

1400Q

13000

11000

10000

900Q

8000

7000

<u>6000</u>

5000

400Q

3000

2000

1000

g

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!

OUANTILE FRAMEWORK

Linking assessment with mathematics instruction

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 Ouantile 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 abilites. 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



For more information, free resources, and to search the Math Skills Database, visit Quantiles.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

Use definitions and theorems of angles formed when a transversal intersects parallel lines.

Use properties, definitions, and theorems of angles and lines to solve problems related to adjacent, vertical, complementary, supplementary, and linear pairs of angles.

1220Q

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

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

PREREOUISITE SKILL

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

MetaMetrics.

For more information, visit Quantiles.com.

ALGEBRA & ALGEBRAIC THINKING NUMBER SENSE NUMERICAL OPERATIONS

MEASUREMEN

EMENT GEOMETE

DATA ANALYSIS STATISTICS & PROBABILITY



OUANTILE FRAMEWORK FOR MATHEMATICS

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Middle School Example Sophia

Heritage Middle School | Grade 6 **Quantile Measure: 770Q**



class. In her current learning path, the focus skill being taught is *translate* between models or verbal phrases and part of a knowledge cluster that 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 ability being at the same level as the focus skill, learning will be optimal. Once Sophia is performing well with prepared to learn the impending skills connected with this focus skill.

8100 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.

8000

IMPENDING SKILL Identify parts of a numerical or algebraic expression.

8000

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.

620**0**

PREREOUISITE SKILL Translate between models or verbal phrases and numerical expressions.

4300

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



For more information, visit Quantiles.com.

ALGEBRA & ALGEBRAIC

SENSE

OPERATIONS

MEASUREMENT

DATA ANALYSIS , & PROBABILITY



OUANTILE FRAMEWORK FOR MATHEMATICS

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Late Elementary Example Donald

Heritage Elementary School | Grade 4 **Student 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.

8000

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



IMPENDING SKILL Organize, Organize, display, and display, and interpret interpret information information in bar graphs. in line graphs.

4800 🔺

FOCUS SKILL

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

CCSS 3.MD.3

2000 🔺

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.

EM10Q

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

1100

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



For more information, visit Quantiles.com.

ALGEBRA

OPERATIONS

DATA ANALYSIS,



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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 and subtraction facts. This focus skill is 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 being taught (her Quantile measure +/-50Q), Aliyah will be ready for this type 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.

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EM2600

PREREQUISITE SKILL

for sums to 10.

Model the concept of addition

AI GEBRA NUMBER & ALGEBRAIC

NUMERICAL **OPERATIONS**

MEASUREMENT

GEOMETRY

DATA ANALYSIS . & PROBABILITY

EM250 IMPENDING SKILL

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

EM800 FOCUS SKILL

Know and use related addition and subtraction facts. CCSS 1.0A.4

> EM1100 PREREQUISITE SKILL

Identify missing addends for addition facts.

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