

<p style="text-align: center;"><b>Pre-Kindergarten</b>  <b>NUMERICAL AND PROPORTIONAL REASONING</b>                      Quantitative relationships can be expressed numerically in multiple ways                      in order to make connections and simplify calculations                      using a variety of strategies, tools and technology.</p>		
<p style="text-align: center;"><b>How are quantitative relationships represented by numbers?</b></p>		
Students should...	Performance Standards	Expected Performances
2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships.	a. <b>Use numbers</b> to <ul style="list-style-type: none"> <li>• count,</li> <li>• order, and</li> <li>• compare.</li> </ul>	(1) <b>Count</b> and <b>identify</b> the number of objects in a set. (2) <b>Compare</b> sets and <b>identify</b> those sets with <ul style="list-style-type: none"> <li>• more,</li> <li>• less, and</li> <li>• the same amounts.</li> </ul> (3) Describe the position of objects using the terms first and last.
	b. <b>Share</b> equal parts of a whole object.	(1) Explore a whole of an object Explore a half of an object.
2.2 Use numbers and their properties <ul style="list-style-type: none"> <li>• to compute flexibly,</li> <li>• to compute fluently, and</li> <li>• to reasonably estimate                             <ul style="list-style-type: none"> <li>○ measures &amp;</li> <li>○ quantities.</li> </ul> </li> </ul>	a. Count, adding one more to the previous amount.	(1) Count by rote, 1 to 10 (2) Count as one more object is added to a set of objects.

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<p style="text-align: center;"><b>How are quantitative relationships represented by numbers?</b></p>		
Students should...	Performance Standards	Expected Performances
<p>2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships.</p>	<p>a. Use numbers to</p> <ul style="list-style-type: none"> <li>• count,</li> <li>• order,</li> <li>• compare,</li> <li>• label,</li> <li>• locate and</li> <li>• measure.</li> </ul>	<p><b>(1) Use</b> numbers to</p> <ul style="list-style-type: none"> <li>• locate,</li> <li>• order,</li> <li>• label, and</li> <li>• measure.</li> </ul> <p><b>(2) Identify</b> the numerals 1-10.  <b>Match</b> sets of objects to the numerals 1-10.  <b>(3) Compare</b> sets using the terms</p> <ul style="list-style-type: none"> <li>• more,</li> <li>• less or</li> <li>• the same and</li> </ul> <p><b>Order</b> sets from least to greatest.  <b>(4) Identify</b> ordinal position of objects,</p> <ul style="list-style-type: none"> <li>• first through fifth, and</li> <li>• last.</li> </ul> <p><b>(5) Act out</b> story problems and <b>Solve</b> practical problems using objects.</p>
	<p>b. Share equal parts of an object.</p>	<p><b>(1)</b> Use a variety of models to identify</p> <ul style="list-style-type: none"> <li>• a whole of an object and</li> <li>• a half of an object.</li> </ul> <p><b>(2)</b> Compare two parts of a whole and                      Describe the two parts of the whole as</p> <ul style="list-style-type: none"> <li>• closer to a whole, or</li> <li>• closer to very little.</li> </ul> <p><b>(3)</b> Recognize that two halves can be put together to make a whole.</p>
	<p>c. Share a set of objects that is divided into groups with equal amounts.</p>	<p><b>(1) Share</b> a set of objects considered to be a whole, <b>by forming</b> two smaller sets that have equal amounts.</p>

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**Kindergarten**

**NUMERICAL AND PROPORTIONAL REASONING**

Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.

**How are quantitative relationships represented by numbers?**

Students should...	Performance Standards	Expected Performances
<p>2.2 Use numbers and their properties</p> <ul style="list-style-type: none"> <li>• to compute flexibly,</li> <li>• to compute fluently, and</li> <li>• to reasonably estimate                             <ul style="list-style-type: none"> <li>○ measures &amp;</li> <li>○ quantities.</li> </ul> </li> </ul>	<p>a. <b>Count</b>, adding one more to the previous number</p> <p><b>Group</b> by ones and tens <b>Count</b> by ones and tens</p>	<p><b>(1) Count</b></p> <ul style="list-style-type: none"> <li>• to and past 10,</li> <li>• to 20,</li> <li>• then to 30.</li> </ul> <p><b>Group</b> objects by 10. <b>Count objects</b> by 10.</p> <p><b>(2) Estimate</b> the amount of objects in a set using ten as a benchmark, and then <b>count</b> to determine if the amount is</p> <ul style="list-style-type: none"> <li>• more than ten or</li> <li>• less than ten.</li> </ul> <p><b>(3) Identify sets</b> and <b>Identify numbers</b> which</p> <ul style="list-style-type: none"> <li>• are equal and</li> <li>• are one more.</li> </ul> <p><b>(4) Recognize</b> pennies and dimes <b>Name</b> pennies and dimes <b>Count</b> pennies and dimes <b>Trade</b> pennies for objects.</p>

<b>Grade One</b> <b>NUMERICAL AND PROPORTIONAL REASONING</b> Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.		
<b>How are quantitative relationships represented by numbers?</b>		
Students should...	Performance Standards	Expected Performances
2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships	a. <b>Represent</b> and <b>Order</b> two digit numbers as groups of tens and ones in the base ten place value system.	<b>(1) Estimate quantity</b> and <b>describe quantity</b> with benchmark amounts such as <ul style="list-style-type: none"> <li>• 0,</li> <li>• 10 and</li> <li>• 100.</li> </ul> <b>(2)</b> Represent 2-digit numbers <ul style="list-style-type: none"> <li>• on number lines and</li> <li>• using models.</li> </ul> <b>(3) Determine values</b> and <b>compare values</b> and <b>trade</b> with sets of pennies and dimes. <b>(4) Identify</b> ordinal position of objects, first through tenth.
	b. <b>Identify</b> and <b>compare</b> equal parts of a whole.	<b>(1) Identify</b> and <b>Represent</b> <ul style="list-style-type: none"> <li>• <math>\frac{1}{2}</math> of a whole,</li> <li>• <math>\frac{1}{3}</math> of a whole and</li> <li>• <math>\frac{1}{4}</math> of a whole and</li> </ul> <b>Identify portions</b> that are <ul style="list-style-type: none"> <li>• not halves,</li> <li>• not thirds or</li> <li>• not fourths.</li> </ul> <b>(2) Compare</b> parts of a whole object and <i>estimate</i> whether the parts of the whole object are closer to <ul style="list-style-type: none"> <li>• a very little,</li> <li>• one half, or</li> <li>• one whole.</li> </ul> <b>(3)</b> Make a whole of equal sized parts of familiar objects.
	c. Partition a set of objects into smaller groups with equal amounts.	<b>(1)</b> Identify half of a small set of objects considered to be the whole.
	d. Describe relationships between quantities using ratios.	<b>(1)</b> Describe patterns with simple ratios using familiar contexts, such as <ul style="list-style-type: none"> <li>• 1 cat has 4 legs,</li> <li>• 2 cats have 8 legs.</li> </ul>

**Grade One**

**NUMERICAL AND PROPORTIONAL REASONING**

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**How are quantitative relationships represented by numbers?**

Students should...	Performance Standards	Expected Performances
<p>2.2 Use numbers and their properties</p> <ul style="list-style-type: none"> <li>• to compute flexibly,</li> <li>• to compute fluently, and</li> <li>• to reasonably estimate measures</li> <li>• to reasonably estimate quantities.</li> </ul>	<p>a. Count by groups. Add one more to the grouping Compare values of groups.</p>	<p>(1) Count whole numbers to 100. (2) <b>Identify, Read, and Write</b></p> <ul style="list-style-type: none"> <li>• numerals to 100</li> <li>• numerals beyond 100</li> </ul> <p>(3) <b>Group</b> and <b>Skip count</b> by</p> <ul style="list-style-type: none"> <li>• 2s</li> <li>• 5s</li> <li>• 10s</li> </ul> <p>(4) Count on from a given amount</p> <ul style="list-style-type: none"> <li>• orally</li> <li>• with models</li> </ul> <p>Count back from ten</p> <p>(5) <b>Identify</b> 1 more and 1 less <b>Explore</b> 10 more and 10 less</p>
	<p>b. Add by</p> <ul style="list-style-type: none"> <li>• counting and</li> <li>• combining</li> </ul> <p>Subtract by</p> <ul style="list-style-type: none"> <li>• separating,</li> <li>• comparing or</li> <li>• counting on.</li> </ul>	<p>(1) Write number sentences(to <b>model?</b>)and to <b>solve</b></p> <ul style="list-style-type: none"> <li>• addition story problems</li> <li>• subtraction story problems</li> </ul> <p>Use objects to <b>model</b> and to <b>solve</b></p> <ul style="list-style-type: none"> <li>• addition story problems</li> <li>• subtractions story problems</li> </ul> <p>Use pictures to <b>model</b> and to <b>solve</b></p> <ul style="list-style-type: none"> <li>• addition story problems</li> <li>• subtractions story problems</li> </ul> <p>(2) <b>Develop</b> and <b>Describe</b> and <b>Use</b> a variety of strategies</p> <ul style="list-style-type: none"> <li>• to add 1-digit numbers.</li> <li>• to subtract 1-digit numbers.</li> </ul> <p>(3) Explore finding the sum of two 2-digit numbers using</p> <ul style="list-style-type: none"> <li>• models and</li> <li>• counting strategies.</li> </ul> <p>(4) Identify reasonable answers to problems that reflect real world experiences.</p>

<p style="text-align: center;"><b>Grade Two</b>  <b>NUMERICAL AND PROPORTIONAL REASONING</b>                      Quantitative relationships can be expressed numerically in multiple ways                      in order to make connections and simplify calculations                      using a variety of strategies, tools and technology.</p>		
<p style="text-align: center;"><b>How are quantitative relationships represented by numbers?</b></p>		
Students should...	Performance Standards	Expected Performances
2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships	a. Represent three digit numbers  as groups of hundreds, tens and ones  in the base ten place value system.	<p><b>(1) <u>Use place value models</u> and <u>Use pictures</u></b></p> <ul style="list-style-type: none"> <li>• to represent 2-digit numbers and</li> <li>• to represent 3-digit numbers</li> </ul> <p><b><u>Write numbers</u></b> (2- and 3-digit)</p> <ul style="list-style-type: none"> <li>• in expanded forms and</li> <li>• in regrouped forms.</li> </ul> <p><b>(2) <u>Locate, label</u> and <u>order</u></b> 2-digit numbers using</p> <ul style="list-style-type: none"> <li>• place value models,</li> <li>• pictures and</li> <li>• number lines.</li> </ul> <p><b><u>Locate, label</u> and <u>order</u></b> 3-digit numbers using</p> <ul style="list-style-type: none"> <li>• place value models,</li> <li>• pictures and</li> <li>• number lines.</li> </ul> <p><b>(3) <u>Use place value models</u>, <u>Use pictures</u> and <u>Use number lines</u>,</b> to identify</p> <ul style="list-style-type: none"> <li>• 10 more and</li> <li>• 10 less and</li> <li>• 100 more and</li> <li>• 100 less.</li> </ul> <p><b>(4) <u>Count with</u>, <u>Determine values of</u>, <u>Compare values of</u> and <u>Trade</u></b></p> <ul style="list-style-type: none"> <li>• pennies,</li> <li>• dimes and</li> <li>• dollars.</li> </ul>
	b. <b><u>Represent fractions</u></b> by sharing portions of equal size as <ul style="list-style-type: none"> <li>• parts of a whole or</li> <li>• parts of a set.</li> </ul>	<p><b>(1) <u>Model</u> and <u>describe</u></b> equal parts of a whole as unit fractions <math>\frac{1}{2}</math> through <math>\frac{1}{10}</math>.</p> <p><b>(2) <u>Use models</u> and <u>Use familiar objects</u></b> to</p> <ul style="list-style-type: none"> <li>• estimate unit fractions (<math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>) of a whole,</li> <li>• compare unit fractions (<math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>) of a whole, and</li> <li>• order unit fractions (<math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>) of a whole.</li> </ul> <p><b>(3) <u>Estimate</u> and <u>use counting</u> and <u>use grouping of objects</u></b> to find equal parts of a small set of counting objects, such as <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math> or <math>\frac{1}{4}</math> of 12 cookies.</p> <p><b>(4) <u>Explore equivalent fractions</u></b> using models.</p>
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**Grade Two**

**NUMERICAL AND PROPORTIONAL REASONING**

Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.

**How are quantitative relationships represented by numbers?**

Students should...	Performance Standards	Expected Performances
<p>2.1 Continued:</p> <p>Understand that a variety of numerical representations can be used to describe quantitative relationships</p>	<p>c. <b>Recognize</b> that the denominator of a fraction tells how many equal parts</p> <ul style="list-style-type: none"> <li>• an object has been divided into or</li> <li>• a set has been an divided into, and</li> </ul> <p><b>Recognize</b> that the numerator indicates how many of the parts are being considered.</p>	<p>(1) <b>Identify</b> and <b>Build models of</b> fractional parts of a whole (such as <math>\frac{3}{4}</math>), other than unit fractions.</p> <p>(2) <b>Explore</b> and <b>Describe</b> addition with like denominators and <b>Write</b> matching fraction sentences using models.</p>
	<p>d. Describe relationships between quantities using ratios.</p>	<p>(1) <b>Describe simple ratios</b> in patterns</p> <ul style="list-style-type: none"> <li>• using models and</li> <li>• using pictures</li> </ul> <p>such as in a pattern of <u>green, green, red blocks</u>, there are always <u>two green blocks for each red block</u>.</p>
<p>2.2. Use numbers and their properties</p> <ul style="list-style-type: none"> <li>• to compute flexibly,</li> <li>• to compute fluently, and</li> <li>• to reasonably estimate measures</li> <li>• to reasonably estimate quantities.</li> </ul>	<p>a. Develop fact families of basic facts</p> <p>using the inverse relationship of addition and subtraction.</p>	<p>(1) <b>Recall</b> basic addition facts <b>Recall</b> basic subtraction facts.</p> <p>(2) <b>Identify</b> reasonable answers.</p> <p><b>Solve addition problems</b> involving real-world experiences.</p> <p><b>Solve subtraction problems</b> involving real-world experiences.</p>
	<p>b. <b>Explore the relationship</b> of multiplication and division through a variety of methods.</p>	<p>(1) <b>Explore multiplication</b> by</p> <ul style="list-style-type: none"> <li>• extending number patterns,</li> <li>• skip counting,</li> <li>• combining repeated addends,</li> <li>• building models of groups the same size</li> <li>• using arrays and</li> <li>• using pictures.</li> </ul> <p>(2) <b>Explore the connection</b> between multiplication and division using</p> <ul style="list-style-type: none"> <li>• models and</li> <li>• pictures of groups and</li> <li>• arrays.</li> </ul>

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**Grade Two**

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Students should...	Performance Standards	Expected Performances
<p>2.2 Continued: <b>Use</b> numbers and their properties</p> <ul style="list-style-type: none"> <li>• to compute flexibly,</li> <li>• to compute fluently,</li> <li>• to reasonably estimate measures and</li> <li>• to reasonably estimate quantities.</li> </ul>	<p>c. <b>Identify</b> and <b>Use</b> equivalent representations of numbers</p> <ul style="list-style-type: none"> <li>• to estimate and</li> <li>• to compute.</li> </ul>	<p><b>(1) Compare numbers</b> and <b>round numbers to the nearest ten</b> using</p> <ul style="list-style-type: none"> <li>• place value models and</li> <li>• number lines.</li> </ul> <p><b>(2) Explore strategies</b> and <b>Describe strategies</b> for</p> <ul style="list-style-type: none"> <li>• representing 2-digit numbers,</li> <li>• estimating 2-digit numbers,</li> <li>• adding 2-digit numbers without regrouping</li> <li>• adding 2-digit numbers with regrouping</li> <li>• subtracting 2-digit numbers without regrouping and</li> <li>• subtracting 2-digit numbers with regrouping.</li> </ul> <p><b>(3) Recognize</b> when an estimate is appropriate. <b>Use</b> estimation strategies that result in identifying a reasonable answer to a problem.</p>

**Grade Three**

**NUMERICAL AND PROPORTIONAL REASONING**

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**How are quantitative relationships represented by numbers?**

Students should...	Performance Standards	Expected Performances
<p>2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships</p>	<p>a. Represent numbers in <b><u>expanded forms</u></b> and <b><u>regrouped forms</u></b> in the base ten place value system.</p>	<p><b>(1) <u>Use models</u> and <u>Use expanded forms</u> and <u>Use regrouped forms</u></b></p> <ul style="list-style-type: none"> <li>• to represent 2-digit numbers</li> <li>• to represent 3-digit numbers.</li> </ul> <p><b>(2) <u>Locate, Label, Compare</u> and <u>Order</u> whole numbers to 1000</b></p> <ul style="list-style-type: none"> <li>• using place value models,</li> <li>• using number patterns and</li> <li>• using the number line.</li> </ul> <p><b><u>Locate, Label, Compare</u> and <u>Order</u> multiples of 10</b></p> <ul style="list-style-type: none"> <li>• using place value models,</li> <li>• using number patterns and</li> <li>• using the number line.</li> </ul> <p><b><u>Locate, Label, Compare</u> and <u>Order</u> multiples of 100</b></p> <ul style="list-style-type: none"> <li>• using place value models,</li> <li>• using number patterns and</li> <li>• using the number line.</li> </ul> <p><b>(3) <u>Name</u> and <u>State</u> the value of</b></p> <ul style="list-style-type: none"> <li>• pennies,</li> <li>• nickels,</li> <li>• dimes,</li> <li>• quarters and</li> <li>• half-dollars</li> </ul> <p><b><u>Show</u> different ways to make a given amount.</b></p>
<p><b>Grade 3 Continued on Next Page</b></p>		

**(4) Determine and Compare the values of sets of coins and Write the values using decimal notation.**

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<p style="text-align: center;"><b>How are quantitative relationships represented by numbers?</b></p>		
Students should...	Performance Standards	Expected Performances
<p>2.1 Continued:</p> <p>Understand that a variety of numerical representations can be used to describe quantitative relationships</p>	<p>b. Recognize that a fraction with the same numerator and denominator represents the whole object or an entire set.</p>	<p>(1) <b>Use models</b> and <b>Use pictures</b> to represent fractions. <b>Label the parts</b> of the fractions</p> <ul style="list-style-type: none"> <li>• with words and</li> <li>• with fraction symbols.</li> </ul> <p>(2) Identify a whole as: a fraction with the same numerator and denominator.</p> <p>(3) <b>Use counting</b> of objects and <b>Use grouping</b> of objects to find equal parts of a set of objects.</p> <p><b>Use models</b> and <b>Use number patterns</b> to identify amounts such as <math>\frac{2}{3}</math> of 12 is 8.</p>
	<p>c. Use fractions <b>to measure</b></p> <ul style="list-style-type: none"> <li>• on a ruler</li> <li>• on a number line</li> </ul> <p>Use fractions <b>to represent points</b></p> <ul style="list-style-type: none"> <li>• on a ruler</li> <li>• on a number line</li> </ul>	<p>(1) <b>Estimate</b> fractional values <b>Measure</b> to the nearest half unit with the aid of</p> <ul style="list-style-type: none"> <li>• number lines and</li> <li>• rulers.</li> </ul>
<p>2.2 <b>Use</b> numbers and their properties</p> <ul style="list-style-type: none"> <li>• to compute flexibly,</li> <li>• to compute fluently,</li> <li>• to reasonably estimate measures and</li> <li>• to reasonably estimate quantities.</li> </ul>	<p>a. Use strategies that involve <b>place value patterns</b> to</p> <ul style="list-style-type: none"> <li>• estimate,</li> <li>• add and</li> <li>• subtract.</li> </ul> <p>Use strategies that involve <b>algebraic properties</b> to</p> <ul style="list-style-type: none"> <li>• estimate,</li> <li>• add and</li> <li>• subtract.</li> </ul>	<p>(1) Identify 10 more than a number. Identify 100 more than a number. Identify 10 less than a number. Identify 100 less than a number.</p> <p>(2) Compare numbers. Round numbers</p> <ul style="list-style-type: none"> <li>• to the nearest 10 and</li> <li>• to the nearest 100.</li> </ul> <p>(3) Use commutative properties to solve problems. Use associative properties to solve properties</p>

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<p>2.2 Continued:</p> <p><b>Use</b> numbers and their properties</p> <ul style="list-style-type: none"> <li>• to compute flexibly,</li> <li>• to compute fluently,</li> <li>• to reasonably estimate measures and to reasonably estimate quantities.</li> </ul>	<p>b. <b>Approximate solutions</b> to problems involving computation through the use of efficient methods</p>	<p><b>(1) Estimate with, Add with and Subtract with</b></p> <ul style="list-style-type: none"> <li>• 2-digit numbers using a variety of strategies</li> <li>• 3-digit numbers using a variety of strategies</li> </ul> <p><b>(2) Use estimation strategies to determine</b> the reasonableness of a computational answer. Use estimation strategies to <b>justify</b> the reasonableness of a computational answer.</p> <p><b>(3) Recognize</b> when an estimate is appropriate. <b>Determine</b> whether an estimation strategy will result</p> <ul style="list-style-type: none"> <li>• in an overestimate or</li> <li>• in an underestimate.</li> </ul>
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<p>2.2 Continued:</p> <p><b>Use</b> numbers and their properties</p> <ul style="list-style-type: none"> <li>• to compute flexibly,</li> <li>• to compute fluently,</li> <li>• to reasonably estimate measures and to reasonably estimate quantities.</li> </ul>	<p>c. <b>Solve multiplication</b> problems and <b>Solve division</b> problems using</p> <ul style="list-style-type: none"> <li>• rectangular arrays,</li> <li>• number patterns,</li> <li>• skip counting and repeated addends.</li> </ul>	<p><b>(1) State the multiplication facts and division facts</b></p> <ul style="list-style-type: none"> <li>• with factors of 1,</li> <li>• with factors of 2,</li> <li>• with factors of 3,</li> <li>• with factors of 4,</li> <li>• with factors of 5 and</li> <li>• with factors of 10.</li> </ul> <p><b>(2) Explore division problems</b></p> <ul style="list-style-type: none"> <li>• with remainders and</li> <li>• without remainders.</li> </ul> <p><b>(3) Write and solve</b></p> <ul style="list-style-type: none"> <li>• multiplication story problems and</li> <li>• division story problems,</li> </ul> <p><b>Match</b> multiplication story problems to number sentences (equations).  <b>Match</b> division story problems to number sentences (equations).</p>
		<p><b>(4) Use models and Use pictures of sets and Use arrays</b> to represent</p> <ul style="list-style-type: none"> <li>• multiplication of 2-digit numbers by 1-digit numbers</li> <li>• multiplication of 3-digit numbers by 1-digit numbers</li> <li>• division of 2-digit numbers by 1-digit numbers</li> <li>• division of 3-digit numbers by 1-digit numbers</li> </ul>

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Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.

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Students should...	Performance Standards	Expected Performances
<p>2.2 Continued:</p> <p>Use numbers and their properties to</p> <ul style="list-style-type: none"> <li>• compute flexibly,</li> <li>• compute fluently, and</li> <li>• reasonably estimate measures</li> <li>• reasonably estimate quantities</li> </ul>	<p>d. <b>Compare</b> fractions. <b>Identify</b> equivalent fractions.</p> <p><b>Add</b> and <b>subtract</b> fractions with LIKE denominators using</p> <ul style="list-style-type: none"> <li>• models and</li> <li>• pictures.</li> </ul> <p><b>Add</b> and <b>subtract</b> fractions with UNLIKE denominators using</p> <ul style="list-style-type: none"> <li>• models and</li> <li>• pictures</li> </ul>	<p><b>(1) Construct</b> models and <b>Use</b> models to</p> <ul style="list-style-type: none"> <li>• compare fractions with like denominators of 2, 3, 4, 5, 6, and 8</li> <li>• compare fractions unlike denominators of 2, 3, 4, 5, 6, and 8</li> <li>• order fractions with like denominators of 2, 3, 4, 5, 6, and 8</li> <li>• order fractions with unlike denominators of 2, 3, 4, 5, 6, and 8</li> <li>• identify equivalent fractions [with denominators of 2, 3, 4, 5, 6, and 8?]</li> </ul> <p><b>(2) Identify</b> patterns with equivalent ratios such as</p> <ul style="list-style-type: none"> <li>• 3 out of 6 crayons are red or</li> <li>• 4 out of 8 crayons are red is the same as 1 out of 2 crayons is red.</li> </ul> <p><b>(3) Construct</b> models and <b>Use</b> models to</p> <ul style="list-style-type: none"> <li>• add fractions with LIKE denominators</li> <li>• add fractions with UNLIKE denominators</li> <li>• subtract fractions with LIKE denominators</li> <li>• subtract fractions with UNLIKE denominators and</li> </ul> <p><b>Write</b> fraction sentences to match the models.</p> <p><b>(4) Write</b> and <b>Solve</b> story problems that involve fractions.</p>

<b>Grade Four: NUMERICAL AND PROPORTIONAL REASONING</b> Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.		
<b>How are quantitative relationships represented by numbers?</b>		
Students should...	Performance Standards	Expected Performances
2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships.	a. <b><u>Extend</u></b> <ul style="list-style-type: none"> <li>whole number place value patterns,</li> <li>models, and</li> <li>notations</li> </ul> to <b><u>include decimals</u></b> , which are fractions that have denominators that are multiples of ten.	<b>(1) <u>Build place value models</u> and <u>Draw diagrams</u> and <u>Show equivalent representations</u> for</b> <ul style="list-style-type: none"> <li>2-digit numbers in expanded form</li> <li>2-digit numbers in regrouped form</li> <li>3-digit numbers in expanded form</li> <li>3-digit numbers in regrouped form</li> <li>4-digit numbers in expanded form</li> <li>4-digit numbers in regrouped form</li> </ul> <b>(2) <u>Build models</u> and <u>Describe tenths</u> and <u>Describe hundredths</u> using</b> <ul style="list-style-type: none"> <li>equivalent ratio,</li> <li>fraction notation and</li> <li>decimal notation.</li> </ul>
	b. <b><u>Use models</u> and <u>Use pictures</u></b> to reveal patterns about <ul style="list-style-type: none"> <li>equivalent fractions and</li> <li>ratios.</li> </ul>	<b>(1) <u>Estimate locations</u> and <u>Label fractions</u></b> <ul style="list-style-type: none"> <li>on number lines and</li> <li>on rulers.</li> </ul> <b>(2) <u>Build</u> and <u>Label</u> a variety of models to</b> <ul style="list-style-type: none"> <li>represent fractional parts of a whole</li> <li>represent mixed numbers</li> <li>compare fractional parts of a whole</li> <li>compare mixed numbers</li> <li>order fractional parts of a whole</li> <li>order mixed numbers</li> <li>identify ratios</li> <li>identify equivalent fractions.</li> </ul> <b>(3) <u>Use counting</u>, <u>Use number patterns</u> and <u>Use grouping</u> to identify parts of a set.</b>
	c. <b><u>Use fractions</u></b> to represent <ul style="list-style-type: none"> <li>a ratio or</li> <li>a division problem.</li> </ul>	<b>(1) <u>Express</u> a division problem as a fraction and <u>Describe</u> the relationship between the divisor and the remainder written as a fraction.</b>
	d. <b><u>Make comparisons</u></b> using ratios. <b><u>Describe quantitative relationships</u></b> using ratios.	<b>(1) <u>Use models</u>, <u>Use pictures</u> and <u>Use number patterns</u></b> <ul style="list-style-type: none"> <li>to solve simple problems involving ratios</li> <li>to solve simple problems involving proportions.</li> </ul>
<b>Grade 4 Continued on Next Page</b>		

**Grade Four: NUMERICAL AND PROPORTIONAL REASONING**

Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.

**How are quantitative relationships represented by numbers?**

Students should...	Performance Standards	Expected Performances
<p>2.2 <b>Use</b> numbers and their properties to</p> <ul style="list-style-type: none"> <li>• compute flexibly,</li> <li>• compute fluently,</li> <li>• reasonably estimate measures and</li> <li>• reasonably estimate quantities.</li> </ul>	<p>a. Use place value concepts to</p> <ul style="list-style-type: none"> <li>• estimate and</li> <li>• compute</li> </ul> <p>Use commutative properties to</p> <ul style="list-style-type: none"> <li>• estimate and</li> <li>• compute.</li> </ul> <p>Use associative properties to</p> <ul style="list-style-type: none"> <li>• estimate and</li> <li>• compute.</li> </ul>	<p><b>(1) Use <u>place value models</u> and <u>diagrams</u> and <u>number patterns</u> and <u>number lines</u> to</b></p> <ul style="list-style-type: none"> <li>• identify                             <ul style="list-style-type: none"> <li>○ 2-digit whole numbers</li> <li>○ 3-digit whole numbers</li> <li>○ 4-digit whole numbers to 10,000</li> </ul> </li> <li>• order                             <ul style="list-style-type: none"> <li>○ 2-digit whole numbers</li> <li>○ 3-digit whole numbers</li> <li>○ 4-digit whole numbers to 10,000</li> </ul> </li> <li>• round                             <ul style="list-style-type: none"> <li>○ 2-digit whole numbers</li> <li>○ 3-digit whole numbers</li> <li>○ 4-digit whole numbers to 10,000</li> </ul> </li> <li>• compare                             <ul style="list-style-type: none"> <li>○ 2-digit whole numbers</li> <li>○ 3-digit whole numbers</li> <li>○ 4-digit whole numbers to 10,000</li> </ul> </li> </ul> <p><b>(2) <u>Solve practical problems</u> and <u>Extent patterns</u> involving</b></p> <ul style="list-style-type: none"> <li>• 10 more</li> <li>• 10 less</li> <li>• 100 more</li> <li>• 100 less</li> </ul> <p><b>(3) Use <u>place value concepts</u>, <u>number patterns</u>, the <u>number line</u>, the <u>commutative property</u> and the <u>associative property</u> to develop</b></p> <ul style="list-style-type: none"> <li>• estimation strategies and</li> <li>• computation strategies.</li> </ul>
<p><b>Grade 4 Continued on Next Page</b></p>		

**Grade Four: NUMERICAL AND PROPORTIONAL REASONING**

Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.

**How are quantitative relationships represented by numbers?**

Students should...	Performance Standards	Expected Performances
<p>2.2 Continued:</p> <p><b>Use</b> numbers and their properties to</p> <ul style="list-style-type: none"> <li>• compute flexibly,</li> <li>• compute fluently,</li> <li>• reasonably estimate measures and</li> <li>• reasonably estimate quantities.</li> </ul>	<p>a. Continued:</p> <p>Use place value concepts to</p> <ul style="list-style-type: none"> <li>• estimate and</li> <li>• compute</li> </ul> <p>Use commutative properties to</p> <ul style="list-style-type: none"> <li>• estimate and</li> <li>• compute.</li> </ul> <p>Use associative properties to</p> <ul style="list-style-type: none"> <li>• estimate and</li> <li>• compute.</li> </ul> <p>b. Use</p> <ul style="list-style-type: none"> <li>• number patterns,</li> <li>• basic facts,</li> <li>• rectangular arrays,</li> <li>• place value models, and</li> <li>• the distributive property</li> </ul> <p><b>to multiply</b> and <b>to divide</b>.</p>	<p><b>(4) Apply</b> and <b>Explain</b> a variety of estimation strategies in problem-solving situations to</p> <ul style="list-style-type: none"> <li>• add 2-digit numbers without regrouping</li> <li>• add 2-digit numbers with regrouping</li> <li>• subtract 2- and 3-digit numbers with and without regrouping and money amounts less than \$10.00.</li> </ul> <p><b>(5) Determine</b> and <b>Discuss</b> the reasonableness of an answer. <b>Explain</b> why a particular estimation strategy will result in an over- or underestimate.</p> <p><b>(6) Write</b> and <b>Solve</b> multi-step word problems, including problems with</p> <ul style="list-style-type: none"> <li>• extraneous information or insufficient information.</li> </ul> <p><b>(1) Develop fluency</b> with multiplication fact families and division fact families for all factors 1 through 10.</p> <p><b>(2) Relate</b> multiplication and division to</p> <ul style="list-style-type: none"> <li>• models with groups and</li> <li>• rectangular arrays.</li> </ul> <p><b>Begin</b> to identify prime and composite numbers.</p> <p><b>(3)</b> Explore the <b>property of zero</b> in multiplication Explore the implication of zero in division.</p> <p><b>(4) Identify</b> the appropriate operation and <b>write</b> a word problem to match a given addition, subtraction, multiplication or division number sentence and <b>Write</b> the matching number sentence to solve a word problem.</p>

**Grade 4 Continued on Next Page**

**Grade Four: NUMERICAL AND PROPORTIONAL REASONING**

Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.

**How are quantitative relationships represented by numbers?**

Students should...	Performance Standards	Expected Performances
<p>2.2 Continued:</p> <p><b>Use</b> numbers and their properties to</p> <ul style="list-style-type: none"> <li>• compute flexibly,</li> <li>• compute fluently,</li> <li>• reasonably estimate measures and</li> <li>• reasonably estimate quantities</li> </ul>	<p>b. Continued:</p> <p>Use</p> <ul style="list-style-type: none"> <li>• number patterns,</li> <li>• basic facts,</li> <li>• rectangular arrays,</li> <li>• place value models, and</li> <li>• the distributive property</li> </ul> <p><b><u>to multiply</u></b> and <b><u>to divide</u></b>.</p> <p>c. <b>Add</b> and <b>Subtract</b> fractions with LIKE denominators using</p> <ul style="list-style-type: none"> <li>• models</li> <li>• pictures</li> <li>• number sentences</li> </ul> <p><b>Add</b> and <b>Subtract</b> fractions with UNLIKE denominators using</p> <ul style="list-style-type: none"> <li>• models</li> <li>• pictures</li> <li>• number sentences</li> </ul> <p><b>Add</b> and <b>Subtract</b> mixed numbers with LIKE denominators using</p> <ul style="list-style-type: none"> <li>• models</li> <li>• pictures</li> <li>• number sentences</li> </ul> <p><b>Add</b> and <b>Subtract</b> mixed numbers with UNLIKE denominators using</p> <ul style="list-style-type: none"> <li>• models</li> <li>• pictures</li> <li>• number sentences</li> </ul>	<p><b>(5)</b> Use arrays and explore using the distributive property <math>10 \times (5 + 4) = (10 \times 5) + (10 \times 4)</math> to</p> <ul style="list-style-type: none"> <li>• estimate,</li> <li>• multiply 2-digit numbers by 1-digit factors</li> <li>• multiply 3-digit numbers by 1-digit factors</li> <li>• divide 2-digit numbers by 1-digit factors</li> <li>• divide 3-digit numbers by 1-digit factors..</li> </ul> <p><b>(1)</b> Solve problems involving the</p> <ul style="list-style-type: none"> <li>• addition of fractions with like denominators and</li> <li>• subtraction of fractions with like denominators.</li> </ul> <p><b>(2) Use models</b> and <b>Use pictures</b> to estimate a reasonable answer when</p> <ul style="list-style-type: none"> <li>• adding decimals,</li> <li>• subtracting decimals,</li> <li>• adding fractions,</li> <li>• subtracting fractions,</li> <li>• adding mixed numbers,</li> <li>• subtracting mixed numbers</li> </ul> <p><b>(3) Write word problems</b> and <b>Solve word problems</b> involving</p> <ul style="list-style-type: none"> <li>• decimals,</li> <li>• fractions and</li> <li>• mixed numbers</li> </ul> <p><b>Identify</b> reasonable answers, and <b>Match</b> equations to the problems.</p>

<p align="center"><b>Grade Five: NUMERICAL AND PROPORTIONAL REASONING</b></p> <p align="center">Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.</p> <p align="center"><b>How are quantitative relationships represented by numbers?</b></p>		
Students should...	Performance Standards	Expected Performances
<p>2.1 Understand that a variety of numerical representations can be used to describe quantitative relationships.</p>	<p>a. Extend whole number</p> <ul style="list-style-type: none"> <li>• place value patterns,</li> <li>• models, and</li> <li>• notations</li> </ul> <p>to <b><u>include decimals</u></b>, which are fractions that have denominators that are multiples of ten.</p>	<p><b>(1) <u>Identify, Round, Order</u> and <u>Compare</u></b> whole numbers to 1,000,000 using</p> <ul style="list-style-type: none"> <li>• place value models,</li> <li>• diagrams and</li> <li>• number lines.</li> </ul> <p><b>(2) <u>Express numbers</u></b> in</p> <ul style="list-style-type: none"> <li>• expanded forms and</li> <li>• regrouped forms and</li> </ul> <p><b><u>Use the numbers</u></b> to support computational strategies.</p> <p><b>(3) <u>Solve</u></b> problems involving finding</p> <ul style="list-style-type: none"> <li>• 10 more and 10 less</li> <li>• 100 more and 100 less</li> <li>• 1000 more and 1000 less.</li> </ul> <p><b>(4) <u>Estimate products</u> and <u>Estimate missing factors</u></b> using multiples of</p> <ul style="list-style-type: none"> <li>• 10,</li> <li>• 100 and</li> <li>• 1000.</li> </ul> <p><b>(5) <u>Use models</u></b> to extend whole number</p> <ul style="list-style-type: none"> <li>• place value concepts to decimals and</li> <li>• patterns to decimals.</li> </ul> <p><b>(6) <u>Explore</u></b> numbers less than zero and <b><u>Extend the number line</u></b> to introduce the concept of integers within practical applications.</p>
	<p>b. Classify numbers by their factors.</p>	<p><b>(1) <u>Use rectangular arrays</u></b> to</p> <ul style="list-style-type: none"> <li>• identify factor pairs and</li> <li>• classify numbers as                             <ul style="list-style-type: none"> <li>○ prime</li> <li>○ composite</li> <li>○ perfect squares [1, 4, 9, 16, 25, 36, 49, ...]</li> </ul> </li> </ul> <p><b>(2) <u>Explore</u></b> divisibility rules. Explore patterns with remainders.</p>

**Grade 5 Continued on Next Page**

**Grade Five: NUMERICAL AND PROPORTIONAL REASONING**

Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.

**How are quantitative relationships represented by numbers?**

Students should...	Performance Standards	Expected Performances
<p>2.1 Continued:</p> <p>Understand that a variety of numerical representations can be used to describe quantitative relationships.</p>	<p>c. Express numbers as equivalent</p> <ul style="list-style-type: none"> <li>• fractions</li> <li>• decimals</li> <li>• percents</li> </ul>	<p><b>(1) <u>Represent a rational number</u></b> in its equivalent FRACTION, DECIMAL, RATIO and PERCENT forms with</p> <ul style="list-style-type: none"> <li>• models,</li> <li>• number patterns and</li> <li>• common factors.</li> </ul> <p><b>(2) <u>Construct</u> and <u>Use</u></b> models to add</p> <ul style="list-style-type: none"> <li>• fractions with LIKE denominators</li> <li>• fractions with UNLIKE denominators</li> <li>• decimals with LIKE denominators</li> <li>• decimals with UNLIKE denominators</li> <li>• mixed numbers with LIKE denominators</li> <li>• mixed numbers with UNLIKE denominators</li> </ul> <p><b><u>Construct</u> and <u>Use</u></b> models to subtract</p> <ul style="list-style-type: none"> <li>• fractions with LIKE denominators</li> <li>• fractions with UNLIKE denominators</li> <li>• decimals with LIKE denominators</li> <li>• decimals with UNLIKE denominators</li> <li>• mixed numbers with LIKE denominators</li> <li>• mixed numbers with UNLIKE denominators</li> </ul> <p><b><u>Construct</u> and <u>Use</u></b> pictures to add</p> <ul style="list-style-type: none"> <li>• fractions with LIKE denominators</li> <li>• fractions with UNLIKE denominators</li> <li>• decimals with LIKE denominators</li> <li>• decimals with UNLIKE denominators</li> <li>• mixed numbers with LIKE denominators</li> <li>• mixed numbers with UNLIKE denominators</li> </ul> <p><b><u>Construct</u> and <u>Use</u></b> pictures to subtract</p> <ul style="list-style-type: none"> <li>• fractions with LIKE denominators</li> <li>• fractions with UNLIKE denominators</li> <li>• decimals with LIKE denominators</li> <li>• decimals with UNLIKE denominators</li> <li>• mixed numbers with LIKE denominators</li> <li>• mixed numbers with UNLIKE denominators</li> </ul>
<p><b>Grade 5 Continued on Next Page</b></p>		

<p align="center"><b>Grade Five: NUMERICAL AND PROPORTIONAL REASONING</b></p> <p align="center">Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.</p> <p align="center"><b>How are quantitative relationships represented by numbers?</b></p>		
Students should...	Performance Standards	Expected Performances
<p>2.1 Continued:</p> <p>Understand that a variety of numerical representations can be used to describe quantitative relationships.</p>	<p>c. Continued:</p> <p>Express numbers as equivalent</p> <ul style="list-style-type: none"> <li>• fractions</li> <li>• decimals</li> <li>• percents</li> </ul>	<p><b>(3) Use <u>equivalence</u> and Use <u>substitution with common denominators</u></b></p> <ul style="list-style-type: none"> <li>• when adding and</li> <li>• when subtracting [fractions, decimals, and percents?].</li> </ul> <p><b>(4) <u>Construct</u> and <u>Use</u> models to multiply common</b></p> <ul style="list-style-type: none"> <li>• fractions and</li> <li>• mixed numbers.</li> </ul> <p><b><u>Construct</u> and <u>Use</u> pictorial representations to multiply common</b></p> <ul style="list-style-type: none"> <li>• fractions and</li> <li>• mixed numbers.</li> </ul>
	<p>d. <b><u>Represent ratios</u> and <u>Represent proportions</u> and <u>Solve problems</u></b></p> <ul style="list-style-type: none"> <li>• using models</li> <li>• using pictures</li> </ul>	<p><b>(1) <u>Build models</u> to</b></p> <ul style="list-style-type: none"> <li>• identify ratios and</li> <li>• compare ratios</li> </ul> <p><b><u>Describe quantitative relationships</u> using fraction and decimal equivalents.</b></p> <p><b>(2) <u>Write</u> division problems in fraction form and <u>Round</u> the fraction form to estimate an answer to a division problem.</b></p> <p><b>(3) <u>Use ratios</u> and <u>Use proportions</u> to solve practical problems such as</b></p> <ul style="list-style-type: none"> <li>• interpreting maps</li> <li>• interpreting scale drawings or</li> <li>• identifying probability.</li> </ul>

**Grade 5 Continued on Next Page**

<p align="center"><b>Grade Five: NUMERICAL AND PROPORTIONAL REASONING</b></p> <p align="center">Quantitative relationships can be expressed numerically in multiple ways in order to make connections and simplify calculations using a variety of strategies, tools and technology.</p>		
<p align="center"><b>How are quantitative relationships represented by numbers?</b></p>		
Students should...	Performance Standards	Expected Performances
<p>2.2 Continued:</p> <p><b>Use</b> numbers and their properties to</p> <ul style="list-style-type: none"> <li>• compute flexibly,</li> <li>• compute fluently,</li> <li>• reasonably estimate measures and</li> <li>• reasonably estimate quantities</li> </ul>	<p>a. <b>Estimate</b> and <b>Compute</b></p> <ul style="list-style-type: none"> <li>• using models</li> <li>• using pictures</li> </ul>	<p><b>(1) Choose benchmarks</b> and <b>Use benchmarks</b> to approximate locations</p> <ul style="list-style-type: none"> <li>• on number lines and</li> <li>• on coordinate grids.</li> </ul> <p><b>(2) Estimate</b> and <b>Use</b></p> <ul style="list-style-type: none"> <li>• counting to find fractional parts of a set of objects.</li> <li>• grouping of objects to find fractional parts of a set of objects</li> <li>• number patterns to find fractional parts of a set of objects,</li> <li>• equivalent ratios to find fractional parts of a set of objects</li> <li>• division to find fractional parts of a set of objects.</li> </ul> <p><b>(3)</b> Develop strategies, using <b>place value relationships</b> and <b>inverse operations</b> and the <b>commutative property</b> and the <b>associative property</b> and the <b>distributive property</b> to simplify computations with</p> <ul style="list-style-type: none"> <li>• 2-digit numbers</li> <li>• 3-digit numbers</li> <li>• -digit numbers</li> <li>• money amounts</li> </ul> <p><b>(4)</b> Use estimation</p> <ul style="list-style-type: none"> <li>• to predict results</li> <li>• to recognize when an answer is or is not reasonable.</li> </ul> <p><b>(5)</b> Explain when an estimation strategy will result in an over- or underestimate.</p> <p><b>(6) Create</b> and <b>Solve</b> multi-step problems <b>Explore order of operations</b> in the context of practical situations.</p>