

The Quantile® Framework for Mathematics



Linking Assessment with Mathematics Instruction

Improving Student Achievement

The Quantile® Framework for Mathematics takes the guesswork out of mathematics instruction. The Quantile Framework uses a common, developmental scale to measure student mathematics achievement, the difficulty of mathematical skills and concepts, and the materials for teaching mathematics. By placing the curriculum, teaching materials, and students on the same scale, Quantile® measures enable educators to predict which mathematical skills and concepts a student is ready to learn and those that will require additional instruction or enrichment. Students can then be matched with the resources that meet their learning needs. With Quantile measures, educators have a proven metric of student mathematics achievement to target instruction, monitor student progress, predict success in learning a new skill or concept, and forecast performance on high-stakes assessments.

More Information, Not More Testing

Rather than requiring an additional assessment, Quantile measures add value to already existing tests and instructional programs. A growing number of classroom, norm-referenced and state-level assessments are linked with the Quantile Framework. Students who take these assessments receive a Quantile measure—a number followed by a “Q.” A Quantile measure indicates that the student is ready for instruction of a particular mathematical skill or concept and has knowledge of the prerequisite skills necessary to learn it.

For example, if a state standard for third graders is to develop their understanding of multiplication and division with whole numbers, educators can use their students’ Quantile measures to forecast which students will have success with this skill and to identify those who may need to learn other skills or concepts before or during the lesson. Mathematics textbooks and other instructional resources are linked with the Quantile Framework, allowing educators to match students with targeted materials to help them better understand mathematical skills and concepts.

Learning on a Developmental Scale

The six strands of the Quantile Framework bridge the Content Standards of the National Council of Teachers of Mathematics “Principles and Standards for School Mathematics” and the domains specified in the Common Core State Standards for Mathematics (CCSSM). The Quantile Framework’s six content strands are Algebra and Algebraic Thinking; Number Sense; Numerical Operations; Measurement; Geometry; Data Analysis, Statistics, and Probability. The Quantile scale ranges from Emerging Mathematician (below 0Q) to above 1600Q, and spans the mathematics continuum from concepts taught in kindergarten to those typically taught in Algebra II, Geometry, Trigonometry, and Precalculus.

The Quantile scale is a taxonomy—or classification system—of mathematical skills and concepts along the continuum of mathematics development. Each content strand is annotated by “Quantile Skills and Concepts (QSCs),” which describe specific skills, objectives, or grade-level expectations that support each state’s curriculum and CCSSM. Like a roadmap, QSCs demonstrate how these skills fall along the continuum of mathematics development. Each QSC has a Quantile measure that estimates how difficult it will likely be for a student to learn, as compared with other skills in the taxonomy.

Quantile measures determine students’ mathematics achievement, not their grade level. A class of 30 sixth graders will likely have students with a wide range of Quantile measures. Educators can use those varied Quantile measures to target instruction and remediate or enrich as needed, using tools and resources that match the students’ Quantile measures.



Using Quantile Measures to Support Mathematics Instruction

The Quantile website (www.Quantiles.com) offers educators and parents a wealth of free resources for using Quantile measures to support and simplify differentiated mathematics instruction.

On Quantiles.com, the Math Skills Database enables users to search through the entire taxonomy of skills and concepts on the Quantile scale to obtain their difficulty levels, resources, and specific state curriculum alignments. Every teacher has the ability to search for a concept using grade level state standards. Each state standard is aligned to one or more QSCs so that the teacher can attain the difficulty level of that skill or concept, as well as resources for the material that can be used for classroom instruction. Resources, such as mathematics textbooks, Web links, practice pages, math-literature guides, black line masters, and games can be found through the search features directly linked to mathematics standards by grade level. This allows educators to match students with the instructional materials that best meet their mathematics learning needs, which simplifies the instructional planning process.

Educators also can use the Quantile Teacher Assistant on the website to see how the Quantile range of the class compares with the Quantile measure of the QSC being taught. Educators can access a variety of resources that are aligned with their state standards to support differentiated instruction based on each student's mathematical ability.

The Quantile map, a graphic representation of the Quantile Framework, also is available on the website. The map visually illustrates mathematics development and the connections between skills and concepts across the content strands.

The Science Behind the Quantile Framework

Launched in 2004, the Quantile Framework was created by the renowned psychometric team at MetaMetrics®, an educational measurement and research organization. Based in part on the organization's more than 20 years of psychometric research, the release of Quantile measures came after four years of development, including an extensive national field study during the 2003–2004 school year.



MetaMetrics, an educational measurement and research organization, develops scientific measures of student achievement that link assessment with targeted instruction to improve learning. The organization's psychometric team developed the widely used Lexile Framework for Reading; El Sistema Lexile para Leer, the Spanish-language version of the reading framework; The Quantile Framework for Mathematics; and The Lexile Framework for Writing. In addition to licensing Lexile® and Quantile measures to state departments of education, testing and instructional companies, and publishers, MetaMetrics offers professional development, resource measurement and customized consulting services.

For more information on how The Quantile Framework for Mathematics can help to link assessment with instruction and improve student mathematics achievement, call 1-888-539-4537 or visit www.Quantiles.com.



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