

K-2
Addition and Subtraction Fluency

NCTM
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Sessions goals

1. To understand the fluency standards from The Common Core. (Arizona College and Career Ready Standards)
2. Learn various strategies to use with students to increase fact fluency.
3. Have a few ideas to use in your classrooms to reinforce strategies and fact fluency.

Fluency Standards

PART 1

Table 1: Grade-Level Fluency

Grade	Required Fluency
K	Add/subtract within 5
1	Add/subtract within 10
2	Add/subtract within 20
2	Add/subtract within 100 (pencil and paper)
3	Multiply/divide within 100
4	Add/subtract within 1,000
4	Add/subtract within 1,000,000
5	Multidigit multiplication
6	Multidigit division
6	Multidigit decimal operations
7	Solve $px + q = r$, $p(x + q) = r$

Fluent in the standards means "fast and accurate"

To be fluent is to flow; fluent isn't halting, stumbling or reversing oneself.

Drill vs Strategies

PART 2

Why teach strategies

Through hands-on activities and thoughtful discussions, students develop deeper understandings about math facts and cultivate useful strategies related to these basic facts. An instructional approach in which students investigate the conceptual understanding of basic facts, explore strategies to support their understanding of numbers, and then engage in strategic practice in order to automatically recall the facts provides students with a strong and balanced foundation for mastery.

Mastering the Basic Math Facts in Addition and Subtraction by Susan O'Connell and John Sanacore/N, 2011

Foundation Facts	
+1/+2	Students build on their understanding of counting by exploring 1 or 2 more and 1 or 2 less.
+0	Using their knowledge of the concept of addition, students explore what happens when they add or subtract nothing from a quantity.
+10	Adding 10 to a single-digit number results in a 2-digit sum. Students explore adding 10 in order to build understanding and automaticity that will be needed later when exploring the using-ten strategy.
Doubles	Students explore the concept of doubling and what it means to add 2 groups of equal size.
Making Ten	Because 10 is foundational in our number system, students explore the different ways in which 2 addends result in a sum of 10. This knowledge becomes critical as they later explore using tens to find unknown facts.
Building on the Foundation	
Using tens	Now that students know combinations of addends that have a sum of 10, they use their understanding of the flexibility of numbers to find ways to break apart addends to create simpler facts by using tens (e.g., $9 + 7$ is changed to $10 + 6$).
Using doubles	Students' knowledge of doubles facts is now put to use to find unknown facts that are near-doubles (e.g., $4 + 5$ might be thought of as $4 + 4 + 1$).

Mastering the Basics: Math Facts in Addition and Subtraction, by Susan O'Connell and John DeStefano, 2011

Strategies

- Count all
- Count on
- Borrow
- Doubles
- Decomposing & recomposing numbers
- Subitizing
- Compensating
- Making 5's or 10's

Tools for teaching strategies

- Number lines
- Blocks
- Hundreds charts
- Ten frame/5 frame
- Base 10 blocks
- Number cards

Activities: Building strategies

PART 3

One more or Doubles plus 1

Materials:

- One board per pair
- One die
- Markers (2 diff. colors)

Concepts:

- One more
- One less
- Doubles
- Doubles plus 1

Directions:

- Player 1 rolls the dice, adds 1 or doubles the number then marks that number off the board. Player 2 does the same. The first player to get 10 numbers covered wins.

Square

Materials:

- Square game board
- Spinner page or 9 sided die
- Markers, or beans

Concepts:

- One more
- One less
- Doubles
- Doubles plus 1

Directions:

- Player 1 rolls the dice, they double the number on the die, and places a marker on the game board. Player 2 does the same. The winner is the first person to create a 2 x 2 square.

16	12
10	8

ACTIVITIES: Reinforcing strategies

PART 3 CONT.

3 in a row

- **Materials:**
 - Game sheet
 - Paper clips
 - Markers or beans
- **Concepts:**
 - Addition
 - Part-part whole
- **Directions:**
 - Player 1 places the paper clips on two of the numbers below, then adds the two numbers, and places a marker on the sum on the game board. Player 2 repeats. The winner is the first player to get 3 sums in a row on the game board.

Hundreds Chart

- **Materials:**
 - Hundreds chart to reference.
- **Concepts:**
 - Adding and subtracting ten
 - Adding and subtracting within 100
 - 1 more or less
 - Math vocabulary
- **Directions:**
 - Whole class, the teacher will read off a riddle, and students try to identify it on the chart.
 - Working in partners, students take turns reading each other riddles.

Snap

- **Materials:**
 - 1 deck of cards
- **Concepts:**
 - Basic operations
- **Directions:**
 - In pairs, students divide the deck of cards in half.
 - Player 1 says snap, and both players flip over a card at the same time.
 - Both students try to be the first one to say the sum.
 - Students must say the whole problem to win. (ex. $4 + 5 = 9$)

The General

- **Materials:**
 - 1 deck of cards
- **Concepts:**
 - Basic operations
- **Directions:**
 - In Trios, students divide the deck of cards in half.
 - Player 1 & 2 each take a card without looking and hold it to their forehead.
 - Player 3, says the sum of the 2 cards.
 - Players 1 & 2 try to be the first to say the value of the card on their forehead by looking at the other players card.

Fluency Tests

A CERTAIN NUMBER OR TIME
≠ FLUENCY



One More

+1

2-player game

Materials:

1 dice

2 color counters or 2 markers

1 game board

Directions:

Player 1 rolls the die and then adds 1. Player 1 covers the sum on the board.

Player 2 does the same.

The first player to cover 10 numbers on the board wins!

7	6	5	3	4	2	6	2
2	5	7	6	5	3	4	3
3	6	4	7	6	5	2	5
5	2	6	4	3	3	7	7
6	7	3	5	2	4	7	4



Doubles + 1

+ 1

2-player game

Materials:

1 dice

2 color counters or 2 markers

1 game board

Directions:

Player 1 rolls the die, doubles that number then adds 1. Player 1 covers the sum on the board.

Player 2 does the same.

The first player to cover 12 numbers on the board wins!

3	7	11	13	9	5	7
7	13	5	11	9	3	13
5	7	9	3	13	5	11
9	11	13	9	7	11	9
3	7	9	5	11	13	3

Squares

0	10	4	10	2	14
18	14	8	12	18	6
4	6	16	0	10	18
12	18	16	2	8	16
16	2	10	14	4	12
8	14	18	6	12	0

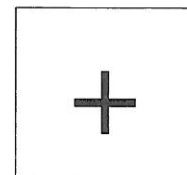
Doubles

Directions:

- Player 1 rolls the dice and doubles the number. The player then puts a marker on the board for that sum.
- Player 2 repeats the process.
- Then winner is the first player to get 4 sums in a square shape, as shown below.

4	18
12	8

3 IN A ROW



Materials:

2 paper clips, two different colored tools and a worksheet

Directions:

Player 1 places both paper clips on the number 1-9 row at the bottom, adds those two numbers together then shades in the number on the board. Player 2 can then move 1 of the paper clips along the bottom row, then add those two numbers and with your player color shade in that number in player 2's color on the board. Players continue taking turns until one player has colored 3 boxes in a row (horizontally, vertically or diagonally)

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

0 1 2 3 4 5 6 7 8 9 10

Hundreds Chart

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	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100