KY Math Standards 2nd grade   FCPS 2nd Grade Trajectory   2nd Unit 1 Google Link   2nd Grade Priority Content

Unit 1: Real-World Story Problems- Start with Tens	Estimated Time Frame: 41 Days

Essential Standards: 2.OA.1, 2.OA.2, 2.NBT.1, 2.NBT.2, 2.NBT.5, Supporting Standards: 2.NBT.9, 2.MD.8, 2.MD.10

Big Idea(s)   CRA explanations for 2nd grade Unit 1

THE BASE TEN NUMERATION SYSTEM- The base ten numeration system is a scheme for recording numbers using digits 0-9, groups of ten, and place value.

COMPARISON- Numbers, expressions, and measures can be compared by their relative values.

Essential Questions:	Common Misconceptions:
- How do patterns help us count faster and solve math problems? - How can numbers be put together and taken apart to solve problems? - What kinds of patterns are there in our number system?	- Students often get confused when positional place value (HTO) is introduced **before** they have a deep understanding of the base ten system. Spend time at the beginning of the year building groups and sets of ten, counting sets of ten, making groups of 100 from the tens. Students need to conceptually build that understanding for themselves. Hundreds, Tens, Ones (HTO) charts can cause misconceptions when introduced before conceptual understanding is solid. **NO BASE TEN BLOCKS**! Students are typically not mathematically aware enough in 2nd grade to understand the "why" behind "trading". Give students materials that they can physically take apart or put together at the beginning of this instruction, moving into manipulatives where they can SEE all the parts. That can then scaffold the concept of trade (dot strips or sticker strips) **KEY WORDS!** Be aware key words have **MULTIPLE** meanings and can create misconceptions. It is best to use reasoning and identify the action and unknown. For example: If there are 10 girls and 8 boys in our class. How many **more** girls are there than boys?

Standards for Mathematical Practice (**bolded** practices are emphasized in this unit)	Kentucky Interdisciplinary Literacy Practices
MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics. MP.5. Use appropriate tools strategically. **MP.6. Attend to precision.** **MP.7. Look for and make use of structure.** **MP.8. Look for and express regularity in repeated reasoning.**	1. Recognize that text is anything that communicates a message. 2. Employ, develop, and refine schema to understand and create text. 3. View literacy experiences as transactional, interdisciplinary and transformational. 4. Utilize receptive and expressive language arts to better understand self, others, and the world. 5. Apply strategic practices, with scaffolding and then independently, to approach new literacy tasks. **6. Collaborate with others to create new meaning.** **7. Utilize digital resources to learn and share with others.** **8. Engage in specialized, discipline specific literacy practices.** **9. Apply high level cognitive processes to think deeply and critically about text.** 10. Develop a literacy identity that promotes lifelong learning.

Essential Standards: KAS Content Standards **CRA explanations for 2nd grade Unit 1**	Prerequisite Skills & Essential Vocabulary	Sample Learning Intentions* & Sample Success Criteria*
KY.2.OA.1 Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart and comparing, with unknowns in all positions, by using drawings and equations with a symbol for the unknown number to represent the problem. **End Goal in Quarter 1**: Solve one-step word problems by adding and subtracting within 20 with unknowns in all positions.	Use addition and subtraction within 20 to solve word problems. ● Sum ● Difference ● Compare ● Total ● Take apart ● Put together ● Unknown ● Addend	I am learning to solve two-step word problems using addition and subtraction. I can… ● use drawings, equations, manipulatives to solve one-step word problems within 20. ● make a model to show how I solved a word problem. ● solve one-step word problems with an unknown number.

Suggested progression for the year, not intended to go through all these in one unit: see chart 1. numberless word problems 2. Add to/Take from with result unknown 3. Put together, take apart with result unknown 4. Put together, take apart with addend unknown 5. Add to, take from with change unknown 6. Comparison problems with difference unknown 7. Put together, take apart with both addends unknown 8. Comparison problems with bigger unknown, then smaller unknown 9. Add to, take from with start unknown 10. Comparison problems with bigger unknown, then smaller unknown Coherence K.1.OA.1→ KY.2.OA.1→ KY.3.OA.8	● Symbol ● Value	● represent the unknown with a symbol.
KY.2.OA.2 Fluently add and subtract within 20 using mental strategies. End goal in Unit 1: Students should be able to add and subtract within 10 fluently. **Suggested progression (Progression Poster):** 1. make finger patterns for numbers up to 5; then numbers up to 10 2. Subitize quantities on a 5-frame/dice patterns; then a 10-frame 3. partition numbers to 5; then to 10 4. add small doubles (1+1, 2+2, 3+3, then 4+4, 5+5) 5. fact cards of partitions of 5 and 10 & small doubles Coherence KY.1.OA.6→ KY.2.OA.2	Fluently add and subtract within 10. ● Double ● Equal ● Partition ● Combine ● Difference ● Sum ● Subitize ● Patterns ● Value	I am learning to add and subtract within 20 mentally. I can… ● combine numbers to make 5 ● combine numbers to make 10. ● combine numbers to make __. (6, 7, 8, 9) ● add doubles.
KY.2.NBT.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens and ones. (numbers to 100)	Understanding ten is a unit of ten items. Understanding teen numbers as	I am learning to understand place value to 100.

Coherence KY.1.NBT.2→ KY.2.NBT.1→KY.3.NBT.1
 	
KY.1.NBT.2 (prerequisite) Understand the two-digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a "ten." b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight or nine 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.
 	
Suggested progression (Progression Poster):
  1. build towers of 10s with unifix cubes
  2. build tens with sticks and bundles or straws
Hundreds, Tens, Ones charts can cause misconceptions when introduced before conceptual understanding is solid.
	ten and some more.
	
	● tens
	● ones
	● bundles
	● tower
	● quantity
	● represent
	● value
		I can …
		● build numbers within 100.
		● build towers (or bundles) of 10 to make a given number.
		● count and organize collections of items to 100.
		● build numbers in more than one way (ex. 24 ones, 2 tens & 4 ones).
		● represent a picture of a quantity with numbers. (ex. write a number to represent a picture of 2 tens and 4 ones)
		● represent a number with a picture of a quantity. (ex. draw a picture to represent 24)

KY.2.NBT.2 Count forwards and backwards within 1000; skip-count by 5s, 10s and 100s.
 	
Coherence KY.1.NBT.1→ KY.2.NBT.2
 	
End Goal in Unit 1: Students should be able to count and write numbers to 100 forward and backward by 1s, 10s, 5s, & 100s (in that order) from any number.
 	
Suggested progression:
  1. count forward and backward by 1s starting at any number to 250
  2. skip count by 10s forward then backward on the decade to 250
  3. skip count by 10s forward then backward off the decade to 250 (ex. 4, 14, 24 or 64, 54, 44)
  4. skip count by 5s forward then backward
	Counting sets of up to 100 objects.
	
	Counting a quantity in more than one way.
	
	Counting, writing, and reading numbers to 100 and beyond
	
	Identifying and using patterns in the number sequence to count, read, and write numbers and quantities to 100 and beyond (counting on & off decuple,
		I am learning to count forward and backward within 500.
		
		I can …
		● count to 120 by 1s.
		● Count backward from 120 by 1s.
		● Count backward from any number by 1s.
		● Count to 120 by 10s.
		● Skip count backwards by 10s.
		● Skip count backwards from any number by 10s.
		● Skip count to 120 by 5s.
		● Skip count backwards by 5s.
		● Skip count backwards from any number by 5s.
		● skip count forward by 100s

5. skip count forward by 100s to 500 6. skip count backward by 100s 7. skip count forward by 100s from any number (ex. 14, 114, 214) 8. skip count backward by 100s from any number (ex. 432, 332, 232)	counting forward & backward, etc…) ● Forward ● Backward ● Skip-count by 5s & 10s, 100s ● Place value ● Patterns ● Decade	● skip count backward by 100s ● skip count forward by 100s from any number ● skip count backward by 100s from any number
KY.2.NBT.5 ~~Fluently~~ **add and subtract within 100 using strategies based on place value, properties of operations and/or the relationship between addition and subtraction.** Coherence KY.1.NBT.4→ KY.2.NBT.5→KY.3.NBT.2 **End goal in Unit 2: Students can add and subtract within 100 using visuals.** **Suggested progression (Progression Poster): (for the entire year) Choose the best number range for your students based on where they are in the progression.:** **1. Use materials to add and subtract within 20.** 2. Use visuals to add and subtract within 20. 3. Screen/ flash visuals to add and subtract within 20. 4. Mentally add and subtract within 20. **5. Use materials to add and subtract within 50.** 6. Use visuals to add and subtract within 50. 7. Screen/ flash visuals to add and subtract within 50. 8. Mentally add and subtract within 50. **9. Use materials to add and subtract within 100.** 10. Use visuals to add and subtract within 100. 11. Screen/ flash visuals to add and subtract within 100. 12. Mentally add and subtract within 100.	Developing an understanding of the structure of the number system (+/-1, +/-2, +/- 10, number strings: eg. 7+2, 17+2, 27+2) ● subitize ● add ● subtract ● flash ● take away ● minus ● plus ● stickers ● bundles ● visualize	I am learning to add and subtract within 100. I can… ● use materials (ten frames, sticks and bundles, stickers, bead racks, bead strings) to add and subtract within 100. ● add and subtract using visual representations of numbers within 100.
Supporting Standards:		

KY.2.NBT.9 Explain why addition and subtraction strategies work, using place value and the properties of operations. Coherence KY.1.OA.3→ KY.2.NBT.9 (**Progression Poster**): ● Continuous throughout the year, embed during Number Talk routine or Discussions	Understand the order of addends does not affect the resulting sum. ● add ● subtract ● plus ● minus ● difference ● place ● value ● total	I am learning to explain the strategy I used to solve a problem. I can… ● solve problems using place value. ● solve problems using the relationship between addition and subtraction.
KY.2.MD.8 Solve word problems with adding and subtracting within 100, (not using dollars and cents simultaneously) using the $ and ¢ symbols appropriately (not including decimal notation). Coherence KY.1.MD.3→ KY.2.MD.8 ● Add same value coins within 20 ¢ , increase the range throughout the year and make a combination of coins to represent a value.	Identify coin names and values. ● total value ● set	I am learning to solve problems using money. I can… ● find the total value of a set of coins.
KY.2.MD.10 Create a pictograph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart and compare problems using information presented in a bar graph. Coherence KY.1.MD.4→ KY.2.MD.10→KY.3.MD.3 ● only assessed during this quarter ● Can spiral review this if needed.	Create a table or chart to organize data. ● pictograph ● bar graph ● data ● represent ● information	I am learning to represent data on a graph. I can… ● create a pictograph using data. ● create a bar graph using data. ● solve problems using data from a pictograph. ● solve problems using data from a bar graph.

*Disclaimer: Success Criteria is the evidence students must produce to demonstrate learning. These examples are not comprehensive.

Needed Manipulatives and Tools

number lines (student made or open/empty)
Five-frame
Ten-frame
Bundles and sticks (craft sticks and rubber bands or hair bands)
counting collections (video example)
Towers of Unifix cubes
Hundreds Charts
Bead racks/ bead strings
Coins
Math Journal

Anchor Materials/Resources

Investigations Unit 1 - Coins, Number Strings and Story Problems
Investigations - Daily Routines Planner – Unit 1

KCM Website for Primary Mathematics Support
username: **bluegrass** password: **math** **great source for additional workshop tasks

Math Learning Center Math Apps

Counting Collections - video

Choral Counting & Counting Collections by Megan L. Franke, Elham Kazemi, and Angela Chan Turrou Stenhouse Publishers

Number Talks / **Number Strings**

Unit 1-Illustrative Mathematics

Progression Poster

Math Tools
Number Talk Images

Summative Assessment

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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