



behavioral research & teaching

Product Name: Middle School Math (Mid Math)

Product Description

Originally measures were developed for the 2% population (i.e., students performing **well below** grade-level expectations) and aligned to the NCTM Focal Point Standard. New Middle School Math items (2,700) have been developed for 6th-8th grade students (performing **at or slightly below** grade-level expectations) and aligned to the Common Core State Standards.

List of Essential Features

- Universal design for assessment
- Considers *all* characteristics of test-takers.
- Precisely defined constructs.
- Accessible, non-biased items.
- Items amendable to accommodations.
- Simple, clear, and intuitive instructions and procedures.
- Maximum readability and comprehensibility.
- Maximum legibility of text, tables, figures, and illustrations

Audience

Middle School Math is intended for teachers, schools, or districts as a tool to monitor 6th- 8th grade students' progress in math proficiency.

Middle School Math

Test form creation

- 20 alternate test forms planned for benchmark and progress-monitoring
- All forms of equivalent difficulty
- All forms of comparable content
- All test items aligned with the Common Core Standards

Standards

RP: Ratios and Proportional Relationships (G6 – 3 sub-standards, G7 – 3 sub-standards)

NS: The Number System (G6 – 8 sub-standards, G7 – 3 sub-standards, G8 – 2 sub-standards)

EE: Expressions and Equations (G6 – 9 sub-standards, G7 – 4 sub-standards, G8 – 8 sub-standards)

G: Geometry (G6 – 4 sub-standards, G7 – 6 sub-standards, G8 – 9 sub-standards)

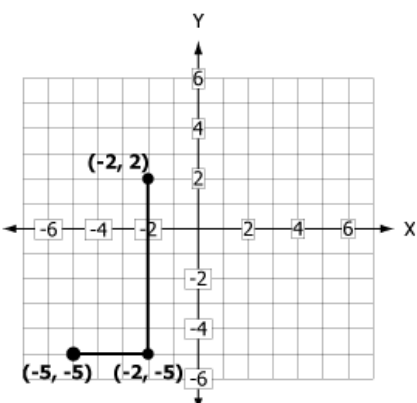
SP: Statistics and Probability (G6 – 5 sub-standards, G7 – 8 sub-standards, G8 – 4 sub-standards)

F: Functions (G8 – 5 sub-standards)

Items Developed

Grade	RP	NS	EE	G	SP	F
6	180	180	180	180	180	-
7	180	180	180	180	180	-
8	-	180	180	180	180	180

Item 663018 [Edit](#) [Refresh](#)




What coordinates will complete the rectangle?

(-5, 2)

(2, -5)

(-5, -2)

I don't know

Next 

Alignment

- 15 teachers from across the United States each rate 300 items.
- Approximately half of all items, randomly sampled, will be judged for alignment.
- Each item judged for alignment will be rated by at least 3 teachers, establishing a consensus or unanimous rating for each item (aligned/not aligned).
- Alignment process will include questions more directly relevant to *formative* assessments, rather than the more typical process used for *summative* assessments.

Middle School Mathematics Items

Development and Future Research Plans

Project overview

- Develop 2,700 new math items for easyCBM in grades 6-8; 900 items per grade
 - Aligned with the common core standards
 - Piloted to examine their technical adequacy
 - Plan: 20 alternate test forms for benchmark and progress-monitoring of comparable difficulty

Existing items vs. New Items

Existing Items

- Originally developed for the 2% population (i.e., students performing **well below** grade-level expectations)
- Aligned to the NCTM Focal Point Standards

New Middle School Math Items

- Should be developed for students performing **at or slightly below** grade-level expectations.
- Aligned to the Common Core State Standards

Outline of items written

Number of Items to Write

Grade	RP	NS	EE	G	SP	F
6	180	180	180	180	180	-
7	180	180	180	180	180	-
8	-	180	180	180	180	180

- **RP** - Ratios and Proportional Relationships
- **NS** - Number System
- **EE** - Expressions and Equations
- **G** - Geometry
- **SP** - Statistics and Probability
- **F** - Functions

Universal Design

How should we design a building so the widest range of populations possible can access it?



Universal Design for Assessment

- Considers *all* characteristics of test-takers.
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- Maximum legibility of text, tables, figures, and illustrations

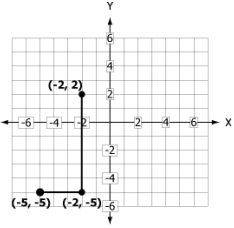
Thompson, Johnstone, and Thurlow (2002)

New Middle School Math Items

• Common Core Standards


- 5 standards per grade
- New items in grades 6, 7, 8

Item 663018 [Edit](#) [Refresh](#)



What coordinates will complete the rectangle?

(-5, 2)
 (2, -5)
 (-5, -2)
 I don't know

Next 

6th Grade Standard: Expressions and Equations (4)


Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.*

Item 6EE4016 [Edit](#) [Refresh](#)

Which is an equivalent expression?

$$y \times y \times y \times y?$$

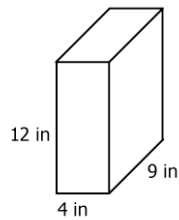
y^4
 $4y$
 $\frac{4}{y}$
 I don't know

Next 

7th Grade Standard: Geometry (6)

Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Item 766008 [Edit](#) [Refresh](#)



How much water is needed to fill the box halfway with water?

216 in³

192 in³

108 in³

I don't know

Next

8th Grade Standard: Number Systems (1)

Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

Item 8NS1035 [Edit](#) [Refresh](#)

Which number is irrational?

$\sqrt{14}$

$5\frac{2}{3}$

$\overline{.7}$

I don't know

Next

Alignment

- Planned study
 - 15 teachers
 - Each reviews 300 items
 - Approximately half of all items will be reviewed
- Teach Qualifications
 - All have classroom experience
 - Many are Math coaches for District
 - All are familiar with Common Core
 - Many have helped implement Common Core in some way

Teacher Sampling Plan

Grade 6					Grade 7				
100 set 1	100 set 2	100 set 3	100 set 4	100 set 5	100 set 1	100 set 2	100 set 3	100 set 4	100 set 5
a	a b	b	b c	c	c d	d	d e	e	e f
h	i	i j	j	j k	k	k l	l	l m	m

Note. Eighth grade not pictured due to space, but is included in the plan

Item Sampling Plan

Item Set 1		Item Set 2		Item Set 3	
Random #	Item ID	Random #	Item ID	Random #	Item ID
RP1		RP1		RP1	
618	6RP1002	344	6RP1013	488	6RP1029
1623	6RP1010	742	6RP1017	1227	6RP1025
1650	6RP1001	2337	6RP1015	1735	6RP1030
2372	6RP1007	2809	6RP1016	1838	6RP1022
3040	6RP1008	3487	6RP1014	2064	6RP1024
RP2		RP2		RP2	
1182	6RP2008	687	6RP2014	478	6RP2028
3169	6RP2005	698	6RP2016	891	6RP2023
3594	6RP2003	786	6RP2017	1730	6RP2030
4454	6RP2001	1270	6RP2011	1756	6RP2024
4850	6RP2002	3366	6RP2018	3437	6RP2025

Questions?

<http://www.brtprojects.org/>



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Behavioral Research and Teaching

The projects at BRT concentrate on access to learning so that appropriate and accurate information can be collected from all students to improve decision-making. We focus on developing information systems with three primary goals:

- Improve basic skills assessments so that all students can read, write, and compute.
- Enhance learning of middle and secondary content subject matter so that all students have the opportunity to develop a broad knowledge base.
- Provide accessibility to large-scale testing so that all students can demonstrate their proficiencies on state and local achievement standards.

News & Updates

- [National Conference on Student Assessment \(NCSA\)-Minneapolis, MN.](#)
Jun, 2012
The National Conference on Student Assessment (NCSA) provides a forum for conference attendees to find out what is happening in the world of assessment - what is new, what is changing, and what is working and not working. NCSA is a practitioner's conference and where attendees can network with professionals in the assessment community while learning about the possibilities of assessment and learning.
- [American Educational Research Association \(AERA\) 2012 Annual Meeting-Vancouver. British Columbia, Canada](#)
Apr. 2012

Current Research

- [1. Diagnostic Reading Progress Monitoring \(DRPM\) Scaling](#)
- [2. RTI Progress Monitoring Case Study](#)
- [3. Reading Measures Structure Analysis](#)
- [4. Spanish Reading Tests Review and Pilot](#)
- [5. easyCBM Reading Construct Validity](#)
- [6. Middle School Math Item Scaling](#)
- [7a. easyCBM Beginning Reading Measures Alignment: Teachers](#)
- [7b. easyCBM Reading Comprehension](#)