

Number and Computation Chart of Student Competencies For Grades 1 through 8

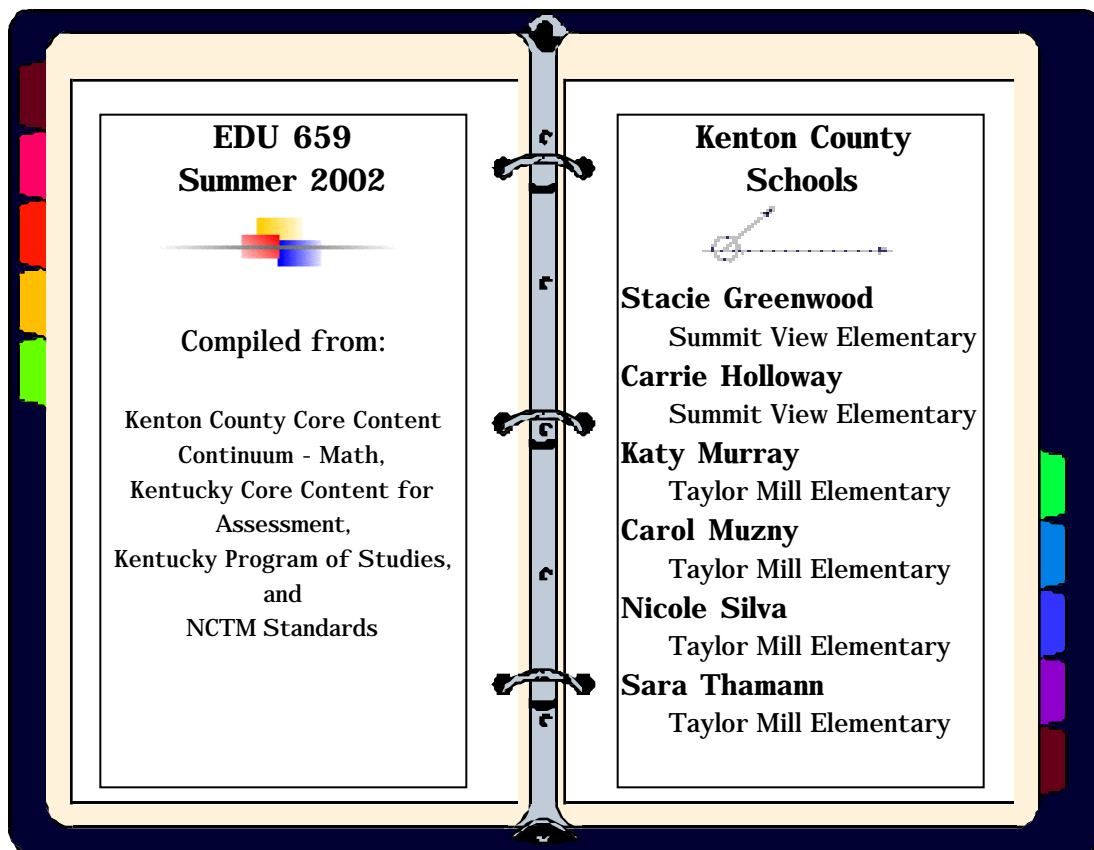


Chart of Student Competencies
Number and Operations
First Grade

Topic	Number/Computation	Date(s) Taught	Date(s) Assessed
<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • recognize, identify, model, and count numbers 0-100 both orally and written, forwards and backwards. • relate number words and numerals to the quantities they represent, using various physical models and representation. • recognize and identify place value ones, tens, and hundreds. • skip count by 1's, 2's, 5's and 10's • recognize and identify ordinal and cardinal numbers 0-10. • recognize and identify fractions – whole, halves, thirds, and fourths. • use appropriate math vocabulary and symbols +, -, =, >, <. • recognize and identify the function of a calculator. • estimate quantity of objects 			

<p>Understand meanings of operations and how they relate to one another</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • recognize and identify the meaning of addition and subtraction – sums to 18. • recognize the relationship between addition and subtraction. • associate base ten block system relationship to the place value system. 		
<p>Compute fluently and make reasonable estimates</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • add two digit equations without regrouping. • use calculator for simple addition and subtraction. 		

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Number and Operations

Second Grade

Topic	Number/Computation	Date(s) Taught	Date(s) Assessed
	<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • recognize and identify place value ones, tens, and hundreds. • relate how the base 10 number system relates to place value. • skip count 1's, 2's, 5's, and 10's as an introduction to multiplication using (x) sign. • recognize and identify doubles concept (1 less, 1 more). • order and compare numbers $<$, $>$. • estimate quantities • recognize and identify odd and even numbers. • recognize and identify math vocabulary- sum, difference, equal, less than, greater than, and addends. • write a fraction to correspond to a given picture. • use math vocabulary in problem solving situations (how many left, etc). 		
	<p>Understand meanings of operations and how they relate to one another</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • recognize and identify parts of a whole, equal/unequal parts of a fraction. • apply vocabulary to concrete activity for choice of operation. • understand when to use multiplication and 		

<p>division such as equal groupings of objects and sharing equally.</p> <ul style="list-style-type: none"> • demonstrate how properties of addition/subtraction are used in computation. • demonstrate how basic facts relate to life situations. 		
<p>Compute fluently and make reasonable estimates</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • add and subtract basic facts through 18 by memory. • solve 1 more, 1 less (addition problems) based on knowledge of doubles. • 2 digit addition/subtraction with and without trading (renaming and regrouping). • use a calculator for basic problems. • use calculators, mental computation, estimation, paper and pencil, and objects to compute and solve problems. 		

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Number and Operations
Third Grade

Topic Number/Computation	Date(s) Taught	Date(s) Assessed
<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • read, write, model, order, and compare whole numbers from 0 to 10,000, developing place value for hundred thousands and millions. • develop understanding of fractions as parts of unit wholes and as parts of a collection (e.g. $\frac{2}{4}$). • estimate quantities. • round numbers up through hundreds. • explore appropriate estimation procedures for whole numbers. • use decimals to represent money. • explore multiples by skip-counting by 2, 5, 10. 		
<p>Understand meanings of operations and how they relate to one another</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • understand meaning of addition and subtraction (basic facts, 3 and 4 digits with and without regrouping). • understand meaning of multiplication and division (basic facts through 10, multiply and divide 2 digit by 1 digit with no remainders). • understand the effects of multiplying whole numbers. • identify strategies for problem solving (e.g. guess/check, draw, using diagrams). 		

<p>Compute fluently and make reasonable estimates</p> <p>The student should be able to:</p> <ul style="list-style-type: none">• add, subtract (basic facts, 3 and 4 digits with and without regrouping) whole numbers using a variety of methods (e.g. mental, paper/pencil, calculator).• multiply, and divide (basic facts through 10, multiply and divide 2 digit by 1 digit with no remainders) whole numbers using a variety of methods (e.g. mental, paper/pencil, calculator).• apply strategies for problem solving (e.g. guess/check, draw, using diagrams).• add common fractions with common denominators using manipulatives.• add and subtract decimals using money.		

Chart of Student Competencies
Number and Operations
Fourth Grade

Topic	Number/Computation	Date(s) Taught	Date(s) Assessed
	<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • read, write, model, order, and compare whole numbers from 0 to 1,000,000, developing place value for hundred thousands and millions. • find factors/multiples of a whole number. • estimate quantities. • compare fractions with a numerator of 1 using manipulatives. • explore multiple representations of equivalent fractions (e.g., $\frac{1}{2} = \frac{3}{6}$) with manipulatives. • read, write, and identify decimals through one-thousandths with manipulatives. • develop equivalent relationships between common fractions, decimals, and whole numbers (e.g. $\frac{1}{2} = 0.5$). • recognize, identify, and define odd and even numbers. • develop understanding of fractions as locations on number lines. • add and subtract fractions with common denominators using manipulatives and/or diagrams. • add and subtract simple decimals to hundredths using manipulatives and/or diagrams. 		
	<p>Understand meanings of operations and how they relate to one another</p>		

<p>The student should be able to:</p> <ul style="list-style-type: none"> • understand computational procedures for adding, subtracting, multiplying, and dividing whole numbers using memorized basic facts. • understand how properties of addition, subtraction, multiplication, and division are used in computation (e.g. number sense: $24 + 9 = 24 + 10 - 1$). • understand various meanings and effects of multiplication and division. • identify and communicate strategies for problem solving (e.g. guess/check, draw a diagram, work backwards). 		
<p>Compute fluently and make reasonable estimates</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • explore appropriate estimation procedures(+, -, x, ÷) for whole numbers to 1,000,000 and judge the reasonableness of such results. • apply computational procedures for adding, subtracting, multiplying, and dividing whole numbers using memorized basic facts. • apply strategies for problem solving (e.g. guess/check, draw a diagram, work backwards). 		

Chart of Student Competencies

Number and Operations

Fifth Grade

Topic Number/Computation	Date(s) Taught	Date(s) Assessed
<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • read, write, model, order, and compare whole numbers from 0 to 100,000,000, developing place value for ten millions and one hundred millions. • use factors to determine prime and composite numbers, determine factors/multiples of whole numbers, and describe classes of numbers according to the nature of their factors • compare and apply the relative sizes of common and mixed fractions. • investigate multiple representations of equivalent fractions (e.g., $\frac{1}{2} = \frac{3}{6}$), decimals, whole numbers and percents with manipulatives, drawings, and fractional notation. • read, write, and identify decimals through ten-thousandths. • recognize, identify, and define odd and even numbers. • develop understanding of fractions as divisions of whole numbers. • explore numbers less than 0 by extending the number line and through familiar applications. • explore appropriate estimation procedures for whole numbers, fractions, and decimals and judge the reasonableness of such results. 		

<p>Understand meanings of operations and how they relate to one another</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • understand the various meanings and effects of addition, subtraction, multiplication, and division of whole numbers. • understand how properties of addition, subtraction, multiplication, and division are used in computation (e.g. number sense: $24 + 9 = 24 + 10 - 1$). • identify and communicate strategies for problem solving (e.g. guess/check, draw a diagram, work backwards, inverse operations). • understand and use properties of operations, such as the distributive property of multiplication over addition. 		
<p>Compute fluently and make reasonable estimates</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • add, subtract, multiply, and divide whole numbers using a variety of methods (e.g. mental, paper/pencil, calculator). • determine least common multiples. • add and subtract simple fractions with common denominators using manipulatives and symbolic notation. • add and subtract decimals to hundredths using manipulatives and symbolic notation. • apply strategies for problem solving (e.g. guess/check, draw a diagram, work backwards). 		

Chart of Student Competencies

Number and Operations

Sixth Grade

Topic	Number/Computation	Date(s) Taught	Date(s) Assessed
<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • increase number sense using fractions, decimals, and percents (including percents greater than 100% and improper fractions). • develop meaning of ratio (describe and compare two sets of data using ratios and appropriate notations, such as 2:3, 2/3, 2 to 3). • develop place value of larger and smaller numbers (include decimals). • investigate exponents (e.g., squares, cubes). • estimate with large and small quantities of numbers. • determine prime numbers, composite numbers, factors, multiples, greatest common factors, and least common multiples. • compare, order, and convert between whole numbers, fractions, and decimals using concrete materials, drawings or pictures, and mathematical symbols (<, >, =, order on a number line). • investigate how applications of properties (e.g., commutative, distributive, associative, inverse, identify) show relationships among numbers and operations. 			
<p>Understand meanings of operations and how they relate to one another</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • increase and apply understanding of operations (+, -, x, ÷) to include fractions and 			

<p>decimals using manipulatives and symbols (e.g. mental, pencil and paper, calculators).</p> <ul style="list-style-type: none"> • simplify fractions with prime factorizations (stating a given number as a product of prime numbers). 		
<p>Compute fluently and make reasonable estimates The student should be able to:</p> <ul style="list-style-type: none"> • use prime numbers, composite numbers, factors, multiples, and divisibility rules to solve problems. • estimate and mentally compute using fractions and decimals. • add, subtract, multiply, and divide fractions, decimals, and percents. 		

Chart of Student Competencies

Number and Operations

Seventh Grade

Topic	Number/Computation	Date(s) Taught	Date(s) Assessed
	<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • increase number sense to include percents and integers. • develop number sense for pi (π) as one example of an irrational number. • understand and use whole number exponents and scientific notation. • compare, order, and determine equivalent relationships among fractions, decimals, and percents. 		
	<p>Understand meanings of operations and how they relate to one another</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • continue understanding of operations (+, -, \times, \div) to include integers. • extend and apply operations of integers (+, -, \times, \div) both concretely and symbolically (mental, pencil and paper, calculators). • compute percentages of numbers. • solve proportions. • extend concepts and application of operations with fractions and decimals to include percents. • explain and apply properties (e.g., commutative, associative, distributive, inverse, and identity). 		

<p>Compute fluently and make reasonable estimates</p> <p>The student should be able to:</p> <ul style="list-style-type: none">• apply meaning of ratio and proportion to solve problems.• use percentages in proportional reasoning.• develop proportional thinking, rates, scaling, and similarity.		

Chart of Student Competencies

Number and Operations

Eighth Grade

Topic	Number/Computation	Date(s) Taught	Date(s) Assessed
	<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • use irrational numbers (e.g., square roots). • relate rational and irrational numbers (e.g., magnitude and order) on a number line. 		
	<p>Understand meanings of operations and how they relate to one another</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • use percents, decimals, integers, and fractions (include percents less than 1). • determine the inverse relationship between addition and subtraction, multiplication and division, or raising to an exponent and taking the root of a number. 		
	<p>Compute fluently and make reasonable estimates</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • use percentages and proportions in consumer applications (e.g., simple interest, percentages of increase or decrease, discounts, unit pricing, sale prices). • develop and analyze algorithms for computing with fractions, decimals, and integers and develop fluency in their use. • develop and use strategies to estimate the results of rational-number computations and judge the reasonableness of the results. • develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios. 		

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| <ul style="list-style-type: none">• add, subtract, multiply, and divide with integers. | | |
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References

Kenton County Core Content Continuum – Math, Level P2 – Grade 5

Kentucky Core Content for Assessment, Grades K –5 and 6 – 8

Kentucky Program of Studies, Primary, Grades 4 - 8

National Council of Teachers of Mathematics Standards, Grades K - 8