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"

**GRADE 6**

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**

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 (§)

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:**

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

3.3A represent fractions greater than zero and less than or equal to one with denominators of 2, 3, 4, 6, and 8 and given a specified point on a number line (§).

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 (§).

2.3A partition objects into equal parts and name the parts, including halves, fourths, and eighths, using words (§).

**Instructional Implications**

- 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.

**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).

**Academic Vocabulary**

- Area
- Denominator
- Distance
- Equivalent fractions
- Numerator
- Whole

**Rigor Implications**

- Apply
- Represent
- Explain

**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.
GRADE 6

How to read STAAR Supporting Standards Analysis Pages

Standard and Indication of “Readiness” or “Supporting”

GRADE 3 3.9E Supporting

Texas Essential Knowledge and Skills Statement

Student Expectation

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.N. Personal Financial Literacy

How does it support the Readiness Standard(s)?

Listing reasons to save and explain the benefits will support one’s ability to manage their 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 (e.g., purchase a large item, in case of emergencies, college, etc.). In conjunction with 3.MCP, students should recognize the benefits to saving.

Academic Vocabulary

• Benefit
• College
• Save (savings plan)

Rigor Implications

• Apply
• List
• Explain

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.
### Action Steps

| Action Step                              | Guiding Questions & Notes                                                                 
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Read each analysis page.</td>
<td>What stands out?</td>
</tr>
<tr>
<td></td>
<td>Do you have data on any of the standards that suggest whether the standard is a strength or a concern?</td>
</tr>
<tr>
<td></td>
<td>How many of the standards are at a high level of rigor?</td>
</tr>
<tr>
<td>Instructional Implications</td>
<td>How will these implications inform your planning?</td>
</tr>
<tr>
<td></td>
<td>How can you use this information to modify instruction?</td>
</tr>
<tr>
<td>TEKS Scaffolding</td>
<td>What concepts did students learn in the previous grade to prepare them?</td>
</tr>
<tr>
<td></td>
<td>Do you have students who may struggle with those concepts?</td>
</tr>
<tr>
<td></td>
<td>Look at how the students will use that concept in subsequent grades - will the way you teach it still apply in those grades?</td>
</tr>
<tr>
<td>Action Steps</td>
<td>Guiding Questions &amp; Notes</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Content Builder (Readiness Standards only)</strong></td>
<td>How many parts does this standard have?</td>
</tr>
<tr>
<td></td>
<td>Which of the parts are new to your team or to the students?</td>
</tr>
<tr>
<td></td>
<td>This content is important for students’ future learning. How will you assess retention?</td>
</tr>
<tr>
<td><strong>Supporting the Readiness Standards (Supporting Standards only)</strong></td>
<td>How can you use this information as you plan lessons?</td>
</tr>
<tr>
<td></td>
<td>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)?”</td>
</tr>
<tr>
<td><strong>Vocabulary</strong></td>
<td>What strategies will you use to ensure mastery of the vocabulary for each standard in this unit?</td>
</tr>
<tr>
<td></td>
<td>What is your plan if students do not master the vocabulary?</td>
</tr>
<tr>
<td><strong>Use the Distractor Factor</strong></td>
<td>How can you address the information in the Distractor Factor section?</td>
</tr>
<tr>
<td></td>
<td>From your teaching experience, is there anything you would add to this? Write it on your analysis pages!</td>
</tr>
<tr>
<td><strong>Reflection</strong></td>
<td>How have you taught this content in the past?</td>
</tr>
<tr>
<td></td>
<td>How will you teach it differently this year?</td>
</tr>
<tr>
<td></td>
<td>How will you utilize the readiness and supporting standards for formative and summative assessment?</td>
</tr>
</tbody>
</table>
GRADE 6  6.2D Readiness

TEKS Scaffold

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.2B</td>
<td>approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line (S)</td>
</tr>
<tr>
<td>8.2D</td>
<td>order a set of real numbers arising from mathematical and real-world contexts (R)</td>
</tr>
</tbody>
</table>

6.2 Number and Operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:  

(D) order a set of rational numbers arising from mathematical and real-world contexts

6.2D

• order a set of rational numbers arising from mathematical context
• order a set of rational numbers arising from real-world context

Instructional Implications

In conjunction with 6.2C, students will use number lines to order a set of rational numbers arising from mathematical and real-world contexts (i.e. newspaper advertisements, stock market values, temperatures, etc.). Instruction should have students comparing/ordering a mixture of rational number representations (i.e. order the following tool lengths from shortest to longest: 5 1/2", 2 1/4", 5", 5.75", 5.6"). In adherence to the standard, examples are not limited to positive values; examples should also extend to positive and negative rational numbers and zero (i.e. order the following temperatures from least to greatest: -11°, 1°, 23°, 0°, 14°, -6°).

Distractor Factor

• Students may disregard the sign of negative integers when ordering non-positive numbers.
• Students may compare the number of digits instead of applying their understanding of place value to determine the value of decimals (i.e. 0.451 is greater than 0.98 because it has more digits).
• Students may not understand that 0.7 is equivalent to 0.70.
• Students need to understand the context of problems to order decimals correctly (i.e. when ordering time from fastest to slowest, students may want to order from greatest to least).

Academic Vocabulary

• equal to (=)
• greater than (>)
• least to greatest
• less than (<)
• negative
• non-negative
• non-positive
• positive
• rational numbers

Rigor Implications

• Apply
• Represent
• Use
• Order

Content Builder - (See Appendix for Tree Diagram)

• order a set of rational numbers arising from mathematical context
• order a set of rational numbers arising from real-world context

Academic Vocabulary

• equal to (=)
• greater than (>)
• least to greatest
• less than (<)
• negative
• non-negative
• non-positive
• positive
• rational numbers

Rigor Implications

• Apply
• Represent
• Use
• Order
GRADE 6  6.3D Readiness

TEKS Scaffold

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.3A</td>
<td>add, subtract, multiply, and divide rational numbers fluently (S)</td>
</tr>
<tr>
<td>7.3B</td>
<td>apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers (R)</td>
</tr>
</tbody>
</table>

6.3 Number and Operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying the solutions. The student is expected to:

(D) add, subtract, multiply, and divide integers fluently

6.3C represent integer operations with concrete models and connect the actions with the models to standardized algorithms (S)

6.2C locate, compare, and order integers and rational numbers using a number line (S)

Content Builder - (See Appendix for Tree Diagram)

- Add integers
- Subtract integers
- Multiply integers
- Divide integers

Instructional Implications

In conjunction with 6.3C, as students model the actions of +/−/×/÷ with concrete objects/pictorial models they will begin to discover a standard algorithm to calculate such values fluently (i.e. a negative number added to another negative number always yields a negative sum; a negative number multiplied by a negative number always yields a positive product). An emphasis on solving problems and justifying solutions may support students in the development of fluency. Instruction should include mixing the various operations to ensure student flexibility in moving among the operations.

Distractor Factor

- Students may have difficulty determining the sign (positive or negative) for the sum, difference, product, or quotient when performing the operations of addition, subtraction, multiplication, and division on integers.

Academic Vocabulary

- addends
- addition
- difference
- dividend
- division
- divisor
- factors
- integer
- negative
- multiplication
- positive
- product
- quotient
- subtraction
- sum

Rigor Implications

- Apply
- Represent
- Solve
- Justify
- Add
- Subtract
- Multiply
- Divide
GRADE 6  6.3E Readiness

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.12D</td>
<td>calculate and compare simple interest and compound interest earnings (R)</td>
</tr>
<tr>
<td>8.12A</td>
<td>solve real-world problems comparing how interest rate and loan length affect the cost of credit (S)</td>
</tr>
<tr>
<td>7.3B</td>
<td>apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers (R)</td>
</tr>
</tbody>
</table>

6.3E  Number and Operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying the solutions. The student is expected to:

(E) multiply and divide positive rational numbers fluently

Instructional Implications

In accordance to the standard, students should begin multiplying and dividing rational numbers fluently. Rational numbers include whole number, fractions, decimals, and percentages. In conjunction with 6.2A, instruction should include multiplication and division of rational numbers in various forms (i.e. 2/5 x 0.6 or 2/5 x 60% or 0.4 x 60%) and products/quotients represented in various forms (i.e. 2/5 x 0.6 = 0.24 or 24/100 or 6/25 or 24%). An emphasis on solving problems and justifying solutions may support students in the development of fluency. Estimating products/quotients prior to solving will allow students to apply reasonableness to solutions.

Distractor Factor

- Students may find a common denominator to multiply fractions.
- Students may line up the decimal point to multiply decimals.
- Students may not relate division to multiplying by the reciprocal, such as 2/5 ÷ 3 as equivalent to 2/5 • 1/3
- Students may incorrectly represent percents, such as 6% as 0.6.

Academic Vocabulary

- decimals
- denominator
- dividend
- division
- divisor
- factors
- fractions
- integers
- mixed numbers
- multiplication
- numerator
- positive rational numbers
- product
- quotient
- reciprocal
- whole numbers

Rigor Implications

- Apply
- Represent
- Solve
- Justify
- Multiply
- Divide

Content Builder - (See Appendix for Tree Diagram)

- Multiply positive rational numbers fluently
- Divide positive rational numbers fluently

Instructional Implications

In accordance to the standard, students should begin multiplying and dividing rational numbers fluently. Rational numbers include whole number, fractions, decimals, and percentages. In conjunction with 6.2A, instruction should include multiplication and division of rational numbers in various forms (i.e. 2/5 x 0.6 or 2/5 x 60% or 0.4 x 60%) and products/quotients represented in various forms (i.e. 2/5 x 0.6 = 0.24 or 24/100 or 6/25 or 24%). An emphasis on solving problems and justifying solutions may support students in the development of fluency. Estimating products/quotients prior to solving will allow students to apply reasonableness to solutions.

Distractor Factor

- Students may find a common denominator to multiply fractions.
- Students may line up the decimal point to multiply decimals.
- Students may not relate division to multiplying by the reciprocal, such as 2/5 ÷ 3 as equivalent to 2/5 • 1/3
- Students may incorrectly represent percents, such as 6% as 0.6.

Academic Vocabulary

- decimals
- denominator
- dividend
- division
- divisor
- factors
- fractions
- integers
- mixed numbers
- multiplication
- numerator
- positive rational numbers
- product
- quotient
- reciprocal
- whole numbers

Rigor Implications

- Apply
- Represent
- Solve
- Justify
- Multiply
- Divide
### TEKS Scaffold

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.4B</td>
<td>graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship (R)</td>
</tr>
<tr>
<td>8.4C</td>
<td>use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems (R)</td>
</tr>
<tr>
<td>8.4A</td>
<td>use similar right triangles to develop an understanding that slope, ( m ), given as the rate comparing the change in y-values to the change in x-values, ( (y_2 - y_1)/(x_2 - x_1) ), is the same for any two points ( (x_1, y_1) ) and ( (x_2, y_2) ) on the same line (S)</td>
</tr>
<tr>
<td>7.4B</td>
<td>calculate unit rates from rates in mathematical and real-world problems (S)</td>
</tr>
<tr>
<td>7.4D</td>
<td>solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems (R)</td>
</tr>
</tbody>
</table>

### 6.4B Proportionality

The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:

(B) apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates

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

- apply qualitative reasoning to solve prediction of real-world problems involving ratios
- apply qualitative reasoning to solve prediction of real-world problems involving rates
- apply quantitative reasoning to solve comparison of real-world problems involving ratios
- apply quantitative reasoning to solve comparison of real-world problems involving rates

### Instructional Implications

In accordance with the standard, students will apply qualitative reasoning (Which is better?) and quantitative reasoning (Which is more/less?) to solve ratio and rate problems from real-world contexts. These problems might include situations involving measurements, prices, miles per hour, number of pieces of candy per person, or cups per quart, etc.

Instruction should have students solving a variety of prediction and comparison problems.

- **Prediction problems:**
  - 3 out of 8 students prefer pepperoni pizza; predict how many of the 250 sixth grade students are likely to prefer pepperoni pizza
- **Comparison problems:**
  - two classes ordered pizza; the first class ordered pizza so every 3 students will have 2 pizzas; the second class ordered pizza so every 5 students will have 3 pizzas; determine if the first or second period class has more pizza for each student

### Distractor Factor

- Students may think of ratios as an additive relationship instead of a multiplicative relationship.

### Academic Vocabulary

- ratio
- rate
- proportional relationship
- quantitative
- qualitative

### Rigor Implications

- Apply
- Develop
- Solve
### 6.4G Proportionality

The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:

- **G** generate equivalent forms of fractions, decimals, and percents using real-world problems, including problems that involve money.

### Instructional Implications

In accordance to the standard, it is essential that students have a conceptual understanding of equivalent fractions, decimals, and percents (i.e. fractions, decimals, or percents are equivalent if they are representations for the same amount or quantity). Instruction should include the use of real-world problems (including problems that involve money) to generate equivalent forms of fractions, decimals, and percents. Using real-world problems, students can develop an understanding of equivalent fractions (i.e. if one dollar represents a whole, generate an equivalent decimal and fraction for an 8% sales tax: 8/100 or 2/25 or 0.08). It is important that instruction vary the type of representations to develop student fluidity in progressing among the different representations (i.e. given a percent generate an equivalent fraction and decimal; given a decimal generate an equivalent fraction and percent; given a fraction generate an equivalent decimal and percentage). Instruction should also include values greater than one whole (i.e. 3 4/5, 3.45, 345%). To reinforce equivalent fractions, decimals, and percents, the student can enter the different forms into a calculator and compare the equivalent values.

### Distractor Factor

- Students may not relate percent (being out of 100) to decimals (in the hundredths position) or fractions (X/100).

### Academic Vocabulary

- decimal
- equivalent
- fraction
- percent

### Rigor Implications

- Apply
- Develop
- Generate

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### TEKS Scaffold

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.2A</td>
<td>extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers (S)</td>
</tr>
<tr>
<td>8.2D</td>
<td>order a set of real numbers arising from mathematical and real-world contexts (R)</td>
</tr>
<tr>
<td>7.4D</td>
<td>solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems (R)</td>
</tr>
<tr>
<td>6.5C</td>
<td>use equivalent fractions, decimals, and percents to show equal parts of the same whole (S)</td>
</tr>
</tbody>
</table>

### 6.4E

- represent ratios and percents with concrete models, fractions, and decimals (S) |

### 6.4F

- represent benchmark fractions and percents such as 1%, 10%, 25%, 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers (S) |

### 4.2G

- relate decimals to fractions that name tenths and hundredths (R) |

### 4.3C

- determine if two given fractions are equivalent using a variety of methods (S) |
Content Builder - (See Appendix for Tree Diagram)

- convert units within a measurement system using proportions
- convert units within a measurement system using unit rates

Instructional Implications

In adherence to the TEKS and in conjunction with 6.4C/D, students should convert a variety of units for various forms of measurement (time, length, capacity, weight, etc.). Instruction should include a variety of conversion problems within the same measurement system (i.e. minutes to hours; feet to yards; gallons to quarts; ounces to pounds). With the use of proportions, students use knowledge of one ratio to determine a value in the other ratio (i.e. using proportional reasoning, the student should be able to determine that \( \frac{1 \text{ minute}}{60 \text{ seconds}} = \frac{2 \text{ minutes}}{120 \text{ seconds}} \) since each unit of measure in the ratio \( \frac{1 \text{ minute}}{60 \text{ seconds}} \) was doubled). As students become more adept at proportional reasoning and in conjunction with 6.3E/6.7D it is important to reference the multiplication identity property of one (i.e. since \( \frac{1 \text{ minute}}{60 \text{ seconds}} \times 1 = \frac{1 \text{ minute}}{60 \text{ seconds}} \), then \( \frac{1 \text{ minute}}{60 \text{ seconds}} \times 2 = \frac{2 \text{ minutes}}{60 \text{ seconds}} \) because \( \frac{2}{2} = 1 \) when representing various proportions. This proportional reasoning can be applied to metric conversions (i.e. 

\[
\frac{10 \text{ millimeters}}{1 \text{ centimeter}} \times \frac{3}{3} = \frac{30 \text{ millimeters}}{3 \text{ centimeters}} \]

and customary conversions (i.e. 

\[
\frac{27 \text{ inches}}{2.25 \text{ feet}} \times \frac{3}{3} = \frac{9 \text{ inches}}{0.75 \text{ feet}}
\]

Students should be able to use division to determine the unit rate (i.e. consider the relationship between the two units of measure, \( \frac{15 \text{ feet}}{5 \text{ yards}} \)), determine the unit rate, \( 15 \div 5 = 3 \), and then use the unit rate, \( \frac{3 \text{ feet}}{1 \text{ yard}} \), to calculate the number of feet equal in length to 105 yards, \( \frac{3 \text{ feet}}{1 \text{ yard}} \times \frac{10.5 \text{ yards}}{1 \text{ yard}} = \frac{31.5 \text{ feet}}{1 \text{ yard}} \). Students will need to decide which method (i.e. proportions or unit rates) is the most efficient to convert units within a measurement system.

Distractor Factor

- Students may use the wrong operation to convert from one unit to another incorrectly (i.e. dividing the number of feet by 12 inches when converting feet to inches).

Academic Vocabulary

- customary measurement
- measurement system
- metric measurement
- proportion
- unit rate
- units

Rigor Implications

- Apply
- Develop
- Convert
GRADE 6 ✰ 6.5B Readiness

**TEKS Scaffold**

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.6H</td>
<td>solve problems using qualitative and quantitative predictions and comparisons from simple experiments (R)</td>
</tr>
<tr>
<td>7.3B</td>
<td>apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers (R)</td>
</tr>
<tr>
<td>7.4D</td>
<td>solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems (R)</td>
</tr>
</tbody>
</table>

6.5 Proportionality. The student applies mathematical process standards to solve problems involving proportional relationships. The student is expected to:

(B) solve real-world problems to find the whole given a part and the percent, to find the part given the whole and percent, and to find the percent given the part and whole, including the use of concrete and pictorial models

6.4G generate equivalent forms of fractions, decimals, and percents using real-world problems, including problems that involve money (R)

6.5C use equivalent fractions, decimals, and percents to show equal parts of the same whole (S)

6.4F represent benchmark fractions and percents such as 1%, 10%, 25%, 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers (S)

6.4E represent ratios and percents with concrete models, fractions, and decimals (S)

5.3D represent multiplication of decimals with products to the hundredths using objects and pictorial models, including area models (S)

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

- solve real-world problems with concrete and pictorial models
  - find the whole given a part and the percent
  - find the part given the whole and percent
  - find the percent given the part and whole

**Instructional Implications**

In adherence with the standard, instruction should include the use of concrete (i.e., folded strips of paper) and pictorial models (i.e., 10 x 10 grids, number lines, etc.) to solve real-world percent problems. In conjunction with 6.4F, the use of benchmark percents, multiples of these values, and the use of numbers compatible with benchmark percents will put the focus of the instruction on the relationships involved, not complex computational skills. Students will be asked to use these tools to calculate a whole given a part and the percent (i.e., a sale price of $84 represents 35% of the original price, determine the original price, \[ \frac{35}{100} = \frac{84\text{ sale price}}{x \text{ original price}} \]; calculate the part given the whole and percent (i.e., a discount of 35% off the original price of $240, determine the discount price, \[ \frac{35}{100} = \frac{x \text{ sale price}}{240\text{ original price}} \]; calculate the percent of a given part and whole (i.e., a sale price of $84 and an original price of $240, calculate the percentage discount of the sales price, \[ \frac{x}{100} = \frac{84\text{ sale price}}{240\text{ original price}} \]. Students should be able to justify their answer choices through the lens of the concrete and/or pictorial models (i.e., if the whole strip of paper represents the original price of $240 and the strip is divided into three equal parts representing \[ \frac{1}{3} \text{ or } 33 \frac{1}{3} \% \text{ and } \frac{2}{3} \text{ or } 66 \frac{2}{3} \% \text{, then each third of the sentence strip represents approximately } 80, 240 \div 3). Students should be encouraged to employ a variety of strategies to solve percent problems.

**Distractor Factor**

- Students may view the value of 20% as the whole number 20 instead of 0.20 or \( \frac{20}{100} \).

**Academic Vocabulary**

- part
- percent
- proportional relationships
- whole

**Rigor Implications**

- Apply
- Solve
- Find
GRADE 6 6.6C Readiness

**Instructional Implications**

In conjunction with 6.6A/6.6B, students will use verbal descriptions, tables, graphs, and equations to represent the both additive (i.e. \( y = x + b \)) and multiplicative relationships (i.e. \( y = kx \)). Through verbal descriptions, students will articulate the relationship between the independent and dependent quantities as it relates to the given situation (i.e. for every tricycle there are three times as many wheels). The use of tables organizes data and provides a means for students to look for patterns and develop a rule that describes the way the independent and dependent quantities are related (i.e. multiplying the number of tricycles times 3 will yield the total number of wheels). The use of a process column identifying the rule can support students in representing the data using symbolic notation (i.e. \( t \cdot 3 = w \)).

### Academic Vocabulary

- **coordinates**
- **dependent quantity**
- **equation**
- **graph**
- **independent quantity**
- **linear**
- **ordered pair**
- **relationship**
- **table**
- **verbal description**

### Distractor Factor

- Students may want to symbolically represent a given situation based on the pattern between the independent quantities or the dependent quantities and not the independent to the dependent quantities (i.e. the number of wheels can be represented as \( t \cdot 3 \) because the output column increases by three each time).
- Students may not understand how the coordinates of an ordered pair communicate information [i.e. \( (2, 6) \) represents that for two tricycles there would be six wheels].
- Students may not begin the number pattern at zero.

### Rigor Implications

- **Apply**
- **Use**
- **Describe**
- **Represent**
## TEKS Scaffold

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.10E</td>
<td>factor, if possible, trinomials with real factors in the form ax^2 + bx + c, including perfect square trinomials of degree two (R)</td>
</tr>
<tr>
<td>A.11B</td>
<td>simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents (R)</td>
</tr>
</tbody>
</table>

### 6.7 Expressions, Equations, and Relationships

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

- **(A)** generate equivalent numerical expression using order of operations, including whole number exponents and prime factorization

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

- generate equivalent numerical expressions using order of operations
- generate equivalent numerical expressions using order of operations including whole number exponents
- generate equivalent numerical expressions using order of operations including prime factorization

### Instructional Implications

In accordance with this standard, students will use order of operations to generate equivalent expressions. Expressions should include the use of whole number exponents (i.e. $7 + 2^3 = 7 + (2 \times 2 \times 2) = 7 + 8 = 15$) and prime factorization (i.e. $56 = 2^3 \times 7$) to generate equivalent numerical expressions. In accordance to the standard, exponential representations are limited to whole numbers. For students to develop the concept of exponents, instruction should include ample opportunities for students to work with exponents as whole numbers so students understand that a whole number exponent is repeated multiplication of a number times itself. (i.e. $6 \times 2^3$ and $6 \times 2 \times 2 \times 2$ are equivalent numerical expressions and $123$ and $6 \times 2^3$ are not equivalent numerical expressions).

### Distractor Factor

- Students may just work problems from left to right instead of applying order of operations
- Students may do addition before subtraction disregarding the order of the two operations in the expression.
- Students may do multiplication before division disregarding the order of the two operations in the expression.
- Students may multiply the base and exponent in the term $3^2$ instead of $3 \times 3$ (i.e. $3^2 = 3 \times 2 = 6$, instead of $3^2 = 3 \times 3 = 9$)
- Students may not understand that “simplifying” an expression does not change the value. Each step in order of operations yields an equivalent expression.

### Academic Vocabulary

- equation
- exponents
- expression
- order of operations
- prime factorization
- relationship
- simplify
- whole number

### Rigor Implications

- Apply
- Develop
- Generate
- Use
6.7D Readiness

**TEKS Scaffold**

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.8C</td>
<td>model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants (R)</td>
</tr>
<tr>
<td>7.11A</td>
<td>model and solve one-variable, two-step equations and inequalities (R)</td>
</tr>
</tbody>
</table>

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

- generate equivalent expressions using properties of operations
  - additive identity
  - multiplication identity
  - additive inverse
  - multiplicative inverse
  - commutative property of addition
  - commutative property of multiplication
  - associative property of addition
  - associative property of multiplication
  - distributive property

**Instructional Implications**

In conjunction with 6.7C, as students begin representing equivalent expressions with concrete objects and/or pictorial models, those actions can be associated with the properties of operations. A calculator may be used to support the development of the understanding of these various properties of operations (i.e. additive inverse property: students enter numerous examples using rational numbers such as \(3 + -3, -2.3 + 2.3, 2/3 + -2/3\); distributive property: students enter the expressions \(2(3.6 + 8.4)\) and \(2(3.6) + 2(8.4)\) and compare the values of the expressions. Instruction should also include examples of expressions that are not equivalent (i.e. \(2(3.6 + 8.4)\) is equivalent to \(2(3.6) + 2(8.4)\), but is not equivalent to \(2(3.6) + 8.4 \) or \(2 + 3.6 + 8.4\)). As students begin to verbalize and describe the various operational properties, instruction should then translate from numerical to algebraic representations of the property (i.e. commutative property of multiplication may be described verbally as: the expression \(5.8 \cdot 3\) is equivalent to the expression \(3 \cdot 5.8\) because the same factors were used in each expression, the factors were just switched around the multiplication sign, each expression has a product of 17.4, so this may be written as \(5.8 \cdot 3 = 3 \cdot 5.8\) or \(a \cdot b = b \cdot a\)).

**Distractor Factor**

- Students may apply the commutative and associative property to subtraction and division.
- Students may have difficulty identifying the reciprocal as the multiplicative inverse of fractions.
- Students may confuse the taking of the opposite operation when applying the additive inverse property with the reciprocal when applying the multiplicative inverse.

**Academic Vocabulary**

- additive identity property
- additive inverse property
- associative property of addition
- commutative property of addition
- commutative property of multiplication
- distributive property
- equivalent

- expression
- identity
- inverse
- multiplicative identity property
- multiplicative inverse property
- opposite
- reciprocal

**Rigor Implications**

- Apply
- Develop
- Generate
- Use
6.8 Expressions, Equations, and Relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:

(D) determine solutions for problems involving the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers

Instructional Implications
In conjunction with 6.BB/C, instruction will move from the concrete development of the various area (i.e. rectangles, parallelograms, trapezoids, and triangles) and volume (right rectangular prisms) formulas to applying those formulas to solve problems. As outlined by the standard, problems should include positive rational numbers (decimals and fractions). Instruction should vary the context of the problems (i.e. given the lengths of the sides and/or heights, determine the area/volume; given the area/volume and one of the dimensions of the sides/edges and/or heights, determine the missing side/edge and/or height; given the area/volume of a square/cube, what are the dimensions of the sides?). It is important that students understand why area is represented in square units and volume is presented in cubic units.

Distractor Factor
• Students may confuse the concept of perimeter, area, and volume.
• When determining the area/volume of a square/cube or volume of a cube, students may forget that the side lengths must be equal.
• Students may not correctly label the units of measure (i.e. length in units; area in square units; and volume in cubic units).
• Students may not relate how the formula for area of a rectangle is a component of the formula for volume of a rectangular prism.

Academic Vocabulary
• area
• cubic units (cubic feet, cubic centimeters, etc.)
• dimensions
• parallelogram
• positive rational numbers
• rectangle
• right rectangular prism
• solution
• square units (square feet, square centimeters, etc.)
• triangle
• trapezoid
• volume

Rigor Implications
• Apply
• Use
• Represent
• Determine(solve)
6.10A Readiness

TEKS Scaffold

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.8C</td>
<td>model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants (R)</td>
</tr>
<tr>
<td>7.11A</td>
<td>model and solve one-variable, two-step equations and inequalities (R)</td>
</tr>
<tr>
<td>6.9B</td>
<td>represent solutions for one-variable, one-step equations and inequalities on number lines (S)</td>
</tr>
<tr>
<td>6.10B</td>
<td>determine if the given value(s) make(s) one-variable, one-step equations or inequalities true (S)</td>
</tr>
</tbody>
</table>

6.10 Expressions, Equations, and Relationships. The student applies mathematical process standards to use equations and inequalities to solve problems. The student is expected to:

[A] model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.9C</td>
<td>write corresponding real-world problems given one-variable, one-step equations or inequalities (S)</td>
</tr>
<tr>
<td>6.9A</td>
<td>write one-variable, one-step equations and inequalities to represent constraints or conditions within problems (S)</td>
</tr>
<tr>
<td>5.4B</td>
<td>represent and solve multi-step problems involving the four operations with whole numbers using equations with a letter standing for the unknown quantity (R)</td>
</tr>
<tr>
<td>4.5A</td>
<td>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)</td>
</tr>
</tbody>
</table>

Instructional Implications

In accordance with the standard, students model and solve one-variable, one-step equations or inequalities. One-variable, one-step equations should include exposure to all four operations. Instruction should vary the position of the variable (i.e., x + 3 > 5; 3 + x > 5; 5 < x + 3). Students should associate the manipulation of concrete objects to the symbolic solving of the equation/inequality (i.e., x + 3 = 5).

\[
\begin{align*}
\text{x + 3} & \quad = \quad 5 \\
\text{x + 3} & \quad + \quad -3 \quad = \quad 5 \quad + \quad -3 \\
\text{x + 3} & \quad = \quad 2 
\end{align*}
\]

In adherence to the standard, geometric concepts should also be applied to the representation and solving of one-step, one-variable problems (i.e., if the area of a rectangle is 56.5 cm² and the length measures 5 cm, what is the width of the rectangle? would be represented by the equation 5w = 56.5). Number lines can be used to represent the solution of inequalities.

\[
\begin{align*}
\text{x + 3} & \quad > \quad 5 \\
\text{x + 3} & \quad \geq \quad 5
\end{align*}
\]

As this standard addresses both equations and inequalities, students must understand that equations yield one solution; whereas inequalities yield more than one solution.

Distractor Factor

- Students may disregard the equality/inequality symbol when solving equations and only perform an operation on one side of the equation.
- Students may not change the direction of the inequality symbol when multiplying or dividing by a negative value.
- Students may focus on the direction of the inequality sign to determine its representation on the number line instead of relying on what the symbol is communicating (i.e., 2 > x; student will shade all values to the right of 2 on the number line since that is the direction the inequality symbol is pointing).
- Students will ignore the inclusion or exclusion of solutions to inequalities and not apply it to a given point.

Academic Vocabulary

- equations
- inequalities
- solution
- variable

Rigor Implications

- Apply
- Use
- Model
- Solve
6.11 Measurement and Data. The student applies mathematical process standards to use coordinate geometry to identify locations on a plane. The student is expected to:

- [A] graph points in all four quadrants using ordered pairs of rational numbers

### Instructional Implications

In accordance with the standard, students graph points in all four quadrants using ordered pairs; \((x, y)\). Instruction should include a variety of examples using rational numbers for the ordered pair \(\{-3, 1/2\}, \{5.3, 3.5\}, \{3.5, -3/5\}, \{-4/5, -4.5\}\). Instruction should begin with the point at which the two axes intersect to form a perpendicular line identified as the origin \((0, 0)\). The origin is the starting point for the graphing of all the coordinates of an ordered pair. Instruction should relate coordinates of an ordered pair to the coordinate plane. The first number is referred to as the \(x\)-coordinate which will be located by moving parallel to the \(x\)-axis. The second number is referred to as the \(y\)-coordinate which will be located by moving parallel to the \(y\)-axis. Students should mathematically communicate their actions of locating a given point on a coordinate plane (i.e. relating the \(x\)-coordinate to the parallel movement along the \(x\)-axis; relating the \(y\)-coordinate to the parallel movement along the \(y\)-axis; with the movement beginning at the origin), not the use of a trick to finding location (i.e. rise over run). Instruction should include the identification of the four quadrants (i.e. Quadrant I, II, III, IV) and the types of ordered pairs that would be represented in each of the four quadrants (i.e. quadrant II consists of \(x\)-values less than zero and \(y\)-values greater than zero; \(x < 0, y > 0\); etc.). Instruction should also include examples where \(0\) is one of the coordinates in the ordered pair and students need to understand when a point is located on the \(x\)-axis and a point is located on the \(y\)-axis (i.e. ordered pairs with the coordinates \((x, 0)\) are on the \(x\)-axis, and ordered pairs with the coordinates \((0, y)\) are on the \(y\)-axis).

### Distractor Factor

- Students may change the order when plotting the coordinates of an ordered pair, \((x, y)\) and plot the \(y\)-coordinate and then the \(x\)-coordinate.
- Students may confuse the \(x\)- and \(y\)-axis.
- Students may confuse the coordinates for points on the \(x\)-axis and the \(y\)-axis.
- Students may not locate coordinates correctly given graphs of intervals other than one.

### Academic Vocabulary

- coordinate plane
- graph
- ordered pair
- origin
- point
- quadrant
- rational numbers
- \(x\)-axis (horizontal axis)
- \(x\)-intercept
- \(y\)-axis (vertical axis)
- \(y\)-intercept

### Rigor Implications

- Apply
- Use
- Identify
- Graph
6.12C Readiness

**Academic Vocabulary**
- coordinate plane
- graph
- ordered pair
- origin
- point
- quadrant
- rational numbers
- x-axis (horizontal axis)
- x-intercept
- y-axis (vertical axis)
- y-intercept

**Rigor Implications**
- Apply
- Use
- Analyze
- Summarize
- Describe

**Instructional Implications**
In conjunction with 6.12A/B, as the students begin representing numeric data graphically they will begin to summarize numeric data with numerical summaries (i.e. use the measures of center, mean and median, such that: mean - a central balance point computed by adding all the numbers in the set of data and dividing the sum by the number of elements added; median - middle value in an ordered set of data such that 50% of the data is below and 50% of the data is above the middle value; use the measures of spread, range and interquartile range, such that: range - distance between highest and lowest data values; interquartile range - the difference between quartile 3, median of upper 50% of data, and quartile 1, median of lower 50% of data). Instruction should provide ample experiences for students to use these summaries to describe the center, spread, and shape of the data distribution (i.e. a single representation such as the mean or median give a snapshot of the population, but do not tell anything about the spread or shape of the data distribution which can lead to erroneous conclusions; whereas summaries including measures of center, the range, and measures of spread provide a more complete picture of the population). Instruction should also include summarizing numeric data when changes are made to a data set and the effects these changes may have on the mean, median, range, and interquartile range (i.e. the original data set may be 4, 6, 9, 10, 15 and the data set is changed to 4, 6, 9, 10, 40, compare the numerical summaries of the two sets of data). Through the lens of the data being represented on a dot plot, stem- and-leaf plot, histogram, or box plots, students can describe the shape of the data as it relates to the given situation.

**Distractor Factor**
- Students may not put the data set in order when summarizing the median.
- Students may not count a value of 0 as part of the data set when summarizing the mean.
- Students may count a value that appears repeatedly in a data set only once when summarizing the mean.
GRADE 6  6.12D Readiness

TEKS Scaffold

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.12A</td>
<td>compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads (R)</td>
</tr>
</tbody>
</table>

6.12 Measurement and Data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:

(D) summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution

6.12C summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution (R)

6.12D Measurement and Data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:

(D) summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution

Instructional Implications

In adherence with the standard, the student will summarize categorical data (i.e. data that is not numerical, but categories, such as favorite television show, where the frequency of each category would be represented as the height of a bar in a bar graph) with numerical and graphical summaries. Included in these summaries will be the mode (i.e. the category that occurred the most, not the frequency of the category), the percent values in each category (i.e. percentages calculated using a relative frequency table), and the percent bar graph (i.e. the frequency of data where 6th grade girls and boys indicated their favorite television show is displayed using percentages of the frequency of the data). The table and graph below display the frequency (i.e. count) and percentage of data (i.e. favorite television show) gathered in a survey about 6th grade boys and girls favorite television show.

<table>
<thead>
<tr>
<th>Show A</th>
<th>Show B</th>
<th>Show C</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>8</td>
<td>20</td>
<td>40</td>
<td>12</td>
</tr>
<tr>
<td>Boys</td>
<td>15</td>
<td>40</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>

The purpose of the graphical summary is to describe the data distribution.

Distractor Factor

• Students may think of data (response to a question) as the same as frequency (the number of times each response occurred).
• Students may not calculate the percent values correctly.
• Students may not realize the percent values for each category must total 100%.

Academic Vocabulary

• categorical data
• data distribution
• frequency
• graphical summary
• mode
• numerical summary
• percent bar graph
• percent of values (percentage)
• relative frequency table

Rigor Implications

• Apply
• Use
• Analyze
• Summarize
• Describe
6.13A Readiness

**TEKS Scaffold**

<table>
<thead>
<tr>
<th>TEKS</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.12A</td>
<td>compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads (R)</td>
</tr>
<tr>
<td>7.6G</td>
<td>solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents (R)</td>
</tr>
<tr>
<td>6.12A</td>
<td>compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads (R)</td>
</tr>
</tbody>
</table>

**6.13 Measurement and Data.** The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to:

- (A) interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots

**Instructional Implications**

In conjunction with 6.12A, as students represent data on a dot plot, stem-and-leaf plot, histogram, and box plots, instruction will extend to the interpretation of numeric data summarized in the graphs. In conjunction with 6.12B/C, instruction should include a variety of these graphs and allow students to shift from the visual image of the data (graph) to the numeric data summarized in the graphs such as measures of center (i.e. mean, median, mode), and measures of spread (i.e. range and interquartile range). By describing numeric data summarized in these graphs the student should be able to understand how this numeric data (i.e. mean, median, mode, range, and interquartile range) is a key element used to discuss and analyze the shape of the data distribution (i.e. grouped or spread, skewed or symmetrical).

**Distractor Factor**

- Students may not put the numeric data in order when calculating the median.
- Students may not count 0 as a part of the numeric data when calculating the mean.

**Academic Vocabulary**

- box plot (box and whiskers)
- data distribution
- dot plot
- histogram
- interquartile range (IQR)
- mean
- measures of center
- measures of spread
- median
- mode
- numeric data
- range
- shew
- stem-and-leaf plot
- symmetrical

**Rigor Implications**

- Apply
- Use
- Solve
- Interpret
STAAR SUPPORTING STANDARDS
GRADE 6  6.2A Supporting

6.2 Number and Operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:
(A) classify whole numbers, integers, and rational numbers using a visual representation such as a Venn diagram to describe relationships between sets of numbers.

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

- 6.11A graph points in all four quadrants using ordered pairs of rational numbers

How does it support the Readiness Standard(s)?

Describing the relationship between whole numbers, integers, and rational numbers will support its application to the graphing of ordered pairs in all four quadrants.

Instructional Implications

In accordance with the standard, students will not only classify whole numbers, integers, and rational numbers but describe how these sets of numbers are related to each other. Instruction should include the use of visual representations (i.e. Venn Diagram) to demonstrate the interrelationship between the terms.

The use of a number line may support students with this understanding (i.e. begin with a number line marked 0, 1, 2, 3, … to reflect all whole numbers; extend the number line to include the negative numbers -1, -2, -3… to reflect integers; discuss fractional and decimal values in between integers -2.5, -0.05, 0, -1/3, 1 1/2, 5/4 … to reflect rational numbers).

Academic Vocabulary

- integers
- negative
- nonnegative
- nonpositive
- positive
- rational numbers
- sets of numbers
- Venn diagram
- whole numbers

Rigor Implications

- Apply
- Represent
- Use
- Classify
- Describe
6.2 Number and Operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:

(B) identify a number, its opposite and its absolute value

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

- 6.3D add, subtract, multiply, and divide integers fluently
- 6.10A model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts

How does it support the Readiness Standard(s)?

As students will need an understanding of zero pairs to add/subtract integers and to model/solve of equation and inequalities, knowing the difference between opposite and absolute value will be foundational.

Instructional Implications

In adherence to the standard, instruction will merge the understanding of opposite numbers and absolute values (i.e. how far a number is from zero) to avoid student misconceptions of the two terms. Through the use of a number line (i.e. horizontal and vertical that include examples of rational numbers), students will understand that the opposite of a given number is the same distance away from zero as the given number (i.e. 5 and -5 are both five units away from zero; -5/8 and 5/8 are both 0.875 units from zero). It is important students understand the opposite sign (i.e. "-" ) places a number to the opposite side of zero (i.e. -6 may be read as "the opposite of 6" which is negative 6 and -(-1.5) may be read as "the opposite of the opposite of 1.5" which is 1.5). Instruction will extend the study of distance from zero by introducing the absolute value symbolism (i.e. |5| + 5 and |(-5)| as the length away from zero. Instruction can relate the idea that this symbolism for absolute value is a mathematician’s version of "texting" the question, "How many units away from zero is the number ____?" As length cannot be presented as a negative number, all absolute values should be reflected as non-negative rational numbers. Instruction should include a variety of problems (i.e. a submarine dives to a depth of 200.5 feet which may be described as |-200.5| which translates to 200.5 feet below sea level).

Academic Vocabulary

- absolute value
- integers
- negative
- nonnegative
- nonpositive
- opposite numbers
- positive
- rational numbers
- whole numbers

Rigor Implications

- Apply
- Represent
- Use
- Identify
GRADE 6  
6.2C Supporting

6.2 Number and Operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:

(C) locate, compare, and order integers and rational numbers using a number line

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

- 6.2D order a set of rational numbers arising from mathematical and real-world contexts
- 8.2D order a set of real numbers arising from mathematical and real-world contexts

How does it support the Readiness Standard(s)?

This standard describes the mathematical relationship found in integers and rational numbers; this relationship will support students in identifying the value of an integer or rational number in order to effectively order rational numbers.

Instructional Implications

In adherence to the TEKS and in conjunction with 6.2E/6.4E, students should be fluid in representing rational numbers in a variety of forms (i.e. 7/10, 0.7, 70%). This standard will apply that knowledge in comparing and ordering numbers. Instruction should have students comparing/ordering a mixture of rational number representations (i.e. order the following: -4 3/4, 4.667, 4.67%). As students compare two rational numbers, they should be using the correct academic vocabulary (i.e. 5.3 > 5 1/4; five and three-tenths is greater than five and one-fourth). It is important for students to recognize the inverse comparison statement as well (i.e. 5 1/4 < 5.3; five and one-fourth is less than five and three-tenths). Instruction should connect the comparative language to the symbols (>, <, =). It is critical that students understand how to correctly read and interpret each of the symbols not as a trick to remember directionality of the symbols (i.e. the alligator’s mouth eats the bigger number). The standard also has students ordering three or more rational numbers from least to greatest or greatest to least. The use of open number lines will allow students to compare and order rational numbers more efficiently, especially when comparing and ordering negative rational numbers (i.e. 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).

Academic Vocabulary

- decimal
- equal (=)
- fraction
- greater than (>)
- greatest to least
- integers
- least to greatest
- less than (<)
- negative
- nonnegative
- nonpositive
- number line
- percentages
- positive
- rational numbers
- sets of numbers

Rigor Implications

- Apply
- Represent
- Use
- Locate
- Compare
- Order
6.2E  Number and Operations. The student applies mathematical process standards to represent and use rational numbers in a variety of forms. The student is expected to:
  (E) extend representations for division to include fraction notation such as $\frac{a}{b}$ where $b \neq 0$

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
  • 6.3E  multiply and divide positive rational number fluently
  • 6.7A  generate equivalent numerical expressions using order of operations, including whole number exponents, and prime factorization

How does it support the Readiness Standard(s)?

Relating fraction notation to division will be essential as students divide positive rational numbers (i.e. $\frac{2}{1}$) and generate equivalent expressions using order of operations (i.e. $\frac{4 \cdot 6 + 2}{2}$).

Instructional Implications

In adherence to the standard, instruction should model the various representation of division (i.e. $\frac{a}{b} \cdot a \cdot b$, $\frac{a}{b} \neq 0$). Students should identify the quotient, dividend, and divisor components in each representation.

Academic Vocabulary

• denominator
• dividend
• division
• divisor
• fraction notation
• numerator
• quotient
• symbols for division: $\frac{a}{b} \cdot a \cdot b$, $\frac{a}{b} \neq 0$

Rigor Implications

• Apply
• Represent
• Use
• Extend
6.3 Number and Operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying the solutions. The student is expected to:

(A) recognize that dividing by a rational number and multiplying by its reciprocal result in equivalent values

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

- 6.3E multiply and divide positive rational numbers fluently

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

It is critical for students to develop the conceptual understanding of dividing by a rational number and multiplying by its reciprocal result in equivalent values as students move toward multiplying and dividing rational numbers fluently. This supporting standard provides that developmental progression.

**Instructional Implications**

In accordance to the standard, it is essential that students have a conceptual understanding of how dividing a rational number and multiply by its reciprocal yield equal values (i.e. $\frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$; $\frac{1}{2} \div \frac{3}{1} = \frac{1}{6}$, where students need to determine what the value would be if $\frac{1}{2}$ is divided equally into 3 groups) not as a memorized rule (i.e. when dividing fractions just invert and multiply). Instruction should provide a real-world example of how this algorithm works (i.e. dividing a piece of paper in to two equal parts $1 \div 2$ is the same as taking half of a whole sheet of paper $\frac{1}{2} \times 1$). Modeling examples of division of fractions and multiplication of its reciprocal with pattern blocks, fraction strips, and/or fractions circles will help build that conceptual understanding. To reinforce dividing by a rational number and multiplying by its reciprocal result in equivalent values, students can also enter the division expression and the multiplication expression into a calculator and compare the quotients and products of both expressions.

**Academic Vocabulary**

- denominator
- division
- equivalent
- expressions
- multiplication
- numerator
- product
- quotient
- rational number
- reciprocal

**Rigor Implications**

- Apply
- Represent
- Solve
- Justify
- Recognize
6.3B Supporting

6.3 Number and Operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying the solutions. The student is expected to:

(B) determine with and without computation whether a quantity is increased or decreased when multiplied by a fraction, including values greater than or less than one

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

• 6.3E multiply and divide positive rational number fluently

How does it support the Readiness Standard(s)?

It is critical for students to develop the conceptual understanding of whether a quantity is increased or decreased when multiplying by a fraction as students move toward multiplying and dividing rational numbers fluently. This standard will support them in justifying whether their solutions are reasonable.

Instructional Implications

The intention of this standard is to ensure student understanding of the magnitude of numbers when multiplying by fractional values such that the product may or may not have a greater value than the factors (i.e. 1/2 • 1/4 = 1/8 or 3/2 • 2/3 = 3/4 = 3/1). Instruction should include the modeling of such examples with visual representations and include values greater than and less than one. Students should have many experiences to be able to determine whether a quantity increases or decreases when multiplied by a fraction. To reinforce if a quantity increases or decreases when multiplied by a fraction, students can also enter different multiplication problems into a calculator and compare the product to the factors.

Academic Vocabulary

• decreased
• denominator
• factor
• fraction
• improper fraction
• increased
• mixed number
• multiplication
• numerator
• product
• proper fraction
• quantity
• unit fraction

Rigor Implications

• Apply
• Represent
• Solve
• Justify
• Determine
6.3 Number and Operations. The student applies mathematical process standards to represent addition, subtraction, multiplication, and division while solving problems and justifying the solutions. The student is expected to:
(C) represent integer operations with concrete models and connect the actions with the models to standardized algorithms

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
• 6.3D add, subtract, multiply, and divide integers fluently.

How does it support the Readiness Standard(s)?
It is critical for students to develop the conceptual understanding of adding, subtracting, multiplying, and dividing integers with concrete models and connecting those actions to the standardized algorithm. This supporting standard provides that developmental progression.

Instructional Implications
In accordance to the standard, it is essential that students have a conceptual understanding of the integer operations (i.e. $4 - (-2) = x$; subtraction represents distance between two numbers and this equation is asking for the distance between 4 and -2 which is 6), not just a memorized rule (i.e. $4 - (-2) = x$; when subtracting a negative number just put the "two negatives signs together to make a plus sign" and add so $4 + 2 = 6$). Instruction should include a variety of representations for students to relate their understanding (i.e. two colored counting chips, number lines, etc.) and real world examples (i.e. bank balance using credits (positive) and debits (negative); the sum between the credit and debits determines the value of the bank balance). To extend student exploration of integer operations, students can enter a variety of integer operational problems into a calculator to generalize an algorithm.

Academic Vocabulary
• addends
• addition
• difference
• dividend
• division
• divisor
• factors
• integer
• multiplication
• product
• quotient
• subtraction
• sum

Rigor Implications
• Apply
• Represent
• Solve
• Justify
• Connect
6.4A  Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:

(A) compare two rules verbally, numerically, graphically, and symbolically in the form \( y = ax \) or \( y = x + a \) in order to differentiate between additive and multiplicative relationships

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

• 6.6C represent a given situation using verbal descriptions, tables, graphs, and equations in the form \( y = hx \) and \( y = x + b \)

How does it support the Readiness Standard(s)?

Identifying an additive or multiplicative pattern through the lens of verbal, numeric, graphical, or symbolic representation will support students in being able to associate an appropriate real-world situation.

Instructional Implications

In accordance with the standard, students will compare two rules in the form \( y = ax \) and \( y = x + a \) in problem situations. Instruction will incorporate different representations of the rules (i.e. verbally, graphically, and symbolically). Through verbal representations, students will articulate the difference between additive (i.e. the same amount is added to a measure which results in a new measure) and multiplicative (i.e. the same amount is multiplied to a measure which results in a new measure) relationships. Through the symbolical representation, students will observe how a multiplicative pattern (i.e. \( y=ax \)) compares to an additive pattern (i.e. \( y=x + a \)). Through the lens of numerical representation, students need to observe patterns that may or may not be consecutive within a table. Students would describe the relationship between the input value and the output value to ascertain "what’s my rule." Through the graphical representations, students will observe that graphs of both multiplicative and additive patterns are linear; however, graphs of a multiplicative pattern contain the origin \((0, 0)\) while graphs of an additive pattern contain the point \((0, a)\), \(a \neq 0\). When students recognize and understand the difference between additive and multiplicative approaches, they will begin to develop an understanding of proportional relationships.

Academic Vocabulary

• additive relationship
• coordinate plane
• equation
• linear
• multiplicative relationship
• ordered pair
• origin
• proportional relationship
• x-axis
• y-axis
• y-intercept

Rigor Implications

• Apply
• Develop
• Compare
• Differentiate
6.4C Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:

(C) give examples of ratios as multiplicative comparisons of two quantities describing the same attribute

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

• 6.4B apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates

How does it support the Readiness Standard(s)?

Understanding how ratios are multiplicative comparisons of two quantities describing the same attribute will support the application of comparing such quantities.

Instructional Implications

This standard requires students give examples of ratios that compare like units (same attributes). Both part to whole (i.e. ratio 4 girls in a class of 30 students) and part to part ratios (i.e. ratio 4 girls to 6 boys in a class) compare two measures of the same type. A multiplicative comparison of two quantities can be used to describe the same attribute (i.e. the part to part ratio of 4 girls to 6 boys may also be described as the number of boys in the class is 1.5 times as many the number of girls in the class).

Academic Vocabulary

• attribute
• multiplicative
• part to part comparison
• part to whole comparison
• proportional relationship
• quantities
• ratio

Rigor Implications

• Apply
• Develop
• Give
• Describe
6.4D  Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:

(D) give examples of rates as the comparison by division of two quantities having different attributes, including rates as quotients

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

• 6.4B  apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates

How does it support the Readiness Standard(s)?

Understanding how rates are a comparison by division of two quantities having different attributes will support the application of comparing and solving such real-world examples.

Instructional Implications

This standard requires students give examples of rates that compare unlike units (different attributes). A ratio that compares measures of two different types is termed a rate (i.e. miles per gallon, miles per hour, inches per foot, ounces per cup, etc.). Instruction should have students give examples of rates as comparison by division and include rates as quotients (i.e. cost of 2 dozen pencils is $7.20; this rate can be represented as $7.20/24 pencils or the quotient of 7.20 ÷ 24 = 0.30 which is the same as the rate $0.30/1 pencil). Instruction might include the use of a table for students to visualize the ratio between the two different types of measures (i.e. cost to number of pencils).

<table>
<thead>
<tr>
<th>Number of Pencils</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>$7.20</td>
</tr>
<tr>
<td>12</td>
<td>$3.60</td>
</tr>
<tr>
<td>4</td>
<td>$1.20</td>
</tr>
<tr>
<td>1</td>
<td>?</td>
</tr>
</tbody>
</table>

Students should express such comparisons as a unit rate (i.e. $0.30 per 1 pencil).

Academic Vocabulary

• attribute
• division
• proportional relationship
• quotient
• rate
• ratio
• unit rate

Rigor Implications

• Apply
• Develop
• Give
GRADE 6  6.4E Supporting

6.4E  Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:

(E) represent ratios and percents with concrete models, fractions, and decimals

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

• 6.3E multiply and divide positive rational numbers fluently
• 6.4B apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratio and rates
• 6.5B solve real-world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the part and the whole, including the use of concrete and pictorial models

How does it support the Readiness Standard(s)?

Representing ratios and percents with concrete objects will provide the foundational understanding of how to abstractly multiply/divide rational numbers, solve percentage problems, and apply to ratio and rates situations.

Instructional Implications

In accordance with the standard, students will use concrete models, fractions, and decimals to represent ratios and percents. The term percent is another name for “hundredths.” Instruction should include a variety of concrete models (i.e. 100 pennies, 10 by 10 grids, base ten fraction models). The concrete models may be used to model fractions and decimals (i.e. 50/100 and 0.50) and then use the concrete models of the fractions and decimals to represent ratios and percents (i.e. 50/100 and 0.50 represent the ratio \( \frac{100}{100} \text{pennies} \) and the percent 50%). It is important to have students equate hundredths with percents orally and in writing (i.e. 75/100 is written as the decimal 0.75 and is read 75 hundredths; since percent is another name for hundredths it may also be read as 75 percent and written 75%). Instruction should include concrete models, fractions, and decimals to represent percents greater than 100% (i.e. 1 1/4, 1.25 represents the percent 125%). In adherence to the standard, ratios should also be represented with concrete objects, fractions, and decimals. Instruction should include a variety of examples to model connections (i.e. with two color counters, model how there are twice as many girls than boys in the class:

<table>
<thead>
<tr>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>✅✅</td>
<td>✅</td>
</tr>
<tr>
<td>✅✅✅</td>
<td>✅✅</td>
</tr>
<tr>
<td>✅✅✅✅</td>
<td>✅✅</td>
</tr>
</tbody>
</table>

2 Girls = 1 Boy
4 Girls = 2 Boys
6 Girls = 3 Boys

Academic Vocabulary

• decimal
• fraction
• percent
• proportional relationship
• ratio

Rigor Implications

• Apply
• Develop
• Represent
6.4 Proportionality. The student applies mathematical process standards to develop an understanding of proportional relationships in problem situations. The student is expected to:

(F) represent benchmark fractions and percents such as 1%, 10%, 25% 33 1/3%, and multiples of these values using 10 by 10 grids, strip diagrams, number lines, and numbers

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

- 6.4B apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratios and rates
- 6.5B solve real-world problems to find the whole given a part and the percent, to find the part given the whole and the percent, and to find the percent given the art and the whole including the use of concrete and pictorial models
- 6.3E multiply and divide positive rational numbers fluently

How does it support the Readiness Standard(s)?

Estimating is a critical foundation for being able to determine reasonableness of sums/differences/products and quotients. Benchmarking fractions and percents will allow students the ability to determine if their solutions are reasonable.

Instructional Implications

In conjunction with 6.4E, as students begin to think about the relative size of various percents and fractions, they will need to begin to develop and represent benchmark fractions and percents (i.e. 1%, 10%, 25%, 33 1/3% and the multiples of these values). Instruction should include a variety of representations using 10 by 10 grids (i.e. the shading of 10 squares on a 10 by 10 grid represents the benchmark of 10% and the fraction benchmark 10/100 or 1/10); strip diagrams (i.e. the folding of a strip of paper into thirds would represent the benchmark of 33 1/3% and 66 2/3% and the fraction benchmark 1/3 and 2/3); number lines (i.e. a number line divided into ten equal parts would represent the benchmark 10% 20%, 30%, etc. and the fraction benchmarks 1/10, 2/10, 3/10, etc.); and numbers (i.e. 50 is half of 100 which represents 50% or 1/2, 25 cents represents 1/4 of a dollar or 25% of a dollar). The use of benchmarking of fractions and percents will allow students to become more fluid with estimation and reasonableness in problem solving.

Academic Vocabulary

- benchmark
- equivalent
- fraction
- multiples
- percent

Rigor Implications

- Apply
- Develop
- Represent
GRADE 6 6.5A Supporting

6.5A Proportionality. The student applies mathematical process standards to solve problems involving proportional relationships. The student is expected to:

(A) represent mathematical and real-world problems involving ratios and rates using scale factors, tables, graphs, and proportions

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

- 6.4B apply qualitative and quantitative reasoning to solve prediction and comparison of real-world problems involving ratio and rates

How does it support the Readiness Standard(s)?

Representing ratio and rates through the use of scale factors, tables, graphs, and proportions will be the foundation for students to be able to solve prediction and/or comparison problems in the real world.

Instructional Implications

In accordance with the standard, students will represent mathematical and real-world problems involving ratios and rates. Students will use different methods (i.e. scale factors, tables, graphs, and proportions) to represent the problems. Instruction should include one scenario where students use the different methods to solve the problem so the students can compare the methods and decide which method was the most efficient method for the given problem. Through the use of scale factors (scale factor is a number a quantity is multiplied by) students can represent real-world problems (i.e. the scale legend on a map shows one inch = 80 miles, the distance from El Paso to Dallas on a map measures approximately 7.9 inches, determine the approximate number of miles from El Paso to Dallas, 1 inch x 7.9 = 7.9 inches and 80 miles x 7.9 = 632 miles). Students will generate ratios that represent a proportional relationship (i.e. \( \frac{1\text{ inch}}{80\text{ miles}} = \frac{7.9\text{ inches}}{632\text{ miles}} \)). With tables, students use a multiplicative relationship to transform a given measure into another measure so a proportional relationship exists.

<table>
<thead>
<tr>
<th>Measure (Inches)</th>
<th>Process</th>
<th>Distance (Miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 x 80</td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>2 x 80</td>
<td>160</td>
</tr>
<tr>
<td>3</td>
<td>3 x 80</td>
<td>240</td>
</tr>
<tr>
<td>7</td>
<td>7 x 80</td>
<td>560</td>
</tr>
<tr>
<td>7.9</td>
<td>7.9 x 80</td>
<td>?</td>
</tr>
<tr>
<td>8</td>
<td>8 x 80</td>
<td>640</td>
</tr>
</tbody>
</table>

In conjunction with 6.4A, the students will use graphs in the format \( y = ax \) of real-world problems involving ratios that represent a proportional relationship. These graphs can be used to connect the idea of proportional relationships to algebraic interpretations.

Academic Vocabulary

- graph
- proportional relationship
- proportions
- rate
- ratio
- scale factor
- table

Rigor Implications

- Apply
- Solve
- Represent
6.5 Proportionality. The student applies mathematical process standards to solve problems involving proportional relationships. The student is expected to:

(C) use equivalent fractions, decimals, and percents to show equal parts of the same whole

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

- 6.4G generate equivalent forms of fractions, decimals and percents using real-world problems, including problems that involve money

How does it support the Readiness Standard(s)?

This standard is setting the concrete understanding of how fractions, decimals, and percents that are related to the same whole are equivalent. Flexibility moving between fractions, decimals, and percents will support a student’s ability to generate equivalent forms in order to solve problems.

Instructional Implications

In accordance with this standard, students use fractions, decimals, and percents that are equivalent to show equal parts of the same whole. Instruction might include the use of a 10 x 10 grid (i.e. one row of ten squares shaded represents 10/100, 1/10, 0.1, 0.10, 10%), circle graphs (i.e. a circle divided into four equal parts with one part shaded represents 1/4, 0.25, 25%), number lines (i.e. a number line divided into five equal parts with two out of the five parts marked represents 2/5, 4/10, 0.4, 0.40, 40%). Students need to be able to justify the equivalence of each of their representations.

Academic Vocabulary

- decimal
- equivalent
- fraction
- part
- percent
- whole

Rigor Implications

- Apply
- Solve
- Use
6.6 Expressions, Equations, and Relationships. The student applies mathematical process standards to use multiple representations to describe algebraic relationships. The student is expected to:

(A) identify independent and dependent quantities from tables and graphs

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

- 6.6C represent a given situation using verbal descriptions, tables, graphs, and equations in the form \( y = hx \) or \( y = x + b \)

How does it support the Readiness Standard(s)?

Being able to identify the independent and dependent quantities will be critical in representing situations in a table, graph, and equation.

Instructional Implications

In accordance with the standard, students will use tables and graphs to identify the independent quantity and dependent quantity in an algebraic relationship. Instruction should include a variety of tables (i.e. horizontal and vertical tables) and graphs where students identify the independent and dependent quantities. Through the lens of a table, students should be able to identify the value of the dependent variable is reliant on the quantity of the independent variable. Through the lens of a graph, students should identify the independent variable is represented on the x-axis and the dependent values are represented on the y-axis. For a given problem, the table and graph may be shown side by side for students to identify the independent and dependent quantities and make the connection between the two representations. The students need to be able to identify the independent quantities from the table are represented along the horizontal axis on the graph and the dependent quantities from the table are represented along the vertical axis on the graph.

Table

<table>
<thead>
<tr>
<th>Number of Tricycles (t)</th>
<th>Process Column</th>
<th>Number of Wheels (w)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 \cdot 3</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1 \cdot 3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>2 \cdot 3</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>3 \cdot 3</td>
<td>9</td>
</tr>
<tr>
<td>t</td>
<td>t \cdot 3</td>
<td>w</td>
</tr>
</tbody>
</table>

Graph

Academic Vocabulary

- coordinate plane
- dependent quantity
- graph
- horizontal axis
- independent quantity
- table
- vertical axis

Rigor Implications

- Apply
- Use
- Describe
- Identify
6.6 Expressions, Equations, and Relationships. The student applies mathematical process standards to use multiple representations to describe algebraic relationships. The student is expected to:

(B) write an equation that represents the relationship between independent and dependent quantities from a table

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

• 6.6C represent a given situation using verbal descriptions, tables, graphs, and equations in the form y = kx and y = x + b

How does it support the Readiness Standard(s)?

Relating the independent and dependent quantities from a table to establish an equation will be foundational to relating the information to an appropriate situation.

Instructional Implications

In conjunction with 6.6A, students will use tables to write equations that represent the relationship between the independent quantity and dependent quantity in an algebraic relationship. Instruction should include a variety of tables (i.e. horizontal and vertical tables) where the independent values are not consecutive. It is important students develop an understanding that a rule is a form of communication that describes the way the independent and dependent quantities are related. This rule applies to each row in the table and is written as an equation (i.e. the equation represents how the independent quantity affects the dependent quantity; the value of the dependent quantity is defined in terms of the independent quantity). Students should be able to relate their equation to the values within the table and/or graph.

Academic Vocabulary

• dependent quantity
• equation
• independent quantity
• relationship
• table

Rigor Implications

• Apply
• Use
• Describe
• Write
6.7 Expressions, Equations, and Relationships. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(B) distinguish between expressions and equations verbally, numerically, and algebraically

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

• 6.6C represent a given situation using verbal descriptions, tables, graphs, and equations in the form y = kx or y = x + b

How does it support the Readiness Standard(s)?

Distinguishing between expressions and equations will support the understanding of how that applies to representing situations verbally, tabularly, graphically, and symbolically.

Instructional Implications

In accordance with the standard, students will distinguish between expressions and equations. It is important for students to recognize that all equations consist of equivalent expressions linked with an “=” sign. Instruction will incorporate different ways to distinguish between expressions and equations (i.e. verbally, numerically, and algebraically). Through verbal representations, students will use real world situations to convey the difference between an expression (i.e. Sandra earns $6 an hour for babysitting and babysits for 5 hours) and an equation (i.e. Sandra earns $6 an hour for babysitting; she babysits for 5 hours and earns $30). Through the lens of numerical representations, students will represent real-world situations with numeric expressions (i.e. 6 • 5) and numeric equations (i.e. 6 • 5 = 30) to distinguish between the two terms. Through algebraic representation, students will represent real-world situations with algebraic expressions (i.e. 6x) and algebraic equations (i.e. 6x = 30). Instruction should include side by side comparisons of expressions and equations using the three formats of verbally, numerically, and algebraically.

Academic Vocabulary

• algebraically
• equation
• expression
• numerically
• verbally

Rigor Implications

• Apply
• Develop
• Distinguish
GRADE 6 6.7C Supporting

6.7C Expressions, Equations, and Relationships. The student applies mathematical process standards to develop concepts of expressions and equations. The student is expected to:

(C) determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations

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

- 6.7D generate equivalent expressions using the properties of operations: inverse, identity, commutative, associative, and distributive properties

How does it support the Readiness Standard(s)?

This standard provides the concrete understanding of equivalent expressions. Applying the physical representation and manipulation of concrete objects to an abstract property of operation (i.e. inverse, identity, commutative, associative, distributive) will allow students to solve algebraic equations with a better understanding.

Instructional Implications

In accordance with the standard, students will use concrete models, pictorial models, and algebraic representations to determine if two expressions are equivalent (i.e. the expression 2(x + 3) is equivalent to the expression 2x + 6). Instruction should include a variety of concrete models (i.e. algebra tiles, proportional color rods, grid paper, etc.) along with a variety of problems using pictorial models and algebraic representations. The use of concrete and pictorial models allows students to develop mental images for expressions which they can use to apply to algebraic representations of expressions (i.e. using algebra tiles to model a rectangle with the dimensions 2 by (x + 3), have students draw a picture of the model, and then write different equivalent expressions to represent the area of the model: 2x + 2(3), 2(x + 3), or x + x + 3 + 3). Instruction should connect the concrete and/or pictorial models to the algebraic representation in order to move students from concrete to abstract learning.

<table>
<thead>
<tr>
<th>Concrete/Pictorial Model</th>
<th>Algebraic Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x + 3</td>
<td>2x + 6</td>
</tr>
<tr>
<td>x + 3</td>
<td>2(x + 2(3))</td>
</tr>
<tr>
<td></td>
<td>2(x + 3)</td>
</tr>
<tr>
<td></td>
<td>x + x + 3 + 3</td>
</tr>
</tbody>
</table>

Instruction should also include examples of expressions that are not equivalent (i.e. 2(x + 3) is not equivalent to 2x + 3 or 2 + x + 3). In conjunction with 6.7D, students will begin connecting their concrete understanding of equivalent expressions to properties of operations (i.e. the distributive property).

Academic Vocabulary

- algebraic representations
- concrete models
- equivalent
- expression
- pictorial models

Rigor Implications

- Apply
- Develop
- Determine
- Use
6.8A Supporting

6.8 Expressions, Equations, and Relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:
(A) extend previous knowledge of triangles and their properties to include the sum of angles of a triangle, the relationship between the lengths of sides and measures of angles in a triangle, and determining when three lengths form a triangle

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
- 6.8D determine solutions for problems involving the area of rectangles, parallelograms, trapezoid, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers

How does it support the Readiness Standard(s)?
In determining the area of a triangle, it is possible that the measure of angles would be given but not all of the side lengths/height would be given. Therefore, students would have to apply the relationship between the lengths of sides and measures of angles in a triangle to determine the missing length.

Instructional Implications
In adherence with the standard, students will build on their knowledge of triangles to develop additional properties (i.e. sum of angles of a triangle, relationship between lengths of sides and measures of angles, three lengths form a triangle). Instruction should include examples where students model the properties such as the sum of angles of a triangle (i.e. students cut out three congruent triangles and label the corresponding angles A, B, and C; arrange the vertices of the three triangles along a straight line) to model the sum of the interior angles form a 180° angle.

To establish the relationship between lengths of the sides and measures of angles, students may use physical models such as strips of paper attached with brads at the vertices (i.e. measure the sides and angles in the triangle: the longest side of a triangle is opposite the angle with the greatest measure, or the shortest side of a triangle is opposite the angle with the least measure).

To determine when three lengths form a triangle, strips of paper attached with brads at the vertices may be used to form a triangle and then unattached to compare two sides of the triangle with the third side (i.e. the sum of the lengths of any two sides in a triangle are greater than the length of the third side).

Academic Vocabulary
- acute angle
- adjacent angle
- angle
- degrees
- exterior angle
- interior angle
- length
- measure
- measure of angle
- obtuse angle
- opposite angle
- relationship
- right angle
- side
- triangle
- vertex

Rigor Implications
- Apply
- Use
- Solve
- Extend
- Determine
6.8B 6.8 Expressions, Equations, and Relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:
   (B) model area formulas for parallelograms, trapezoids, and triangles by decomposing and rearranging parts of these shapes

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
   • 6.8D determine solutions for problems involving the area of rectangles, parallelograms, trapezoid, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers

How does it support the Readiness Standard(s)?
   This standard provides the concrete experience of being able to physically manipulate areas of various shapes in order to develop formulas. This foundational understanding will allow students to better apply the use of various formulas in problem situations.

Instructional Implications
   In adherence with the standard, students will model area formulas for parallelograms, trapezoids, and triangles. Instruction should include experiences where students decompose these shapes and rearrange the parts to form a new shape whose area formula can be associated to the decomposed shape’s area formula (i.e. decompose a parallelogram and rearrange the parts to form a rectangle and connect the area formula for a rectangle to the area formula for a parallelogram).
   
   \[ \text{Area Formula} = b \times h \]

   This process should be repeated for trapezoids and triangles (i.e. decompose each shape and rearrange the parts to form a parallelogram and connect the area formula for a parallelogram to the area formula for a trapezoid or triangle).

Academic Vocabulary
   • area
   • formula
   • parallelogram
   • rectangle
   • trapezoid
   • triangle

Rigor Implications
   • Apply
   • Use
   • Solve
   • Model
   • Decompose
   • Rearrange
6.8 Expressions, Equations, and Relationships. The student applies mathematical process standards to use geometry to represent relationships and solve problems. The student is expected to:

(C) write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prism where dimensions are positive rational numbers

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

- 6.8D determine solutions for problems involving the area of rectangles, parallelograms, trapezoid, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers

How does it support the Readiness Standard(s)?

In conjunction with 6.8B, as students are physically manipulating various shapes to develop area formulas, those actions need to apply to an abstract representation to yield an equation. Students deriving the formula through concrete experiences will allow them to better apply and manipulate such equations when solving real-world problems.

Instructional Implications

In conjunction with 6.8B, instruction should move students from the concrete understanding of decomposing/rearranging figures to represent area to the abstract representation of its formula. In adherence with the standard, students will write equations and represent problems related to the area of shapes (i.e. rectangles, parallelograms, trapezoids, and triangles) and limits the study of the volume to just right rectangular prisms. Instruction should include equations where dimensions are positive rational numbers (i.e. decimals and fractions). Students should be encouraged to represent their equations for volume and area in more than one way (i.e. given the area of a triangle is 45 square meters and the length of the shortest side is 2.5 units, what is the height of the triangle; 45 = 1/2 (2.5)(h); 2.5h ÷ 2 = 45; 45= 2.5/2 * h).

Academic Vocabulary

- area
- cubic units (cubic feet, cubic centimeters, etc.)
- dimensions
- equation
- parallelogram
- positive rational numbers
- rectangle
- right rectangular prism
- square units (square feet, square centimeters, etc.)
- trapezoid
- triangle
- volume

Rigor Implications

- Apply
- Use
- Solve
- Write
- Represent
6.9A Supporting

6.9 Expressions, Equations, and Relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:

(A) write one-variable, one-step equations and inequalities to represent constraints or conditions within problems

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

• 6.10A model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts

How does it support the Readiness Standard(s)?

Writing an equation/inequality based on constraints or conditions within a problem will be foundation before students can solve such algebraic situations.

Instructional Implications

In accordance with the standard, students are limited to writing one-variable, one-step equations (i.e. 3x = 6) and one-variable, one-step inequalities (3x < 6). Instruction will model examples of equations identifying conditions (i.e. a hamburger costs $5 which is $1.30 more than a soda; 5 = x + 1.30) and inequalities representing constraints (i.e. a repairman charges $45 an hour and wants to earn at least $438.75; 45x ≥ 438.75). Emphasis needs to be placed on real-world examples of applying greater than/less than (i.e. the temperature must be warmer than 75°F for the air conditioner to turn on; x > 75) vs. greater than or equal to/less than or equal to (i.e. maximum capacity of a ballroom is 300 people; x ≤ 300). Instruction should address how equations yield one solution (i.e. 3x = 6, x = 2); whereas, inequalities yield several possible solutions (i.e. 3x < 6, x < 2).

Academic Vocabulary

• equations
• inequalities
• variable

Rigor Implications

• Apply
• Use
• Represent
• Write
6.9 Expressions, Equations, and Relationships. The student applies mathematical process standards to use equations and inequalities to represent situations. The student is expected to:

(B) represent solutions for one-variable, one-step equations and inequalities on number lines

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

- 6.10A model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts

How does it support the Readiness Standard(s)?

Representing solutions to equations and inequalities on a number line will allow for a more concrete understanding of abstract solutions.

Instructional Implications

In accordance with the standard, students represent solutions for one-variable, one-step equations and inequalities on number lines (i.e. the solution for $2 = x + 3$ on a number line:

```
-1 0 1 2
```

the solution for $2x < 9$ on a number line:

```
-1 0 1 2 3 4 5
```

Instruction on inequalities should address the use of the open circle (value is not included in the set of possible solutions, $x > 2$) and a filled circle (value is included in the set of possible solutions, $x \geq 2$). In conjunction with 6.9A, as students begin representing solutions to real-world inequalities, it will be imperative for them to relate the appropriate use of an open circle (i.e. Sandra must make more than a 75 on her exam to make an A average for the semester; $x > 75$) vs. filled circles (i.e. the room capacity of the cafeteria is no more than 300 people; $x \leq 300$).

Academic Vocabulary

- equation
- inequality
- number line
- solution
- variable

Rigor Implications

- Apply
- Use
- Represent
6.9C  **What Readiness Standard(s) or concepts from the Readiness Standards does it support?**

- 6.10A  model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts

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

Relating a real-world problem to an equation or inequality develops a contextual understanding for such abstract representations. Applying a real-world problem scenario to an equation or inequality will allow the student to justify his/her answer more clearly.

**Instructional Implications**

In accordance with the standard, students write corresponding real-world problems given one-variable, one-step equations (i.e. $6x = 48$; John bought 48 sodas for the picnic, how many six-packs of soda did he buy?) or inequalities (i.e. $6x \geq 43$; John needs at least 43 sodas for the picnic to serve everyone, what would be a reasonable number of six-packs of sodas he should buy?). Instruction should include problems involving rational numbers (decimals and fractions).

**Academic Vocabulary**

- equations
- inequality
- variable

**Rigor Implications**

- Apply
- Use
- Write
6.10 Expressions, Equations, and Relationships. The student applies mathematical process standards to use equations and inequalities to solve problems. The student is expected to:

(B) determine if the given value(s) make(s) one-variable, one-step equations or inequalities true

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

- 6.10A model and solve one-variable, one-step equations and inequalities that represent problems, including geometric concepts

How does it support the Readiness Standard(s)?

Determining if given value(s) make an equation or inequality true will be critical to accurately solving one-variable, one-step equations and inequalities.

Instructional Implications

In accordance with the standard, students determine if a given value makes an equation (i.e. substitute the value -3 for x in the equation x + 4 = 7 to determine if x = -3 will make a true statement: -3 + 4 = 1, since 1 ≠ 7, -3 is not a solution for the equation) or inequality (i.e. substitute the value 3/4 for x in the inequality 8x < 6 to determine if x = 3/4 will make a true statement: 8 • 3/4 < 6, since 6 < 6 is not true, 3/4 is not a solution for the inequality). As students become comfortable with determining if a given value yields a true statement, students can begin applying this process to determine if their solution is correct when solving equations (see 6.10A).

Academic Vocabulary

- equations
- inequalities
- solution
- variable

Rigor Implications

- Apply
- Use
- Solve
- Determine
6.12 Measurement and Data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:
(A) represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and box plots

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
• 6.13A interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots

How does it support the Readiness Standard(s)?
Representing student collected data graphically will allow students the opportunity to personalize the activity allowing them to make more sense of the data and summarize more appropriately.

Instructional Implications
In adherence with the standard, the student will represent data graphically to include dot plots, stem-and-leaf plots, and box plots. The emphasis of instruction should be on helping students understand that all graphs convey information but different types of graphs highlight different features of the data (i.e. dot plots provide a graphic display used to compare frequency counts within groups; stem-and-leaf plots provide an efficient method of ordering data, and individual elements of data can be identified; histograms display the frequency of data in consecutive equal intervals along a numeric scale, the adjoining bars are connected; box plots display the median and information about the range and distribution of the data). It is important to present situations that include a real context and have students decide which graph(s) would be best for the given situation. Students should understand graphs convey factual information and also provide opportunities to make inferences that are not directly observed in the graph (i.e. what message may have been intended when viewing the graph). Students should represent the same numeric data using several graphs and then select which graph to use based on the intended audience and purpose.

Academic Vocabulary
• box plot (box and whiskers)
• dot plot
• histogram
• numeric data
• stem-and-leaf plot

Rigor Implications
• Apply
• Use
• Analyze
• Represent
6.12B Measurement and Data. The student applies mathematical process standards to use numerical or graphical representations to analyze problems. The student is expected to:

(B) use the graphical representation of numeric data to describe the center, spread, and shape of the distribution

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

- 6.12C summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution.

How does it support the Readiness Standard(s)?

Representing student collected data and analyzing the data will be foundational to accurate summarization and statistical analysis. Describing the center, spread, and shape of the distribution of data will be foundational skills to statistical analysis.

Instructional Implications

In conjunction with 6.12A, the student will use the graphical representation (i.e. dot plot, stem-and-leaf plot, box plot, and histograms) of numeric data and describe the center (i.e. mean – a central balance point computed by adding all the numbers in the set of data and dividing the sum by the number of elements added, median – middle value in an ordered set of data such that 50% of the data is below and 50% of the data is above the middle value, mode value or category that occurs most frequently in the set of data), spread (i.e. range distance between maximum and minimum data value), and shape of the distribution (i.e. what information the data conveys about the population from which it was gathered is the data heavily weighted to the left of the center, to the right of the center, or is it symmetrical to the center). Instruction should include different types of graphs representing the same data so students can develop an understanding how one type of graph may be a better representation of the numeric data than a different type of graph (i.e. a box plot is a visual display of not only the median value, but also displays information about the range, and distribution of the data).

Academic Vocabulary

- center
- graphical representations
- numeric data
- shape of the distribution
- skew
- spread
- symmetrical

Rigor Implications

- Apply
- Use
- Analyze
- Describe
GRADE 6  6.13B Supporting

6.13B Measurement and Data. The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to:

(B) distinguish between situations that yield data with and without variability

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

• 6.12C summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution

How does it support the Readiness Standard(s)?

Distinguishing between situations yielding data with and without variability will directly impact student’s ability to interpret data.

Instructional Implications

In adherence with the standard, the student will distinguish between situations that have data with variability (i.e. the data can be summarized using the range: how many students are attending the pep rally each week will be answered based on numbers that vary from week to week) and data without variability (i.e. the data can be summarized using a single value: how many students will attend the school play this Friday will be answered with a single number). Instruction should include a variety of problems for students to solve.

Academic Vocabulary

• data
• variability

Rigor Implications

• Apply
• Use
• Solve
• Distinguish
6.14A Personal Finance Literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one’s life as a knowledgeable consumer and investor. The student is expected to:

(A) compare the features and costs of a checking account and debit card offered by different local financial institutions

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

- 6.14 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Comparing features and costs of checking accounts and debit cards from different financial institutions 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, the student will compare features (i.e. on-line banking, 24-hour access to debit card machines, interest paying checking accounts, etc.) and costs (i.e. monthly banking fee, ATM usage fee, higher interest rates on loan, etc.) of a checking account (i.e. an account which allows the holder to write checks against deposited funds) and debit card (i.e. an electronic card issued by a bank that allows bank clients access to their account to withdraw cash or pay for goods and services). Instruction should include information on checking accounts and debit cards (i.e. brochures, guest speakers, internet, etc.) offered by different local financial institutions. Since features and fees for checking accounts and debit cards vary from financial institution to financial institution, it is important instruction includes information from several financial institutions.

Academic Vocabulary

- checking account
- debit card
- deposited funds
- fees
- financial institution
- withdrawals

Rigor Implications

- Apply
- Develop
- Compare
6.14B Supporting

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

- 6.14 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Distinguishing between debit and credit cards 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, the student will distinguish between debit cards and credit cards. Instruction should include information on the basic premise of a debit card (i.e. a debit card draws money directly from your checking account when you make a purchase) and a credit card (i.e. a credit card allows you to borrow money in small amounts to do basic transactions and then you pay interest on your charges if you do not pay the balance on the amounts you charged; generally, credit cards have a designated grace period before interest is charged to unpaid balances).

Academic Vocabulary

- charge
- credit card
- debit card
- fees
- interest
- purchase
- transaction
- unpaid balance

Rigor Implications

- Apply
- Develop
- Distinguish
6.14C  Personal Finance Literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one’s life as a knowledgeable consumer and investor. The student is expected to:
(C) balance a check register that includes deposits, withdrawals, and transfers

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
• 6.14 Personal Financial Literacy

How does it support the Readiness Standard(s)?
Balancing a check register 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, the student will balance a check register (i.e. include deposits, withdrawals, and transfers). In conjunction with 6.1A/6.1D, instruction should include a form where students enter deposits, withdrawals, and transfers to keep a record of the balance for a fabricated account.

Academic Vocabulary
• balance
• check register
• deposit
• transfer
• withdrawal

Rigor Implications
• Apply
• Develop
• Balance
6.14D 6.14 Personal Finance Literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one’s life as a knowledgeable consumer and investor. The student is expected to:

(D) explain why it is important to establish a positive credit history

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

- 6.14 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Establishing a positive credit history 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, the student will explain the importance of establishing and maintain a positive credit history (i.e. a record of how someone has repaid loans, credit card bills, and other debts in the past, whether or not someone has filed bankruptcy, a summation of someone’s borrowing and repayment habits that they have established over time with creditors). In conjunction with 6.2D, the students should relate positive and negative rational numbers to a positive credit history or negative credit history. Instruction should include how potential creditors (i.e. mortgage lenders or credit card companies) use information from someone’s credit history to decide whether credit will be extended to the person requesting credit.

Academic Vocabulary

- bankruptcy
- credit history
- creditor
- debt
- loan
- mortgage lender

Rigor Implications

- Apply
- Develop
- Explain
6.14E Supporting

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

- 6.14 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Describing the information on a credit report and how long it is retained 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, the student will describe information in a credit report (i.e. a report containing detailed information on a person’s credit history). Instruction should include information on how long a person’s credit report is retained (i.e. changes as creditors add information or old data expires, negative information may remain on a person’s credit report for up to seven years, bankruptcy may remain on a report for up to 10 years and unpaid tax liens can stay on a person’s credit history indefinitely, positive information may remain on a report as long as the account is active or up to 10 years for closed accounts).

Academic Vocabulary

- bankruptcy
- credit history
- credit report
- creditor
- tax liens

Rigor Implications

- Apply
- Develop
- Describe
6.14F 6.14 Personal Finance Literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one’s life as a knowledgeable consumer and investor. The student is expected to:

(F) describe the value of credit reports to borrowers and to lenders

What Readiness Standard(s) or concepts from the Readiness Standards does it support?
- 6.14 Personal Financial Literacy

How does it support the Readiness Standard(s)?
Describing the value of credit reports to borrowers and lenders 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, the student will describe the value of a credit report (i.e. report containing detailed information on a person’s credit history) to a borrower (i.e. person requesting to borrow money) and to a lender (i.e. person, business, or financial institution lending money to a person). Instruction may include a side by side chart displaying the value of a credit report to a borrower and to a lender.

Academic Vocabulary
- borrower
- credit report
- lender

Rigor Implications
- Apply
- Develop
- Describe
6.14 Personal Finance Literacy. The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one’s life as a knowledgeable consumer and investor. The student is expected to:
(G) explain various methods to pay for college, including through savings, grants, scholarships, student loans, and work-study.

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

• 6.14 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Explaining the various methods to pay for college 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, the student will explain various methods to pay for college (i.e. savings, grants, scholarships, student loans, and work-study). Instruction may include having students use the internet to investigate these different methods for various colleges and which method may work best for the student’s degree plan.

Academic Vocabulary

• grant
• savings
• scholarship
• student loan
• work-study

Rigor Implications

• Apply
• Develop
• Explain
6.14H Supporting

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

- 6.14 Personal Financial Literacy

How does it support the Readiness Standard(s)?

Comparing annual salaries of several occupations will support one’s ability to manage financial resources more effectively for a lifetime of financial security.

Instructional Implications

In adherence with the standard, the student will compare the annual salary for several occupations that require different levels of education (i.e. post-secondary) and training (i.e. vocational). Instruction may include a spreadsheet that calculates the different annual salaries and the effects this has on lifetime income.

Academic Vocabulary

- annual salary
- income
- lifetime income

Rigor Implications

- Apply
- Develop
- Compare
- Calculate
APPENDIX

TREE DIAGRAM
Grade 6 Math TEKS Tree - Readiness Standards

6.2D  Order  Rational numbers  Mathematical problems

6.3D  Add  Integers
      Subtract  Integers
      Multiply  Integers
      Divide  Integers

6.3E  Multiply  Numbers  Positive  Rational

6.3F  Divide  Numbers  Positive  Rational

6.4B  Apply  Reasoning  Quantitative  Qualitative

6.4C  Solve  Prediction problems  Ratios  Rates

6.4D  Solve  Comparison problems  Ratios  Rates

6.4E  Generate  Equivalent forms  Fractions  Decimals  Percents

6.4F  Generate  Problems  Real-world  Money

6.4G  Generate  Units  (same measurement system)

6.4H  Convert  Proportions  Unit rates

6.5B  Solve  Real-world problems

Find  Whole  From part and percent
      Part  From whole and percent
      Percent  From part and whole

6.6C  Represent  Situations

6.6D  Use  Numerical

6.7A  Use  Prime factorization

6.7B  Use  Whole number exponents

6.7C  Generate  Equivalent expressions

6.7D  Use  Properties

6.8D  Solve  Area problems

6.9D  Solve  Volume problems

6.10A  Solve  Equations  One-variable  One-step

6.11A  Solve  Inequalities  One-variable  One-step

6.12A  Solve  (including geometry)

6.13A  Solve  All four quadrants

6.14A  Solve  Ordered pairs: rational numbers

Continued →
Grade 6 Math TEKS Tree - Readiness Standards

6.12C Summarize Data
- Use Summaries
  - Center
  - Shape
  - Spread
- Describe

6.12D Summarize Categorical data
- Use Summaries
  - Numerical
  - Graphical
- Describe Distribution

6.13A Interpret Numeric data
- Dot plots
- Stem-and-leaf plots
- Histograms
- Box plots

TEKS Student Expectations for implementation beginning 2014-2015.