ACUITY

The New York City Department of Education

Grade 6 Mathematics Baseline Assessment

Teacher Version

September 24, 2012–June 14, 2013

NYC Department of Education

Test Design and Instructional Purpose

The Mathematics Baseline Assessment is designed to help you collect *some* information about your students' mathematical readiness for the work they will encounter in sixth grade. This information can provide insight around students' understanding of the skills, concepts, and application necessary to support successful engagement in the major work of sixth grade. Consequently, the results from the Baseline Assessment may assist you in developing instructional plans that will help your students meet the Common Core expectations for sixth grade.

The assessment is composed of three sections that assess skills and content from the previous grade. Each section has a particular focus. The focus of each section was determined by identifying concepts from fifth grade that support major concepts in sixth grade. All of the items are multiple-choice and were developed to assess a student's understanding of a particular part(s) of a standard, cluster, or domain.

This assessment is meant to be a resource for identifying and understanding some of the skills and concepts that may need to be reinforced/taught if students did not learn them in the previous grade. Please note that since schools are at different points in their transition to the Common Core Learning Standards, students may or may not have been exposed to the Common Core Learning Standards of the preceding 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

The Baseline Assessment is not an exhaustive test. Some important Common Core Learning Standards contain prerequisite skills and concepts that could not be assessed on this test.

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

In Grade 5, the major work focuses largely on fluently multiplying multi-digit whole numbers; finding whole-number quotients and remainders to the case of two-digit divisors; developing the ability to use equivalent fractions as a strategy to add and subtract fractions (with like and unlike denominators); multiplying and dividing fractions or whole numbers by a fraction; and extending algorithms for multi-digit operations to decimals. In Grade 6, students are expected to become fluent in operations with whole numbers, decimals, and fractions and to extend their work with rational numbers to integers. Students are also expected to begin to use properties of operations to work with variables and variable expressions and equations and to use their understanding of multiplication and division of fractions to understand ratios, proportional relationships, and unit rates.

Section 1 (11 items): This section focuses on operations with whole numbers, decimals, and fractions.

Section 2 (7 items): This section focuses on writing and evaluating numerical expressions and generating and interpreting numerical relationships.

Section 3 (12 items): This section focuses on multiplying and dividing fractions.

Math Baseline Grade 6 Report*	
Section 1 Standards 5.NBT.6; 5.NBT.7; 5.NF.1; 5.NF.2; 5.MD.2	A student who correctly answers the questions in Section 1 evidences an understanding of operations with whole numbers, decimals, and fractions. These skills will prepare students for fluency in operations with whole numbers, decimals, and fractions in grade 6 as well as rational numbers and integers in Grade 7.
Section 2 Standards 5.OA.1; 5.OA.2; 5.OA.3; 5.MD.5b	A student who correctly answers the questions in Section 2 evidences an understanding of how to write and evaluate numerical expressions. Students will also demonstrate their ability to generate and interpret numerical relationships. These skills will develop the skills necessary to begin using properties of operations to work with variables and variable expressions and equations.
Section 3 Standards 5.NF.3; 5.NF.4a; 5.NF.5b; 5.NF.5a; 5.NF.6; 5.NF.7c	A student who correctly answers the questions in Section 3 evidences an understanding of how to multiply and divide fractions. Students will apply this skill to multiply and divide fractions in preparation for understanding ratios, proportional relationships and unit rates.

*Listed standards indicate that at least one item is partially aligned to that standard.

Section 1 Items:

Grade	Domain	Cluster	Standard	Items
5	Number and Operations in Base Ten	Perform operations with multi-digit whole numbers and with decimals to hundredths.	5.NBT.6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	1,2
5	Number and Operations in Base Ten	Perform operations with multi-digit whole numbers and with decimals to hundredths.	5.NBT.7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	3,4,5
5	Number and Operations— Fractions	Use equivalent fractions as a strategy to add and subtract fractions.	5.NF.1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, $a/b + c/d = (ad + bc)/bd$.)	6,10
5	Number and Operations— Fractions	Use equivalent fractions as a strategy to add and subtract fractions.	5.NF.2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.	7,8
5	Measurement and Data	Represent and interpret data.	5.MD.2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.	9

Section 2 Items:

Grade	Domain	Cluster	Standard	Items
5	Operations and Algebraic Thinking	Write and interpret numerical expressions.	5.OA.1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	11,12
5	Operations and Algebraic Thinking	Write and interpret numerical expressions.	5.OA.2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.	13,14
5	Operations and Algebraic Thinking	Analyze patterns and relationships.	5.OA.3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.	15,16
5	Measurement and Data	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	5.MD.5b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.	17,18

Section 3 Items:

Grade	Domain	Cluster	Standard	Items
5	Number and Operations - Fractions	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	5.NF.3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?	19,20
5	Number and Operations - Fractions	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	5.NF.4a. Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)	21,22
5	Number and Operations - Fractions	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	5.NF.5a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.	25,26
5	Number and Operations - Fractions	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	5.NF.6. Solve real-world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.	29,30
5	Number and Operations - Fractions	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	5.NF.7c. Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?	23,24
5	Number and Operations - Fractions	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	5.NF.5b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.	27,28

ACUITY

The New York City Department of Education

Grade 6 Mathematics Baseline Assessment

Teacher Version

September 24, 2012–June 14, 2013

NYC Department of Education