Intervention Name:
Math Wise

Common Core State Standards Domain Areas: (check all that apply)

Counting and Cardinality (K)	Operations and Algebraic Thinking (K-5)	Numbers and Operations in Base Ten (K-5)	Numbers and Operations – Fractions (3-5)	Measurement and Data (K-5)	Geometry (K-HS)	Ratios and Proportional Relationships (6-7)	The Number System (6-8)	Expressions and Equations (6-8)	Statistics and Probability (6-HS)	Functions (8-HS)	Number and Quantity (HS)	Algebra (HS)	Modeling (HS)
	X	X											

Setting: (check all that apply)		
Whole-class	Small-group	Individual
X		

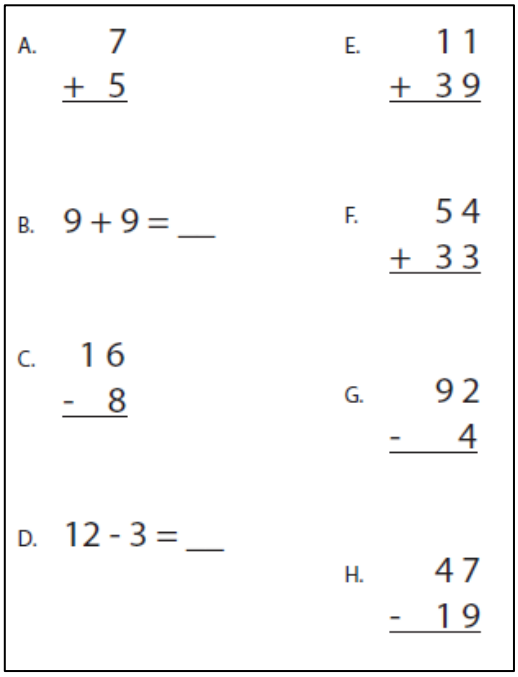
Focus Area: (check all that apply)		
Acquisition	Fluency	Generalization
X	X	X

Function of Intervention: Math Wise is a whole-class intervention for second-grade students. With Math Wise, students participate in lessons focused on addition and subtraction of single- and double-digit numbers.

Brief Description: Math Wise focuses on six types of addition or subtraction problems. Each type of problem is taught within a different unit:

1. Addition number combinations (single digits)
2. Addition without regrouping (double digits)
3. Addition with regrouping (double digits)
4. Subtraction number combinations (single digits)
5. Subtraction without regrouping (double digits)
6. Subtraction with regrouping (double digits)

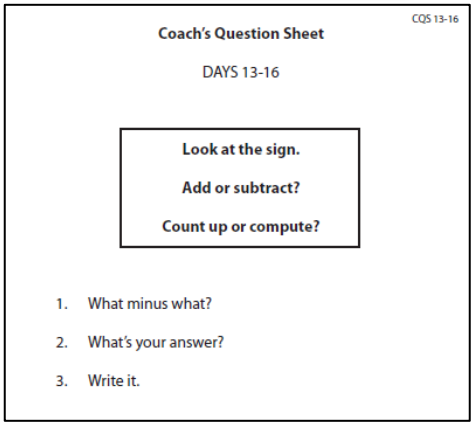
During each Math Wise lesson, four activities occur. First, the teacher leads a lesson for 15-20 minutes that introduces or reviews a concept related to addition or subtraction. During the teacher-led lesson, the teacher works through eight mathematics problems with the students. The teacher uses manipulatives to demonstrate mathematical concepts. The teacher also teachers mnemonics to help students with regrouping addition and subtraction problems.



(Fuchs, Powell, & Fuchs, 2011)

Second, the students work in pairs to practice the lesson's skill. In the pair, one student starts as the Coach. The Coach asks questions to the Player to guide to Player, step-by-step through the mathematics problems. Students switch roles halfway through pair work. The pair work is similar to Math Peer-Assisted Learning Strategies (PALS; Fuchs et al. 1997).

The Coach reads questions from the Coach's Question Sheet.


CQS 13-16

Coach's Question Sheet

DAYS 13-16

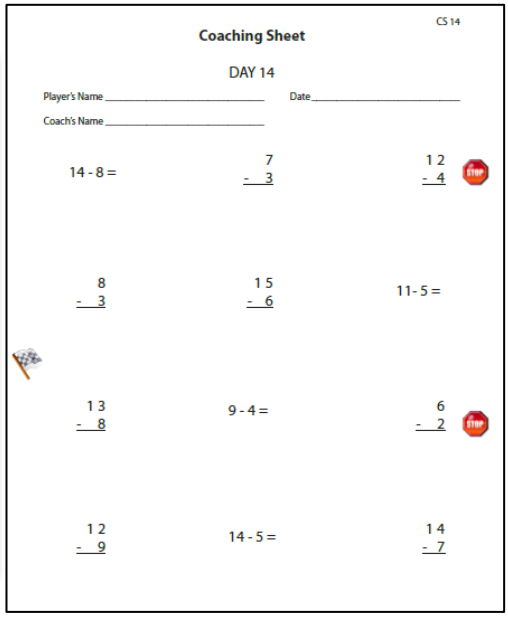
Look at the sign.

Add or subtract?

Count up or compute?

1. What minus what?
2. What's your answer?
3. Write it.

The Player answers the math problems on the Coaching Sheet. Students switch roles at the flag. The Player begins "self-talk" at the stop sign.


CS 14

Coaching Sheet

DAY 14

Player's Name _____ Date _____

Coach's Name _____

14 - 8 =

7 - 3

12 - 4

8 - 3

15 - 6

11 - 5 =

13 - 8

9 - 4 =

6 - 2

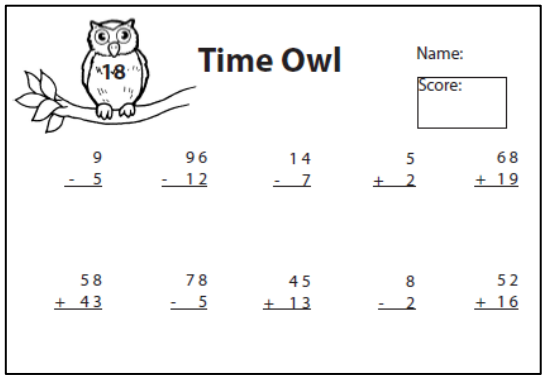
12 - 9

14 - 5 =

14 - 7

(Fuchs, Powell, & Fuchs, 2011)

Third, students complete a "Time Owl." This occurs only during Lessons 15 through 34. During the Time Owl, the teacher reads a directive (e.g., "Solve all the addition problems"), and students have 1 minute to follow the directive. At the end of 1 minute, students trade Time Owls with their partner, and partners grade one another's work. Students earn 1 point for reaching a Time Owl goal (e.g., "Answering 7 out of 10 correctly.") The Time Owl helps students practice discrimination skills and focuses on the operator symbols and regrouping strategies of mathematics.


Time Owl

Name:

Score:

9 - 5	96 - 12	14 - 7	5 + 2	68 + 19
58 + 43	78 - 5	45 + 13	8 - 2	52 + 16

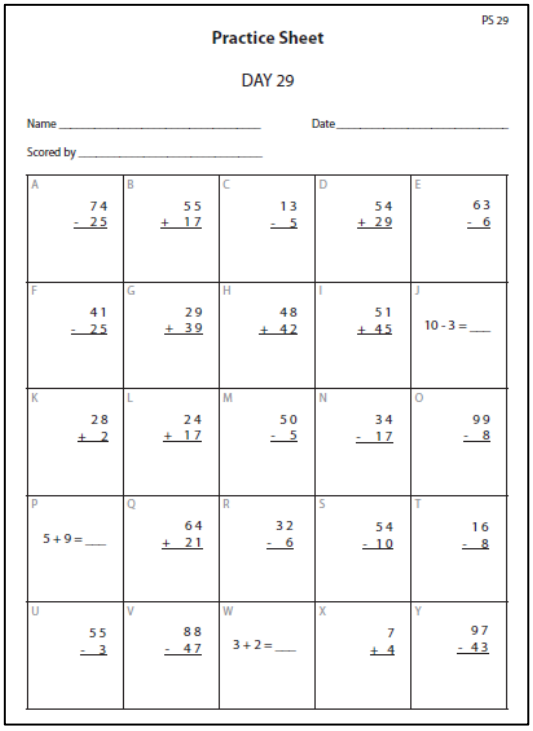
(Fuchs, Powell, & Fuchs, 2011)

Students in the pair mark their points on a shared point sheet.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

(Fuchs, Powell, & Fuchs, 2011)

Fourth, students work individually on a cumulative review. Students work for 5 minutes. At the end of 5 minutes, students trade practice sheets with their partner, and partners grade one another's work. Students each 1 point for working on their own Practice Sheet.



PS 29

Practice Sheet

DAY 29

Name _____ Date _____

Scored by _____

A 74 - 25	B 55 + 17	C 13 - 5	D 54 + 29	E 63 - 6
F 41 - 25	G 29 + 39	H 48 + 42	I 51 + 45	J 10 - 3 = ___
K 28 + 2	L 24 + 17	M 50 - 5	N 34 - 17	O 99 - 8
P 5 + 9 = ___	Q 64 + 21	R 32 - 6	S 54 - 10	T 16 - 8
U 55 - 3	V 88 - 47	W 3 + 2 = ___	X 7 + 4	Y 97 - 43

(Fuchs, Powell, & Fuchs, 2011)

Procedures:

- **Duration:** Math Wise should run for 17 weeks, 2 lessons each week (for a total of 34 lessons).
- **Teacher training:** Teachers must read and become familiar with the Math Wise materials. A script accompanies each lesson. Teachers should read and become familiar with the scripts before implementing a lesson.
- **Instructional practices:** Every Math Wise session includes a teacher-led lesson followed by pair practice followed by individual practice. Teachers work with the entire class of students during the teacher-led lesson. As students work in pairs or individually, the teacher walks around, monitors students, and provides feedback when necessary. Teachers must prepare student materials for each lesson.
- **Monitoring system:** To promote on-task behavior, students have the opportunity to earn points during a Math Wise session. Students can earn points from the teacher for being on-task and working well with a partner. Students can also earn points for answering problems correctly on the Time Owl or Practice Sheet. The pair with the greatest number of points at the end of each lesson gets to collect Math Wise materials.

Critical Components (i.e., that must be implemented for intervention to be successful): Teachers must implement Math Wise lessons with fidelity. Fidelity checklists for each lesson are included within the Math Wise manual. Teachers must be prepared to lead each session, engage students in the materials, and provided appropriate feedback.

Critical Assumptions (i.e., with respect to prerequisite skills): Students start Math Wise with basic numeral recognition and counting skills. If students have difficulty with very basic number sense skills, Math Wise may not be appropriate.

Materials: Teachers must purchase the Math Wise manual ($75) by emailing pals@vanderbilt.edu.

References:

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Phillips, N. B., Karns, K., & Dutka, S. (1997). Enhancing students' helping behavior during peer-mediated instruction with conceptual mathematical explanations. *The Elementary School Journal, 97,* 223-249.

Fuchs, L. S., Powell, S. R., Cirino, P. T., Schumacher, R. F., Marrin, S., Hamlett, C. L., … & Changas, P. C. (in press). Does calculation or word-problem instruction provide a stronger route to pre-algebraic knowledge? *Journal of Educational Psychology*.

Fuchs, L. S., Powell, S. R., & Fuchs, D. (2011) *Math Wise: Calculation and computation program at second grade.* Nashville, TN: Vanderbilt University.