FCPS – 1ST GRADE STANDARDS FRAMEWORK – TRAJECTORY MAP FOR KAS & INV3

FCPS Priorities for Mathematics Classrooms, K-12

Priority 1: Curriculum – All teachers consistently use the district adopted curriculum and make instructional decisions about how to use it in a way that aligns with the vision for excellent math instruction.

Priority 2: Student Thinking and Discussion – All students are responsible for doing the thinking and participating in academic discussions during each lesson.

Priority 3: Appropriate Balance of Rigor – All math lessons incorporate an appropriate balance of conceptual understanding, procedural skills and fluency, and application (as determined by the target standards).

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Kentucky Academic Standards	**1st Quarter – Aug., Sept. Units 1 & 2**	**2nd Quarter – Oct., Nov., Dec. – Units 3 & 4**	**3rd Quarter – Jan., Feb., mid-Mar. – Unit 5 & 6**	**4th Quarter – mid-Mar., April, May – Units 7 & 8**
Operations and Algebraic Thinking				
Cluster: Represent and solve problems involving addition and subtraction.				
KY.1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions			**MP. 1, MP.2**	
Students flexibly model or represent addition and subtraction situations or context problems (involving sums and differences up to 20). See Table 1 in Appendix A. **Note:** Drawings need not show detail, but accurately represent the quantities involved in the task.	• I can solve "add-to" word problems up to 10 with result unknown. • I can solve "take-from" word problems with result unknown. • I can solve "put together problems" with result unknown. •	• I can find at least 5 solutions to a put together/take apart problems with both addend unknown. • I can solve comparison problems with the difference unknown (how many more, how many fewer).	• I can solve put together/take apart problems with one addend unknown. • I can solve an add to and take from problems with unknown change. • I can solve comparison story problems with a bigger or smaller unknown.	
KY.1.OA.2 Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, by using objects, drawings and equations with a symbol for one unknown number to represent the problem.			**MP. 1, MP.4, MP.5**	
Students flexibly model or represent addition situations or context problems (involving adding three quantities and have a sum less than or equal to 20). **Note:** Drawings need not show detail, but accurately represent the quantities involved in the task.	•	• I can solve story problems with 3 addends.	•	•

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Attending to the Standards for Mathematical Practice
Students realize mathematics involves interpreting the meaning of problems and endeavoring to solve problems by selecting useful and appropriate tools and manipulatives **(MP.1, MP.5).** When reading/interpreting word problems, students recognize a number (seven or 17) represents a quantity (7 dots or 17 people) and consider what is happening to these quantities in the context of the problem **(MP.2)**. Students represent situations using numbers and symbols. For example, students translate "There are ten apples. Some were eaten. Three remain. How many were eaten?" into an equation such as 10 – __ = 3? **(MP.4).**

Cluster: Understand and apply properties of operations and the relationship between addition and subtraction

KY.1.OA.3 Apply properties of operations as strategies to add and subtract.			**MP. 2, MP.7**	
Students are not responsible for knowing the formal language of the different properties, but have the conceptual understanding of each property (commutative and associative property).	• I can determine which of two pairs of numbers to 10 is greater.	• I can represent numbers with equivalent expressions. • I can find at least 5 solutions to a put together/take apart problems with both addend unknown.	• I can use anchor numbers (e.g. 5, 10) to help solve other problems.	• I can use what I know about 10 to help solve problems with larger numbers.
KY.1.OA.4 Understand subtraction as an unknown-addend problem.			**MP. 2, MP.7**	
Students connect addition and subtraction as operations. (I can solve 10 - 8 by thinking about what adds to 8 to make 10 [__+ 8 = 10].)	• I can solve "take-from" word problems with result unknown. •	• I can solve comparison problems with the difference unknown (how many more, how many fewer). •	• I can solve a take apart problem with one addend unknown. • I can determine the unknown in an addition or subtraction equation relating 3 numbers (e.g., 5+ ____=8).	•

Attending to the Standards for Mathematical Practice
Students understand an equation such as 8 + 3 = 11, the numerals "8" and 3" represent two quantities combine to form a combined quantity of 11. Students explain the order in which the addends are combined does not affect the resulting sum (MP.3). Students generalize this idea (the commutative property) to all addition situations, for example, explaining that switching two piles of counters doesn't change how many are there **(MP.7).** Similarly, students notice the order and manner in which multiple addends are combined does not affect the sum (the associative property). Students reason 10 - 8 = ? also means 8 + ? = 10; therefore, they solve the problem by asking themselves what is the number added to 8 to make 10 **(MP.2).**

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Cluster: Add and subtract within 20.				
KY.1.OA.5 Relate counting to addition and subtraction			**MP.5, MP.8**	
Strategies used when relating addition to subtraction: counting all (addition); counting on (addition); counting all (subtraction); counting back (subtraction); counting on (subtraction). Chart with Examples at end of document	• I can understand that counting forward 1 or 2 is the same as adding 1 or 2. • I can understand that counting backward 1 or 2 is the same as subtracting 1 or 2. • I can solve +1, +2, -1, -2 problems.	• I can use a number-line to solve addition and subtraction problems. • I can solve +1, +2, -1, -2 problems fluently.	• I can use a number-line to solve addition and subtraction problems. • I can count on/count back to add/subtract within 20	• I can count on/count back to add/subtract within 20.
KY.1.OA.6 Add and subtract within 20.			**MP.2, MP.7, MP.8**	
a. Fluently add and subtract within 10. *Students solve addition and subtraction tasks (with sums and differences within 10) efficiently, accurately, flexibly and appropriately. Being fluent means students choose flexibly among methods and strategies to solve contextual and mathematical problems, they understand and explain their approaches, and they produce accurate answers efficiently.* ***Note**: Reaching fluency is an ongoing process that will take much of the year.*	• I can solve doubles and small parts of tens fluently.	• I can solve five-plus parts of ten and all partitions of five.	• I can solve large parts of ten and all other combinations. • I can show fluency with addition & subtraction ***within*** 10. •	• I can show fluency with addition & subtraction ***within*** 10. • I can solve all partitions of 6, 7, 8,9, & 10.
b. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making 10; decomposing a number	• I can understand that counting forward or backward is the same as adding or subtracting.	• I can represent numbers with equivalent expressions.	• I can use different strategies to solve problems.	• I can use different strategies to solve problems.

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leading to a 10; using the relationship between addition and subtraction; creating equivalent but easier or known sums.	• I can determine which of two pairs of numbers to 10 is greater.	• I can make a ten to help solve a problem. • I can break a number into smaller parts that help solve the problem.		
Cluster: Work with addition and subtraction equations.				
1.OA.D.7: Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2	•	• I can represent numbers with equivalent expressions.	• I can understand and explain the meaning of the equal sign. • I can explain which expressions are (or are not) equal and why.	•
1.OA.D.8: Determine the unknown whole number in an addition or subtraction equation relating to three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = □ – 3, 6 + 6 = □.	• I can solve +1, +2, -1, -2 problems fluently.	•	• I can determine the unknown in an addition or subtraction equation relating 3 numbers (e.g., 5+ ____=8).	•
Number and Operations in Base Ten				
Cluster: Extend the counting sequence.				
1.NBT.1: Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.	• I can count forward or backward starting at any number between 1 and 30. •	• I can say the number word sequence forward and backward within 120. • I can read numerals 0 – 120.	•	• I can explain that the multiples of 10 through 90 (decuples) refer to 1-9 tens and 0 ones.

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		• I can write numerals 0 – 120.		• I can use a numeral to represent a number of objects organized into tens and ones. • I can represent a given numeral with tens and ones.
Cluster: Understand place value				
KY.1.NBT.2: Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:			**MP.5, MP.7**	
a. 10 can be thought of as a bundle of ten ones — called a "ten."	•	• I can explain ten ones and one "ten" and model what that looks like.	•	•
b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.	•	• I can explain the teen numbers as one ten and some number of ones.	•	•
c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).	•	• I can build bundles or sets of ten and count by tens.	•	• I can explain that the multiples of 10 through 90 (decuples) refer to 1-9 tens and 0 ones and model what that looks like.
KY.1.NBT.3: Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.			**MP.2**	
	•	• I can compare numbers	•	• I can use standard notation to represent the comparison of 2-digit numbers.

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Cluster: Use place value understanding and properties of operations to add and subtract.				
KY.1.NBT.4 Add within 100 including adding a two-digit number and a one-digit number. Add a two-digit number and a multiple of 10.			**MP.7, MP.2, MP.3**	
• Students model addition examples with sums to 100 using concrete materials, pictures and numerals. Students use mental computation strategies to develop conceptual understanding and number sense around adding one- and two-digit numbers. ** Manipulatives include: Unifix Cubes, Linker Cubes, bundles of craft sticks, 100 rekenkek, 100 bead string, open number-lines. For conceptual understanding, **DO NOT** use base ten blocks or other materials where ones cannot be easily determined.				
a. Add within 100 using… • concrete models or drawings; • strategies based on place value; • properties of operations; • the relationship between addition and subtraction.	•	•	•	• I can add a one-digit number to any two-digit number using concrete models and strategies that represent tens and ones. (• I can add a multiple of 10 to any 2-digit number using mental math, jump-counting, or an open number line.
b. Relate the addition strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.	•	•	• I can add or subtract a ten to a multiple of ten. (60 + 10 = ___) • I can add or subtract a multiple of ten to a multiple of ten. (40 + 30 = __)	• I can add a multiple of 10 to any 2-digit number using mental math, jump-counting, or an open number line. •
1.NBT.C.5 – Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.	•	•	•	• I can mentally add or subtract 10 to/from any 2-digit number and explain my thinking.

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1.NBT.C.6 – Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	•	•	•	• I can subtract multiples of 10 from multiples of 10 using concrete models that represent tens and ones (bundles or linking cubes).
Measurement and Data				
Cluster: Measure lengths indirectly and by iterating length units				
1.MD.A.1 – Order three objects by length; compare the lengths of two objects indirectly by using a third object.	•	• Compare the lengths of two objects indirectly by using a third length and explain.	•	•
1.MD.A.2 – Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a*	•	• I can demonstrate accurate measuring techniques when measuring an object or distance in multiple units. • I can accurately start at the beginning, end at the end, and leave no gaps or overlaps. • I can accurately measure in a straight line and keep track	•	•

whole number of length units with no gaps or overlaps.		of the number of units measured.		
Cluster: Tell and write time.				
1.MD.B.3 – Tell and write time in hours and half-hours using analog and digital clocks.	•	• I can tell time to the hour.	•	• I can tell time to the half-hour.
Cluster: Represent and interpret data.				
1.MD.C.4 – Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	•	•	• I can represent and describe a set of data with two or three categories. • I can describe how many are in each group. • I can describe which group has more/how many more. • I can describe how many responses were collected.	•
Geometry				
Cluster: Reason with shapes and their attributes.				
1.G.1 – Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.	• I can compose and decompose shapes in different ways. • I can build and draw familiar 2-D shapes. • I can use geometric language to describe and identify important attributes, and use those	•	•	• I can use geometric language to describe and identify defining attributes of familiar 3D shapes. • I can match a 2D representation of a 3-D shape to the outline of one of it's faces.

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	attributes to sort familiar 2-D shapes.			
1.G.2 – Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.[1] [1]*Students do not need to learn formal names such as "right rectangular prism."*	• I can compose and decompose shapes in different ways. •	•	•	• I can compose 3-D shapes.
1.G.3 – Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.	•	• I can explain that halves or fourths (quarters) apply to wholes divided into two (or four) equal parts. • I can partition circles and rectangles into two and four equal parts. • I can explain what happens to each share as the whole is partitioned into parts.	•	•
	•	•	•	•
	•	•	•	•

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Appendix A

Appendix A: Tables

Table 1

Common Addition and Subtraction Situations[1]

	Result Unknown	Change Unknown	Start Unknown
Add To	Two bunnies sat on the grass. Three more bunnies hopped there. How many bunnies are on the grass now? 2 + 3 = ?	Two bunnies were sitting on the grass. Some more bunnies hopped there. Then there were five bunnies. How many bunnies hopped over to the first two? 2 + ? = 5	Some bunnies were sitting on the grass. Three more bunnies hopped there. Then there were five bunnies. How many bunnies were on the grass before? ? + 3 = 5
Take From	Five apples were on the table. I ate two apples. How many apples are on the table now? 5 – 2 = ?	Five apples were on the table. I ate some apples. Then there were three apples. How many apples did I eat? 5 - ? = 3	Some apples were on the table. I ate two apples. Then there were three apples. How many apples were on the table before? ? – 2 = 3
	Total Unknown	**Addend Unknown**	**Both Addends Unknown[3]**
Put Together/ Take Apart[2]	Three red apples and two green apples are on the table. How many apples are on the table? 3 + 2 = ?	Five apples are on the table. Three are red and the rest are green. How many apples are green? 3 + ? = 5, 5 – 3 = ?	Grandma has five flowers. How many can she put in her red vase and how many in her blue vase? 5 = 0 + 5, 5 = 5 + 0 5 = 1 + 4, 5 = 4 + 1 5 = 2 + 3, 5 = 3 + 2
	Difference Unknown	**Bigger Unknown**	**Smaller Unknown**
Compare[4]	**("How many more?" version):** Lucy has two apples. Julie has five apples. How many more apples does Lucy have than Julie? **("How many fewer?" version):** Lucy has two apples. Julie has five apples. How many fewer apples does Lucy have than Julie? 2 + ? = 5, 5 – 2 = ?	**(Version with "more"):** Julie has three more apples than Lucy. Lucy has two apples. How many apples does Julie have? **(Version with "fewer"):** Lucy has three fewer apples than Julie. Lucy has two apples. How many apples does Julie have? 2 + 3 = ?, 3 + 2 = ?	**(Version with "more"):** Julie has three more apples than Lucy. Julie has five apples. How many apples does Lucy have? **(Version with "fewer"):** Lucy has three fewer apples than Julie. Julie has five apples. How many apples does Lucy have? 5 – 3 = ?, ? + 3 = 5

Blue shading indicates the four Kindergarten problem subtypes. Students in grades 1 and 2 work with all subtypes and variants (blue and green). Yellow indicates problems that are the difficult four problem subtypes students in grade 1 work with but do not need to master until grade 2.

[1] Adapted from Box 2-4 of National Research Council (2009, op. cit., pp. 32, 33).

[2] These *take apart* situations can be used to show all the decompositions of a given number. The associated equations, which have the total on the left of the equal sign, help children understand that the = sign does not always mean *makes* or *results in* but always does mean *is the same number as*.

[3] Either addend can be unknown, so there are three variations of these problem situations. Both Addends Unknown is a productive extension of this basic situation especially for small numbers less than or equal to 10.

[4] For the Bigger Unknown or Smaller Unknown situations, one version directs the correct operation (the version using *more* for the bigger unknown and using *less* for the smaller unknown). The other versions are more difficult.

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1.OA.5 - Chart

Counting all (addition)	Start with 1 and count to find the total number of objects	**5 + 3** Start from 1, count up to 5, and count up 3 more: 1, 2, 3, 4, 5 . . . 6, 7, 8
Counting on (addition)	Count from the start number rather than starting at 1	**5 + 3** Start at 5 . . . 6, 7, 8
Counting all (subtraction)	Remove the appropriate number of items and count the remaining items starting with 1	**8 – 5** Start with 8 objects. Remove 5 and count the remaining items: 1, 2, 3
Counting back (subtraction)	Start with the total, count back the number being subtracted	**8 – 5** Start at 8 and count back 5, one number at a time: 7, 6, 5, 4, 3
Count on (subtraction)	Start with the change number and count on to reach the total	**8 – 5** Start with 5 and count up to 8 by ones (and later by larger numbers): 5 . . . 6, 7, 8