

CHAPTER 4: Addition and Subtraction of Two-Digit Numbers

MINI-MODULE B

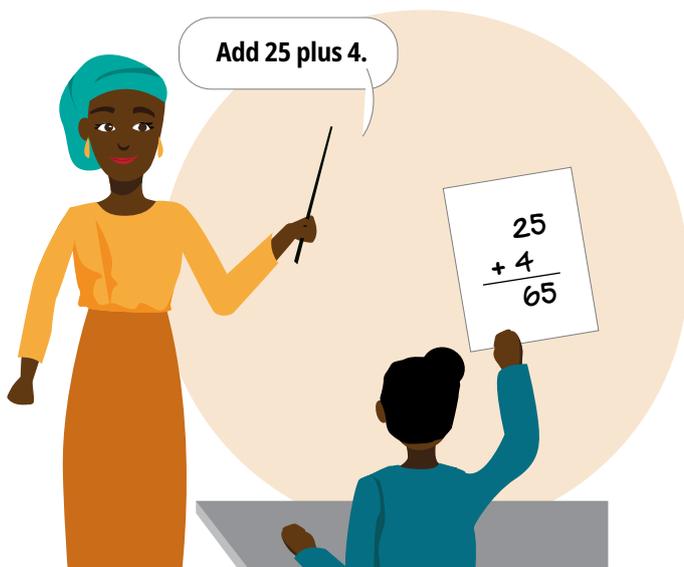
Standard Algorithm for Adding Two-Digit Numbers without Regrouping

Objectives

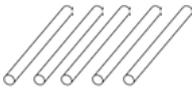
This mini-module aims to help teachers:

- Demonstrate how to add two-digit numbers using place value materials and the standard algorithm.
- Teach the standard algorithm for addition using materials and writing.
- Practice a new teaching activity.

Illustration of Teaching



Recommended Materials

Tens	Ones
	

Tens	Ones
2	1
+ 1	5
3	6

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



REFLECT:

- What mistake did the student make?
- Why do you think the student made this mistake?
- What questions could you ask this student to help them see their mistake?
- What materials could you use to address this mistake?

Ideas to Consider

This student understands to write the numbers 25 and 4 vertically and add the digits. However, they have not aligned the digits with the same place value. They added the digit 4 to the tens' digit in 25, which represents 20. This mistake means that they actually added $25 + 40 = 65$ instead of $25 + 4 = 29$. This student may not have a good understanding of the place value of digits. Or they might not understand that only digits with the same place value should be added.



ACTIVITY: ADD TWO-DIGIT NUMBERS USING STICKS

This activity can be completed alone, in pairs, or with a group of teachers. You may prepare groups of ten sticks before the activity to save time. If you have colleagues to work with, take turns adding with place value materials. Discuss your responses to the questions.

Purpose: Practice adding two-digit numbers using place value materials.

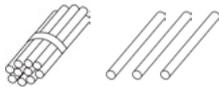
Materials needed: Place value manipulatives (e.g., sticks with rubber bands or strings to group them; base 10 blocks).

Instructions

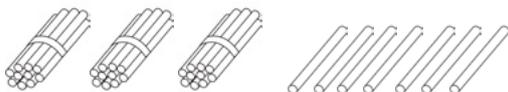
- Read a story: ***Fatima has 24 oranges and 13 mangos. She wants to find out how many fruits she has in total.***
- ***What math operation should we use for this problem?*** (Addition)
- ***How can we use place value manipulatives to find the total number of fruits?***
- Count out 24 sticks to represent the oranges:



- Count out 13 sticks to represent the mangos:



- Put the groups of 24 and 13 together:

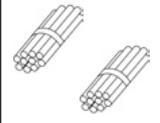
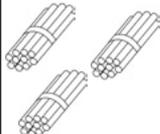
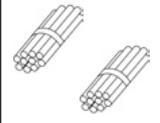
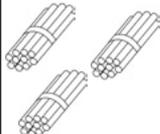
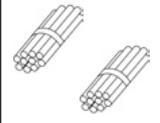
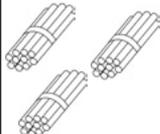


- Count the sticks by tens and ones:
"10, 20, 30, 31, 32, 33, 34, 35, 36, 37"
- Note that this means Fatima has 37 fruits.
- Write an addition sentence for the problem: $24 + 13 = 37$

What Do Children Learn about the Standard Algorithm for Addition?

Children should have a good understanding of the place value of tens and ones before they learn the standard algorithm for adding two-digit numbers. Before learning how to write and solve a vertical addition problem with two-digit numbers, children should spend time practicing adding ones and tens with place value materials. Place value materials like sticks can be used to show how to add tens and ones, with or without a place value chart. Children can then write and add symbols and digits in a place value chart, which helps them keep the digits lined up. Once they have a good understanding

of how to add digits with the same place value, they are ready to add using the standard algorithm. It is important to line digits up neatly with other digits of the same place value to avoid mistakes. One common mistake is to line up the digits from left to right, but a good understanding of place value can help children avoid this.

Children should be able to . . .	What does this mean?	Example														
Add numbers up to 99 using place value materials	Add using place value materials representing tens and ones.	<p>Q: What is $21 + 15$?</p> <p>A: I can show the first number, then count and add the second number. First I count out 21:</p> <table border="1"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table> <p>Then I add 15:</p> <table border="1"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table> <p>$21 + 15 = 36$</p>	Tens	Ones			Tens	Ones								
Tens	Ones															
																
Tens	Ones															
																
Add numbers up to 99 using a place value chart	Use a place value chart to add two-digit numbers written in columns.	<table border="1"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td>//</td> <td>●</td> </tr> <tr> <td>/</td> <td>●●●●●</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Tens</th> <th>Ones</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1</td> </tr> <tr> <td>+ 1</td> <td>5</td> </tr> <tr> <td>3</td> <td>6</td> </tr> </tbody> </table>	Tens	Ones	//	●	/	●●●●●	Tens	Ones	2	1	+ 1	5	3	6
Tens	Ones															
//	●															
/	●●●●●															
Tens	Ones															
2	1															
+ 1	5															
3	6															
Add numbers up to 99 using the standard algorithm for addition	Write a vertical addition problem with the digits in columns based on place value. Add the ones and then the tens.	<table style="display: inline-table; margin-right: 20px;"> <tbody> <tr><td style="text-align: right;">21</td></tr> <tr><td style="text-align: right;">+ 15</td></tr> <tr><td style="text-align: right;">-----</td></tr> <tr><td style="text-align: right;">36</td></tr> </tbody> </table> <table style="display: inline-table;"> <tbody> <tr><td style="text-align: right;">42</td></tr> <tr><td style="text-align: right;">+ 5</td></tr> <tr><td style="text-align: right;">-----</td></tr> <tr><td style="text-align: right;">47</td></tr> </tbody> </table>	21	+ 15	-----	36	42	+ 5	-----	47						
21																
+ 15																

36																
42																
+ 5																

47																

Reflection

Write your responses down or discuss your ideas with your colleagues:

- Think of your own students. Which skills from the above table do you think they would find challenging? Why? How can you support them?
- Consider the last skill in the table, vertical addition. What are the other math skills that children should have before they learn this?

Teaching Practice

This practice activity may be completed by teachers with their own class or with a smaller group of students.



ACTIVITY: ADD TWO-DIGIT NUMBERS WITH STICKS

Purpose: Add using materials representing tens and ones.

Materials needed: A place value chart and place value manipulatives (e.g., sticks with rubber bands or strings to group them) for students to use in pairs. You may prepare groups of ten sticks before the activity to save time.

Instructions

- Give each pair of students a set of 40 sticks and a place value chart.
- Read the story: ***One sunny Saturday morning, there were 20 girls and 16 boys playing football. We want to find out how many children there are all together.***
- Discuss: ***How can we solve this problem? How do you know?*** (Example: **Add** because we want to find the total number of children, including girls and boys.)
- Say: ***We will use our sticks to add the girls and boys.***
- Ask students to show the number of **girls** playing football in their place value chart:

Tens	Ones

- Check students' work and help them place the 20 sticks in the correct column if needed.
- Ask students to count out different sticks to show the number of **boys** playing football, and put those in the chart too.

Tens	Ones

- Ask: ***How many football players are there in total? How do you know?***
- Count the sticks by tens and ones: "10, 20, 30, 31, 32, 33, 34, 35, 36"
- Say: ***There are 36 football players in total. We found the total by adding the tens together in the tens' column and adding the ones together in the ones' column.***
- Write a horizontal addition sentence for the problem on the board: $20 + 16 = 36$
- Repeat with other two-digit addition problems without regrouping (e.g., $16 + 12 = 28$, $15 + 23 = 38$).



This document is licensed under a Creative Commons Attribution 4.0 International License.
<https://creativecommons.org/licenses/by/4.0/>

MAY 2025

AUTHORS: Brittany Meredith, Yasmin Sitabkhan, Wendi Ralaingita, Linda Akach