# STAAR
# FIELD GUIDE
## FOR TEACHERS

GRADE 3 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

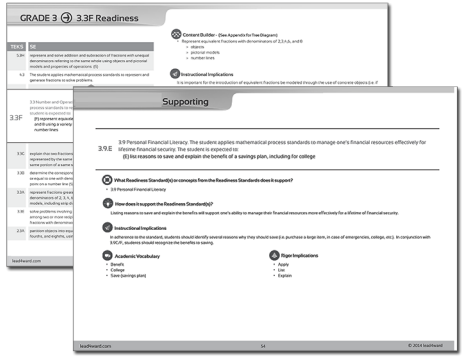
The rigor of the tests will be increased by

- 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

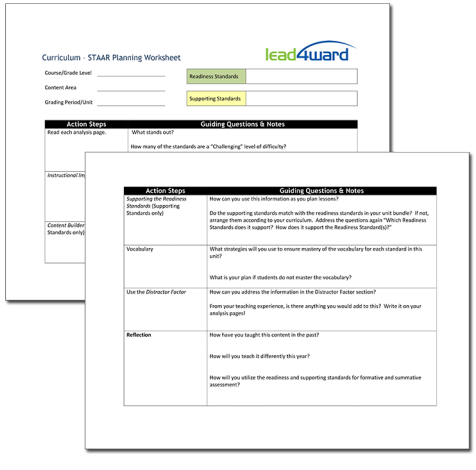
 

## About the STAAR Field Guide for Teachers

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.).

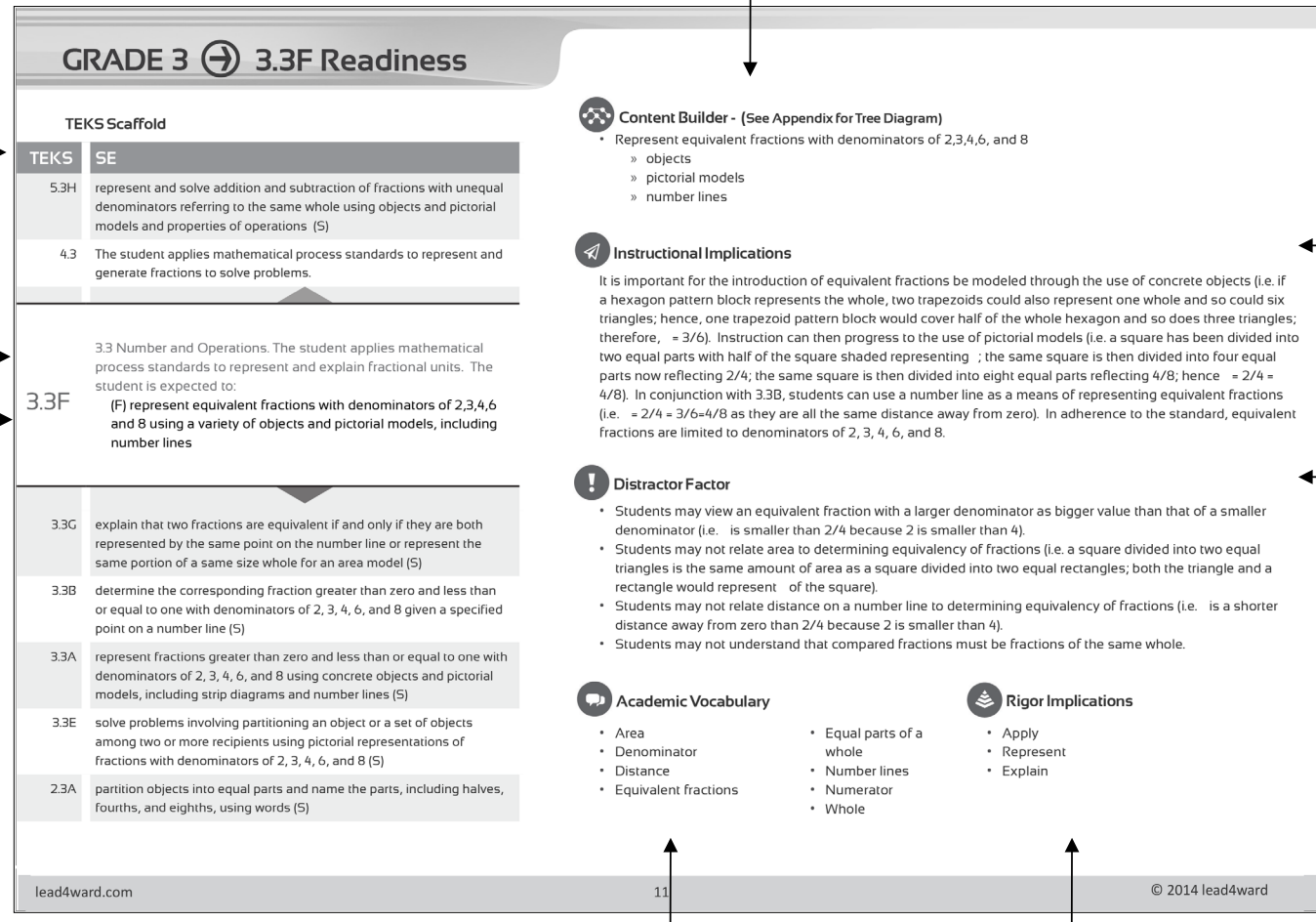
6. Plan for instruction
   - » Collect the curriculum documents used for planning
   - » Use the STAAR - Curriculum Planning Worksheet as you plan each unit. The worksheet provides guiding questions and reflection opportunities to aid you in maximizing the material in the STAAR Field Guide
   - » Determine 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.



## 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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Texas Essential Knowledge and Skills Statement

Student Expectation

**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.

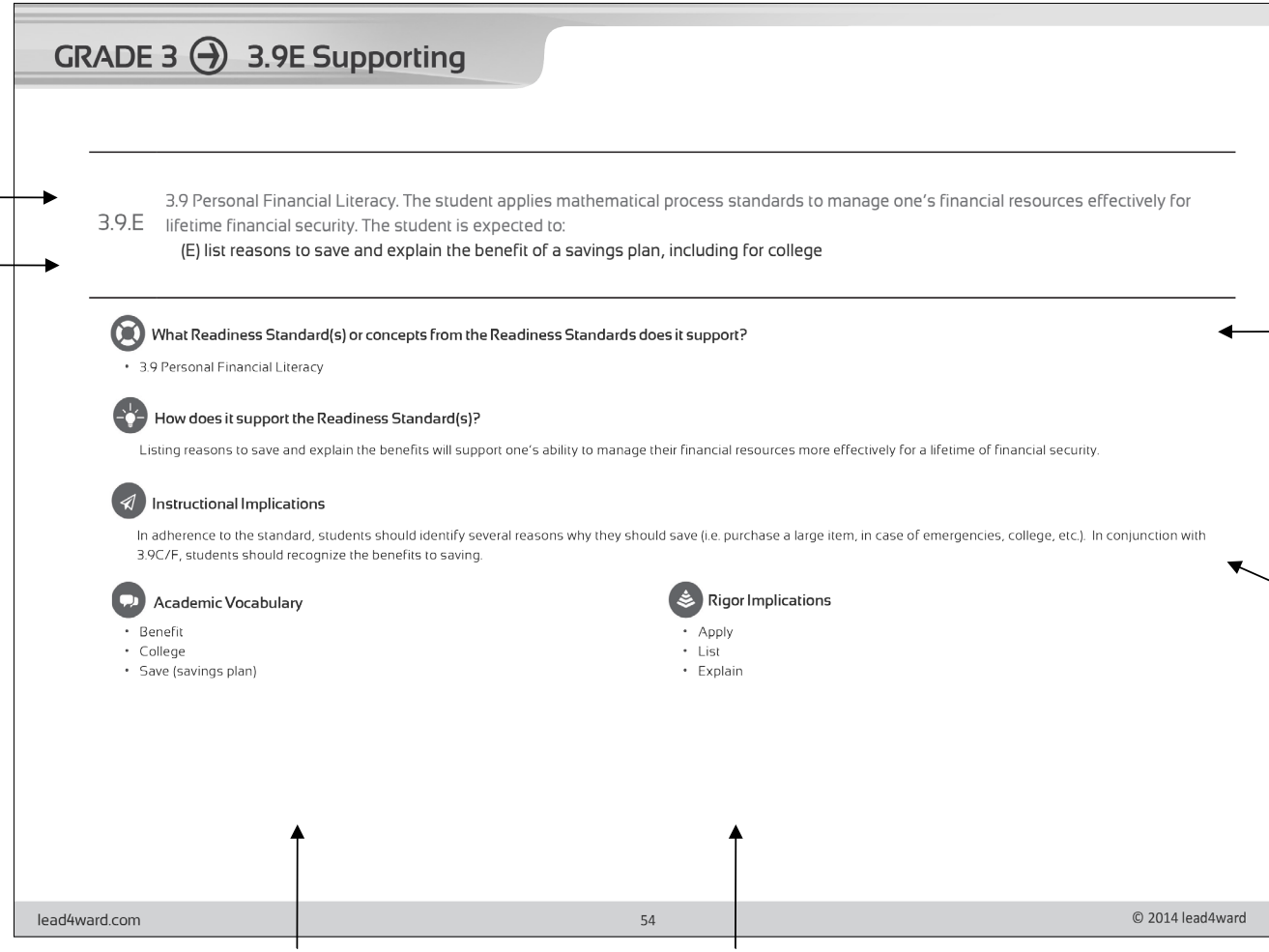
**Academic Vocabulary**
Vocabulary words extracted directly from the standard and/or associated with the instruction of the content within the standard.

**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?<br><br>Do you have data on any of the standards that suggest whether the standard is a strength or a concern?<br><br>How many of the standards are at a high level of rigor? |
| *Instructional Implications* | How will these implications inform your planning?<br><br>How can you use this information to modify instruction? |
| TEKS Scaffolding | What concepts did students learn in the previous grade to prepare them?<br><br>Do you have students who may struggle with those concepts?<br><br>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?<br><br>Which of the parts are new to your team or to the students?<br><br>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?<br><br>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?<br><br>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?<br><br>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?<br><br>How will you teach it differently this year?<br><br>How will you utilize the readiness and supporting standards for formative and summative assessment? |

# GRADE 3 → 3.2A Readiness

### TEKS Scaffold

| TEKS | SE |
|---|---|
| 5.2A | represent the value of the digit in decimals through the thousandths using expanded notation and numerals (S) |
| 4.2B | represent the value of the digit in whole numbers through 1,000,000,000 and decimals to the hundredths using expanded notation and numerals (R) |
| **3.2A** | **3.2 Number and Operations.** The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. The student is expected to: (A) compose and decompose numbers up to 100,000 as a sum of so many thousands, so many hundreds, so many tens, and so many ones using objects, pictorial models, and numbers, including expanded notation as appropriate |
| 2.2B | use standard, word, and expanded forms to represent numbers up to 1,200 (R) |
| 2.2A | use concrete and pictorial models to compose and decompose numbers up to 1,200 in more than one way as a sum of so many thousands, hundreds, tens, and ones (S) |
| 1.2C | use objects, pictures, and expanded and standard forms to represent numbers up to 120 (R) |
| 1.2B | use concrete and pictorial models to compose and decompose numbers up to 120 in more than one way as so many hundreds, so many tens, and so many ones (S) |

### Content Builder - (See Appendix for Tree Diagram)

- Compose numbers up to 100,000 as sum of so many hundreds, so many tens, and so many ones
  - » using objects
  - » pictorial models
  - » expanded notation
- Decompose numbers up to 100,000 as sum of so many hundreds, so many tens, and so many ones
  - » using objects
  - » pictorial models
  - » expanded notation

### Instructional Implications

As students represent numbers using base ten blocks, their understanding should be associated with writing numbers in expanded notation (182 = 1 x 100 + 8 x 10 + 2 x 1). This type of representation will allow students to focus on the value of each digit and support their understanding of the magnitude of each place value (i.e. representing the number 182 with base ten blocks there would be one hundred flat which the value can be represented as 1 x 100; there would be eight ten rods which the value can be represented as 8 x 10; there would be two unit cubes which the value can be represented as 2 x 1). 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. Encourage students to represent a number in more than one way as a means of building flexibility with numbers (i.e. 182 can be also be represented with 18 ten rods and 2 unit cubes reflected in expanded notation as 18 x 10 + 2 x 1). This understanding will lend itself to regrouping in subtraction (i.e. 182 - 91 = ___; 182 would have to be regrouped into 18 tens and 2 ones).

### Distractor Factor

- Students confuse the place value a digit is in with its value (i.e. 345; the digit 4 is in the tens place value but it is valued at 40).
- Students may incorrectly use the word "and" to represent numbers in words (i.e. 345 is represented as "three hundred forty-five" not "three hundred and forty-five). The use of the word "and" is applied in the representation of whole number and decimal/fractional values (i.e. 3.45 is represented as "three and forty-five hundredths").
- Students may not use the hyphen appropriately when representing numbers in words (i.e. 345 is represented as "three hundred forty-five").

### Academic Vocabulary

- Expanded notation
- Place value
  - » Thousands
  - » Hundreds
  - » Tens
  - » Ones
- Thousands period
- Ones/Unit period

### Rigor Implications

- Apply
- Represent
- Compare
- Compose
- Decompose

# GRADE 3 → 3.2D Readiness

### TEKS Scaffold

| TEKS | SE |
|---|---|
| 5.2B | compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or = (R) |
| 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** | 3.2 Number and Operations. The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. The student is expected to: (D) use place value to compare and order whole numbers up to 100,000 and represent comparisons using the symbols <, >, or = |
| 2.2D | use place value to compare and order whole numbers up to 1,200 using comparative language, numbers, and symbols (<,>, or =) (R) |
| 1.2G | represent the comparison of two numbers to 100 using the symbols >,<,or = (R) |
| 1.2F | order whole numbers up to 120 using place value and open number lines (S) |
| 1.2E | use place value to compare whole numbers up to 120 using comparative language (S) |

### Content Builder - (See Appendix for Tree Diagram)

- Use place value to compare whole numbers up to 100,000
- Use place value to order whole numbers up to 100,000
- Represent comparisons using the symbols >,<, =

### Instructional Implications

As students compare the value of numbers, they need to be able to relate their understanding of place value (i.e. the number 5,342 is greater than 3,226 because the digit 5 in 5,342 means there are 5 thousands which is a value of 5,000; however, the digit 3 in 3,226 means there are only 3 thousands which is a value of 3,000). Students will compare two numbers using the correct academic vocabulary (i.e. 5,342 is greater than 3,226). It is important for students to recognize the inverse comparison statement as well (i.e. 3,226 is less than 5,342). Instruction should connect the comparative language to the symbols (>, <, =). It is critical that students do not learn how to read each of the symbols 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. 5,342>3,226 and 3,226<5,342). The standard also has students ordering three or more numbers from least to greatest or greatest to least. The use of open number lines (see 3.2C) will allow students to order more efficiently as 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 may not be able to read comparison symbols correctly as they rely on a trick to determine
- directionality.
- Students may view a comparison statement and its inverse as two different comparison statements (i.e. 456>412 is the same as 412<456).
- Students may confuse the place value a digit is in with its value (i.e. 345; the digit 4 is in the tens place value but it is valued at 40).

### Academic Vocabulary

- Digit
- Equal to (=)
- Greater than (>)
- Greatest to least
- Least to greatest
- Less than (<)
- Place value
  - » Thousands
  - » Hundreds
  - » Tens
  - » Ones

### Rigor Implications

- Apply
- Represent
- Compare
- Use

# 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. |
| 3.3F | 3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to: (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 to 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 covers half of the whole hexagon and so do three triangles; therefore, 1/2 = 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 1/2; 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 1/2 = 2/4 = 4/8). In conjunction with 3.3B, students can use a number line as a means of representing equivalent fractions (i.e. 1/2 = 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. 1/2 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 1/2 of the square).
- Students may not relate distance on a number line to determining equivalency of fractions (i.e. 1/2 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

# GRADE 3 → 3.3H Readiness

**TEKS Scaffold**

| TEKS | SE |
|---|---|
| 5.2B | compare and order two decimals to thousandths and represent comparisons using the symbols >, <, or = (R) |
| 4.3B | decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations (S) |
| 3.3H | 3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to: (H) compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models |
| 2.3B | explain that the more fractional parts used to make a whole, the smaller the part; and the fewer the fractional parts, the larger the part (R) |
| 2.3A | partition objects into equal parts and name the parts, including halves, fourths, and eighths, using words (S) |
| 1.6G | partition two-dimensional figures into two and four fair shares or equal parts and describe the parts using words (S) |

## Content Builder - (See Appendix for Tree Diagram)

- Compare two fractions having the same numerator in problems by reasoning about their sizes
- Compare two fractions have the same denominator in problems by reasoning about their sizes
- Justify comparison conclusions
  - » symbols
  - » words
  - » objects
  - » pictorial models

## Instructional Implications

In adherence to the standard, the comparison of fractions are limited to those where the numerators are the same with different denominators (1/4 and 1/8) or the denominators are the same with different numerators (2/3 and 1/3). This will allow the focus to be on the size of the whole or the size of the part in order to compare fractions. Students should be able to articulate that when the denominators are same the size of the numerator will determine which is larger/smaller (i.e. 2/6<5/6 because both fractions were divided into the same number of parts but 2/6 has three less parts than 5/6) and when the numerators are the same the size of the denominator will determine which is larger/smaller (i.e. 3/8<3/6 because an object divided into eight equal parts would be a smaller area than an object divided into six equal parts). Encourage students to state two comparison statements to ensure understanding (i.e. 3/8<3/6 and 3/6>3/8).

## Distractor Factor

- Students may not understand that larger denominators yield smaller parts of a whole; the smaller denominators yield larger parts of a whole.
- Students may not view the comparison statement 3/8 < 3/6 is the same as 3/6 > 3/8

## Academic Vocabulary

- Comparison symbol
- Denominator
- Equal parts
- Fractions
- Greater than (>)
- Less than (<)
- Numerator
- Part of a whole
- Size
- Whole

## Rigor Implications

- Apply
- Represent
- Explain
- Compare
- Justify

# GRADE 3 → 3.4A Readiness

## TEKS Scaffold

| TEKS | SE |
|---|---|
| 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 (R) |
| 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) |
| 3.4A | 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to: (A) 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 |
| 2.4C | solve one-step and multi-step word problems involving addition and subtraction within 1,000 using a variety of strategies based on place value, including algorithms (R) |
| 1.5D | represent word problems involving addition and subtraction of whole numbers up to 20 using concrete and pictorial models and number sentences (R) |
| 1.3F | generate and solve problem situations when given a number sentence involving addition or subtraction of numbers within 20 (R) |

## Content Builder - (See Appendix for Tree Diagram)

- Solve one-step problems involving addition within 1,000
  - » using place value
  - » properties of operations (teacher only)
- Solve one-step problems involving subtraction within 1,000
  - » using place value
  - » properties of operations (teacher only)
  - » relationship between addition and subtraction
- Solve multi-step problems involving addition and subtraction within 1,000
  - » using place value
  - » properties of operations (teacher only)
  - » relationship between addition and subtraction

## Instructional Implications

Students will employ their understanding of place value and expanded notation to develop strategies to addition and subtraction problems. Properties of operations include the commutative, associative, and inverse properties. Although instruction may model the names of the properties (i.e. commutative, associative, inverse, etc.), students will only be asked to employ the underlying concepts in order to solve addition and subtraction problems
(i.e. Commutative & Associative Property:
134 + 517= ____; (100 + 30 + 4) + (500 + 10 + 7)= ____; (100 + 500) + (30 + 10) + (4 + 7) = ____); (600 + (40) + (11) = 651).
(i.e. Inverse Property:
262 - 48 = ___; 48 + ____ = 262; (40 + 8) + ___ = (200 + 60 + 2); (40 + 8) + (200 + 10 + 2 + 2)= 62; 262 - 48 = 214)
As students become more fluent with numbers, the traditional algorithm can be introduced relating the steps they took with their understanding of expanded notation.
As the standard requires students to solve one and two-step word problems, instruction should include samples of two-step addition, subtraction, and a mixture of addition and subtraction. In conjunction with 3.5A, students may need a visual to represent their understanding (i.e. use of part-part-whole mat).
Word problems should include a variety of contexts.
Joining: Sarah had 43 pencils. Juan gave her 18 more pencils. How many pencils does Sarah have now? Sarah had 25 pencils. Juan gave her some more pencils. Now Sarah has 43 pencils. How many pencils did Juan give her? Sarah had some pencils. Juan gave her 18 pencils. Now Sarah has a total of 43 pencils. How many pencils did Sarah have to begin with?
Separating: Sarah had 43 pencils. She gave 18 pencils to Juan. How many pencils does Sarah have now? Sarah had a total of 43 pencils. She gave some to Juan. Now she only has 25 pencils. How many pencils did she give to Juan? Sarah had some pencils. She gave 18 to Juan. Now Sarah has 25 pencils left. How many pencils did Sarah have before?
Comparing: Juan has 43 pencils and Sarah has 25 pencils. How many more pencils does Juan have than Sarah? Sarah has 18 fewer pencils than Juan. If Sarah has 25 pencils, how many pencils does Juan have? Juan has 18 more pencils than Sarah. If Juan has 43 pencils, how many pencils does Sarah have? Juan has 43 pencils and Sarah has 25 pencils. How many more pencils does Sarah need to have the same amount as Juan?
Be sure that students represent the associated numbers sentences in different ways
(i.e. one step: 42 - 18 = ____ or ___ = 42 - 18 or 18 + ____ = 42) (i.e. two-step: 18 + ____ + 6 = 42 or ___ = 42 - 6 - 18).

## Distractor Factor

- Students may try to apply "key words" to select the appropriate operation instead of understanding the context of the problem.
- Students may not recognize a number sentence and its inverse as being equivalent (i.e. 42 - 18 = ___ is the same things as 18 + ___ = 42).

## Academic Vocabulary

- Addition
- Difference
- Place value
- Subtraction
- Strategies
- Sum

## Rigor Implications

- Apply
- Develop
- Use
- Solve

# GRADE 3 → 3.4K 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) |
| 5.3G | 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 (R) |
| 4.4H | solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders (R) |
| 3.4K | 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to: (K) 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 |
| 3.5B | represent and solve one- and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations (R) |
| 2.6A | model, create, and describe contextual multiplication situations in which equivalent sets of concrete objects are joined (S) |
| 2.6B | model, create, and describe contextual division situations in which a set of concrete objects is separated into equivalent sets (S) |
| 1.5B | skip count by twos, fives, and tens to determine the total number of objects up to 120 in a set (S) |

## Content Builder - (See Appendix for Tree Diagram)

- Solve one-step problems involving multiplication within 100
  - » pictorial models
    - » arrays
    - » area models
    - » equal groups
  - » properties of operations
  - » recall of facts
- Solve one-step problems involving division within 100
  - » pictorial models
    - » arrays
    - » area models
    - » equal groups
  - » properties of operations
  - » recall of facts
- Solve two-step problems involving multiplication and division within 100
  - » pictorial models
    - » arrays
    - » area models
    - » equal groups
  - » properties of operations
  - » recall of facts

## Instructional Implications

In conjunction with 3.4G, students build on their flexibility of numbers to solve one- and two-step multiplication and/or division problems. Instruction should include the use of manipulatives for equal grouping, base ten blocks to build arrays and the use of rectangular area models to build the concrete understanding of the operation. Pictorial models (i.e. arrays and area models) should be related to the use of partial products/partial quotients and the traditional algorithm. Both strategies yield the same product; however, the partial products method models the value of each digit being multiplied and the traditional algorithm models the digits in each place value being multiplied.) Encourage students to demonstrate their understanding in more than one way.

## Distractor Factor

- Students may try to apply "key words" to select the appropriate operation instead of understanding the context of the problem.

## Academic Vocabulary

- Area model
- Array
- Equal groups
- Division
  - » Quotient
  - » Divisor
  - » Dividend
- Multiplication
  - » Product
  - » Factor
- Strategies

## Rigor Implications

- Apply
- Develop
- Use
- Solve

# GRADE 3 → 3.5A Readiness

## TEKS Scaffold

| TEKS | SE |
|---|---|
| 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 (R) |
| 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 | 3.5 Algebraic Reasoning. The student applies mathematical process standards to analyze and create patterns and relationships. The student is expected to:<br>(A) represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations |
| 2.7C | represent and solve addition and subtraction word problems where unknowns may be any one of the terms in the problem (S) |
| 1.5D | represent word problems involving addition and subtraction of whole numbers up to 20 using concrete and pictorial models and number sentences (R) |
| 1.3E | explain strategies used to solve addition and subtraction problems up to 20 using spoken words, objects, pictorial models, and number sentences (S) |

### Content Builder - (See Appendix for Tree Diagram)

- Represent one-step problems involving addition of whole numbers to 1,000
  - » pictorial models
  - » number lines
  - » equations
- Represent two-step problems involving addition of whole numbers to 1,000
  - » pictorial models
  - » number lines
  - » equations
- Represent one-step problems involving subtraction of whole numbers to 1,000
  - » pictorial models
  - » number lines
  - » equations

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

- Represent two-step problems involving subtraction of whole numbers to 1,000
  - » pictorial models
  - » number lines
  - » equations
- Represent two-step problems involving addition and subtraction of whole numbers to 1,000
  - » pictorial models
  - » number lines
  - » equations

### Instructional Implications

In conjunction with 3.4A, students will represent addition/subtraction problems with pictorial models (base ten representations), number lines (movement of tens and ones on a number line), and equations (number sentence to represent problem) in order to solve one- and two-step problems. The use of strip diagrams (part-part-whole mat) may support the understanding of how to represent such equations (i.e. The Wildcats basketball team scored 75 points. Michael scored 35 of the points, Damon scored 20 points, and the remaining points were scored by Rayshawn. How many points were scored by Rayshawn?

| Total Number of Points Scored by Wildcat's Team (whole)<br>75 | | |
|---|---|---|
| Michael's Points<br>(part) | Damon's Points<br>(part) | Rayshawn's Points<br>(part) |
| 35 | 20 | ? |

75 = 35 + 20 + ____.) Encourage students to write more than one equation for every problem (i.e. 75 = 35 + 20 + _____; 75 - 35 - 20 = ___).

### Distractor Factor

- Students may try to apply "key words" to select the appropriate operation instead of understanding the context of the problem.
- Students may not recognize a number sentence and its inverse as being equivalent (i.e. 42 - 18 = ___ is the same things as 18 + ___ = 42).

### Academic Vocabulary

- Addition
- Difference
- Equations/Number sentences
- Number lines
- Subtraction
- Sum

### Rigor Implications

- Apply
- Analyze
- Create
- Represent

# GRADE 3 → 3.5B 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) |
| 5.3G | 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 (R) |
| 4.4H | solve with fluency one- and two-step problems involving multiplication and division, including interpreting remainders (R) |
| **3.5B** | 3.5 Algebraic Reasoning. The student applies mathematical process standards to analyze and create patterns and relationships. The student is expected to:<br>**(B) represent and solve one-and two-step multiplication and division problems within 100 using arrays, strip diagrams, and equations** |
| 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) |
| 2.6A | model, create, and describe contextual multiplication situations in which equivalent sets of concrete objects are joined (S) |
| 2.6B | model, create, and describe contextual division situations in which a set of concrete objects is separated into equivalent sets (S) |
| 1.5B | skip count by twos, fives, and tens to determine the total number of objects up to 120 in a set (S) |

### Content Builder - (See Appendix for Tree Diagram)

- Represent one-step multiplication problems within 100
  - » using arrays
  - » strip diagrams
  - » equations
- Represent one-step division problems within 100
  - » using arrays
  - » strip diagrams
  - » equations

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

- Represent two-step multiplication problems within 100
  - » using arrays
  - » strip diagrams
  - » equations
- Represent two-step division problems
  - » using arrays
  - » strip diagrams
  - » equations
- Represent two-step multiplication and division problems within 100
  - » using arrays
  - » strip diagrams
  - » equations

### Instructional Implications

In conjunction with 3.4K, students will represent multiplication/division problems with arrays, strip diagrams (similar to a part-part-whole mat), and equations in order to solve one- and two-step problems. The use of strip diagrams (part-part-whole mat) may support the understanding of how to represent such equations (i.e. Michael scored three times as many baskets as Rayshawn. If Rayshawn scored 5 baskets, how many baskets did Michael make?)

| Michael's Baskets<br>? | | |
|---|---|---|
| Rayshawn's Baskets<br>(part) | Rayshawn's Baskets<br>(part) | Rayshawn's Baskets<br>(part) |
| 5 | 5 | 5 |

Encourage students to write more than one equation for every problem (i.e. ___ = 5 + 5+ 5; _____ = 3 x 5).

### Distractor Factor

- Students who do not have an understanding of the context of the problem may incorrectly represent the expression/equation (i.e. if Michael scored three times as many baskets as Rayshawn, that means that the number of baskets Michael scored should be higher than Rayshawn).
- Students may try to apply "key words" to select the appropriate operation instead of understanding the context of the problem.

### Academic Vocabulary

- Arrays
- Division
- Equations
- Multiplication
- Product
- Quotient
- Strip diagrams

### Rigor Implications

- Apply
- Analyze
- Create
- Represent

# GRADE 3 → 3.5E Readiness

### TEKS Scaffold

| TEKS | SE |
|---|---|
| 5.4D | recognize the difference between additive and multiplicative numerical patterns given in a table or graph (S) |
| 5.4C | generate a numerical pattern when given a rule in the form y = ax or y = x + a and graph (R) |
| 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** | **3.5 Algebraic Reasoning. The student applies mathematical process standards to analyze and create patterns and relationships. The student is expected to: (E) represent real-world relationships using number pairs in a table and verbal descriptions** |
| 2.7A | determine whether a number up to 40 is even or odd using pairing of objects to represent the number (S) |
| 2.6A | model, create, and describe contextual multiplication situations in which equivalent sets of concrete objects are joined (S) |
| 2.6B | model, create, and describe contextual division situations in which a set of concrete objects is separated into equivalent sets (S) |
| 1.5B | skip count by twos, fives, and tens to determine the total number of objects up to 120 in a set (S) |

### Content Builder - (See Appendix for Tree Diagram)

- Represent real-world relationships using number pairs in a table
- Represent real-world relationships using number pairs in verbal descriptions

### Instructional Implications

In accordance to the standard, students should be given a real world situation (i.e. number of wheels on a tricycle) and asked to represent the number pattern in a table (i.e. see below) and a verbal description (i.e. for every tricycle there are three times as many wheels). Table representations should be both vertical and horizontal. Verbal descriptions should relate pattern to the real world situation not just identifying "what's my rule" (i.e. "There are three times as many wheels for the number of tricycles," not "x 3"). Students should verbalize the inverse verbal description as it applies to the number pattern in the table (i.e. number of tricycles times 3 equals the total number of wheels or the number of wheels divided by 3 equals the total number of tricycles).

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

### Distractor Factor

- Students may identify a pattern by comparing input to input values and/or output to output values instead of input to output values.
- Students may confuse a multiplicative pattern for a numeric pattern as they view multiplication as repeated addition.
- Students may not recognize the equivalency of a verbal description and its inverse (i.e. number of tricycles times 3 equals the total number of wheels or the number of wheels divided by 3 equals the total number of tricycles).

### Academic Vocabulary

- Number pairs
- Patterns
- Table
- Verbal description

### Rigor Implications

- Apply
- Analyze
- Create
- Represent

# GRADE 3 → 3.6A Readiness

### TEKS Scaffold

| TEKS | SE |
|---|---|
| 5.5A | classify two-dimensional figures in a hierarchy of sets and subsets using graphic organizers based on their attributes and properties (R) |
| 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 | 3.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional geometric figures to develop generalizations about their properties. The student is expected to:<br>(A) 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 |
| 2.8B | classify and sort three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes as special rectangular prisms), and triangular prisms, based on attributes using formal geometric language (R) |
| 2.8C | classify and sort polygons with 12 or fewer sides according to attributes, including identifying the number of sides and number of vertices (R) |
| 1.6E | identify three-dimensional solids, including spheres, cones, cylinders, rectangular prisms (including cubes), and triangular prisms, and describe their attributes using formal geometric language (R) |
| 1.6A | classify and sort regular and irregular two-dimensional shapes based on attributes using informal geometric language (R) |
| 1.6D | identify two-dimensional shapes, including circles, triangles, rectangles, and squares as special rectangles, rhombuses, and hexagons, and describe their attributes using formal geometric language (R) |

### Content Builder - (See Appendix for Tree Diagram)

- Classify two-dimensional figures using formal geometric language
- Sort two-dimensional figures using formal geometric language
  - » quadrilaterals, rhombuses, parallelograms, trapezoids, rectangles, and squares
- Classify three-dimensional shapes using formal geometric language
- Sort three-dimensional figures using formal geometric language
  - » cones, cylinders, spheres, triangular and rectangular prisms, cubes

### Instructional Implications

Students must be given a variety of two- and three-dimensional figures to sort based on their attributes (i.e. number of sides/edges, number vertices, number/types of faces, etc.). Instruction should model the language of informal deduction (i.e. all squares are rectangles, but not all rectangles are squares; all cubes are rectangular prisms but not all rectangular prisms are cubes.) In adherence to the standard, solids are limited to prisms, cones, cylinders, spheres and cubes and do not include pyramids. Students should recognize that the shape of the base defines whether the prism is triangular or rectangular.

### Distractor Factor

- Students may interchange the term side referencing two-dimensional shapes and edge referencing a three-dimensional shape.
- Students may count the common vertices of a three-dimensional figure twice as they view each face independently.
- Students may not view a square as a rectangle or a cube as a rectangular prism.

### Academic Vocabulary

- Attribute
- Edges
- Faces
- Figure
- Polygon
- Shape
- Sides
- Solid
- Two-dimensional
  - » parallelograms
  - » quadrilaterals
  - » rectangles
  - » rhombuses
  - » squares
  - » trapezoids
- Three-dimensional
  - » Cone
  - » Cube (special type of rectangular prism)
  - » Cylinder
  - » Sphere
  - » Triangular prism
  - » Rectangular prism
- Vertex (vertices)

### Rigor Implications

- Apply
- Analyze
- Develop
- Classify
- Sort

# GRADE 3 → 3.6C Readiness

### TEKS Scaffold

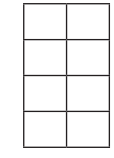
| TEKS | SE |
|---|---|
| 5.4H | represent and solve problems related to perimeter and/or area and related to volume (R) |
| 4.5C | use models to determine the formulas for the perimeter of a rectangle (l + w + l + w or 2l + 2w), including the special form for perimeter of a square (4s) and the area of a rectangle (l x w) (S) |
| 4.5D | solve problems related to perimeter and area of rectangles where dimensions are whole numbers (R) |
| 3.6D | decompose composite figures formed by rectangles into non-overlapping rectangles to determine the area of the original figure using the additive property of area (S) |
| **3.6C** | 3.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional geometric figures to develop generalizations about their properties. The student is expected to:<br>(C) determine the area of rectangles with whole number sides lengths in problems using multiplication related to the number of rows times the number of unit square in each row |
| 2.9F | use concrete models of square units to find the area of a rectangle by covering it with no gaps or overlaps, counting to find the total number of square units, and describing the measurement using a number and the unit (S) |
| 1.6F | compose two-dimensional shapes by joining two, three, or four figures to produce a target shape in more than one way if possible (S) |

### Content Builder - (See Appendix for Tree Diagram)

- Determine the area of rectangles with whole number side lengths in problem using multiplication related to the number of unit squares in each row

### Instructional Implications

Instruction should connect the visual of an array to area to a related multiplication fact (i.e. There are four rows with two unit squares in each row for a total of 8 square units; 4 x 2 = 8; the area of this rectangle is 8 square units).



Students should also connect the appropriate vocabulary to the arrays (i.e. the number of rows and columns represent the factors and the total number of square units represents the product) and number sentence (i.e. 4 x 2 = 8; the 4 and the 2 represent the factors and 8 represents the product.).

### Distractor Factor

- Students confuse the concept of area with perimeter.
- Students who just count up the number of square units to determine the area may not connect how multiplication relates to area.
- Students may think that a 4 by 2 array yields a different area than a 2 by 4 array.

### Academic Vocabulary

- Array
- Area
- Factor
- Length
- Multiplication
- Product
- Rectangles
- Row
- Square unit

### Rigor Implications

- Apply
- Analyze
- Develop
- Determine

# GRADE 3 → 3.7B Readiness

**TEKS Scaffold**

| TEKS | SE |
|---|---|
| 5.4H | represent and solve problems related to perimeter and/or area and related to volume (R) |
| 4.5D | solve problems related to perimeter and area of rectangles where dimensions are whole numbers (R) |
| 3.7B | 3.7 Geometry and Measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement. The student is expected to: (B) determine the perimeter of a polygon or missing length when given perimeter and remaining side lengths in problems |
| 2.9E | determine a solution to a problem involving length, including estimating lengths (R) |
| 1.7D | describe a length to the nearest whole unit using a number and a unit (R) |

**Content Builder - (See Appendix for Tree Diagram)**

- Determine the perimeter of a polygon
- Determine the missing length when given the perimeter
- Determine the remaining side lengths in perimeter problems

**Instructional Implications**

Instruction should include finding the perimeter of regular and irregular shaped polygons. In adherence with the standard, problems should include those where all side lengths are given and students determine the perimeter; some of the side lengths are given and students must use direct comparisons to determine unknown side lengths in order to calculate the perimeter; or the perimeter and some of the side lengths are given and students must determine the missing side lengths.

**Distractor Factor**

- Students will only add up the lengths of the sides that are given within a problem without considering side lengths that may be missing.
- Students confuse the concept of area with perimeter.

**Academic Vocabulary**

- Length
- Perimeter
- Polygon
- Sides

**Rigor Implications**

- Apply
- Select
- Solve
- Determine

# GRADE 3 → 3.8A Readiness

### TEKS Scaffold

| TEKS | SE |
|---|---|
| 5.9A | represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-andleaf plots (S) |
| 5.9B | represent discrete paired data on a scatterplot (S) |
| 4.9A | represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions (R) |
| 3.8A | 3.8 Data Analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data.The student is expected to: (A) summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals |
| 2.10B | organize a collection of data with up to four categories using pictographs and bar graphs with intervals of one or more (S) |
| 1.8B | use data to create picture and bar-type graphs (R) |
| 1.8A | collect, sort, and organize data in up to three categories using models/ representations such as tally marks or T-charts (S) |

### Content Builder - (See Appendix for Tree Diagram)

- Summarize a data set with multiple categories
  - » frequency table
  - » dot plot
  - » pictographs
  - » bar graphs with scaled intervals

### 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 multiple categories (i.e. extend survey question of "Do you like cats or dogs?" to "What is your favorite animal?"). In accordance with the standard, data should be represented on a frequency table, dot plot, pictograph, or bar graph. Graph representations should include both vertical and horizontal formats. Pictographs should include symbolism that does not represent one-to-one correspondence (i.e. smiley face represents 4 people) and portion representations (i.e. a picture of half a smiley face yields 2 people). Bar graphs include scaled intervals (i.e. information on the x- or y-axis skip count by tens). Extend instruction to include representing the same data set in each of the four types of displays to compare. Summarization of data should also include being able to determine the total amount of data collected by viewing a graph (i.e. the sum of each bar graph length will yield the total number of data pieces). Include activities where students must analyze given data within a graph and determine the title and/or the labels.

### Distractor Factor

- Students may misinterpret pictographs in which each picture represents a value other than one.
- Students may misread bar graphs that have scaled intervals.
- When representing the same set of data on all four types of graphs, students may interpret the data as different because of the difference in the visual representations.
- When representing the same set of data vertically and horizontally, students may interpret the data as different because of the difference in the visual representations.

### Academic Vocabulary

- Bar graph
- Categories
- Data
- Dot plot
- Frequency table
- Graph Titles
- Labels
- Pictograph
- Scaled intervals

### Rigor Implications

- Apply
- Collect
- Organize
- Display
- Interpret
- Summarize

# STAAR
# SUPPORTING
## STANDARDS

3.2.B 3.2 Number and Operations. The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. The student is expected to:

(B) describe the mathematical relationships found in the base-10 place value system through the hundred thousands place

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

- 3.2A compose and decompose numbers up to 100,000 as a sum of so many ten thousands, so many thousands, so many hundreds, so many tens, and so many ones using objects, pictorial models, and numbers, including expanded notation as appropriate
- 3.2D compare and order whole numbers up to 100,000 and represent comparisons using symbols >, <, or =

### How does it support the Readiness Standard(s)?

This standard describes the mathematical relationship found in the base-10 place value system; this understanding will support students in identifying the value of each digit in a number in order to represent numbers in expanded notation and to effectively compare/order numbers.

### Instructional Implications

Through the use of base ten blocks, students will visually understand the magnitude of numbers (i.e. the thousand cube is ten times more than the hundred flat, the hundred flat is ten times more than the ten rod; the hundred flat is ten times smaller than the thousand cube, the ten rod is ten times smaller than the hundred flat, etc.). Students should understand that each time you move one place value to the left, the value of the numbers become ten times larger and each time you move right, the value of the numbers become ten times smaller.

### Academic Vocabulary

- Base-10 place value system
  - » Hundred thousands
  - » Ten thousands
  - » Thousands
  - » Hundreds
  - » Tens
  - » Ones
- Digit

### Rigor Implications

- Apply
- Represent
- Compare
- Describe

3.2.C 3.2 Number and Operations. The student applies mathematical process standards to represent and compare whole numbers and understand relationships related to place value. The student is expected to:

(C) represent a number on a number line as being between two consecutive multiples of 10; 100; 1,000; or 10,000 and use words to describe the relative size of numbers in order to round whole numbers

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

- 3.2D compare and order whole numbers up to 100,000 and represent comparisons using symbols >, <, or =
- 3.4A solve with fluency one-step and two-step problems involving addition and subtraction with 1,000 using strategies based on place value, properties of operations, the relationship between addition and subtraction
- 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

### 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. As rounding is one way of estimating values, students will be able to evaluate if their solutions are reasonable.

### Instructional Implications

Instruction should begin with skip counting by tens, hundreds, thousands, and ten-thousands for students to understand consecutive multiples. Students should represent these landmark values through the use of an open number line. As students are given a specific number to locate on an open number line, you will begin to assess students' understanding of place value (i.e. students place the number 1,387 between 1,300 and 1,400), the relative position of numbers (i.e. the number 1,300 would be indicated first and the number 1,400 would be indicated second on the open number line), and the magnitude of numbers (i.e. students physically place the number 1,387 closer to 1,400 than 1,300). Students will apply this understanding to the rounding of whole numbers to the nearest 10; 100; 1,000; 10,000.

### Academic Vocabulary

- Consecutive multiples
- Number line
- Place value
  - » Tens, hundreds, thousands
- Round

### Rigor Implications

- Apply
- Represent
- Compare
- Use
- Describe

3.3.A 3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:

(A) 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

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

- 3.3F represent equivalent fractions with denominators of 2, 3, 4, 6 and 8 using a variety of objects and pictorial models, including number lines
- 3.3H compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models

### How does it support the Readiness Standard(s)?

This supporting standard develops the conceptual understanding of fractional parts of a whole. Being able to represent fractions using concrete objects, pictorial models, strip diagrams, and numbers lines will provide a strategy for comparing and determining equivalency of fractions.

### Instructional Implications

In adherence to the standard, fractions are limited to those equal to or less than one whole and include denominators of 2, 3, 4, 6, and 8 equal parts. Students will utilize manipulatives (i.e. pattern blocks, geoboards, etc.), pictorial models (i.e. circles, rectangles, etc.), strip diagrams (i.e. rectangular strips of folded paper), and number lines (i.e. lines containing intervals that are divided equally between zero and one whole) to represent a fraction.

### Academic Vocabulary

- Denominator
- Equal parts
- Fractions
- Fractional part
- Number line
- Numerator
- Part of a whole
- Strip diagram
- Whole

### Rigor Implications

- Apply
- Represent
- Explain

3.3.B 3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:

(B) 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

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

- 3.3F represent equivalent fractions with denominators of 2, 3, 4, 6 and 8 using a variety of objects and pictorial models, including number lines
- 3.3H compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models

### How does it support the Readiness Standard(s)?

Locating a fraction as a specific point on a number line will provide students a strategy for comparing and determining equivalency of fractions.

### Instructional Implications

In adherence to the standard, instruction is limited to fractions greater than zero but less than one whole and will limit fractions to 2, 3, 4, 6, and 8 equal parts. Students will utilize number lines containing intervals that are divided equally between zero and one whole. Students will be asked to identify the fractional point represented on a given number line. Students will need to determine the number of parts that make up the whole (the total number of intervals) and the distance a specific fractional point is away from zero in order to appropriately name the fractional value. Instruction should relate the how to read increments on a ruler (i.e. half, fourth, and eighths) to that of a number line.

### Academic Vocabulary

- Denominator
- Equal parts
- Fraction
- Numerator
- Number line
- Part of a whole
- Point
- Whole

### Rigor Implications

- Apply
- Represent
- Explain
- Determine

3.3.C 3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:

(C) explain that a unit fraction 1/b represents the quantity formed by one part of a whole that has been partitioned into b equal parts where b is a non-zero whole number

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

- 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

### How does it support the Readiness Standard(s)?

In conjunction with 3.3D, students will have to understand the term "unit fraction" in order to write an appropriate number sentence for a given fraction. This understanding will support students when adding and subtracting fractions with equal denominators in grade 4.

### Instructional Implications

All fraction lessons should begin with identifying how many parts it takes to equal one whole (i.e. the square has been divided into four equal parts diagonally, so it takes 4 triangles to make up the whole square). In adherence to the standard, it is not possible to have a whole divided into zero equal parts (i.e. 6/0 is not a fractional unit). A unit fraction identifies one part of the whole (i.e. one triangle represents 1/4 of the whole square).

### Academic Vocabulary

- Equal parts
- Fractional units
- Part of a whole
- Unit fraction
- Whole

### Rigor Implications

- Apply
- Represent
- Explain

3.3.D 3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:

(D) compose and decompose a fraction a/b with a numerator greater than zero and less than or equal to b as a sum of parts 1/b

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

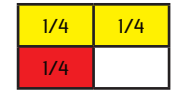
- 4.3E represent and solve addition and subtraction of fractions with equal denominators using objects and pictorial models that build to the number line and properties of operations

### How does it support the Readiness Standard(s)?

In conjunction with 3.3C, students begin to write an appropriate number sentence with unit fractions for a given fraction. This understanding will support students when adding and subtracting fractions with equal denominators in grade 4.

### Instructional Implications

In conjunction with 3.3C, as students identify the unit fraction for a given whole (i.e. one triangle represents 1/4 of the whole square, instruction will extend to using the unit fractions to represent the sum of the parts of an 1/b fraction (i.e. as three of the four triangles are shaded its value can be represented as 1/4 + 1/4 + 1/4 = 3/4). To support students with transitioning from the concrete to abstract learning of fractions, students should associate the pictorial representation to the values in the number sentence.




The standard limits number sentences to those with common denominators (i.e. students would not represent 3/4 as 1/2 + 1/4 = 3/4). In adherence to the standard, sums of fractions are limited to those greater than zero and less than one whole (i.e. students would not be expected to represent 6/4).

### Academic Vocabulary

- Denominator
- Equal parts
- Fraction
- Numerator
- Part of a whole
- Sum of the parts
- Whole

### Rigor Implications

- Apply
- Represent
- Explain
- Compose
- Decompose

3.3.E 3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:

(E) 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

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

- 3.3F represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines
- 3.3H compare two fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models

### How does it support the Readiness Standard(s)?

Through the partitioning of concrete objects or sets of objects, this supporting standard develops the conceptual understanding of fractions. The visual representations of fractions will support the comparing of fractions.

### Instructional Implications

The study of fractions will extend to real world situations in which students will have to partition a whole object (i.e. a candy bar being shared among three friends) or set of objects (i.e. a bag containing 6 pieces of candy being shared among three friends) and determine the fractional amount (i.e. each friend would receive 1/3 of the whole candy bar; each friend would receive 2/6 of the bag of candy as 1/6 + 1/6 = 2/6). Instruction should begin with identifying the whole so that students can identify if they are working with a whole object or a set of objects. In adherence to the standard, situations are limited to wholes (denominators) of 2, 3, 4, 6, and 8.

### Academic Vocabulary

- Denominator
- Equal parts
- Fractions
- Numerator
- Part of a whole
- Whole

### Rigor Implications

- Apply
- Represent
- Explain
- Solve

3.3.G 3.3 Number and Operations. The student applies mathematical process standards to represent and explain fractional units. The student is expected to:

(G) 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 the same size whole for an area model

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

- 3.3F represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines

### How does it support the Readiness Standard(s)?

Students can use concrete objects and/or number lines to determine equivalency of fractions. This standard supports the understanding that equivalent fractions will be located on the same point of a number line and/or cover the same amount of area of the same whole.

### Instructional Implications

In conjunction with 3.3F, as students represent equivalent fractions with the use of objects/pictorial models (i.e. fraction circles, pattern blocks, geoboards, etc.), it is essential that they understand that in order for two fractions to be equivalent they must take up the same amount of area (i.e. if a hexagon represents one whole, then a trapezoid represents halves and triangles represents thirds; one trapezoid represents 1/2 of the whole and three triangles represents 3/6 of the whole; these two fractions are equivalent because they take up the same amount of area); likewise, when using number lines students need to understand that two fractions are equivalent only if they are the exact same distance away from zero (i.e. 1/2, 2/4, 3/6, and 4/8 all fall on the same point on the number line representing equivalency).

### Academic Vocabulary

- Area model
- Distance
- Equal parts
- Equivalent fractions
- Number line
- Part of a whole
- Point
- Portion
- Whole

### Rigor Implications

- Apply
- Represent
- Explain

3.4.B 3.3 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:
(B) round to the nearest 10 or 100 or use compatible numbers to estimate solutions to addition and subtraction problems

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

- 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

### How does it support the Readiness Standard(s)?

As students will be asked to solve addition and subtraction problems, it will be important to estimate solutions prior to solving. Rounding and the use of compatible numbers will support students in estimating solutions and evaluating reasonableness of solutions.

### Instructional Implications

In conjunction with 3.4A, students will estimate solutions to addition and subtraction problems prior to solving for the exact answer. Students will employ the understanding of representing a number on a number line between two consecutive multiples of 10 or 100 (see 3.2C) as a means of estimating sums and differences (i.e. 679 - 344 = ____; 700 - 300 = 400 or 680 - 340 = 340). In adherence to the standard, the intent of rounding is to estimate a solution; therefore, employing a specific rounding rule is not necessary. Compatible numbers is another means for estimating solutions (i.e. 679 - 344 = ___; 675 - 350 = 325).

### Academic Vocabulary

- Addition
- Compatible numbers
- Difference
- Round
- Estimate
- Nearest 10 or 100
- Solutions
- Subtraction
- Sum

### Rigor Implications

- Apply
- Develop
- Use
- Solve
- Round
- Estimate

3.4.C 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:
(C) determine the value of a collection of coins and bills

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

- 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

### How does it support the Readiness Standard(s)?

Solving addition and subtraction of problems may include determining the value of a collection of coins and bills.

### Instructional Implications

Students are to apply their knowledge of skip counting to determine the value of a collection of bills and/or coins (i.e. given four dollar bills, 3 dimes, 4 nickels and 6 pennies students will skip count by tens to add the value of dimes 10, 20, 30; continuing skip counting by fives to add the value of the nickels 35, 40, 45, 50; then skip count by twos to add the value of the pennies; 52, 54, 56 yielding a total of $4.56).

### Academic Vocabulary

- Bills
- Coins
- Dimes
- Nickels
- Pennies
- Quarters
- Value

### Rigor Implications

- Apply
- Develop
- Use
- Solve
- Estimate

3.4.D 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(D) determine the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to ten by ten

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

- 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

### How does it support the Readiness Standard(s)?

It is critical for students to develop the conceptual understanding of multiplication before moving to the abstract understanding of the standard algorithm and solving problems involving multiplication. This supporting standard provides that development progression.

### Instructional Implications

Students should be provided a variety of examples of equally-sized groups of objects to determine the total (i.e. a picture of 4 tricycles yields 12 tires; a picture of 3 octopi yield 24 legs, etc.). Instruction should include the use of arrays (i.e. a rectangular array with 5 rows and 3 columns yields a total of 15 units). In adherence to the standard, examples are limited to 10 x 10. In conjunction with 3.4E, instruction should relate the visual representation to its associated multiplication sentence (i.e. a rectangular array with 5 rows and 3 columns yields a total of 15 units; 5 x 3 = 15). Students should also relate the term factor and product to the pictorial and number sentence (i.e. a rectangular array with 5 rows and 3 columns yields a total of 15 units; 5 x 3 = 15; the 5 and 3 are factors of the product 15).

### Academic Vocabulary

- Array
- Columns
- Equal-sized groups
- Factor
- Multiplication
- Product
- Rows

### Rigor Implications

- Apply
- Develop
- Use
- Solve
- Determine

3.4.E 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(E) represent multiplication facts by using a variety of approaches such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line, and skip counting

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

- 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

### How does it support the Readiness Standard(s)?

It is critical for students to develop the conceptual understanding of multiplication before moving to the abstract understanding of the standard algorithm and solving problems involving multiplication. This supporting standard provides that development progression.

### Instructional Implications

The intent of this standard is to build the conceptual understanding of multiplication. Students will use a variety of methods to understand the meaning of multiplication. Be sure the actions of each strategy are related to number sentence (i.e. 3 x 6 = 18; the 3 represents the three tires on a tricycle and the 6 represents the number of tricycles and 18 represents the total number of tires; the 3 represents the number of spaces hopped in between each number on a number line and the 6 represents how many times we hopped by three and 18 represents the total number of hops; 18 represents the total number of "spaces" hopped; the 3 represents the number of rows in the array and the 6 represents the number of columns and the 18 represents the total number of units). Instruction should also associate the terms factor and product to the pictorial and numeric representation.

### Academic Vocabulary

- Area models
- Arrays
- Equal-sized groups
- Factor
- Multiplication facts
- Number line
- Product
- Repeated addition
- Skip counting

### Rigor Implications

- Apply
- Develop
- Use
- Solve
- Represent

3.4.F 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(F) recall facts to multiply up to ten by ten with automaticity and recall the corresponding division fact

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

- 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

### How does it support the Readiness Standard(s)?

The recalling of multiplication facts will allow students to solve multiplication and division problems with efficiency.

### Instructional Implications

As students begin developing their understanding of multiplication through the variety of approaches (see 3.4E), instruction must move to the recalling of these facts with automaticity. It is critical that students have enough time developing the contextual meaning of multiplication before moving to the abstract. Students many need additional time to experience real world examples of determining the total number of objects in an equal grouping set (a picture of six tricycles reflects 3 x 6 = 18) and taking the total number of objects and putting them in to equal groups (taking 18 wheels and placing into groups of 3; 18 ÷ 3 = 6) in order to understand how multiplication and division are related. Instruction should relate how the terms factor/product/quotient relate to the multiplication and division (see 3.4J).

### Academic Vocabulary

- Division fact
- Factor
- Multiplication fact
- Product

### Rigor Implications

- Apply
- Develop
- Use
- Solve
- Recall

3.4.G 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(G) use strategies and algorithms, including the standard algorithm, to multiply a two-digit number by a one-digit number; strategies may include mental math, partial products, and the commutative, associative, and distributive properties

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

- 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

### How does it support the Readiness Standard(s)?

It is critical for students to develop the conceptual understanding of multiplication before moving to the abstract understanding of the standard algorithm and solving problems involving multiplication. This supporting standard provides that development progression.

### Instructional Implications

In accordance with the standard, students are to use strategies to develop their conceptual understanding of two-digit times one digit multiplication. The use of mental math, partial products, and operational properties will allow students to build their flexibility in the use of numbers (i.e. 24 x 5 = (20+4) x 5 = (20 x 5) + (4 X 5) = 100 + 20 = 120). It is imperative to relate those actions to the steps found in the traditional algorithm.

$$\begin{array}{r} {\scriptstyle 2} \\ 24 \\ \times\ 5 \\ \hline 120 \end{array}$$

In the partial products strategy, the tens place got multiplied by five first and then the ones place value got multiplied by five; the two values were then added together yielding a product of 120. In the traditional algorithm, the ones place value was multiplied by five first and the tens place value was multiplied by five second, the two values were added together yielding a product of 120. Both strategies yield the same product; however, the partial products method models the value of each digit being multiplied and the traditional algorithm models the digits within each place value being multiplied.) Encourage students to demonstrate their understanding in more than one way. Although the teacher may model the formal names of the properties (i.e. commutative, associative, distributive, etc.), students will only be asked to "use" the underlying concepts in order to solve multiplication problems as outlined within the cognitive expectation of the standard.

### Academic Vocabulary

- Algorithm
- Factor
- Multiplication
- Product
- Properties (Application Of)
  - » Commutative property
  - » Associative property
  - » Distributive property
- Strategy/Strategies (Application Of)
  - » Mental math
  - » Partial products
  - » Properties

### Rigor Implications

- Apply
- Develop
- Use
- Solve

3.4.H 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(H) determine the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally

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

- 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

### How does it support the Readiness Standard(s)?

It is critical for students to develop the conceptual understanding of division before moving to the abstract understanding of the standard algorithm and solving problems involving division. This supporting standard provides that development progression.

### Instructional Implications

In accordance with the standard, instruction of division should include the use of manipulatives to model fair-sharing and the understanding of repeated subtraction to build conceptual understanding of the operation. Instruction should relate the manipulation of the objects to its associated division sentence (i.e. 15 lollipops shared among five friends can be modeled with 15 colored tiles divided into five equal groups, 15 ÷5 = 3). Students should also relate the terms quotient, dividend, and divisor to the actions and values in the number sentence (i.e. 15 color tiles represents the dividend, the 5 friends represents the divisor and the 3 lollipops in each group represents the quotient; dividend ÷ divisor = quotient).

### Academic Vocabulary

- Dividend
- Division
- Divisor
- Equal groups
- Equal shares
- Quotient
- Repeated subtraction

### Rigor Implications

- Apply
- Develop
- Use
- Solve
- Determine

3.4.I 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(I) determine if a number is even or odd using divisibility rules

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

- 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
- 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

### How does it support the Readiness Standard(s)?

As students solve problems using all operations, developing patterns with even and odd solutions can support students with their computational efficiency and accuracy.

### Instructional Implications

Instruction should allow students to use concrete objects to create equal pairs to determine if a number is even or odd (i.e. the number 17 has eight pairs with one left over reflecting an odd number). In accordance with the standard, instruction should relate the divisibility of two to even numbers (i.e. the number 14 had seven pairs reflecting an even number; 14 is divisible by two). If a whole number has in its ones place a 2, 4, 6, 8, or 0, the number is even as it is divisible by two (e.g. the number 356 is divisible by two; therefore it is even because of the 6 in the ones place).

### Academic Vocabulary

- Divisibility rules
- Even
- Odd

### Rigor Implications

- Apply
- Develop
- Use
- Solve
- Determine

3.4.J 3.4 Number and Operations. The student applies mathematical process standards to develop and use strategies and methods for whole number computations in order to solve problems with efficiency and accuracy. The student is expected to:

(J) determine a quotient using the relationship between multiplication and division

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

- 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
- 3.5B represent and solve one- and two-step multiplication and division problems within 100 using arrays, strips diagrams, and equations

### How does it support the Readiness Standard(s)?

Relating multiplication to division supports a student's ability to represent and solve multiplication and division problems.

### Instructional Implications

In accordance with the standard, students should relate the product from a multiplication number sentence to that of a quotient in a division number sentence.
Factor x Factor = Product (i.e. 8 x 6 = 48)
Product ÷ Factor = Factor (i.e. 48 ÷ 6 = 8)
Dividend (Product) ÷ Divisor (Factor) = Quotient (Factor)

### Academic Vocabulary

- Division
  - » Quotient
  - » Dividend
  - » Divisor
- Multiplication
  - » Product
  - » Factor

### Rigor Implications

- Apply
- Develop
- Use
- Solve
- Determine

3.5.C 3.4 Algebraic Reasoning. The student applies mathematical process standards to analyze and create patterns and relationships. The student is expected to:

(C) describe a multiplication expression as a comparison such as 3 x 24 represents 3 times as much as 24

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

- 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
- 3.5B represent and solve one- and two-step multiplication and division problems within 100 using arrays, strips diagrams, and equations

### How does it support the Readiness Standard(s)?

Describing multiplicative expressions as a comparison will support the strategies of arrays, area models, and equal groups for solving of multiplicative and/or division problems.

### Instructional Implications

In conjunction with 3.4D/E, this standard extends the concrete understanding of basic multiplication facts to two-digit by one-digit multiplication. Students relate multiplicative expression to repeated addition (24 + 24 + 24), equal-sized groups (three groups of 24), arrays (represent two ten rods and four unit cubes three times), area models (represent a 20 + 4 rectangle three times yielding 20 + 20 + 20 + 4 + 4 + 4), equal jumps on a number line (jump 24 spaces three times on a number line), and skip counting (24, 48, 72).

### Academic Vocabulary

- Arrays
- Equal-sized groups
- Expression
- Multiplication
- Number line
- Repeated addition
- Skip counting

### Rigor Implications

- Apply
- Analyze
- Create
- Describe

3.5.D

3.5 Algebraic Reasoning. The student applies mathematical process standards to analyze and create patterns and relationships. The student is expected to:

(D) 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

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

- 3.5B represent and solve one- and two-step multiplication and division problems within 100 using arrays, strips diagrams, and equations

### How does it support the Readiness Standard(s)?

Relating multiplication and division equations supports a student's ability to represent and solve multiplication and division problems.

### Instructional Implications

In accordance with the standard, instruction should vary the unknown of a multiplication or division equation (i.e. ___ x 3 = 24; 3 x _____ = 24; 24 ÷ ___ = 3; 24 ÷ 3 = _____). In conjunction with 3.4J, students should relate the multiplicative terms (factor and product) to the division terms (quotient, dividend, and divisor) to further develop the relationship between multiplication and division.

### Academic Vocabulary

- Division
  - » Quotient
  - » Divisor
  - » Dividend
- Multiplication
  - » Product
  - » Factor
- Number Sentence/Equation
- Unknown number

### Rigor Implications

- Apply
- Analyze
- Create
- Determine

3.6.B 3.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional geometric figures to develop generalizations about their properties. The student is expected to:

(B) use attributes to recognize rhombuses, parallelograms, trapezoids, rectangles, and squares as examples of quadrilaterals and draw examples of quadrilaterals that do not belong to any of these subcategories

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

- 3.6A classify and sort two- and three-dimensional figure, including cones, cylinders, spheres, and triangular and rectangular prisms, and cubes, based on attributes using formal geometric language

### How does it support the Readiness Standard(s)?

In order to classify and sort two- and three-dimensional shapes, students must identify attributes that define such figures. Determining examples and non-examples of such categories will allow students to focus on defining attributes.

### Instructional Implications

Students identify four-sided polygons as quadrilaterals and sort given quadrilaterals into subcategories based on their attributes. Instructions should include how the subcategories are similar, yet different (i.e. all squares can be called a rectangle, parallelogram and rhombus; however, a square cannot be called a trapezoid). Be sure students are exposed to both regular (  ) and right angled trapezoids (  ). In adherence to the standard, students should also create examples of quadrilaterals that do not fall into any of the identified subcategories (  ).

### Academic Vocabulary

- Attributes
  - » Vertex (vertices)
  - » Side
- Polygons
  - » Rhombus
  - » Parallelogram
  - » Trapezoid
  - » Rectangle
  - » Square (special type of rectangle)
- Quadrilaterals

### Rigor Implications

- Apply
- Analyze
- Develop
- Use (recognize)
- Draw

3.6.D

3.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional geometric figures to develop generalizations about their properties. The student is expected to:

(D) decompose composite figures formed by rectangles into non-overlapping rectangles to determine the area of the original figure using the additive property of area

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

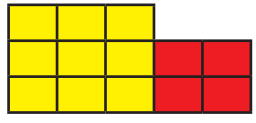
- 3.6C determine the area of rectangles with whole number side lengths in problems using multiplication related to the number of rows times the number of unit squares in each row

### How does it support the Readiness Standard(s)?

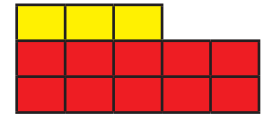
Decomposing composite figures into non-overlapping rectangles will support the students' ability to apply their understanding of multiplication to area.

### Instructional Implications

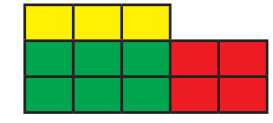
Instruction should associate the decomposing of composite figures to creating two or more arrays. Encourage students to decompose composite figures in more than one way; associate a given multiplication expression to each component of the composite figures; represent an addition equation representing the area of each subsection of the figure in order to determine the area of the composite figure.



(3 x 3) + (2 x 2)= 9 + 4 = 13



(1 x 3) + (2 x 5) = 3 + 10 = 13



(1 x 3) + (2 x 3) + (2 x 2) = 3 + 6 + 4 = 13

### Academic Vocabulary

- Additive property (Application Of)
- Area
- Array
- Composite figure
- Non-overlapping
- Rectangle

### Rigor Implications

- Apply
- Analyze
- Develop
- Decompose
- Determine

3.6.E 3.6 Geometry and Measurement. The student applies mathematical process standards to analyze attributes of two-dimensional geometric figures to develop generalizations about their properties. The student is expected to:

(E) decompose two congruent two-dimensional figures into parts with equal areas and express the area of each part as a unit fraction of the whole and recognize that equal shares of identical wholes need not have the same shape.

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

- 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
- 3.3F represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines

### How does it support the Readiness Standard(s)?

This supporting standard relates fractional equivalency to area. The instructional focus is on how two fractions are equivalent if the two fractional portions have the same area; the two fractional portions/areas do not necessarily have to be the same shape.

### Instructional Implications

Students should divide a two-dimensional shape into equal parts in more than one way (i.e. a square can be divided into two equal parts vertically, horizontally, or diagonally). Students recognize that each equal part of the two-dimensional shape has the same amount of area and can be represented as a unit fraction (i.e. one part of the two equal parts can be represented as 1/2). In adherence to the standard, students must also recognize that equal shares of the same whole do not have to have the same shape but have the same amount of area (i.e. both the rectangular half of a whole square and the triangular half of the same whole square represent 1/2).

### Academic Vocabulary

- Area
- Congruent
- Equal shares
- Polygon
- Shape
- Two-dimensional
- Unit fraction
- Whole

### Rigor Implications

- Apply
- Analyze
- Develop
- Decompose
- Express
- Recognize

3.7.A 3.7 Geometry and Measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement. The student is expected to:

(A) represent fractions of halves, fourths, and eighths as distances from zero on a number line

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

- 3.3F represent equivalent fractions with denominators of 2, 3, 4, 6, and 8 using a variety of objects and pictorial models, including number lines
- 3.3H compare fractions having the same numerator or denominator in problems by reasoning about their sizes and justifying the conclusion using symbols, words, objects, and pictorial models

### How does it support the Readiness Standard(s)?

Locating a fraction as a specific point on a number line will allow students a strategy for comparing and determining equivalency of fractions.

### Instructional Implications

Fractional parts of a whole can be represented as the distance away from zero on a number line. Instruction should begin with the folding of paper strips to develop students' concrete understanding. Instruction can then extend fractional distances on a number line to the use of the ruler in measuring the length of objects to the nearest 1/2, 1/4, and 1/8 increments. This understanding will support further study of comparing fractions and determining equivalent fractions using a number line (see 3.3A/B/F/G).

### Academic Vocabulary

- Distance
- Fractions (halves, fourths, eighths)
- Number line
- Zero

### Rigor Implications

- Apply
- Select
- Solve
- Represent

# GRADE 3 → 3.7C Supporting

3.7.C 3.7 Geometry and Measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement. The student is expected to:

(C) determine the solutions to problems involving addition and subtraction of time intervals in minutes, using pictorial models or tools such as a 15-minute event plus a 30-minute event equals 45 minutes

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

- 4.8C solve problems that deal with measurement of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate

### How does it support the Readiness Standard(s)?

Determining solutions to elapsed time problems within the hour will extend to solving elapsed time problem outside of the hour in grade 4.

### Instructional Implications

In adherence with the standard, students are to use a tool (i.e. clock) and/or pictorial model (i.e. image of a clock, number line) to determine time intervals. Instruction should vary the type of real world examples (i.e. Mandy took 15 minutes to eat breakfast, 10 minutes to get dressed, and 5 minutes to make her bed. How long did it take her to get ready this morning? If Mandy wakes up at 7:10 am every morning and she takes 30 minutes to get ready, what time is she ready for school? If Mandy must leave for school by 7:40 and she takes 30 minutes to get ready, what time should she wake up for school?).

### Academic Vocabulary

- Addition
- Minute
- Subtraction
- Time intervals

### Rigor Implications

- Apply
- Select
- Solve
- Determine

3.7.D 3.7 Geometry and Measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement. The student is expected to:

(D) determine when it is appropriate to use measurements of liquid volume (capacity) or weight

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

- 4.8C solve problems that deal with measurement of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate

### How does it support the Readiness Standard(s)?

Understanding the difference between liquid volume (capacity) and weight will support students in solving such problems appropriately in grade 4.

### Instructional Implications

Students need to understand the difference between the liquid volume (capacity) and the weight of an object (i.e. the number of fluid ounces in a bottle of water is a different measure than the weight of the water bottle). In conjunction with 3.7E, instruction should invoke the use of various measurement tools for students to investigate the difference between the two concepts.

### Academic Vocabulary

- Capacity
- Liquid volume
- Weight

### Rigor Implications

- Apply
- Select
- Solve
- Determine

3.7.E 3.7 Geometry and Measurement. The student applies mathematical process standards to select appropriate units, strategies, and tools to solve problems involving customary and metric measurement. The student is expected to:

(E) determine liquid volume (capacity) or weight using appropriate units and tools

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

- 4.8C solve problems that deal with measurement of length, intervals of time, liquid volumes, mass, and money using addition, subtraction, multiplication, or division as appropriate

### How does it support the Readiness Standard(s)?

Students will need hands on experiences with selecting and using appropriate tools and measurement units for liquid volume (capacity) and weight in order to solve such problems in grade 4.

### Instructional Implications

In conjunction with 3.7D, students should be able to select appropriate tools to measure capacity (i.e. graduated cylinders, cups, and containers) vs. weight (i.e. scales). Instruction should also include the appropriate units to measure capacity (i.e. gallons, quarts, cups, liters, etc.) vs. weight (i.e. pounds, ounces, grams, etc.). Hands on experiences should include practice with metric and customary measurements.

### Academic Vocabulary

- Capacity
- Customary
- Liquid volume
- Measurement tools
- Metric
- Units
- Weight

### Rigor Implications

- Apply
- Select
- Solve
- Determine

3.8.B 3.8 Data Analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:

(B) solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals

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

- 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
- 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
- 3.8A summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals

### How does it support the Readiness Standard(s)?

This supporting standard merges the calculation of whole numbers with various graph representations. Through the interpretation of data on a graph, students should be able to apply their ability to solve addition/subtraction and multiplication/division of whole numbers.

### Instructional Implications

Instruction should vary the context of the problems being asked of the students (i.e. joining, separating, comparing, and distance). In conjunction with 3.8A, as students have graphed the same data set on 4 different types of graphs, students could then solve the same problem using the different graph representations to model their flexibility in moving among the different types of graphs.

### Academic Vocabulary

- Bar graph
- Categorical data
- Dot plot
- Frequency table
- Pictograph
- Scaled intervals

### Rigor Implications

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

3.9.A 3.9 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) explain the connection between human capital/labor and income

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

- 3.9 Personal Financial Literacy

**How does it support the Readiness Standard(s)?**

Understanding human capital/labor and income will support one's ability to manage his or her financial resources more effectively for a lifetime of financial security.

**Instructional Implications**

Human capital (skills, knowledge, competency, and education) has a positive correlation to one's ability to gain income. Students need to understand that the more education, experience, and abilities they have usually leads to the earning of more money. Instruction should include students researching various professions, the amount of education needed, and the average earned income for such professions.

**Academic Vocabulary**

- Human capital
- Income
- Labor

**Rigor Implications**

- Apply
- Explain

3.9.B 3.9 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) describe the relationship between the availability or scarcity of resources and how that impacts costs

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

- 3.9 Personal Financial Literacy

### How does it support the Readiness Standard(s)?

Understanding how the availability or scarcity of a resource impacts costs will support one's ability to manage his or her financial resources more effectively for a lifetime of financial security.

### Instructional Implications

This standard is laying the foundation for the law of supply and demand. Students need to understand that as the availability of resources is abundant, the cost of the item tends to be less; when the availability of a resource is scarce, the cost tends to be higher. Instruction should include several real world examples (i.e. release of a new game system tends to be high at first because everyone is wanting the item and there are few available in the store; however, after several months the cost of the game system goes down because there is no longer a need for such an item, game systems are available in several stores, or have been replaced by a newer game system.).

### Academic Vocabulary

- Resources
  - » Availability of resources
  - » Scarcity of resources
  - » Cost

### Rigor Implications

- Apply
- Describe (relate)

3.9.C 3.9 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 costs and benefits of planned and unplanned spending decisions

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

- 3.9 Personal Financial Literacy

### How does it support the Readiness Standard(s)?

Identifying the costs and benefits of planned and unplanned spending decisions will support one's ability to manage his or her financial resources more effectively for a lifetime of financial security.

### Instructional Implications

In conjunction with 3.9F, students need to understand that financial decisions made will have positive and negative results. In adherence with this standard, students should weigh the benefits (good things) for planning for unexpected spending versus the costs (bad things) of not planning for unexpected spending.

### Academic Vocabulary

- Benefits
- Costs
- Decisions
- Planned spending
- Unplanned spending

### Rigor Implications

- Apply
- Identify

3.9.D 3.9 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) explain that credit is used when wants or needs exceed the ability to pay and that it is the borrower's responsibility to pay it back to the lender, usually with interest

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

- 3.9 Personal Financial Literacy

### How does it support the Readiness Standard(s)?

Understanding the use and expectations associated with credit will support one's ability to manage his or her financial resources more effectively for a lifetime of financial security.

### Instructional Implications

In adherence with the standard, instruction should address how credit can be used when one goes beyond their ability to pay. Students will need to understand the role and responsibility of a borrower and lender. Be sure to provide students with several real world examples of how not only the principle of the loan, but also the interest, must be paid back.

### Academic Vocabulary

- Resources
- Borrower
- Credit
- Interest
- Lender
- Needs
- Principle
- Wants

### Rigor Implications

- Apply
- Explain

3.9.E 3.9 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) list reasons to save and explain the benefit of a savings plan, including for college

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

- 3.9 Personal Financial Literacy

### How does it support the Readiness Standard(s)?

Listing reasons to save and explaining the benefits 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, students should identify several reasons why they should save (i.e. purchase a large item, in case of emergencies, college, etc.). In conjunction with 3.9C/F, students should recognize the benefits to saving.

### Academic Vocabulary

- Benefit
- College
- Save (savings plan)

### Rigor Implications

- Apply
- List
- Explain

# GRADE 3 → 3.9F Supporting

3.9.F 3.9 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) identify decisions involving income, spending, saving, credit, and charitable giving

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

- 3.9 Personal Financial Literacy

### How does it support the Readiness Standard(s)?

Understanding the concepts of income, spending, saving, credit and charitable giving will support one's ability to manage his or her financial resources more effectively for a lifetime of financial security.

### Instructional Implications

In adherence with the standard, instruction should model how individuals have decisions that need to be made in regards to income (i.e. how much should I be earning for my weekly allowance?), spending (i.e. how much of my allowance do I feel comfortable spending each week?), saving (i.e. how much money should I save of my allowance?), credit (i.e. should I save my money for the new video game or take a loan from my dad?), and charitable giving (i.e. how much should I donate to the less fortunate?).

### Academic Vocabulary

- Charitable giving
- Credit
- Decisions
- Income
- Saving
- Spending

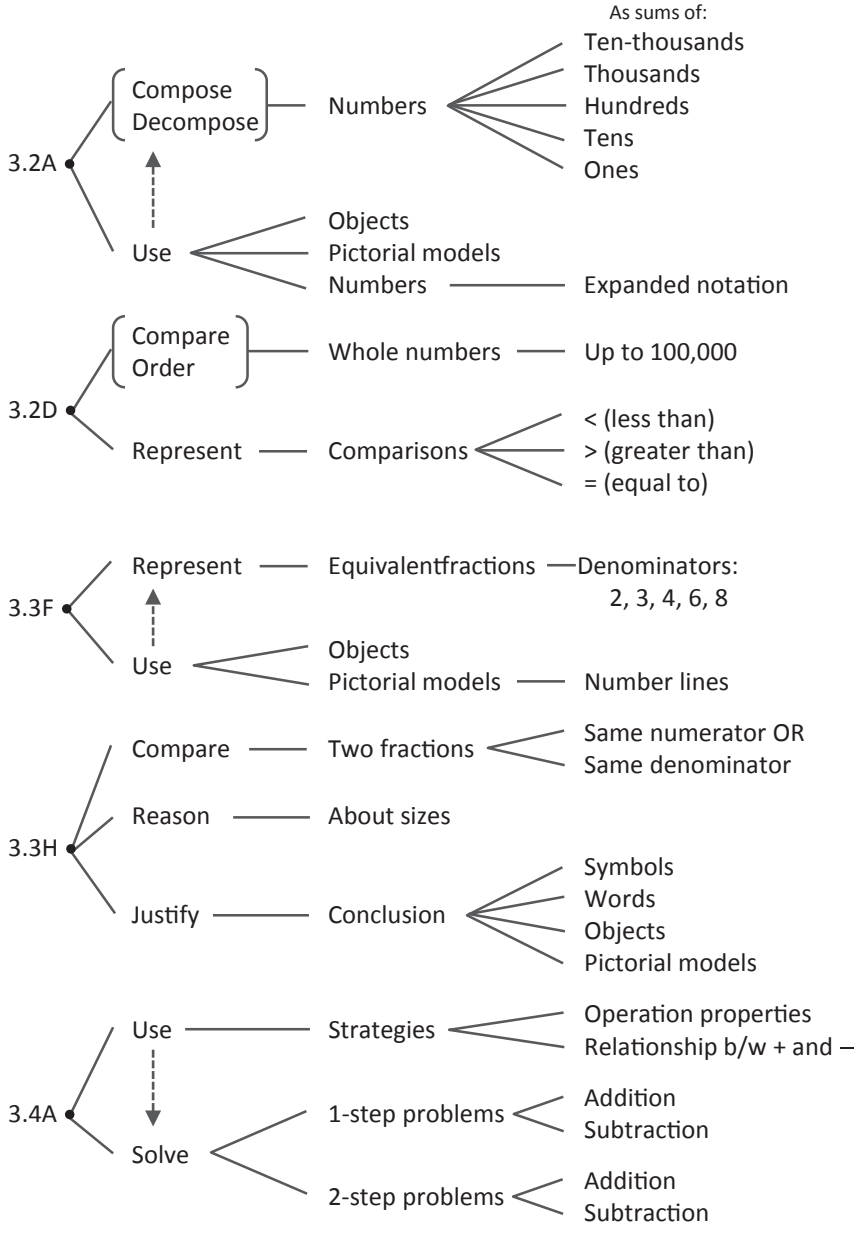
### Rigor Implications

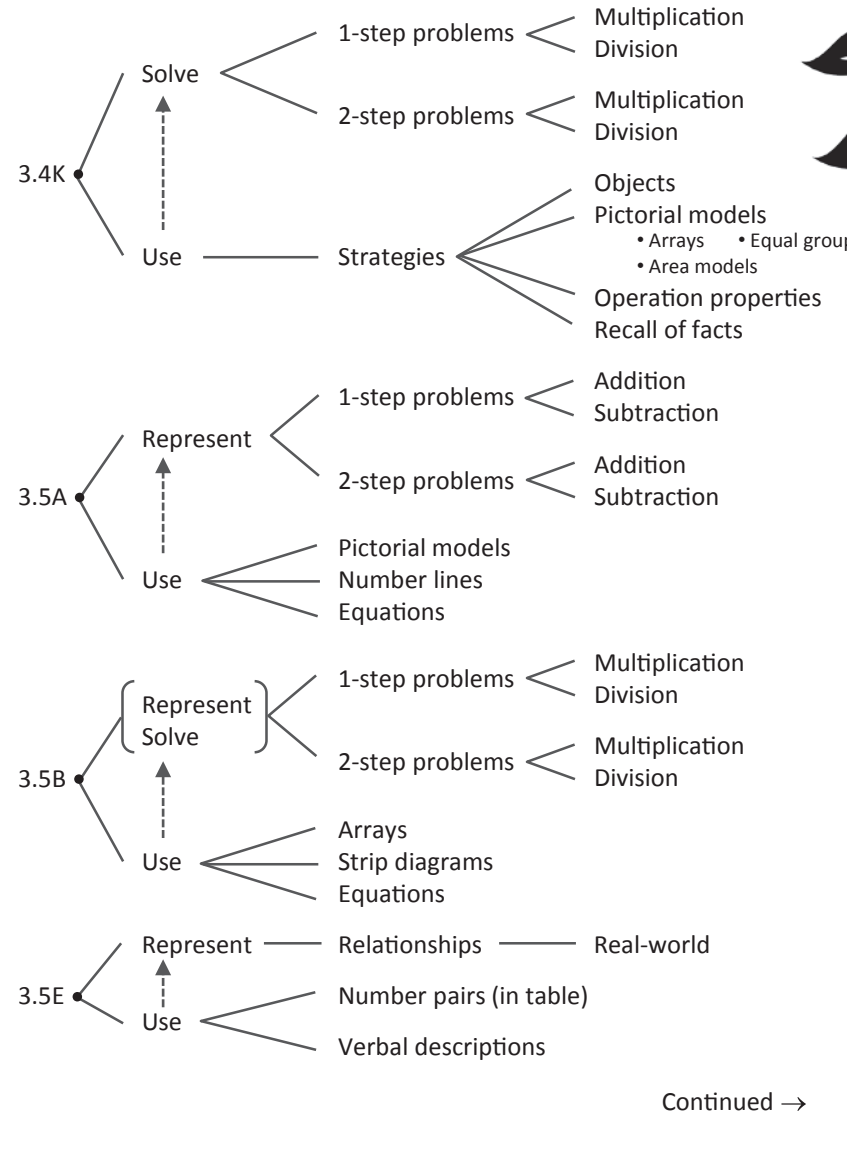
- Apply
- Identify

# APPENDIX

## TREE DIAGRAM

# Grade 3 Math TEKS Tree - Readiness Standards




Continued →

TEKS Student Expectations for implementation beginning 2014-2015.

# Grade 3 Math TEKS Tree - Readiness Standards