THE QUANTILE® FRAMEWORK FOR MATHEMATICS MAP

Linking assessment with mathematics instruction

Imagine empowering and accelerating students' learning in mathematics by better differentiating instruction and monitoring growth in student ability. With the Quantile Framework, educators can help achieve this goal by identifying level-appropriate mathematical tasks for students and track their progress!

HOW IT WORKS

The Quantile Framework for Mathematics is a unique measurement system that uses a common scale and metric to assess a student's mathematical achievement level and the difficulty of specific skills and concepts. The Quantile Framework describes a student's ability to solve mathematical problems and the demand of the skills and concepts typically taught in kindergarten mathematics through Algebra II, Geometry, Trigonometry and Precalculus. The Quantile Map provides educators with a sampling of primary mathematical skills and concepts from over 500 Quantile Skills and Concepts (QSCs) throughout the Quantile scale. This sampling of QSCs ranges from EM (Emerging Mathematician) for early, foundational mathematical skills and concepts to 1500Q for more advanced skills and concepts. As the difficulty, or demand of the skill increases, so does the Quantile® measure.

HOW TO USE IT

With the Quantile Framework, educators can explore the interconnectedness of mathematical skills and concepts and identify those elements that are critical for progressing student learning. Educators are better able to inform their instruction on how to best teach a skill or concept by pinpointing which skills build upon each other. The skill mapping of mathematical concepts enables educators to build an instructional path that best fits their students' unique abilities. Both students and QSCs receive a Quantile measure. Numerous tests report Quantile student measures including many state end-of-year assessments, national norm-referenced assessments and math programs. On the QSC side, more than 580 textbooks, 64,000 lessons and 3,100 downloadable resources have received Quantile measures.

Quantile measures provide educators with the information they need to identify gaps in mathematical knowledge, as well as serve as a guide for progressing to more advanced topics. Every QSC is part of a knowledge cluster that shows relationships and connections between mathematical skills and offers their relative difficulty among different skills. Both the prerequisite and impending skills are elements of knowledge clusters and serve as building blocks that support students' success. Educators can advance student learning by using prerequisite and impending skills to build mathematical knowledge and understanding. Prerequisite skills help educators see the pieces of the puzzle that make up a skill or concept, showing what needs to be understood first. Impending skills are skills and concepts that build upon a focus skill and allow educators to see a trajectory of knowledge across grades and content strands.

James: 1190Q

Sophia: 770Q

Donald: 450Q

Aliyah: EM100Q

1500Q+
1400Q
1300Q
1200Q
1100Q
1000Q
900Q
800Q
700Q
600Q
500Q
400Q
300Q
200Q
100Q
0Q
EM100Q

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For more information and to search the ***Quantile*® Math Skills Database**, visit Hub.Lexile.com.

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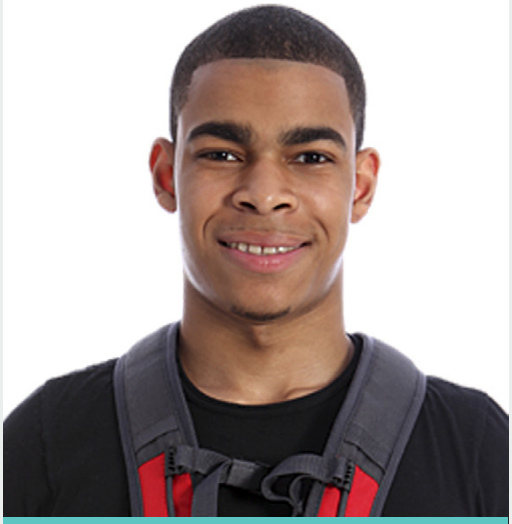
High School Example
James

Heritage High School | Geometry Course

Quantile Measure: 1190Q



James is exploring theorems about lines and angles in his Geometry class. In his current learning path, the focus skill being taught is ***use properties, definitions, and theorems of angles and lines to solve problems related to adjacent, vertical, complementary, supplementary, and linear pairs of angles***. This focus skill is part of a knowledge cluster that contains prerequisite and impending skills. Working with prerequisite skills can help students struggling to learn and impending skills can help students progress to the next level of learning.

Since James' Quantile measure is within the range of the focus skill being taught (his Quantile measure +/- 50Q), James will be ready for this type of instruction. With his mathematical ability being at the same level as the focus skill, learning will be optimal. Once James is performing well with the focus skill, he will be better prepared to learn the impending skills connected with this focus skill.

1250Q
IMPENDING SKILL
Use definitions and theorems of angles formed when a transversal intersects parallel lines.

1220Q
IMPENDING SKILL
Use properties, definitions, and theorems of polygons to solve problems related to the interior and exterior angles of a convex polygon.

1160Q
FOCUS SKILL
Use properties, definitions, and theorems of angles and lines to solve problems related to adjacent, vertical, complementary, supplementary, and linear pairs of angles.
CCSS G.CO.9

1010Q
PREREQUISITE SKILL
Define and identify alternate interior, alternate exterior, corresponding, adjacent and vertical angles.

1020Q
PREREQUISITE SKILL
Define and identify complementary and supplementary angles.

800Q
PREREQUISITE SKILL
Write a linear equation or inequality to represent a given number or word problem; solve.

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★ NUMBER SENSE
■ NUMERICAL OPERATIONS
● MEASUREMENT
▲ GEOMETRY
▲ DATA ANALYSIS, STATISTICS & PROBABILITY

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Middle School Example
Sophia

Heritage Middle School | Grade 6

Quantile Measure: 770Q

Sophia is using variables to represent mathematical expressions in her math class. In her current learning path, the focus skill being taught is ***translate between models or verbal phrases and algebraic expressions.*** This focus skill is part of a knowledge cluster that contains prerequisite and impending skills. Working with prerequisite skills can help students struggling to learn and impending skills can help students progress to the next level of learning.

Since Sophia's Quantile measure is within the range of the focus skill being taught (her Quantile measure +/- 50Q), Sophia will be ready for this type of instruction. With her mathematical ability being at the same level as the focus skill, learning will be optimal. Once Sophia is performing well with the focus skill, she will be better prepared to learn the impending skills connected with this focus skill.

810Q
IMPENDING SKILL

Write an equation to describe the algebraic relationship between two defined variables in number and word problems, including recognizing which variable is dependent.

800Q
IMPENDING SKILL

Identify parts of a numerical or algebraic expression.

800Q
IMPENDING SKILL

Write a linear equation or inequality to represent a given number or word problem; solve.

750Q
FOCUS SKILL

Translate between models or verbal phrases and algebraic expressions.

CCSS 6.EE.6

620Q
PREREQUISITE SKILL

Translate between models or verbal phrases and numerical expressions.

430Q
PREREQUISITE SKILL

Describe the meaning of an unknown in the context of a word problem.

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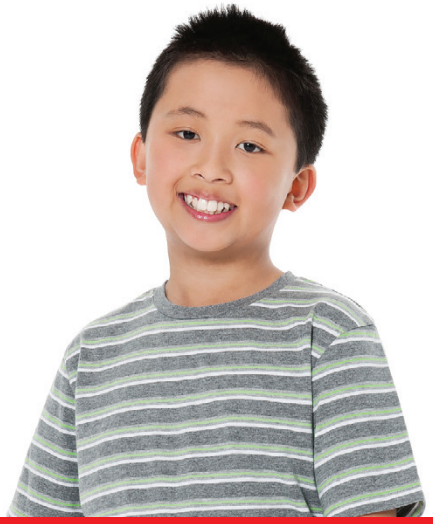
Late Elementary Example Donald

Heritage Elementary School | Grade 4

Quantile Measure: 450Q



Donald is learning about line graphs with very large data values. In his current learning path, the focus skill being taught is ***organize, display, and interpret information in graphs containing scales that represent multiple units***. This focus skill is part of a knowledge cluster that contains prerequisite and impending skills. Working with prerequisite skills can help students struggling to learn and impending skills can help students progress to the next level of learning.

Since Donald's Quantile measure is within the range of the focus skill being taught (his Quantile measure +/- 50Q), Donald will be ready for this type of instruction. With his mathematical ability being at the same level as the focus skill, learning will be optimal. Once Donald is performing well with the focus skill, he will be better prepared to learn the impending skills connected with this focus skill.

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800Q

IMPENDING SKILL

Identify and use appropriate scales and intervals in graphs and data displays.

480Q

FOCUS SKILL

Organize, display, and interpret information in graphs containing scales that represent multiple units.

CCSS 3.MD.3

480Q

IMPENDING SKILL

Organize, display, and interpret information in bar graphs.

470Q

IMPENDING SKILL

Organize, display, and interpret information in line graphs.

200Q

PREREQUISITE SKILL

Organize, display, and interpret information in line plots and tally charts.

90Q

PREREQUISITE SKILL

Skip count by 3s, 4s, 6s, 7s, 8s, and 9s.

110Q

PREREQUISITE SKILL

Skip count by 2s, 5s and 10s beginning at any number.

EM10Q

PREREQUISITE SKILL

Organize, display, and interpret information in picture graphs and bar graphs using grids.

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Early Elementary Example
Aliyah

Heritage Elementary School | Kindergarten

Quantile Measure: EM100Q

Aliyah is exploring unknown-addend problems in her class. In her current learning path, the focus skill being taught is ***know and use related addition and subtraction facts***. This focus skill is part of a knowledge cluster that contains prerequisite and impending skills. Working with prerequisite skills can help students struggling to learn and impending skills can help students progress to the next level of learning.

Since Aliyah's Quantile measure is within the range of the focus skill being taught (her Quantile measure +/- 50Q), Aliyah will be ready for this type of instruction. With her mathematical ability being at the same level as the focus skill, learning will be optimal. Once Aliyah is performing well with the focus skill, she will be better prepared to learn the impending skills connected with this focus skill.

EM25Q
IMPENDING SKILL
Model the concept of subtraction using numbers less than or equal to 10.

EM80Q
FOCUS SKILL
Know and use related addition and subtraction facts.
CCSS 1.OA.4

EM110Q
PREREQUISITE SKILL
Identify missing addends for addition facts.

EM260Q
PREREQUISITE SKILL
Model the concept of addition for sums to 10.

GLOSSARY

Emerging Mathematician (EM) A code that comes before a Quantile measure of below zero for material and student measures at early levels.

Quantile Skill and Concept (QSC) The description of a skill and its Quantile measure.

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