K – 5 End of the Year Computation Targets

Following are Everett's end of the year recall targets in computation. The recall of basic facts is important so students' performance and accuracy are not impacted when doing more sophisticated mathematical problems later in their school career. But when reviewing these targets please keep in mind that **recall is one of many components demonstrating mathematical performance**. Students' success in mathematics is also very dependent on their being able to utilize these facts in problem solving situations, which is not assessed through recall tasks. (Adapted from Mercer Island SD)

	K – 2	3	4	5
End of the Year Recall Expectations of Basic Facts	We want our students to develop a solid conceptual understanding of the mathematical operations before placing emphasis on recall. Thus we have K-2 computation expectations in order to allow for the development of these concepts. *By the end of second grade the goal is for all students to:* Compute addition and subtraction to 10+10 with fluency. Recall basic addition and subtraction facts to 10: 20 facts in 1 minute, 90% accuracy.	Recall of multiplication facts 0 -10 (or Array set A): 50 facts in 3 minutes, 90% accuracy Recall of addition facts to 10+10: 30 facts in 2 minutes, 90% accuracy	Recall multiplication/division facts 0 – 12: 60 facts in 3 minutes, 90% accuracy (Array sets A and B)	Recall multiplication/division facts 0 – 12: 80 facts in 3 minutes, 90% accuracy at the beginning of the year. Practice these facts throughout the year to maintain fluency.
Multi-digit Computation without tools	*By the end of second grade the goal is for all students to:* Solve addition and subtraction problems with two- or three-digit numbers (breaking apart into 100's, 10's and 1's), estimate with reasonableness	Competent with at least two strategies for solving each of the 4 operations up to 3-digit and estimate with reasonableness. (Repeated addition should rarely be used as a strategy by the end of the year)	Competent with at least two *efficient* strategies for solving each of the 4 operations up to 3-digit and estimate with reasonableness.	Addition or subtraction of non-negative fractions: up to 3-like denominator fractions. Addition or subtraction of non-negative decimals: two numbers with decimals to the 1000th place or with 3 decimals to the 100th place. Use the understanding of the number system/properties to solve larger problems. Apply the concepts of odd and even numbers to check for divisibility Finds factors and multiples to help solve problems
Place Value	*By the end of second grade the goal is for all students to*: Conservation of large numbers, working with 10's and 1's, and identifying place value (vocabulary) Compare, order and represent numbers to 1,000	Conservation of large numbers, working with 10's and 1's, landmarks in the 100's and identifying place value Compare, order, and represent numbers to 10,000		
Counting	*By the end of second grade the goal is for all students to:* Count on and count back. Count by 2's, 5's, and 10's.	Skip counting, counting on/back, grouping by 2's, 5's, and 10's		

Please refer to the documents following titled "Children's Strategies for Solving Basic Facts" and "Children's Strategies for Multi-Digit Computation" for descriptions of direct modeling, counting, derived facts, recall and invented algorithms.

CHILDREN'S STRATEGIES FOR SOLVING BASIC FACTS

PROBLEM	DIRECT MODELING	COUNTING	DERIVED FACTS	RECALL
5 + 7 = ? **Join Result Unknown**	Makes a set of 5 counters and a set of 7 counters. Pushes the two sets together and counts all the counters.	Counts: "5 [pause], 6, 7, 8, 9, 10, 11, 12," extending a finger with each count. "The answer is 12" [The counting sequence may also begin with the larger number]	"Take 1 from the 7 and give it to the 5. That makes 6 + 6, and that's 12."	5 plus 7 is 12.
12 – 5 = ? **Separate Result Unknown**	Makes a set of 12 counters and removes 5 of them. Then counts the remaining counters.	Counts back "12, 11, 10, 9, 8 [pause], 7. It's 7." Uses fingers to keep track of the number of steps in the counting sequence.	"12 take away 2 is 10, and take away 3 more is 7."	12 take away 5 is 7.
4 + ? = 11 **Join Change Unknown**	Makes a set of 4 counters. Makes a second set of counters, counting "5, 6, 7, 8, 9, 10, 11," until there is a total of 11 counters. Counts the 7 counters in the second set.	Counts "4 [pause], 5, 6, 7, 8, 9, 10, 11," extending a finger with each count. Counts the 7 extended fingers. "It's 7."	"4 + 6 is 10 and 1 more is 11. So it's 7."	4 and 7 make 11.
5 x 7 = ?	Makes 7 groups of 5 counters and counts them all.	5, 10, 15, 20, 25, 30, 35	5 times 5 is 25 and 10 more is 35.	5 times 7 is 35.
56 ÷ 8 = ?	Counts out 56 counters. Pulls out groups of 8 until 7 groups are made.	8, 16, 24, 32, 40, 48, 56	8 times 8 is 64. 8 less is 56. So that's 7.	8 x 7 is 56.

Adapted from: Carpenter, T.P., Fennema, E. & Franke, M.L. (1996). Cognitively Guided Instruction: A knowledge base for reform in primary mathematics instruction. *Elementary School Journal*, 97, 3-20.

CHILDREN'S STRATEGIES FOR MULTI-DIGIT COMPUTATION

PROBLEM	DIRECT MODELING		COUNTING		ALGORITHMS
	BY 1s	BY 10s	BY 1s	BY 10s	
25 + 17 = ?	Makes the set of 25 by ones and a set of 17 by ones and counts them all	Makes a set of 25 and a set of 17 by using tens and ones and counts them all	Starts with 25, counts by 1s, keeping track of how many are added on until the total is reached e.g., 25, 26, 27, 28, 29, 30, 31….42	Starts with 25, counts on by 10s. e.g., 25, 35, 36, 37….42	20 and 10 is 30, 5 and 7 is 12. 30 and 12 is 42 **OR** 25 and 10 is 35 and 7 more is 42 **OR** 25 and 20 is 45, less 3 is 42.
47 – 28 = ?	Makes a set of 47 by ones and then takes away 28 by ones.	Makes a set of 47 by using tens and ones and then takes away 28.	Counts back from 47 by ones or counts on from 28 until get to 47	Counts back from 47 by ones or counts on from 28 by tens	40 take away 20 is 20. 8 take away 7 is 1. 20 take away 1 is 19 **OR** 47 take away 20 is 27. 27 take away 8 is 19. **OR** 47 take away 20 is 17 plus two is 19.
12 X 15 = ?	Makes a set of 12 by ones and repeats that 15 times. Counts everything up.	Makes a set of 12 by using tens and 1s and repeats that 15 times. Counts everything up.	SKIP COUNTS 12, 24, 36, 48 ……180 or adds 12, 15 times and figures out various ways of adding the list up.		12 times 12 is 144. 12 times 3 is 36. 144 times 36 is 180. **OR** 12 times 10 is 120. 12 times 5 is 60. 120 and 60 is 180. **OR** 12 times 5 is 60. 60 times 3 is 180.
120 ÷ 15	Makes a set of 120 by ones. Pulls out groups of 15 and counts how many groups are pulled out and how many are left over.	Makes a set of 120 by using 10s and ones. Pulls out groups of 15 and counts how many groups are pulled out and how many are left.	SKIP COUNTS 15, 30, 45, 60, 75, 90, 105, 120 or adds up 15 until get close to or to 120.		15 goes into 105, 7 times and 15 more is 120. That's 8. **OR** 15 times 4 is 60. 60 times 2 is 120. That's 8.

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