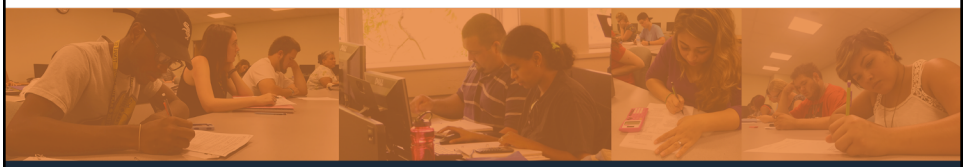
The University of Texas at Austin
Charles A. Dana Center

Using Critical Areas of Focus in Mathematics To Strengthen Instruction Towards Deeper Mathematical Understanding

Bobbie Greenlee, Math Coach, Polk County Schools
Michael Greenlee, Professional Learning Facilitator, Elementary Math
April 3, 2019, NCSM Annual Conference



The University of Texas at Austin
Charles A. Dana Center

Dana Center by the Numbers

We provided professional development for **Department of Defense Education Activity teachers**, benefiting 88,500 students in 14 countries.

The University of Texas at Austin
Charles A. Dana Center

Dana Center by the Numbers

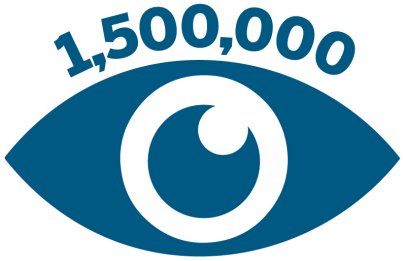
1,000
teacher-leaders

Nearly 1,000 Louisiana teacher-leaders and mentors received **capacity-building support** from our professional learning facilitators.

The University of Texas at Austin
Charles A. Dana Center

3

Dana Center by the Numbers



People who viewed MathCuts—**quick, engaging strategies** for K–6 classroom teachers—on Facebook.

The University of Texas at Austin
Charles A. Dana Center

4

Contact Information

Michael Greenlee
michael.greenlee@austin.utexas.edu
512.693.9273
@UTDCMike

Visit the Dana Center website at utdanacenter.org.

Find us on Facebook at facebook.com/utdanacenter or on Twitter at @UTDanaCenter.

Objective

Understand how relating the standards to their place in the critical areas of focus—and in the major work of each grade level or course—affects instruction.

Focus and Coherence of the Standards

"Fragmenting the Standards into individual standards, or individual bits of standards, …produces a sum of parts that is decidedly less than the whole."

***

"A drive to break the Standards down into 'microstandards' risks making the checklist mentality even worse than it is today."

***

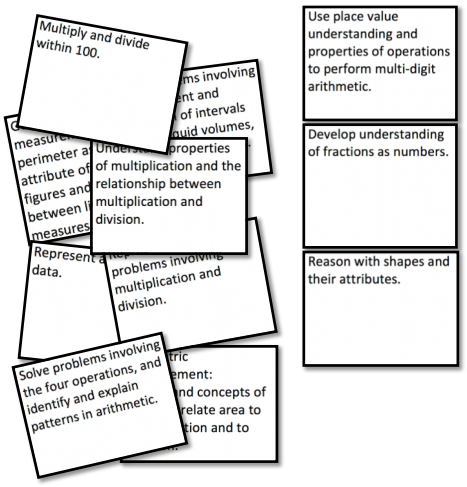
"If the Standards are like a tree, then microstandards are like twigs. You can't build a tree out of twigs, but you can use twigs as kindling to burn down the tree."

— Excerpted from page 5 in Achieve the Core. (2013 April 9). *K–8 Publishers' Criteria for the Common Core State Standards for Mathematics*. Available via https://achievethecore.org/page/267/publishers-criteria-for-the-ccss-in-mathematics

The University of Texas at Austin Charles A. Dana Center 7

Where to Focus Grade 3 Mathematics

- Arrange the cluster heading cards for Grade 3 in order of importance.
- Consider how much time you should prioritize to teach each cluster.
- Number the cards by writing the number of their position in your order in the top right corner.



The University of Texas at Austin Charles A. Dana Center 8

Critical Areas of Focus

The critical areas are designed to bring focus to the standards at each grade level by describing the big ideas that educators should use to build their curriculum and to guide instruction.

The University of Texas at Austin
Charles A. Dana Center

Mathematics | Grade 3

In Grade 3, instructional time should focus on four critical areas: (1) developing understanding of multiplication and division and strategies for multiplication and division within 100; (2) developing understanding of fractions, especially unit fractions (fractions with numerator 1); (3) developing understanding of the structure of rectangular arrays and of area; and (4) describing and analyzing two-dimensional shapes.

(1) Students develop an understanding of the meanings of multiplication and division of whole numbers through activities and problems involving equal-sized groups, arrays, and area models; multiplication is finding an unknown product, and division is finding an unknown factor in these situations. For equal-sized group situations, division can require finding the unknown number of groups or the unknown group size. Students use properties of operations to calculate products of whole numbers, using increasingly sophisticated strategies based on these properties to solve multiplication and division problems involving single-digit factors. By comparing a variety of solution strategies, students learn the relationship between multiplication and division.

(2) Students develop an understanding of fractions, beginning with unit fractions. Students view fractions in general as being built out of unit fractions, and they use fractions along with visual fraction models to represent parts of a whole. Students understand that the size of a fractional part is relative to the size of the whole. For example, 1/2 of the paint in a small bucket could be less paint than 1/3 of the paint in a larger bucket, but 1/3 of a ribbon is longer than 1/5 of the same ribbon because when the ribbon is divided into 3 equal parts, the parts are longer than when the ribbon is divided into 5 equal parts. Students are able to use fractions to represent numbers equal to, less than, and greater than one. They solve problems that involve comparing fractions by using visual fraction models and strategies based on noticing equal numerators or denominators.

(3) Students recognize area as an attribute of two-dimensional regions. They measure the area of a shape by finding the total number of same-size units of area required to cover the shape without gaps or overlaps, a square with sides of unit length being the standard unit for measuring area. Students understand that rectangular arrays can be decomposed into identical rows or into identical columns. By decomposing rectangles into rectangular arrays of squares, students connect area to multiplication, and justify using multiplication to determine the area of a rectangle.

(4) Students describe, analyze, and compare properties of two-dimensional shapes. They compare and classify shapes by their sides and angles, and connect these with definitions of shapes. Students also relate their fraction work to geometry by expressing the area of part of a shape as a unit fraction of the whole.

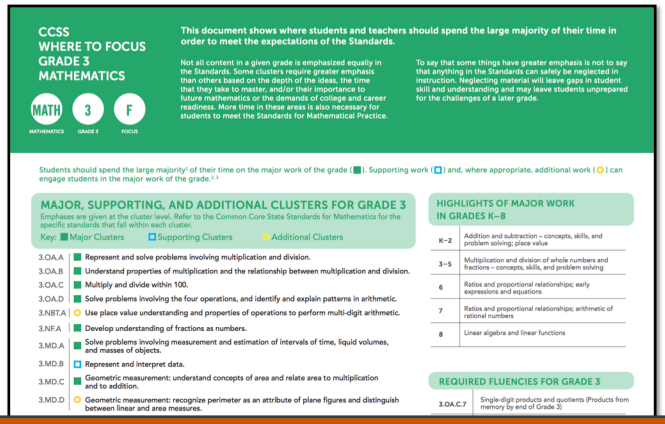
Critical Areas of Focus

- Revisit each of the Grade 3 cluster headings.
- Identify which clusters are directly called out in the Critical Areas of Focus.
- Label those cluster cards with the number of the critical area they support (CA1, CA2, and so on)

How do the clusters NOT found in the Critical Areas of Focus support the Critical Areas?

The University of Texas at Austin
Charles A. Dana Center
10

Where to Focus



CCSS
WHERE TO FOCUS
GRADE 3
MATHEMATICS

MATH 3 F

This document shows where students and teachers should spend the large majority of their time in order to meet the expectations of the Standards.

Not all content in a given grade is emphasized equally in the Standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. More time in these areas is also necessary for students to meet the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the Standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.

Students should spend the large majority[1] of their time on the major work of the grade (■). Supporting work (□) and, where appropriate, additional work (○) can engage students in the major work of the grade.[2,3]

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR GRADE 3

Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Key: ■ Major Clusters □ Supporting Clusters ○ Additional Clusters

3.OA.A	■ Represent and solve problems involving multiplication and division.
3.OA.B	■ Understand properties of multiplication and the relationship between multiplication and division.
3.OA.C	■ Multiply and divide within 100.
3.OA.D	■ Solve problems involving the four operations, and identify and explain patterns in arithmetic.
3.NBT.A	○ Use place value understanding and properties of operations to perform multi-digit arithmetic.
3.NF.A	■ Develop understanding of fractions as numbers.
3.MD.A	■ Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
3.MD.B	□ Represent and interpret data.
3.MD.C	■ Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
3.MD.D	○ Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

HIGHLIGHTS OF MAJOR WORK IN GRADES K–8

K–2	Addition and subtraction – concepts, skills, and problem solving; place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional relationships; early expressions and equations
7	Ratios and proportional relationships; arithmetic of rational numbers
8	Linear algebra and linear functions

REQUIRED FLUENCIES FOR GRADE 3

3.OA.C.7	Single-digit products and quotients (Products from memory by end of Grade 3)

Code each cluster heading as a Major Cluster (MC), Supporting Cluster (SC), or Additional Cluster (AC).

Where to Focus

- How do the Supporting Clusters support the Major Work?
- Are there any Additional Clusters that would support the Major Work?
- What does it mean if a cluster is classified as Major work but is NOT called out directly in the Critical Areas of Focus?

Meeting the Intent of the Standards

Represent and interpret data.
3.MD.B.3: Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*

- What are the implications for teaching this standard knowing that it is a Supporting Cluster and is not called out in the Critical Areas of Focus?

Contact Information

Michael Greenlee
michael.greenlee@austin.utexas.edu
512.693.9273
@UTDCMike

Visit the Dana Center website at utdanacenter.org.

Find us on Facebook at facebook.com/utdanacenter or on Twitter at @UTDanaCenter.