

# Day 5 – Adding and Subtracting Multidigit Numbers

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## Goals:

**I can describe how multiplication and measurement division problems support the development of place value ideas.**

**I can describe the strategies that children use to count and name large numbers using benchmarks of 10.**

**I can name multidigit numbers in a variety of ways.**

**I can use a variety of representations of multidigit numbers.**

**I can use open number lines and numbers sentences to record and represent children's strategies.**

**K.1.1.2** Read, write, and represent whole numbers from 0 to at least 31. Representations may include numerals, pictures, real objects and picture graphs, spoken words, and manipulatives such as connecting cubes.

**1.1.1.1** Use place value to describe whole numbers between 10 and 100 in terms of tens and ones.

**1.1.1.2** Read, write and represent whole numbers up to 120. Representations may include numerals, addition and subtraction, pictures, tally marks, number lines and manipulatives, such as bundles of sticks and base 10 blocks.

**1.1.1.4** Find a number that is 10 more or 10 less than a given number.

**1.1.2.1** Use words, pictures, objects, length-based models (connecting cubes), numerals and number lines to model and solve addition and subtraction problems in part-part-total, adding to, taking away from and comparing situations.

**1.1.2.2** Compose and decompose numbers up to 12 with an emphasis on making ten.

**1.1.2.3** Recognize the relationship between counting and addition and subtraction. Skip count by 2s, 5s, and 10s.

**2.1.2.3** Estimate sums and differences up to 100.

**2.1.2.4** Use mental strategies and algorithms based on knowledge of place value and equality to add and subtract two-digit numbers. Strategies may include decomposition, expanded notation, and partial sums and differences.

**2.1.2.5** Solve real-world and mathematical addition and subtraction problems involving whole numbers with up to 2 digits.

## Setting the Stage for Multidigit Numbers

**Using Multiplication** (1<sup>st</sup>-grade class, <http://smarturl.it/CM5.1>, 11 minutes, 30 seconds\*)

Gardener Juliet has 6 bean pods. Each pod has 10 bean seeds inside. She also has 2 extra seeds. How many seeds does she have?

- We watched this video on day 4.

**What to look for.** (Counting by ones, counting by tens, direct place value)

## Using Measurement Division

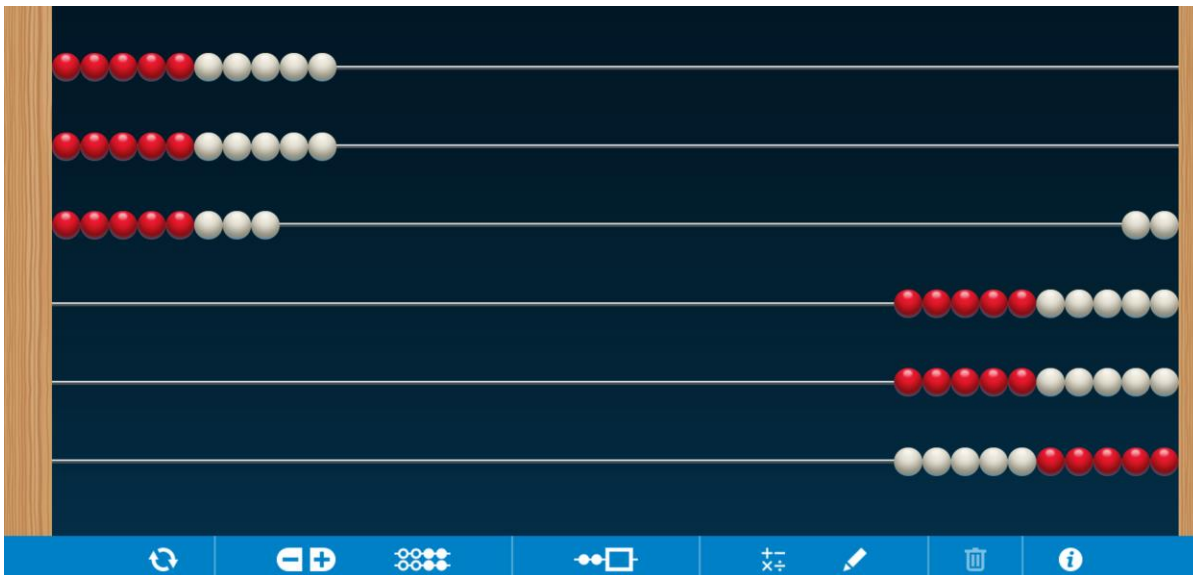
- C.B.T. <http://smarturl.it/CM6.4>
- D.P.V. <http://smarturl.it/CM6.5>

Tiffany has 57 flowers. She makes bunches of flowers with 10 flowers in each bunch. How many bunches can she make?

**What to look for.** (Counting by ones, counting by tens, direct place value)

## Developing Number Talks around Tens

What do you see? How do you see it?



Recording thinking with symbols

Naming multidigit numbers in a variety of ways

**47**

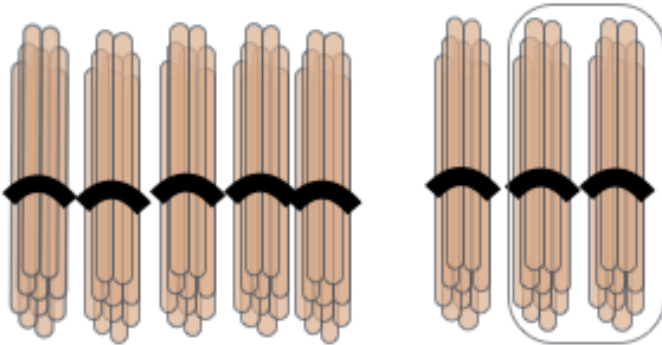
**120**

**734**

## Bundles of Sticks

How many bundles of ten sticks do you see? How many sticks altogether?

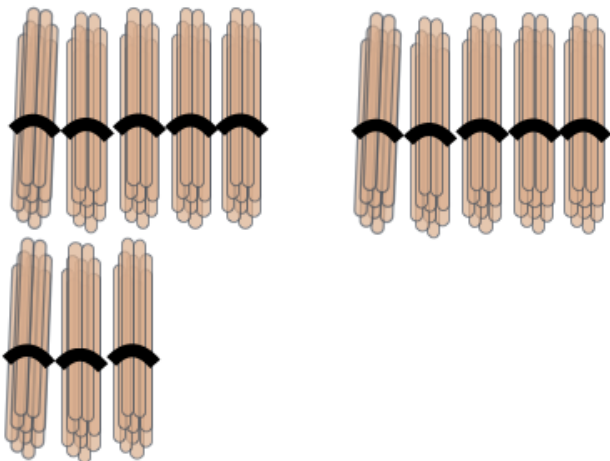
### Math Talk 1a



Begin by showing 1, 2 or 3 bundles. Ask, “How many sticks? How do you see it?” (If students do not mention the number of bundles, ask, “How many bundles of ten sticks do you see?”)

Continue to place down bundles 1 or more at a time until reaching 120, pausing to ask, “How many sticks? How do you see it?”

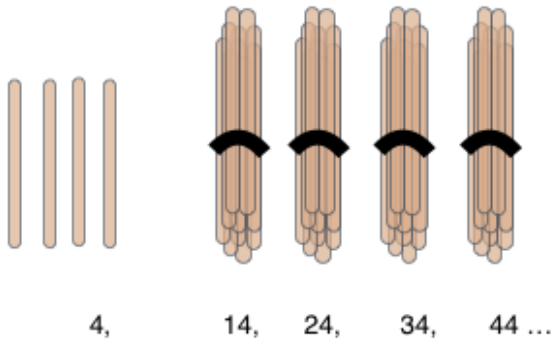
### Math Talk 1b



Remove bundles 1 or more at a time. Each time ask, “How many sticks? How do you see it?” (If students do not mention the number of bundles, ask, “How many bundles of ten sticks do you see?”)

Continue removing bundles 1 or more at a time until reaching 0, pausing to ask, “How many sticks? How do you see it?”

## Math Talk 2a

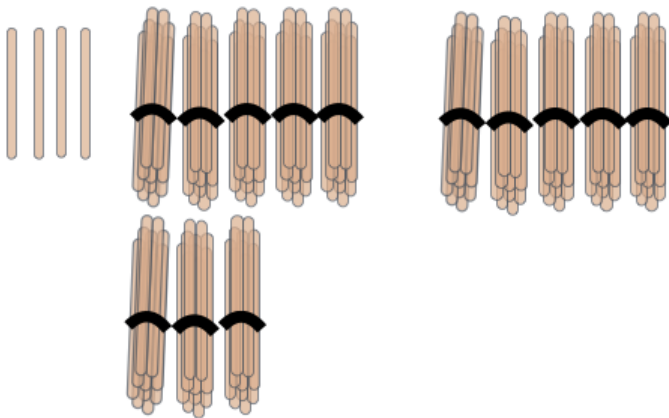


Begin by showing 4 single sticks. After the class identifies the number of sticks, place bundles of 1 or more.

Ask, “How many sticks? How do you see it?” (If students do not mention the number of bundles, ask, “How many bundles of ten sticks do you see?”)

Continue to place down bundles 1 or more at a time until crossing 120, pausing to ask, “How many sticks? How do you see it?”

## Math Talk 2b

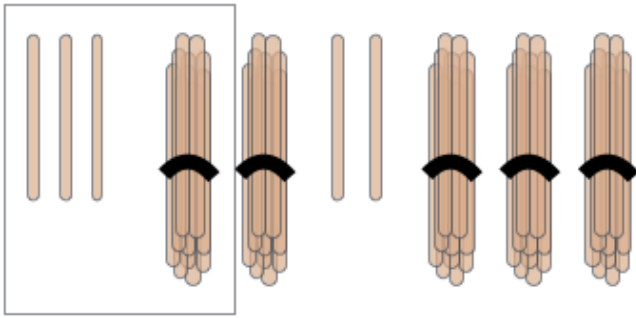


Begin by showing a 4 single sticks and 12 bundles. After the class identifies the number of sticks, remove bundles of 1 or more.

Ask, “How many sticks? How do you see it?” (If students do not mention the number of bundles, ask, “How many bundles of ten sticks do you see?”)

Continue to remove bundles 1 or more at a time until reaching 4, pausing to ask, “How many sticks? How do you see it?”

### Math Talk 3a

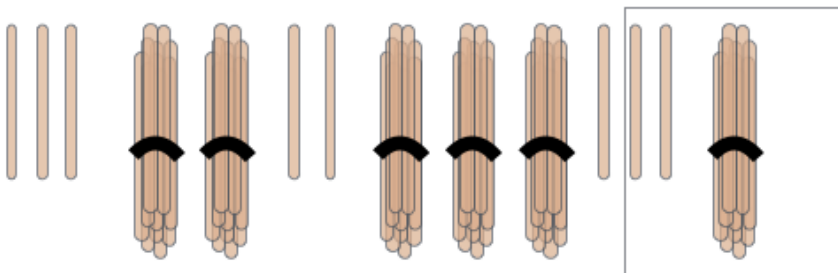


Begin by showing a 3 single sticks and 1 bundle. After the class identifies the number of sticks, place down 1 bundle. Ask, “How many sticks? How do you see it?” Follow by placing down 2 sticks and 1 bundle. Ask, “How many sticks? How do you see it?”

Continue to place down bundles and sticks until crossing over 100, pausing each time to ask, “How many sticks? How do you see it?”

### Math Talk 3b

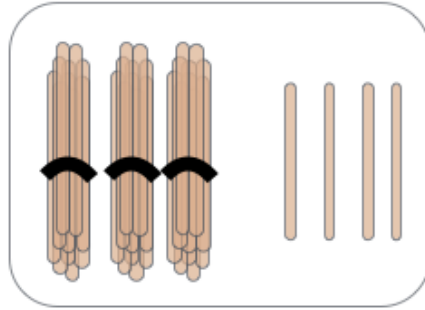
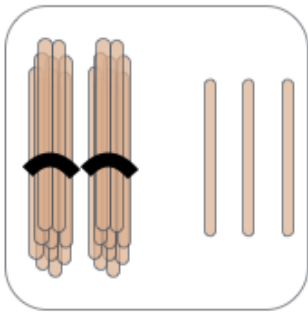
Keep the final display from math Talk 3a



Remove 1 bundle and 2 sticks. Ask, “How many sticks? How do you see it?” Follow by removing 1 stick and 2 bundles. Ask, “How many sticks? How do you see it?”

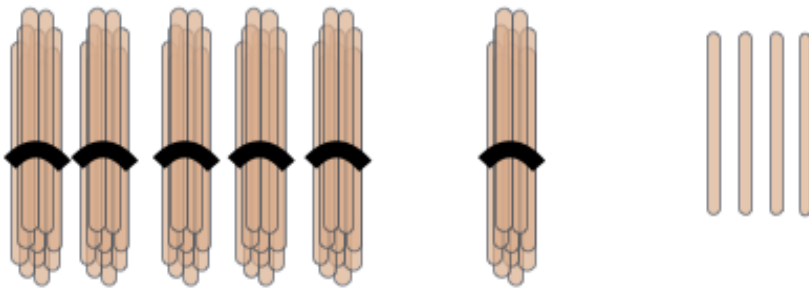
Continue to remove bundles and sticks until reaching 0, pausing each time to ask, “How many sticks? How do you see it?”

## Math Talk 4a



Place down 2 bundles and 3 sticks. Ask, “How many sticks? How do you see it?” Place down 3 bundles and 4 sticks. Ask, “How many sticks? How do you see it?”

## Math Talk 4b



Show 6 bundles and 4 sticks. Ask, “How many sticks? How do you see it?” I want to take away 14 sticks. How can I do it? How many are left?

# Using Base-Ten Blocks



## **Adding and Subtracting Using Multidigit Numbers and Direct Modeling**

**Join (result unknown)  $28 + 35 = ?$**

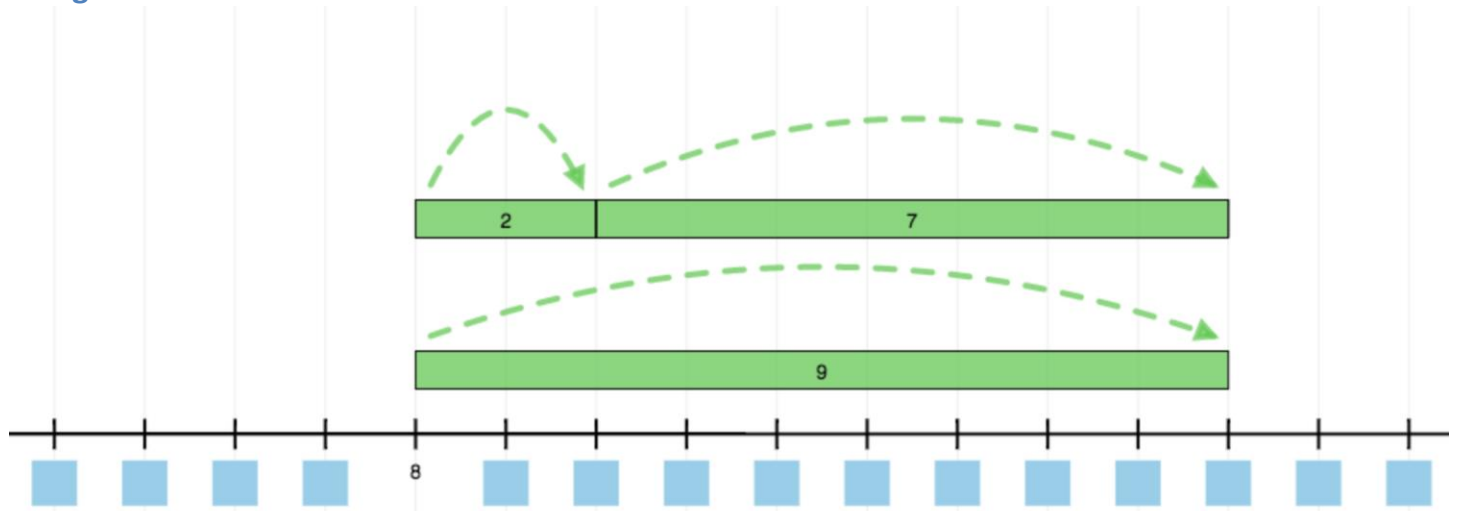
**Separate (result unknown)  $75 - 26 = ?$**

**Join (change unknown)  $47 + ? = 75$**

# Number Talks with Open Number Lines – Tools for discussing and modeling student strategies.

## Addition

Using a number line for  $8 + 9$



<http://www.mathlearningcenter.org/web-apps/number-line/>

### Recording Student Strategies using an Open Number Line

### Using Written Symbols

a) Counting on by ones



b) Make Tens



Using an open number line for  $18 + 19$

Becky walked 18 blocks in the morning and 19 blocks in the afternoon. How many blocks did she walk for the day?

Recording Student Strategies using an Open Number Line

Using Written Symbols

a) Counting by ones



b) Counting on in chunks



c) Doubles/Near Doubles



d) Breaking each number into its place value and combining tens and then combining ones



Discuss efficiency.

**Word Problem**

**Recording Student Strategies using an Open Number Line**

**Using Written Symbols**

a) Student A - Madeline



b) Student B – Laney (pink shirt)



c) Student C – Nate



d) Student D – Boy in orange and blue polo shirt



## Subtraction

### Join (change unknown)

Carlos the frog needs to make 31 hops to get to the lily pad. He made 14 hops then stopped. How many more hops does he need to hop to get to the lily pad?

Recording Student Strategies using an Open Number Line

Using Written Symbols

a) Adding up by ones



b) Adding up in chunks



c) Counting back by ones



d) Counting back in chunks



**Subtracting 70 – 34, Number Talks 3.4, 3<sup>rd</sup>-grade, 3 minutes, 50 seconds**

**Recording Student Strategies using an Open Number Line**

**Using Written Symbols**

a) Syad



b) Mary



c) Andrew



d) Grant



**Video 3.3 70 – 59 (Number Talks Video 3.3, 3<sup>rd</sup>-grade, 6 minutes, 50 seconds)  
from Number Talks page 320**

1. How does the number line provide support for understanding Grant's constant difference strategy? In what other ways could you model this strategy to help students understand why it works?
2. The students share several subtraction strategies: Constant Difference, Adding Up, Removing in Chunks, Adjusting One of the Numbers. Discuss how these strategies are similar and different.
3. When Andrew shared his strategy, students were unsure whether 1 should be added or subtracted. Share your observations about the student and teacher roles during the class discussion. How could you help students understand his thinking?

## Overview of Invented Strategies from Children's Mathematics - CGI (page 108)

Problem	Incrementing	Combining the Same Units	Compensating
<p><b>Join (Result Unknown)</b> Paul had 28 strawberries in his basket. He picked 35 more strawberries. How many strawberries did he have then?</p>	<p>"20 and 30 is 50, and 8 more is 58. 2 more is 60, and 3 more than that is 63."</p>	<p>"20 and 30 is 50. 8 plus 5 is like 8 plus 2 and 3 more, so it's 13. 50 and 13 is 63."</p>	<p>"If I change 28 to 30, I have to take 2 from 35. 30 plus 33 is 63."</p>
<p><b>Separate (Result Unknown)</b> Paul had 83 strawberries in his basket. He gave 38 strawberries to his friend. How many strawberries did Paul have left?</p>	<p>"83 take away 30 is 53, and take away 3 is 50. Then take away 5 more. That's 45."</p>	<p>"80 take away 30 is 50. 3 take away 8 makes 5 more to take away. 50 take away 5 is 45."</p>	<p>"83 take away 38 is the same as 85 take away 40. That's 45."</p>
<p><b>Join (Change Unknown)</b> Paul has 47 strawberries in his basket. How many more strawberries does he have to pick to have 75 altogether?</p>	<p>"47 and 3 is 50 and 20 more is 70. So that's 23, but I need 5 more, so it's 28."  "47 [pause], 57, 67. That's 20. 67 and 3 is 70, and 5 more is 75. So 8 and the 20, 28."</p>	<p><b>Combining the Same Units is not commonly used for Join (Change Unknown).</b></p>	<p>"If it were 45, it would be 30. But it's 47, so it's 2 less. 28."</p>