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!
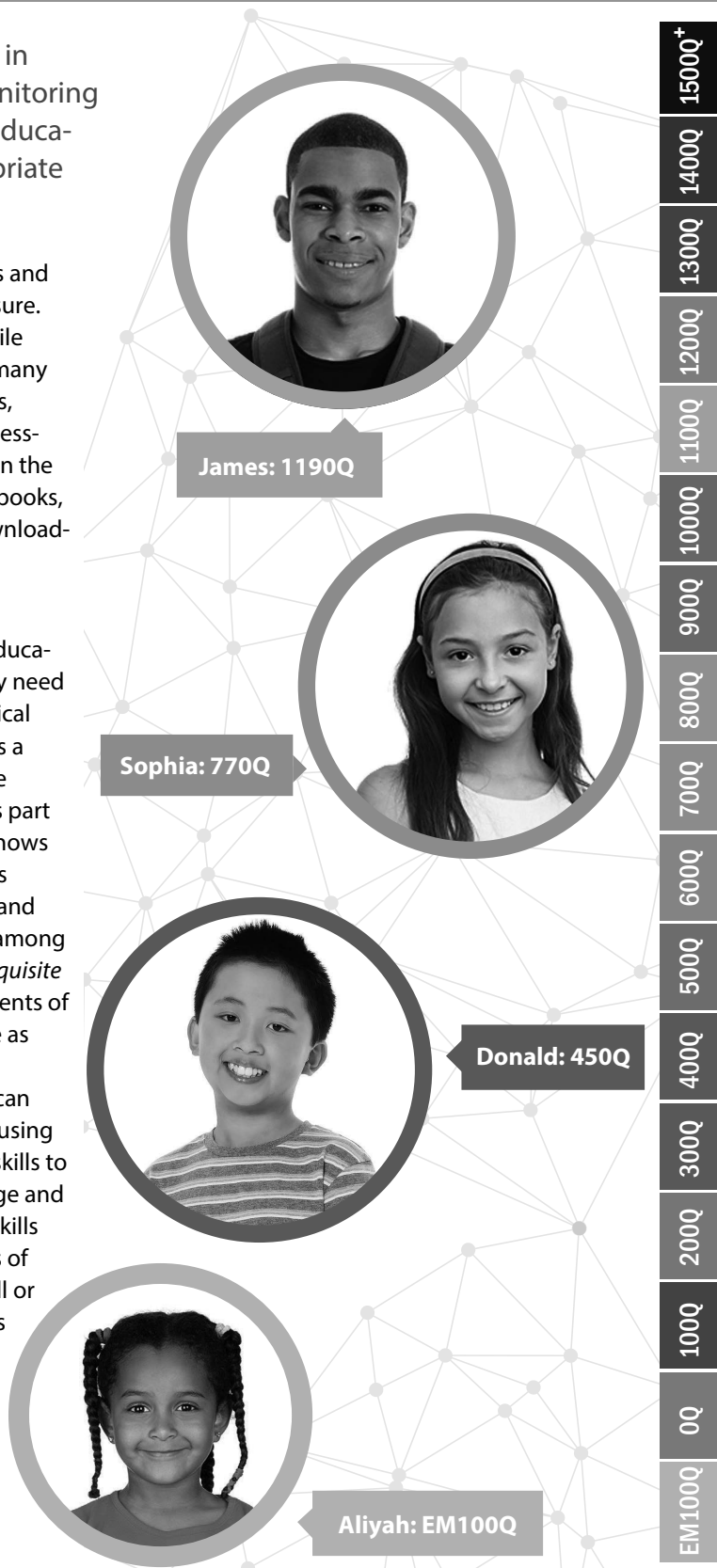
HOW IT WORKS

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 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

15000Q+
14000Q
13000Q
12000Q
11000Q
10000Q
9000Q
8000Q
7000Q
6000Q
5000Q
4000Q
3000Q
2000Q
1000Q
0Q
EM100Q

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

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LINKING ASSESSMENT WITH INSTRUCTION
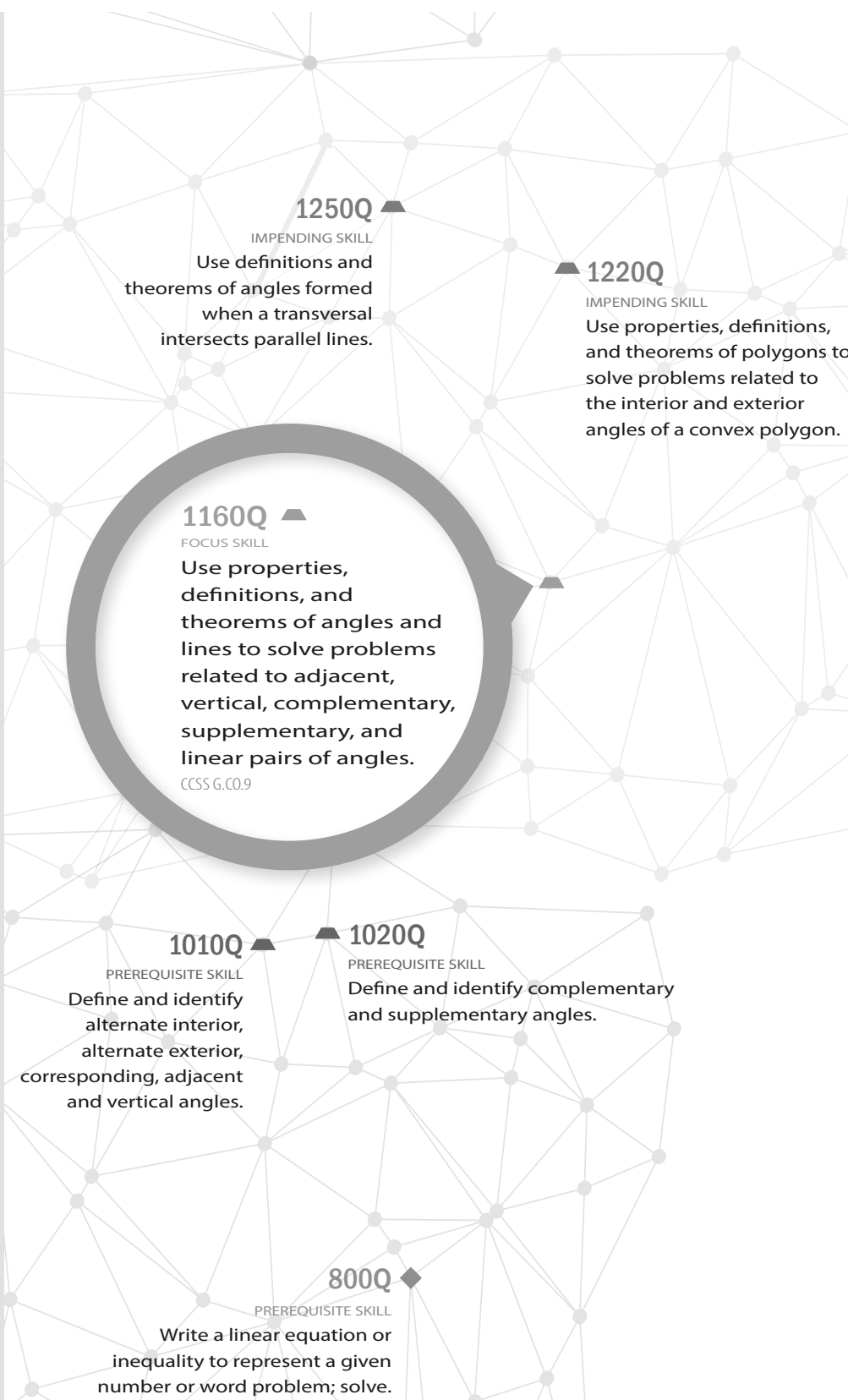
High School Example
James

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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◆ ALGEBRA & ALGEBRAIC THINKING
★ NUMBER SENSE
■ NUMERICAL OPERATIONS
● MEASUREMENT
▬ GEOMETRY
▲ DATA ANALYSIS , STATISTICS & PROBABILITY
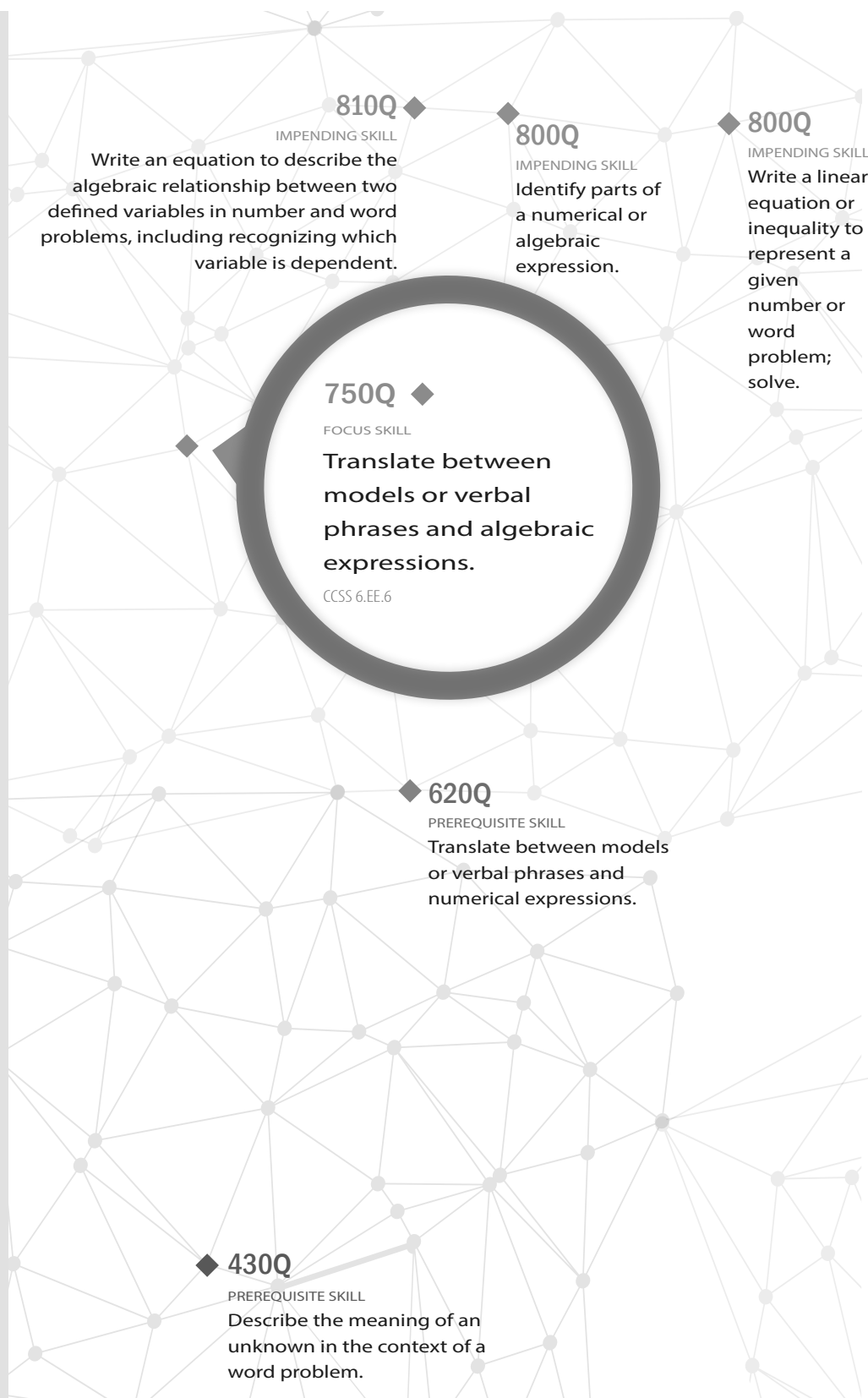
Middle School Example
Sophia

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.

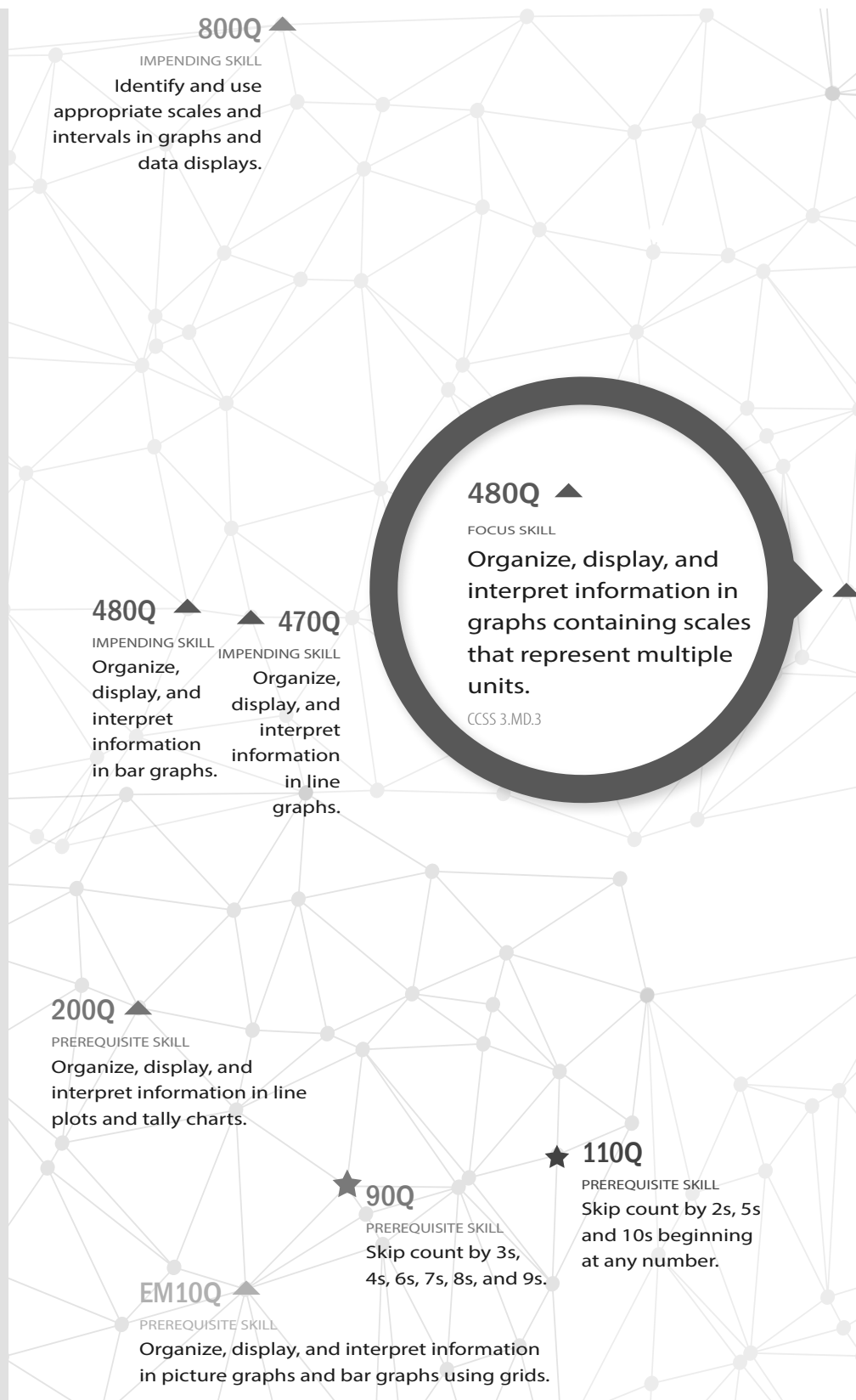| ◆ ALGEBRA & ALGEBRAIC THINKING	★ NUMBER SENSE	■ NUMERICAL OPERATIONS	● MEASUREMENT	⬟ GEOMETRY	▲ DATA ANALYSIS , STATISTICS & PROBABILITY

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.

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.

110Q ★
PREREQUISITE SKILL
Skip count by 2s, 5s and 10s beginning at any number.

90Q ★
PREREQUISITE SKILL
Skip count by 3s, 4s, 6s, 7s, 8s, and 9s.

EM10Q ▲
PREREQUISITE SKILL
Organize, display, and interpret information in picture graphs and bar graphs using grids.

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◆ ALGEBRA & ALGEBRAIC THINKING
★ NUMBER SENSE
■ NUMERICAL OPERATIONS
● MEASUREMENT
▰ GEOMETRY
▲ DATA ANALYSIS, STATISTICS & PROBABILITY

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.

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