

# easyCBM® K-5 Math Alignment to the CCSS

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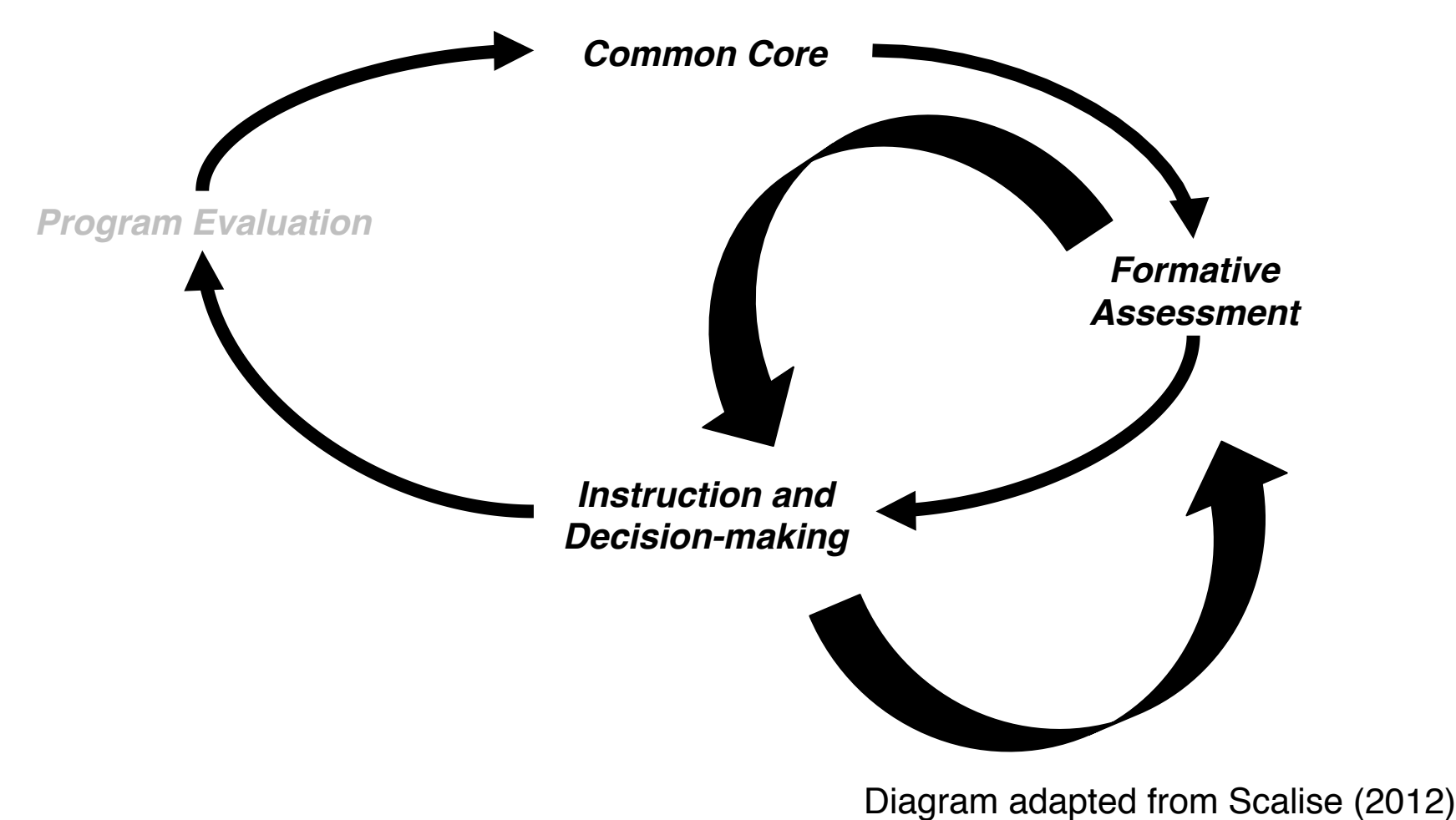
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## Study Purpose

- 1) To study the alignment between existing easyCBM® K-5 mathematics assessments and the Common Core State Standards (CCSS).
- 2) To strengthen CCSS-easyCBM® alignment, bolstering existing assessments to enhance the validity of score interpretations and instructional decisions made in response to student performance. (e.g., RTI).

## Background

- CCSS provide a unified set of expectations for student knowledge and skill development
- CCSS guide instruction and assessment
- Alignment studies have focused primarily on accountability assessments (e.g., Webb 1999, Achieve, 2002)
- Formative Assessment (i.e., easyCBM®):
  - Measure student progress (i.e., growth)
  - Guide instructional decision-making
  - Aid in the identification of students in need of additional services above/outside typical instruction
- Instruction and assessment form an integrated and ongoing process within the standards-based instructional cycle
- CCSS, pre-requisite knowledge/skills, and formative assessment must be aligned for teachers to make valid test-based inferences and appropriate instructional decisions tied to student performance and academic needs.



**Literature Cited**

Anderson, D., Irvin, P. S., Alonzo, J., & Tindal, G. (2012). The Alignment of the easyCBM Middle School Mathematics CCSS Measures to the Common Core State Standards (Report No. 1208). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

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Irvin, P. S., Park, B. J., Alonzo, J., Tindal, G. (2012). The Alignment of the easyCBM Grades 3-5 Math Measures to the Common Core Standards (Report No. 1229). Eugene, OR: Behavioral Research and Teaching, University of Oregon.

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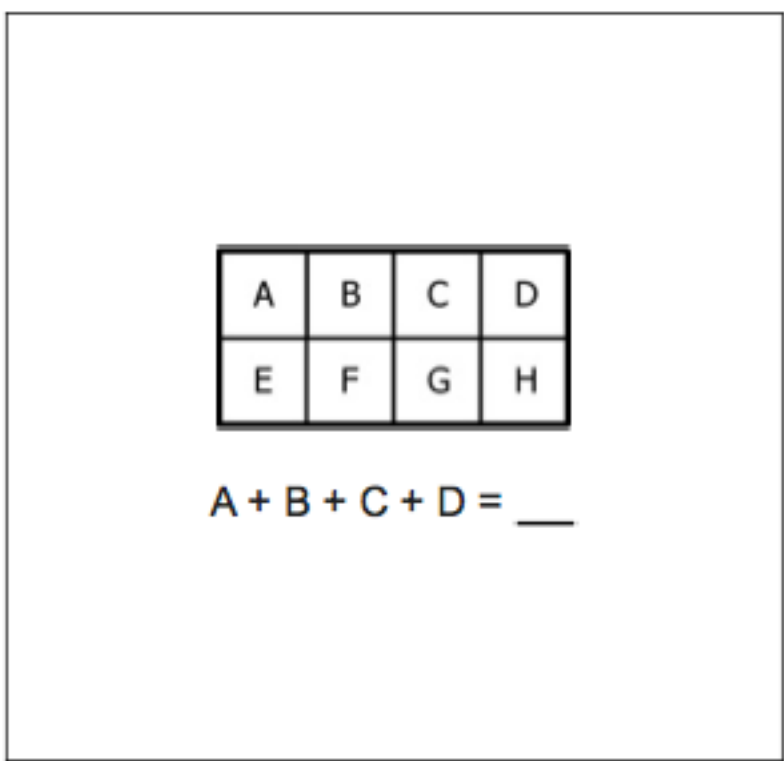
- Assessments Aligned with Grade Level Content Standards and Scaled to Reflect Growth for Students with Disabilities R324A70188 funded from 07-11.
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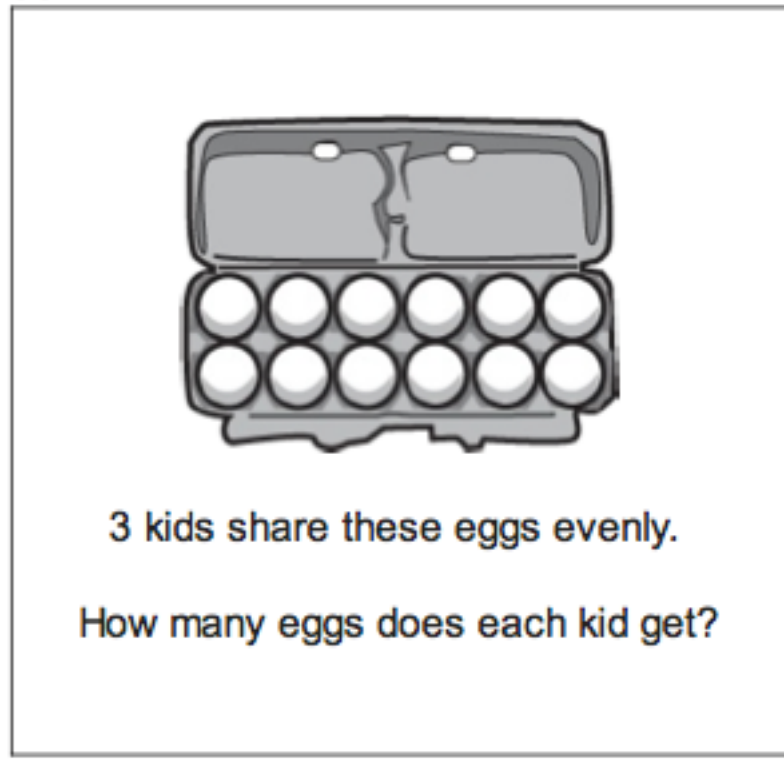
The opinions expressed are those of the authors and do not represent views of the Institute for Education Sciences or the U.S. Department of Education.

## Methods

- **Participants:** 30 teachers/district leaders, 10 states, teaching experience: *Mean* = 10.61 yrs., *Range* = 1-23 yrs.
- **Design:** 135 seasonal benchmark items analyzed for alignment to on- and prior-grade CCSS, and standard pre-requisite skill sets
- **Strength of alignment rating scale:** 3-point Likert (0-2), where 0 = not at all linked, 1 = somewhat linked, 2 = directly linked

## Gr 3 Item Sample – Ratings

Standard Level Agreement		
 <p>A. <math>\frac{1}{8}</math> B. <math>\frac{4}{8}</math> C. <math>\frac{2}{8}</math></p>	Rater	Rating (Strength)
	Rater 1	3.NF.1 (n/a)
	Rater 2	3.G.2 (2)
	3.NF.1	3.NF.1 (1)
	Rater 4	3.NF.1 (2)
	Rater 5	3.NF.1 (2)
<p><b>3.NF.1</b> - Understand a fraction <math>\frac{1}{b}</math> as the quantity formed by 1 part when a whole is partitioned into <math>b</math> equal parts; understand a fraction <math>\frac{a}{b}</math> as the quantity formed by <math>a</math> parts of size <math>\frac{1}{b}</math>.</p> <p><b>3.G.2</b> - Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as <math>\frac{1}{4}</math> of the area of the shape.</p>		

Domain Level Agreement		
 <p>A. 4 B. 6 C. 3</p>	Rater	Rating (Strength)
	Rater 1	3.OA.3 (n/a)
	Rater 2	3.OA.2 (1)
	Rater 3	3.OA.3 (2)
	Rater 4	3.OA.3 (2)
	Rater 5	3.OA.8 (1)
<p><b>3.OA.3</b> - Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</p> <p><b>3.OA.2</b> - Interpret whole-number quotients of whole numbers, e.g., interpret <math>56 \div 8</math> as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as <math>56 \div 8</math>.</p> <p><b>3.OA.8</b> - Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.</p>		

**Additional Information**

Please contact **Shawn Irvin**, [pirvin@uoregon.edu](mailto:pirvin@uoregon.edu), for more information on this and other educational measurement projects. **Behavioral Research and Teaching:** <http://www.brtprojects.org/>.

## Results

**Table 1. Grade 1 Results**

On Grade					Prior Grade				
Domain (# of Stnd)	Total	Fall BM	Winter BM	Spring BM	Domain (# of Stnd)	Total	Fall BM	Winter BM	Spring BM
	# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)		# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)
1.G (4)	4 (100%)	4 (100%)	3 (75%)	3 (75%)	K.CC (7)	7 (100%)	2 (29%)	4 (57%)	7 (100%)
1.MD (4)	2 (50%)	2 (50%)	1 (25%)	1 (25%)	K.G (6)	5 (83%)	4 (67%)	5 (83%)	3 (50%)
1.NBT (6)	6 (100%)	4 (67%)	4 (67%)	6 (100%)	K.MD (3)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
1.OA (8)	8 (100%)	7 (88%)	8 (100%)	7 (88%)	K.NBT (1)	1 (100%)	0 (0%)	1 (100%)	0 (0%)
					K.OA (5)	2 (40%)	0 (0%)	2 (40%)	2 (40%)
1 total (22)	20 (91%)	17 (77%)	16 (73%)	17 (77%)	K total (22)	15 (68%)	6 (27%)	12 (55%)	12 (55%)

**Table 2. Grade 3 Results**

On Grade					Prior Grade				
Domain (# of Stnd)	Total	Fall	Winter	Spring	Domain (# of Stnd)	Total	Fall	Winter	Spring
	# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)		# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)
3.OA (9)	9 (100%)	9 (100%)	8 (89%)	9 (100%)	2.G (3)	3 (100%)	3 (100%)	3 (100%)	3 (100%)
3.NBT (3)	1 (33%)	1 (33%)	0 (0%)	0 (0%)	2.MD (10)	2 (25%)	1 (10%)	1 (10%)	0 (0%)
3.NF (3)	3 (100%)	3 (100%)	3 (100%)	3 (100%)	2.NBT (9)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3.MD (8)	3 (38%)	2 (25%)	1 (18%)	2 (25%)	2.OA (4)	2 (50%)	2 (50%)	0 (0%)	0 (0%)
3.G (2)	2 (100%)	2 (100%)	1 (50%)	2 (100%)					
3 total (25)	18 (72%)	17 (68%)	13 (52%)	16 (64%)	2 total (26)	7 (27%)	6 (23%)	4 (15%)	3 (12%)

**Table 3. Grade 5 Results**

On Grade					Prior Grade				
Domain (# of Stnd)	Total	Fall	Winter	Spring	Domain (# of Stnd)	Total	Fall	Winter	Spring
	# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)		# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)	# Stnd addressed (%)
5.OA (3)	2 (67%)	0 (0%)	1 (33%)	1 (33%)	4.OA (5)	1 (20%)	1 (20%)	0 (0%)	0 (0%)
5.NBT (7)	6 (86%)	4 (57%)	5 (71%)	5 (71%)	4.NBT (6)	5 (83%)	4 (67%)	3 (50%)	3 (50%)
5.NF (7)	7 (100%)	4 (57%)	4 (57%)	5 (71%)	4.NF (7)	4 (57%)	3 (43%)	3 (43%)	3 (43%)
5.MD (5)	3 (60%)	3 (60%)	3 (60%)	3 (60%)	4.MD (7)	3 (43%)	2 (29%)	2 (29%)	1 (14%)
5.G (4)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	4.G (3)	1 (33%)	1 (33%)	0 (0%)	0 (0%)
5 total (26)	18 (69%)	11 (42%)	13 (50%)	14 (54%)	4 total (28)	14 (50%)	11 (39%)	8 (29%)	7 (25%)

## Future Research and Current Assessment Development

- Current easyCBM® assessment development in grades K-5 is focused on writing additional mathematics items to address underrepresented CCSS within current measures.
- 3,000 new math items, 500 in each of grades K-5 have been written and reviewed by teacher experts, and are currently in prep for in-house review. New items will be piloted and scaled in spring 2013, with the release of new CCSS-aligned easyCBM® math benchmark and progress-monitoring assessments scheduled for fall 2013.
- CCSS Math benchmark and progress monitoring assessments for grades 6-8 were released in fall 2012 for district easyCBM® users (Anderson, Irvin, Patarapichayatham, Alonzo & Tindal, 2012).

**Table 4. Grade 1 Item Sampling Plan for Current CCSS Item Writing Study**

Gr1 CCSS	Item Set 1	Item Set 2	Item Set 3	Item Set 4	CCSS Align	Total
G1	10	10	10	10	4	40
G2	10	10	10	10	5	40
G3	12	11	11	11	1	45
MD1	8	8	8	8	1	32
MD2	8	8	8	8	0	32
MD3	8	8	8	8	0	32
MD4	7	7	7	8	3	29
NBT1	0	0	0	0	7	0
NBT2	1	2	1	1	5	5
NBT3	10	10	10	10	2	40
NBT4	0	0	0	0	6	0
NBT5	10	10	10	10	0	40
NBT6	10	10	10	10	0	40
OA1	0	0	0	0	6	0
OA2	6	6	7	6	4	25
OA3	0	0	0	0	5	0
OA4	6	6	6	7	1	25
OA5	6	7	6	6	1	25
OA6	0	0	0	0	5	0
OA7	6	6	7	6	0	25
OA8	7	6	6	6	3	25
Gr1 Total	125	125	125	125		500 Items