Revised for the Most Recent TEKS

STAAR MASTER®
Student Practice Book

Sample Booklet
Grade 6
Mathematics
(Revised TEKS)

Lori Mammen
Editorial Director

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For more than two decades, we have helped you achieve student success on Texas tests by providing the highest quality test-prep materials. With STAAR MASTER®, we continue our commitment to create research-based content that engages students and makes teaching easier.

The TEKS for mathematics have undergone significant changes, and we have revised our STAAR MASTER® Student Practice Books for Math accordingly. The most prominent changes include:
• Reorganization of mathematics strands
• An all-new strand addressing “Personal Financial Literacy”
• An increased depth of understanding as to why and how mathematics processes work
Newly Revised Math!

Mathematics
Revised for the 2014–2015 eligible TEKS
Grades 3–8

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• An increased depth of understanding as to why and how mathematics processes work

Get a head-start on new changes.

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Credible
Same ECS quality
• based on most recent eligible TEKS and STAAR® test blueprints
• practice items marked with complexity level (L, M, or H)
• questions labeled with “skill tags”

Authentic
Reflects key characteristics of STAAR®
• increased rigor
• emphasis on readiness standards
• more open-ended [griddable] items [mathematics and science]
• assessment of process skills within context (mathematics, science, and social studies)

Fresh
Includes challenging, original content
• targeted practice in a variety of contexts
• range of topics to interest students
• clear and consistent page layout
• complete answer keys for teachers

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STAAR MASTER® Student Practice Book, Teacher Guide—Mathematics, Grade 6
Inside the Teacher Guide

This teacher guide includes the following information—

- An overview of the STAAR MASTER® Student Practice Book and some key characteristics of the State of Texas Assessments of Academic Readiness (STAAR®) for Mathematics
- Descriptions of complexity levels assigned to practice items
- Strategies/suggestions for mathematics instruction and test preparation
- A mathematics vocabulary list for the appropriate grade level
- A master list of STAAR-eligible standards and expectations from the Texas Essential Knowledge and Skills (TEKS) for Mathematics (adopted 2014), including mathematical process skills
- A complete answer key, with corresponding complexity levels for each practice item

Inside the Student Practice Book

The STAAR MASTER Student Practice Book provides practice and review material for the Grade 6 Mathematics portion of the STAAR. The content reflects key components and characteristics of the yearly state assessment, including the following.

- The practice items focus on the grade-specific content of the STAAR-eligible TEKS for Mathematics adopted in 2014, including mathematical process skills.
- The practice items reflect the kinds of problems students might encounter on the actual STAAR.
- Whenever possible, practice items reflect a “real-world” context, covering a broad range of topics and ideas of interest to students.
- Each exercise is labeled for easy identification of the TEKS reporting category, standard, and expectation addressed in the practice items.
- Several exercises address the same standard/expectation, providing repeated practice for students in a variety of contexts.
- Selected practice items are “griddable questions,” reflecting the format used on the actual STAAR.

Items in each student practice book address the standards and student expectations found within the reporting categories for the grade level.

- Reporting Category 1: Numerical Representations and Relationships
- Reporting Category 2: Computations and Algebraic Relationships
- Reporting Category 3: Geometry and Measurement
- Reporting Category 4: Data Analysis and Personal Financial Literacy

The majority of items in the book also address the “Mathematical Process Standards” in the TEKS. Mastery of these standards and expectations is not reported under a separate category, but is incorporated into items throughout the four reporting categories.

Note: Each exercise in the student practice book focuses on only one student expectation, with one important exception. Each exercise related to personal financial literacy includes a mix of the grade-level student expectations for that standard. Many of the student expectations for this topic are narrow in scope (e.g., 6.14B: Distinguish between debit cards and credit cards). For this reason, the editors found it difficult to include a variety of item types within each exercise. By including a mix of practice items for all the student expectations in each exercise, the editors believe students will find them more interesting and realistic. In addition, there is less chance that the correct answer to one item will “give away” the correct answer to another item on the same page.

Skills Tags: Each exercise includes a “skills tag” (see Figure 1) for easy identification of the TEKS-based standard and student expectation addressed in the exercise.

Readiness vs. Supporting Standards: The standards found in the STAAR-eligible TEKS are categorized as “readiness standards” or “supporting standards,” with greater emphasis on the former. Readiness standards address broader, deeper ideas and are considered more critical for students to know and master. Supporting standards address more narrowly defined ideas. While supporting standards are assessed, they receive less emphasis. The STAAR MASTER Student Practice Book mirrors this balance of readiness and supporting standards to provide meaningful, authentic practice for students.

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Griddable Questions: In addition to multiple-choice items, the STAAR® for Mathematics also includes open-ended questions known as "griddable questions" (Texas Education Agency, 2014d). These open-ended items allow students to solve a problem without the influence of given answer choices. The answer grid for Grade 6 has eight columns, with one column designated for a positive or negative sign and one column designated for a fixed decimal point (see Figure 2). All correct answers will be positive or negative numbers that range from -9,999.99 to 9,999.99. To indicate their answer, students enter the appropriate number(s) in the boxes and then fill in the corresponding "bubble(s)" below the number(s). Students will not grid units of measure (e.g., ft). It is acceptable for students to grid a zero as long as it does not affect the value of the correct answer. Students must enter a negative sign for a negative number. If the student does not mark a sign, the answer is assumed to be positive.

Mathematical Process Standards: The Mathematical Process Standards are not tested in isolation, nor do they appear in a separate reporting category. Rather, these standards are incorporated into items based on content standards from the four reporting categories and are reported along with those content standards. Similarly, items in the student practice book require students to demonstrate understanding of these important mathematical processes within the context of each problem. When a practice item requires the application of a process skill, a tag identifies the process standard and expectation addressed (see Figure 3).

Increased Rigor: Many educators describe the STAAR as "more rigorous" than previous state assessments, but what does rigor mean? Academic rigor is a measure of the cognitive demand required by a specific test item. In a rigorous system, standards, curriculum, instruction, and assessment tightly align with congruent measures of cognitive complexity. In a rigorous system, students must demonstrate a deep mastery of skills and understanding through rich, complex tasks. Students will definitely encounter problems that require higher levels of thinking than required on previous assessments. The student practice book includes items written at varying levels of complexity to reflect the kind of rigor students can expect on the actual test. Teachers should refer to "Depth of Knowledge" below for more information about the levels of complexity in practice items.

Depth of Knowledge: Norman Webb’s “depth-of-knowledge” model (2002a) is currently an influential alignment model in education. “Depth of knowledge” describes the degree of complexity required to solve a particular problem. Distinct cognitive demands occur at each level. Webb defines four levels of depth of knowledge: Level 1: Recall; Level 2: Skill or Concept; Level 3: Strategic Thinking; and Level 4: Extended Thinking.

Using a modified version of Webb’s depth-of-knowledge model (see page 5 of this teacher guide), we have aligned items in the STAAR MASTER® Student Practice Book to the TEKS. The complexity levels assigned to the items appear in the Answer Key.
**Descriptions of STAAR MASTER® Complexity Levels**

The following descriptions provide an overview of the three complexity levels used to align the STAAR MASTER® Student Practice Book items to the STAAR®-eligible TEKS. Each explanation details the kinds of activities that occur within each level. However, they do not represent all of the possible thought processes for each level.

**Low Complexity (L)**

Low-complexity items align with the TEKS at Level 1 of the Webb (2002a) model. Items of low complexity involve recall and reproduction. Activities and problems at this level require routine, single-step methods. An item may ask students to recognize or restate a fact, definition, or term. For example, students may need to identify attributes of a geometric figure. Items of this complexity may require students to follow a basic procedure with clearly defined steps. At this cognitive level, students may need to apply a formula or perform a simple algorithm. Some major concepts represented at this level include arithmetic facts, perimeter, and converting units of measure. A low-complexity item may ask students to identify, recognize, use, or measure information and concepts.

**Moderate Complexity (M)**

Moderate-complexity items align with the TEKS at Level 2 of the Webb model. Items of moderate complexity involve both comprehension and the subsequent processing of information. Activities at this level demand more than one step in the reasoning process. Students are asked to determine how to best solve the problem. An item may ask students to generate a table of paired numbers based on a real-life situation. Items may involve using a model to solve a problem. At this cognitive level, students will need to visualize for tasks such as extending patterns and determining nonexamples. Items may involve interpreting information from a complex graph, table, or diagram. At this cognitive level, students will need to justify the reasonableness of a solution process when more than one solution exists. Students will use concepts to solve and explain problems, such as how changes in dimensions affect the volume of a figure. A high-complexity item may ask students to plan, reason, explain, compare, differentiate, draw conclusions, cite evidence, analyze, synthesize, apply, or prove. Some items also require students to apply low- and/or moderate-complexity skills and concepts.

**High Complexity (H)**

High-complexity items align with the TEKS at Level 3 and/or Level 4 of the Webb model. Items of high complexity require students to use strategic, multi-step thinking; develop a deeper understanding of the information and extend thinking. The problems at this level are non-routine and more abstract. Students are asked to demonstrate more flexible thinking, apply prior knowledge, and test conjectures, and support their responses. High-complexity items may require students to make generalizations from patterns. Items may involve interpreting information from a complex graph, table, or diagram. At this cognitive level, students will need to justify the reasonableness of a solution process when more than one solution exists. Students will use concepts to solve and explain problems, such as how changes in dimensions affect the volume of a figure. A high-complexity item may ask students to plan, reason, explain, compare, differentiate, draw conclusions, cite evidence, analyze, synthesize, apply, or prove. Some items also require students to apply low- and/or moderate-complexity skills and concepts.

*Note: Although state standards may include expectations that require extended thinking, many large-scale assessment activities are not classified as Level 4. Performance and open-ended assessments may require activities at Level 4.*
How to Use This Book

Effective Test Preparation: What is the most effective way to prepare students for any mathematics competency test? Experienced educators know that the best test preparation includes three critical components—

• a strong curriculum aligned with the content and skills to be assessed
• effective, relevant, and varied instructional methods that allow students to learn content and skills in many different ways
• targeted practice that familiarizes students with the specific content and format of the test

A strong and effective, relevant, varied instructional methods provide the foundation for all appropriate test preparation. Merely “teaching the test” performs a disservice to students, who must acquire knowledge, practice skills, and have important educational experiences that can never be measured on tests limited by time and in scope. For this reason, resources like the STAAR MASTER® Student Practice Book should never become the heart of the curriculum or replace strong instructional methods.

Targeted Practice: The STAAR MASTER® Student Practice Book does address the final element of effective test preparation by providing meaningful targeted practice. This book familiarizes students with the specific content of the STAAR® for mathematics and the general format of competency tests. When students are familiar with both the content and the format of a test, they know what to expect on the actual test. This, in turn, improves their chances for success.

Using STAAR MASTER® Products: When used as part of the regular curriculum, the STAAR MASTER® Student Practice Book allows teachers to—

• pretest skills that students must demonstrate for the actual test
• determine students’ areas of strength/weakness
• assess student performance at different complexity levels
• provide meaningful test-taking practice for students
• ease students’ test anxiety
• communicate test expectations and content to parents

Quick Tips for Instruction

Math teachers have myriad instructional strategies and materials available to them. The following ideas can serve as springboards for effective mathematics instruction. Teachers should use those that are appropriate for their students.

Group Work: Helen Keller once said, “Alone we can do so little; together we can do so much.” This is absolutely true in the mathematics classroom! Students who struggle when working alone often benefit by working with others. Students (and the teacher!) can work through selected practice exercises together, first noting what each problem involves. They should also note the range of problem-solving techniques found within a group. Group work also lets students discuss common errors and strategies for avoiding them.

Formulating Answers: Teachers should encourage students to formulate their own answers before they even look at available answer choices. For instance, students can treat every problem in an exercise as a “guessable question” and actually solve each problem before reading the answer choices. This approach discourages “guessing” an answer or an over-reliance on mental math since students read the answer choices only after finding the answers on their own.

Developing Fundamental Understanding: Teachers promote the recognition of “real-world” mathematics when they develop and use problems relevant to students’ daily experiences at school and at home. Working through “real” problems can also foster an understanding of the mathematics process standards.

Mathematics Vocabulary: Effective communication in mathematics requires the use of precise language (e.g., Adams, 2003; Harmon, Hedrick, & Wood, 2005). This includes understanding symbols, definitions, notations, and other developmentally appropriate language. A mathematics vocabulary list appears on pages 7–8 of this teacher guide, and some simple vocabulary strategies appear on page 9. Most important, however, is that teachers use precise vocabulary when teaching mathematics. Students should know and be expected to use precise language, as well.

Math Manipulatives: The correct use of math manipulatives provides concrete stepping stones to understanding abstract concepts. Recommended math manipulatives and suggestions for their use appear on page 10 of this teacher guide.
### Answer Key

Note: Complexity levels appear in parentheses. L = Low, M = Moderate, H = High

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*All Web sites listed were active at time of publication.


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Mathematics, Grade 6

for the State of Texas Assessments of Academic Readiness

Lori Mammen
Editorial Director

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STAAR MASTER® Student Practice Book—Mathematics, Grade 6
Reporting Category 1
Numerical Representations and Relationships

6.7C: Determine if two expressions are equivalent using concrete models, pictorial models, and algebraic representations (Supporting Standard)

1. The model below represents the expression $3x + 9$.

Which model represents an expression equivalent to $3x + 9$?

A

B

C

D

2. The model below represents the expression $4y + 12$.

Which model represents an expression equivalent to $4y + 12$?

A

B

C

D
Reporting Category 2
Computations and Algebraic Relationships

Exercise 25

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 (Readiness Standard)

(6.1A; 6.1B)

1. Herman saves 22% of his monthly paycheck so he can buy a new car. He earned $825 last month. How much money did Herman save for his new car last month?
   A $62.70  
   B $165.00  
   C $181.50  
   D $206.25

(6.1A; 6.1B)

2. An object that weighs 150 pounds on Earth weighs only 57 pounds on Mars. What percent of an object’s weight on Earth is its weight on Mars?
   A 38%  
   B 42%  
   C 57%  
   D 93%

(6.1A; 6.1B)

3. Objects on Jupiter weigh 240% of their weight on Earth. If an object weighs 30.5 pounds on Earth, how many pounds would it weigh on Jupiter?
   Record your answer in the boxes. Then fill in the bubbles. Be sure to use the correct place value.

(6.1A; 6.1B; 6.1D)

4. Thirty-six members of the middle school choir, or 30%, participated in the regional contest, as shown in the model below.

   How many total students are in the choir?
   A 115  
   B 120  
   C 130  
   D 136

(6.1A; 6.1B)

5. A business office has a $5,000 budget for printing resources. The manager spent $900 on ink cartridges. What percent of the budget did the manager spend on ink cartridges?
   A 9%  
   B 15%  
   C 18%  
   D 21%
6.8C: Write equations that represent problems related to the area of rectangles, parallelograms, trapezoids, and triangles and volume of right rectangular prisms where dimensions are positive rational numbers (Supporting Standard)

(6.1D; 6.1E) 1. The diagram below shows a parallelogram and its dimensions.

Which equation represents the area of the parallelogram?

A  \( A = 20^2 \)
B  \( A = 20 \times 15 \)
C  \( A = \frac{1}{2} (4 \times 15) \)
D  \( A = \frac{1}{2} (4 + 16) \times 15 \)

(6.1E) 2. The table below shows the widths and areas of several rectangles.

<table>
<thead>
<tr>
<th>Width, ( w ) (in inches)</th>
<th>Area, ( A ) (in inches(^2))</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>36</td>
</tr>
<tr>
<td>7</td>
<td>42</td>
</tr>
<tr>
<td>8</td>
<td>48</td>
</tr>
</tbody>
</table>

Which equation shows the relationship between the widths and areas of the rectangles?

A  \( A = 5w + 4 \)
B  \( A = 5w + 5 \)
C  \( A = 6w + 1 \)
D  \( A = 6w \)

(6.1D; 6.1E) 3. The diagram below shows a trapezoid and its dimensions.

Which equation represents the area of the trapezoid?

A  \( A = 4^2 \)
B  \( A = 4 \times 9 \)
C  \( A = \frac{1}{2} (4 \times 9) \)
D  \( A = \frac{1}{2} (4 + 9)7 \)

(6.1D; 6.1E) 4. The diagram below shows a rectangular prism and its dimensions.

Which equation represents the volume of the prism?

A  \( V = 3^3 \)
B  \( V = 6 \times 1 \)
C  \( V = 6 \times 1 \times 3 \)
D  \( V = 3 + 6 + 1 \)
Use the information below to answer questions 1–3.

Janice enjoys science and wants to be either a microbiologist or an electrician. The chart below includes information about both careers.

### Microbiologist vs. Electrician

<table>
<thead>
<tr>
<th>Description</th>
<th>Microbiologist</th>
<th>Electrician</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studies microorganisms, such as bacteria, fungi, and algae</td>
<td>Performs technical duties related to wiring and electrical flow in buildings and machines</td>
<td></td>
</tr>
<tr>
<td>Educational Requirements</td>
<td>Bachelor’s degree</td>
<td>Vocational training</td>
</tr>
<tr>
<td>Median Income</td>
<td>$67,700 per year, $32.55 per hour</td>
<td>$93,700 per year, $45.05 per hour</td>
</tr>
</tbody>
</table>

1. Based on information from the chart above, which of the following statements is most likely true?
   A. Being a microbiologist is a more serious career than being an electrician.
   B. An electrician will probably pay less for an education than a microbiologist.
   C. Being a microbiologist requires fewer scientific skills than being an electrician.
   D. Microbiologists and electricians learn and use the same set of skills in their work.

2. Compared to an electrician, how much less will a microbiologist earn over a span of 20 years?
   A. $52,000   C. $520,000
   B. $260,000  D. $720,000

3. If Janice becomes an electrician, she should expect her beginning salary to be—
   A. equal to $93,700 per year
   B. less than $67,700 per year
   C. less than $93,700 per year
   D. greater than $93,700 per year
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