

# The Quantile<sup>®</sup> Framework for Mathematics

## A Practical Approach: Linking Assessment to Instruction

*Presented by:*

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*Linking Assessment With Instruction*



# The Quantile Framework For Mathematics

- What is the Quantile Framework for Mathematics?
- Why do I need to know about it?



# Along the way we'll discuss...

- ...the use of Quantiles as a measurement system
- ...how to profile students, forecast readiness, and identify skill difficulty
- ...differentiation opportunities for all students
- ...the **FREE online resources** found at [www.Quantiles.com](http://www.Quantiles.com)



# Imagine...

...what if there was a means of determining student readiness to address various math concepts?

...what if there existed a tool that could drill a math concept all the way down to foundational knowledge?



# Activity: Let's explore student readiness and mathematical difficulty

Think about the following problem:

*Each cup of soda sells for 25¢. How many cups of soda must be sold to collect \$8.25?*

- What are the skills that a student would need to employ in order to solve this problem?
- In what grade would a student possibly face this question?



# Skills/concepts you may have thought of:

- being able to read the problem
- basic number sense
- skip count by 25
- counting/grouping strategies
- value of coins/money
- odd numbers can be divided evenly
- division: division facts, an understanding of subtraction, understanding of division steps/process, multiplication facts, 2-digit quotients, placement of digits in the quotient,
- decimals/money sense
- algebraic equation

**Of course, there are many other skills along the way!**



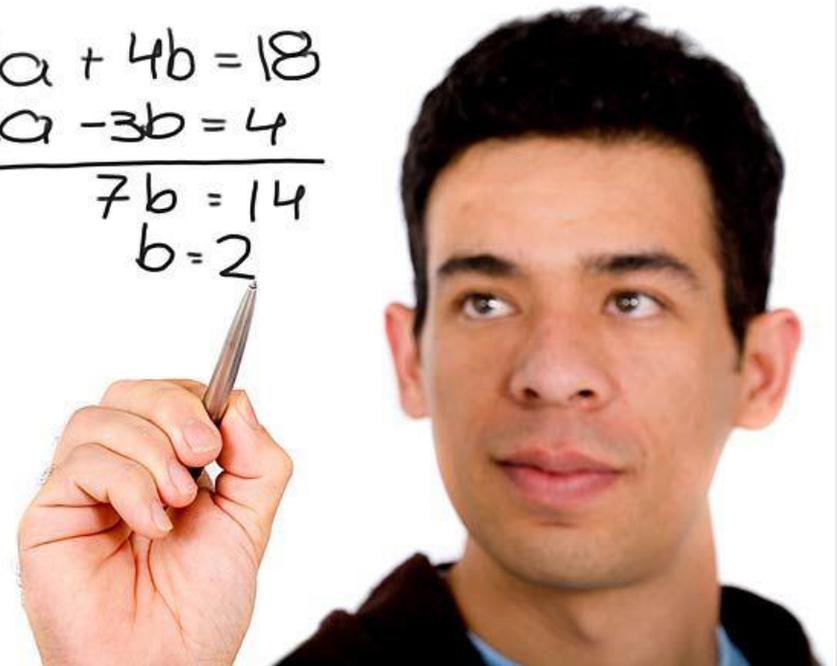
# Two issues that Math educators deal with on a daily basis:



*How to determine student readiness?*

$$\begin{array}{r} 2a + 4b = 18 \\ 2a - 3b = 4 \\ \hline 7b = 14 \\ b = 2 \end{array}$$

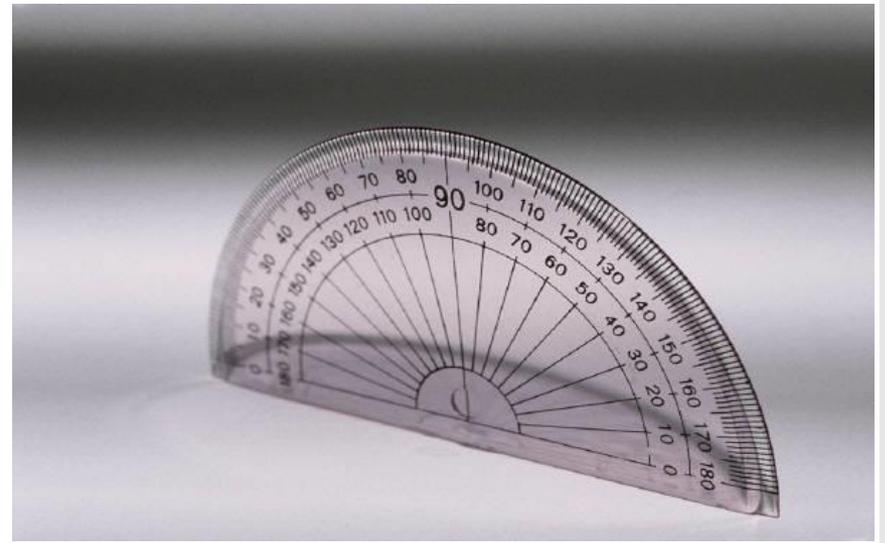
*How to establish the degree of difficulty for various skills in mathematics?*



# MetaMetrics' Mission/Unification

To provide a means of ***matching instructional materials to student ability***, in order to foster better educational practices and provide a means to track student progress.

(Same mission behind  
Lexile Framework  
development!)

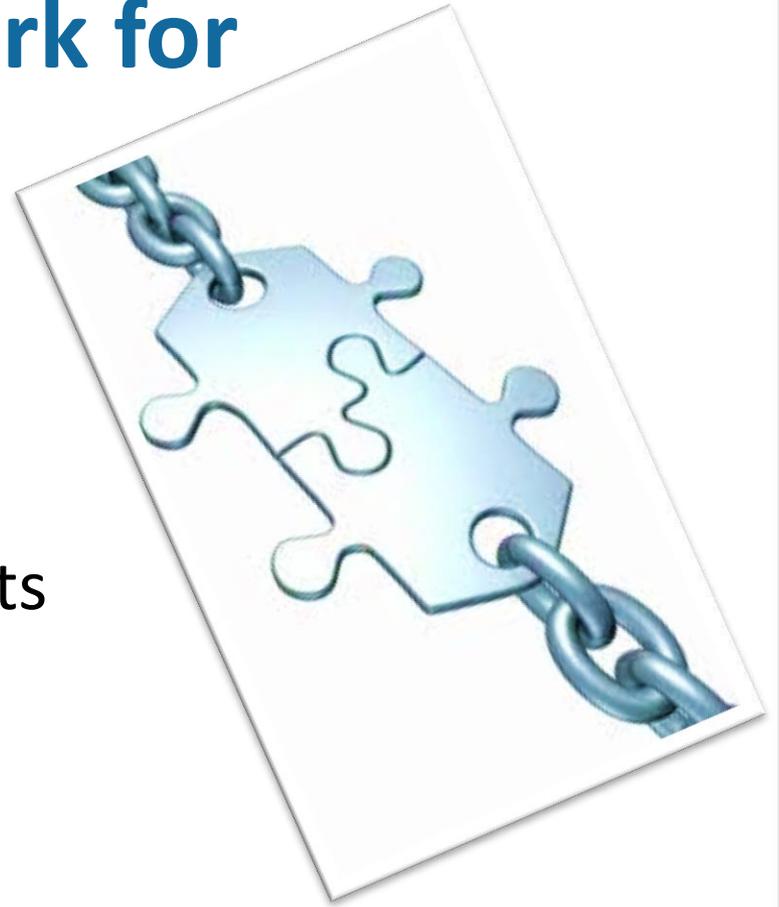


**Let's explore where you can  
receive a  
Quantile measure  
on your students!**



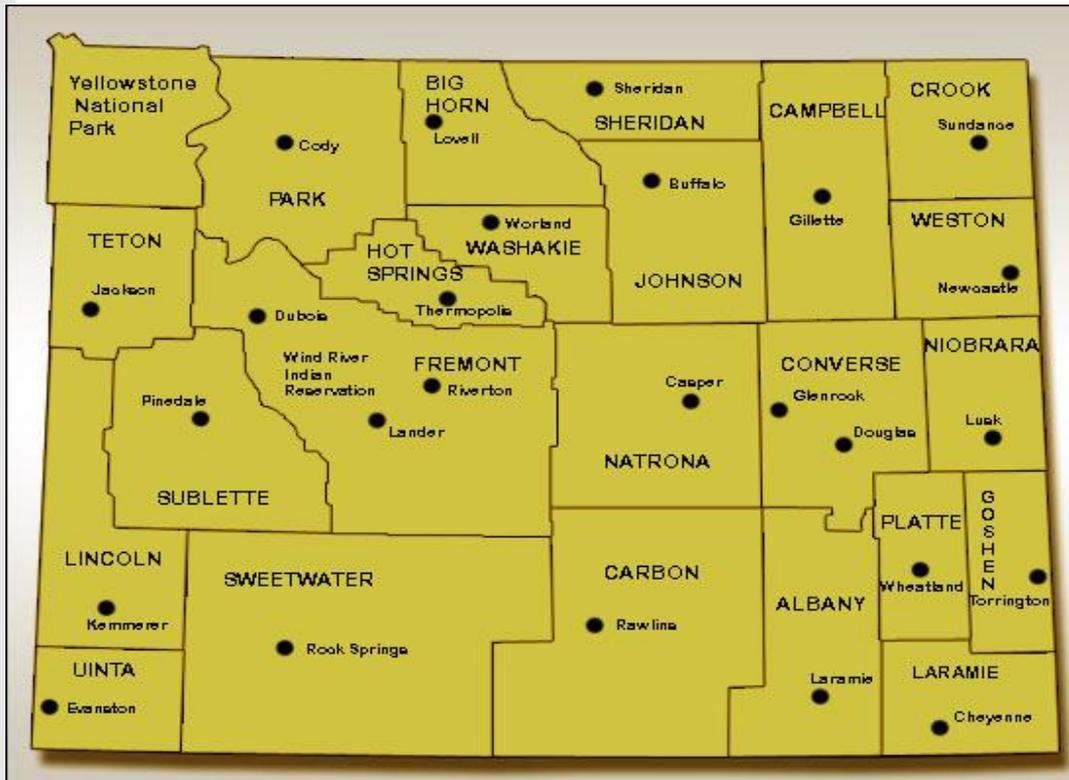
# The Quantile Framework for Math is linked to:

- State Assessments
- Norm-Referenced Assessments
- Formative Assessments
- Math Programs
- Online Curriculum



# Assessments Used in Wyoming

- Criterion-Referenced Assessment in Reading and Mathematics (PAWS-Proficiency Assessments for Wyoming Students), Grades 3-8



# Individual Student Report:



DEPARTMENT OF EDUCATION

## Student Report

First Name: Madison  
Middle Initial: P  
Last Name: Allen

Grade: 3  
Birthdate: 07/14/2006  
Student ID: 84738475

Test Window: 03/03/14 - 03/28/14

School: School 1 of District 1

District: District 1

### Purpose of Report

This report provides information about your child's performance on the Proficiency Assessment for Wyoming Students (PAWS) and the Student Assessment of Writing Skills (SAWS). This report will help you understand your child's performance in reading and math (grades 3-8), science (grades 4 and 8), and writing (grades 3, 5, and 7) for the 2013-2014 school year.

### Glossary of Terms

**Scale Score:** Your child's raw score (total number of points earned) transformed into a score on a scale.

**Score Ranges:** The range of scale score points assigned to each proficiency level. Each subject area has a unique range of points.

**Domain Performance:** Describes your child's performance in sub-categories (domains) of each content area. The Scale Score column indicates your child's performance in relation to the overall reading scale (above). The Domain Performance column shows your child's percent correct in each of the measured domains.

**State Percentile Rank:** State Percentile Rank indicates your child's performance in relation to other Wyoming students in the same grade. The percentile shows the percentage of Wyoming students in the same grade who obtained scores equal to or less than your child's score.

**Lexile Measure:** Helps readers select materials at their reading level. This can serve as a guide in selecting books for your child.

**Quantile Measure:** Similar to the Lexile and can help you identify math activities to do at home. These activities will help your child practice mathematical skills leading to increased mathematical understanding.

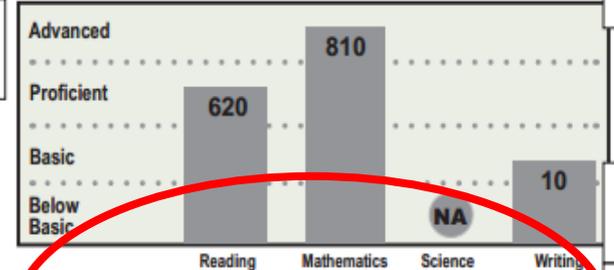
**Not Tested (NT):** Your child did not take this part of the assessment.

**Not Applicable (NA):** This content area is not tested at this grade level.

For Additional Resources and Information- Visit the Wyoming Department of Education online

Go to the Wyoming Department of Education's website at [www.doe.wy.gov](http://www.doe.wy.gov) for more information about the PAWS and SAWS Assessments.

	Score Ranges				Your Student	State Percentile Rank
	Below Basic	Basic	Proficient	Advanced		
Reading	375-552	553-589	590-640	641-800	620	100%
Mathematics	375-549	550-598	599-659	660-850	810	100%
Science	NA	NA	NA	NA	NA	NA
Writing	0-8	9-13	14-20	21-24	24	80%



Lexile® Measure	1111L	Quantile® Measure	1000Q
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### CONTENT PERFORMANCE BY DOMAIN

	PAWS	Scale Score	Domain Performance (% Correct)	
Reading	Literature: Craft and Structure	340	90%	
	Literature: Key Ideas and Details	708	59%	
	Informational Text: Craft and Structure	752	64%	
	Informational Text: Key Ideas and Details	742	93%	
	Language	837	64%	
Math	Number Operations - Base 10	773	65%	
	Geometry	410	80%	
	Number Operations - Fractions	663	78%	
	Operations and Algebraic Thinking	493	46%	
	Measurement & Data	309	50%	
Science	NA			
Writing	<b>SAWS</b>		<b>Total Possible</b>	<b>Student Score</b>
	Narrative Total:		12	12
	Idea Development	4	3	
	Organization	3	2	
	Voice	3	3	
	Conventions	2	4	
	<b>Informative/Explanatory Total:</b>		<b>12</b>	<b>8</b>
	Idea Development	4	2	
	Organization	2	3	
	Voice	4	2	
Conventions	2	1		



This presentation consists of  
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For more information, and to search for books by Lexile measure, visit [www.Lexile.com](http://www.Lexile.com).  
For more information about Quantile measures, visit the Math @ Home section at [www.Quantiles.com](http://www.Quantiles.com)

# PAWS and Quantiles

A child entering gr. 5 from gr. 4 with a 700Q measure on the grade 4 PAWS, must grow a minimum of 100Q in grade 5 to be considered Proficient at the end of the year.

Table 1. PAWS performance standards in the Quantile measure.

Grade	Below Basic	Basic	Proficient	Advanced
3	470Q and Below	475Q to 710Q	715Q to 980Q	985Q and Above
4	450Q and Below	455Q to 750Q	755Q to 1040Q	1045Q and Above
5	590Q and Below	595Q to 795Q	800Q to 1135Q	1140Q and Above
6	670Q and Below	675Q to 910Q	915Q to 1210Q	1215Q and Above
7	775Q and Below	780Q to 990Q	995Q to 1240Q	1245Q and Above
8	805Q and Below	810Q to 980Q	985Q to 1260Q	1265Q and Above

**Test Administration.** PAWS will be administered between March 2<sup>nd</sup> and March 27<sup>th</sup>, 2015.

# Formative Assessments Linked to the Quantile Framework

	<b>Progress Towards Standards (PTS3)</b>
	<b>A+ Learning Link</b>
	<b>Scholastic Math Inventory (SMI)</b>
	<b>i-Ready Diagnostic &amp; Instruction</b>

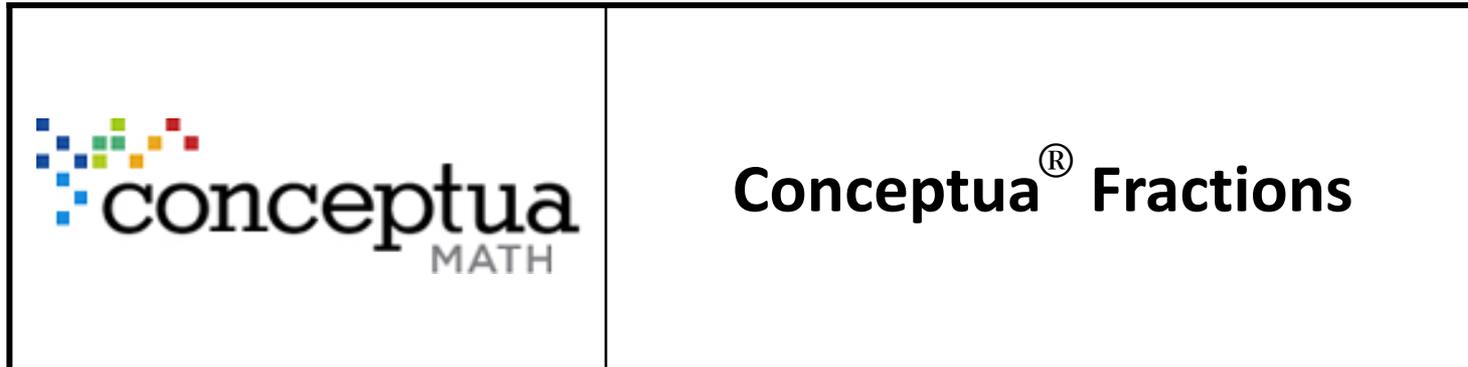
# Math Program Linked to the Quantile Framework



**Vmath, TransMath,  
Inside Algebra**



# Online Curriculum Linked to the Quantile Framework



Let's explore  
Standards  
that have been aligned to the Quantile  
Framework for Mathematics

OR

*(How an educator determines the difficulty of any  
math standard in their curriculum!)*



# Wyoming Standards



The Quantile® Framework for Mathematics  
Linking assessment with mathematics instruction



About the Quantile Framework

Use the Quantile Framework

Become a Quantile Partner

## Math Skills Database

Standard Search

Keyword Search

Search the Math Skills Database for Quantile Skills and Concepts (QSCs) using your state standards. The database contains targeted, free resources appropriately matched to students by Quantile measure and math content.

Search Criteria

Wyoming

- New Mexico
- New York
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin

Wyoming

Course

- Kindergarten
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Grade 6
- Grade 7
- Grade 8
- Algebra 1
- Geometry
- Algebra 2
- Integrated Mathematics I
- Integrated Mathematics II
- Integrated Mathematics III

Standard

Search



# Wyoming Standards



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Keyword Search

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Search Criteria

Wyoming

Grade 5

All Standards

Search

### All Standards

- 5.OA.1: Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these...
- 5.OA.2: Write simple expressions that record calculations with numbers, and interpret numerical expressions...
- 5.OA.3: Generate two numerical patterns using two given rules. Identify apparent relationships between...
- 5.NBT.1: Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it...
- 5.NBT.2: Explain patterns in the number of zeros of the product when multiplying a number by powers of 10,...
- 5.NBT.3.a: Read and write decimals to thousandths using base-ten numerals, number names, and expanded form,...
- 5.NBT.3.b: Compare two decimals to thousandths based on meanings of the digits in each place, using  $>$ ,  $=$ , and...
- 5.NBT.4: Use place value understanding to round decimals to any place.
- 5.NBT.5: Fluently multiply multi-digit whole numbers using the standard algorithm.
- 5.NBT.6: Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit...
- 5.NBT.7: Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and...
- 5.NF.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given...
- 5.NF.2: Solve word problems involving addition and subtraction of fractions referring to the same whole,...
- 5.NF.3: Interpret a fraction as division of the numerator by the denominator ( $a/b = a \div b$ ). Solve word...
- 5.NF.4.a: Interpret the product  $(a/b) \times q$  as a parts of a partition of  $q$  into  $b$  equal parts; equivalently, as...
- 5.NF.4.b: Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the...
- 5.NF.5.a: Comparing the size of a product to the size of one factor on the basis of the size of the other...
- 5.NF.5.b: Explaining why multiplying a given number by a fraction greater than 1 results in a product greater...
- 5.NF.6: Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using...



# Common Core Standards



The Quantile<sup>®</sup> Framework for Mathematics  
Linking assessment with mathematics instruction

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## Math Skills Database

Search the Math Skills Database for Quantile Skills and Concepts (QSCs) using your state standards. The database contains targeted, free resources appropriately matched to students by Quantile measure and math content.

Standard Search

Keyword Search

Search Criteria **Common Core** ▼

- Course
- Kindergarten
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Grade 6
- Grade 7
- Grade 8
- Algebra 1
- Geometry
- Algebra 2
- Mathematics I
- Mathematics II
- Mathematics III

Standard ▼ Search

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MetaMetrics develops scientific measures of academic achievement and complementary technology solutions that help learners achieve their goals by providing unique insights about their ability level and potential for growth.

Our products and services help learners achieve their goals.

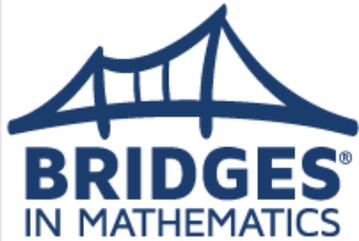


Let's explore  
resources  
that have been calibrated to the  
Quantile Framework for Mathematics



# Differentiation Opportunities:

SAS Curriculum Pathways



that quiz



# Math Textbooks are Calibrated

## Textbook detail

### Go Math! Grade 6 Common Core Edition

**Title:** Go Math! Grade 6 Common Core Edition

**Publisher:** [Houghton Mifflin Harcourt](#)

**Course:** [Grade 6](#)

**ISBN-13:** 9780547587783

**ISBN-10:** 0547587783

Hide all QSCs

### Table of Contents

#### Chapter 1: Whole Numbers and Decimals

##### Lesson 1: Divide Multi-Digit Numbers ([Hide related QSCs](#)) (690Q)

QSC ID	Skill	Quantile Measure	Resources
QSC171	<a href="#">Estimate and solve division problems with multi-digit divisors; explain solution.</a>	690Q	21
QSC208	<a href="#">Solve one-step linear equations and inequalities and graph solutions of the inequalities on a number line in number and word problems.</a>	650Q	46

##### Lesson 2: Prime Factorization ([Hide related QSCs](#)) (780Q)

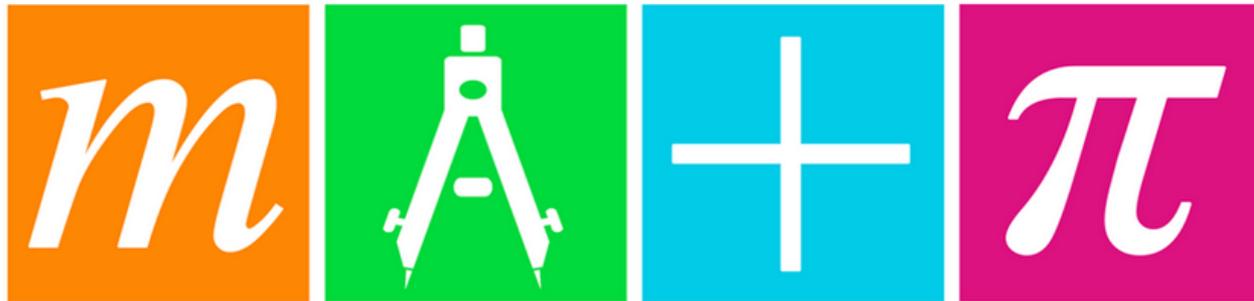
QSC ID	Skill	Quantile Measure	Resources
QSC232	<a href="#">Write numbers using prime factorization.</a>	780Q	11

##### Lesson 3: Least Common Multiple ([Hide related QSCs](#)) (780Q)

# FREE Summer Math Program

MetaMetrics has developed a  
Summer Math Program:

# SUMMER



# CHALLENGE

# Research indicates that:

- Summer math loss is more pronounced than reading loss
- Students lose math ability regardless of household income level
- Parents are more likely to read with their children than practice math skills
- Math practice is less intuitive and more technical than reading practice
- **On average, all students, regardless of socio-economic status, lose approximately 2.6 months of grade level equivalency in mathematical computation over the summer months each year**

Cooper, H., Nye, B., Charlton, K., Lindsay, J., & Greathouse, S. (1996). **The effects of summer vacation on achievement test scores: A narrative and meta-analytic review.** Review of Educational Research, 66(3), 227-268.



# Summer Math Challenge Overview

- **Free** initiative for parents and their children
- Email-based math skills maintenance program
- Focus on **reinforcing skills** acquired during previous school year
- Target students **entering grades 3-6** in the fall  
(skills in grades 2-5 reviewed in SMC)
- Entry level can be based on Quantile score or parent input
- One math Common Core concept addressed per week through daily emails of activities and resources
- Visit [www.Quantiles.com](http://www.Quantiles.com) to
  - Register for daily emails
  - Track student progress
  - Provide feedback on Program





## Summer Math Challenge

Grade 3 (Medium), Week 5: Finding Area

July 21, 2014: Gotcha Covered

Hello Jane,

It's hard to believe it is already week five!

Today's activities will focus on finding the area of squares, rectangles, and some other special shapes. The video shows how to find the area of a square. In the video, please note that the teacher uses a dot to show multiplication rather than an  $\times$ . Your child may remember his or her teacher writing the formula for finding area as  $\text{Area} = \text{length} \times \text{width}$ . Either multiplication symbol can be used.

Your child will be a "measuring professional" when this interactive activity is finished! He or she will be finding the area and perimeter of rectangular room sections at a party. Remember that perimeter is the distance around the outside edges of the rooms.

Here are the directions your child should follow.

- Click the link below.
- Then click "Let's Go."
- Read the directions in the upper right corner.
- Below these directions are the areas and perimeters of the room sections to design.
- Click in the corner of a square to drag it to make a room with the correct area and perimeter.
- Click on one line to move it over to the space where it needs to be placed.
- The design can be checked at any time by clicking on the green "Check It" button.

Tomorrow will bring another day of finding area!

Note that this game is not compatible with iPads or iPhones. As an alternate activity, click the link below to print out the practice page for your child to complete. Use the answer key on the second page to check the answers together.

### Today's Resources:

#### Videos

[How do you find the area of a rectangle? \(Virtual Nerd\)](#)

#### Interactive Activities

[Party Designer \(Math Playground\)](#)

#### Practice Pages

[Finding Area \(Common Core Sheets\)](#)

### Helpful links:

[Missed a day? Go to the Summer Math Challenge dashboard to get caught up!](#)

[Learn more about the skills and concepts associated with today's activity.](#)

[Contact Quantiles.com for support](#)

# Summer Math Challenge Sample Daily Email



# Summer Math Challenge sample dashboard

## Summer Math Challenge

### Welcome to the Summer Math Challenge Dashboard

Click on the squares below to learn more about the math concept for each week. Click on your child's name to update their profile.

Lucy (Grade 3)

[Download Certificate](#)

SUMMER MATH CHALLENGE  
Week 1: Multiplication Facts



Week 1

<

SUMMER MATH CHALLENGE  
Week 2: Advanced Multiplication



Week 2

SUMMER MATH CHALLENGE  
Week 3: Fractions



Week 3

SUMMER MATH CHALLENGE  
Week 4: Compare and Order Fractions



Week 4

>



## THIS CERTIFICATE OF COMPLETION IS AWARDED TO:

Lucy

For successfully reviewing the following math concepts\* included in the Summer Math Challenge:

### Multiplication Facts



Concept ID: 118

### Advanced Multiplication



Concept ID: 162

### Fractions



Concept ID: 538

### Compare and Order Fractions



Concept ID: 115

### Finding Area



Concept ID: 146

To complete this week's activities visit  
[quantiles.com/summer-math!](http://quantiles.com/summer-math!)

\*For more information about these concepts, please visit [quantiles.com/tools/math-skills-database/keyword-search](http://quantiles.com/tools/math-skills-database/keyword-search) and enter the Concept ID in the keyword search field.

# Timeline for Summer Math Challenge

- ***April 1, 2014*** – Summer Math enrollment begins
- ***June 23, 2014*** – parents begin receiving Summer Math emails

**Not too late to sign up!**

**Activities will be available 2014-2015 school year!**

**Adding grade 6 next year!**



## WDE partners with MetaMetrics for free summer learning

Posted: Saturday, May 31, 2014 12:00 am

CHEYENNE, Wyo. — The Wyoming Department of Education in partnership with MetaMetrics, is trying to negate the effects of summer learning loss with two new summer learning initiatives: Find a Book, Wyoming, and The Summer Math Challenge. Wyoming students grow in their reading and mathematics abilities during the academic school year. However, students can slip in their abilities over the summer months. This phenomenon is called “summer learning loss,” and is well documented by researchers throughout the country. The following two programs are specially geared to help stop summer learning loss and are free to Wyoming students.

**Find a Book, Wyoming:** Research shows that when students read high-interest, ability appropriate books over the summer, they can actually grow and improve their reading ability. The Find a Book, Wyoming tool supports and facilitates this research-based solution. Find a Book, Wyoming enables students, educators and parents to build custom reading lists based on their reading ability as well as personal interests. The tool also enables students, parents and educators to check the availability of books at their local library, as well as submit a pledge to read this summer. To access the Find a Book, Wyoming tool, visit [lexile.com/fab/wy](http://lexile.com/fab/wy).

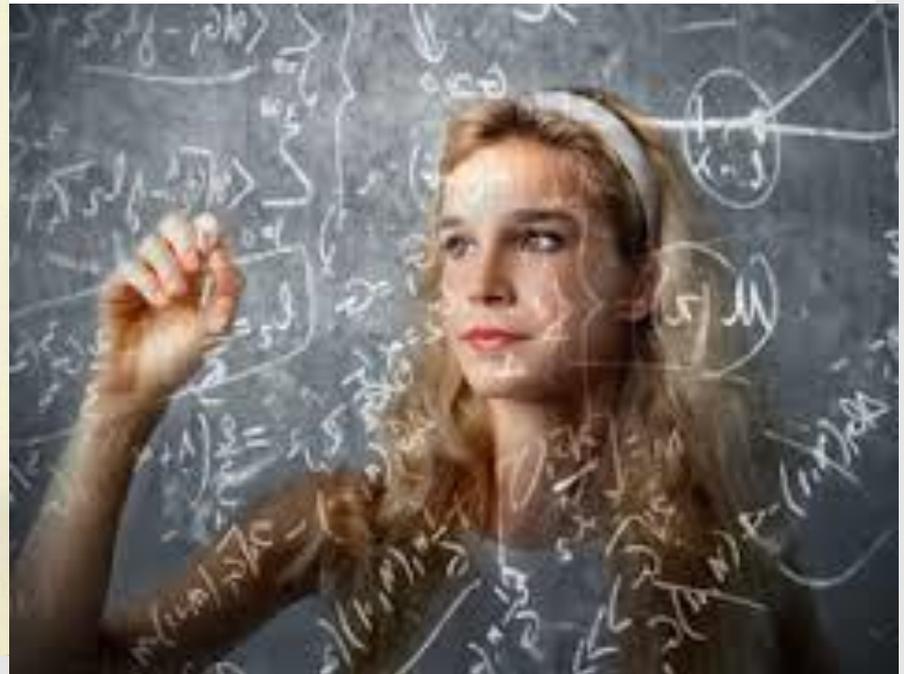
**The Summer Math Challenge:** The Summer Math Challenge is a math skills maintenance program based on grade-level state standards for mathematics. The program is targeted to students who have just completed second through fifth grade and is designed to help them retain math skills learned during the previous school year. Parents who enroll their child, receive daily emails with targeted activities and resources to help children retain the math skills learned during the previous school year. The Summer Math Challenge begins June 23 and runs until Aug. 1. For more information about the Summer Math Challenge, visit [quantiles.com/content/summer-math-challenge](http://quantiles.com/content/summer-math-challenge).

Both learning tools use measures that are reported on the Proficiency Assessments for Wyoming Students for grades 3-8 and 11. Find a Book, Wyoming uses a student’s reading score, reported as a Lexile measure, to provide a corresponding list of texts that fall within the student’s reading ability. The Summer Math Challenge uses a student’s mathematics score, reported as a Quantile® measure, to produce activities tailored to the student’s mathematical ability. Both tools have features that allow students, parents and educators to estimate a Lexile or Quantile measure if it is not known. For more information, contact Julie Magee at [julie.magee@wyo.gov](mailto:julie.magee@wyo.gov) or 307-777-8740.

# Wyoming Dept. of Ed Endorses MetaMetrics’ Summer Initiatives

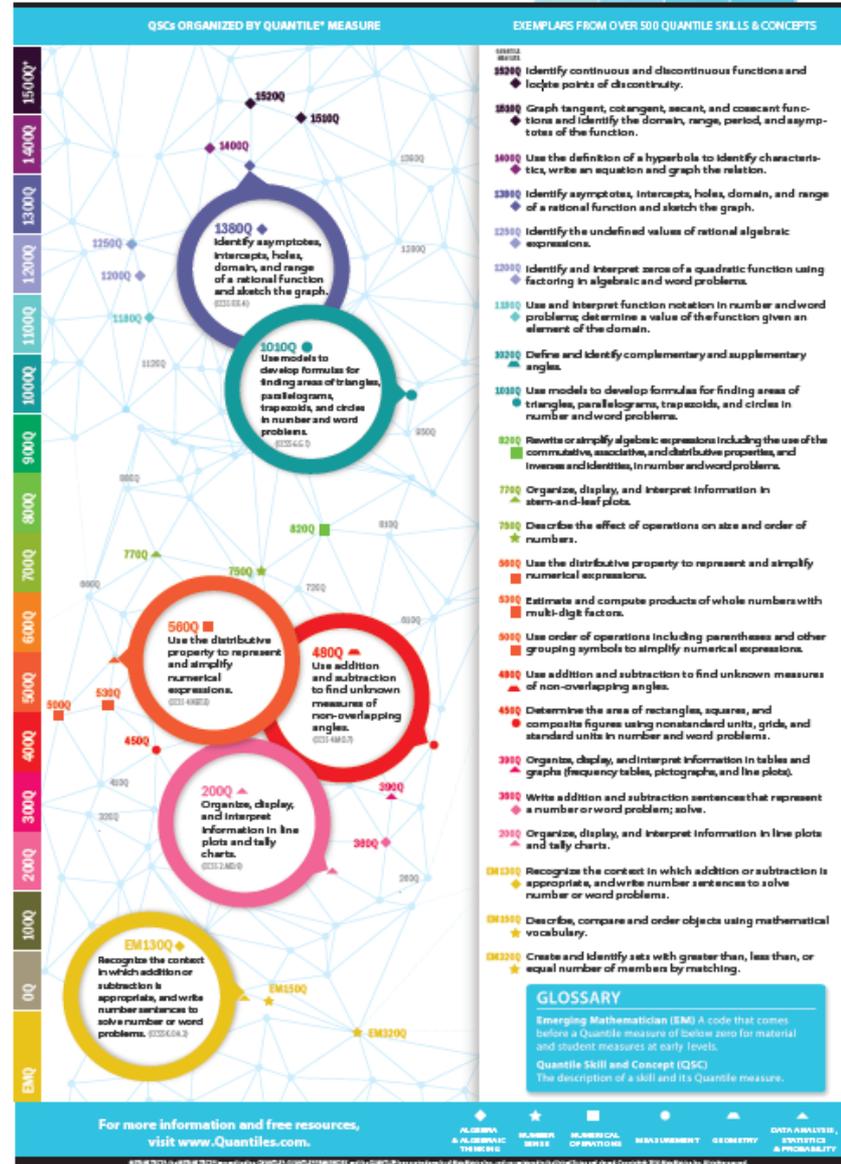


# What is the Quantile Framework for Mathematics?

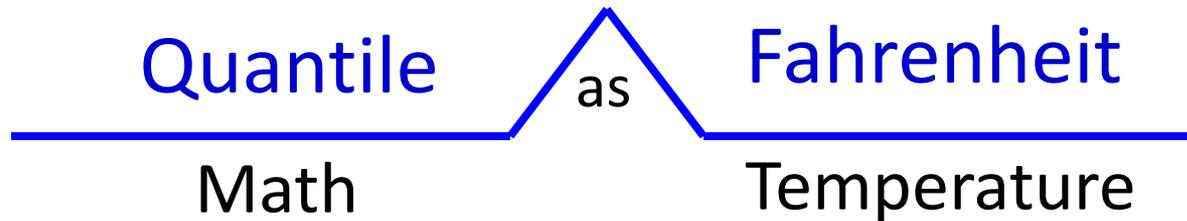


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# The Quantile Framework for Mathematics is...



# Metric for Measurement



*...not an indicator of mastery*  
*...not the curriculum*  
*...not the math program*  
*...not a grade equivalent*

# The Quantile Framework for Mathematics

is...

Compare and order fractions using common numerators or denominators (710Q)

placing the difficulty of a skill,

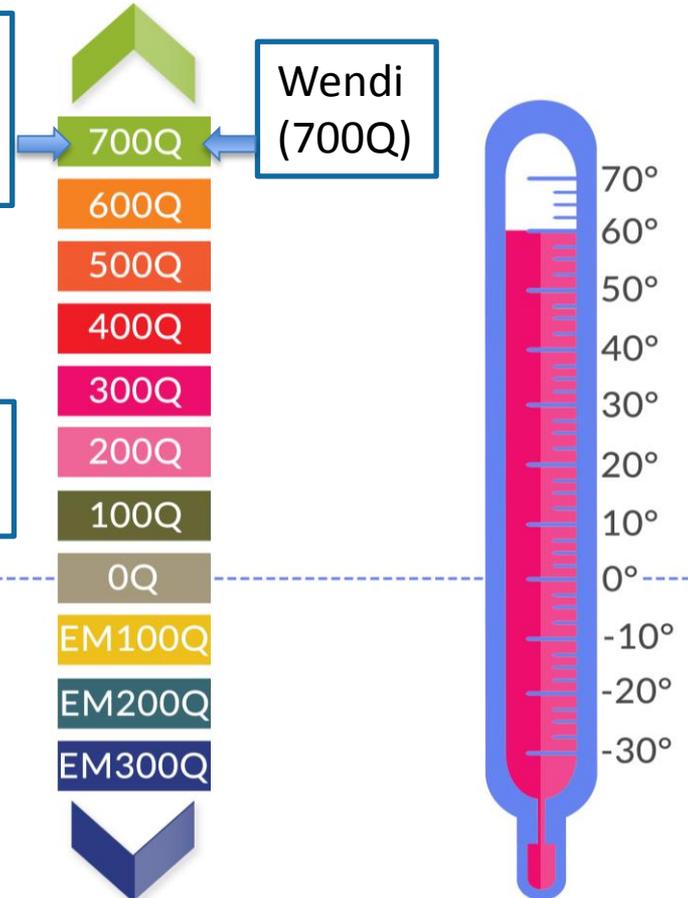
student ability and resources

Resource (710Q)

Other Resources

[www.Quantiles.com](http://www.Quantiles.com)

all on the same scale



Quantile Scale < > Thermometer



# Taxonomy of the Quantile Framework

- The Quantile Framework has over 500 QSCs (Quantile Skills and Concepts) that have been tested across the nation.
- QSCs are delivered as a taxonomy of skills, concepts and processes in specific terms.



# What is a QSC? (Quantile Skill and Concept)

- Within the Quantile Framework, **QSC** is the term **we** use to reference a Skill and Concept.
- A specific mathematical skill or concept, e.g.,

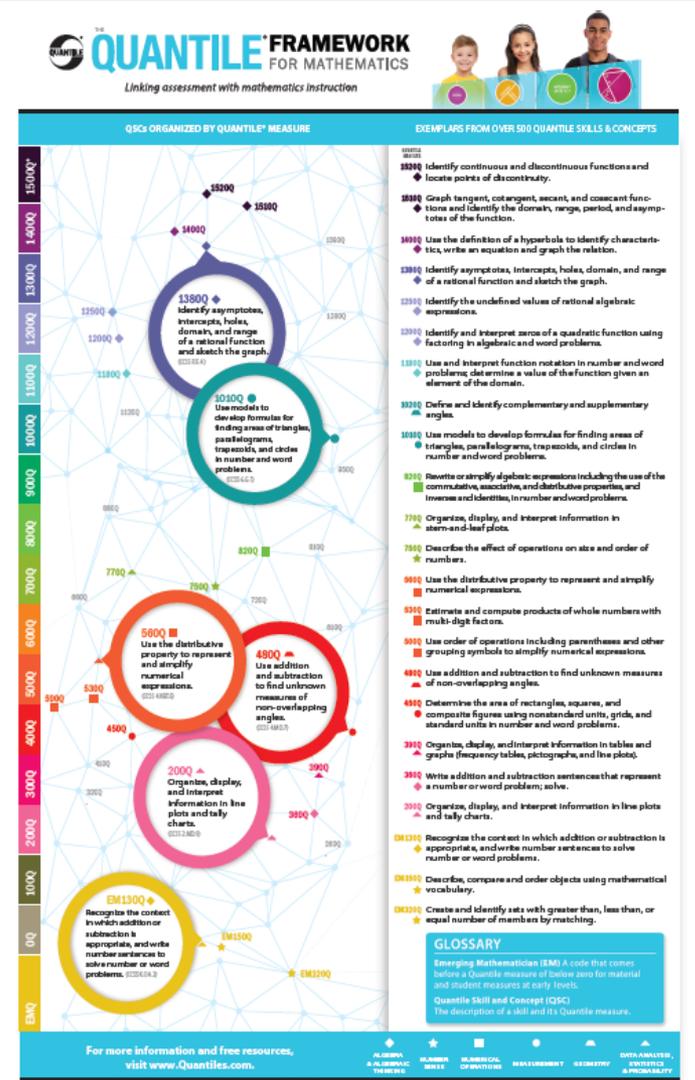
“Use models to investigate the concept of the Pythagorean Theorem” is:

**QSC 271**

*(Quantile Skill and Concept)*

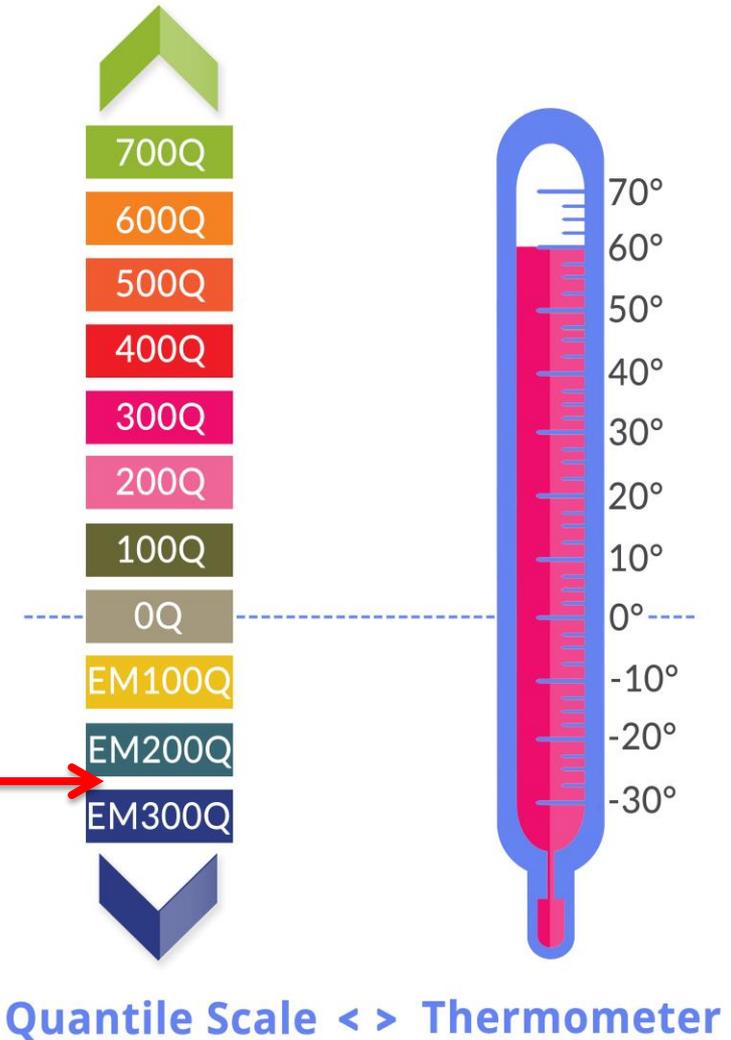
with a

Quantile measure of difficulty:  
**1010Q**



# Measures Reported

- Measures reported from EM400Q to 1600Q
- Measures below 0Q are reported as “EM” or “Emerging Mathematician”
- “Model the concept of addition for sums to 10” EM 260Q.
- The “EM” replaces the negative sign in the measure.



# A Sample of QSCs in the EM space:

The diagram shows a vertical stack of colored boxes representing quantile levels: 400Q (red), 300Q (magenta), 200Q (pink), 100Q (olive green), 0Q (tan), EM100Q (yellow), EM200Q (teal), and EM300Q (dark blue). A dashed line is positioned between 0Q and EM100Q. A blue arrow labeled 'Harder skills' points to the right from the top of the stack, and another blue arrow labeled 'Easier skills' points to the right from the bottom of the stack.

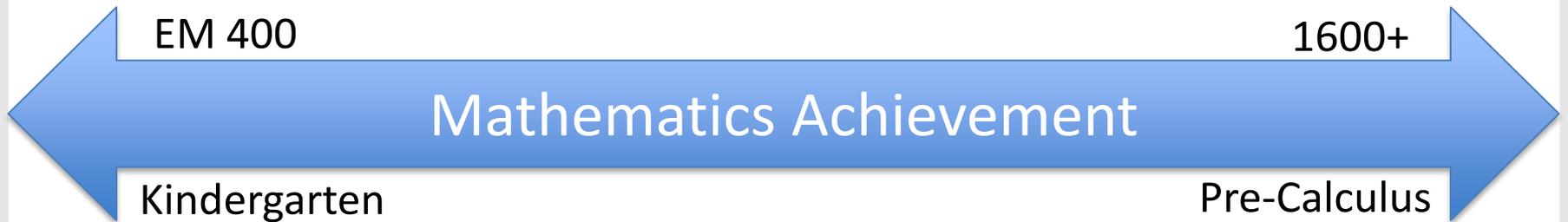
Skills		Resources	
QSC ID	Quantile Measure	Description	Strand
QSC65	EM60Q	Rote count 101 to 1000.	Number Sense
QSC627	EM60Q	Use models to determine properties of basic solid figures (slide, stack, and roll).	Geometry
QSC676	EM60Q	Read and write word names for numbers from 13 to less than 100.	Number Sense
QSC24	EM80Q	Rote count beginning at 1 or at another number by 1s, and rote count by 2s, 5s and 10s to 100 beginning at 2, 5, or 10.	Number Sense
QSC537	EM80Q	Identify and name spheres and cubes.	Geometry
QSC1003	EM80Q	Know and use related addition and subtraction facts.	Numerical Operations
QSC30	EM90Q	Group objects by 2s, 5s, and 10s in order to count.	Number Sense
QSC25	EM100Q	Read and write numerals using one-to-one correspondence to match sets of 11 to 100.	Number Sense
QSC28	EM100Q	Read and write word names from zero to twelve.	Number Sense
QSC536	EM100Q	Identify, draw, and name basic shapes such as triangles, squares, rectangles, hexagons, and circles.	Geometry
QSC584	EM100Q	Measure time using nonstandard units.	Measurement
QSC1005	EM100Q	Tell time to the nearest hour and half-hour using digital and analog clocks.	Measurement
QSC20	EM110Q	Organize, display, and interpret information in concrete or picture graphs.	Data Analysis, Statistics, and Probability
QSC27	EM110Q	Read and write numerals from 30 to 100.	Number Sense
QSC75	EM110Q	Identify missing addends for addition facts.	Algebra and Algebraic Thinking

# Quantiles Measures: Empirically Derived

- Identify items that meet psychometric criteria
- Quantile measures are determined using field test results. Data from the actual performance of examinees is used.
- The results are also reviewed by a group of subject-matter experts (SMEs).
- Analysis and scale development
- Empirical scaling is more replicable than expert judgment alone.



# Quantile Scale: Mapping Math



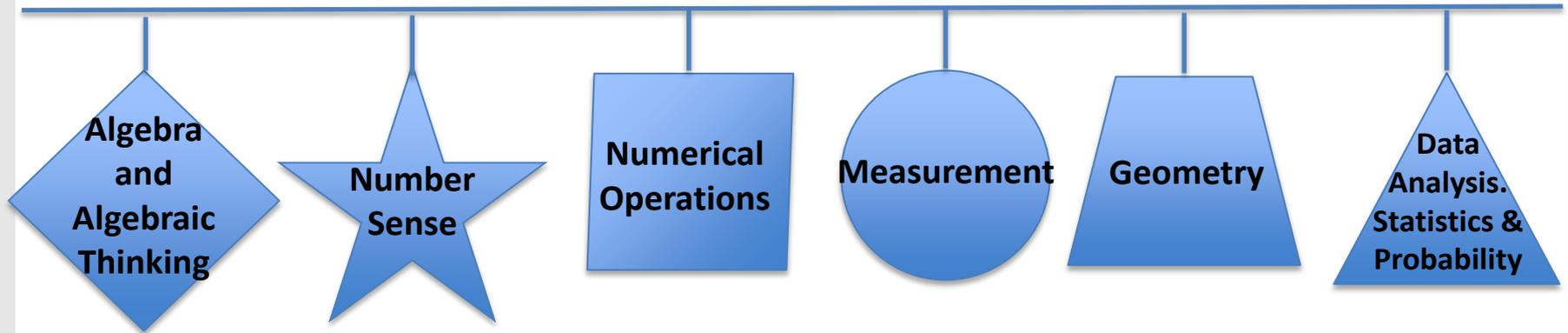
## The Quantile scale is:

1. **Unidimensional** (*i.e., one score describes mathematics achievement across the strands*)
2. **Developmental** (*i.e., higher the measure, the more complex the math skill is or proficient the student is!*)

*Note: The opposite is true in the EM space.*

# Content Strands in Mathematics

## The Quantile Framework for Mathematics



**Strand assignments are included in  
The Quantile Framework for Mathematics**

# Unidimensional Construct

*One score is representative of overall mathematical ability*

## Quantile Scale

EM400

Kindergarten

1600+

Pre-Calculus

810Q

Relationships among radius, diameter, circumference

930Q

Relationships with diameter, circumference, pi

870Q

Discounts, Taxes, Commissions (%)

840Q

Compare and order rational numbers

810Q

Use tables to determine ratio/rate of change

870Q

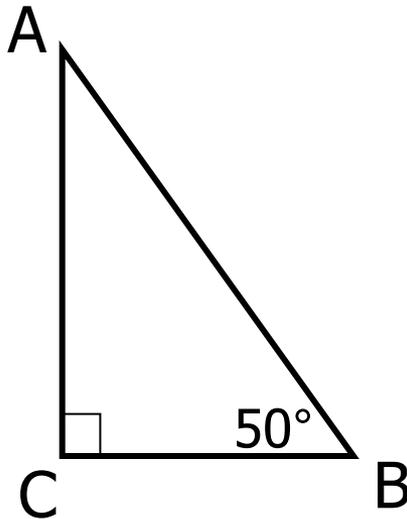
Circle graphs with ratios & percents



# one problem=knowledge across 4 strands

## Measurement Item

What is the measure of  $\angle A$ ?



<u>Step</u>	<u>Strand</u>
Recognize it's a triangle & right triangle	Geometry
Sum of the interior angles sum to $180^\circ$ .	Geometry
A right angle is $90^\circ$ .	Measurement
Set up "equation" & solve	Algebra and Algebraic Thinking
Calculations	Numerical Operations

# The Quantile Scale is developmental

within one strand



Measurement



240Q  
Length

400Q  
Perimeter

840Q  
Volume of  
rectangular  
solids

930Q  
Circumference

1040Q  
Area of triangles,  
parallelograms,  
circles, &  
trapezoids



# The Quantile Scale is developmental across strands



## Numerical Operations

240Q:  
Use Skip counting to model  
multiplication



## Algebra & Algebraic Thinking

360Q:  
Describe & demonstrate  
patterns in skip counting



## Data Analysis, Statistics & Probability

470Q:  
Display, read, or interpret  
data on a line graph



# Activity: Let's think about... The Value of Skill Difficulty

- What does each skill mean?
- In which grade is the skill introduced?
- Which content strand does each skill come from?
- Solve problems involving elapsed time.
- Use a coordinate grid to solve problems. Describe the path between given points on the plane.
- Divide using single-digit divisors, with and without remainders.



# Activity cont'd: The Value of Skill Difficulty

Which skill is most difficult?

- Solve problems involving elapsed time.
- Use a coordinate grid to solve problems. Describe the path between given points on the plane.
- Divide using single-digit divisors, with and without remainders.



# Activity cont'd: The Value of Skill Difficulty

Which skill is most difficult?

- Solve problems involving elapsed time. **450Q**
- Use a coordinate grid to solve problems. Describe the path between given points on the plane. **480Q**
- Divide using single-digit divisors, with and without remainders. **450Q**

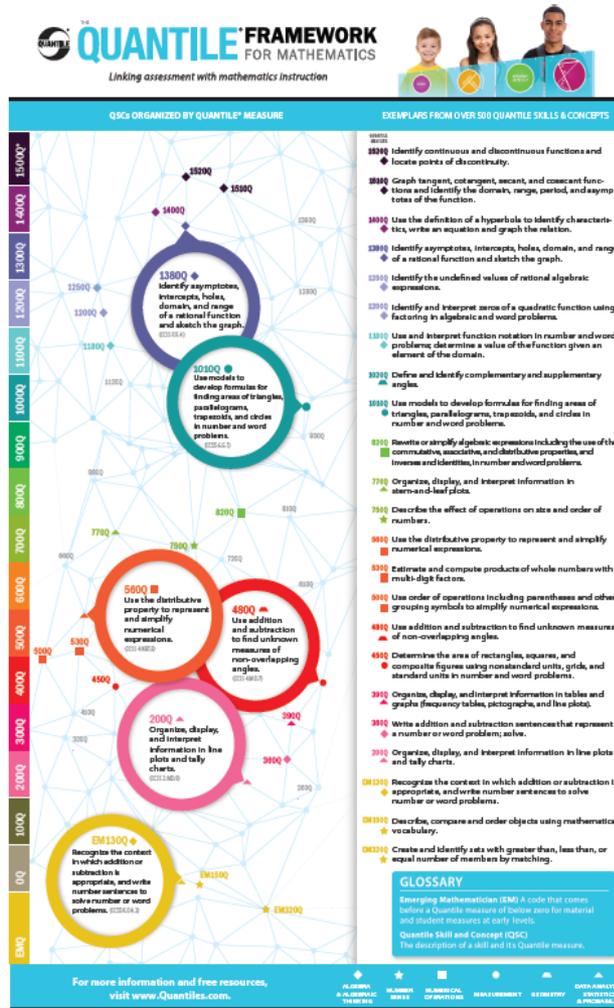




# Why do I need to know about the Quantile Framework for Mathematics?



# The Puzzle Pieces...



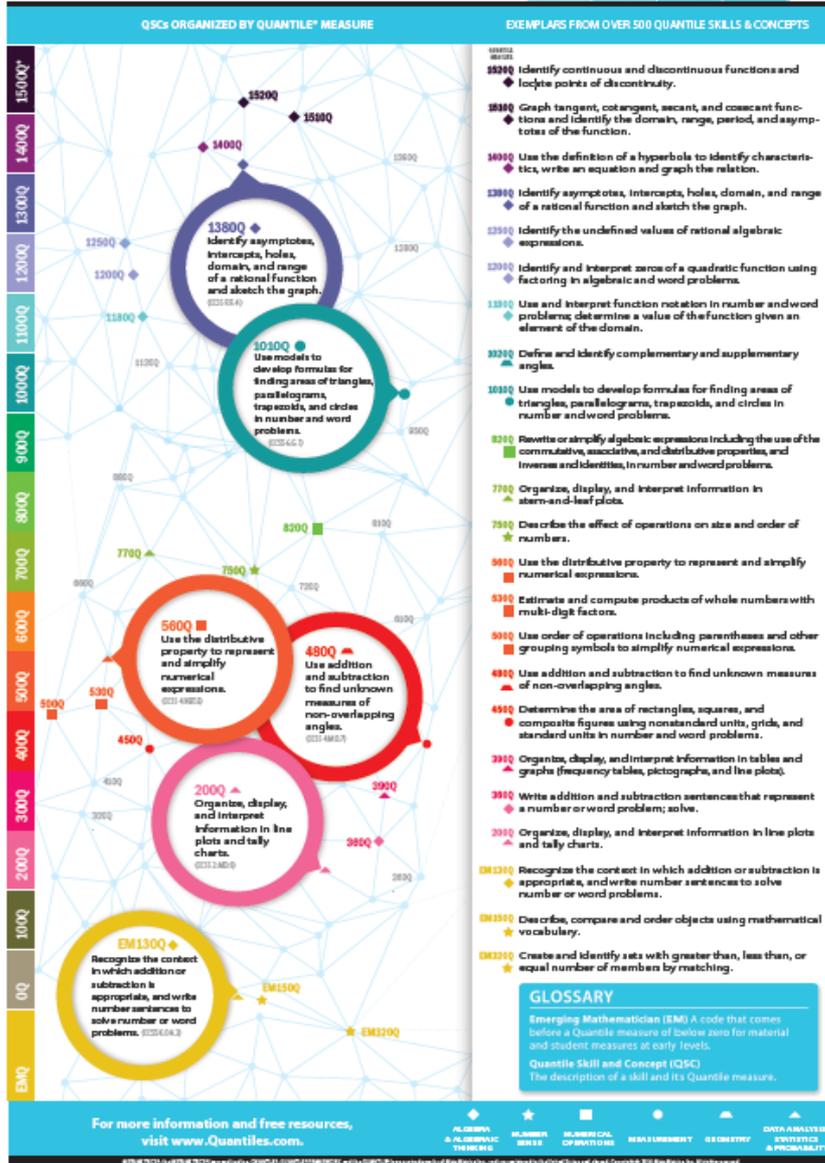

(a **Student Quantile measure of readiness** to determine math ability)

## The Quantile Framework for Mathematics Linking assessment with mathematics instruction

### EXPLORE

(The Math Skill Database where QSCs have been aligned to **Skills, Concepts, Curriculums and CCSS**)





# Picturing Mathematics Using the Quantile Map

## Activity: Student Ability vs Skill Difficulty

- Place the Quantile Map flat on your table.
- Each person needs one pink and one blue strip of paper from your table.
- We will work together to discuss the various gaps indicated by examining the Quantile measure of a skill compared to various student Quantile measures.





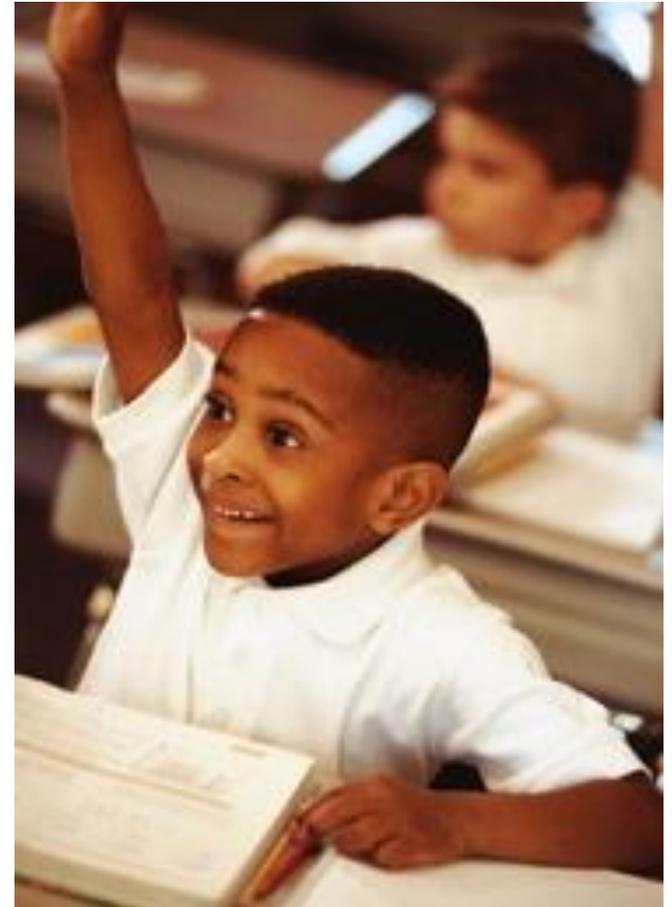
# Ready for success?

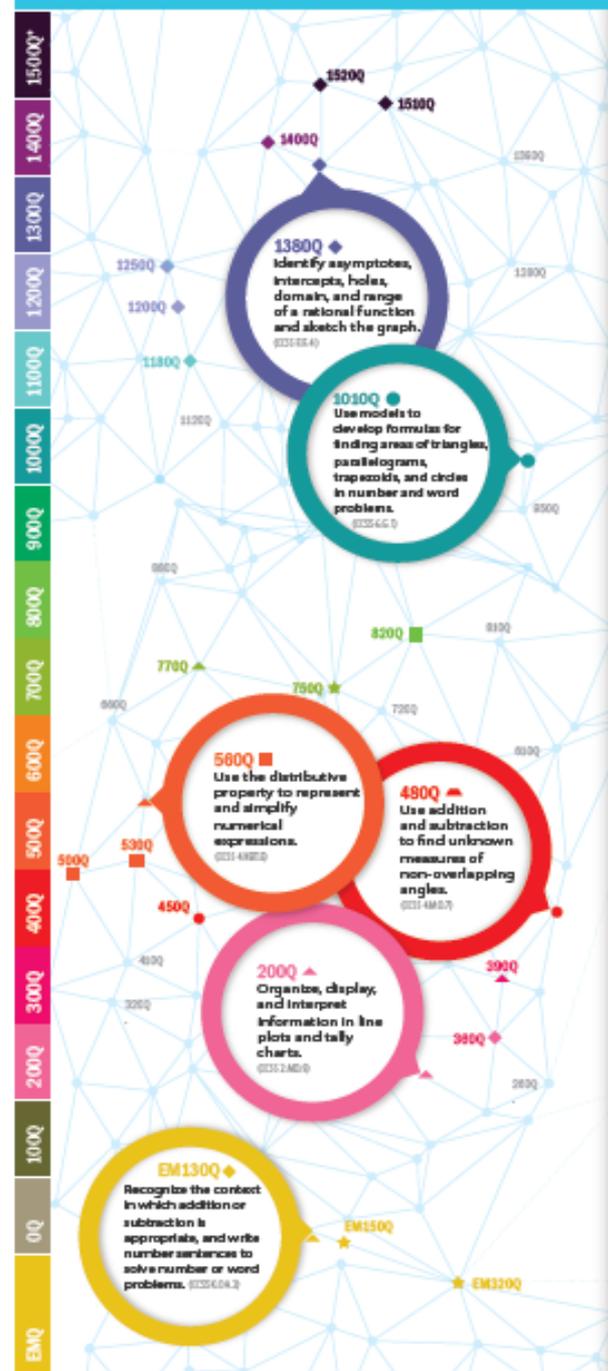
***Matching the “at risk” student to the skill using the Quantile Framework, helps insure they are ready for instruction!***

***After the introductory lesson there is...***

- ...guided practice,
- ...during/after school tutoring,
- ...homework practice,
- ...review in the next day or so,

***serves to increase a student’s success rate!***





- EM150Q** Identify continuous and discontinuous functions and locate points of discontinuity.
- EM10Q** Graph tangent, cotangent, secant, and cosecant functions and identify the domain, range, period, and asymptotes of the function.
- EM10Q** Use the definition of a hyperbola to identify characteristics, write an equation and graph the relation.
- EM10Q** Identify asymptotes, intercepts, holes, domain, and range of a rational function and sketch the graph.
- EM10Q** Identify the undefined values of rational algebraic expressions.
- EM10Q** Identify and interpret zeros of a quadratic function using factoring in algebraic and word problems.
- EM10Q** Use and interpret function notation in number and word problems; determine a value of the function given an element of the domain.
- EM10Q** Define and identify complementary and supplementary angles.
- EM10Q** Use models to develop formulas for finding areas of number and word problems.
- EM10Q** Rewrite or simplify algebraic expressions including the use of the commutative, associative, and distributive properties, and inverse and identities, in number and word problems.
- EM10Q** Organize, display, and interpret information in stem-and-leaf plots.
- EM10Q** Describe the effect of operations on size and order of numbers.
- EM10Q** Use the distributive property to represent and simplify numerical expressions.
- EM10Q** Estimate and compute products of whole numbers with multi-digit factors.
- EM10Q** Use order of operations including parentheses and other grouping symbols to simplify numerical expressions.
- EM10Q** Use addition and subtraction to find unknown measures of non-overlapping angles.
- EM10Q** Determine the area of rectangles, squares, and composite figures using nonstandard units, grids, and standard units in number and word problems.
- EM10Q** Organize, display, and interpret information in tables and graphs (frequency tables, pictographs, and line plots).
- EM10Q** Write addition and subtraction sentences that represent a number or word problem; solve.
- EM10Q** Organize, display, and interpret information in line plots and tally charts.
- EM130Q** Recognize the context in which addition or subtraction is appropriate, and write number sentences to solve number or word problems.
- EM150Q** Describe, compare and order objects using mathematical vocabulary.
- EM120Q** Create and identify sets with greater than, less than, or equal number of members by matching.

**GLOSSARY**

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

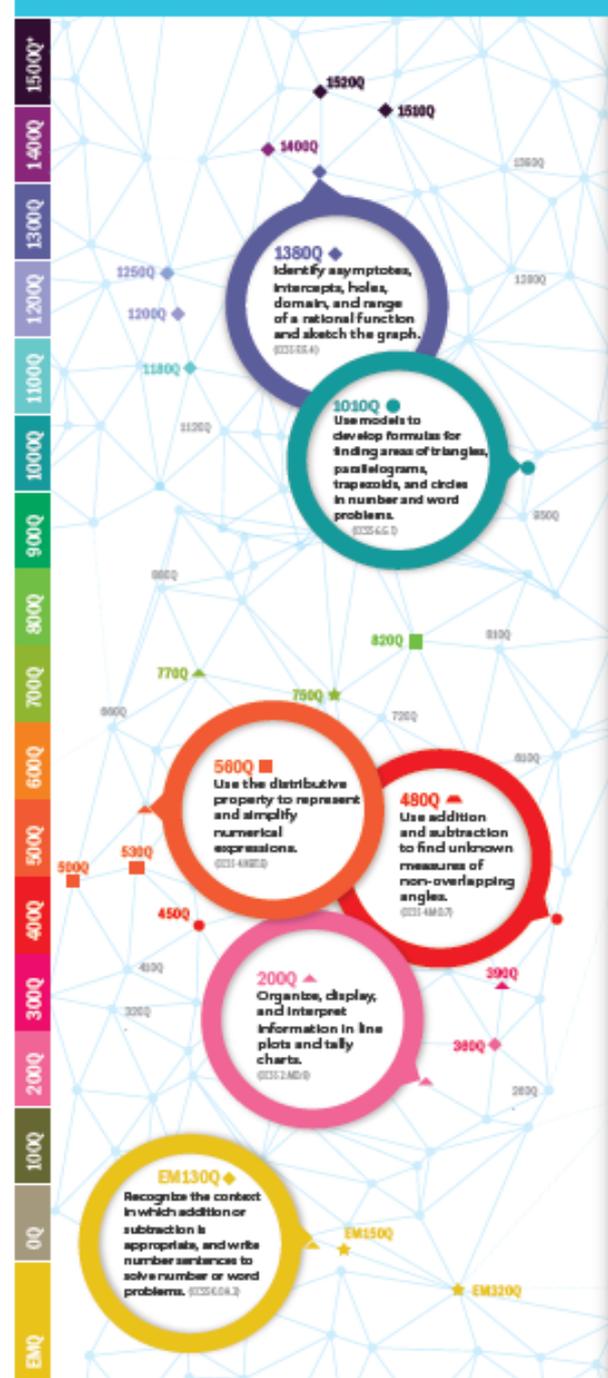
**Quantile Skill and Concept (QSC)** The description of a skill and its Quantile measure.

Focus Skill  
Difficulty 970Q

Marcus 950Q

Marcus is ready for this skill!

Focus Skill:  
Organize and compare one set of information in histograms and bar graphs. (970Q)



- EM1300Q** ♦ Recognize the context in which addition or subtraction is appropriate, and write number sentences to solve number or word problems. (CC.6.EA.2)
- 200Q** ▲ Organize, display, and interpret information in line plots and tally charts. (CC.1.MD.9)
- 450Q** ● Use addition and subtraction to find unknown measures of non-overlapping angles. (CC.1.MD.7)
- 580Q** ■ Use the distributive property to represent and simplify numerical expressions. (CC.4.NE.2)
- 480Q** ▲ Use addition and subtraction to find unknown measures of non-overlapping angles. (CC.1.MD.7)
- 1010Q** ● Use models to develop formulas for finding areas of triangles, parallelograms, trapezoids, and circles in number and word problems. (CC.5.G.1)
- 1380Q** ♦ Identify asymptotes, intercepts, holes, domain, and range of a rational function and sketch the graph. (CC.12.EA.4)
- 1050Q** ● Use and interpret function notation in number and word problems; determine a value of the function given an element of the domain. (CC.12.EA.4)
- 3200Q** ▲ Define and identify complementary and supplementary angles. (CC.4.G.1)
- 1010Q** ● Use models to develop formulas for finding areas of triangles, parallelograms, trapezoids, and circles in number and word problems. (CC.5.G.1)
- 820Q** ■ Rewrite or simplify algebraic expressions including the use of the commutative, associative, and distributive properties, and inverse and identities, in number and word problems. (CC.7.EA.1)
- 770Q** ▲ Organize, display, and interpret information in stem-and-leaf plots. (CC.4.MD.1)
- 750Q** ★ Describe the effect of operations on size and order of numbers. (CC.4.OA.1)
- 580Q** ■ Use the distributive property to represent and simplify numerical expressions. (CC.4.NE.2)
- 530Q** ■ Estimate and compute products of whole numbers with multi-digit factors. (CC.4.NE.4)
- 500Q** ■ Use order of operations including parentheses and other grouping symbols to simplify numerical expressions. (CC.4.OA.1)
- 480Q** ▲ Use addition and subtraction to find unknown measures of non-overlapping angles. (CC.1.MD.7)
- 450Q** ● Determine the area of rectangles, squares, and composite figures using nonstandard units, grids, and standard units in number and word problems. (CC.1.MD.3)
- 390Q** ▲ Organize, display, and interpret information in tables and graphs (frequency tables, pictographs, and line plots). (CC.1.MD.4)
- 380Q** ♦ Write addition and subtraction sentences that represent a number or word problem; solve. (CC.1.OA.8)
- 200Q** ▲ Organize, display, and interpret information in line plots and tally charts. (CC.1.MD.9)
- EM130Q** ♦ Recognize the context in which addition or subtraction is appropriate, and write number sentences to solve number or word problems. (CC.1.OA.2)
- EM150Q** ★ Describe, compare and order objects using mathematical vocabulary. (CC.1.OA.5)
- EM320Q** ★ Create and identify sets with greater than, less than, or equal number of members by matching. (CC.1.OA.9)

**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.

# Focus Skill: Estimate and compute sums and differences with decimal numbers. (580Q)

Juanita 1050Q

Juanita only needs a review of this skill and then move on to enrichment activities!

Focus Skill  
Difficulty 550Q

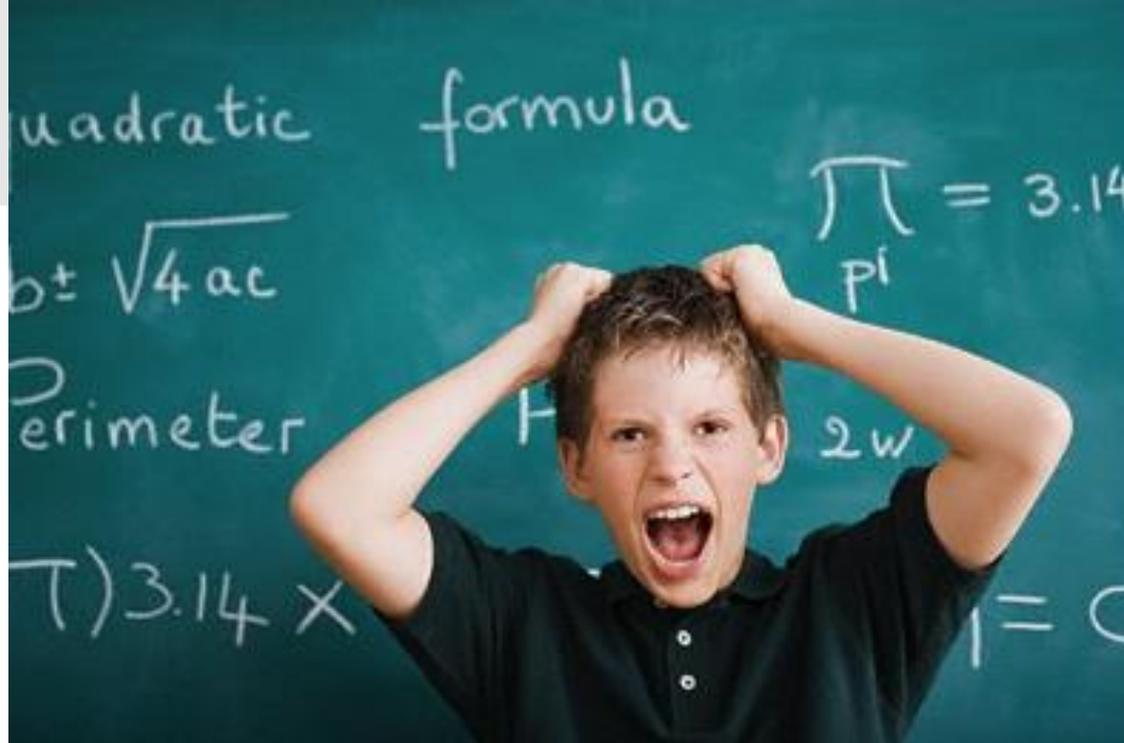
# Quantile Learning Frontier

What is the student's

**Quantile  
Learning  
Frontier?**







**What happens when students are  
not ready  
or  
too advanced  
for the focus skill to be taught?**

# An Essential Feature of the Quantile Framework: the Knowledge Cluster!

## ***A Knowledge Cluster has 4 parts:***

1. Focus skill
2. Prerequisite skills to ensure prior knowledge
3. Supporting skills to add depth across content strands
4. Impending skills to point to what students will encounter next



# Quantile Knowledge Clusters

<p><b>Impending Skill:</b> Use proportional reasoning to solve problems related to similar and congruent polygons. (950Q)</p>	<p><b>Impending Skills:</b> Skills that are dependent on understanding the <b>Target Skill</b>.</p>	<p><b>Impending Skill:</b> Verify how properties and relationships of geometric figures are maintained or how they change through transformations. (1070Q)</p>
---	---	--

<p><b>Supporting Skill:</b> Write a proportion to model a word problem; solve proportions. (720Q)</p>	<p><b>Supporting Skill:</b> Determine and use scale factors to reduce and enlarge drawings on grids to produce dilations. (990Q)</p>	<p><b>Supporting Skill:</b> Analyze graphs, identify situation, or solve problems with varying rates of change. (780Q)</p>
---	--	--

<p><b>Focus Skill:</b> Use proportions to express relationships between corresponding parts of similar figures. (920Q)</p>
--

<p><b>Prerequisite Skill:</b> Identify corresponding parts of similar and congruent figures. (770Q)</p>	<p><b>Prerequisite Skills:</b> Skills that should be learned before beginning instruction on the <b>Target Skill</b>.</p>	<p><b>Prerequisite Skill:</b> Given a proportional relationship represented by tables, graphs, models, or algebraic or verbal descriptions, identify the unit rate. (900Q)</p>
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# The Quantile Framework for Mathematics

is...

Compare and order fractions using common numerators or denominators (710Q)

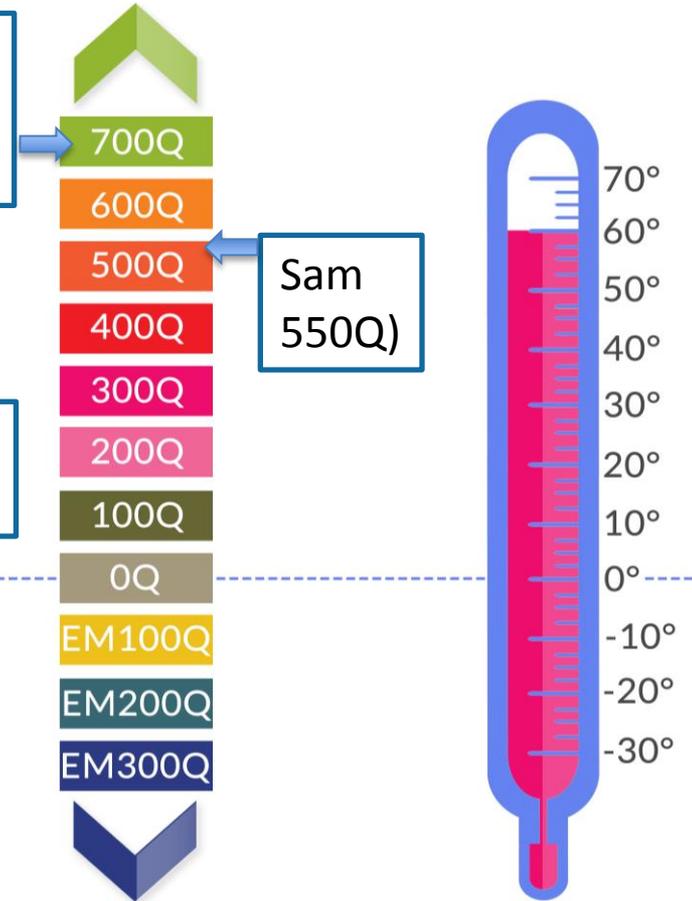
placing the difficulty of a skill,

student ability and resources

Resource (710Q)

Other Resources [www.Quantiles.com](http://www.Quantiles.com)

all on the same scale



Quantile Scale < > Thermometer



# Knowledge Clusters—applications

- To inform instruction that addresses the needs and abilities of each student
- To provide insight into content background necessary for success
- To add depth and breath to concepts in mathematics
- To adjust IEPs according to Quantile measures
- To provide a resource for meeting the needs of all RTI tiers

**One size  
does not  
fit all...**



**...when it  
comes to  
Math instruction!**

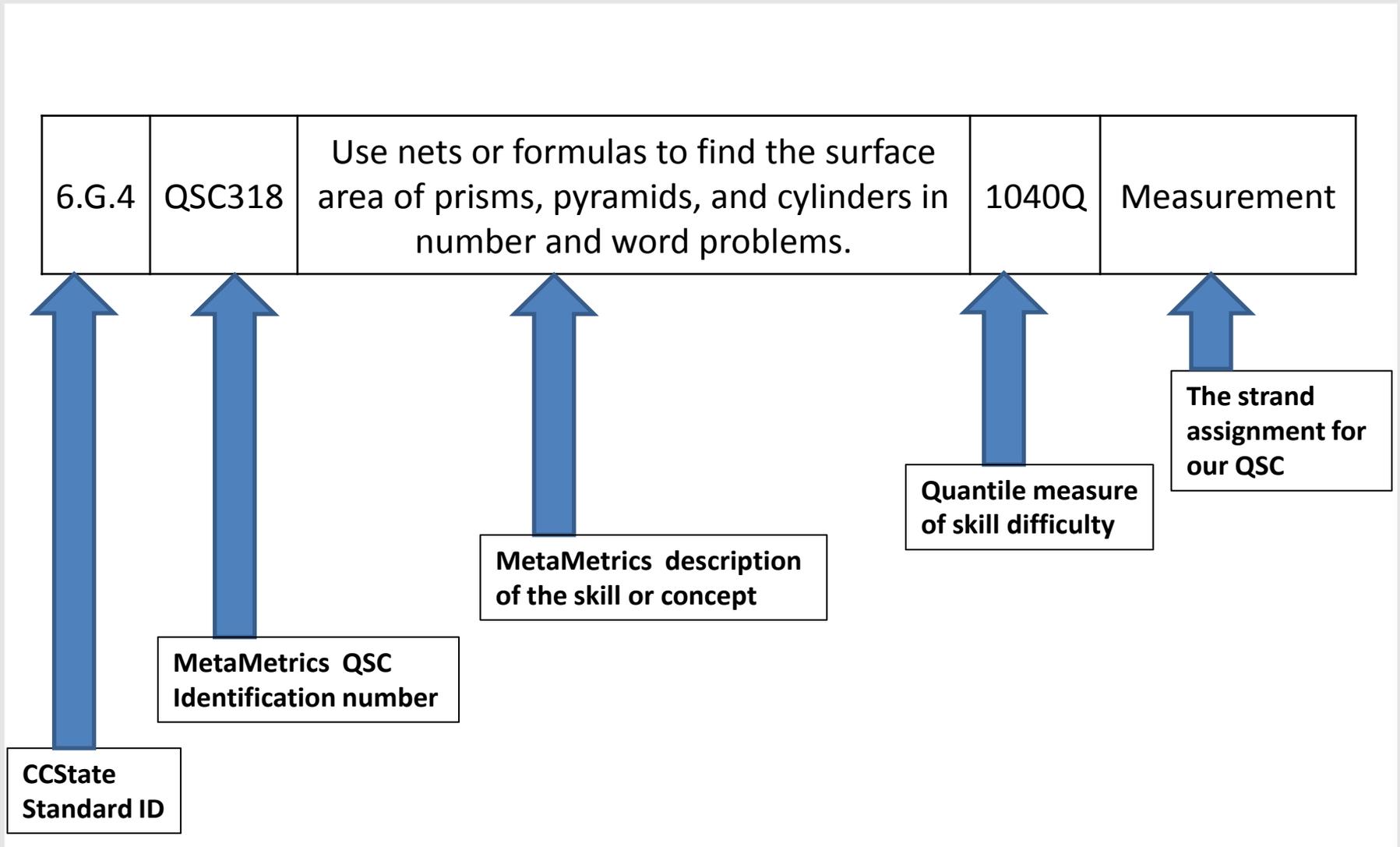


# Benefits of the Quantile Framework

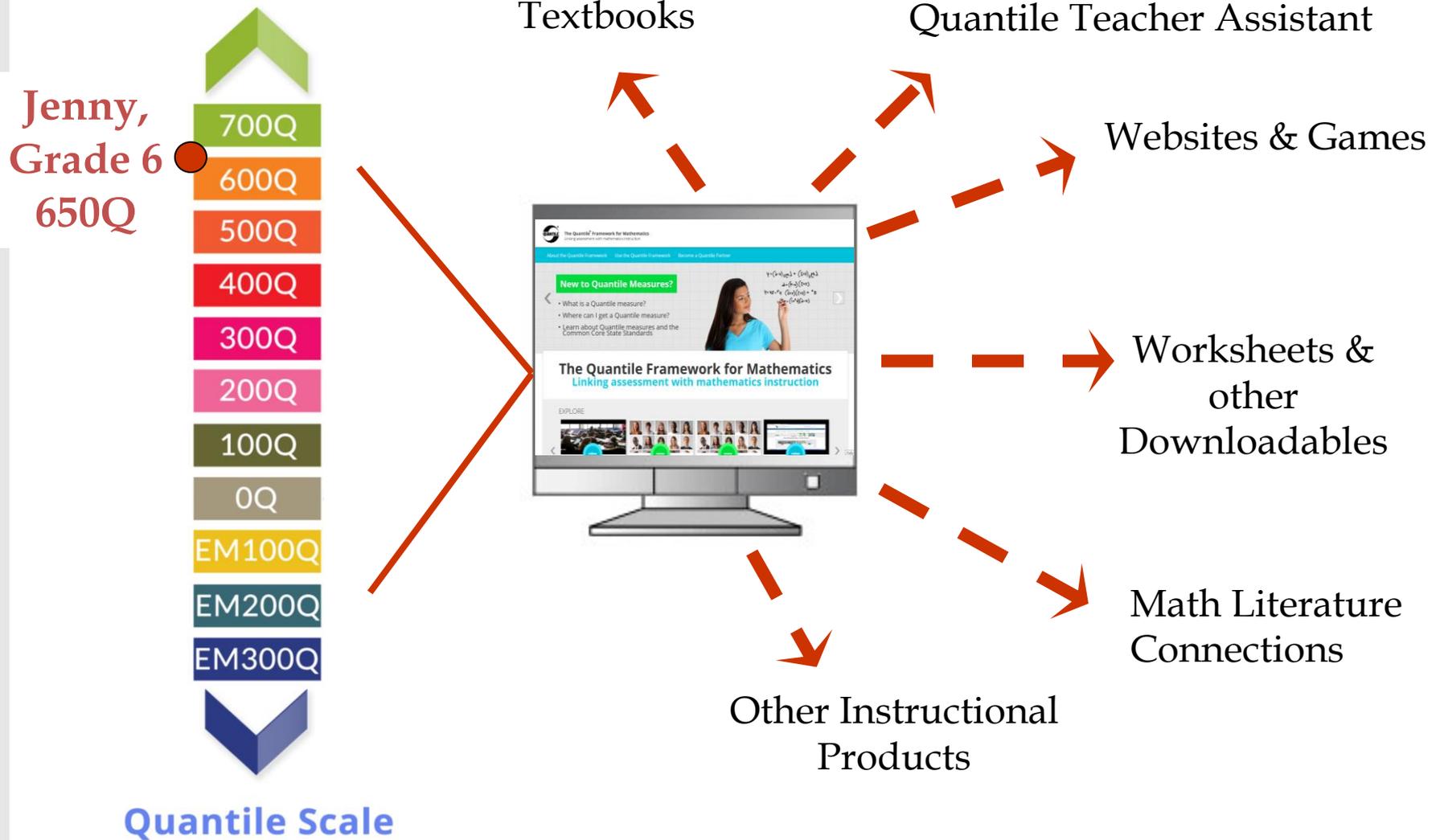
- **LINK:**  
student ability to skill difficulty (using a common measure)
- **FORECAST:**  
student success rate (after introductory lessons)
- **DIFFERENTIATE:**  
math instruction for struggling students
- **TRACK:**  
growth over time



# Aligning your curriculum



# Applications of the Quantile Measure



# A Snapshot of the Quantile Website

## **Math Skill Database**

### QSC Search

- Curriculum Alignment
- Knowledge Clusters
- Textbook lesson alignment
- Instructional Resources

## **Math At Home**

## **Find your Textbook**

## **Quantile Teacher Assistant**



# [www.Quantiles.com](http://www.Quantiles.com)



The Quantile® Framework for Mathematics  
Linking assessment with mathematics instruction



About the Quantile Framework

Use the Quantile Framework

## Summer Math Challenge

- Prevent Summer Math loss
- For rising 3rd - 6th grade students
- Daily emails with fun activities and resources
- Register now for FREE



## The Quantile Framework for Mathematics: Linking assessment with mathematics instruction.

EXPLORE



News



Amazon.co.jp Provides Lexile Measures for English Books



Blog

Egg Cartons and Collaboration



Video

MetaMetrics Summer Learning Loss Webinar



Events



Learn more about upcoming MetaMetrics events!



# Benefits of [www.Quantiles.com](http://www.Quantiles.com) for Educators:

- Resources to assist with differentiation
- Reduce loss of math knowledge over the summer
- Resources have been calibrated to the Quantile Framework
- Support at-risk math students as well as the gifted student
- Teachers can recommend practice tutorials prior to classroom assessments
- Resources to support RTI recommendations or Individual Educational Plans
- Classroom teacher can maintain contact with a homebound student
- Peer teachers can work together in a streamlined fashion
- Emails to upcoming students
- All resources are free and web based



# Benefits of [www.Quantiles.com](http://www.Quantiles.com) for Families:

- Students can take ownership of their learning
- Practice math skills w/ caregivers during the summer months
- Strengthen math skills of children during the school year
- Additional help at home when an assignment needs clarification.
- Students can review the skills from their textbook prior to a test
- Support RTI recommendations or Individual Educational Plans for their child
- Tutorial videos to help reteach or review math concepts taught in the classroom
- Previous grade level math can be reviewed for upcoming school year
- All resources are free, web based and calibrated to the classroom math textbook



# When to use the Quantile Framework

- Curriculum insight
- Parental suggestions
- Tutorial guidance
- Co-teaching opportunities



# Pulling it all together



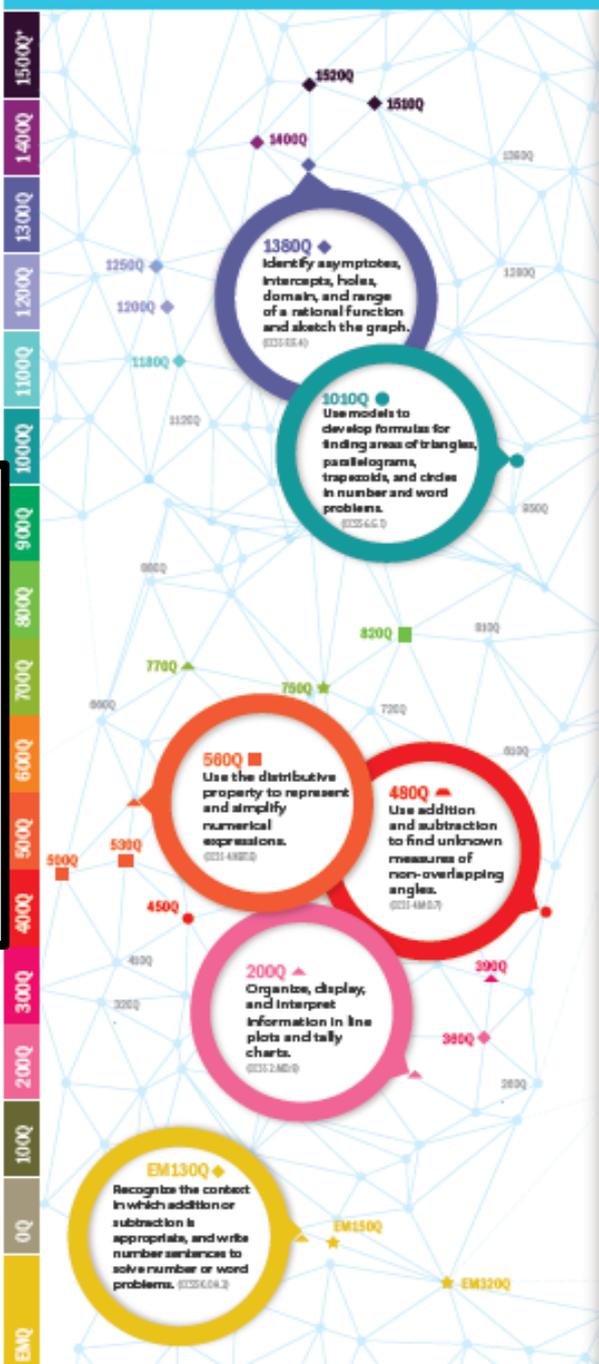
**Student Measure**  
**Skill Difficulty**  
**The Curriculum**  
**Assessments**  
**Textbooks**



# Lesson Planning using Quantiles

Let's take a look at how the  
Quantile website  
can assist a teacher in meeting the  
needs of a single student,  
Laura  
or that of a small group at similar level





**Focus Skill:**  
**Describe data using the mean. (850Q)**

**Skill Difficulty**  
**850Q**

Too far for Laura  
 to reach  
 without  
 Differentiation!

**Laura 450Q**

- 5380Q Identify asymptotes, intercepts, holes, domain, and range of a rational function and sketch the graph.
- 5290Q Identify the undefined values of rational algebraic expressions.
- 5200Q Identify and interpret zeros of a quadratic function using factoring in algebraic and word problems.
- 1380Q Use and interpret function notation in number and word problems; determine a value of the function given an element of the domain.
- 8320Q Define and identify complementary and supplementary angles.
- 1010Q Use models to develop formulas for finding areas of triangles, parallelograms, trapezoids, and circles in number and word problems.
- 820Q Rewrite or simplify algebraic expressions including the use of the commutative, associative, and distributive properties, and inverse and identities, in number and word problems.
- 770Q Organize, display, and interpret information in stem-and-leaf plots.
- 750Q Describe the effect of operations on size and order of numbers.
- 580Q Use the distributive property to represent and simplify numerical expressions.
- 530Q Estimate and compute products of whole numbers with multi-digit factors.
- 500Q Use order of operations including parentheses and other grouping symbols to simplify numerical expressions.
- 480Q Use addition and subtraction to find unknown measures of non-overlapping angles.
- 450Q Determine the area of rectangles, squares, and composite figures using nonstandard units, grids, and standard units in number and word problems.

**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.

Let's look at  
**Student Readiness**  
 and  
**Task Difficulty**



# Math Skills Database

**Focus Skill to teach measures  
850Q.  
Go to the Knowledge Cluster of  
the Focus Skill.**

Standard Search

Keyword Search

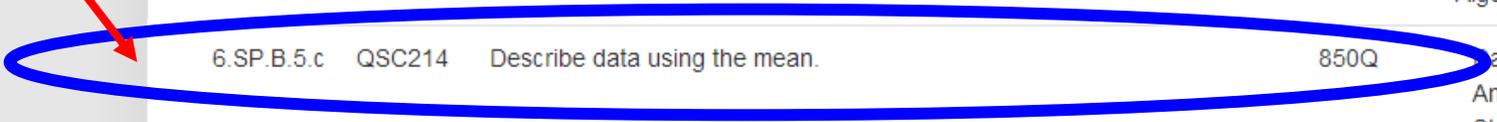
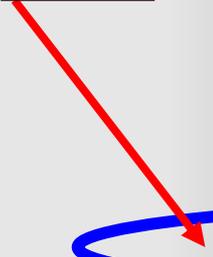
Search the Math Skills Database for Quantile Skills and Concepts (QSCs) that are appropriately matched to students by Quantile measure and math content.

Search Criteria

83 results found

State Goal	QSC ID	QSC Description	Quantile Measure	Strand
6.EE.A.1	QSC220	Use exponential notation and repeated multiplication to describe and simplify exponential expressions.	600Q	Numerical Operations
6.EE.A.2.a	QSC218	Translate between models or verbal phrases and algebraic expressions.	750Q	Algebra and Algebraic Thinking
6.EE.A.2.b	QSC1031	Identify parts of a numerical or algebraic expression.	800Q	Algebra and Algebraic Thinking
6.EE.A.2.c	QSC236	Simplify numerical expressions that may contain exponents.	770Q	Numerical Operations
6.EE.A.2.c	QSC274	Evaluate algebraic expressions in number and word problems.	840Q	Algebra and Algebraic
6.SP.B.5.c	QSC214	Describe data using the mean.	850Q	Data Analysis, Statistics, and Probability
6.EE.B.5	QSC1032	Identify from a set of numbers which values satisfy a given equation or inequality.	860Q	Algebra and Algebraic

**Laura's  
Quantile  
Measure:  
450Q**



# Knowledge Cluster:

## Quantile Skill and Concept Details

Laura's  
Quantile  
Measure:  
450Q

A Quantile Skill and Concept (QSC) is a skill or concept that has a Quantile measure. [Learn More.](#)

### QSC214: Describe data using the mean.

**QSC ID:** QSC214  
**Quantile Measure:** 850Q  
**Strand:** Data Analysis, Statistics, and Probability  
**Description:** Describe data using the mean.

These skills are still too high for  
Laura! Go to even lower  
prerequisite skills....

[Hide 5 related QSCs](#)

### Knowledge Cluster

#### Prerequisite Skills

**QSC171:** Estimate and solve division problems with multi-digit divisors; explain solution. (690Q)

**QSC201:** Estimate and compute sums and differences with decimals. (580Q)

#### Supporting Skills

No supporting skills available.

#### Impending Skills

**QSC561:** Identify outliers and determine their effect on the mean, median, and range of a set of data. (1050Q)

**QSC281:** Describe data using or selecting the appropriate measure of central tendency; choose a measure of central tendency based on the shape of the data distribution. (950Q)

**QSC1000:** Determine the mean absolute deviation (MAD) for one or more sets of data. Describe the meaning of MAD for given data sets. (920Q)

# Quantile Skill and Concept Details

Using the Knowledge Cluster helps identify the point where Laura is ready to begin her instruction!

A Quantile Skill and Concept (QSC) is a skill or concept that has a Quantile measure. [Learn More.](#)

## QSC171: Estimate and solve division problems with multi-digit divisors; explain solution.

**QSC ID:** QSC171  
**Quantile Measure:** 690Q  
**Strand:** Numerical Operations  
**Description:** Estimate and solve division problems with multi-digit divisors; explain solution.

Laura's  
Quantile  
Measure:  
450Q

### Knowledge Cluster

[Hide 7 related QSCs](#)

#### Prerequisite Skills

- [QSC166:](#) Divide using single-digit divisors with and without remainders. (450Q)
- [QSC170:](#) Estimate and compute products of whole numbers with multi-digit factors. (530Q)
- [QSC1009:](#) Apply appropriate types of estimation for number and word problems that include estimating products and quotients. (470Q)

#### Supporting Skills

No supporting skills available.

#### Impending Skills

- [QSC608:](#) Multiply or divide two decimals or a decimal and a whole number in number and word problems. (700Q)
- [QSC214:](#) Describe data using the mean. (850Q)
- [QSC266:](#) Use remainders in problem-solving situations and interpret the remainder with respect to the original problem. (710Q)

# Steps to take in order to meet Laura's needs:

Target Skill to teach: *Describe data using the mean (850 Q)*

Prerequisite Skill: *Estimate and solve division problems with 2 and 3 digit divisors (690Q)*

Prerequisite Skill: *Divide using single-digit divisors with and without remainders. (450Q)*



Laura's Quantile measure indicated that her instruction needs to begin here before attempting the more advanced skill!

**Let's take a look at how the Quantile website can assist a teacher in meeting the needs of a roster of students in the classroom.**



Mrs. Ashford's Seventh Grade Class		
Grade	Name	Quantile Measure
7	Caroline	450
7	Aliyah	470
7	Tony	540
7	Diana	610
7	Clifford	610
7	Carlos	650
7	Portia	690
7	Tameka	690
7	Crystal	690
7	Juan	730
7	Victoria	730
7	Jacob	740
7	Cody	740
7	Infiniti	760
7	Destiny	770
7	Brandon	770
7	Holly	770
7	Henry	790
7	Ellen	800
7	Lee	890
7	Ashleigh	1130
7	Lauryn	1250
7	Corey	1290

## Activity:

Consider QSC 263  
(720Q)

*Write a proportion to model a word problem; solve proportions.*

*(Wyoming Standard 7.RP.3: Use proportional relationships to solve multistep ratio and percent problems.)*

**With the QSC  
measuring 720Q  
which students are  
ready for this skill?**



# QSC263: Write a proportion to model a word problem; solve proportions.

QSC ID: QSC263  
Quantile Measure: 720Q

**QSC for "on target" students!**

Strand: Numerical Operations  
Description: Write a proportion to model a word problem; solve proportions.

## Knowledge Cluster

**The Knowledge Cluster offers insight to prerequisite skills for those not on target.**

### Prerequisite Skills

- QSC208: Solve one-step linear equations and inequalities and graph solutions of the inequalities on a number line in number and word problems. (650Q)
- QSC654: Write a ratio or rate to compare two quantities. (210Q)

### Supporting Skills

- QSC233: Calculate unit rates in number and word problems, including comparison of unit rates. (830Q)
- QSC258: Convert measures of length, area, capacity, weight, and time expressed in a given unit to other units in the same measurement system in number and word problems. (820Q)
- QSC287: Determine and use scale factors to reduce and enlarge drawings on grids to produce dilations. (990Q)
- QSC558: Use proportional reasoning to solve problems related to similar polygons. (950Q)

### Impending Skills

- QSC362: Write equations to represent direct variation and use direct variation to solve number and word problems. (890Q)
- QSC558: Use proportional reasoning to solve problems related to similar polygons. (950Q)
- QSC264: Calculate or estimate the percent of a number including discounts, taxes, commissions, and simple interest. (870Q)
- QSC1065: Find the coordinates of a point on a segment between given endpoints that partitions the segment by a given ratio. (1120Q)

# Click on first prerequisite, QSC 208, to gain insight for students not ready for QSC 263

**QSC208:** Solve one-step linear equations and inequalities and graph solutions of the inequalities on a number line in number and word problems.

**QSC ID:** QSC208

**Quantile Measure:** 650Q

**Strand:** Algebra and Algebraic Thinking

**Description:** Solve one-step linear equations and inequalities and graph solutions of the inequalities on a number line in number and word problems.

## Knowledge Cluster

**The Prerequisites in the Knowledge Cluster for QSC 208 can be used for those students needing remediation.**

### Prerequisite Skills

[QSC97](#): Locate points on a number line. (250Q)

[QSC548](#): Describe the meaning of an unknown in the context of a word problem. (430Q)

[QSC604](#): Graph or identify simple inequalities using symbol notation  $>$ ,  $<$ ,  $\leq$ ,  $\geq$ , and  $\neq$  in number and word problems. (550Q)

[QSC605](#): Find the value of a variable in a number sentence. (530Q)

### Supporting Skills

[QSC132](#): Solve word problems using patterns. (490Q)

[QSC180](#): Construct or complete a table of values to solve problems associated with a given relationship. (630Q)

[QSC218](#): Translate between models or verbal phrases and algebraic expressions. (750Q)

[QSC623](#): Identify additive inverses (opposites) and multiplicative inverses (reciprocals, including zero) and use them to solve number and word problems. (780Q)

### Impending Skills

[QSC275](#): Solve two-step linear equations and inequalities and graph solutions of the inequalities on a number line. (690Q)

[QSC622](#): Solve number and word problems using percent proportion, percent equation, or ratios. (820Q)

[QSC210](#): Write an equation to describe the algebraic relationship between two defined variables in number and word problems, including recognizing which variable is

Mrs. Ashford's Seventh Grade Class

Grade	Name	Quantile Measure
7	Caroline	450
7	Aliyah	470
7	Tony	540
7	Diana	610
7	Clifford	610
7	Carlos	650
7		
7		
7		
7		
7		
7		
7		
7		
7		
7		
7		
7	Lee	890
7	Ashleigh	1130
7	Lauryn	1250
7	Corey	1290

The lower prerequisites in the Knowledge Cluster provide teaching suggestions for students needing remediation.

# QSC208: Solve one-step linear equations and inequalities on a number line in number and word

QSC ID: QSC208  
 Quantile Measure: 650Q  
 Strand: Algebra and Algebraic Thinking  
 Description: Solve one-step linear equations and inequalities and graph solutions on a number line.

## Knowledge Cluster

### Prerequisite Skills

- QSC97: Locate points on a number line. (250Q)
- QSC548: Describe the meaning of an unknown in the context of a word problem. (430Q)
- QSC604: Graph or identify simple inequalities using symbol notation  $>$ ,  $<$ ,  $\leq$ ,  $\geq$ , and  $\neq$  in number and word problems. (500Q)
- QSC605: Find the value of a variable in a number sentence. (530Q)

### Supporting Skills

- QSC132: Solve word problems using patterns. (490Q)
- QSC180: Construct or complete a table of values to solve problems associated with a given equation or inequality. (500Q)
- QSC218: Translate between models or verbal phrases and algebraic expressions. (750Q)
- QSC623: Identify additive inverses (opposites) and multiplicative inverses (reciprocals, including zero). (500Q)

### Impending Skills

- QSC275: Solve two-step linear equations and inequalities and graph solutions of the inequalities on a number line. (750Q)
- QSC622: Solve number and word problems using percent proportion, percent equation, or percent of. (500Q)
- QSC210: Write an equation to describe the algebraic relationship between two defined variables. (500Q)



Mrs. Ashford's Seventh Grade Class

Grade	Name	Quantile Measure
7	Caroline	450
7	Aliyah	470
7	Tony	540
7	Diana	610
7	Clifford	610
7	Carlos	650
7	Portia	690
7	Tameka	690
7	Crystal	690
7	Juan	730
7	Victoria	730

**Supporting and Impending QSCs provide suggestions to add depth to instruction.**

7	Brandon	770
7	Holly	770
7	Henry	790
7	Ellen	800
7	Lee	890
7	Ashleigh	1130
7	Lauryn	1250
7	Corey	1290

# QSC263: Write a proportion to model a word problem

QSC ID: QSC263

Quantile Measure: 720Q

Strand: Numerical Operations

Description: Write a proportion to model a word problem; solve proportions.

## Knowledge Cluster

### Prerequisite Skills

QSC208: Solve one-step linear equations and inequalities and graph solutions of the inequalities.

QSC654: Write a ratio or rate to compare two quantities. (210Q)

### Supporting Skills

QSC233: Calculate unit rates in number and word problems, including comparison of unit rates.

QSC258: Convert measures of length, area, capacity, weight, and time expressed in a given unit.

QSC287: Determine and use scale factors to reduce and enlarge drawings on grids to produce similar figures.

QSC558: Use proportional reasoning to solve problems related to similar polygons. (950Q)

### Impending Skills

QSC362: Write equations to represent direct variation and use direct variation to solve number problems.

QSC558: Use proportional reasoning to solve problems related to similar polygons. (950Q)

QSC264: Calculate or estimate the percent of a number including discounts, taxes, commissions, and interest.

QSC1065: Find the coordinates of a point on a segment between given endpoints that partitions the segment in a given ratio.



# In Summary...

The Quantile Framework places the mathematics curriculum, the materials to teach mathematics, and the students on the same scale.

*Thus enabling the teacher to:*

- *target instruction*
- *forecast understanding*  
*and*
- *improve mathematics instruction and achievement.*



# Imagine...

...what if there was a means of determining student readiness to address various math concepts?

**We call it a student's Quantile Measure!**

...what if there existed a tool that could drill a math concept all the way down to foundational knowledge?

**We call it the Quantile Framework for Math!**



# CONTACT US

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