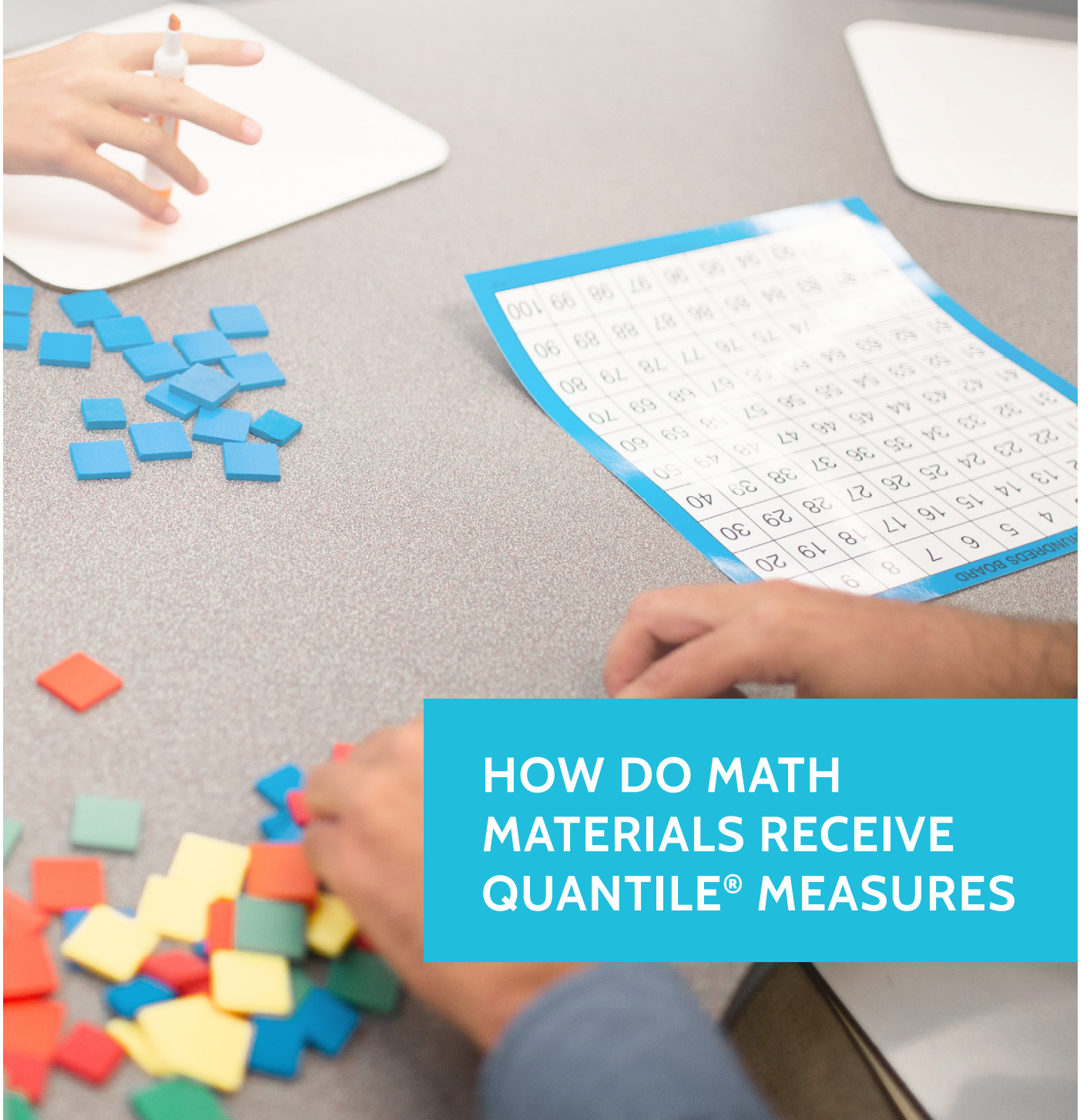




QUANTILE[®] FRAMEWORK FOR MATHEMATICS



**HOW DO MATH
MATERIALS RECEIVE
QUANTILE[®] MEASURES**

How Do Math Materials Receive Quantile Measures?

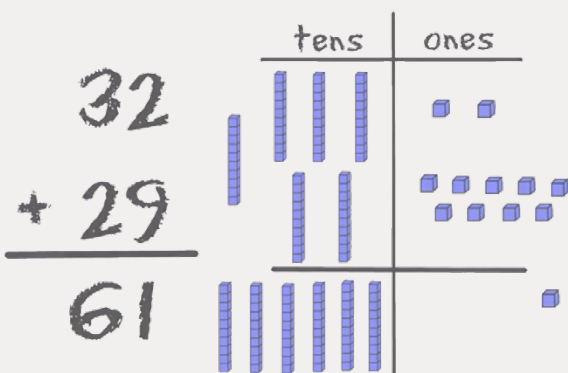
Mathematics materials receive Quantile measures by being calibrated to the Quantile Framework. The math demand of the material, such as textbook lessons, games and other resources, is analyzed by MetaMetrics. In the analysis, both subject matter experts review the material as well as automated software that uses an algorithm to evaluate the material's mathematics demand. The automated software and subject matter reviews are done independently. These results are then compared to determine which mathematics skills and concepts are represented. Oftentimes, there are several skills/concepts assigned with a specific lesson or activity. A Quantile measure is assigned that describes the overall difficulty of the skills/concepts represented in the material.

In this way, mathematics materials are placed on the Quantile scale, a scale that ranges from beginning math skills below 0Q to advanced mathematics materials above 1600Q.

The following are two mathematics activities: one at 90Q and one at 790Q. Although they are on the same topic of addition, the higher Quantile measured material involves more complex mathematics skills and concepts.

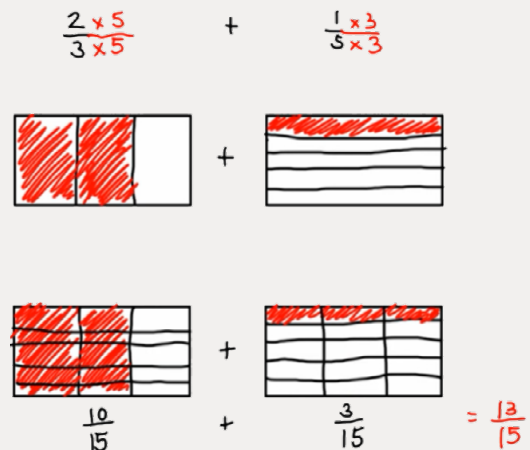
90Q

*Sample Activity: Video on Addition
With Regrouping Measures*



790Q

*Sample Activity: Video on Adding Fractions
With Unlike Denominators Measures*



MetaMetrics' Research on Mathematics

MetaMetrics studied the difficulty of lessons in mathematics textbooks commonly used in the United States to help understand the mathematics demand that students will likely encounter in their elementary through high school mathematics courses. Results are shown in the table below. In a related study, MetaMetrics found that the mathematics ability needed for college and career readiness ranged from approximately 1220Q to 1440Q, and the median mathematics demand for college and career readiness was 1350Q.



Our mathematics demand research and how Quantile measures can be used to determine and encourage college and career readiness is detailed in the FAQs section of this Toolkit, which is accessible on the Toolkit homepage: metametricsinc.com/quantile-toolkit-edtech.

Math Demand for College and Career Readiness

Read our research briefs describing this work: [A Quantitative Task Continuum for K-12 Mathematics](#) and [The Quantile Framework for Mathematics Quantifies the Mathematics Ability Needed for College and Career Readiness](#).

QUANTILE MEASURES TO GUIDE MATHEMATICS INSTRUCTION FOR COLLEGE AND CAREER READINESS

Grade	Lessons Complexity Measures Beginning of Year	Lessons Complexity Measures End of Year
1	EM50Q*	80Q
2	40Q	300Q
3	240Q	490Q
4	390Q	680Q
5	560Q	810Q
6	680Q	890Q
7	800Q	950Q
8	840Q	1050Q
9	900Q	1150Q
10	1070Q	1230Q
11	1100Q	1350Q

*When a Quantile measure is below OQ, an EM (Emerging Mathematician) code is reported with the measure.



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