



**The New York City
Department of Education**

**Grade 6 Mathematics Benchmark
Assessment**

**Teacher Guide
Fall 2012**

November 26, 2012–January 11, 2013



Table of Contents

Test Design and Instructional Purpose	3
Limitations	3
Test Content	4
Rubrics for Scoring Short-Response & Extended-Response/ Performance Task Items	7

Test Design and Instructional Purpose

The Mathematics Benchmark Assessment is designed to help you collect *some* information about your students' progress toward meeting the Common Core expectations for sixth grade. This information can provide insights into your students' mathematical proficiency, specifically their fluency with skills, their conceptual understanding, and their ability to apply concepts and skills in novel settings. Consequently, the results from the Benchmark Assessment may influence your plans for targeting instruction to meet your students' needs.

There are two Benchmark Assessments available for the school year. Both assessments are aligned to units from the New York City Department of Education's Curriculum Maps. The first Grade 6 Mathematics Benchmark Assessment, designed to be administered in the fall, focuses on Units 1 and 2; and the second Grade 6 Mathematics Benchmark Assessment, designed to be administered in the winter, focuses on Units 3 and 4. The assessments contain various item types: multiple choice, true-false (for the purpose of assessing fluency), short response, and constructed response/performance tasks. Items may partially align to a single standard, several standards, a cluster, or a domain, or may require synthesis across clusters and/or domains.

The Benchmark Assessments are meant to provide a lens for identifying some of the skills and concepts that may need to be taught or reinforced if students are to meet the Common Core expectations for sixth grade. The results of this assessment will best support your instruction and your students' learning if you are familiar with the Common Core Learning Standards, including the fluency expectations, key advances, and culminating standards.

Limitations

Neither Benchmark Assessment is an exhaustive test. While each Benchmark Assessment reflects the Common Core Learning Standards in the units that comprise its blueprint, Common Core Standards contain a breadth of skills and concepts that cannot be fully assessed by any single measure.

Additionally, each Benchmark Assessment is limited to one, two, or three units and covers approximately 25–40% of the year's instruction. Accordingly, the Benchmark Assessments do not reflect the work of the entire grade.

As a result, this assessment is best used as part of a comprehensive set of evaluative measures that include teacher observation, classwork, homework, and school- or teacher-made assessments.

Test Content

Unit 1 focuses on Multiplying. Unit 2 focuses on Ratios.

Content of Benchmark 1

Unit	Domain	Cluster	Standard	Items
2	Ratio and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems	6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."	2
2	Ratio and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.3a. Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.	1, 7, 10, 20, 37
2	Ratio and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.3b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?	3, 11, 12, 21, 27
2	Ratio and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.3c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	22, 28, 38, 41
2	Ratio and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6.RP.3d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	13, 15, 26, 29

1	The Number System	Apply and extend previous understandings of multiplication and division	6.NS.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. <i>For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.)</i> How much chocolate will each person get if 3 people share $1/2$ lb of chocolate equally? How many $3/4$ -cup servings are in $2/3$ of a cup of yogurt? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi?	16, 17, 24, 25, 40
1	The Number System	Compute fluently with multi-digit numbers and find common factors and multiples.	6.NS.2. Fluently divide multi-digit numbers using the standard algorithm.	9, 14, 18, 23, 30, 31, 32, 33, 34, 35
1	The Number System	Compute fluently with multi-digit numbers and find common factors and multiples.	6.NS.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	4, 8, 39, 42
1	The Number System	Compute fluently with multi-digit numbers and find common factors and multiples.	6.NS.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express $36 + 8$ as $4(9 + 2)$.	5, 6, 36

1	Geometry	Solve real-world and mathematical problems involving area, surface area, and volume.	6.G.2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.	19
---	-----------------	--	---	----

Rubrics for Scoring Short-Response and Extended-Response/Performance Task Items

Item # 36

Key Elements	
N/A	
Criteria	
2	Meets Standard (Meets criteria at grade level) Writes the equivalent expression using the distributive property AND Explains what the new expression represents
1	Near Standard (Mostly meets criteria) Writes the equivalent expression using the distributive property OR Explains what the new expression represents
0	Far Below Standard Incorrect response
Exemplar	
2	15(4 + 3) AND The greatest common factor of 60 and 45 is 15. Therefore, 15 students got 4 pencils and 3 erasers each. OR Other valid explanation

Item # 37

Key Elements	
N/A	
Criteria	
2	Meets Standard (Meets criteria at grade level) Finds Maria's rate AND Finds difference in rates
1	Near Standard (Mostly meets criteria) Finds Maria's rate OR Finds difference in rates
0	Far Below Standard Incorrect response

Exemplar	
2	Maria's rate is 40 words per minute. AND 10 words per minute is the difference in words per minute.

Item # 38

Key Elements	
N/A	
Criteria	
2	Meets Standard (Meets criteria at grade level) Calculates the amount spent correctly AND Shows correct and complete steps of work
1	Near Standard (Mostly meets criteria) Calculates the amount spent correctly OR Shows correct and complete steps of work
0	Far Below Standard Incorrect response
Exemplar	
2	\$13.00 AND Let the total money in the bag be \$ x. $\frac{27}{100}x = 1.89 + 2 \times 0.81 = 3.51$ $x = \frac{3.51 \times 100}{27} = \13.00 OR Other valid work

Item # 39

Key Elements	
N/A	
Criteria	
3	Meets Standard (Meets criteria at grade level) 3 correct elements Correct multiplication process in finding cost of red and green grapes AND Correct subtraction process in finding amount left after purchase of grapes AND Correct answer

2	Near Standard (Mostly meets criteria) 2 correct elements Correct multiplication process in finding cost of red and/or green grapes OR correct subtraction process in finding amount left after purchase of grapes OR Correct answer
1	Approaching Standard (Partially meets criteria) 1 correct element Correct multiplication process in finding cost of red and/or green grapes OR Correct subtraction process in finding amount left after purchase of grapes OR Correct answer
0	Far Below Standard Incorrect response
Exemplar	
3	23.75 – (1.35 x 2.60) + (1.35 x 1.40) 23.75 – (3.51 + 1.89) 23.75 – 5.4 OR Other valid process AND \$18.35

Item # 40

Key Elements	
N/A	
Criteria	
3	Meets Standard (Meets criteria at grade level) 3 correct elements Valid model which represents the solution AND Correct answer AND Valid explanation
2	Near Standard (Mostly meets criteria) 2 correct elements Valid model which represents the solution OR Correct answer OR Valid explanation

1	<p>Approaching Standard (Partially meets criteria) 1 correct element Valid model which represents the solution OR Correct answer OR Valid explanation</p>
0	<p>Far Below Standard Incorrect response</p>
Exemplar	
3	<div style="border: 1px solid black; width: 300px; height: 150px; margin: 0 auto; position: relative;"> <div style="position: absolute; top: 0; left: 0; width: 25%; height: 25%; background-color: #cccccc;"></div> <div style="position: absolute; top: 0; left: 25%; width: 25%; height: 25%; background-color: #cccccc;"></div> <div style="position: absolute; top: 0; left: 50%; width: 25%; height: 25%; background-color: #cccccc;"></div> <div style="position: absolute; top: 0; left: 75%; width: 25%; height: 25%; background-color: white;"></div> <div style="position: absolute; top: 25%; left: 0; width: 25%; height: 25%; background-color: #cccccc;"></div> <div style="position: absolute; top: 25%; left: 25%; width: 25%; height: 25%; background-color: #cccccc;"></div> <div style="position: absolute; top: 25%; left: 50%; width: 25%; height: 25%; background-color: #cccccc;"></div> <div style="position: absolute; top: 25%; left: 75%; width: 25%; height: 25%; background-color: white;"></div> </div> <p>Or other valid response showing six of eight portions shaded AND 6 AND $\frac{3}{4} \div \frac{1}{8}$ is equal to 6 so I shaded a total of 6 in the model. Or other valid explanation</p>

Item # 41

Key Elements	
N/A	
Criteria	
6	Meets Standard (Meets criteria at grade level) 6 correct elements
5	5 correct elements
4	4 correct elements

3	3 correct elements
2	2 correct elements
1	1 correct element
0	Far Below Standard Incorrect response
Exemplar	
6	<p>Part A $15/100 = x/6.75$ OR Other valid proportion AND \$1.01 AND $[(3 \times 1.50) + (2 \times 4.75)] \times (25/100) =$ OR Other valid expression AND \$3.50 AND</p> <p>Part B $(4.8 + 1.2) / 1.5 = m$ OR $4.8 + 1.2 = 1.5 \times m$ OR Other valid equation AND 4 (magazines)</p>

Item # 42

Key Elements	
N/A	
Criteria	
6	<p>Meets Standard (Meets criteria at grade level) 6 correct elements correct division process when finding amount to spend on supplies AND correct answer when finding amount to spend on supplies AND correct multiplication process when finding total cost of pencils AND correct answer when finding total cost of pencils AND</p>

	correct answer when finding total cost of binder and notebook AND correct answer when finding amount left over to spend on supplies
5	5 correct elements
4	4 correct elements
3	3 correct elements
2	2 correct elements
1	1 correct element
0	Far Below Standard Incorrect response
Exemplar	
6	Part A $52.50 \div 3 = 17.50$ AND \$17.50 Part B $4 \times 1.57 = 6.28$ AND \$6.28 Part C \$7.64 Part D \$3.58



**The New York City
Department of Education**

**Grade 6 Mathematics Benchmark
Assessment**

**Teacher Guide
Fall 2012**

November 26, 2012–January 11, 2013

