

# Grade 4 Mathematics Item Specifications



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## 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.

## Grade 4 Mathematics

**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.

# Grade 4 Mathematics

Mathematics		4.NBT.A.1
<b>NBT A 1</b>	<p><b>Number Sense and Operations in Base Ten</b></p> <p><b>Use place value understanding and properties of operations to perform multi-digit arithmetic with numbers up to one million.</b></p> <p>Round multi-digit whole numbers to any place.</p>	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<p>The student will estimate whole numbers ranging from four to five digits to tens or hundreds using rounding.</p> <p>The student will estimate whole numbers ranging from five to six digits to hundreds or thousands using rounding.</p>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Calculator Designation</b></u>
Limit the number being rounded to less than one million and greater than one thousand		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.NBT.A.2
<b>NBT</b>	<b>Number Sense and Operations in Base Ten</b>	
<b>A</b>	<b>Use place value understanding and properties of operations to perform multi-digit arithmetic with numbers up to one million.</b>	
<b>2</b>	Read, write and identify multi-digit whole numbers up to one million using number names, base ten numerals and expanded form.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 3
<p>The student will write or identify numbers up to one million in base ten numerals (standard form) given number names (word form).</p> <p>The student will write or identify numbers up to one million in base ten numerals (standard form) given expanded form.</p> <p>The student will write or identify numbers up to one million in number names (word form) given base ten numerals (standard form.)</p> <p>The student will write or identify numbers up to one million in number names (word form) given expanded form.</p> <p>The student will identify numbers up to one million in expanded form given base ten numerals (standard form).</p> <p>The student will identify numbers up to one million in expanded form given number names (word form).</p> <p>The student will be able to convert between the number names (word form), base ten numerals (standard form) and expanded form in numbers up to one million.</p>		<b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced
		<b><u>Sample Stems</u></b>
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
<p>Expanded form may be expressed <math>500+30+7=</math> or <math>(5 \times 100) + (3 \times 10) + (7 \times 1)</math>.</p> <p>Expanded form may be fully expanded.</p> <p>Use the terminology “standard form” and “base ten numerals” interchangeably in the classroom.</p> <p>Use the terminology “word form” and “number names” interchangeably in the classroom.</p> <p>Assessment terminology will be limited to only “base ten numerals” and “number names”.</p>		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.NBT.A.3
<b>NBT A 3</b>	<p><b>Number Sense and Operations in Base Ten</b></p> <p><b>Use place value understanding and properties of operations to perform multi-digit arithmetic with numbers up to one million.</b></p> <p>Compare two multi-digit numbers using the symbols <math>&gt;</math>, <math>=</math> or <math>&lt;</math>, and justify the solution.</p>	
<p style="text-align: center;"><u><b>Expectation Unwrapped</b></u></p> <p>The student will compare two whole numbers using the symbols <math>&gt;</math>, <math>=</math> or <math>&lt;</math>.</p> <p>The student will justify the solution by identifying the place value that was used to compare the two whole numbers.</p>		<p style="text-align: center;"><u><b>DOK Ceiling</b></u></p> <p style="text-align: center;">3</p> <hr/> <p style="text-align: center;"><u><b>Item Format</b></u></p> <p>Selected Response Constructed Response Technology Enhanced</p> <hr/> <p style="text-align: center;"><u><b>Sample Stems</b></u></p>
<p style="text-align: center;"><u><b>Content Limits/Assessment Boundaries</b></u></p> <p>Up to six digit whole numbers. Do not use <math>\geq</math> or <math>\leq</math> as options.</p>		<p style="text-align: center;"><u><b>Calculator Designation</b></u></p> <p><b>NO</b> – a calculator will not be available for items</p>

# Grade 4 Mathematics

Mathematics		4.NBT.A.4
NBT A 4	<p><b>Number Sense and Operations in Base Ten</b></p> <p><b>Use place value understanding and properties of operations to perform multi-digit arithmetic with numbers up to one million.</b></p> <p>Understand that in a multi-digit whole number, a digit represent 10 times what it would represents in the place to its right.</p>	
<p style="text-align: center;"><b><u>Expectation Unwrapped</u></b></p> <p>The student will be able to use multi-digit whole numbers or pictorial representations to show that the value of a digit is ten times greater than the value of the digit in the place to the immediate right.</p>		<p style="text-align: center;"><b><u>DOK Ceiling</u></b> 3</p> <hr/> <p style="text-align: center;"><b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced</p> <hr/> <p style="text-align: center;"><b><u>Sample Stems</u></b> ____ (tens) = 70(ones)</p>
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <p>Limited to whole numbers. Limited to thousands place. Limited to the digit to the immediate right or one place value.</p>		<p style="text-align: center;"><b><u>Calculator Designation</u></b></p> <p><b>NO</b> – a calculator will not be available for items</p>



# Grade 4 Mathematics

Mathematics		4.NBT.A.5
<b>NBT</b>	<b>Number Sense and Operations in Base Ten</b>	
<b>A</b>	<b>Use place value understanding and properties of operations to perform multi-digit arithmetic with numbers up to one million.</b>	
<b>5</b>	Demonstrate fluency with addition and subtraction of whole numbers.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 3
<p>The student will use multiple representations to model real-world and mathematic problems involving addition and subtraction of whole numbers.</p> <p>The student will critique the reasoning of others, identifying errors and alternate approaches to solving problems involving addition and subtraction of whole numbers.</p> <p>The student will decontextualize and contextualize problems and solutions to explain his or her reasoning in addition and subtraction problems of whole numbers.</p> <p>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 addition and subtraction of whole numbers.</p> <p>The student will communicate his or her reasoning precisely to problems involving addition and subtraction of whole numbers.</p>		<b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced
		<b><u>Sample Stems</u></b>
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
<p>Whole numbers up to one million but not less than three digits. Fluency refers to accuracy and efficiency and does not equate to memorization.</p>		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.NBT.A.6
<b>NBT A 6</b>	<b>Number Sense and Operations in Base Ten</b> <b>Use place value understanding and properties of operations to perform multi-digit arithmetic with numbers up to one million.</b> Multiply a whole number of up to four digits by a one-digit whole number and multiply two two-digit numbers, and justify the solution.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<p>The student will multiply a number up to four digits by a one-digit number.</p> <p>The student will multiply a two-digit number by a two-digit number.</p> <p>The student will use distributive property to solve one digit to four digit numbers.</p> <p>The student will use an area model or array to solve two-digit by two digit multiplication.</p> <p>The student will justify a solution by using estimation or by identifying a strategy.</p>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Calculator Designation</b></u>
Some strategies may include area model, partial products and repeated addition. Do not assess on identifying the properties of operations.		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.NBT.A.7
<b>NBT</b> <b>A</b> <b>7</b>	<b>Number Sense and Operations in Base Ten</b> <b>Use place value understanding and properties of operations to perform multi-digit arithmetic with numbers up to one million.</b> Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, and justify the solution.	
<p style="text-align: center;"><b><u>Expectation Unwrapped</u></b></p> <p>The student will divide three-digit by one digit whole numbers with remainders.</p> <p>The student will divide four-digit by one digit whole numbers with remainders.</p> <p>The student will justify a solution by using estimation or by identifying a strategy.</p>		<p style="text-align: center;"><b><u>DOK Ceiling</u></b></p> <p style="text-align: center;">2</p> <hr/> <p style="text-align: center;"><b><u>Item Format</u></b></p> <p>Selected Response            Constructed Response            Technology Enhanced</p> <hr/> <p style="text-align: center;"><b><u>Sample Stems</u></b></p>
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <p>Do not assess on identifying the properties of operations.            Show remainders using R as opposed to a fraction or decimal.</p>		<p style="text-align: center;"><b><u>Calculator Designation</u></b></p> <p><b>NO</b> – a calculator will not be available for items</p>

## Grade 4 Mathematics

Mathematics		4.NF.A.1
<b>NF</b>	<b>Number Sense and Operations in Fractions</b>	
<b>A</b>	<b>Extend understanding of fraction equivalence and ordering. (Limit denominators to 2, 3, 4, 5, 6, 8, 10, 12 and 100.)</b>	
<b>1</b>	Explain and/or illustrate why two fractions are equivalent.	
<p style="text-align: center;"><u><b>Expectation Unwrapped</b></u></p> <p>The student will select models of equivalent fractions.</p> <p>The student will illustrate using models of equivalent fractions less than one.</p>		<p style="text-align: center;"><u><b>DOK Ceiling</b></u> 3</p> <p style="text-align: center;"><u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced</p> <p style="text-align: center;"><u><b>Sample Stems</b></u></p>
<p style="text-align: center;"><u><b>Content Limits/Assessment Boundaries</b></u></p> <p>Limit the denominators to 2, 3, 4, 5, 6, 8, 10, 12 or 100. All fractions should be less than one.</p>		<p style="text-align: center;"><u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items</p>

# Grade 4 Mathematics

Mathematics		4.NF.A.2
<b>NF A 2</b>	<b>Number Sense and Operations in Fractions</b> <b>Extend understanding of fraction equivalence and ordering. (Limit denominators to 2, 3, 4, 5, 6, 8, 10, 12 and 100.)</b> Recognize and generate equivalent fractions.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 2
The student will recognize and identify equivalent fractions.  The student will generate equivalent fractions.		<b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced
		<b><u>Sample Stems</u></b>
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
Limit the denominators to 2, 3, 4, 5, 6, 8, 10, 12 or 100. All fractions should be less than one.		<b>NO</b> – a calculator will not be available for items

## Grade 4 Mathematics

Mathematics		4.NF.A.3
<b>NF</b>	<b>Number Sense and Operations in Fractions</b>	
<b>A</b>	<b>Extend understanding of fraction equivalence and ordering. (Limit denominators to 2, 3, 4, 5, 6, 8, 10, 12 and 100.)</b>	
<b>3</b>	Compare two fractions using the symbols $>$ , $=$ or $<$ , and justify the solution.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 3
The student will compare two fractions and justify the solution by using a number line.		<b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced
The student will compare two fractions and justify the solution by using a visual fraction model.		
The student will compare two fractions using the symbols $>$ , $=$ or $<$ .		
The student will identify flaws in a justification.		
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
Limit the denominators to 2, 3, 4, 6 or 8. All fractions should be less than one.		<b>NO</b> – a calculator will not be available for items

## Grade 4 Mathematics

Mathematics		4.NF.B.4
<b>NF</b> <b>B</b> <b>4</b>	<b>Number Sense and Operations in Fractions</b> <b>Extend understanding of operations on whole numbers to fraction operations.</b> Understand addition and subtraction of fractions as joining/composing and separating/decomposing parts referring to the same whole.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
The student will combine fractions with like denominators to make a fraction or whole number using a visual model.  The student will separate a whole or fraction to make fractional parts using a visual model.		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
		<u><b>Sample Stems</b></u> Given a picture of a whole, students will show how to shade various parts to show a fraction.
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Calculator Designation</b></u>
Visual fraction models may include a manipulative or drawings where students have to label or shade. Visual models should include only one whole. Questions need not explicitly include addition and subtraction signs.		<b>NO</b> – a calculator will not be available for items

## Grade 4 Mathematics

Mathematics		4.NF.B.5
<b>NF B 5</b>	<b>Number Sense and Operations in Fractions</b> <b>Extend understanding of operations on whole numbers to fraction operations.</b> Decompose a fraction into a sum of fractions with the same denominator and record each decomposition with an equation and justification.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 3
<p>The student will create an equation that shows a given fraction decomposed into fractional parts with the same denominator.</p> <p>The student will create an equation that shows a given fraction decomposed in more than one way.</p> <p>The students will justify a sum of an equation by using a number line.</p> <p>The students will justify a sum of an equation by using a visual fraction model.</p>		<b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
<p>All decompositions should be shown with the same denominator.</p> <p>Visual fraction models may include a manipulative or drawing where students have to label or shade.</p>		<b>NO</b> – a calculator will not be available for items



## Grade 4 Mathematics

Mathematics		4.NF.B.6
<b>NF</b> <b>B</b> <b>6</b>	<b>Number Sense and Operations in Fractions</b> <b>Extend understanding of operations on whole numbers to fraction operations.</b> Solve problems involving adding and subtracting fractions and mixed numbers with like denominators.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
The student will solve addition problems involving fractions with like denominators.  The student will solve addition problems involving mixed numbers with like denominators.  The student will solve subtraction problems involving fractions with like denominators.  The student will solve subtraction problems involving mixed numbers with like denominators.		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Sample Stems</b></u>
Problems may include word problems with or without context, or solving a given, an expression or equation. Equivalent forms may be expressed. Simplified forms may not be required.		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.NF.B.7
<b>NF B 7</b>	<p><b>Number Sense and Operations in Fractions</b></p> <p><b>Extend understanding of operations on whole numbers to fraction operations.</b></p> <p>Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p>	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<p>The student will be given the multiplication problem and asked to find repeated addition or equal groups.</p> <p>The student will be given the repeated addition or equal groups and asked to find the multiplication equation.</p>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
		<u><b>Sample Stems</b></u>
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Calculator Designation</b></u>
<p>Equal groups could be a visual model or in words.</p>		<p><b>NO</b> – a calculator will not be available for items</p>

## Grade 4 Mathematics

Mathematics		4.NF.B.8
<b>NF</b>	<b>Number Sense and Operations in Fractions</b>	
<b>B</b>	<b>Extend understanding of operations on whole numbers to fraction operations.</b>	
<b>8</b>	Solve problems involving multiplication of a fraction by a whole number.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
The student will solve word problems involving multiplication of a fraction by a whole number.		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
The student will find the product of a fraction and a whole number.		
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Calculator Designation</b></u>
Word problems should be limited to one step problems. All fractions should be less than one. Product may be greater than one. Accept either mixed numbers or improper fractions as products. Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12 or 100. Whole numbers should be limited to numbers less than ten.		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.NF.C.9
<b>NF</b> <b>C</b> <b>9</b>	<b>Number Sense and Operations in Fractions</b> <b>Understand decimal notation for fractions, and compare decimal fractions. (Denominators of 10 or 100.)</b> Use decimal notation for fractions with denominators of 10 or 100.	
<u><b>Expectation Unwrapped</b></u>  The student will rename a given fraction with a denominator of ten as a decimal.  The student will rename a given fraction with a denominator of one hundred as a decimal.		<u><b>DOK Ceiling</b></u> 3  <u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced  <u><b>Sample Stems</b></u>
<u><b>Content Limits/Assessment Boundaries</b></u>  Decimal numbers should be less than one.		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items

## Grade 4 Mathematics

Mathematics		4.NF.C.10
<b>NF C 10</b>	<p><b>Number Sense and Operations in Fractions</b></p> <p><b>Understand decimal notation for fractions, and compare decimal fractions. (Denominators of 10 or 100.)</b></p> <p>Understand that fractions and decimals are equivalent representations of the same quantity.</p>	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
<p>The student will rename a given decimal as a fraction with a denominator of ten.</p> <p>The student will rename a given decimal as a fraction with a denominator of one hundred.</p> <p>The student will identify equivalent representations of fractions and decimals.</p>		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Sample Stems</b></u>
<p>All fractions should be less than one.</p> <p>May include visual models as the prompt.</p> <p>Fractions may only have denominators of ten and one hundred.</p>		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.NF.C.11
<b>NF C 11</b>	<p><b>Number Sense and Operations in Fractions</b></p> <p><b>Understand decimal notation for fractions, and compare decimal fractions. (Denominators of 10 or 100.)</b></p> <p>Read, write and identify decimals to the hundredths place using number names, base ten numerals and expanded form.</p>	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b> 3
<p>The student will write or identify decimals up to the hundredths place in base ten numerals (standard form) given number names (word form).</p> <p>The student will write or identify decimals up to the hundredths place in base ten numerals (standard form) given expanded form.</p> <p>The student will write or identify decimals up to the hundredths place in number names (word form) given base ten numerals (standard form).</p> <p>The student will write or identify decimals up to the hundredths place in number names (word form) given expanded form.</p> <p>The student will identify decimals up to the hundredths place in expanded form given base ten numerals (standard form).</p> <p>The student will identify decimals up to the hundredths place in expanded form given number names (word form).</p>		<b><u>Item Format</u></b> Selected Response Constructed Response Technology Enhanced
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
<p>Decimal numbers may be greater than one.</p> <p>Some decimal numbers should include decimals to tenths.</p> <p>Expanded form may be fully expanded.</p> <p>For assessment purposes, expanded form should only be written as addition.</p> <p>Use the terminology “standard form” and “base ten numerals” interchangeably in the classroom.</p> <p>Use the terminology “word form” and “number names” interchangeably in the classroom.</p> <p>Assessment terminology will be limited to only “base ten numerals” and “number names”.</p>		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.NF.C.12
<b>NF C 12</b>	<b>Number Sense and Operations in Fractions</b> <b>Understand decimal notation for fractions, and compare decimal fractions. (Denominators of 10 or 100.)</b> Compare two decimals to the hundredths place using the symbols $>$ , $=$ or $<$ , and justify the solution.	
<p style="text-align: center;"><b><u>Expectation Unwrapped</u></b></p> <p>The student will compare two decimals and justify the solution by using a visual model.</p> <p>The student will compare two decimals and justify the solution in written form.</p> <p>The student will compare two decimals using the symbols <math>&gt;</math>, <math>=</math> or <math>&lt;</math>.</p>		<p style="text-align: center;"><b><u>DOK Ceiling</u></b></p> <p style="text-align: center;">3</p> <hr/> <p style="text-align: center;"><b><u>Item Format</u></b></p> <p>Selected Response            Constructed Response            Technology Enhanced</p> <hr/> <p style="text-align: center;"><b><u>Sample Stems</u></b></p>
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <p>Visual models could include hundreds grid, number line, benchmarks, or manipulative.            Values should be limited to hundreds through hundredths. (e.g. 625.78 would be largest number of digits.)            May not include <math>\geq</math> or <math>\leq</math>.</p>		<p style="text-align: center;"><b><u>Calculator Designation</u></b></p> <p><b>NO</b> – a calculator will not be available for items</p>

# Grade 4 Mathematics

Mathematics		4.RA.A.1
<b>RA</b> <b>A</b> <b>1</b>	<b>Relationships and Algebraic Thinking</b> <b>Use the four operations with whole numbers to solve problems</b> Multiply or divide to solve problems involving a multiplicative comparison.	
<u><b>Expectation Unwrapped</b></u>  The student will solve multiplication word problems involving missing factors.  The students will identify an equation that represents a multiplicative comparison in a given word problem.		<u><b>DOK Ceiling</b></u> 3
		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
		<u><b>Sample Stems</b></u> Example of word problems might be: Janet ate twelve cookies. This was four <b>times</b> as many as Lori ate. How many did Lori eat?
<u><b>Content Limits/Assessment Boundaries</b></u> Numbers may include factors one to ten only.		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items



# Grade 4 Mathematics

Mathematics		4.RA.A.2
<b>RA</b> <b>A</b> <b>2</b>	<b>Relationships and Algebraic Thinking</b> <b>Use the four operations with whole numbers to solve problems</b> Solve multi-step whole number problems involving the four operations and variables and using estimation to interpret the reasonableness of the answer.	
<p style="text-align: center;"><b><u>Expectation Unwrapped</u></b></p> <p>The student will identify an equation using a variable that represents a given problem.</p> <p>The student will solve a whole number multi-step word problem involving any of the four operations.</p> <p>The student will solve a multi-step, whole number equation.</p> <p>The student will use estimation to interpret the reasonableness of an answer.</p> <p>The student will identify a strategy that may be used to determine the reasonableness of a solution.</p>		<p style="text-align: center;"><b><u>DOK Ceiling</u></b></p> <p style="text-align: center;">3</p> <hr/> <p style="text-align: center;"><b><u>Item Format</u></b></p> <p>Selected Response            Constructed Response            Technology Enhanced</p> <hr/> <p style="text-align: center;"><b><u>Sample Stems</u></b></p>
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <p>Problems should be limited to not more than three steps.            Problems should be limited to two operations.            If multiplication is involved, use the multiplication standard to limit size of numbers. 4. NBT.A.6            If division is involved, use the division standard to limit size of numbers. 4.NBT.A.7            If measurement is involved, use the measurement standard to limit problem. 4.GM.C.6            Variable is represented as a letter standing for the unknown quantity.</p>		<p style="text-align: center;"><b><u>Calculator Designation</u></b></p> <p><b>NO</b> – a calculator will not be available for items</p>

# Grade 4 Mathematics

Mathematics		4.RA.A.3
<b>RA A 3</b>	<p><b>Relationships and Algebraic Thinking</b></p> <p><b>Use the four operations with whole numbers to solve problems</b></p> <p>Solve whole number division problems involving variables in which remainders need to be interpreted, and justify the solution.</p>	
<p style="text-align: center;"><b><u>Expectation Unwrapped</u></b></p> <p>The student will solve division problems and determine how the remainder will affect the solution.</p> <p>The student will choose an equation to represent a given word problem. The equation must have a variable representing one of the values.</p>		<p style="text-align: center;"><b><u>DOK Ceiling</u></b></p> <p style="text-align: center;">3</p> <hr/> <p style="text-align: center;"><b><u>Item Format</u></b></p> <p>Selected Response Constructed Response Technology Enhanced</p> <hr/> <p style="text-align: center;"><b><u>Sample Stems</u></b></p>
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <p>If division is involved, use the division standard to limit size of numbers. 4.NBT.A.7</p>		<p style="text-align: center;"><b><u>Calculator Designation</u></b></p> <p><b>NO</b> – a calculator will not be available for items</p>

# Grade 4 Mathematics

Mathematics		4.RA.B.4
<b>RA</b> <b>B</b> <b>4</b>	<b>Relationships and Algebraic Thinking</b> <b>Work with factors and multiples</b> Recognize that a whole number is a multiple of each of its factors and find the multiples for a given whole number.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
The student will identify factors of a given number from a list  The student will recognize the characteristics of a composite number based on its factors.  The student will identify multiples of a given number.  The student will generate factors of a given number.  The student will generate multiples of a given number.		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Calculator Designation</b></u>
If students are asked to list multiples, limit list of multiples to five. All numbers in the problem and the correct solution should be less than one hundred.		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.RA.B.5
<b>RA</b> <b>B</b> <b>5</b>	<b>Relationships and Algebraic Thinking</b> <b>Work with factors and multiples</b> Determine if a whole number within 100 is composite or prime, and find all factor pairs for whole numbers within 100.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
The student will identify a given number as prime or composite.  The student will find all factor pairs for a given whole number.  The student will identify all factor pairs for a given whole number.		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Calculator Designation</b></u>
Whole numbers no greater than one hundred. Factor pairs may be written as (n, m), n x m, n and m or T-chart. No square numbers for factor pairs.		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.RA.C.6
<b>RA</b> <b>C</b> <b>6</b>	<b>Relationships and Algebraic Thinking</b> <b>Generate and analyze patterns.</b> Generate a number pattern that follows a given rule.	
<u><b>Expectation Unwrapped</b></u>  The student will generate a numeric pattern when given the starting number and given the rule.		<u><b>DOK Ceiling</b></u> 3
		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
		<u><b>Sample Stems</b></u>
<u><b>Content Limits/Assessment Boundaries</b></u>  Pattern should not include division. Pattern should include only one operation.		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.RA.C.7
<b>RA</b> <b>C</b> <b>7</b>	<b>Relationships and Algebraic Thinking</b> <b>Generate and analyze patterns.</b> Use words or mathematical symbols to express a rule for a given pattern.	
<u><b>Expectation Unwrapped</b></u>		<u><b>DOK Ceiling</b></u> 3
The student will use words to express a rule for a given pattern.  The student will use an equation to express a rule for a given pattern.		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
<u><b>Content Limits/Assessment Boundaries</b></u>		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items
Pattern should not include division. Pattern should include only one operation.		

# Grade 4 Mathematics

Mathematics		4.GM.A.1
<b>GM</b> <b>A</b> <b>1</b>	<b>Geometry and Measurement</b> <b>Classify 2-dimensional shapes by properties of their lines and angles.</b> Draw and identify points, lines, line segments, rays, angles, perpendicular lines and parallel lines.	
<u><b>Expectation Unwrapped</b></u>  The student will draw and identify points, lines, line segments and rays.  The student will draw and identify perpendicular lines and parallel lines.  The student will draw and identify angles.		<u><b>DOK Ceiling</b></u> 3  <u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced  <u><b>Sample Stems</b></u>
<u><b>Content Limits/Assessment Boundaries</b></u> Identify rays, angles, perpendicular lines and parallel lines in two-dimensional figures. Points may not be assessed using real world pictures.		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.GM.A.2
<b>GM</b>	<b>Geometry and Measurement</b>	
<b>A</b>	<b>Classify 2-dimensional shapes by properties of their lines and angles.</b>	
<b>2</b>	Classify two-dimensional shapes by their sides and/or angles.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b>
The student will classify two-dimensional shapes by their sides.		3
The student will classify two-dimensional shapes into more than one category.		<b><u>Item Format</u></b>
The student will classify two-dimensional shapes by their angles.		Selected Response Constructed Response Technology Enhanced
		<b><u>Sample Stems</u></b>
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
The focus should be on triangles and quadrilaterals.		<b>NO</b> – a calculator will not be available for items



# Grade 4 Mathematics

Mathematics		4.GM.A.3
<b>GM</b> <b>A</b> <b>3</b>	<b>Geometry and Measurement</b> <b>Classify 2-dimensional shapes by properties of their lines and angles.</b> Construct lines of symmetry for a two-dimensional figure.	
<p style="text-align: center;"><b><u>Expectation Unwrapped</u></b></p> <p>The student will construct lines of symmetry for a two-dimensional figure.</p> <p>The student will identify lines of symmetry for a two-dimensional figure.</p>		<p style="text-align: center;"><b><u>DOK Ceiling</u></b></p> <p style="text-align: center;">3</p> <hr/> <p style="text-align: center;"><b><u>Item Format</u></b></p> <p>Selected Response            Constructed Response            Technology Enhanced</p> <hr/> <p style="text-align: center;"><b><u>Sample Stems</u></b></p>
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <p>Circles will not be assessed.            Polygons do not have to be regular.</p>		<p style="text-align: center;"><b><u>Calculator Designation</u></b></p> <p><b>NO</b> – a calculator will not be available for items</p>

# Grade 4 Mathematics

Mathematics		4.GM.B.4
<b>GM</b> <b>B</b> <b>4</b>	<b>Geometry and Measurement</b> <b>Understand the concepts of angle and measure angles.</b> Identify and estimate angles and their measure.	
<u><b>Expectation Unwrapped</b></u>  The student will estimate the measure of an angle.		<u><b>DOK Ceiling</b></u> 3
		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
		<u><b>Sample Stems</b></u>
<u><b>Content Limits/Assessment Boundaries</b></u> Angles may be between zero and one hundred and eighty (inclusive). Classifying angles will be covered in expectation 4.GM.A.1.		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.GM.B.5
<b>GM</b> <b>B</b> <b>5</b>	<b>Geometry and Measurement</b> <b>Understand the concepts of angle and measure angles.</b> Draw and measure angles in whole-number degrees using a protractor.	
<p style="text-align: center;"><b><u>Expectation Unwrapped</u></b></p> <p>The student will draw angles using a protractor.</p> <p>The student will measure angles using a protractor.</p>		<p style="text-align: center;"><b><u>DOK Ceiling</u></b></p> <p style="text-align: center;">3</p> <hr/> <p style="text-align: center;"><b><u>Item Format</u></b></p> <p>Selected Response            Constructed Response            Technology Enhanced</p> <hr/> <p style="text-align: center;"><b><u>Sample Stems</u></b></p>
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <p>When using protractors to draw angles, limit measurements to multiples of ten degrees. (In the classroom the student may be expected to draw angles to the nearest degree.)</p>		<p style="text-align: center;"><b><u>Calculator Designation</u></b></p> <p><b>NO</b> – a calculator will not be available for items</p>

# Grade 4 Mathematics

Mathematics		4.GM.C.6.a
<b>GM</b>	<b>Geometry and Measurement</b>	
<b>C</b>	<b>Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.</b>	
<b>6</b>	Know relative sizes of measurement units within one system of units.	
<b>a</b>	Convert measurements in a larger unit in terms of a smaller unit.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b>
<p>The student will choose the correct unit of measurement for a given situation within a single system.</p> <p>The students will convert measurements from larger units to smaller units.</p>		3
		<b><u>Item Format</u></b>
		Selected Response Constructed Response Technology Enhanced
		<b><u>Sample Stems</u></b>
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
Units limited to inches, feet, yards, kilometers, meters, centimeters, kilograms, grams, pounds, ounces, liters, milliliters, pints, quarts, gallons, hours, minutes and seconds.		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.GM.C.7
<b>GM</b> <b>C</b> <b>7</b>	<b>Geometry and Measurement</b> <b>Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.</b> Use the four operations to solve problems involving distances, intervals of time, liquid volume, weight of objects and money.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b>
<p>The student will use the four operations to solve problems involving distance.</p> <p>The student will use the four operations to solve problems involving intervals of time.</p> <p>The student will use the four operations to solve problems involving liquid volume.</p> <p>The student will use the four operations to solve problems involving weight of objects.</p> <p>The student will use the four operations to solve problems involving money.</p>		3
		<b><u>Item Format</u></b>
		Selected Response Constructed Response Technology Enhanced
		<b><u>Sample Stems</u></b>
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
Limit fractions to denominators two, four or eight. Decimals should be limited to tenths and hundredths. Intervals of time may refer to elapsed time. When computing two numbers all restraints from other fourth grade expectations apply. (e.g., one digit divisors, fractions with like denominators and units should convert from larger to smaller) 4.NBT.A.6, 4.NBT.A.7, 4.GM.C.6		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.GM.C.8
<b>GM</b>	<b>Geometry and Measurement</b>	
<b>C</b>	<b>Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.</b>	
<b>8</b>	Apply the area and perimeter formulas for rectangles to solve problems.	
<b><u>Expectation Unwrapped</u></b>		<b><u>DOK Ceiling</u></b>
The student will apply area formulas for rectangles to solve problems.		3
The student will find the width of a rectangle when given the area and the length.		<b><u>Item Format</u></b>
The student will find the length of a rectangle when given the area and the width.		Selected Response Constructed Response Technology Enhanced
The student will apply perimeter formulas for rectangles to solve problems.		<b><u>Sample Stems</u></b>
The student will find the width of a rectangle when given the perimeter and the length.		
The student will find the length of a rectangle when given the perimeter and the width.		
<b><u>Content Limits/Assessment Boundaries</u></b>		<b><u>Calculator Designation</u></b>
Use whole numbers only. Any division may only include single digit divisors.		<b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.DS.A.1
<b>DS</b> <b>A</b> <b>1</b>	<b>Data and Statistics</b> <b>Represent and analyze data</b> Create a frequency table and/or line plot to display measurement data.	
<u><b>Expectation Unwrapped</b></u>  The student will identify a frequency table for a given set of measurement data.  The students will plot the points on a given frequency table or line plot when given the set of measurement data.  The student will correctly place numbers for the scale on a line plot given a set of measurement data.		<u><b>DOK Ceiling</b></u> 3  <u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced  <u><b>Sample Stems</b></u>
<u><b>Content Limits/Assessment Boundaries</b></u> Scale for data displays could be marked with whole numbers or fractions. Limit fractions to denominators two, four or eight.		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items

# Grade 4 Mathematics

Mathematics		4.DS.A.2
<b>DS</b> <b>A</b> <b>2</b>	<b>Data and Statistics</b> <b>Represent and analyze data</b> Solve problems involving addition and subtraction by using information presented in a data display.	
<u><b>Expectation Unwrapped</b></u>  The student will solve problems using information on a given data display by adding or subtracting.		<u><b>DOK Ceiling</b></u> 3
		<u><b>Item Format</b></u> Selected Response Constructed Response Technology Enhanced
		<u><b>Sample Stems</b></u>
<u><b>Content Limits/Assessment Boundaries</b></u> Fraction operations may only use like denominators. Limit fractions to denominators of two, four or eight. Limit denominators 2, 4 or 8. Data displays are limited to line plot, frequency table, bar graph and picture graph. Problems may include word problems, with or without context, or solving a given expression or equation.		<u><b>Calculator Designation</b></u> <b>NO</b> – a calculator will not be available for items



## Grade 4 Mathematics

Mathematics		4.DS.A.3
<b>DS A 3</b>	<b>Data and Statistics</b> <b>Represent and analyze data</b> Analyze the data in a frequency table, line plot, bar graph or picture graph.	
<p style="text-align: center;"><b><u>Expectation Unwrapped</u></b></p> <p>The student will find the mode given a frequency table, line plot, bar graph or picture graph.</p> <p>The student will find the range given a frequency table, line plot, bar graph or picture graph.</p> <p>The students will identify the least occurring data.</p> <p>The student will identify trends in the data.</p> <p>The student will answer questions about trends on the graph.</p> <p>The student will make predictions using the data.</p>		<p style="text-align: center;"><b><u>DOK Ceiling</u></b></p> <p style="text-align: center;">3</p> <hr/> <p style="text-align: center;"><b><u>Item Format</u></b></p> <p>Selected Response            Constructed Response            Technology Enhanced</p> <hr/> <p style="text-align: center;"><b><u>Sample Stems</u></b></p>
<p style="text-align: center;"><b><u>Content Limits/Assessment Boundaries</u></b></p> <p>Limit fractions to common denominators. Limit fractions to denominators of two, four or eight.</p>		<p style="text-align: center;"><b><u>Calculator Designation</u></b></p> <p><b>NO</b> – a calculator will not be available for items</p>