# Mathematics Assessments

*SBOE Ad Hoc Committee on Mathematics Framework*
*March 27, 2025*

# TEA Assessment Divisions

José Ríos, **Associate Commissioner**

Chris Rozunick, **Division Director**

Jo Ann Bilderback, Director, Math, Science, and Social Studies

# Today's Topics

Overview of Texas Assessment Program

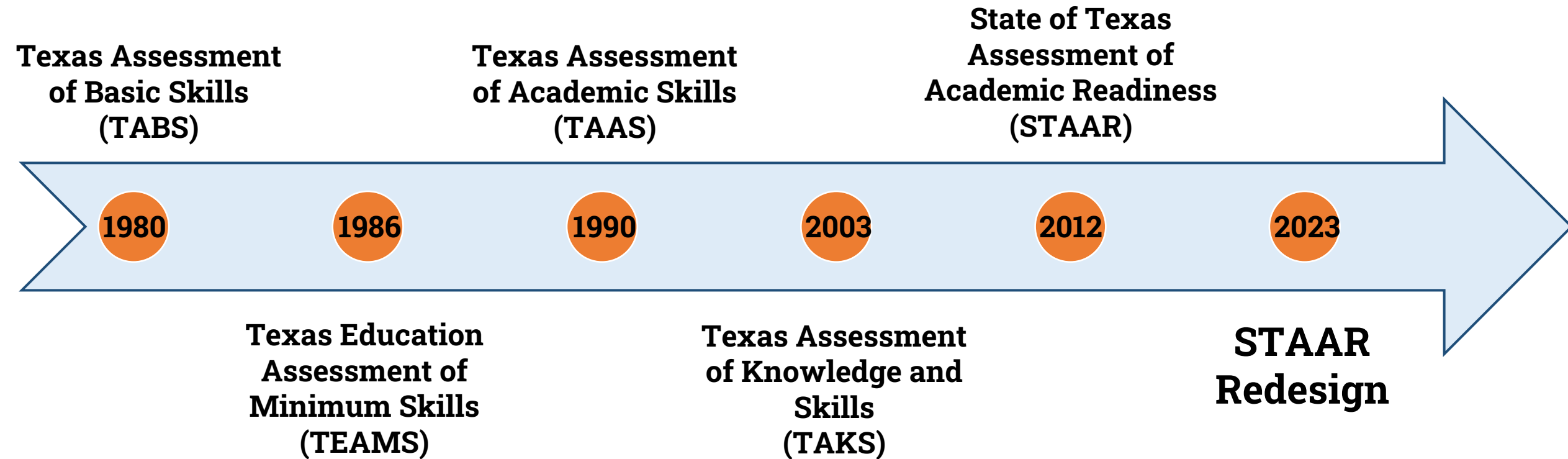Performance Levels: STAAR vs NAEP

TEKS to TEST

STAAR Resources

Questions

# Overview of the Texas Assessment Program

TEA | Texas Education Agency | TE★AS ASSESSMENT

Supporting Student Success

# Texas has a long history of statewide summative assessments to measure student learning

**Texas Assessment of Basic Skills (TABS)**

**Texas Assessment of Academic Skills (TAAS)**

**State of Texas Assessment of Academic Readiness (STAAR)**

1980　　1986　　1990　　2003　　2012　　2023

**Texas Education Assessment of Minimum Skills (TEAMS)**

**Texas Assessment of Knowledge and Skills (TAKS)**

**STAAR Redesign**

# As the curriculum standards increased in rigor over the years, the state summative assessment followed



Exit Level TABS Item (1982)

BARRELS OF CRUDE OIL EXPORTED MONTHLY

= 1 Million Barrels

Texas, Alaska, Pennsylvania, California, Louisiana

Which state exports the least amount of barrels of crude oil monthly?

A  Louisiana
B  Texas
C  Alaska
D  Pennsylvania

TABS assessed the Basic Skills Competencies. In this example of an Exit Level (HS) question from 1982, students are expected to read data from a pictograph.

This content is now aligned to 3.8A in the current TEKS.

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

**STAAR Grade 3 (2024)**

A restaurant sells four sizes of pizza. The table shows the pizzas sold.

**Pizzas Sold**

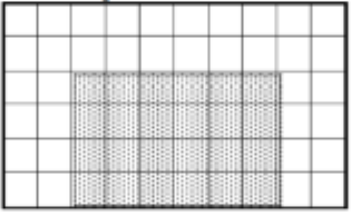| Size | Number |
|---|---|
| Small | 4 |
| Medium | 10 |
| Large | 18 |
| Extra large | 8 |

Which pictograph shows the data in the table?
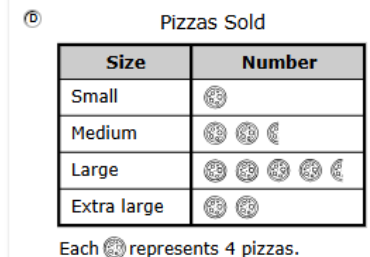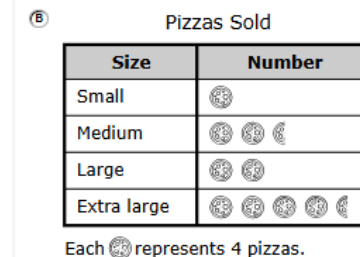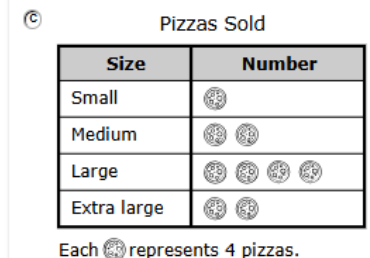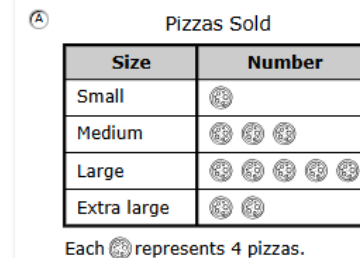
# As the curriculum standards increased in rigor over the years, the state summative assessment followed

## TAAS Example 4th Grade Math

11. Which sentence tells one way to find the area in square units of the shaded area.



A Count the unshaded squares only
B Count the shaded squares only
C Count only the squares along the edge
D Count all the square in the grid

TAAS assessed the Essential Elements. The content of this question is currently in the elementary grade-band, but it connects area to multiplication.

This content in the current TEKS is 3.6C.

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

**STAAR Grade 3 (2024)**

Lena draws a rectangle on a grid made of same-sized squares that do not overlap.

- Each square has an area of one square centimeter.
- There are 32 rows in the rectangle.
- Each row has 8 squares.

What is the area of the rectangle in square centimeters?

Enter your answer in the space provided.

# With the STAAR Redesign in 2023, non-multiple-choice questions were introduced

- ✓ Engage students in higher level thinking
- ✓ Provide more engagement/interaction
- ✓ Align with questions asked in the classroom and provide more authentic response
- ✓ Allow for more accessibility
- ✓ Provides more information on misconceptions

Math Samplers and Practice Tests *online*

Math uses 10 non-multiple-choice question types.

| | |
|---|---|
| Equation Editor | Hot Spot |
| Text Entry | Drag and Drop |
| Graphing | Match Table Grid |
| Number Line | Multi-select |
| Inline Choice | Fraction Model* |

\* Grades 3-5 only

# Performance Levels:
# STAAR vs NAEP

# Overview of NAEP and STAAR

**STAAR**
State of Texas
Assessments of
Academic Readiness

**NAEP**
NATIONAL ASSESSMENT
OF EDUCATIONAL
PROGRESS
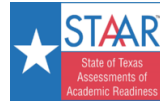
**Purpose**

Assesses the **Texas Essential Knowledge and Skills (TEKS)**

Measures content frameworks developed by the **National Assessment Governing Board**

**Participation**

Participation is **required for all students in Texas public schools**

Asks a nationally **representative sample** of students in **grades 4, 8, and 12** to participate

**Administration**

Assessments are administered over a few weeks in **Spring** for **2-5 hours** each**.** Students testing in the same subject and grade level take the **same test**.

Administered by NAEP staff on NAEP equipment in **90–120 minutes o**n one day in **Jan-Mar.** Students in the same subject and grade see **different questions**.

**Results and Uses**

Measures state, district, school, and individual student results; used as a **measure of accountability**

Used to set state education policy, examine school and group performance, and make local decisions about curriculum and instruction

Evaluates **trends in student achievement over time** by demographic groups for the nation, states, and some urban districts

Results are **not reported for individual students or schools**

NAEP's achievement levels indicate what students should know and be able to do according to the NAGB. The board sets the aspirational goal that all students should reach the NAEP Proficient achievement level.
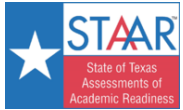
**Masters Grade Level:** students are expected to succeed in the next grade with little/no intervention. Students demonstrate the ability to **think critically** and **apply the assessed knowledge/skills** in **familiar and unfamiliar contexts**.

**Meets Grade Level:** students have a high likelihood of success in the next grade but may need short-term, targeted intervention. Students generally demonstrate the ability to **think critically** and **apply the assessed knowledge/skills in familiar contexts**.

**Approaches Grade Level:** students are likely to succeed in the next grade with targeted intervention. Students generally demonstrate the **ability to apply the assessed knowledge/skills in familiar contexts.**

**Did Not Meet Grade Level:** students are unlikely to succeed in the next grade without significant, ongoing intervention. Students **do not demonstrate a sufficient understanding of the assessed knowledge/skills.**

**NAEP Advanced:** students with superior performance at each grade assessed

**NAEP Proficient:** students with solid academic performance for each grade assessed.

- Students demonstrate **competency over challenging subject matter**, including **subject-matter knowledge**, **application to real-world situations**, and **analytical skills** appropriate to the subject matter

**NAEP Basic:** students with partial mastery of prerequisite knowledge/skills that are fundamental for proficient work at each grade assessed

**NAEP Below Basic:** students do not meet Basic

# A National Comparison: NAEP 2024

## 4th Grade Reading

| Scale Score | 2022 | 2024 | Change |
|---|---|---|---|
| 🇺🇸 | 216 | 214 | -2 |
| Texas | 214 | 212 | -2 |

| Texas Rank | 33rd | **37th** | -4 |
|---|---|---|---|

## 8th Grade Reading

| | 2022 | 2024 | Change |
|---|---|---|---|
| | 259 | 257 | -1 |
| | 255 | 252 | -3 |

| Texas Rank | 41st | **44th** | -3 |
|---|---|---|---|

## 4th Grade Math

| Scale Score | 2022 | 2024 | Change |
|---|---|---|---|
| 🇺🇸 | 235 | 237 | +2 |
| Texas | 239 | 241 | +2 |

| Texas Rank | 14th | **8th** | +6 |
|---|---|---|---|

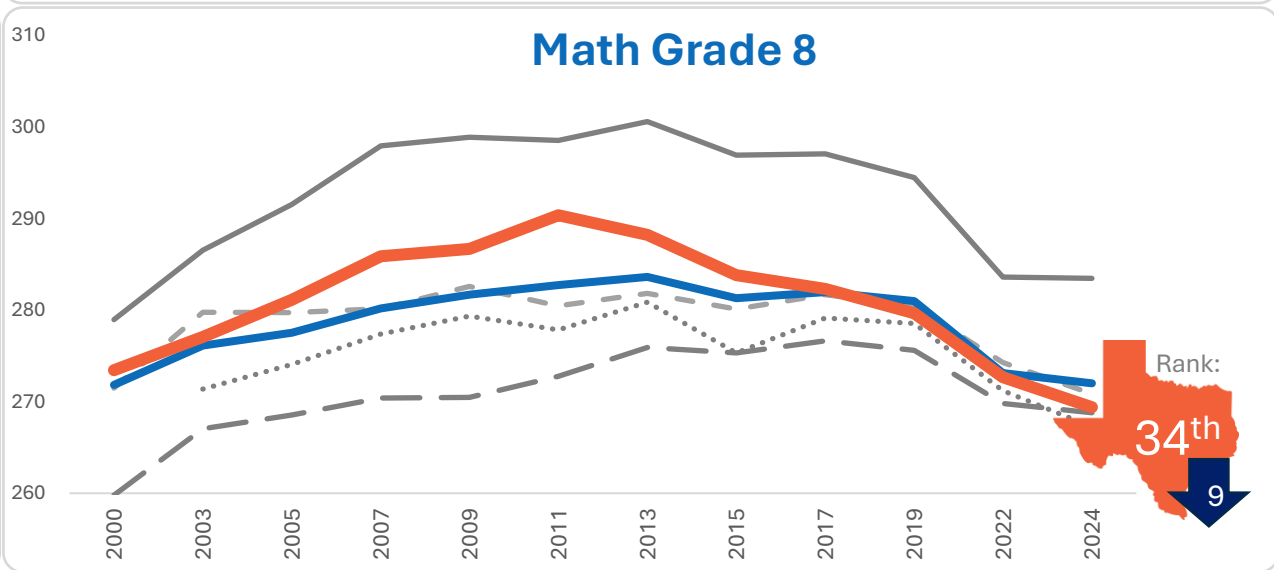## 8th Grade Math

| | 2022 | 2024 | Change |
|---|---|---|---|
| | 273 | 272 | -1 |
| | 273 | 269 | -4 |

| Texas Rank | 25th | **34th** | -9 |
|---|---|---|---|

| Student Group | Reading 4th Grade | Reading 8th Grade | Math 4th Grade | Math 8th Grade |
|---|---|---|---|---|
| African American | 9th | 12th | 1st | 12th |
| Asian/Pacific Islander | 7th | 5th | 2nd | 11th |
| Hispanic | 16th | 38th | 4th | 14th |
| White | 14th | 16th | 2nd | 25th |
| English Learners | 5th | 1st | 2nd | 1st |
| Special Education | 22nd | 32nd | 12th | 32nd |
| Low Income | 18th | 42nd | 4th | 22nd |
| Non-Low Income | 26th | 26th | 10th | 38th |
| **Texas Rank: Adjusted** | **9th** | **10th** | **3rd** | **6th** |

# NAEP 2024 Results
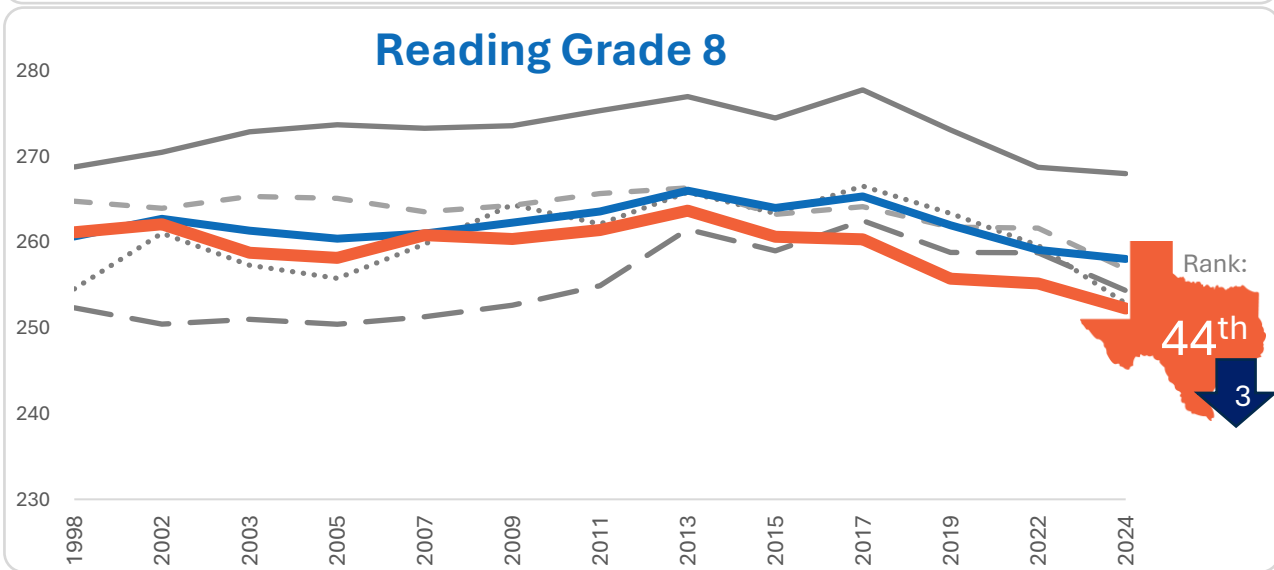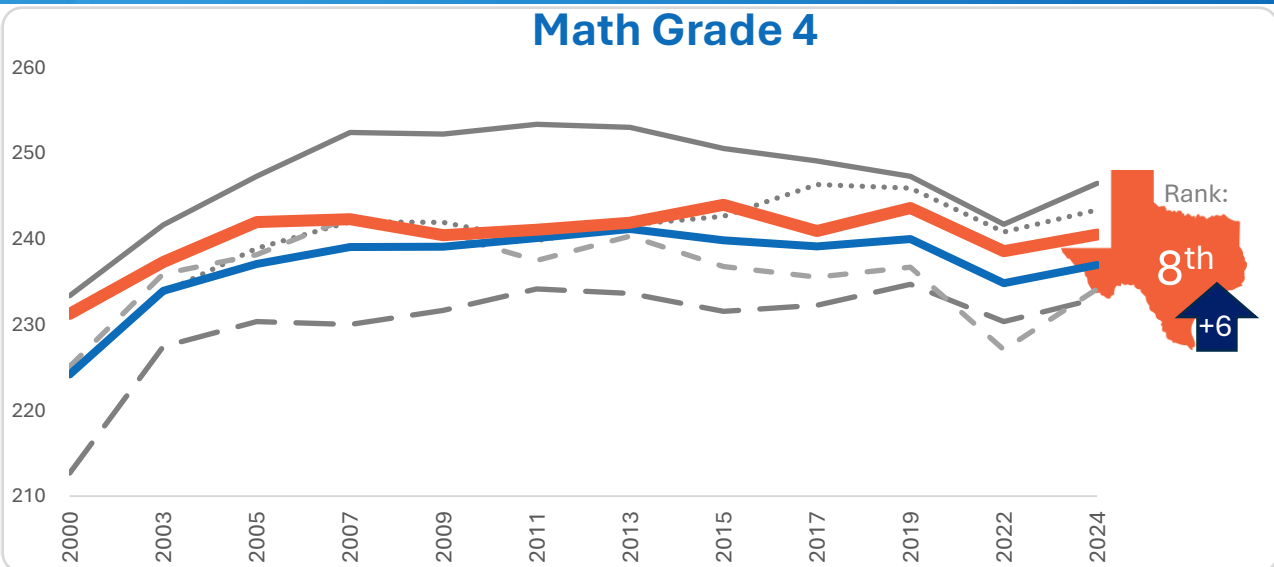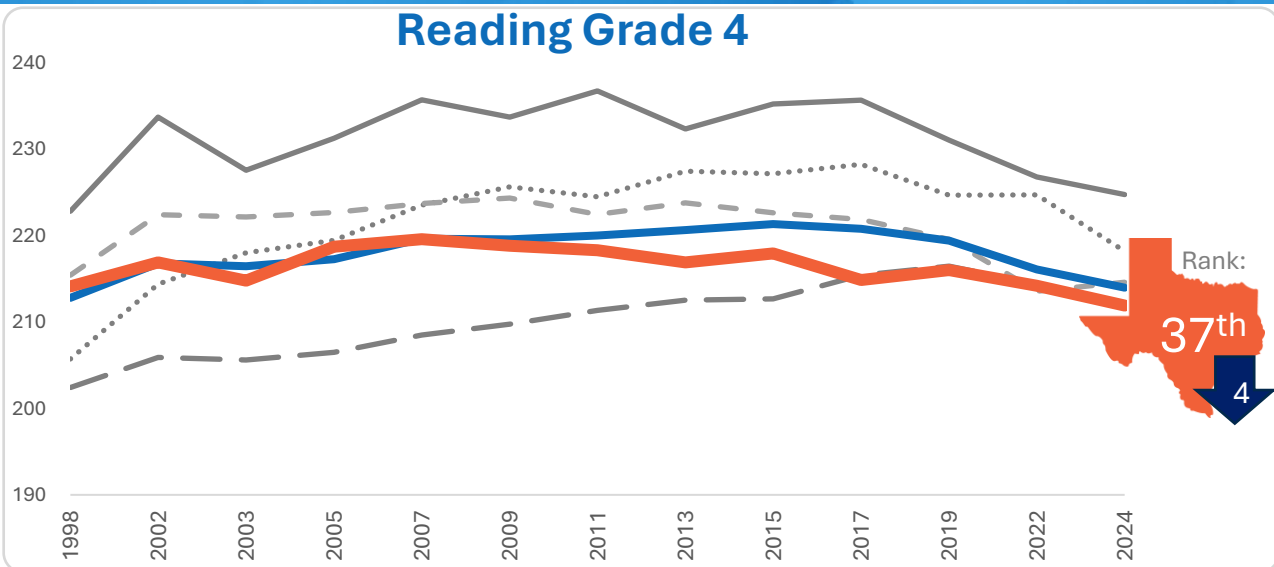


**Reading Grade 4** — Rank: 37th (↓4)

**Math Grade 4** — Rank: 8th (↑+6)

**Reading Grade 8** — Rank: 44th (↓3)

**Math Grade 8** — Rank: 34th (↓9)

Legend: Texas | US | California | Massachusetts | Florida | New York | Rank Change from 2022

# TEKS to Test

# SBOE defines what all students should know and be able to do at each grade level – Texas Essential Knowledge and Skills (TEKS)

College, Career, & Military Readiness

ON TRACK
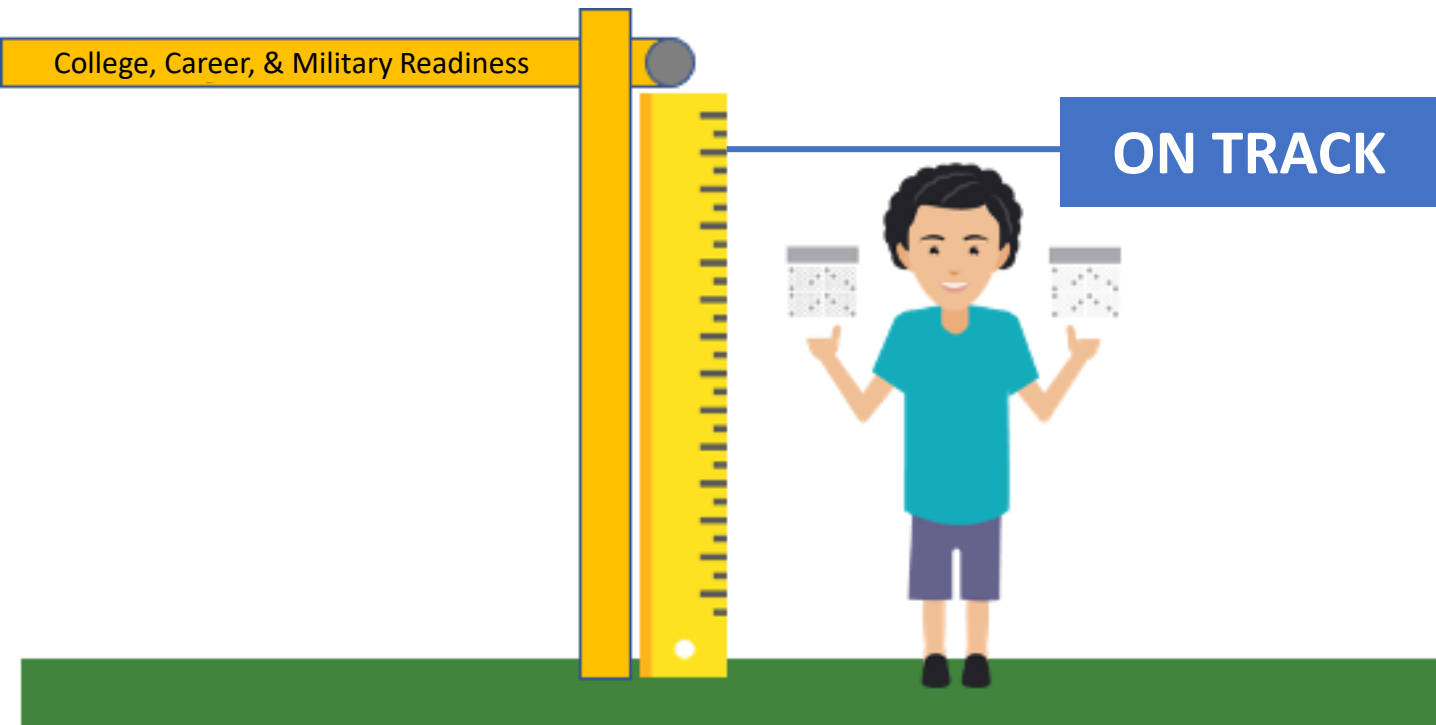
The State of Texas Assessment of Academic Readiness (STAAR) assess the TEKS. Therefore, the SBOE's work in TEKS adoption drives the state summative assessment.

# STAAR is a state "summative" assessment

Assessments provide educators and parents with helpful information to support strong teaching and guide students to their full potential.

State summative assessments serve several primary purposes:

- To serve as a bar for rigor and standards alignment in planning
- To determine mastery of a breadth of knowledge & skills for students
- To help determine which individual students should receive additional holistic supports
- To evaluate the effectiveness of curriculum and instruction programs after delivery

# STAAR has been proven valid, reliable, aligned to the TEKS, with passage readability on grade-level

**House Bill 743, Rep. Huberty/Sen. Seliger**

**84th Texas Legislature**

"The assessment instrument must, on the basis of empirical evidence, be determined to be **valid and reliable** by an entity that is independent of the agency and of any other entity that developed the assessment instrument."

**Analysis Completed in 2016**

**Findings**: STAAR was found to be valid. The evaluation confirmed the "**test bears a strong association with on-grade curriculum requirements**."
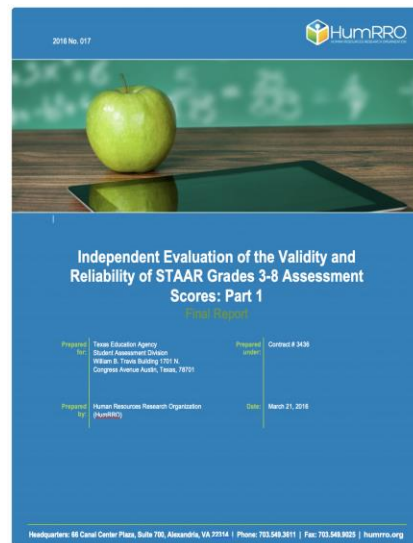
**House Bill 3, Rep. Huberty/Sen. Taylor**

**86th Texas Legislature**

Required an institution of higher education to conduct a study on the state assessment instruments to independently evaluate the readability and alignment.

**Analysis Completed in 2019**

**Findings:** Across grade levels and subjects, all tests included in the study **were aligned with the TEKS** for the grade level tested.

- **91% of passages met the criterion for readability** as defined in the study in terms of text complexity



2016 No. 017

HumRRO

**Independent Evaluation of the Validity and Reliability of STAAR Grades 3-8 Assessment Scores: Part 1**
Final Report

Prepared for: Texas Education Agency, Student Assessment Division, William B. Travis Building 1701 N. Congress Avenue Austin, Texas, 78701

Prepared under: Contract # 3436

Prepared by: Human Resources Research Organization (HumRRO)

Date: March 21, 2016

Headquarters: 66 Canal Center Plaza, Suite 700, Alexandria, VA 77314 | Phone: 703.549.3611 | Fax: 703.549.9025 | humrro.org



**2019 Assessments**
Final Report: Part 1

OSP# 201902572-001
December 2, 2019

The Meadows Center
FOR PREVENTING EDUCATIONAL RISK

Supporting Student Success

# House Bill (HB) 3906 improved instructional alignment for STAAR

- The question wasn't whether STAAR is designed to accurately measure student knowledge and skills. We know the answer, and it has been and continues to be: yes.

- The question is whether STAAR could be designed differently in order to more positively influence instructional practices.

Measuring whether students have learned a concept well isn't the same as teaching it well

**STAAR was redesigned because of HB 3906 effective 2022-23, so that it now aligns with strong instructional practices, while still accurately measuring student mastery.**

# Creating high-quality assessments is a rigorous process

**Educator involvement**

## Assessment design

1. Assessment design framework is developed*
2. Assessment blueprints are developed*
3. Educator advisory committees provide feedback*

## Passage and item development

4. Professional item writers develop new passages & items
5. TEA content specialists review passages & items
6. Educator external review committees review passages & items

Educators are involved throughout the process. **Each passage and question is reviewed and approved by educators** prior to field testing**.**

## Test construction

12. Educator rangefinding to support consistent grading of essays
11. Items are accommodated
10. Operational test forms are created from item bank

## Field testing

9. Items with good data are added to the item bank
8. Field tested items and statistical data are reviewed
7. Items are field tested

Field testing collects data on items to ensure that they are unbiased and measure what they're supposed to.

## Admin & QC

13. Assessments are administered
14. Performance review

## Scoring and reporting

15. Standard setting is completed with educator input*
16. Assessments are scored
17. Score reporting occurs
18. Technical reports are written

It takes over **two years** from assessment design to scoring and reporting. Thus, any changes to assessments must be planned far in advance.

*Does not occur every year

# Educator committees provide feedback on assessing the newly adopted TEKS



- **Assessed Curriculum**: List of standards appropriate to use on a large-scale summative assessment

- **Frequency to assess standards**: The designation for "Readiness" or "Supporting" indicates the frequency a standard is assessed

- **Reference Materials**: List of formulas, measurement tools, etc.

- **Blueprint**: Outline of how the assessment will be constructed

- **Questions/Communications**: Educators help identify questions that may arise from the field and provide suggestions on communications

# The language of the student expectation (SE) is honored when determining if is appropriate to include in the assessed curriculum for the summative assessment

**4.4C** - **determine the approximate measures of angles in degrees** to the nearest whole number **using a protractor**

**4.4D** - **draw an angle with a given measure**

**4.4E** - **determine the measure of an unknown angle formed by two non-overlapping adjacent angles** given one or both angle measures

*The content in these standards is skill-based and lends itself to formative assessment AND a large-scale summative assessment.*

**4.4A** - illustrate the measure of an angle as the part of a circle whose center is at the vertex of the angle that is "cut out" by the rays of the angle. Angle measures are limited to whole numbers

**4.4B** - illustrate degrees as the units used to measure an angle, where 1/360 of any circle is one degree and an angle that "cuts" n/360 out of any circle whose center is at the angle's vertex has a measure of n degrees. Angle measures are limited to whole numbers

*The content in these standards is instruction-based and lends itself to formative assessment in the classroom rather than a large-scale summative assessment.*

# The way some standards are written allows us multiple ways to assess a standard

**3.5A – represent one- and two-step problems involving addition and subtraction of whole numbers to 1,000 using pictorial models, number lines, and equations.**

| | |
|---|---|
| represent **one-step problems** involving **addition** of whole numbers to 1,000 using **pictorial models** | represent **two-step problems** involving **addition** of whole numbers to 1,000 using **pictorial models** |
| represent **one-step problems** involving **addition** of whole numbers to 1,000 using **number lines** | represent **two-step problems** involving **addition** of whole numbers to 1,000 using **number lines** |
| represent **one-step problems** involving **addition** of whole numbers to 1,000 using **equations**. | represent **two-step problems** involving **addition** of whole numbers to 1,000 using **equations**. |
| represent **one-step problems** involving **subtraction** of whole numbers to 1,000 using **pictorial models** | represent **two-step problems** involving **subtraction** of whole numbers to 1,000 using **pictorial models** |
| represent **one-step problems** involving **subtraction** of whole numbers to 1,000 using **number lines** | represent **two-step problems** involving **subtraction** of whole numbers to 1,000 using **number lines** |
| represent **one-step problems** involving **subtraction** of whole numbers to 1,000 using **equations**. | represent **two-step problems** involving **subtraction** of whole numbers to 1,000 using **equations**. |

# Process standards are not directly assessed but provide support to the content standards

## STAAR questions are aligned to content standards.



The process standards are embedded throughout the TEKS K-12. They are critical to a good math program (pedagogy). From an assessment perspective, assessing a process standard on its own doesn't show student progress.

A. Apply mathematics to **real-world** problems

B. Use a **problem-solving** model that incorporates analyzing given information

C. Select tools to solve problems

D. Communicate mathematical ideas using multiple representations

E. Create and use representations

F. Analyze mathematical relationships to **connect and communicate mathematical ideas**

G. Display, explain, and justify mathematical ideas and arguments

# While assessing content, students naturally have to apply process standards

**4.4(F)** **Use strategies and algorithms**, including the standard algorithm, to **divide up to a four-digit dividend by a one-digit divisor**

**4.1B use a problem-solving model** that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution

**4.1C select tools**, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems

| | |
|---|---|
| A. | Apply mathematics to **real-world** problems |
| B. | Use a **problem-solving** model that incorporates analyzing given information |
| C. | Select tools to solve problems |
| D. | Communicate mathematical ideas using multiple representations |
| E. | Create and use representations |
| F. | Analyze mathematical relationships to **connect and communicate mathematical ideas** |
| G. | Display, explain, and justify mathematical ideas and arguments |

Calvin drives 1,924 miles over 4 days. He drives the same number of miles each day.

How many miles does Calvin drive each day?

Ⓐ 7,696 mi

Ⓑ 480 mi

Ⓒ 481 mi

Ⓓ 1,920 mi

Spring 2024

**We want to allow the students to use multiple ways to solve the problem.**

# There are multiple process standards reflected in each standard assessed and this is optimal for students to show their knowledge

**3** Thomas put a ham in the oven at 4:45 P.M. After 15 minutes he put a cake in the oven. The ham and the cake were in the oven together for 60 minutes. Then Thomas took them both out of the oven.

(number line showing 4:30, 4:45, 5:00, 5:15, 5:30, 5:45, 6:00, 6:15, 6:30, 6:45)
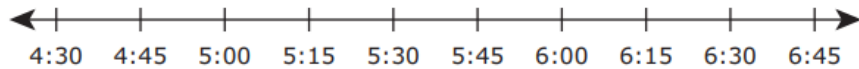
At what time did Thomas take both the ham and cake out of the oven?

- **A** 5:45 P.M.
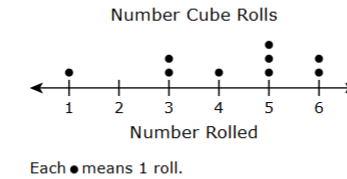- **B** 6:30 P.M.
- **C** 5:15 P.M.
- **D** 6:00 P.M.

Grade 3 Math STAAR Example (2016)

| A. | Apply mathematics to **real-world** problems |
|---|---|
| B. | Use a **problem-solving** model that incorporates analyzing given information |
| E. | Create and use representations |
| F. | Analyze mathematical relationships to **connect and communicate mathematical ideas** |

Ben rolls a number cube 10 times and records the results shown.

6   3   5   4   4   1   5   3   6   5

He then creates the dot plot shown with the results.

Number Cube Rolls

(dot plot over numbers 1 2 3 4 5 6, labeled Number Rolled)

Each ● means 1 roll.

Complete the sentence by selecting the correct answers from the drop-down menus.

Ben's dot plot is incorrect because there should be [ ] above the number [ ]

Grade 3 Math STAAR Example (2024)

| A. | Apply mathematics to **real-world** problems |
|---|---|
| B. | Use a **problem-solving** model that incorporates analyzing given information |
| D. | Communicate mathematical ideas using multiple representations |
| E. | Create and use representations |
| F. | Analyze mathematical relationships to **connect and communicate mathematical ideas** |

STAAR Resources

TEA | TEXAS ASSESSMENT

Supporting Student Success

# STAAR resources are available on the TEA website for easy access to released test materials and materials specific to content areas

## STAAR Resources

**Student Assessment Overview**

**STAAR**

Mathematics Resources

Reading Language Arts Resources

Science Resources

Social Studies Resources

STAAR Spanish Resources

Released Test Questions

STAAR Alternate 2

TELPAS

TELPAS Alternate

## Released Test Questions

**Released Test Questions**

Beginning with the 2022–2023 school year, STAAR assessments are administered primarily online. Direct links to the STAAR released online tests are included in the chart below. All versions (accommodated, braille, ASL, etc.) of STAAR tests are available on the Practice Test Site. Since STAAR is now an online assessment with technology enhanced items, PDF versions of STAAR released tests are no longer available.

Click on the tabs below to find each year's released test forms or sample test questions.

| 2024 | 2023 | 2022 | 2021 | Sample Test Questions |

Expand All

| Grade 3 | ▼ |
| Grade 4 | ▼ |
| Grade 5 | ▼ |
| Grade 6 | ▼ |
| Grade 7 | ▼ |
| Grade 8 | ▼ |
| High School | ▼ |

- Scoring Guides are available on the following webpages: STAAR Reading Language Arts Resources, STAAR Science Resources, STAAR Social Studies Resources, and STAAR Spanish Resources.
- To get printed copies of STAAR braille released tests, complete the order form.
- Previous STAAR Released Questions are available.

**Grade 3**

**Math**

- Math Test Form
- Math Answer Key
- Math Item Rationale
- Math Student Expectations Tested

## Grade 3 Math

- Math Test Form
- Math Answer Key
- Math Item Rationale
- Math Student Expectations Tested

# The released test form is on-line and provides the same tools available to students in the testing platform



Navigation forwards/ backwards

Reference Materials, Notepad, Graph/Draw, and other screen features

This provides stakeholders an opportunity to see exactly how the online tools available to students during STAAR will function.

# The STAAR online test form provides multiple accessibility tools and accommodation supports

### Accessibility Tools

★ Highlighter

★ Notepad

★ Help

★ Guideline

★ Color

★ Zoom

★ Mouse Pointer

★ Line Reader

★ Mark for Review

★ Answer Eliminator

### Content-Specific Accessibility Tools

★ Basic, Scientific, and Graphing Calculators

★ Customary and Metric Rulers

★ Mathematics Reference Materials

★ Science Reference Materials

★ Spelling Assistance

### Tools to Support Student-specific Accommodations

★ Content and language supports (pop-ups, rollovers, and pre-reads)

★ Text-to-speech

★ Speech-to-text

★ Refreshable braille

★ ASL videos

★ Basic calculators for certain tests

- TEA developed a video to demonstrate the available online accommodations and support local assessment decisions.



**Accommodations Available on Online STAAR Tests for Eligible Students**

TEA | TEXAS ASSESSMENT

- To learn more, visit the Accommodation Resources webpage within TEA's website

# The answer key provides information about the content assessed, the question types, and the frequency the content is assessed

## STAAR Spring 2024 Grade 3 Math Answer Key

| Item Position | Item Type | TEKS Assessed | Maximum Number of Points | Correct Answer(s) | Reporting Category | Readiness or Supporting |
|---|---|---|---|---|---|---|
| 1 | Multiple Choice | 3.2.4.A | 1 | A | 2 | Readiness |
| 2 | Multiple Choice | 3.1.2.D | 1 | D | 1 | Readiness |
| 3 | Inline Choice | 3.4.8.A | 2 | 2 dots, 4. See Appendix 1.1 | 4 | Readiness |
| 4 | Multiple Choice | 3.1.2.B | 1 | C | 1 | Supporting |
| 5 | Multiple Choice | 3.4.9.B | 1 | B | 4 | Supporting |
| 6 | Multiple Choice | 3.3.7.B | 1 | A | 3 | Readiness |
| 7 | Multiple Select | 3.2.5.A | 2 | B, E See Appendix 1.2 | 2 | Readiness |

## STAAR Spring 2024 Grade 3 Math Appendix

**1.1**

Ben rolls a number cube 10 times and records the results shown.

6  3  5  4  4  1  5  3  6  5

He then creates the dot plot shown with the results.

Number Cube Rolls

Number Rolled

Each ● means 1 roll.
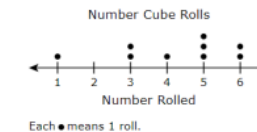
Complete the sentence by selecting the correct answers from the drop-down menus.

Ben's dot plot is incorrect because there should be [2 dots] above the number [4.]

**1.2**

Jada is traveling to visit her aunt who lives 789 miles away. She needs to travel 321 more miles to arrive at her aunt's house.

Which representations can be used to find the number of miles Jada has already traveled?

Select **TWO** correct answers.

☐ 321 − ☐ = 789

☑ 321 + ☐ = 789

☐ 789 + 321 = ☐

☐ 
| ? | |
|---|---|
| 789 | 321 |

☑ 
| | 789 |
|---|---|
| ? | 321 |

With this information on one document, teachers and parents don't have to search in multiple places for this information.

# Item Rationale documents provide explanations for the correct answer(s) and possible misconceptions for distractor answer choices

## STAAR Spring 2024 Grade 3 Mathematics Rationales

| Item Position | | Rationale |
|---|---|---|
| 1 | Option A is correct | To determine how many hot dogs were sold during the carnival, the student should have subtracted the number of hot dogs that were not sold, 83, from the total number of hot dogs the school started with, 375. |
| | Option B is incorrect | The student likely understood that 83 should be subtracted from 375 but subtracted the smaller digit from the larger digit in the tens place. The student needs to focus on understanding how to regroup numbers, when needed, for subtraction. |
| | Option C is incorrect | The student likely misunderstood the question and therefore added 375 and 83 rather than subtracting 83 from 375. The student needs to focus on choosing the correct operations when solving word problems. |
| | Option D is incorrect | The student likely understood that 83 should be subtracted from 375 but did not regroup correctly in the tens place, reducing the digits in both the hundreds place and the tens place by 1 (rewriting 375 as $2^165$ [2 hundreds, 16 tens, 5 ones]). The student needs to focus on understanding how to regroup numbers, when needed, for subtraction. |

**Multiple-choice and similar non-multiple-choice questions**

The Rationales provide a problem-solving method for the correct answer and information about possible student misconceptions for the incorrect answers.

## STAAR Spring 2024 Grade 3 Mathematics Rationales

| Item Position | | Rationale |
|---|---|---|
| 3 | 2 dots, 4 | To determine why Ben's dot plot (a graphical way of showing the frequency of an event by placing a dot or dots above a value on a number line) is incorrect, the student should have matched the numbers from the results shown (the ten times the number cube was rolled) to the numbers of dots on the number line. The number 1 was rolled 1 time, so the 1 dot above 1 on the number line is correct. No 2s were rolled, so it is correct that there are no dots above 2. The number 3 was rolled 2 times, so the 2 dots above 3 are correct. The number 4 was rolled 2 times, so there should be 2 dots above the 4; however, there is only 1 dot. Therefore, Ben's dot plot is incorrect because there should be 2 dots above the number 4. |

**Non-multiple-choice questions**

Questions

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Thank you for the discussion today.