

Assessment Instrument Table: STAR MATH®

Element	Description	Assessment Instrument Information
Instrument Name	Name of specific instrument (more than vendor name).	Star Math
Vendor	Name of the company or organization that produces the instrument.	Renaissance Learning, Inc.
Purpose (Intended Use)	The described purpose and appropriate uses of the instrument.	Star Math is a student-based, computer-adaptive assessment for measuring student achievement in math. Star Math fulfills a variety of assessment purposes, including interim assessment, screening, standards benchmarking, diagnosing skill gaps, skills-based reporting and instructional planning, and progress monitoring.
Population	Who (which students) could be assessed using the instrument.	Students in grades 1 through 12
When? How frequently?	How frequently the instrument can be administered in a school year, and recommended or required administration windows.	As an interim assessment, Star Math was designed for frequent administration. The Star Math assessments fit virtually any assessment schedule with minimal impact on instructional time and administrative workload. <i>Educators can administer Star Math three times per year in fall, winter, and spring.</i> Educators may also administer Star Math as a progress monitoring assessment as often as weekly.
Content Area (s)	Content area or areas being assessed.	Star Math is a grade 1–12 test that focuses on measuring student performance in the following key domains: <ul style="list-style-type: none"> • Numbers and Operations • Algebra • Geometry and Measurement • Data Analysis, Probability, and Statistics

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Learning Objectives	Specific learning objectives being assessed, at as detailed a level as is provided. This may be "topics" or categories or may be actual learning objective statements.	<p>Star Math assesses math achievement of students in grades 1–12. Items assess four broad domains: Numbers and Operations; Algebra; Geometry and Measurement; and Data Analysis, Probability, and Statistics. The Star Math item bank includes thousands of rigorously calibrated items that test on a total of 550 skills; multiple items are available to measure each skill.</p> <p>The table below displays the domains and skill sets assessed by Star Math. Due to the large number of grade-specific skills, they are not listed in the table.</p> <table border="1" data-bbox="745 446 1921 1396"> <thead> <tr> <th data-bbox="745 446 1092 487">Domain</th> <th data-bbox="1102 446 1921 487">Skill set</th> </tr> </thead> <tbody> <tr><td data-bbox="745 495 1092 1396" rowspan="25">Numbers and Operations</td><td data-bbox="1102 495 1921 519">Count with Objects and Numbers</td></tr> <tr><td data-bbox="1102 527 1921 552">Identify Odd and Even Numbers</td></tr> <tr><td data-bbox="1102 560 1921 584">Relate Place and Value to a Whole Number</td></tr> <tr><td data-bbox="1102 592 1921 617">Add and Subtract Whole Numbers without Regrouping</td></tr> <tr><td data-bbox="1102 625 1921 649">Add and Subtract Whole Numbers with Regrouping</td></tr> <tr><td data-bbox="1102 657 1921 682">Multiply Whole Numbers</td></tr> <tr><td data-bbox="1102 690 1921 714">Divide Whole Numbers without a Remainder in the Quotient</td></tr> <tr><td data-bbox="1102 722 1921 747">Divide Whole Numbers with a Remainder in the Quotient</td></tr> <tr><td data-bbox="1102 755 1921 779">Identify, Compare, and Order Fractions</td></tr> <tr><td data-bbox="1102 787 1921 812">Add and Subtract Fractions with Like Denominators</td></tr> <tr><td data-bbox="1102 820 1921 844">Find Prime Factors, Common Factors, and Common Multiples</td></tr> <tr><td data-bbox="1102 852 1921 876">Add and Subtract Fractions with Unlike Denominators</td></tr> <tr><td data-bbox="1102 885 1921 909">Convert Between an Improper Fraction and a Mixed Number</td></tr> <tr><td data-bbox="1102 917 1921 941">Relate a Decimal to a Fraction</td></tr> <tr><td data-bbox="1102 950 1921 974">Relate Place and Value to a Decimal Number</td></tr> <tr><td data-bbox="1102 982 1921 1006">Add or Subtract Decimal Numbers</td></tr> <tr><td data-bbox="1102 1015 1921 1039">Divide a Whole Number Resulting in a Decimal Quotient</td></tr> <tr><td data-bbox="1102 1047 1921 1071">Multiply and Divide with Fractions</td></tr> <tr><td data-bbox="1102 1079 1921 1104">Multiply and Divide with Decimals</td></tr> <tr><td data-bbox="1102 1112 1921 1136">Relate a Decimal Number to a Percent</td></tr> <tr><td data-bbox="1102 1144 1921 1169">Solve a Proportion, Rate, or Ratio</td></tr> <tr><td data-bbox="1102 1177 1921 1201">Evaluate a Numerical Expression</td></tr> <tr><td data-bbox="1102 1209 1921 1234">Perform Operations with Integers</td></tr> <tr><td data-bbox="1102 1242 1921 1266">Determine a Square Root</td></tr> <tr><td data-bbox="1102 1274 1921 1299">Solve a Problem Involving Percentages</td></tr> <tr><td data-bbox="1102 1307 1921 1331">Count with Objects and Numbers</td></tr> </tbody> </table>	Domain	Skill set	Numbers and Operations	Count with Objects and Numbers	Identify Odd and Even Numbers	Relate Place and Value to a Whole Number	Add and Subtract Whole Numbers without Regrouping	Add and Subtract Whole Numbers with Regrouping	Multiply Whole Numbers	Divide Whole Numbers without a Remainder in the Quotient	Divide Whole Numbers with a Remainder in the Quotient	Identify, Compare, and Order Fractions	Add and Subtract Fractions with Like Denominators	Find Prime Factors, Common Factors, and Common Multiples	Add and Subtract Fractions with Unlike Denominators	Convert Between an Improper Fraction and a Mixed Number	Relate a Decimal to a Fraction	Relate Place and Value to a Decimal Number	Add or Subtract Decimal Numbers	Divide a Whole Number Resulting in a Decimal Quotient	Multiply and Divide with Fractions	Multiply and Divide with Decimals	Relate a Decimal Number to a Percent	Solve a Proportion, Rate, or Ratio	Evaluate a Numerical Expression	Perform Operations with Integers	Determine a Square Root	Solve a Problem Involving Percentages	Count with Objects and Numbers
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		Identify Odd and Even Numbers Relate Place and Value to a Whole Number Add and Subtract Whole Numbers without Regrouping Add and Subtract Whole Numbers with Regrouping Multiply Whole Numbers Divide Whole Numbers without a Remainder in the Quotient Divide Whole Numbers with a Remainder in the Quotient Identify, Compare, and Order Fractions Add and Subtract Fractions with Like Denominators Find Prime Factors, Common Factors, and Common Multiples Add and Subtract Fractions with Unlike Denominators Convert Between an Improper Fraction and a Mixed Number Relate a Decimal to a Fraction
	Algebra	Relate a Rule to a Pattern Determine the Operation Given a Situation Graph on a Coordinate Plane Evaluate an Algebraic Expression or Function Solve a Linear Equation Determine a Linear Equation Identify Characteristics of a Linear Equation or Function Solve a System of Linear Equations Determine a System of Linear Equations Simplify an Algebraic Expression Solve a Linear Inequality Solve a Nonlinear Equation Graph a One-Variable Inequality
	Geometry and Measurement	Relate Money to Symbols, Words, and Amounts Use the Vocabulary of Geometry and Measurement Determine a Missing Figure in a Pattern Determine a Measurement Tell Time Calculate Elapsed Time Solve a Problem Involving the Perimeter of a Shape Solve a Problem Involving the Area of a Shape Identify Congruence and Similarity of Geometric Shapes Solve a Problem Involving the Surface Area or Volume of a Solid

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		Determine a Missing Measure or Dimension of a Shape
		Read or Answer a Question about Charts, Tables, or Graphs
		Use a Chart, Table, or Graph to Represent Data
		Determine a Measure of Central Tendency
		Use a Proportion to Make an Estimate
		Determine the Probability of One or More Events

Individual Metrics	The scores provided at the individual (student) level.	All the results of Star Math tests across grade levels are converted to a common scale using an item-response theory model; these scaled scores range from 0 to 1400. Scaled scores are useful in comparing student performance over time and in identifying performance and all criterion and norms associated with that scale.
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The following scores which include comparison points in the score are also provided:

Norm-referenced scores:

- The **grade-equivalent** represents how a student’s test performance compares with other students nationally. It ranges from 0.0 to 12.9+. For example, a student with a grade-equivalent of 7.6 performed as well as a typical seventh-grader in the sixth month of the school year.
- A **percentile rank** provides the best measure of a student’s level of achievement compared to other students in the same grade nationally. A percentile rank ranges from 1–99, and it indicates the percentage of a student’s peers whose scores were equal to or lower than the student’s score. For example, a student who has a percentile rank of 85 performed as well as or better than 85 percent of students in the same grade.
- A **normal curve equivalent** is similar to the percentile rank, but it is based on an equal-interval scale. This means the difference between any two successive scores on the normal curve equivalent scale has the same meaning throughout the scale. Normal curve equivalents range from 1–99. Normal curve equivalents are primarily used for research; they are useful in making comparisons between different achievement tests and for statistical computations, such as for determining an average score for a group of students.
- **Student growth percentile (SGP)** is a measure of growth between a pre- and post-test relative to the growth made by other students in the same grade with the same pre-test score. It is a simple and effective way for educators to interpret a student’s growth rate

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		<p>relative to that of his or her academic peers nationwide. SGPs for Star Math are calculated using an approach similar to the Colorado Growth Model.</p> <p>Specialty score</p> <ul style="list-style-type: none"> The algebra readiness indicator focuses on a student’s mastery of the math concepts and skills learned in elementary and middle school that provide the student’s foundation for high-school level algebra. This score appears on the Star Math Student Instructional Planning Report to help teachers identify student progress through these foundational skills to ensure they are on track to be ready for algebra.
Individual Comparison Points (cut scores)	Information provided regarding how good is good enough performance on the instrument. Comparison information should be available for every individual metric. This may be performance level ratings with specific cut scores.	<p>Star Math provides maps of scaled score ranges to:</p> <ul style="list-style-type: none"> Grade-level equivalent scores (from 0.0 to 12.9+) Percentile ranks (associated with Grade Placements) <p>These maps provide comparison points for scaled scores by grade level.</p> <p>Districts can set performance categories based on their own cut scores for the Star Math scaled score to color-coded individual and group performance by category, such as: At Benchmark, On Watch, Intervention, and Urgent Intervention. Once cut scores have been set, Star Math reports categorize individual students’ scaled scores according to these color-coded performance categories.</p> <p>All but the Star Math scaled score include comparison points as part of the metric definition.</p>
Aggregate Metrics	Scores provided at the group level. The groups for which scores are reported. Note: the group could be a grade level, school, district, or disaggregated groups (e.g. race/ethnicity, gender, IEP status, FRL status) Specify the group(s) and the score(s) provided.	<p>When districts set cut scores for individual student scaled scores to establish performance categories, these categories are used to provide aggregate metrics, including the percent and number of students by district benchmark category (available by grade at the district, school levels) across years of available data. These metrics can be calculated using cross-sectional data (same grade year to year) or for the same students over multiple years.</p> <p>The following additional aggregate metrics are also provided:</p> <ul style="list-style-type: none"> Median Student Growth Percentile: the middle student growth percentile within the included group. This metric is reported for different time periods (fall to spring, spring to spring) by grade level within school, grade level within the district, and by class.

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Aggregate Comparison Points (vendor)	Information provided regarding how good is good enough performance at the group level.	<ul style="list-style-type: none"> Average scores at the school by grade level and classroom levels of the following individual metrics: scaled score, grade equivalent, percentile rank, and normal curve equivalent. <p>Percent of students in or above the estimated mastery range for math standards (Colorado Academic Standards) by school and by class within the school: Star Math provides an estimate of the students' mastery of standards by aligning them to the same 1400-point difficulty scale used to report Star Math scores. The estimated mastery range identifies a band of scores where the student is just below or above mastery. The percentage of students who score in or above this range indicates overall progress toward standards mastery.</p> <p>Because most of the individual metrics provided for Star Math are norm-referenced scores, almost all of the aggregate metrics also include a comparison point within the metric definition.</p> <p>This includes the following metrics (described on the previous page):</p> <ul style="list-style-type: none"> Percent/number scoring at district-determined performance levels (note districts determine the comparison points used in these metrics when they set their own cut scores for different performance levels) Median growth percentiles Average grade equivalent Average percentile rank Average normal curve equivalent Percentage of students in or above estimated mastery range for mathematics standards
Aggregate Comparison Points (CDE)	Cut points established for requests to reconsider.	The table on the following page provides aggregate metrics for cut scores identified for the 50 th percentile. CDE-provided comparison points include Fall and Spring Mean Scale Scores and Median Growth Percentiles for each grade level.

Note: The CDE comparison points for Star Math for the 2017-18 Request-to-Reconsider process have been revised from previous years.

Mathematics – Scale Scores by Grade Level			
Fall Scale Scores		Spring Scale Scores	Scale Score Growth (Fall to Spring)
Grade	50th Percentile Scale Score	50th Percentile Scale Score	Median Growth Percentile Meets Rating
1	264	380	50
2	416	495	50
3	502	586	50
4	590	651	50
5	655	708	50
6	723	764	50
7	765	793	50
8	796	821	50
9	806	822	50
10	808	827	50
11	829	842	50
12	843	855	50

Data Reports	Description of data reports that are provided/available at the individual and aggregate level(s).	<p>Scores are displayed on a variety of reports that educators can choose to run at the classroom, grade, school, or district level. In addition, administrators can customize many of the Star Math reports to view information about participation and performance across the district and by various demographic subgroups (for example, students receiving free and reduced lunch, English language learners, etc.).</p> <p>On the following page, we describe key Star Math reports, including the levels for which the report is available.</p>
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		<p>Growth Proficiency Chart (student, class, grade, district) plots SGP and proficiency on a quadrant graph so that educators can easily see whether students are challenged and growing every year, regardless of their academic starting point.</p> <p>Growth Report (student, class, grade, school) shows educators whether students are reaching their growth expectations. The Growth Report includes median student growth percentiles and averages for the following metrics: scaled score, grade equivalent, percentile rank, and normal curve equivalent.</p> <p>State Performance Report (student, class, grade, school, district) predicts student performance on high-stakes tests. Predictions account for growth that typically occurs between the date of the last Star Math test taken and the date of the state test. At the school, grade, and district levels, this report lists the percentage and number of students projected to be at each performance level assessed by the state test when the test is administered. At the class level, the report shows the average scores for the class.</p> <p>State Standards Report (student, class, grade, district) gauges students’ current and projected mastery according to the Colorado Academic Standards. At the student level, these reports measure an individual student’s performance on the state standards via scaled score; at the class level, the report shows the percentage of students demonstrating mastery of the standards; and at the district level, the report shows how each grade level within a school or the district is performing.</p> <p>For additional information please see Key Report Samples for the Star assessments.</p>
Alignment	Information provided by the vendor about alignment of this instrument to other instruments, standards, etc.	<p>Star Math features rigorously calibrated items that test a total of 550 skills, all designed to align to national and state curriculum standards in math. Star Math is aligned to the Colorado Academic Standards and is placed on the Colorado-specific learning progression for math.</p> <p>The relationship between Star Math scores with other standardized math assessments has been psychometrically studied and documented. Detailed information is provided in the Star Math Technical Manual.</p>
Technical Quality	Information about the technical quality of the instrument. Reference to technical analysis if available electronically.	<p>Star Math has met the highest standards of reliability and validity set forth by the U.S. Department of Education’s National Center on Response to Intervention (NCRTI), the most trusted source for unbiased evaluation of screening and progress-monitoring tools for Response to Intervention. NCRTI has found the Star assessments deserving of the highest rating of “Convincing Evidence” for</p>

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		<p>screening and progress-monitoring. For details, please visit http://www.rti4success.org/resources/tools-charts/screening-tools-chart.</p> <p>Star Math also met the highest psychometrics standards for progress monitoring by the U.S. Department of Education’s National Center on Intensive Intervention. For details, please visit http://www.intensiveintervention.org/chart/progress-monitoring.</p> <p>Star Math is extremely reliable as evidenced through analyses of generic reliability, split-half reliability, test-retest reliability, and standard error of measurement. Details are available on pages 39–49 of the <i>Star Math Technical Manual</i>.</p> <p>Evidence of the assessment’s concurrent, predictive, and construct validity is presented on pages 50–73 of the <i>Star Math Technical Manual</i>. The Star Math blueprints and the alignment study of both assessments with the Colorado Academic Standards provide additional evidence of the tests’ construct validity.</p>