

Student Competency Charts

Grades 3-8

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Chart of Student Competencies Number and Operations

Grade Level: 3

Name of Developer: Verna Pulsfort

Topic	Dates Taught	Dates 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"> • explore the estimation and rounding processes • use place value and expanded form of numbers to 10,000 • develop understanding of fractions as parts of unit wholes, as parts of a collection • generate equivalent forms of fractions using manipulatives • order and compare fractions • explore the connections between fractions, decimals and whole numbers • recognize even and odd numbers • skip count by 2's, 5's, 10's and 100 • read, write, and model numbers from 0-1,000 		
<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"> • apply the operations of addition and subtraction of three digit numbers • use multiple representations of numbers using drawings, manipulatives and charts for the four operations • add and subtract decimals (money) • use mental, pencil and paper, and calculator for four operations • solve story problems using addition, subtraction, multiplication and division 		
<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 two digit numbers • use the estimation process with addition and subtraction operations 		

Chart of Student Competencies Number and Operations

Grade Level: 4

Names of Developer: Cami Young

Topic	Dates Taught	Dates Assessed
<p>Understand <i>numbers</i>, ways of representing numbers, relationships among numbers, and number systems The student should be able to:</p> <ul style="list-style-type: none"> • Determine factors/multiples of a whole number • Investigate multiple representations of equivalent fractions with manipulatives • Read, write, and identify decimals through one-thousandths with manipulatives • Order and compare numbers to 1 million • Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers • Describe classes of numbers according to characteristics such as the nature of their factors • Use models, benchmarks, and equivalent forms to judge the size of fractions • Develop equivalent relationships between common fractions, decimals, and whole numbers • Compare unit fractions (numerators of 1) using manipulatives • Read, write, and model whole numbers from 0 to 1 million • Order and compare numbers to 1 million • Understand the relative magnitude of whole numbers to 1 million • Estimation with quantities of objects 		
<p>Understand meanings of <i>operations</i> and how they relate to one another The student should be able to:</p> <ul style="list-style-type: none"> • Add and subtract fractions with common denominators using manipulatives and diagrams • Apply skills of long division using 1 digit divisor • Identify and use relationships between operations • Add and subtract decimals using money 		

Topic	Dates Taught	Dates Assessed
<p><i>Compute</i> fluently and make reasonable estimates The student should be able to:</p> <ul style="list-style-type: none"> • Understand and apply computational procedures or adding, subtracting, multiplying, and dividing whole numbers using memorized basic facts • Develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems • Select appropriate methods and tools for computing with whole numbers from among mental computation, estimations, calculators, and paper and pencil according to the context and nature of the computations and use the selected methods or tools • Explore appropriate estimation procedures and use the information to judge the reasonableness of such results 		

Chart of Student Competencies Number and Operations

Grade Level: 5

Name of Developer: Pam Dumaine

Topic	Dates Taught	Dates Assessed
<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems The student should be able to:</p> <ul style="list-style-type: none"> • Read, write, model and compare whole numbers from 0 to 100,000,000 and decimals through ten-thousandths • Develop place value for rational numbers from one hundred million to ten-thousandths • Determine prime & composite numbers, factors, multiples, greatest common factors and least common multiples • Compare and apply the relative sizes of common and mixed fractions, decimals and whole numbers • Compare, order and convert between whole numbers, fractions and decimals using concrete materials, drawings & number lines • Investigate multiple representations of equivalent fractions with manipulatives, drawings and fractional notation. • Estimate quantities of objects 		
<p>Understand meanings of operations and how they relate to one another The student should be able to:</p> <ul style="list-style-type: none"> • Add and subtract fractions with common and unlike denominators • Add and subtract decimals to hundredths using manipulatives and symbolic notation • Extend understanding of operations (+, -, x, /) to include fractions and decimals • Develop an understanding of real-life applications using decimals and fractions 		
<p>Compute fluently and make reasonable estimates The student should be able to:</p> <ul style="list-style-type: none"> • Master addition and subtraction of larger numbers with regrouping • Master multiplication of larger numbers and long division using 2-digit divisors • Estimate computational results using an appropriate strategy 		

**Chart of Student Competencies
Number and Operations**

Grade Level: 6

Names of Developer: Kathy Steffen

Topic	Dates Taught	Dates 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"> • Continue to develop meaning for 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: 3:5, 3/5, 3 to 5). • Use prime numbers, composite numbers, factors, multiples, and divisibility to solve problems. • Develop an understanding of large numbers using exponential notation (e.g., squares, cubes). • Compare, order, and convert between whole numbers, fractions, and decimals using mathematical symbols (<, >, =, order on a number line), concrete materials, and drawings or pictures. • Estimate with large and small quantities 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"> • Solve real-world problems using a combination of the four basic operations. • Explore how applications of properties (e.g., commutative, associative, inverse, and identity) show relationships among numbers and operations. • Extend understanding of the meaning and effects of operations (+, -, x, ÷) to include fractions and decimals. 		
Topic	Dates Taught	Dates Assessed
<p>Compute fluently and make reasonable estimates</p> <p>The student should be able to:</p> <ul style="list-style-type: none"> • Select appropriate methods and tools for computing with fractions and 		

<p>decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods.</p> <ul style="list-style-type: none">• Develop and analyze algorithms for computing with fractions and decimals and develop fluency in their use.		
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Chart of Student Competencies Number and Operations

Grade Level: 7

Names of Developer: Linda Phillips

Topic	Dates Taught	Dates Assessed
<p>Understand numbers, ways of representing numbers, relationships among numbers, and number systems The student should be able to:</p> <ul style="list-style-type: none"> • extend number sense for fraction, decimals and percents to solve problems; • compare, order, and determine equivalent relationships among fractions, decimals and percents; • develop meaning for integers and represent and compare quantities with them; • understand and use ratios and proportions to represent quantitative relationships; • develop an understanding of large numbers and recognize and appropriately use exponential, scientific and calculator notation; • extend the use of factors, multiples, and prime factorization to include relatively prime numbers to solve problems; • develop number sense for pi as one example of an irrational number. 		
<p>Understand meanings of operations and how they relate to one another The student should be able to:</p> <ul style="list-style-type: none"> • understand the meaning and effects of arithmetic operations (+, -, x, /) with fractions, decimals and integers; • use the associative and commutative properties of addition and multiplication and the distributive property of multiplication over addition to simplify computations with integers, fractions and decimals; 		
<p>Compute fluently and make reasonable estimates The student should be able to:</p> <ul style="list-style-type: none"> • select appropriate methods and tools for computing with integers and percents (both concretely and symbolically) from among mental computation, estimation, calculator or computers, and paper and pencil, depending on the situation, and apply the selected methods; • 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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Chart of Student Competencies Number and Operations

Grade Level: 8

Names of Developer: Paige Harper

Topic	Dates Taught	Dates Assessed
Understand numbers, ways of representing numbers, relationships among numbers, and number systems The student should be able to: <ul style="list-style-type: none"> • Use percents, decimals, integers, and fractions (include percents greater than 100 and less than 1) • Use irrational numbers (e.g. square roots) • Relate irrational and rational numbers (e.g. magnitude, order on a number line) 		
Understand meanings of operations and how they relate to one another The student should be able to: <ul style="list-style-type: none"> • Determine the inverse relationship between addition and subtraction, multiplication, division, or raising to an exponent and taking the root of a number. • Use percentages and proportions in consumer applications (e.g. simple interest, percentages of increase or decrease, discounts, unit pricing, sale prices) • Extend positive and negative number operations. 		
Compute fluently and make reasonable estimates The student should be able to: <ul style="list-style-type: none"> • Develop and analyze algorithms for computing with fractions, decimals, percents and integers and develop fluency in their use. 		

References:

- Diocese of Covington (2002). *Diocese of Covington K-12 Curriculum Guidelines for Mathematics*. Covington, KY: Diocese of Covington.
- Kentucky Department of Education (2001). *Program of Studies*. Retrieved from Kentucky Department of Education Web site: <http://www.kde.state.ky.us/oapd/curric/Publications/ProgramofStudies/Math/midmath.html>.
- Lincoln Elementary (2001). *Dayton Independent School Curriculum for Fourth Grade Mathematics*. Dayton, KY: Lincoln Elementary.
- National Council of Teachers of Mathematics (2000). Principles and Standards for School Mathematics. Reston, VA: NCTM.
- Sharp Middle School (1999). Pendleton County Schools. Falmouth, KY.