Grade 5 Mathematics

Item Specifications

Table of Contents

Grade 5 Mathematics

Introduction

In 2014 Missouri legislators passed House Bill 1490, mandating the development of the Missouri Learning Expectations. In April of 2016, these Missouri Learning Expectations were adopted by the State Board of Education. Groups of Missouri educators from across the state collaborated to create the documents necessary to support the implementation of these expectations.

One of the documents developed is the item specification document, which includes all Missouri grade level/course expectations arranged by domains/strands. It defines what could be measured on a variety of assessments. The document serves as the foundation of the assessment development process.

Although teachers may use this document to provide clarity to the expectations, these specifications are intended for summative, benchmark, and large-scale assessment purposes.

Components of the item specifications include:

Expectation Unwrapped breaks down a list of clearly delineated content and skills the students are expected to know and be able to do upon mastery of the Expectation.

Depth of Knowledge (DOK) Ceiling indicates the highest level of cognitive complexity that would typically be assessed on a large scale assessment. The DOK ceiling is not intended to limit the complexity one might reach in classroom instruction.

Item Format indicates the types of items used in large scale assessment. For each expectation, the item format specifies the type best suited for that particular expectation.

Text Types suggests a broad list of text types for both literary and informational expectations. This list is not intended to be all inclusive: other text types may be used in the classroom setting. The expectations were written in grade level bands; for this reason, the progression of the expectations relies upon increasing levels of quantitative and qualitative text

complexities.

Content Limits/Assessment Boundaries are parameters that item writers should consider when developing a large scale assessment. For example, some   expectations should not be assessed on a large scale assessment but are better suited for local assessment.

Sample stems are examples that address the specific elements of each expectation and address varying DOK levels. The sample stems provided in this document   are in no way intended to limit the depth and breadth of possible item stems. The expectation should be assessed in a variety of ways.

7/11/17

Grade 5 Mathematics

Mathematics	5.NBT.A.1

NBT **A** **1**	**Number Sense and Operations in Base Ten** **Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.** Read, write and identify numbers from billions to thousandths using number names, base ten numerals and expanded form.

Expectation Unwrapped	**DOK Ceiling** 2
The student will write or identify numbers using number names (word form), given base ten numerals (standard form).	
	Item Format Selected Response Constructed Response Technology Enhanced
The student will write or identify numbers using number names (word form), given expanded form.	
The student will write or identify numbers using base ten numerals (standard form), given number names (word form).	
The student will write or identify numbers using base ten numerals (standard form), given expanded form.	**Sample Stems**
The student will identify numbers using expanded form, given number names (word form).	Which statement is fully expanded?
The student will identify numbers using expanded form, given base ten numerals (standard form).	
The student will find multiple equivalent representations in number names (word form), base ten numerals (standard form) and expanded form.	

Content Limits/Assessment Boundaries	**Calculator Designation**
Use the terminology "standard form" and "base ten numerals" interchangeably in the classroom. Use the terminology "word forms" and "number names" interchangeably in the classroom. Assessment terminology will be limited to only base ten numerals and number names. Expanded form can contain addition and/or multiplication, fully or partially expanded. Expanded form will not include powers of ten. When **fully expanded** is stated, the answer should be broken down completely by each place value. Students should not be asked to write expanded form in constructed response.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NBT.A.2

NBT A 2	**Number Sense and Operations in Base Ten** **Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.** Compare two numbers from billions to thousandths using the symbols >, = or <, and justify the solution.

Expectation Unwrapped	DOK Ceiling
The student will compare two numbers from billions to thousandths using the symbols >, =, or <. The student will explain how a given number is >, =, or < another given number. The student will identify if a given justification is correct.	3
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries Does not include ≥ or ≤.	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NBT.A.3

NBT A 3	**Number Sense and Operations in Base Ten** **Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.** Understand that in a multi-digit number, a digit represents 1/10 times what it would represents in the place to its left.

Expectation Unwrapped	**DOK Ceiling** 2
The student will recognize that a digit in one place represents ten times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	**Item Format** Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries Comparison of digits is not limited to one place value to the left or right.	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NBT.A.4

NBT A 4	**Number Sense and Operations in Base Ten** **Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.** Evaluate the value of powers of 10 and understand the relationship to the place value system.

Expectation Unwrapped	**DOK Ceiling** 3
The student will calculate the value of powers of ten. The student will compare how place value changes in relation to powers of ten. The student will convert between base ten numerals (standard form) and expanded form with powers of ten.	**Item Format** Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries Powers are limited to positive integers no greater than ten. Use the terminology "standard form" and "base ten numerals" interchangeably in the classroom. Assessment terminology will be limited to only base ten numerals and expanded form. When given in a question stem, expanded form with powers of ten should include parenthesis, such as $652 = (6 \times 10^2) + (5 \times 10^1) + (2 \times 10^0)$.	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NBT.A.5

NBT A 5	**Number Sense and Operations in Base Ten** **Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.** Round numbers from billions to thousandths place.

Expectation Unwrapped	**DOK Ceiling**
The student will estimate whole numbers with six to eight digits using rounding. The student will estimate decimal numbers up to the thousandths place using rounding.	2
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NBT.A.6

NBT A 6	**Number Sense and Operations in Base Ten** **Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.** Add and subtract multi-digit whole numbers and decimals to the thousandths place, and justify the solution.

Expectation Unwrapped	**DOK Ceiling** 3
The student will add multi-digit whole numbers. The student will add multi-digit decimals. The student will subtract multi-digit whole numbers. The student will subtract multi-digit decimals. The student will identify or explain an error in adding or subtracting. The student will explain the reasonableness of the solution. The student will identify if a given justification is correct.	**Item Format** Selected Response Constructed Response Technology Enhanced
	Sample Stems What is the sum of 52.03 and 28.1? What is the difference between 0.72 and 0.07?
Content Limits/Assessment Boundaries Whole numbers should be less than one billion and the sum should not exceed ten digits. The term "decimals" could include a whole number part.	**Calculator Designation** **NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.NBT.A.7

NBT A 7	**Number Sense and Operations in Base Ten** **Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.** Multiply multi-digit whole numbers and decimals to the hundredths place, and justify the solution.

Expectation Unwrapped	**DOK Ceiling** 3
The student will multiply multi-digit decimals. The student will use multiple representations to model real-world and mathematic problems involving multiplication of multi-digit whole numbers. The student will critique the reasoning of others, identifying errors and alternate approaches to solving problems involving multiplication of multi-digit whole numbers. The student will decontextualize and contextualize problems and solutions to explain his or her reasoning in multiplication of multi-digit whole numbers. The student will identify and explain patterns and the structure of the problems with specific focus on the properties of mathematics when solving problems involving multiplication of multi-digit whole numbers. The student will communicate his or her reasoning precisely to problems involving multiplication of multi-digit whole numbers.	**Item Format** Selected Response Constructed Response Technology Enhanced
	Sample Stems

Content Limits/Assessment Boundaries	**Calculator Designation**
The product should not exceed ten digits. The term "decimals" could include a whole number part.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NBT.A.8

NBT A 8	**Number Sense and Operations in Base Ten**
	Use place value system understanding to perform operations with multi-digit whole numbers to billions and decimals to thousandths.
	Divide multi-digit whole numbers and decimals to the hundredths place using up to two-digit divisors and four-digit dividends, and justify the solution.

Expectation Unwrapped	DOK Ceiling
	3

Expectation Unwrapped

The student will divide multi-digit whole numbers.

The student will divide multi-digit decimals.

The student will rationalize the solution.

The student will identify if a given justification is correct.

DOK Ceiling

3

Item Format

Selected Response
Constructed Response
Technology Enhanced

Sample Stems

Content Limits/Assessment Boundaries

The term "decimals" could include a whole number part.
Numbers are limited up to two-digit divisors and four-digit dividends.

Calculator Designation

NO – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NF.A.1

	Number Sense and Operations in Fractions
NF **A** **1**	**Understand the relationship between fractions and decimals (denominators that are factors of 100).** Understand that parts of a whole can be expressed as fractions and/or decimals.

Expectation Unwrapped	DOK Ceiling
The student will identify parts of a whole using fractions. The student will identify parts of a whole using decimals. The student will identify parts of a whole using fractions and decimals.	**2**

Item Format
Selected Response
Constructed Response
Technology Enhanced

Sample Stems
If I have a circle split in ten equal sections and 3 are shaded, which fraction would represent the unshaded amount?

Pick the correctly shaded circle to represent ½.

Given a box split in 100 pieces with 35 shaded, represent the shaded portion in decimal form.

Content Limits/Assessment Boundaries	Calculator Designation
Denominators are limited to 1, 2, 4, 5, 10, 20, 25, 50 or 100 when working with fractions and decimals. Denominators 3, 6, 8 and 12 may be used when decimals are not involved.	**NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.NF.A.2

NF A 2	**Number Sense and Operations in Fractions** **Understand the relationship between fractions and decimals (denominators that are factors of 100).** Convert decimals to fractions and fractions to decimals.

Expectation Unwrapped	
The student will convert decimals to fractions. The student will convert fractions to decimals.	**DOK Ceiling** 2
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems Represent 1/20 as a decimal.
Content Limits/Assessment Boundaries Denominators are limited to 1, 2, 4, 5, 10, 20, 25, 50 or 100.	**Calculator Designation** **NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.NF.A.3

NF A 3	**Number Sense and Operations in Fractions**
	Understand the relationship between fractions and decimals (denominators that are factors of 100).
	Compare and order fractions and/or decimals to the thousandths place using the symbols >, = or <, and justify the solution.

Expectation Unwrapped	**DOK Ceiling**
	3
The student will compare fractions using >, =, or <.	**Item Format**
	Selected Response
The student will compare decimals using >, =, or <.	Constructed Response
	Technology Enhanced
The student will compare fractions and decimals using >, =, or <.	**Sample Stems**
The student will place fractions in order.	
The student will place decimals in order.	
The student will place fractions and decimals in order.	
The student will justify the solution by identifying a correct explanation from a list of choices.	
The student will justify the solution.	

Content Limits/Assessment Boundaries	**Calculator Designation**
Denominators are limited to 1, 2, 4, 5, 10, 20, 25, 50 or 100 when working with fractions and decimals. Denominators 3, 6, 8 and 12 may be used when decimals are not involved. Questions should not include ≥ or ≤.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NF.B.4
NF B 4 **Number Sense and Operations in Fractions** **Perform operations and solve problems with fractions and decimals.** Estimate results of sums, differences and products with fractions and decimals to the thousandths.	

Expectation Unwrapped	
The student will estimate sums of fractions. The student will estimate sums of decimals to the thousandths place. The student will estimate differences of fractions. The student will estimate differences of decimals to the thousandths place. The student will estimate products of fractions. The student will estimate products of decimals to the thousandths place.	**DOK Ceiling** 2 **Item Format** Selected Response Constructed Response Technology Enhanced **Sample Stems**
Content Limits/Assessment Boundaries Problems may include word problems with or without context, or solving a given expression or equation. This expectation does NOT cover division.	**Calculator Designation** **NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.NF.B.5.a
NF	**Number Sense and Operations in Fractions**	
B	**Perform operations and solve problems with fractions and decimals.**	
5	Justify the reasonableness of a product when multiplying with fractions.	
a	Estimate the size of the product based on the size of the two factors.	

Expectation Unwrapped	
The student will determine how large/small the product of two fractions will be compared to benchmarks with estimation. The student will select the correct model representing the estimate of multiplying two fractions.	**DOK Ceiling** 3
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries Benchmark fractions will include denominators of 1, 2, 3, 4, 5, 6, 8, 10, 12, 20, 25, 50 or 100. Problems may include word problems with or without context, or solving a given expression or equation.	**Calculator Designation** **NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.NF.B.5.b

NF	**Number Sense and Operations in Fractions**
B	**Perform operations and solve problems with fractions and decimals.**
5	Justify the rationale of a product when multiplying with fractions.
b	Explain why multiplying a given number by a fraction greater than 1 results in a product larger than the given number.

Expectation Unwrapped	**DOK Ceiling**
The student will explain why multiplying a given number by an improper fraction will result in a product larger than the given number.	3
	Item Format
The student will explain why multiplying a given number by a mixed number will result in a product larger than the given number.	Selected Response Constructed Response Technology Enhanced
The student will explain why multiplying a given number by a whole number, greater than 1, will result in a product larger than the given number.	**Sample Stems**
The student will select the correct model representing what would happen when multiplying a fraction by a number greater than one.	

Content Limits/Assessment Boundaries	**Calculator Designation**
Students do not need to do the process but be able to explain what happens when multiplying by a number greater than one. Problems may include word problems with or without context, or solving a given expression or equation.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NF.B.5.c

	Number Sense and Operations in Fractions
NF	**Number Sense and Operations in Fractions**
B	**Perform operations and solve problems with fractions and decimals.**
5	Justify the rationale of a product when multiplying with fractions.
c	Explain why multiplying a given number by a fraction less than 1 results in a product smaller than the given number.

Expectation Unwrapped	DOK Ceiling
	3
The student will explain why multiplying a given number by a fraction between zero and one will result in a product smaller than the given number.	**Item Format**
	Selected Response
The student will select the correct model representing what would happen when multiplying a fraction between zero and one.	Constructed Response
	Technology Enhanced
	Sample Stems

Content Limits/Assessment Boundaries	Calculator Designation
Students do not need to be able to do the process, but be able to explain what happens when multiplying between zero and one. Problems may include word problems with or without context, or solving a given expression or equation.	**NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics		5.NF.B.5.d
NF	**Number Sense and Operations in Fractions**	
B	**Perform operations and solve problems with fractions and decimals.**	
5	Justify the rationale of a product when multiplying with fractions.	
d	Explain why multiplying the numerator and denominator by the same number is equivalent to multiplying the fraction by 1.	

Expectation Unwrapped	**DOK Ceiling**
The student should explain that a fraction containing the same number in the numerator and denominator is equal to one. The student will explain why multiplying a numerator and denominator by the same number is equivalent to multiplying by one. The student will select the correct answer representing what would happen when multiplying a fraction by a fraction equivalent to one.	3
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries Problems may include word problems with or without context, or solving a given expression or equation.	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NF.B.6

NF B 6	**Number Sense and Operations in Fractions**
	Perform operations and solve problems with fractions and decimals.
	Solve problems involving addition and subtraction of fractions and mixed numbers with unlike denominators, and justify the solution.

Expectation Unwrapped	**DOK Ceiling**
	3
The student will add fractions with unlike denominators.	**Item Format**
	Selected Response
The student will add mixed numbers with unlike denominators.	Constructed Response
	Technology Enhanced
The student will add fractions and mixed numbers with unlike denominators.	**Sample Stems**
The student will subtract fractions with unlike denominators.	
The student will subtract mixed numbers with unlike denominators.	
The student will subtract mixed numbers and fractions with unlike denominators.	
The student will explain the rationale of an answer.	
The student will identify the mistake in the steps taken to solve a problem.	
The student will identify if a given justification is correct.	

Content Limits/Assessment Boundaries	**Calculator Designation**
Problems may include word problems with or without context, or solving a given expression or equation. Fractions could include improper fractions. Equivalent or reduced fractions may be expected, but not assumed.	**NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.NF.B.7.a
NF	**Number Sense and Operations in Fractions**	
B	**Perform operations and solve problems with fractions and decimals.**	
7	Extend the concept of multiplication to multiply a fraction or whole number by a fraction.	
a	Recognize the relationship between multiplying fractions and finding the areas of rectangles with fractional side lengths.	

Expectation Unwrapped	
The student will identify the correct equation of a given area model showing a fraction by a fraction. The student will identify the correct equation of a given area model showing a whole number by a fraction. The student will identify the model that represents multiplying a fraction by a fraction. The student will identify the model that represents multiplying a whole number by a fraction.	**DOK Ceiling** 1
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems Which of these pictures (rectangles shaded in by the LxW) represent the equation?
Content Limits/Assessment Boundaries Rectangles should have at least one side less than one. Side lengths should not contain mixed numbers. Problems may include word problems with or without context.	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NF.B.7.b
NF **Number Sense and Operations in Fractions**	

NF	**Number Sense and Operations in Fractions**
B	**Perform operations and solve problems with fractions and decimals.**
7	Extend the concept of multiplication to multiply a fraction or whole number by a fraction.
b	Calculate and interpret the product of a fraction by a whole number and a whole number by a fraction.

Expectation Unwrapped	DOK Ceiling
	3
The student will calculate the product of a fraction by a whole number.	**Item Format**
	Selected Response
The student will calculate the product of a whole number by a fraction.	Constructed Response
	Technology Enhanced
The student will select the correct restatement of a problem involving multiplication of whole numbers and fractions.	**Sample Stems**

Content Limits/Assessment Boundaries	Calculator Designation
Questions should not include mixed numbers or improper fractions.	**NO** – a calculator will not be
Problems may include word problems with or without context, or solving a given expression or equation.	available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.NF.B.7.c
NF	**Number Sense and Operations in Fractions**	
B	**Perform operations and solve problems with fractions and decimals.**	
7	Extend the concept of multiplication to multiply a fraction or whole number by a fraction.	
c	Calculate and interpret the product of two fractions less than one.	

Expectation Unwrapped	DOK Ceiling
The student will calculate the product of two fractions between zero and one.

The student will select the correct restatement of a problem involving multiplication of two fractions between zero and one. | 3 |

Item Format

Selected Response
Constructed Response
Technology Enhanced

Sample Stems

Content Limits/Assessment Boundaries	Calculator Designation
For assessment purposes, the interpret component should be written as a selected response.
Fractions should be less than one.
Problems may include word problems with or without context, or solving a given expression or equation.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.NF.B.8.a

NF	**Number Sense and Operations in Fractions**
B	**Perform operations and solve problems with fractions and decimals.**
8	Extend the concept of division to divide unit fractions and whole numbers by using visual fraction models and equations.
a	Calculate and interpret the quotient of a unit fraction by a non-zero whole number.

Expectation Unwrapped	**DOK Ceiling**
The student will calculate the quotient of a unit fraction by a non-zero whole number. The student will identify a visual model that represents the quotient of a unit fraction by a non-zero whole number. The student will identify an equation that represents the quotient of a unit fraction by a non-zero whole number.	2
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries Unit fractions should have denominators of 2, 3, 4, 5, 6, 8, 10, 12, 20, 25, 50 or 100. A unit fraction consists of a numerator of one. Specific visual models should not be named. Problems may include word problems with or without context, or solving a given expression or equation.	**Calculator Designation** **NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.NF.B.8.b

NF	**Number Sense and Operations in Fractions**
B	**Perform operations and solve problems with fractions and decimals.**
8	Extend the concept of division to divide unit fractions and whole numbers by using visual fraction models and equations.
b	Calculate and interpret the quotient of a whole number by a unit fraction.

Expectation Unwrapped	**DOK Ceiling**
The student will calculate the quotient of a whole number by a unit fraction. The student will identify a visual model that represents the quotient of a whole number by a unit fraction. The student will identify an equation that represents the quotient of a whole number by a unit fraction.	2
	Item Format
	Selected Response Constructed Response Technology Enhanced
	Sample Stems

Content Limits/Assessment Boundaries	**Calculator Designation**
Unit fractions should have denominators of 2, 3, 4, 5, 6, 8, 10, 12, 20, 25, 50 or 100. A unit fraction consists of a numerator of one. Specific visual models should not be named. Problems may include word problems with or without context, or solving a given expression or equation.	**NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.RA.A.1.a

RA	**Relationships and Algebraic Thinking**
A	**Represent and analyze patterns and relationships.**
1	Investigate the relationship between two numeric patterns.
a	Generate two numeric patterns given two rules.

Expectation Unwrapped	DOK Ceiling
	2
The student will generate two numeric patterns (up to five terms) given starting numbers and rules.	**Item Format**
	Selected Response
The student will fill in the missing terms given two incomplete patterns and their rules.	Constructed Response
	Technology Enhanced
The student will extend two numeric patterns given the rules.	**Sample Stems**

Content Limits/Assessment Boundaries	Calculator Designation
Patterns should only contain positive integers and zero.	**NO** – a calculator will not be available for items
Patterns can include addition, subtraction, multiplication and division.	
Rules may use only one operation for each pattern.	
Patterns can be organized in lists or tables.	

7/11/17

Grade 5 Mathematics

Mathematics	5.RA.A.1.b
RA Relationships and Algebraic Thinking	
A Represent and analyze patterns and relationships.	
1 Investigate the relationship between two numeric patterns.	
b Translate two numeric patterns into two sets of ordered pairs.	

Expectation Unwrapped	DOK Ceiling
The student will write corresponding ordered pairs given two numeric patterns.	2
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems

Content Limits/Assessment Boundaries	Calculator Designation
Patterns can be organized in lists or tables. Patterns should only contain positive integers and zero.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.RA.A.1.c
RA **A** **1** **c** **Relationships and Algebraic Thinking** **Represent and analyze patterns and relationships.** Investigate the relationship between two numeric patterns. Graph numeric patterns on the Cartesian coordinate plane.	

Expectation Unwrapped	DOK Ceiling
The student will graph ordered pairs given two numeric patterns on the Cartesian coordinate plane.	2
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems

Content Limits/Assessment Boundaries	Calculator Designation
Questions testing RA.A.1.c should be combined with 5.RA.A.1.b Questions should not ask the student to generate numeric patterns from the graph. Patterns should only contain positive integers and zero. Patterns can be organized in lists or tables.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.RA.A.1.d

RA	**Relationships and Algebraic Thinking**
A	**Represent and analyze patterns and relationships.**
1	Investigate the relationship between two numeric patterns.
d	Identify the relationship between two numeric patterns.

Expectation Unwrapped	
The student will describe the relationship between two given numeric patterns.	**DOK Ceiling** 2
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems What is the first number the two patterns above share? Which statement describes the relationship between the two terms? A. Pattern X's terms are twice the amount of Pattern Y's terms.
Content Limits/Assessment Boundaries Relationships should be related to multiplicative comparisons. Patterns can be organized in lists, tables or graphs (such as 5.RA.A.1.c).	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.RA.A.2
RA A 2 **Relationships and Algebraic Thinking** **Represent and analyze patterns and relationships.** Write a rule to describe or explain a given numeric pattern.	

Expectation Unwrapped	
The student will identify a rule to describe a numeric pattern (rules should include the starting number). The student will fill in a missing number(s) in a numeric pattern. The student will extend a given numeric pattern. The student will choose the sequence of numbers that matches a given rule.	**DOK Ceiling** 2 **Item Format** Selected Response Constructed Response Technology Enhanced **Sample Stems** Given the pattern 64, 32, 16…generate the rule. Answer: Starting at 64, divide by 2

Content Limits/Assessment Boundaries	
Rules include the starting number and the change in the sequence. Limit constructed response to missing numbers. Patterns should only contain positive integers and zero. Patterns can be organized in lists or tables. Each pattern is limited to one operation (addition, subtraction, multiplication and division).	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.RA.B.3

RA B 3	**Relationships and Algebraic Thinking** **Write and interpret numerical expressions.** Write, evaluate and interpret numeric expressions using the order of operations.

Expectation Unwrapped	**DOK Ceiling** 3
The student will evaluate numeric expressions containing positive integers using the order of operations. The student will determine where to place parenthesis given an expression in word form. The student will determine if the given process for solving an expression with two operations is correct. The student will determine if the given process for solving an expression with two operations and grouping symbols is correct.	**Item Format** Selected Response Constructed Response Technology Enhanced
	Sample Stems Can be a true/false table with different reasons (false because Suzy multiplied) for the expression to be false. Solve the expression: 4 x (5+3) Solve the expression: 4 x 5 +3 Choose the expression equivalent to 20 + 3 A. 4 x(5+3) B. 4 x 5 +3 C. 4 +15 D. 3 + 17
Content Limits/Assessment Boundaries Numeric expressions should not include exponents. Expressions should include and only result in positive integers.	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.RA.B.4

RA B 4	**Relationships and Algebraic Thinking**
	Write and interpret numerical expressions.
	Translate written expressions into algebraic expressions.

Expectation Unwrapped	**DOK Ceiling**
The student will rewrite a written expression into an algebraic expression using numbers and a variable.	3
	Item Format
	Selected Response
	Constructed Response
	Technology Enhanced
	Sample Stems
	Jim has three times as many oranges as Sam. Choose the algebraic expression that describes the number of oranges Jim has in terms of x, the number of oranges Sam has.
	John has some cookies. Jane has four fewer than John. Write an algebraic expression to represent the number of cookies John has.

Content Limits/Assessment Boundaries	**Calculator Designation**
Expressions should be limited to one variable.	**NO** – a calculator will not be available for items
An expression does not include the = sign, an equation does.	

Grade 5 Mathematics

Mathematics	5.RA.C.5

RA C 5	**Relationships and Algebraic Thinking**
	Use the four operations to represent and solve problems.
	Solve and justify multi-step problems involving variables, whole numbers, fractions and decimals.

Expectation Unwrapped	**DOK Ceiling**
The student will solve multi-step problems involving variables, whole numbers, fractions and decimals.	3
	Item Format
The student will use estimation to assess the reasonableness of answers.	Selected Response
	Constructed Response
The student will identify the mistake in the steps taken to solve a problem.	Technology Enhanced
	Sample Stems
The student will identify if a given justification is correct.	Billy has 5 ½ times the number of cookies that Julie has. Julie has 2 cookies. How many cookies are there all together?

Content Limits/Assessment Boundaries	**Calculator Designation**
Exclude division of fractions by fractions.	**NO** – a calculator will not be available for items
Measurement should be tested using expectation 5.GM.D.9.	
Variable is represented as a letter standing for the unknown quantity.	
Problems may include word problems with or without context, or solving a given expression or equation.	

7/11/17

Grade 5 Mathematics

Mathematics	5.GM.A.1

	Geometry and Measurement
GM A 1	**Geometry and Measurement** **Classify two- and three- dimensional geometric shapes.** Understand that attributes belonging to a category of figures also belong to all subcategories.

Expectation Unwrapped	
The student will identify two-dimensional shapes based on their attributes. The student will identify three-dimensional shapes based on their attributes. The student will describe a shape within a category (e.g., prisms) regardless of the subcategory	**DOK Ceiling** 3
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems

Content Limits/Assessment Boundaries	Calculator Designation
Shapes should be only categorized into one category for this expectation. Categories are limited to: circles, polygons (limited to all triangles, all quadrilaterals, pentagons, hexagons or octagons), prisms, cylinders, cones, spheres and pyramids.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics		5.GM.A.2
GM A 2	**Geometry and Measurement** **Classify two- and three- dimensional geometric shapes.** Classify figures in a hierarchy based on properties.	

Expectation Unwrapped	**DOK Ceiling**
The student will select all categories that describe a two-dimensional shape. The student will select all categories that describe a three-dimensional shape.	3
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems Multi-select…A square is a ? quadrilateral, triangle, trapezoid, rectangle, polygon, or rhombus.
Content Limits/Assessment Boundaries Categories are limited to: circles, polygons (limited to all triangles, quadrilaterals, pentagons, hexagons or octagons), prisms, cylinders, cones, spheres and pyramids.	**Calculator Designation** **NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.GM.A.3

GM A 3	**Geometry and Measurement**
	Classify two- and three- dimensional geometric shapes.
	Analyze and describe the properties of prisms and pyramids.

Expectation Unwrapped	**DOK Ceiling**
	2
The student will describe the properties of prisms according to the number of edges, faces or vertices as well as the types of bases.	**Item Format**
	Selected Response
The student will describe the properties of pyramids according to the number of edges, faces or vertices as well as the types of bases.	Constructed Response
	Technology Enhanced
The student will compare/contrast prisms and/or pyramids.	**Sample Stems**

Content Limits/Assessment Boundaries	**Calculator Designation**
Categories are limited to: prisms and pyramids.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.GM.B.4.a
GM **Geometry and Measurement**	
B **Understand and compute volume.**	
4 Understand the concept of volume and recognize that volume is measured in cubic units.	
a Describe a cube with an edge length of 1 unit as a "unit cube" with "one cubic unit" of volume that can be used to measure volume.	

Expectation Unwrapped	DOK Ceiling
	2
The student will define volume.	**Item Format**
	Selected Response
The student will distinguish the difference between volume and area.	Constructed Response
	Technology Enhanced
The student will determine if volume, area or perimeter should be found in a given situation.	**Sample Stems**
The student will use volume units correctly, using cubic units.	

Content Limits/Assessment Boundaries	Calculator Designation
	NO – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.GM.B.4.b

GM	Geometry and Measurement
B	Understand and compute volume.
4	Understand the concept of volume and recognize that volume is measured in cubic units.
b	Understand that the volume of a right rectangular prism can be found by stacking multiple layers of the base.

Expectation Unwrapped	DOK Ceiling
	3
The student will count cubic units in a given container to determine the volume. The student will determine the number of cubic units needed to fill the box, given the base.	**Item Format** Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.GM.B.5

GM B 5	**Geometry and Measurement** **Understand and compute volume.** Apply the formulas V = l × w × h and V = B × h for volume of right rectangular prisms with whole-number edge lengths.	

Expectation Unwrapped	**DOK Ceiling** 3
The student will apply the formula for volume on a right rectangular prism with labeled sides.	**Item Format** Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries Side lengths should be only whole numbers. Cubes may be labeled on only one edge.	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.GM.C.6.a

GM	Geometry and Measurement
C	**Graph points on the Cartesian coordinate plane within the first quadrant to solve problems.**
6	Define a first quadrant Cartesian coordinate system.
a	Represent the axes as scaled perpendicular number lines that both intersect at 0, the origin.

Expectation Unwrapped	
The student will define the origin as the point (0, 0). The student will pick the correctly drawn Cartesian coordinate plane. The student will use perpendicular number lines to construct a first quadrant Cartesian coordinate plane. The student will place the x and y axis as well as numbers on a given coordinate plane.	**DOK Ceiling** 2
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems X and Y labeled incorrectly Y intersects X at a point other than (0,0) X intersects Y at a point other than (0,0) Drawn correctly From the choices above, pick the correctly drawn coordinate plane.

Content Limits/Assessment Boundaries	Calculator Designation
Graphs are limited to the first quadrant. Problems will not include word problems.	**NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics		5.GM.C.6.b
GM **C** **6** **b**	**Geometry and Measurement** **Graph points on the Cartesian coordinate plane within the first quadrant to solve problems.** Define a first quadrant Cartesian coordinate system. Identify any point on the Cartesian coordinate plane by its ordered pair coordinates.	

Expectation Unwrapped	**DOK Ceiling** 2
The student will identify the ordered pair of a given point in the first quadrant of the Cartesian coordinate plane. The student will identify the correct point from choices on a Cartesian coordinate plane, given the ordered pair.	**Item Format** Selected Response Constructed Response Technology Enhanced
	Sample Stems Points A, B, C and D will be plotted. The ordered pair will be given and the student will be asked which letter goes with it.
Content Limits/Assessment Boundaries Graph points on the Cartesian coordinate plane within the first quadrant.	**Calculator Designation** **NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics		5.GM.C.6.c
GM	**Geometry and Measurement**	
C	**Graph points on the Cartesian coordinate plane within the first quadrant to solve problems.**	
6	Define a first quadrant Cartesian coordinate system.	
c	Define the first number in an ordered pair as the horizontal distance from the origin.	

Expectation Unwrapped	DOK Ceiling
The student will identify what the x coordinate represents. The student will name the x coordinate given a point in the first quadrant of the Cartesian coordinate plane.	2
	Item Format
	Selected Response Constructed Response Technology Enhanced
	Sample Stems

Content Limits/Assessment Boundaries	Calculator Designation
Graph points on the Cartesian coordinate plane within the first quadrant.	**NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.GM.C.6.d
GM **Geometry and Measurement**	
C **Graph points on the Cartesian coordinate plane within the first quadrant to solve problems.**	
6 Define a first quadrant Cartesian coordinate system.	
d Define the second number in an ordered pair as the vertical distance from the origin.	

Expectation Unwrapped	DOK Ceiling
The student will identify what the y coordinate represents. The student will name the y coordinate given a point in the first quadrant of the Cartesian coordinate plane.	2
	Item Format
	Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries Graph points on the Cartesian coordinate plane within the first quadrant.	**Calculator Designation** **NO** – a calculator will not be available for items

Grade 5 Mathematics

Mathematics	5.GM.C.7

GM C 7	**Geometry and Measurement** **Graph points on the Cartesian coordinate plane within the first quadrant to solve problems.** Plot and interpret points in the first quadrant of the Cartesian coordinate plane.

Expectation Unwrapped The student will plot a point in the first quadrant of the Cartesian coordinate plane given an ordered pair. The student will interpret points using real-world examples. The student will interpret points using mathematical situations.	**DOK Ceiling** 3
	Item Format Selected Response Constructed Response Technology Enhanced
	Sample Stems
Content Limits/Assessment Boundaries Graph points on the Cartesian coordinate plane within the first quadrant.	**Calculator Designation** **NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.GM.D.8

GM D 8	**Geometry and Measurement**
	Solve problems involving measurement and conversions within a measurement system.
	Convert measurements of capacity, length and weight within a given measurement system.

Expectation Unwrapped	
	DOK Ceiling
	2
The student will convert measures of capacity within the metric system.	**Item Format**
	Selected Response
The student will convert measures of capacity within the customary system.	Constructed Response
	Technology Enhanced
The student will convert measures of length within the metric system.	
	Sample Stems
The student will convert measures of length within the customary system.	
The student will convert measures of weight within the metric system.	
The student will convert measures of weight within the customary system.	

Content Limits/Assessment Boundaries	Calculator Designation
Conversions should only be in the same system.	**NO** – a calculator will not be available for items
Units should include in., ft., yd., miles, km, m, cm, mm; kg, g, mg, oz., lb., ton; L, mL, cup, pt., qt. and gal.	

Grade 5 Mathematics

Mathematics	5.GM.D.9

GM D 9	**Geometry and Measurement** **Solve problems involving measurement and conversions within a measurement system.** Solve multi-step problems that require measurement conversions.

<table>
<tr>
<td colspan="1">Expectation Unwrapped

The student will conduct multiple operations within a problem to determine an answer and convert it into a new unit.

The student will be given a problem containing two different units requiring one to be converted before an answer is determined.</td>
<td>DOK Ceiling
3</td>
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<tr>
<td rowspan="1"></td>
<td>Item Format
Selected Response
Constructed Response
Technology Enhanced</td>
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</table>

Expectation Unwrapped	DOK Ceiling
The student will conduct multiple operations within a problem to determine an answer and convert it into a new unit. The student will be given a problem containing two different units requiring one to be converted before an answer is determined.	**DOK Ceiling** 3 **Item Format** Selected Response Constructed Response Technology Enhanced **Sample Stems** Johnny ran 3 miles per day for 5 days each week. How many miles did he run after 4 weeks? How many feet in all? Given 5 tons of dirt, how many truckloads are needed to carry it if each truck will hold 500 pounds?
Content Limits/Assessment Boundaries Conversions should only be in the same system. Questions can be as simple as converting units and then performing one operation. Units should include in., ft., yd., miles, km, m, cm, mm; kg, g, mg, oz., lb., ton; L, mL, cup, pt., qt. and gal.	**Calculator Designation** **NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.DS.A.1

DS A 1	**Data and Statistics** **Represent and analyze data** Create a line graph to represent a data set, and analyze the data to answer questions and solve problems.

Expectation Unwrapped	**DOK Ceiling** 3
The student will choose appropriate axis labels. The student will choose reasonable scales for the x and y axis. The student will choose an appropriate title for the line graph. The student will create a line graph to represent given data by placing points correctly. The student will choose the correct graph representing a given data set. The student will choose the correct data set given a line graph. The student will identify the least/most occurring (mode) data. The student will identify trends in the data. The student will identify the range of the data. The student will answer questions about trends on the graph (i.e. increasing/decreasing) by using data. The student will make predictions using the data	**Item Format** Selected Response Constructed Response Technology Enhanced
	Sample Stems Predict why the water usage in the house increases at 5PM.

Content Limits/Assessment Boundaries	**Calculator Designation**
Fraction should have denominators of 2, 3, 4, 5, 6, 8, 10, 12 or 100. Line graphs should not include double line graphs.	**NO** – a calculator will not be available for items

7/11/17

Grade 5 Mathematics

Mathematics	5.DS.A.2

DS A 2	**Data and Statistics**
	Represent and analyze data
	Create a line plot to represent a given or generated data set, and analyze the data to answer questions and solve problems, recognizing the outliers and generating the median.

Expectation Unwrapped	**DOK Ceiling**
The student will choose an appropriate title for the line plot.	3
	Item Format
The student will create a line plot to represent given data by placing points (x) correctly.	Selected Response
	Constructed Response
The student will choose the correct line plot representing a given data set.	Technology Enhanced
The student will choose the correct data set given a line plot.	**Sample Stems**
	How many more students read 12 books than ten books?
The student will identify the least/most occurring (mode) data.	
The student will identify trends in the data.	
The student will identify the range of the data.	
The student will identify the median of the data.	
The student will identify the outlier(s) of the data.	
The student will answer questions by using data from the line plot.	

Content Limits/Assessment Boundaries	**Calculator Designation**
There will be no formal process to determine outliers, but they should clearly be outside of a group of data points. Data sets in which the median should be found may include an odd or even number of data points.	**NO** – a calculator will not be available for items

7/11/17