

# Building Procedural Fluency from Conceptual Understanding: Addition and Subtraction

Sandy Szako

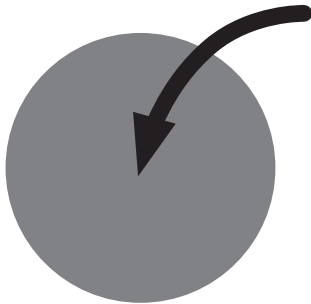
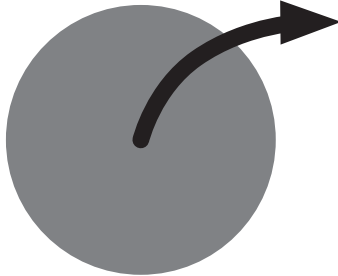
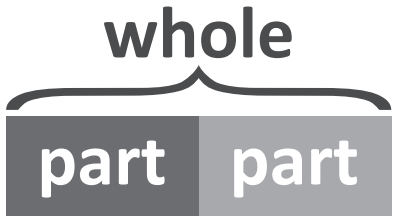
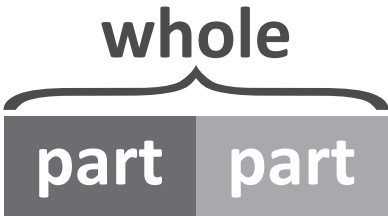
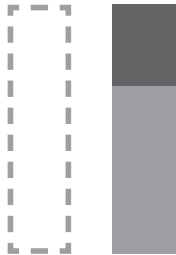

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How could we figure out the total cost of both items of clothing?

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

# ADDITION AND SUBTRACTION STRUCTURES

	Addition	Subtraction
Active	<p>Add to</p> 	<p>Take from</p> 
Static	<p>Put together</p> 	<p>Unknown addend</p> 
Static	<p>Comparison</p> 	<p>Comparison</p> 

# WHAT'S THE PROBLEM?

Carefully read each story problem.

- Check (✓) the box to indicate the operation described.
- For each addition problem, write whether it is 'add to', 'put together' or 'comparison'.
- For each subtraction problem, write whether it is 'take from', 'unknown addend' or 'comparison'.
- It is not necessary to answer the problems.

1. a. Jacinta has 12 cards she wants to trade.  
Jade has 18 cards. How many more cards  
does Jade have than Jacinta?

+	-	?
---	---	---

 \_\_\_\_\_

- b. How many cards do they have together?

+	-	?
---	---	---

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2. a. Brie's lunch total is \$13. If she pays with a \$20-bill,  
how much change will she receive?

+	-	?
---	---	---

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- b. Beau's lunch total is \$15.  
How much less did Brie spend?

+	-	?
---	---	---

 \_\_\_\_\_

3. a. Samuel has \$22. He wants to buy a new bike  
helmet that costs \$55. How much more  
does he need?

+	-	?
---	---	---

 \_\_\_\_\_

- b. Samuel's mother gave him another \$20.  
How much money does he have now?

+	-	?
---	---	---

 \_\_\_\_\_

4. a. Matt threw the beanbag 3 meters farther  
than Tom. Tom's throw measured 9 meters.  
How far did Matt throw the beanbag?

+	-	?
---	---	---

 \_\_\_\_\_

- b. Anton's throw measured 11 meters. How much  
farther did he throw than Tom?

+	-	?
---	---	---

 \_\_\_\_\_

5. a. Monica's previous best race time was 61 seconds.  
She beat it by 2 seconds. What is her new  
personal best time?

+	-	?
---	---	---

 \_\_\_\_\_

- b. The record time is 55 seconds. How much more  
time will she need to shave from her personal  
best to equal that record?

+	-	?
---	---	---

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# NUMBER FACT STRATEGIES

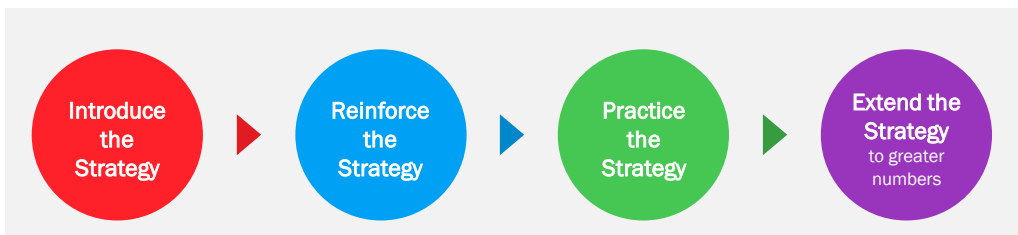
## ADDITION

- Count-On 1, 2 and 0
- Use Doubles
- Make Ten

## SUBTRACTION

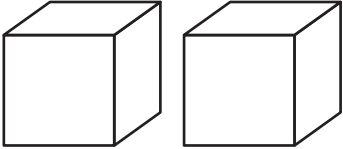
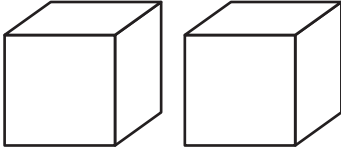
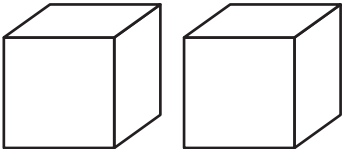
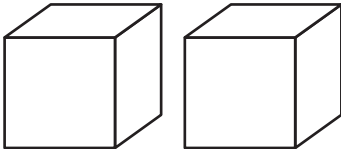
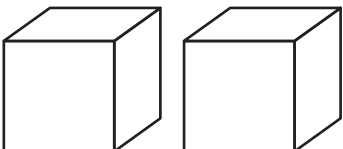
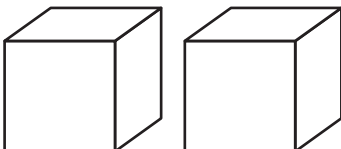
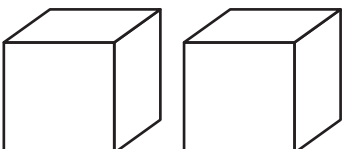
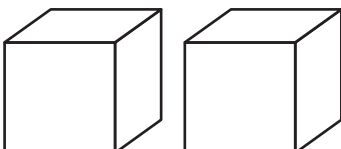
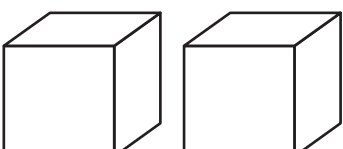
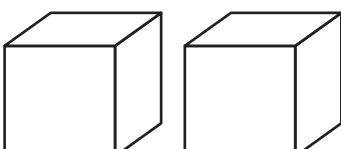
- Think Addition

## The Teaching Sequence









# REINFORCE: Count-On 1 and 2

- Roll your number cubes and count on 1 or 2.
- Find your answer below.
- Write your numbers on the number cubes. Write the number fact.

<div> ____ + ____ = 11</div>	<div> ____ + ____ = 6</div>
<div> ____ + ____ = 5</div>	<div> ____ + ____ = 8</div>
<div> ____ + ____ = 9</div>	<div> ____ + ____ = 7</div>
<div> ____ + ____ = 8</div>	<div> ____ + ____ = 6</div>
<div> ____ + ____ = 7</div>	<div> ____ + ____ = 10</div>

Cube A: 4, 5, 6, 7, 8, 9

Cube B: , , , , , 

## REINFORCE: Double-add-1

11	19	13	15
13	9	17	19
17	11	15	9

Cube: 4, 5, 6, 7, 8, 9 (Same as previous game)



# INTRODUCE: Make Ten


# REINFORCE: Make Ten

- Roll your number cubes and write the fact below the example in the grid that will help you figure out the answer.
- Write the answer to both facts.

$10 + 6 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 5 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 5 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 4 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
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$10 + 3 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
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$10 + 1 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$

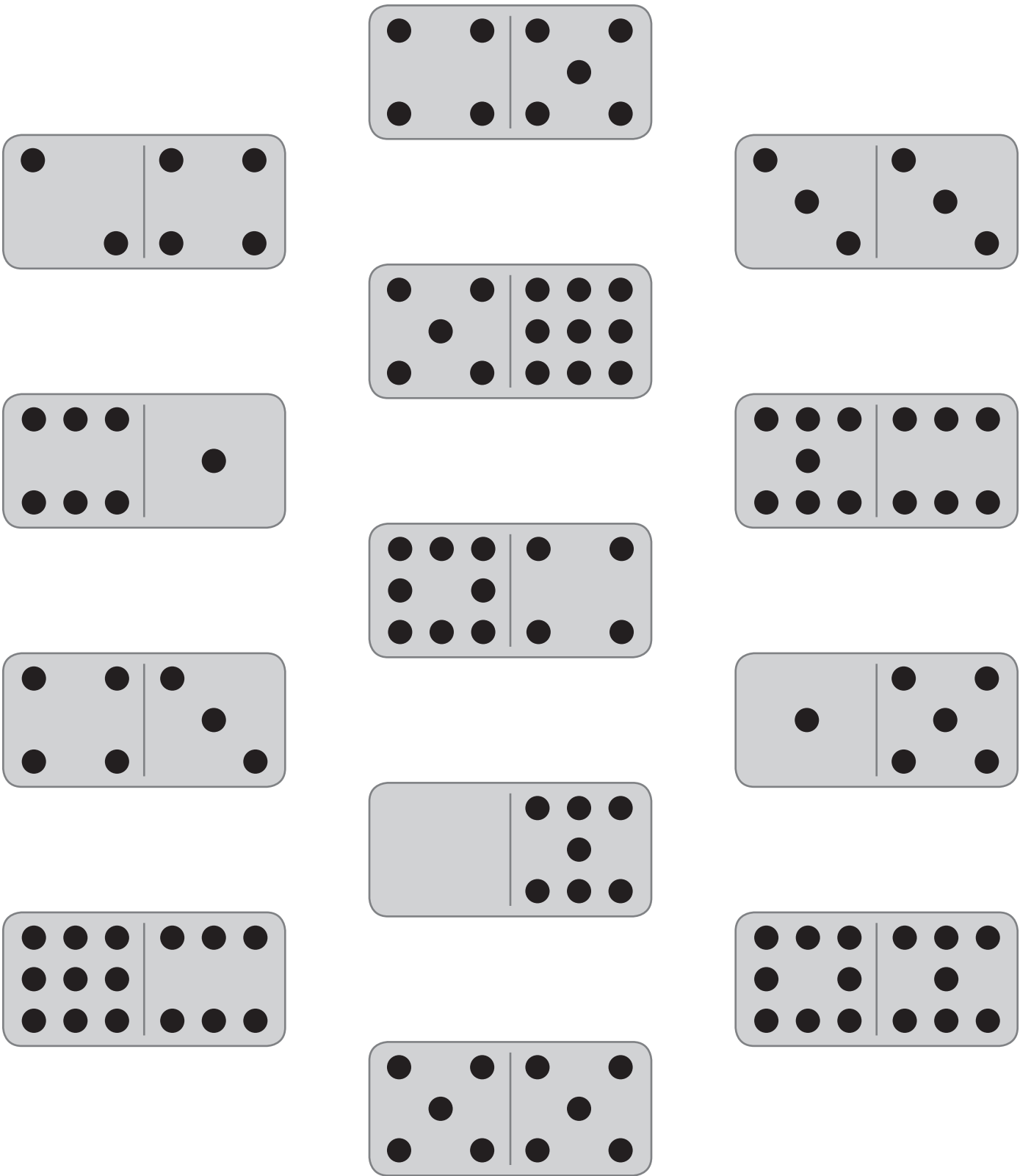
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$10 + 2 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$
$10 + 1 = \underline{\quad}$ $\underline{\quad} + \underline{\quad} = \underline{\quad}$

Cube A: 8, 8, 8, 9, 9, 9

Cube B: 3, 4, 5, 5, 6, 7

# DOMINO SORT

Sort these dominos according to the addition strategy you would use to calculate the total number of dots.



☐ Count On
 ☐ Use Doubles
 ☐ Make Ten

# CONNECT ADDITION AND SUBTRACTION

## Take or Tally

Player 1

Player 2

$$13 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$13 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$12 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$12 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$11 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$11 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$10 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$10 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$9 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$9 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$8 - \underline{\quad\quad} = \underline{\quad\quad}$$

$$8 - \underline{\quad\quad} = \underline{\quad\quad}$$

Tally

Tally

Cube A: 1, 2, 3, 1, 2, 3

Cube B: 7, 8, 9, 10, 11, 12

# Directions for the Games

## Count on 1 or 2

### Focus:

Adding 1 or 2 using the count on strategy

### Materials:

Two number cubes configured as follows:

Cube A: 4, 5, 6, 7, 8, 9

Cube B: 1, 1, 1, 2, 2, 2

Colored pencil or marker for each student in different colors

Game board

### Directions:

The player who completes the most equations is the winner.

### How to Play:

Player 1 rolls, finds the matching equation with the matching sum and fills in the dice and equation on the game board in his/her color.

Next player rolls and fills in dice and equation in his/her color.

If a player rolls a sum that is already filled, he/she misses a turn.

Play continues until board is filled or time runs out.

### Example:

Gertrude rolls a numeral six and 2 dots. She says, Six count on 2 is seven, eight. I will fill in one of the equations with the sum of 8 and fill in the dice to match my roll.

## Doubles plus 1

### Focus:

Using doubles facts to solve a doubles plus 1 equation

### Materials:

Doubles add one game board

Once cube showing the numerals 4, 5, 6, 7, 8, 9

Four counters per player, each player has a different color counter

### Directions:

The player who places all four counters on the board first, wins.

### How to Play:

First player rolls the number cube and doubles the number rolled, then adds one to it.

Player claims the sum by covering it with a counter. If that sum is already covered, the player misses a turn.

Other players have a turn.

### Example:

Carla rolls a 7 and says, "I know that double 7 is 14, so 7 add 1, must be one more, that's 15."

# Bridge to Ten

## Focus:

Reinforce the Bridge-to-Ten strategy for addition

## Materials:

Two number cubes configured as follows:

Cube A: 8, 8, 8, 9, 9, 9

Cube B: 3, 4, 5, 5, 6, 7

Colored pencil or marker for each student in different colors

Game board

## Directions:

The player who completes the most equations in their color is the winner. One player plays the left side of the board, one plays the right side. It is possible to add another player or two. In that case, each player would use the entire board and count the equations completed in his/her color at the end of the game.

## How to Play:

First player rolls both cubes.

Player finds the tens fact that corresponds to the 8 or 9s fact that is rolled.

Player fills in the sum of the tens fact and the equation for the 8 or nines fact.

Next player has a turn.

Play continues until one player fills a side (in a two-player game), or the board is filled (if more than two are playing), or until time runs out.

Player with the most equations in his/her color is the winner.

## Example:

Jorge rolls a 9 and a 5. He says, "I know that 9 is one away from ten, Nine add 5 has the same value as 10 add 4. That's 14. So I will fit in the space with 10 add 4 and add the equation 9 add 5 equals 14.

# Take or Tally

## Focus:

Using addition and subtract

## Materials:

Two number cubes configured as follows:

Cube A: 1, 2, 3, 1, 2, 3

Cube B: 7, 8, 9, 10, 11, 12

Game board

## Directions:

First to complete his/her side of the game board without receiving 5 tallies is the winner.

## How to Play:

First player rolls both cubes.

Player writes the two numbers in one of the number sentences on his/her game board. The completed equation must be true.

If a true sentence cannot be made, the player makes a tally in the space provided at the bottom of the game board.

The first player to complete 6 equations before making 5 tallies is the winner.

# Addition and Subtraction Strategies Videos

## **Introducing the ORIGO Model for Teaching Skills**

ORIGO One: <https://origo-education.wistia.com/medias/26icnyoznj>

Short Link: [b.link/O1\\_22\\_E](https://b.link/O1_22_E)

## **Using Five- and Ten-Frames to Represent Numbers**

ORIGO One: <https://origo-education.wistia.com/medias/affdnul85b>

Short Link: [b.link/O1\\_45\\_E](https://b.link/O1_45_E)

## **Teaching the Count-On Strategy for Addition**

ORIGO One: <https://origo-education.wistia.com/medias/bv1c3s6bht>

Short Link: [b.link/O1\\_1\\_E](https://b.link/O1_1_E)

## **GS20: Counting on one or two add basic facts**

<https://www.youtube.com/watch?v=MW1I9PxDsby>

## **GS13: Exploring Doubles in the Real World**

Gem Stones: <https://youtube.com/watch?v=qfuWSb5CixY>

Short Link: <https://youtu.be/qfuWSb5CixY>

## **GS14: Doubling Numbers Less Than 10**

Gem Stones: <https://youtube.com/watch?v=JZt2P4OdGx8>

Short Link: <https://youtu.be/JZt2P4OdGx8>

## **Teaching the use Doubles Strategy for Addition**

ORIGO One: <https://origo-education.wistia.com/medias/w14o4303pm>

Short Link: [b.link/O1\\_4\\_E](https://b.link/O1_4_E)

## **GS15: Using Doubles to Add “Next Door” Numbers (Doubles-Plus-1 facts)**

Gem Stones: <https://www.youtube.com/watch?v=KMfqfZHzh8I>

Short Link: <https://youtu.be/KMfqfZHzh8I>

## **GS16: Using Doubles to Add Nearby Numbers (Doubles-Plus-2 facts)**

Gem Stones: <https://www.youtube.com/watch?v=0QcCVR6Yqus>

Short Link: <https://youtu.be/0QcCVR6Yqus>

## **GS5: Exploring combinations that make 10**

Gem Stones: <https://www.youtube.com/watch?v=qzydNEeHpQw>

Short Link: <https://youtu.be/qzydNEeHpQw>

## **Using the Make-Ten or Bridge-to-ten Strategy to Addition**

ORIGO One: <https://origo-education.wistia.com/medias/e7tku31liu>

Short Link: [b.link/O1\\_7\\_E](https://b.link/O1_7_E)

## **GS6: Making a “Ten” to Add Basic Facts**

Gem Stones: <https://www.youtube.com/watch?v=ROuWdXdQ11g>

Short Link: <https://youtu.be/ROuWdXdQ11g>

## **GS7: Making a Ten to add a 2 digit number and activity**

Gem Stones: <https://www.youtube.com/watch?v=kq1meaJDirA>

Short Link: <https://youtu.be/kq1meaJDirA>

## **Teaching the Think-Addition Strategy for Subtraction**

ORIGO One: <https://origo-education.wistia.com/medias/cm98lr2tax>

Short Link: [b.link/O1\\_2\\_E](https://b.link/O1_2_E)

## **GS23: Using addition to solve basic subtraction facts:**

<https://www.youtube.com/watch?v=12FZs1JXQKU&t=1s>