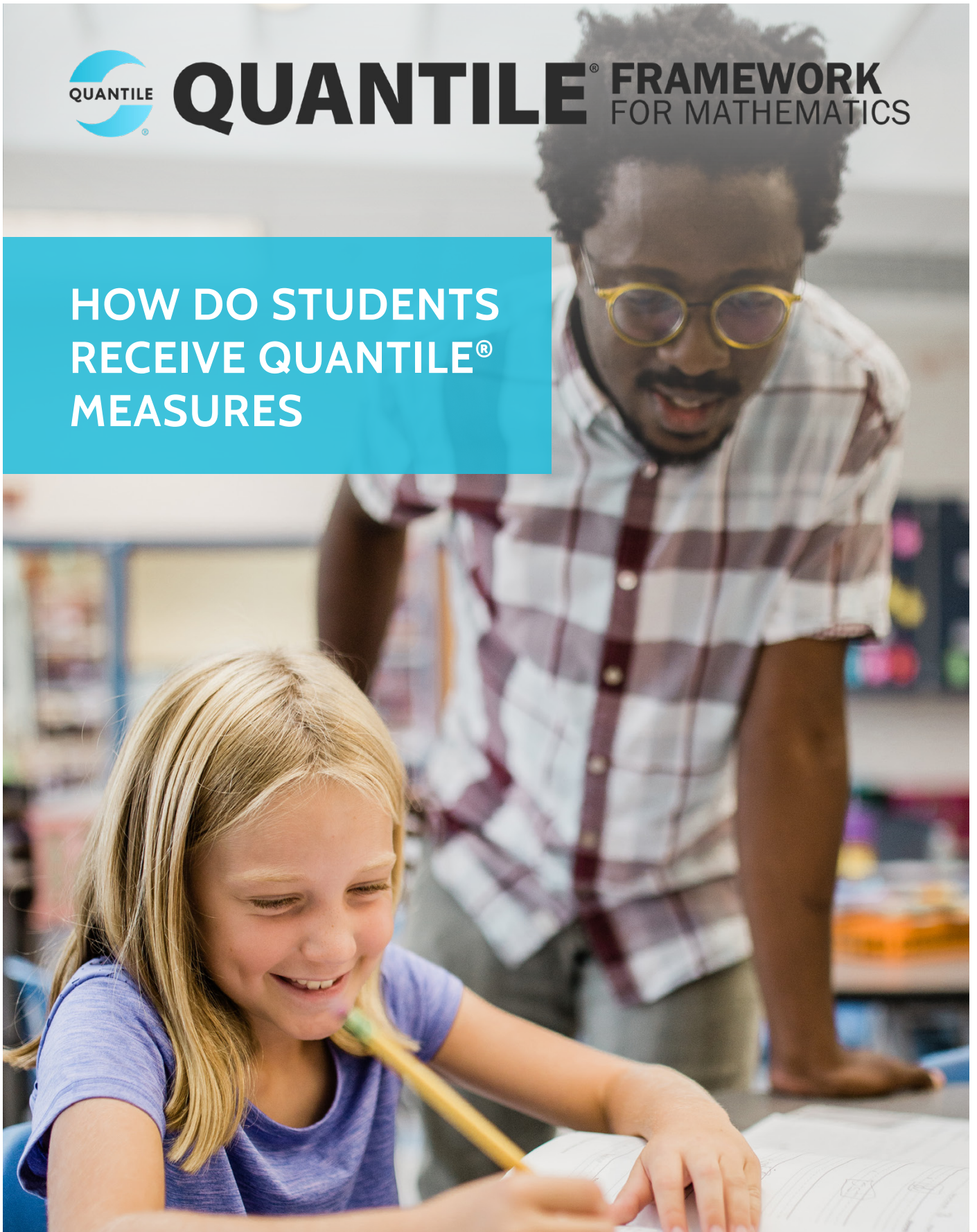




QUANTILE[®] FRAMEWORK FOR MATHEMATICS

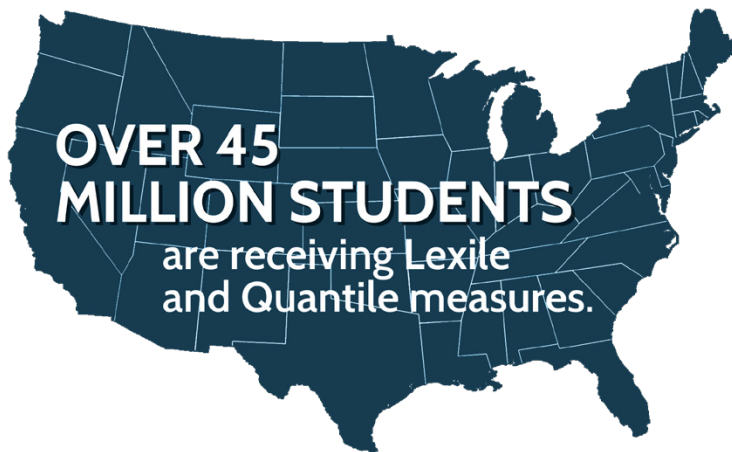
HOW DO STUDENTS
RECEIVE QUANTILE[®]
MEASURES



How Do Students Receive Quantile Measures?

Students receive Quantile measures from a mathematics assessment that is linked to the Quantile scale. Quantile measures for students are numeric representations of a student's mathematics ability and appear as a number followed by a "Q". About 20 million U.S. students in grades 3-12 receive a Quantile measure each year. (See map of Quantile partner states at [metametricsinc.com/state-partnerships](https://www.metametricsinc.com/state-partnerships).) Students in all grades across school districts in all 50 states receive Quantile measures through:

- State assessments and other high stakes testing.
- Benchmark or interim assessments.
- Placement and progress monitoring tests.



Like the Lexile® Framework for Reading, the Quantile Framework measures student mathematics ability and material difficulty on the same scale. Having a common scale on which the measurement of students' math ability and math materials are placed, provides the critical link for supporting personalized learning.

The Quantile Framework is instrument independent, not proprietary to one assessment or publisher. That makes it an *objective standard for mathematics* that assessment companies, leaders in education technology, publishers and state departments of education can rely on. Quantile measures are used by:

- Students of all ages.
- Students of all backgrounds and abilities.

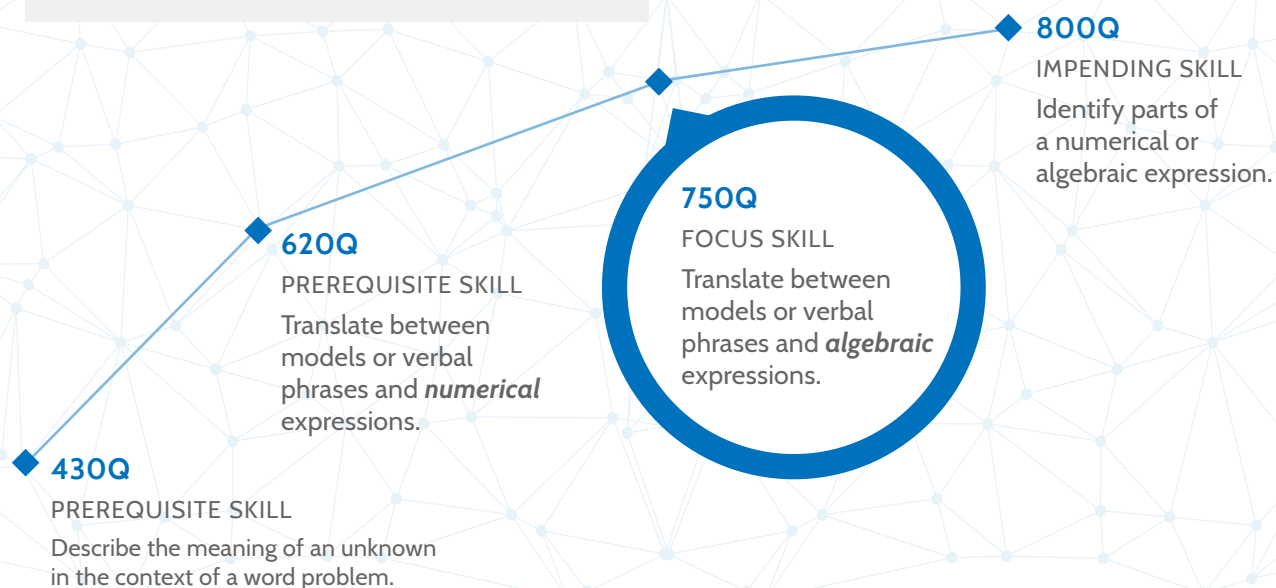
Students in All Stages of Learning Mathematics Receive Quantile Measures

The power of Quantile measures is in examining the growth of students' mathematical achievement wherever the student may be in the development of their mathematical journey. Students can be matched with resources and engaged in instruction that they will find challenging enough to promote growth with a minimum level of frustration for them. Classroom teachers can confidently forecast students' ability to be successful with lessons based upon matching the student measures to the Quantile measure of the material in the lessons.

Quantile measures help teachers to provide *just-right* instruction for on grade level students and offer more challenging math instruction for advanced students. But perhaps more importantly, Quantile measures make it easy for teachers to address students' learning gaps in mathematics, identifying math skills that a student should have learned but did not. There are many causes for mathematics learning gaps; for instance a student may be ill and miss a series of lessons or the pace of a particular lesson may be too fast for the student.

Because mathematics skills tend to build on one another, some concepts cannot be learned until two or three others are mastered. The Quantile Framework has defined over 550 mathematics skills and/or concepts. Each of these connected skills has a measure, and each measure shows how difficult one skill is in relation to the others. The structure of these interconnected skills is a web that spans mathematics content from kindergarten through secondary school mathematics. In this web, each skill is related to other prerequisite skills that students need to understand to progress in their study of mathematics. The relationships of these skills forms what is called a Knowledge Cluster.

EXAMPLE OF KNOWLEDGE CLUSTER



Knowledge Clusters

Knowledge Clusters show the connections between mathematical skills and give their relative difficulty to one another using the Quantile scale. For example, below is the Knowledge Cluster for the math skill of finding a unit rate. This skill has a Quantile measure of 830Q, and there are many skills that relate to it.

FOCUS SKILL

830Q Calculate unit rates to make comparisons.

PREREQUISITE SKILLS

Skills the student needs to have mastered before learning about unit rates. Generally, prerequisite skills have lower Quantile measures than the skill the student is trying to learn.

710Q Identify equivalent decimals and fractions at the symbolic level, including simplifying fractions.

530Q Use proportional reasoning to solve problems.

210Q Write a ratio to compare two quantities.

SUPPLEMENTAL SKILLS

Skills related to learning about unit rate but are not dependent on learning or having learned about it.

820Q Convert measures of length, area, capacity, weight and time expressed in a given unit to other units in the same measurement system.

810Q Determine the ratio or rate of change of a relation given a table or graph.

440Q Describe the probability of an event using a fraction or ratio.

IMPENDING SKILLS

Skills that depend on understanding unit rate, and can be learned after the student has mastered unit rates.

990Q Use scale factors to reduce and enlarge drawings on grids.

950Q Use dimensional analysis to rename quantities or rates.

Teachers can use the Knowledge Clusters to differentiate instruction for students by choosing activities that meet students' needs:

- Choose activities for skills with a Quantile measure lower than students' Quantile measure when the students need additional instructional support to bridge mathematics learning gaps or when students view math topics as more challenging, threatening or unfamiliar.
- Choose activities for skills with a Quantile measure at or above students' Quantile measures to stimulate growth when a topic holds high interest for students or enrichment activities are needed.

Student Quantile Measure Norms by Grade

This chart offers a sense of how students' Quantile measures compare to grade levels. These student norms are based on a study that included a sample of 3.5 million students from all 50 states and the U.S. Virgin Islands who were administered tests that reported Quantile measures from 2010 to 2016. The student Quantile measure ranges in the chart show the 50th through 90th percentiles by grade level for EOY spring testing.

50th to 90th Percentile Student Quantile Measure Norms for Math by Grade

Grade	50th	90th
K	*EM115Q	190Q
1	120Q	390Q
2	310Q	565Q
3	470Q	725Q
4	615Q	865Q
5	715Q	960Q
6	820Q	1070Q
7	910Q	1155Q
8	985Q	1235Q
9	1055Q	1305Q
10	1115Q	1365Q
11 & 12	1170Q	1420Q

* Emerging Mathematician (EM) is a code given to students (and mathematics materials) that are below OQ on the Quantile scale.



hub.lexile.com/quantile-glc

Your customers can visit the **Lexile® & Quantile® Hub** to see interactive **Quantile® Grade Level Charts** with student Quantile measures by grade level and percentile rankings for test administrations at the beginning, middle and end of year.



MetaMetrics[®]

Find Us Online

MetaMetricsInc.com

Quantiles.com