learning. STAAR is an assessment of **academic** readiness.

STAAR is designed to ensure that teachers answer these questions:

- Did students learn what they were supposed to learn in the current year's grade?
- Are students ready for the next grade?
- And are they also ready for the grade after that?

So what's the big deal about that shift? Fundamentally, it requires that teachers relook at curriculum and instruction in a very different way than they have under previous assessment systems (TABS, TEAMS, TAAS, TAKS). Not only are teachers required to have a deep understanding of the content of the grade level they are teaching, but they must also be firmly grounded in how the content of that current grade level prepares students for subsequent grade levels. Overemphasis on grade level attainment ONLY may create a context where teachers in subsequent grade levels have to reteach foundational skills to accommodate for the gap created by the lack of appropriate emphasis earlier. It may require students to "unlearn" previous ways of conceptualizing content and essentially start all over.

STAAR: focus, clarity, depth

[The TEKS] are designed to prepare students to succeed in college, in careers and to compete globally. However, consistent with a growing national consensus regarding the need to provide a more clearly articulated K 16 education program that focuses on fewer skills and addresses those skills in a deeper manner, TEA has further refined the TEKS organization as follows.

STAAR is designed around three concepts: focus, clarity, and depth:

Focus: STAAR will focus on grade level standards that are critical for that grade level and the ones to follow

Clarity: STAAR will assess the eligible TEKS at a level of specificity that allow students to demonstrate mastery

Depth: STAAR will assess the eligible TEKS at a higher cognitive level and in novel contexts

STAAR: the assessed curriculum – readiness, supporting, and process standards

A key concept that underpins the design of STAAR is that all standards (TEKS) do not play the same role in student learning. Simply stated, some standards (TEKS) have greater priority than others - they are so vital to the current grade level or content area that they must be learned to a level of mastery to ensure readiness (success) in the next grade levels. Other standards are important in helping to support learning, to maintain a previously learned standard, or to prepare students for a more complex standard taught at a later grade.

By assessing the TEKS that are most critical to the content area in more rigorous ways, STAAR will better measure the academic performance of students as they progress from elementary to middle to high school. Based on educator committee recommendations, for each grade level or course, TEA has identified a set of readiness standards - the TEKS which help students develop deep and enduring understanding of the concepts in each content area. The remaining knowledge and skills are considered supporting standards and will be assessed less frequently, but still play a very important role in learning.

Readiness standards have the following characteristics:

- They are essential for success in the current grade or course.
- They are important for preparedness for the next grade or course.
- They support college and career readiness.
- They necessitate in-depth instruction.
- They address broad and deep ideas.

Supporting standards have the following characteristics:

- Although introduced in the current grade or course, they may be emphasized in a subsequent year.
- Although reinforced in the current grade or course, they may be emphasized in a previous year.
- They play a role in preparing students for the next grade or course but not a central role.
- They address more narrowly defined ideas.

STAAR assesses the eligible TEKS at the level at which the TEKS were written.

STAAR is a more rigorous assessment than TAKS (and TAAS, TEAMS, TABS before that). The level of rigor is connected with the cognitive level identified in the TEKS themselves. Simply stated, STAAR will measure the eligible TEKS at the level at which they are written.

The rigor of items will be increased by

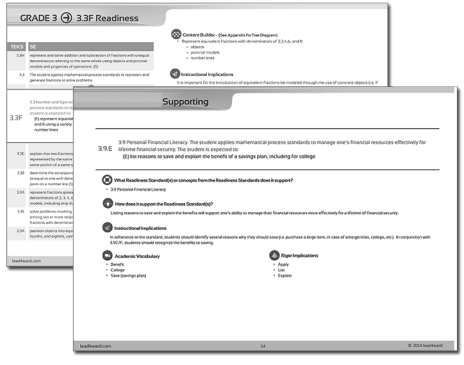
- assessing content and skills at a greater depth and higher level of cognitive complexity
- assessing more than one student expectation in a test item

The rigor of the tests will be increased by

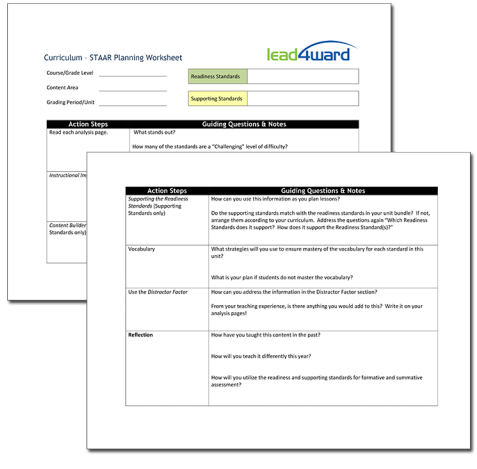
- assessing fewer, yet more focused, student expectations and assessing them multiple times and in more complex ways
- including a greater number of rigorous items on the test, thereby increasing the overall test difficulty

About the STAAR Field Guide for Teachers

The STAAR Field Guide for Teachers is designed as a tool to help teachers prepare for instruction. The tools and resources in this guide are designed to supplement local curriculum documents by helping teachers understand how the design and components of STAAR are connected to the scope and sequence of instruction. In order to help students attain even higher levels of learning as assessed on STAAR, teachers need to plan for increasing levels of rigor. This guide contains the following components:



STAAR Readiness and Supporting Standards Analysis Sheets - overviews of the nature of each readiness and supporting standard assessed on STAAR, designed to be used in planning to build teacher content knowledge and ensure that current grade level instruction reinforces previous learning and prepares students for future grade levels.



STAAR-Curriculum Planning Worksheet - a tool to organize the pages in this guide to be used in planning and professional development.

Steps to Success

1. Download the TEA Documents to add to your STAAR Teacher Field Guide
   - » STAAR Blueprint
   - » Assessed Curriculum Documents
   - » STAAR Test Design
   - » STAAR Reference Materials

2. Visit lead4ward.com/resources to download lead4ward resource materials to add to your STAAR Field Guide
   - » STAAR Snapshot
   - » TEKS Scaffold Documents
   - » IQ Released Tests
   - » Student Recording Sheets

3. Review the STAAR Snapshot for your course/grade level and content area
   - » Note the readiness standards
   - » With your team, explore why those TEKS are classified as readiness standards - and which criteria they meet
   - » Review the supporting standards and note any that may have played a larger role on TAKS

4. Review the components of the STAAR Readiness and Supporting Standards Analysis Sheets
   - » Use the samples on pages 6 and 7 to explore the analysis sheets
   - » Add additional information based on the discussion of the team

5. Create STAAR-Curriculum Planning Packets for each unit or grading period
   - » Collect either the Scope and Sequence document (if it includes the TEKS standards for each unit of instruction) OR Unit Plan documents (where the TEKS standards are bundled together into units of instruction)
   - » The STAAR Field Guide is arranged by standard type (readiness or supporting) in numeric order of the standards. You may need to photocopy certain pages/standards if they are repeated throughout multiple units
   - » Use the scope and sequence or unit plan documents to identify the TEKS taught in each unit/grading period
   - » Compile the STAAR Readiness and Supporting Standards Analysis Sheets that correspond to the TEKS in each unit/grading period
   - » After the pages/standards are sorted into their appropriate unit, create a method of organizing the documents (binder, folder, file, etc.).

6. Plan for instruction
   - » Collect the curriculum documents used for planning
   - » Use the STAAR - Curriculum Planning Worksheet as you plan each unit. The worksheet provides guiding questions and reflection opportunities to aid you in maximizing the material in the STAAR Field Guide
   - » Determine where the team needs additional learning
   - » Evaluate instructional materials
   - » Review the plan for appropriate levels of rigor

How to read STAAR Readiness Standards Analysis Pages

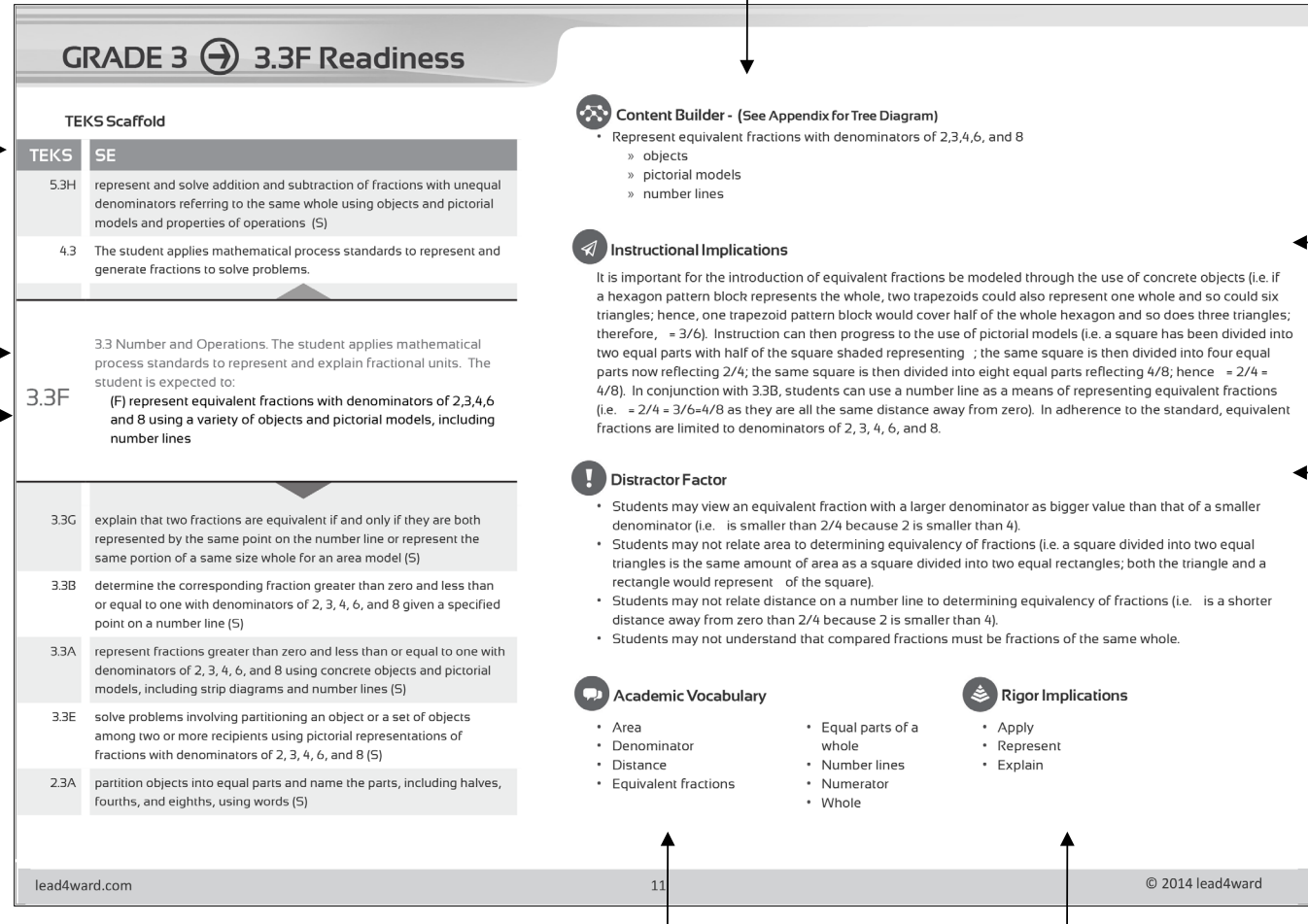
Standard and Indication of "Readiness" or "Supporting"

Content Builder
The basics of the content within the standard are extracted in a bulleted list. Describes multiple measurable parts in a standard - used to select and vary instructional materials.

TEKS Scaffold

Texas Essential Knowledge and Skills Statement

Student Expectation



GRADE 3 → 3.3F Readiness

TEKS Scaffold

TEKS	SE
5.3H	represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models and properties of operations (S)
4.3	The student applies mathematical process standards to represent and generate fractions to solve problems.
	3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:
3.3F	(F) represent equivalent fractions with denominators of 2,3,4,6 and 8 using a variety of objects and pictorial models, including number lines
3.3G	explain that two fractions are equivalent if and only if they are both represented by the same point on the number line or represent the same portion of a same size whole for an area model (S)
3.3B	determine the corresponding fraction greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 given a specified point on a number line (S)
3.3A	represent fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 using concrete objects and pictorial models, including strip diagrams and number lines (S)
3.3E	solve problems involving partitioning an object or a set of objects among two or more recipients using pictorial representations of fractions with denominators of 2, 3, 4, 6, and 8 (S)
2.3A	partition objects into equal parts and name the parts, including halves, fourths, and eighths, using words (S)

Content Builder - (See Appendix for Tree Diagram)
- Represent equivalent fractions with denominators of 2,3,4,6, and 8
  - objects
  - pictorial models
  - number lines

Instructional Implications
It is important for the introduction of equivalent fractions be modeled through the use of concrete objects (i.e. if a hexagon pattern block represents the whole, two trapezoids could also represent one whole and so could six triangles; hence, one trapezoid pattern block would cover half of the whole hexagon and so does three triangles; therefore, = 3/6). Instruction can then progress to the use of pictorial models (i.e. a square has been divided into two equal parts with half of the square shaded representing ; the same square is then divided into four equal parts now reflecting 2/4; the same square is then divided into eight equal parts reflecting 4/8; hence = 2/4 = 4/8). In conjunction with 3.3B, students can use a number line as a means of representing equivalent fractions (i.e. = 2/4 = 3/6=4/8 as they are all the same distance away from zero). In adherence to the standard, equivalent fractions are limited to denominators of 2, 3, 4, 6, and 8.

Distractor Factor
- Students may view an equivalent fraction with a larger denominator as bigger value than that of a smaller denominator (i.e. is smaller than 2/4 because 2 is smaller than 4).
- Students may not relate area to determining equivalency of fractions (i.e. a square divided into two equal triangles is the same amount of area as a square divided into two equal rectangles; both the triangle and a rectangle would represent of the square).
- Students may not relate distance on a number line to determining equivalency of fractions (i.e. is a shorter distance away from zero than 2/4 because 2 is smaller than 4).
- Students may not understand that compared fractions must be fractions of the same whole.

Academic Vocabulary
- Area
- Denominator
- Distance
- Equivalent fractions
- Equal parts of a whole
- Number lines
- Numerator
- Whole

Rigor Implications
- Apply
- Represent
- Explain

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Instructional Implication
Suggestions to modify instruction that support effectively teaching this standard.

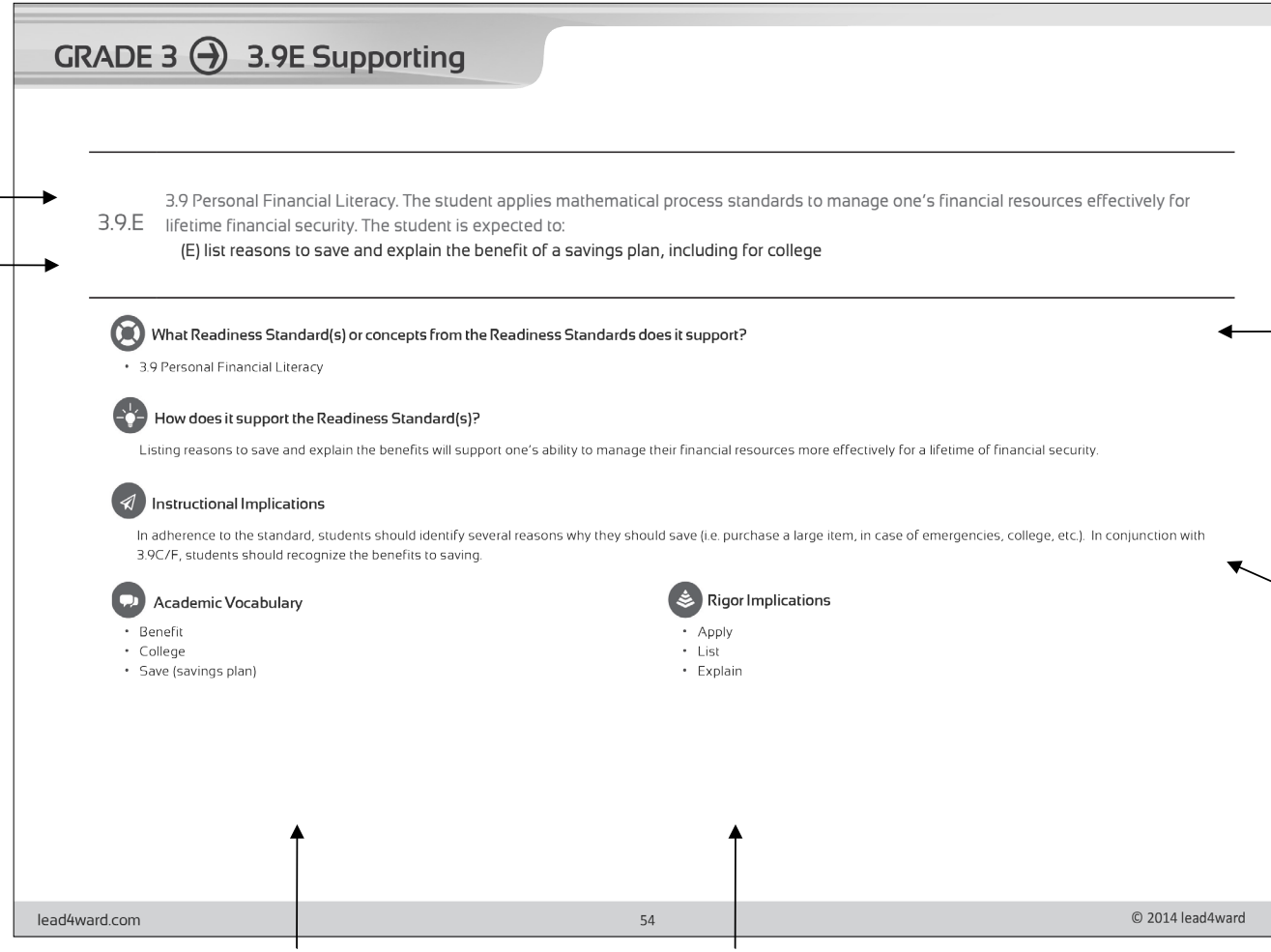
Distractor Factor
Alerts teachers to areas where students traditionally struggle, have misconceptions, or may need reinforcement. Common errors in learning.

Academic Vocabulary
Vocabulary words extracted directly from the standard and/or associated with the instruction of the content within the standard.

Rigor Implications
Uses the verb(s) from the Student Expectation to indicate the cognitive complexity of the standard.

How to read STAAR Supporting Standards Analysis Pages

Standard and Indication of "Readiness" or "Supporting"



Texas Essential Knowledge and Skills Statement

Student Expectation

Supporting the Readiness Standards - Most supporting standards support a readiness standard in the current grade level. This section discusses the relationships of the standards that are often taught together.

Instructional Implication
Suggestions to modify instruction that support effectively teaching this standard.

Academic Vocabulary
Vocabulary words extracted directly from the standard and/or associated with the instruction of the content within the standard.

Rigor Implications
Uses the verb(s) from the Student Expectation to indicate the cognitive complexity of the standard.

Curriculum - STAAR Planning Worksheet

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Course/Grade Level _____

Content Area _____

Grading Period/Unit _____

Readiness Standards	
Supporting Standards	

Action Steps	Guiding Questions & Notes
Read each analysis page.	What stands out? Do you have data on any of the standards that suggest whether the standard is a strength or a concern? How many of the standards are at a high level of rigor?
Instructional Implications	How will these implications inform your planning? How can you use this information to modify instruction?
TEKS Scaffolding	What concepts did students learn in the previous grade to prepare them? Do you have students who may struggle with those concepts? Look at how the students will use that concept in subsequent grades - will the way you teach it still apply in those grades?

Curriculum - STAAR Planning Worksheet (continued)

Action Steps	Guiding Questions & Notes
Content Builder (Readiness Standards only)	How many parts does this standard have? Which of the parts are new to your team or to the students? This content is important for students' future learning. How will you assess retention?
Supporting the Readiness Standards (Supporting Standards only)	How can you use this information as you plan lessons? Do the supporting standards match with the readiness standards in your unit bundle? If not, arrange them according to your curriculum. Address the questions again: "Which Readiness Standards does it support? How does it support the Readiness Standard(s)?"
Vocabulary	What strategies will you use to ensure mastery of the vocabulary for each standard in this unit? What is your plan if students do not master the vocabulary?
Use the *Distractor Factor*	How can you address the information in the Distractor Factor section? From your teaching experience, is there anything you would add to this? Write it on your analysis pages!
Reflection	How have you taught this content in the past? How will you teach it differently this year? How will you utilize the readiness and supporting standards for formative and summative assessment?

GRADE 5 → 5.2B Readiness

TEKS Scaffold

TEKS	SE
6.2D	order a set of rational numbers arising from mathematical and real-world contexts (R)
5.2B	**5.2 Number and Operations.** The student applies mathematical process standards to represent, compare, and order positive rational and understand relationships related to place value. The student is expected to: (B) compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or =
4.2F	compare and order decimals using concrete and visual models to the hundredths (S)
4.2C	compare and order whole numbers to 1,000,000,000 and represent comparisons using the symbols >, <, or = (S)
3.2D	compare and order whole numbers up to 100,000 and represent comparisons using the symbols >, <, or = (R)

Content Builder - (See Appendix for Tree Diagram)

- Compare two decimals to the thousandths
- Order decimals to the thousandths
- Represent the comparison of decimals using symbols >,<, or =

Instructional Implications

In conjunction with 5.2A, as students compare the value of decimals they need to be able to relate their understanding of place value (i.e. 2.42 is less than 2.7 because the digit 4 in 2.42 means there are four tenths which is a value of 0.40; however, the digit 7 in 2.7 means there are seven tenths which is a value 0.70). Students will compare two decimal values using the correct academic vocabulary (i.e. 2.42 is less than 2.7). It is important for students to recognize the inverse comparison statement as well (i.e. 2.7 is greater than 2.42). Instruction should connect the comparative language to the symbols (>, <, =). It is critical that students understand how to correctly read each of the symbols without using a trick to remember directionality of the symbols (i.e. the alligator's mouth eats the bigger number). Encourage students to write and articulate two comparison statements during activities (i.e. 2.42<2.7 and 2.7>2.42). The standard also has students ordering decimals from least to greatest or greatest to least. The use of number lines will allow students to order more efficiently. Numbers increasing from left to right on a number line can be associated to ordering from least to greatest; numbers decreasing from right to left on a number line can be associated to ordering from greatest to least.

Distractor Factor

- Students that rely on a trick to determine directionality (i.e. the alligator's mouth eats the bigger number) may not be able to read comparison symbols correctly.
- Students may compare the number of digits instead of applying their understanding of place value to determine the value of decimals (i.e. 0.451 is greater than 0.98 because it has more digits).
- Students may not understand that 0.7 is equivalent to 0.70.
- Students may not view the comparison statement 5.246 < 5.43 is the same as 5.43 > 5.246.
- Students need to understand the context of problems to order decimals correctly (i.e. when ordering time from fastest to slowest, students may want to order from greatest to least).

Academic Vocabulary

- Comparison symbol
- Equal to (=)
- Greater than (>)
- Greatest to least
- Least to greatest
- Less than (<)
- Tenths, hundredths, thousandths

Rigor Implications

- Apply
- Represent
- Compare
- Order

GRADE 5 → 5.3E Readiness

TEKS Scaffold

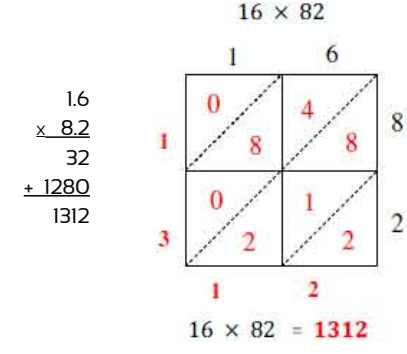
TEKS	SE
7.3B	apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers (R)
6.3E	multiply and divide positive rational numbers fluently (R)
5.3E	**5.3 Number and Operations.** The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to: (E) solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understanding, properties of operations, and the relationship to the multiplication of whole numbers
5.3D	represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models (S)
4.4H	solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders (R)
4.4D	use strategies and algorithms, including the standard algorithm, to multiply up to a fourdigit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties (S)
3.4K	solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts (R)

Content Builder - (See Appendix for Tree Diagram)

- Solve for products of decimals to the hundredths (including money)
  - » Place value understanding
  - » Properties of operations
  - » Relationship to multiplication of whole numbers

Instructional Implications

In conjunction with 5.3D, the intent of this standard is to build flexibility in multiplying decimals (4 x $1.35 = x). Beginning instruction with the use of money will allow students to better relate their understanding of the concept (i.e. 4 x $1.35 = x; representing a one dollar bill, three dimes, and five pennies and asking students to represent four times that amount would yield four dollar bills, 12 dimes, and 20 pennies; $4.00 + $1.20 + $0.20 = $5.40). Instruction can move to the use of place value understanding and properties of operations to solve for products of decimals (i.e. 4 x 1.35 = 4 x (1 + 0.30 + 0.05) = (4 x 1) + (4 x 0.30) + (4 x 0.05) = 4 + 1.20 + 0.20 = 5.40). In alignment with 5.3A, it is essential for students to estimate solutions to decimal multiplication problems before solving the problems (i.e. 4 x 1.35 ≈ 4 x 1 = 4). This will allow students to continue to use whole number multiplication strategies and apply reasonableness when determining the product of decimals (i.e. When computing a product such as 1.6 x 8.2, a student could estimate the answer to be close to 2 x 8 = 16. Then, when multiplying the related whole numbers (16 x 82) to get an answer of 1312, the student could reason that neither 1.312, 131.2, nor 1314 would be reasonable. Thus, 1.6 x 8.2 = 13.12).



In accordance with the standard, products are limited to hundredths.

Distractor Factor

- Students may think that the multiplying two numbers always yields a larger product.
- When applying the standard algorithm, students may want to align place values like in addition/subtraction of decimals.

Academic Vocabulary

- Factors
- Products
- Tenths, hundredths
- Decimal
- Place Value

Rigor Implications

- Apply
- Develop
- Use
- Solve

GRADE 5 → 5.3G Readiness

TEKS Scaffold

TEKS	SE
7.3B	apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers (R)
6.3E	multiply and divide positive rational numbers fluently (R)
5.3G	**5.3 Number and Operations.** The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to: (G) solve for quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole number divisors, using strategies and algorithms, including the standard algorithm
5.3F	represent quotients of decimals to the hundredths, up to four-digit dividends and twodigit whole number divisors, using objects and pictorial models, including area models (S)
5.3C	solve with proficiency for quotients of up to a four-digit dividend by a two-digit divisor using strategies and the standard algorithm (S)
4.4H	solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders (R)
4.4D	use strategies and algorithms, including the standard algorithm, to multiply up to a four-digit number by a one-digit number and to multiply a two-digit number by a two-digit number. Strategies may include mental math, partial products, and the commutative, associative, and distributive properties (S)
3.4K	solve one-step and two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recall of facts (R)
3.5B	represent and solve one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations (R)

Content Builder - (See Appendix for Tree Diagram)

- Solve for quotients of decimals to the hundredths (up to four-digit dividends and two-digit whole number divisors)
  - » Strategies
  - » Algorithms
  - » Standard algorithm

Instructional Implications

In conjunction with 5.3F, the intent of this standard is to build flexibility in dividing decimals. Instruction is limited to four-digit dividends and two-digit whole number divisors (i.e. 4.6 ÷ 2 = x). Beginning instruction with concrete objects will allow students to develop their understanding of the concept and build flexibility with numbers (i.e. if a hundreds flat represents one whole, then 4.6 would be represented with four hundred flats and six ten rods; model the base ten blocks being divided into two equal groups which yield 2 hundred flats and 3 ten rods in each group; 4.6 ÷ 2 = 2.3). In alignment with 5.3A, it will be essential for students to estimate (rounding and compatible numbers) quotients before solving division problems. This will allow students to continue to use whole number division strategies and apply reasonableness when determining quotient of decimals (i.e. 38.4 ÷ 3 ≈ 39 ÷ 3 = 13 if the answer should be around 13 then .128, 1.28, nor 128 would be reasonable; hence, 38.4 ÷ 3 = 12.8). This understanding can also be applied when using the standard algorithm for division.

Distractor Factor

- Students may think that dividing two numbers always yields a smaller quotient.
- When applying the standard algorithm, students may not articulate the correct place value understanding (i.e. 384 ÷3=x; "three goes into three one time" instead of "there are 100 groups of three in 300").
- Students may revert to past experience when using base-ten blocks to represent whole numbers and become confused when using the manipulatives to represent decimal values.

Academic Vocabulary

- Dividend
- Divisor
- Hundredths
- Quotient
- Tenths

Rigor Implications

- Apply
- Develop
- Use
- Solve

GRADE 5 → 5.3K Readiness

TEKS Scaffold

TEKS	SE
7.3B	apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers (R)
6.3E	multiply and divide positive rational numbers fluently (R)
5.3K	**5.3 Number and Operations.** The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to: (K) add and subtract positive rational number fluently
5.3H	represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models and properties of operations (S)
4.3E	represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations (R)
4.3F	evaluate the reasonableness of sums and differences of fractions using benchmark fractions 0, 1/4, 1/2, 3/4, and 1, referring to the same whole (S)
4.4A	add and subtract whole numbers and decimals to the hundredths place using the standard algorithm (R)
3.4A	solve with fluency one-step and two-step problems involving addition and subtraction within 1,000 using strategies based on place value, properties of operations, and the relationship between addition and subtraction (R)

Content Builder - (See Appendix for Tree Diagram)

- Add positive rational numbers fluently
- Subtract positive rational numbers fluently

Instructional Implications

Rational numbers include whole numbers, fractions, and decimals. In adherence to the standard, operations with rational numbers are limited to those that are positive. Students should be able to apply all of their experiences with positive rational numbers to add and subtract fluidly. Instruction should include whole numbers through the billions, decimals through the thousandths, and all representations of fractions (i.e. improper, mixed numbers, like denominators, unlike denominators). In conjunction with 4.2G, students have related decimals to fractions and future instruction may include the addition/subtraction of a mixture of rational number representations (i.e. 4.75 + 2 1/2 = x).

Distractor Factor

- Students may apply the use of "key words" to select addition or subtraction instead of understanding the context of the problem.
- Students may line up the decimal point incorrectly (or not at all) when adding or subtracting decimal numbers.
- Students may forget to use a common denominator when adding or subtracting fractions or mixed numbers.

Academic Vocabulary

- Add
- Decimal
- Denominator
- Difference
- Fraction
- Mixed number
- Numerator
- Rational number
- Subtract
- Sum

Rigor Implications

- Apply
- Develop
- Use
- Solve
- Add
- Subtract

GRADE 5 → 5.3L Readiness

TEKS Scaffold

TEKS	SE
7.3B	apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers (R)
6.3E	multiply and divide positive rational numbers fluently (R)
6.3A	recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values (S)
5.3L	**5.3 Number and Operations.** The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to: (L) divide whole numbers by unit fractions and unit fractions by whole numbers
5.3J	represent division of a unit fraction by a whole number and the division of a whole number by a unit fraction such as 1/3 ÷ 7 and 7 ÷ 1/3 using objects and pictorial models, including area models; Supporting Standard (S)
5.3I	represent and solve multiplication of a whole number and a fraction that refers to the same whole using objects and pictorial models, including area models (S)
5.3F	represent quotients of decimals to the hundredths, up to four-digit dividends and twodigit whole number divisors, using objects and pictorial models, including area models (S)

Content Builder - (See Appendix for Tree Diagram)

- Divide whole numbers by unit fractions
- Divide unit fractions by whole numbers

Instructional Implications

In conjunction with 5.3J, the intent of this standard is to build the concrete understanding of division of fractions. In adherence to the standard, examples are limited to whole numbers divided by a unit fraction (i.e. 4 ÷ 1/4 = x) or a unit fraction divided by a whole number (i.e. 1/4 ÷ 4 = x). A unit fraction is one part of a whole that is divided into equal parts; the numerator is 1. Students would not be expected to divide a non-unit fraction by a whole number (i.e. 3/4 ÷ 5 = x). A non-unit fraction has a numerator other than 1. The standard also excludes the division of two fractions (i.e. 4/5 ÷ 3/4 = x). This foundation will prepare students in better understanding how dividing by a fraction and multiplying by its reciprocal yield equivalent answers (i.e. 3 ÷ 1/4 = 12 and 3 x 4 = 12). Instruction should model how division of fraction is like division of whole numbers (i.e. 18÷3=x; how many equal groups of three divide into 18? Or
18 ÷ 1/3 = x; how many times can one-third go into 18? Or 1/3 ÷ 8 = x; given one-third of a whole divide it into eight equal parts). See 5.3J for examples.

Distractor Factor

- Students may confuse the dividend from the divisor (i.e. 4 ÷ 1/4 = x; "how many fours divide into 1/4" instead of "how many fourths divide into four wholes?").

Academic Vocabulary

- Dividend
- Divisor
- Quotient
- Unit fraction

Rigor Implications

- Apply
- Develop
- Use
- Solve
- Divide

GRADE 5 → 5.4B Readiness

TEKS Scaffold

TEKS	SE
7.11A	model and solve one-variable, two-step equations and inequalities (R)
7.10C	write a corresponding real-world problem given a one-variable, two-step equation or inequality (S)
6.10A	model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts (R)
6.9C	write corresponding real-world problems given one-variable, one-step equations or inequalities (S)
5.4B	**5.4 Algebraic Reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to: (B) represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity
4.5A	represent multi-step problems involving the four operations with whole numbers using strip diagrams and equations with a letter standing for the unknown quantity (R)
3.5A	represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations (R)
3.5B	represent and solve one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations (R)
3.5D	determine the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product (S)

Content Builder - (See Appendix for Tree Diagram)

- Represent multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown
- Solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown

Instructional Implications

In adherence to the standard, instruction should include multi-step problems involving a mixture of operations. The focus is not just on the students being able to solve the problems but also represent them using the appropriate equation (i.e. Marciella buys 75 tickets at a carnival. She keeps 35 tickets for herself and gives the remaining tickets to her 2 sisters who will share them equally. How many tickets does each sister get?; $(75 - 35) \div 2 = t$). Encourage students to write more than one equation (i.e. $75 = 35 + 2t$; $\frac{75-35}{2} = t$).

The representing and solving multi-step problems lays a strong foundation for future algebraic reasoning.

Distractor Factor

- Students may not recognize equivalent equations (i.e. $75 = 35 + 2t$ is the same as $(75-35) \div 2 = t$).
- Students may use "key words" to determine the operation instead of understanding the context of the problem.
- Students may not understand the variety of representations for multiplication [i.e. 3×4; $3 \cdot 4$; 3 (4); 3t] and division (i.e. $20/4$; $20 \div 4$).
- Students may think that they have to use a letter that stands for the unknown quantity (i.e. the letter "t" has to be used since we are looking for "tickets" when any variable would be appropriate).
- Students may not appropriately apply the use of parentheses and brackets when representing the equation of a multiple step problem.
- Students may not understand that the variable/letter has value.

Academic Vocabulary

- Addition (sum)
- Division (quotient)
- Equation
- Multiplication (product)
- Subtraction (difference)
- Variable (letter for unknown quantity)

Rigor Implications

- Apply
- Develop
- Represent
- Solve

GRADE 5 → 5.4C Readiness

TEKS Scaffold

TEKS	SE
7.7A	represent linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form y = mx + b (R)
7.4A	represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including d = rt (R)
6.6C	represent a given situation using verbal descriptions, tables, graphs, and equations in the form y = kx or y = x + b (R)
6.4A	compare two rules verbally, numerically, graphically, and symbolically in the form of y = ax or y = x + a in order to differentiate between additive and multiplicative relationships (S)
5.4D	recognize the difference between additive and multiplicative numerical patterns given in a table or graph (S)
5.4C	**5.4 Algebraic Reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to: (C) generate a numerical pattern when given a rule in the form y=ax or y= x + a and graph
4.5B	represent problems using an input-output table and numerical expressions to generate a number pattern that follows a given rule representing the relationship of the values in the resulting sequence and their position in the sequence (R)
3.5E	represent real-world relationships using number pairs in a table and verbal descriptions (R)

Content Builder - (See Appendix for Tree Diagram)

- Generate a numerical pattern when given a rule y=ax
- Generate a numerical pattern when given a rule y = x + a
- Graph a numeric pattern for y= ax
- Graph a numeric pattern for y= x + a

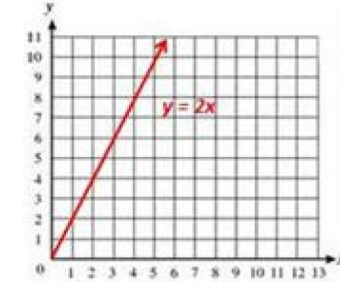
Instructional Implications

In adherence to the standard, instruction should provide additive (y = x + 2) and multiplicative (i.e. y = 2x) rules and students will generate a number pattern (i.e. list of ordered pairs, input/output table, etc.).

Given: y = 2x

(0,0); (1,2); (2,4); (3,6); (4,8); (5,10)

x	y
0	0
1	2
2	2
3	6
4	8
5	10



In support of 5.8C, students will graph the number patterns developed. Graphing of coordinates is limited to those found in the first quadrant. When generating a graph, students will informally discover the difference between discrete (data not represented between the scaled intervals) and continuous data (data values represented between scaled intervals). In conjunction with 5.4D, it will be important for students to include the zero value for x in both the table and the graph in order to identify differences between an additive and multiplicative patterns.

Distractor Factor

- Students may not recognize y = 3x as a multiplication problem.
- Students may not begin the number pattern at zero
- Students may think the order in plotting a coordinate point is not important [i.e. (3, 4) is the same location as (4, 3)].

Academic Vocabulary

- Additive pattern
- Graph
- In-put/out-put table
- Multiplicative pattern
- Rule
- X- axis
- Y-axis

Rigor Implications

- Apply
- Develop
- Generate
- Graph

GRADE 5 → 5.4F Readiness

TEKS Scaffold

TEKS	SE
7.3B	apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers (R)
6.7A	generate equivalent numerical expressions using order of operations, including whole number exponents, and prime factorization (R)
6.7D	generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties (R)
5.4F	**5.4 Algebraic Reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to: (F) simplify numerical expressions that do not involve exponents, including up to two levels of grouping
5.4E	describe the meaning of parentheses and brackets in a numeric expression (S)

Content Builder - (See Appendix for Tree Diagram)

- Simplify numerical expressions that do not involve exponents up to two levels of grouping

Instructional Implications

In conjunction with 5.4E, this standard is setting the foundational understanding for order of operations. Instruction should begin with the contextual understanding of order of operations as it applies in the real world (i.e. Two adults and three children go to the movies. The cost of adult tickets are $7.50 and the cost of a child's ticket is $4.50. How much will it cost for the family to go to the movies? (2 x 7.50) + (3 x 4.50) = p; determine the cost of the two adults first; the cost of the three children second; and then add to the expenses to yield the total cost).

Instruction should model how the work found within brackets/parenthesis is simplified first. Moving from left to right, simplify all multiplication/division problems; moving from left to right simplify all addition/subtraction problems

6 x (2 + 3) ÷ 10
6 x (5) ÷ 10
30 ÷ 10
3

Two levels of grouping mean students need to understand that fractions also represent a division problem (i.e. $\frac{5 \times 6 + 3}{1 + (5 \times 2)} = \frac{30 + 3}{1 + 10} = \frac{33}{11} = 3$)

Distractor Factor

- Students may not relate fractions to division (i.e. 33/11 = 33 ÷ 11)
- Students may not recognize the different representations of multiplication [i.e. 3 x 4; 3•4; 3(4)].
- Students may just work problems from left to right (i.e. 5 + 10 x 4 ≠ 15 x 4 = 60) instead of applying order of operations (i.e. 5 + 10 x 4 = 5 + 40 = 45)
- Students may want to work addition problems first then subtraction (i.e. 15 - 6 + 3 ≠ 15 - 9 = 6) instead of which operation comes first in reading from left to right (i.e. 15 - 6 + 3 = 9 + 3 = 12)
- Students may want to work multiplication problems first then division (i.e. 24 ÷ 3 x 2 ≠ 24 ÷ 6 = 4) instead of which operation comes first when reading from left to right (i.e. 24 ÷ 3 x 2 = 8 x 2 = 16).
- Students may not understand that "simplifying" an expression does not change the value. Each step in order of operations yields an equivalent expression.

Academic Vocabulary

- Equivalent
- Numerical expression
- Simplify

Rigor Implications

- Apply
- Develop
- Simplify

GRADE 5 → 5.4H Readiness

TEKS Scaffold

TEKS	SE
7.9A	solve problems involving the volume of rectangular prisms, triangular prisms, rectangular pyramids, and triangular pyramids (R)
7.9B	determine the circumference and area of circles (R)
7.9C	determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles (R)
6.8D	determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers (R)
5.4H	**5.4 Algebraic Reasoning.** The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to: (H) represent and solve problems related to perimeter and/or area and related to volume
4.5D	solve problems related to perimeter and area of rectangles where dimensions are whole numbers (R)
3.7B	determine the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems (R)
3.6C	determine the area of rectangles with whole number side lengths in problems using multiplication related to the number of rows times the number of unit squares in each row (R)
3.4E	represent multiplication facts by using a variety of approaches such as repeated addition, equalsized groups, arrays, area models, equal jumps on a number line, and skip counting (S)

Content Builder - (See Appendix for Tree Diagram)

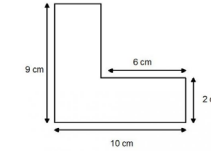
- Represent problems
  - » related to perimeter
  - » related to area
  - » related to volume
  - » related to perimeter and area
  - » related to perimeter and volume
  - » related to area and volume

Content Builder - (See Appendix for Tree Diagram) (Cont.)

- Solve problems
  - » related to perimeter
  - » related to area
  - » related to volume
  - » related to perimeter and area
  - » related to perimeter and volume
  - » related to area and volume

Instructional Implications

This standard merges the understanding of perimeter, area, and volume. Instruction should not only include problems involving the three concepts in isolation (i.e. given a 4 ft x 6 ft rectangle, what is the area? what is the perimeter?), but also extend problems to include merging the different concepts into one question (i.e. if the perimeter of a square is 32 cm, what is the area? if a rectangular prism has a height of 12 inches and the area of its rectangular base measures 15 square inches, what is the volume?) Be sure to vary the given information within the problems (i.e. given the length, width, and height, determine the volume; given one length, the height and volume of a rectangular prism, determine the length of the missing side; given the area of the base and the volume of a rectangular prism, determine the height; given the volume of a cube is 216 cubic meters, determine the dimensions of the base). Students are not only to solve problems but represent them in equations (i.e. given the perimeter is 45 yards and a side length of 15 yards; 45 = 2(15) + 2w). In conjunction with 5.7A, problems should include conversions within the same measurement system (i.e. given a 4 ft x 6 ft rectangle, what is the perimeter in inches?). Area and perimeter problems are not limited to rectangular shapes; therefore, instruction should include composite structures.



Distractor Factor

- Students may confuse the concept of a perimeter, area, and volume.
- When determining perimeter of irregular shapes, students may only add the number of sides given and disregard side lengths that are not labeled.
- When determining the perimeter/area of a square or volume of a cube, students may forget that the side lengths must be equal.
- Students may not correctly label the units of measure (i.e. perimeter in units; area in square units; and volume in cubic units).
- Students may not relate how the formula for area is a component of the formula for volume.

Academic Vocabulary

- Area
- Area of the base
- Base
- Expression/Equation
- Length, width, height
- Perimeter
- Volume

Rigor Implications

- Apply
- Develop
- Represent
- Solve

GRADE 5 → 5.5A Readiness

TEKS Scaffold

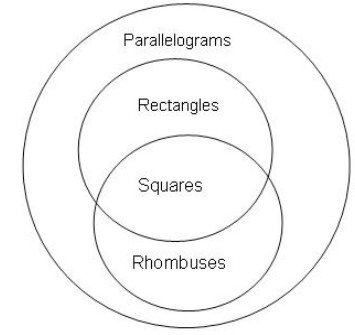
TEKS	SE
7.5A	generalize the critical attributes of similarity, including ratios within and between similar shapes (S)
6.8A	extend previous knowledge of triangles and their properties to include the sum of angles of a triangle, the relationship between the lengths of sides and measures of angles in a triangle, and determining when three lengths form a triangle (S)
5.5A	**5.5 Geometry and Measurement.** The student applies mathematical process standards to classify two-dimensional figures by attributes and properties. The student is expected to: (A) classify two-dimensional figures in a hierarchy of sets and subsets using graphic organizers based on their attributes and properties
4.6D	classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size (R)
3.6A	classify and sort two- and three-dimensional figures, including cones, cylinders, spheres, triangular and rectangular prisms, and cubes, based on attributes using formal geometric language (R)

Content Builder - (See Appendix for Tree Diagram)

- Classify two-dimensional figures in a hierarchy of sets and subsets using graphic organizers based on attributes and properties

Instructional Implications

In adherence to the standard, students need to be able to not only describe the attributes and properties of a two-dimensional figure (i.e. A square is a closed figure that has four vertices, four sides of equal length, two sets of parallel lines, two sets of perpendicular lines, and four right angles) but relate that knowledge to other two-dimensional shapes in order to classify sets and/or subsets (i.e. A square is also classified as a polygon because it is a closed figure with at least three straight sides. It is also a quadrilateral because it is a polygon with four sides. It is also a rectangle because it is a quadrilateral with two pair of congruent, parallel sides and four right angles. It is also a parallelogram because it has four sides with two pair of parallel and congruent sides; it also a rhombus because it is a quadrilateral with all four sides congruent in length). Encourage students to identify all of the appropriate geometric terms for any given shape. According to the standard students need to make use of a graphic organizer to display their understanding of the relationships.



Distractor Factor

- Students may rely only on the look of a geometric figure to determine classification instead of comparing its attributes/properties.
- Students may not understand the inverse relationship between terms (i.e. all squares are rectangles but not all rectangles are squares).

Academic Vocabulary

- Angles
- Attribute
- Figure
- Geometric property
- Parallel/perpendicular lines
- Polygon, quadrilateral, parallelogram, rectangle, rhombus, square, trapezoid, triangle, circle, hexagon, pentagon, octagon
- Shape
- Sides
- Two-dimensional
- Vertex/vertices
- Sets
- Subsets

Rigor Implications

- Apply
- Clasify

GRADE 5 → 5.8C Readiness

TEKS Scaffold

TEKS	SE
7.4A	represent constant rates of change in mathematical and real-world problems given pictorial, tabular, verbal, numeric, graphical, and algebraic representations, including d = rt (R)
7.7A	represent linear relationships using verbal descriptions, tables, graphs, and equations that simplify to the form y = mx + b (R)
6.11A	graph points in all four quadrants using ordered pairs of rational numbers (R)
5.8C	**5.8 Geometry and Measurement.** The student applies mathematical process standards to identify locations on a coordinate plane. The student is expected to: (C) graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table
5.8B	describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane (S)
5.8A	describe the key attributes of the coordinate plane, including perpendicular number lines (axes) where the intersection (origin) of the two lines coincides with zero on each number line and the given point (0, 0); the x-coordinate, the first number in an ordered pair, indicates movement parallel to the x-axis starting at the origin; and the ycoordinate, the second number, indicates movement parallel to the y-axis starting at the origin (S)
4.2H	determine the corresponding decimal to the tenths or hundredths place of a specified point on a number line (S)
3.7A	represent fractions of halves, fourths, and eighths as distances from zero on a number line (S)

Content Builder - (See Appendix for Tree Diagram)

- Graph in the first quadrant of the coordinate plane ordered pairs
  - » mathematical problems generated by number patterns
  - » mathematical problems within an input-output table
  - » real-world problems generated by number patterns
  - » real-world problems generated by input-output table

Instructional Implications

In conjunction with 5.8A/B, graphing coordinates are limited to those in the first quadrant (positive numbers only). In adherence to the standard, coordinates are generated from mathematical (i.e. 12 inches = 1 foot) and real-world (i.e. 3 wheels = 1 tricycle) number patterns. These patterns can be represented through generated number patterns (i.e. 3, 6, 9, etc.) or within an input-output table , such as the one below.

Number of Tricycles	Number of Wheels
0	0
1	3
2	6
3	9
4	12
5	15

Instruction should ensure that all graphs are titled, x- and y-axis are labeled correctly, and intervals of each axis are identified. Students should be able to relate mathematical and real-world problems as they are represented on a graph (i.e. The coordinate, (1, 3) represent one tricycle yielding three wheels and the coordinate (2, 6) represent two tricycles yielding six wheels, etc.).

Distractor Factor

- Students may confuse the x- and y-axis.
- Students may not understand how a coordinate communicates information.
- Students may not locate coordinates correctly given graphs of intervals other than one.
- Students may think the order in plotting a coordinate point is not important [i.e. (1,3) is the same location as (3,1)].

Academic Vocabulary

- Coordinate plane
- Graph
- Input-output table
- Number pattern
- Ordered pairs
- Quadrant
- X- axis
- Y-axis

Rigor Implications

- Apply
- Identify
- Graph

GRADE 5 → 5.9C Readiness

TEKS Scaffold

TEKS	SE
7.6G	solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents (R)
6.13A	interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots (R)
5.9C	**5.9 Data Analysis.** The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to: (C) solve one- and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot
4.9B	solve one- and two-step problems using data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot (S)
3.8B	solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals (S)

Content Builder - (See Appendix for Tree Diagram)

- Solve one-step problems using a
  - » frequency table
  - » dot plot
  - » bar graph
  - » stem-and-leaf plot
  - » scatterplot
- Solve two-step problems using a
  - » frequency table
  - » dot plot
  - » bar graph
  - » stem-and-leaf plot
  - » scatterplot

Instructional Implications

Instruction should vary the context of the problems being asked of the students (i.e. joining, separating, comparing). In conjunction with 5.3K/E/G/L, problems involving whole number/decimal/ and fractional data should be included when interpreting graphed data.

Distractor Factor

- In using the stem-and-leaf plot, students may have difficulty determining what values represent the stem and leaf.
- When using data on different types of graphs, students may interpret the data as different because of the difference in the visual representations.
- When using data on different frequency tables and/or bar graphs, students may interpret the data as different because of the difference in the visual representations.

Academic Vocabulary

- Bar graph
- Data
- Dot plot
- Frequency table
- Graph
- Scatterplot
- Stem-and-leaf plot

Rigor Implications

- Apply
- Identify
- Graph

STAAR
SUPPORTING
STANDARDS

5.2.A 5.2 Number and Operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships related to place value. The student is expected to:

(A) represent the value of the digit in decimals through the thousandths using expanded notation and numerals

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.2B compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or =

How does it support the Readiness Standard(s)?

Focusing on the value of each digit in decimal representations will be critical for students to be able to compare and order decimals values through the thousandths.

Instructional Implications

In conjunction with 4.2B, students have been representing the decimal values through the hundredths with base ten blocks and representing those values through expanded notation. This standard extends that previous knowledge to the thousandths (i.e. 1.357 = 1 x 1 + 3 x 0.10 + 5 x 0.01 + 7 x 0.001). The operations of each of these values are not the instructional piece; it is only the representation of the number sentence to communicate the value of each representation that is the focus of this concept.

Academic Vocabulary

- Billions, millions, thousands, hundreds, tens, ones
- Decimals
- Digit
- Expanded notation
- Numerals
- Place value
- Thousandths, hundredths and tenths

Rigor Implications

- Apply
- Represent
- Compare
- Order
- Understand

5.2.C 5.2 Data Analysis. The sNumber and Operations. The student applies mathematical process standards to represent, compare, and order positive rational numbers and understand relationships related to place value. The student is expected to:

(C) round decimals to tenths or hundredths

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.3A estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, or division

How does it support the Readiness Standard(s)?

As students will be asked to solve problems using all four operations, it will be important to estimate solutions prior to solving. Rounding is one way to estimate values in order to evaluate solutions for reasonableness.

Instructional Implications

Instruction should begin with skip counting by tenths and hundredths for students to understand consecutive multiples. Students should represent these benchmark values through the use of an open number line. As students locate a given number on an open number line, you will begin to assess their understanding of place value (i.e. students place the number 1.23 between 1.2 and 1.3), the relative position of numbers (i.e. the number 1.2 would be indicated first and the number 1.3 would be indicated second on the open number line), and the magnitude of numbers (i.e. students physically place the number 1.23 closer to 1.2 than 1.3). Students will apply this understanding to the rounding of whole numbers to the nearest tenth and hundredth. Relating money to decimals may also support the understanding of rounding (i.e. Is $1.23 closer to $1.20 or $1.30?).

Academic Vocabulary

- Consecutive multiples
- Number line
- Place value
- Round
- Tenths and hundredths

Rigor Implications

- Apply
- Represent
- Compare
- Order
- Understand
- Round

5.4.A 5.4 Algebraic Reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(A) identify prime and composite numbers using patterns

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.3K add and subtract positive rational numbers fluently

How does it support the Readiness Standard(s)?

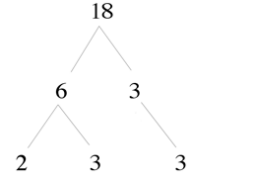
Identifying prime and composite numbers will support students as they will have to determine a common denominator in order to add and subtract fractions with unlike denominators, and identify a common factor in order to represent sums/differences in simplified form.

Instructional Implications

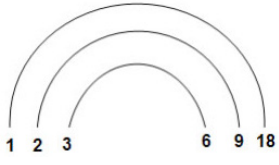
Students need to identify prime numbers as those that only have two factors; one and itself (i.e. 13 is prime because the only factors for 13 are 1 and 13, 1 x 13 = 13). A composite number has more than two factors (i.e. 18 is composite because 1 x 18 = 18; 2 x 9 = 18; 3 x 6 = 18). The number one is neither prime nor composite. Instruction should model multiple representations of composite numbers as this will support future needs of finding a common denominator and/or a common factor.

list: 1, 2, 3, 6, 9, 18

factor tree



factor rainbow



Academic Vocabulary

- Composite
- Number patterns
- Prime

Rigor Implications

- Apply
- Develop
- Identify

5.4.E 5.4 Algebraic Reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(E) describe the meaning of parentheses and brackets in numeric expressions

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 6.7A generate equivalent numerical expressions using order of operations, including whole number exponents and prime factorization
- 5.4B represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity

How does it support the Readiness Standard(s)?

As students will be asked to represent multi-step problems with equations, the use of parentheses and brackets may be required. Understanding the purpose of such symbols will allow students to apply their use more effectively. This knowledge will then extend to the application of parentheses and brackets to the order of operations.

Instructional Implications

In adherence to the standard, students should understand the intentional use of parentheses and brackets. Instruction should apply to a real-world problem for students to better relate (i.e. two adults and three children go to the movies; cost of adult tickets are $7.50; cost of child's ticket is $4.50; how much will it cost for the family to go to the movies? (2 x 7.50) + (3 x 4.50) = p; we put parentheses around (2 x 7.50) and (3 x 4.50) to show how we would determine the cost of the adult and children before adding the two costs together). This standard is setting the foundational understanding for order of operations. Students should recognize how each of the following would yield a different result due to the use of parentheses and brackets:

6 x 2 + 3
6 x (2 + 3)
6 x [(2+3) - 1]

Academic Vocabulary

- Brackets
- Numeric expressions
- Parentheses

Rigor Implications

- Apply
- Develop
- Describe

5.3.A 5.3 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
(A) estimate to determine solutions to mathematical and real-world problems involving addition, subtraction, multiplication, and division

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.4B represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity
- 5.3K add and subtract positive rational number fluently
- 5.3E solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understanding, properties of operations and the relationship to the multiplication of whole numbers
- 5.3G solve for quotients of decimals to hundredths, up to four-digit dividend, and two-digit whole numbers divisors, using strategies and algorithms, including standard algorithm

How does it support the Readiness Standard(s)?

As students are asked to solve problems using all four operations involving whole numbers, fractions, and decimals, it will be important for them to estimate solutions prior to solving. The use of rounding and/or compatible numbers will also allow students to evaluate the reasonableness of solutions.

Instructional Implications

Instruction should model the use of estimations to all operational problems prior to solving for the exact answer. Estimations will become even more critical as students begin working with decimal and fraction problems in order to determine reasonableness to various solutions. Rounding (i.e. 4.5 x 1.25 ≈ 5 x 1 = 5) and compatible numbers (i.e. 4.5 x 1.25 ≈ 4 x 1.25 = 6.00) are two such examples of estimation. In adherence to the standard, the intent of rounding is to estimate a solution; therefore, employing a specific rounding rule is not necessary. It is important for students to determine if their estimates will yield an over-estimated amount or under-estimated amount (i.e. 3.75 x 6.7 could yield 4 x 7 =28. This would be an over-estimated product as both factors were rounded up to the next whole number).

Academic Vocabulary

- Compatible numbers
- Estimate
- Reasonableness
- Round

Rigor Implications

- Apply
- Develop
- Use
- Solve
- Estimate

5.3.B 5.3 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
(B) multiply with fluency a three-digit number by a two-digit number using the standard algorithm

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.4B represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity
- 5.3E solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understanding, properties of operations and the relationship to the multiplication of whole numbers

How does it support the Readiness Standard(s)?

Students will need to become fluid with multi-digit multiplication as they will be asked to solve problems using all four operations and extend their understanding of multiplying whole numbers to that of decimals.

Instructional Implications

In conjunction with 5.3A, students should estimate the product of a multi-digit factor problem before solving for the exact answer. As students begin to use to standard algorithm to determine the product of multi-digit factors, it is essential that they communicate the correct place value understanding (i.e. For example, when completing the steps of a multiplication problem such as 345 x 26, instead of referring to a step as '6x4 is 24, so record the 4 and carry the 2,' students should know that this step represents 6 x 40, which yields 240).

Academic Vocabulary

- Factor
- Place value
- Product

Rigor Implications

- Apply
- Develop
- Use
- Solve
- Multiply

5.3.C 5.3 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(C) solve problems with proficiency for quotients of up to a four-digit dividend by a two-digit divisor using strategies and the standard algorithm

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.4B represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity
- 5.3G solve for quotients of decimals to hundredths, up to four-digit dividend, and two-digit whole numbers divisors, using strategies and algorithms, including standard algorithm

How does it support the Readiness Standard(s)?

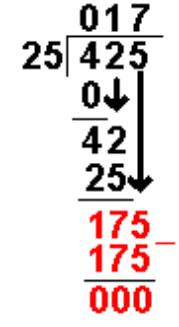
Students will need to become fluid with multi-digit division as they will be asked to solve problems using all four operations and extend their understanding of division of whole numbers to division of decimals.

Instructional Implications

In accordance to the standard, students will move from the concrete understanding of division to more abstract. Students should apply their understanding of number patterns (i.e. 25 x 100= 2,500; 25 x 10 = 250; 25 x 1 = 25), flexibility with numbers (i.e. if 25 x 100 = 2,500 then 25 x 50 = 1,250; if 25 x 10 = 250 then 25 x 5 = 125; if 25 x 1 = 25 then 25 x 2 = 50), and place value (i.e. 425 = 400 + 20 + 5) to develop the standard algorithm (i.e. 425 ÷ 25 = x).

25 x 10 = 250
25 x 5 = 125
25 x 2 = 50

425
-250 (10 groups of 25)
175
-125 (5 groups of 25)
50
-50 (2 groups of 25)
0



Academic Vocabulary

- Dividend
- Divisor
- Place value
- Quotient

Rigor Implications

- Apply
- Develop
- Use
- Solve

5.3.D 5.3 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:
(D) represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

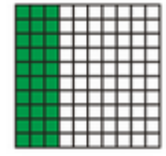
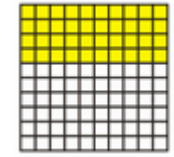
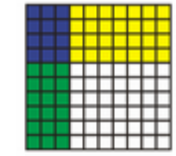
- 5.3E solve for products of decimals to the hundredths, including situations involving money, using strategies based on place-value understanding, properties of operations and the relationship to the multiplication of whole numbers

How does it support the Readiness Standard(s)?

Using concrete objects and pictorial models to represent the multiplication of decimals will support students in developing the concrete understanding of the concept before moving to the abstract of developing a strategy and/or algorithm.

Instructional Implications

In conjunction with 4.2E, students will extend their understanding of how to represent decimals using concrete and visual models (i.e. if a hundred flat represents one whole, then a ten rod represents one-tenth and a unit cube represents one-hundredth) to multiplication (i.e.0 .3 x 0.4 = x). Instruction should model the use of the term "of" when multiplying decimals (i.e. 0.3 x 0.4 = x; what is three-tenths "of" four-tenths). An area model is one example of how to represent the multiplication of decimals. Here, if the hundred flat represents one whole, then an area model is one example of how to represent the multiplication of decimals. (See below.)

Let one of the factors represent the length of the whole	Let the other factor represent the width of the whole	Shade the length (factor) and width (factor) on the same whole; the overlapped area represents the product
0.3	0.4	0.3 x 0.4 = 0.12
		

Academic Vocabulary

- Area model
- Factor
- Hundredths
- Place value
- Product
- Tenths

Rigor Implications

- Apply
- Develop
- Use
- Solve
- Represent

5.3.F 5.3 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(F) represent quotients of decimals to the hundredths, up to four-digit dividends and two-digit whole numbers divisors, using objects and pictorial models, including area model

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.3G solve for quotients of decimals to hundredths, up to four-digit dividend, and two-digit whole numbers divisors, using strategies and algorithms, including standard algorithm

How does it support the Readiness Standard(s)?

Using concrete objects and pictorial models to represent the division of decimals will support students in developing the concrete understanding of the concept before moving to the abstract of developing a strategy and/or algorithm.

Instructional Implications

In accordance to the standard, division of decimals is limited to whole numbers and/or decimals (through the hundredths) divided by whole numbers (up to two-digit whole numbers) yielding quotients of whole numbers and/or decimals (i.e. 422 ÷ 4 = x ; 110.4 ÷ 12 = x ; 0.36 ÷ 6 = x). In conjunction with 4.2E, students will extend their understanding of how to represent decimals using concrete and visual models (i.e. if a hundred flat represents one whole, then a ten rod represents one-tenth and a unit cube represents one-hundredth) to division (i.e. 0.12 ÷ 3 = x). Students can model this action through the use of base ten blocks (i.e. 0.12 can be represented with twelve unit cubes; students model the action of creating three groups with 4 unit cubes in each; 0.12 ÷ 3 = 0.04). Relating the use of money to the division of decimals can be another strategy in developing student's conceptual understanding (i.e. $0.12 is twelve cents which can be represented with one dime and two pennies or 12 pennies; 12 pennies divided into three equal groups yield four cents in each group; $0.12 ÷ 3 = $0.04). Instruction should model how division with decimals is very much like division of whole numbers (i.e. 12 ÷ 3 = x communicates how many equal groups of three divide into 12 or 3 x ___ = 12; 0.12 ÷ 3 = x communicates how many equal groups of three divide into twelve-hundredths or 3 x ___ 0.12?). In conjunction with 5.3D, the use of an area model with the dividend representing the area and the length of the sides representing the divisor and quotient is another strategy to model the division of decimals.

Academic Vocabulary

- Dividend
- Divisor
- Place value
- Quotient

Rigor Implications

- Apply
- Develop
- Use
- Solve
- Represent

5.3.H

5.3 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(H) represent and solve addition and subtraction of fractions with unequal denominators referring to the same whole using objects and pictorial models and properties of operations

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

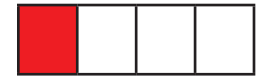
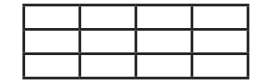
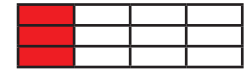
- 5.3K add and subtract positive rational number fluently

How does it support the Readiness Standard(s)?

Using concrete objects and pictorial models to represent the addition and subtraction of fractions with unlike denominators will support students in developing the concrete understanding of the concept before moving to the abstract of developing a strategy and/or algorithm.

Instructional Implications

In conjunction with 4.3E, students will extend their understanding of how to add and subtract fractions with like denominators (i.e. 2/3 + 5/3 = 7/3) to adding and subtracting fractions with unlike denominators (i.e. 2/3 + 1/4 = x). An area model is one example of how to represent the addition/subtraction of fractions with unlike denominators.

Represent one of the addends as the length of the whole (i.e. 2/3) 	Represent the other addend as the width of the whole (i.e. 1/4) 	The representation of the two addends on the same whole yield a common denominator. 
Determine an equivalent fraction for the first addend (i.e. 2/3 = 8/12) 	Determine an equivalent fraction for the second addend (i.e. 1/4 = 3/12) 	Combine the two addends on the same whole to determine the sum (2/3 + 1/4 = x; 8/12 + 3/12 = 11/12) 

Instruction should include models of mixed numbers (i.e. $2\frac{1}{4} + 1\frac{2}{3} = x$).
Subtraction of fractions with unlike denominators can also be modeled using the area model, but the difference would be represented by taking area units away.
In conjunction with 4.3G, students could also use a number line to model the addition/subtraction of fractions with unlike denominators.

Academic Vocabulary

- Area model
- Denominator
- Equal parts
- Fractions
- Numerator
- Whole

Rigor Implications

- Apply
- Develop
- Use
- Solve
- Represent

5.3.I

5.3 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(I) represent and solve multiplication of whole number and fraction that refer to the same whole using objects and pictorial models, including area models

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

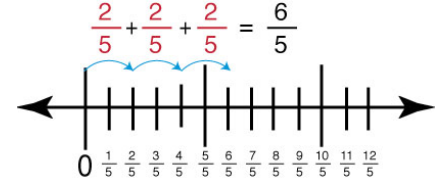
- 5.3K add and subtract positive rational numbers fluently
- 5.3L divide whole numbers by unit fractions and unit fractions by whole numbers

How does it support the Readiness Standard(s)?

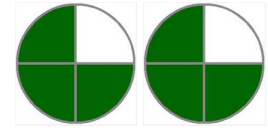
Using concrete objects and pictorial models to represent the multiplication of fractions and whole numbers will support students in developing the concrete understanding of the concept before moving to the abstract of developing a strategy and/or algorithm. Understanding the use of the area model for multiplication of fractions will support its use in the division of fractions as well.

Instructional Implications

In adherence to the standard, instruction is limited to multiplication of a whole number and fraction (i.e. 2/5 x 3 = x) not a fraction times a fraction (2/5 x 1/3 = x). Instruction should associate how multiplication is repeated addition. The use of fraction circles, rectangles, number lines, etc., will support the concrete understanding of repeated addition (i.e. 2/5 x 3 = 2/5 + 2/5 + 2/5 = 6/5).



Instruction should also model the use of the term "of" when multiplying fractions (i.e. 3/4 x 2 = x; what is three-fourths "of" two wholes?).



¾ x 2 = ¾ + ¾ = 6/4

Academic Vocabulary

- Area model
- Factor
- Fractions
- Product

Rigor Implications

- Apply
- Develop
- Use
- Solve
- Add
- Substract

5.3.J

5.3 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for positive rational number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(J) represent division of a unit fraction by a whole number and division of a whole number by a unit fraction such as 1/3 ÷ 7 and 7 ÷ 1/3 using objects and pictorial models, including area models

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

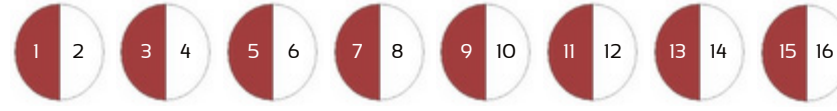
- 5.3L divide whole numbers by unit fractions and unit fractions by whole numbers

How does it support the Readiness Standard(s)?

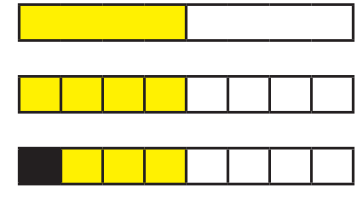
Using concrete objects and pictorial models to represent the division of fractions by whole numbers and whole numbers by fractions will support students in developing the concrete understanding of the concept before moving to the abstract of developing a strategy and/or algorithm.

Instructional Implications

In adherence to the standard, instruction surrounding the division of fractions is limited to unit fractions and whole numbers (i.e. 1/4 ÷ 5 = x or 5 ÷ 1/4 = x). Instruction will not include a non-unit fraction and whole number (i.e. 3/4 ÷ 5 = x) or the division of two fractions (i.e. 4/5 ÷ 3/4 = x). Instruction should model how division of fractions is like division of whole numbers (i.e. 8÷2=x; how many equal groups of two divide into 8? Or 8 ÷ 1/2 = x; how many equal groups of halves divide into 8? If a circle represents one whole, then 8 ÷ 1/2 = 16 because 16 halves will divide into 8 whole circles).



(i.e. 1/2 divided by 4 = x; divide half of whole into four equal parts, how many would be in each group? If a rectangle represents one whole and the shaded portion represents half of a whole, then 1/2 ÷ 4 = 1/8 because a half divided into four parts would yield eighths and each group would have one-eighth).



Academic Vocabulary

- Area model
- Dividend
- Division
- Divisor
- Quotient
- Unit fraction

Rigor Implications

- Apply
- Develop
- Use
- Solve
- Represent

5.4.D 5.4 Algebraic Reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(D) recognize the difference between additive and multiplicative patterns given in a table or graph

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.4C generate a numerical pattern when given a rule in the form y=ax or y=x + a and graph

How does it support the Readiness Standard(s)?

Recognizing the difference between an additive and multiplicative pattern sets the foundational understanding for proportionality as additive patterns yield non-proportional situations and multiplicative patterns yield proportional situations.

Instructional Implications

In conjunction with 5.4C and 5.8C, as students begin graphing coordinates from tables of data, instruction will focus on the similarities and differences between an additive and multiplicative pattern. Additive patterns in a table yield an addition relationship between the input and output data on a table and include the coordinate (0, a) due to the additive property of zero (i.e. a + 0 = a). Multiplicative patterns in a table yield a multiplicative relationship between the input and output data on a table and include the coordinate (0, 0) due to the multiplicative property of zero (i.e. a • 0 = 0). When graphing additive and multiplicative patterns, both will yield a linear representation but additive will start the graph at (0, a) and multiplicative will start the graph at (0, 0).

Academic Vocabulary

- Additive pattern
- Graph
- Multiplicative pattern
- Table

Rigor Implications

- Apply
- Develop
- Recognize

5.6.A 5.6 Geometry and Measurement. The student applies mathematical process standards to understand, recognize, and quantify volume. The student is expected to:

(A) recognize a cube with side length of one unit as a unit cube having one cubic unit of volume and the volume of a three-dimensional figure as the number of unit cubes (n cubic units) needed to fill it with no gaps or overlaps if possible

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.4H represent and solve problems related to perimeter and/or area and related to volume

How does it support the Readiness Standard(s)?

This analysis of geometric attributes of unit cube standard supports the understanding of how volume is measured in cubic units. Physically filling a three-dimensional figure with unit cubes with no gaps or overlaps will provide the concrete development of volume.

Instructional Implications

As students tend to confuse the concept of perimeter, area, and volume, it is essential that they physically layer/fill three-dimensional figures with unit cubes. Just like rulers are used to measure length, clocks are used to measure time, and thermometers are used to measure temperature, unit cubes are used to determine the volume. Recognizing the geometric properties of a unit cube (i.e. It has three dimensions: length, width, and height) will allow students to understand how volume is identified in cubic units. Instruction should provide a variety of three-dimensional figures for students to fill to experience how gaps will not yield an accurate volume for a given figure.

Academic Vocabulary

- Cubic units
- Side length
- Three-dimensional
- Unit cube
- Volume

Rigor Implications

- Apply
- Understand
- Recognize
- Quantify

5.6.B 5.6 Geometry and Measurement. The student applies mathematical process standards to understand, recognize, and quantify volume. The student is expected to:

(B) determine the volume of a rectangular prism with whole number sides in problems related to the number of layers times the number of unit cubes in the area of the base

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.4H represent and solve problems related to perimeter and/or area and related to volume

How does it support the Readiness Standard(s)?

Relating the area of the base to determine the volume of a rectangular prism will support students' understanding of the relationship between the two concepts.

Instructional Implications

As students are physically layering the base of a rectangular prism with unit cubes, it is essential that instruction relate those actions to determining the area of the base. Before students fill the rectangular prism with the unit cubes, instruction should relate how the height of the rectangular prism will determine the number of layers or the number of times the area of the base will be repeated.

Academic Vocabulary

- Area of the base
- Number of layers
- Number of sides
- Rectangular prism
- Unit cubes
- Volume

Rigor Implications

- Apply
- Understand
- Recognize
- Quantify
- Determine

5.4.G 5.4 Algebraic Reasoning. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(G) use concrete objects and pictorial models to develop the formulas for the volume of a rectangular prism, including the special form for a cube (V=l x w x h; V=s x s x s; V=Bh)

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.4H represent and solve problems related to perimeter and/or area and related to volume

How does it support the Readiness Standard(s)?

Physically layering/filling a rectangular prism and associating those actions to the formula will move instruction from the concrete to the abstract.

Instructional Implications

As students are physically layering the base of a rectangular prism with unit cubes, it is essential that instruction relate the actions to determining the area of the base (A= l x w). As students begin filling the rectangular prism with the unit cubes, instruction should relate to how the height of the rectangular prism will determine the number of layers or the number of times the area of the base will be repeated (V= l x w x h). In conjunction with 5.4E, students can begin applying the use of parenthesis to show how the first step was determining the area of the base [V= (l x w) x h]. As students become comfortable with this representation, instruction can move to replacing the (l x w) with the capital B as a means of communicating the area of the base (V = Bh). In adherence to the standard, instruction should include the study of cubes as a special type of rectangular prism in which all sides are of equal length. As students experience filling cubes, they will discover how the length, width, and height are all the same length and its formula can be represented as V = s x s x s. In accordance to the state standards, the use of exponents does not get introduced until grade 6 (see 6.7A).

Academic Vocabulary

- Area of the base
- Cube
- Formula
  V= l x w x h
  V = s x s x s (cube)
  V=Bh
- Height
- Length
- Rectangular prism
- Volume
- Width

Rigor Implications

- Apply
- Develop
- Use

5.7.A 5.7 Geometry and Measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving measurement. The student is expected to:

(A) solve problems by calculating conversions within a measurement system, customary or metric

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.4H represent and solve problems related to perimeter and/or area and related to volume

How does it support the Readiness Standard(s)?

Conversions within the customary or metric system may be necessary when asked to solve problems involving perimeter, area, and volume.

Instructional Implications

In grade 4 (see 4.8B) students used a table to convert measurement units. Multiplicative patterns were identified so students begin to recognize the rules for conversions (i.e. to convert from kilometers to meters multiply by 1,000).

Kilometers	Process	Meters
1	1 X 1,000	1,000
2	2 X 1,000	2,000
3	3 X 1,000	3,000
10	10 X 1,000	10,000
21	21 X 1,000	21,000

Students would have experience converting both metric and customary units for length, liquid volume, and mass. Grade 5 instruction now moves to the application of these discovered rules of conversions.

Academic Vocabulary

- Conversions
- Customary
- Measurement system
- Metric

Rigor Implications

- Apply
- Select
- Solve
- Calculate

5.8 Geometry and Measurement. The student applies mathematical process standards to identify locations on a coordinate plane. The student is expected to:

5.8.A (A) describe the key attributes of the coordinate plane, including perpendicular number lines (axes) where the intersection (origin) of the two lines coincides with zero on each number line and the given point (0, 0); the x-coordinate, the first number in an ordered pair, indicates movement parallel to the x-axis starting at the origin; and the y-coordinate, the second number, indicates movement parallel to the y-axis starting at the origin

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.8C graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table

How does it support the Readiness Standard(s)?

Understanding the proper movement along the coordinate grid in addition to communicating those actions appropriately will be the foundation to interpreting graphed mathematical and real-world data.

Instructional Implications

In adherence to the standard, instruction should focus on the key attributes of a coordinate grid. The x-axis is represented by the horizontal number line; the y-axis is represented by the vertical number line. Coordinate planes may include scaled axes. The point at which the two axes intersect to form a perpendicular line is identified as the origin (0, 0). The origin is the starting point for the graphing of all ordered pairs. Instruction should relate ordered pairs to the coordinate plane. The first number is referred to as the x-coordinate which will be located by moving parallel to the x-axis. The second number is referred to as the y-coordinate which will be located by moving parallel to the y-axis.

Academic Vocabulary

- Attributes
- Axes (plural form of axis)
- Coordinate plane
- Coordinates
- Ordered pairs
- Origin (0, 0)
- Parallel movement
- Perpendicular
- X-axis
- X-coordinate
- Y-axis
- Y-coordinate

Rigor Implications

- Apply
- Identify
- Describe

5.8.B 5.8 Geometry and Measurement. The student applies mathematical process standards to identify locations on a coordinate plane. The student is expected to:

(B) describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.8C graph in the first quadrant of the coordinate plane ordered pairs of numbers arising from mathematical and real-world problems, including those generated by number patterns or found in an input-output table

How does it support the Readiness Standard(s)?

Understanding the proper movement along the coordinate grid in addition to communicating those actions appropriately is the foundation for interpreting graphed mathematical and real-world data.

Instructional Implications

In adherence to the standard, instruction should focus on appropriately communicating the actions of locating a given point on a coordinate plane (i.e. relating the x-coordinate to the parallel movement along the x-axis; relating the y-coordinate to the parallel movement along the y-axis; movement beginning at the origin). In conjunction with 5.8C, data points can be in the form of ordered pairs [i.e. (3, 4)] or those generated from an input/output table.

Academic Vocabulary

- Attributes
- Axes (plural form of axis)
- Coordinate plane
- Coordinates
- Ordered pairs
- Origin (0, 0)
- Parallel movement
- Perpendicular number line
- X-axis
- X-coordinate
- Y-axis
- Y-coordinate

Rigor Implications

- Apply
- Identify
- Describe

5.9.A 5.9 Data Analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying and interpreting data. The student is expected to:

(A) represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurement in fractions or decimals, with dot plots or stem-and-leaf plots

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.9C solve one-and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot

How does it support the Readiness Standard(s)?

This supporting standard provides an opportunity for students to collect, organize, display, and interpret data using a bar graphs, frequency tables, dot plots and stem-and-leaf plots. This concrete experience will allow them to better understand the data represented in order to solve one- and two-step problems.

Instructional Implications

According to the TEKS, students need to collect, organize, and display their own data. Personalizing such activities will allow students to make more sense of the data and summarize more appropriately. Instruction needs to include the collection of categorical data (i.e. "what is your favorite animal?") and numeric data (i.e. "how tall are you?"). In accordance with the standard, categorical data should be represented on a bar graph or frequency table, whereas, numeric data should be represented on a dot plot or stem-and-leaf plot. In adherence to the standard, numeric data needs to extend to include the use of fractional and decimal representations. Students will need more support with the development of stem-and leaf plots. This type of graph will distribute the data by separating one place value from the other or the parts from the whole when working with fractions or decimals (i.e. 55.2, 55.9, 56.5, 56.4, etc.).

Stem	Leaf
55	2 9
56	1 4 4 5
57	0 0

56 | 4 = 56.4

The larger place value or the whole of a fraction/decimal value is identified as the stem and the smaller place value or the part of the whole is called the leaf. Instruction should include representing the same set of data on a different type of graphs to compare. It is important that a key be provided identifying the value of the stem and leaf (i.e. 56|4 = 56.4).

Academic Vocabulary

- Bar Graph
- Categorical data
- Decimal
- Dot plot
- Fraction
- Frequency table
- Numerical data
- Stem-and-leaf plot
- Whole number

Rigor Implications

- Apply
- Solve
- Collect
- Organize
- Display
- Interpret
- Represent

5.9.B 5.9 Data Analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying and interpreting data. The student is expected to:

(B) represent discrete paired data on a scatterplot

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

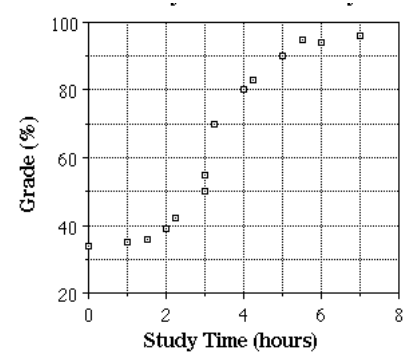
- 5.9C solve one-and two-step problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot

How does it support the Readiness Standard(s)?

This supporting standard provides an opportunity for students to collect, organize, display, and interpret data using a scatterplot. This concrete experience will allow them to better understand the data represented in order to solve one- and two-step problems.

Instructional Implications

Discrete paired data compares two numeric data types to determine if there is a relationship between the two (i.e. the number of hours studied vs. the grade earned on a test). According to the TEKS, students need to collect, organize, and display their own data. Personalizing such activities will allow students to make more sense of the data and summarize more appropriately. Outcomes of the collection, representation, and interpretation of such data may or may not reflect a relationship between the two variables (i.e. the graph reflects that there is a relationship between the number of hours studied and your grade; however, a graph of the number of sodas you drink and your grade may not reflect a relationship).



Academic Vocabulary

- Discrete paired data
- Scatterplot

Rigor Implications

- Apply
- Solve
- Collect
- Organize
- Dispaly
- Interpret
- Represent

5.10.A 5.10 Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(A) define income tax, payroll tax, sales tax, and property tax

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.10 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Defining income tax, payroll tax, sales tax, and property tax will support one's ability to manage his or her financial resources more effectively for a lifetime of financial security.

Instructional Implications

In adherence to the standard, instruction should address the different types of taxes. Instruction should explain how once a year individuals/businesses must file an income tax return to determine whether they owe any taxes or are eligible for a tax refund. Income tax is a key source of funds that the government uses to fund activities and serve the public. Payroll tax is money withheld by employers from the income earned by employees. Payroll taxes fund such programs as Social Security, healthcare, and unemployment compensation. Sales tax is money collected when goods and services are rendered. Each state sets its own sales tax and it is collected accordingly. Property tax is money paid by individuals/businesses that own land/property. The tax is usually based on the value of the land/property. The money raised from this tax is mainly used for road repairs, building of local schools, etc.

Academic Vocabulary

- Income tax
- Payroll tax
- Property tax
- Sales tax

Rigor Implications

- Apply
- Manage
- Define

5.10.B 5.10 Data Analysis. Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(B) explain the difference between gross income and net income

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.10 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Understanding the difference between gross and net income will support one's ability to manage financial resources more effectively for a lifetime of financial security.

Instructional Implications

Gross income is the amount of money earned before taxes, insurance costs, etc., are taken out. Net income is the amount of money earned after all taxes, insurance, etc., are taken out.

Academic Vocabulary

- Gross income
- Net income

Rigor Implications

- Apply
- Manage
- Explain

5.10.C 5.10 Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(C) identify the advantages and disadvantages of different methods of payment including check, credit card, debit card and electronic payments

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.10 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Identifying the advantages and disadvantages of different methods of payment will support one's ability to manage his or her financial resources more effectively for a lifetime of financial security.

Instructional Implications

In adherence to the standard, instruction should include discussions on the advantages and disadvantages of different methods of payment.

Payment Type	Advantages	Disadvantages
Check	Do not have to carry cash	Cost of checks
Credit Card	Do not have to carry cash Establishing good credit	Interest charges if total amount charged is not paid off at the end of each month
Debit Card	Do not have to carry cash; money automatically deducted from your account	Service fee
Electronic Payments	Do not have to mail payment; save on the cost of stamps	Usage fee Errors in entering amount which can create additional fees

Academic Vocabulary

- Check
- Credit card
- Debit card
- Electronic payment
- Payment methods

Rigor Implications

- Apply
- Manage
- Identify

5.10.D 5.10 Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(D) develop a system for keeping and using financial records

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.10 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Developing a system for keeping and using financial records will support one's ability to manage financial resources more effectively for a lifetime of financial security.

Instructional Implications

Organizing a system for securing important financial records should be considered (i.e. storing all checks, bank statements, payroll stubs, income tax returns in a safe; scanning all important financial records for electronic access).

Academic Vocabulary

- Financial records
- System

Rigor Implications

- Apply
- Manage
- Develop

5.10.E 5.10 Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(E) describe actions that might be taken to balance a budget when expenses exceed income

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.10 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Describing a plan that might be taken to balance a budget when expenses exceed income supports one's ability to manage financial resources more effectively for a lifetime of financial security.

Instructional Implications

Instruction should include discussion on managing one's budget appropriately. Students should brainstorm ideas of what can be done when expenses exceed income.

Academic Vocabulary

- Budget
- Expenses
- Income

Rigor Implications

- Apply
- Manage
- Describe

5.10.F 5.10 Personal Financial Literacy. The student applies mathematical process standards to manage one's financial resources effectively for lifetime financial security. The student is expected to:

(F) balance a simple budget

What Readiness Standard(s) or concepts from the Readiness Standards does it support?

- 5.10 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Balancing a simple budget will support one's ability to manage financial resources more effectively for a lifetime of financial security.

Instructional Implications

In conjunction with 5.3K, instruction can merge the balancing of a simple budget with addition and subtraction of whole numbers and decimals (i.e. Margarita has a monthly net pay of $1,544.56. She has the following expenses to pay:

Expense	Cost
Rent	$450.00
Utilities	$124.56
Food	$275.00
Car Payment	$250.00
Car Insurance	$74.50
Gas	$75.00

Margarita wants to trade her car for a newer model. Can she afford a more expensive car? Why or why not?)

Academic Vocabulary

- Balanced budget

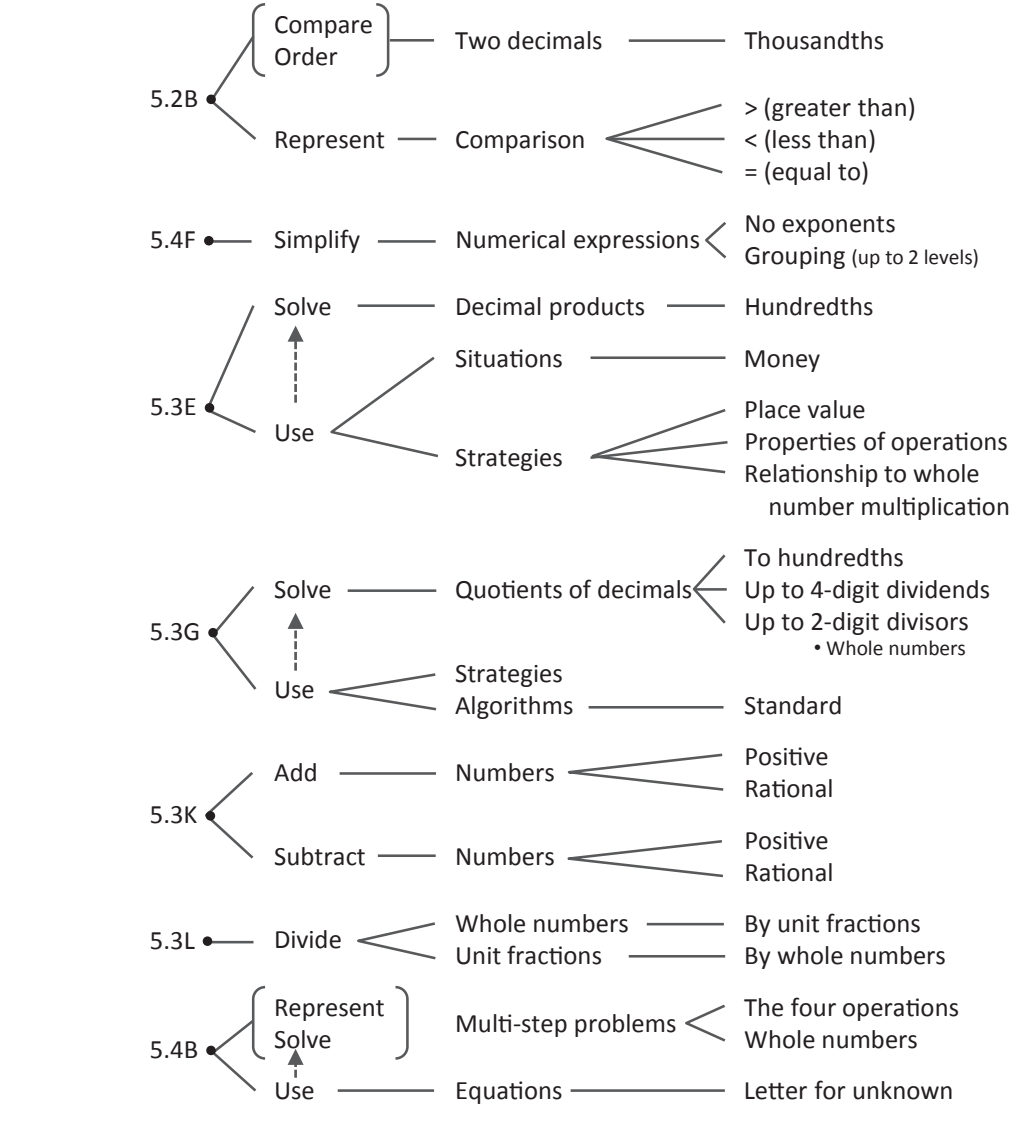
Rigor Implications

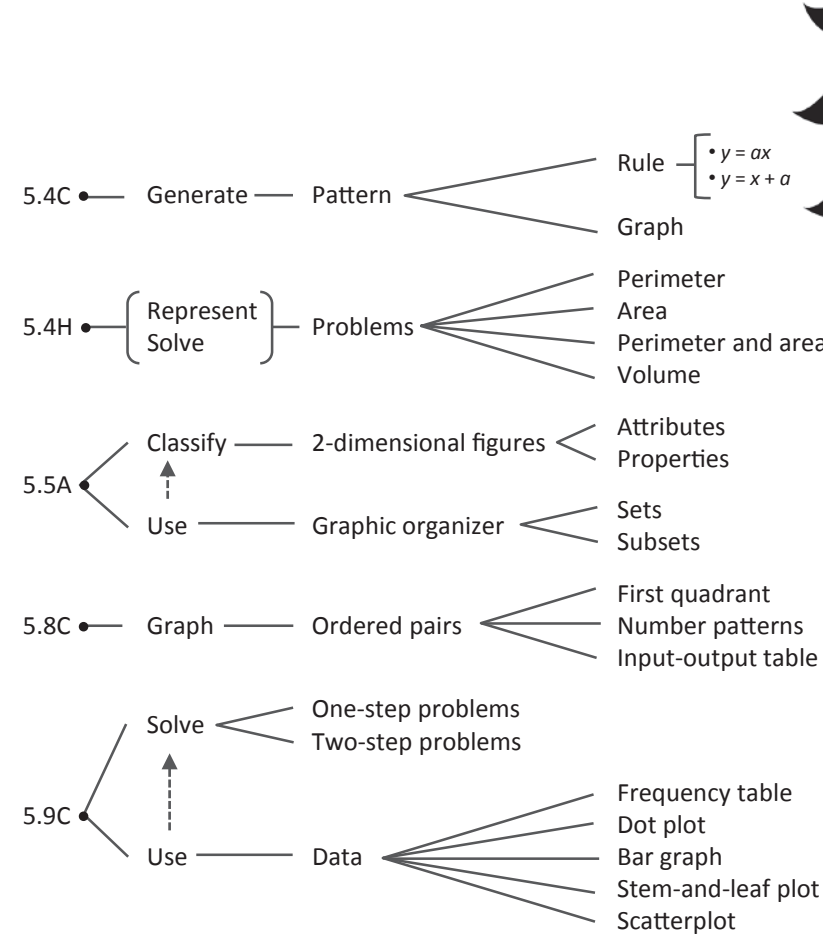
- Apply
- Manage
- Describe

APPENDIX

TREE DIAGRAM

Grade 5 Math TEKS Tree - Readiness Standards





TEKS Student Expectations for implementation beginning 2014-2015.