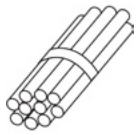
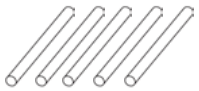
Standard Algorithm for Subtracting Two-Digit Numbers without Regrouping

Objectives

This mini-module aims to help teachers:

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

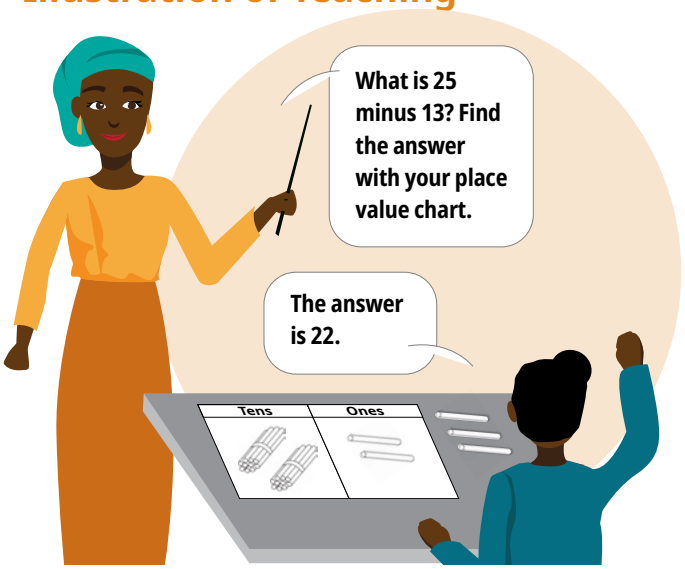
Recommended Materials

Tens	Ones
	

Tens	Ones
4	7
- 2	3
2	4

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

Illustration of Teaching



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

The student was asked to subtract 25 – 13 with their place value chart. They incorrectly answered 22. It looks like they correctly counted 25 sticks, so they may understand place value. However, they took away only 3 sticks, meaning that they did not subtract the ten. The student may have misheard the problem; the teacher could repeat it or write the problem on the board. Another possibility is that they do not yet understand two-digit subtraction. The teacher could demonstrate how to subtract 13 (1 ten and 3 ones) and then give the student another try. It could also help to tell a story (e.g., "There were 22 children playing and 13 went home."). The teacher should give the student more practice with other examples.

ACTIVITY: SUBTRACT TWO-DIGIT NUMBERS USING STICKS

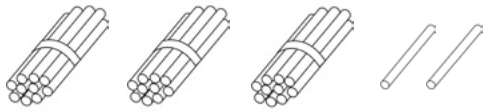
This activity can be completed alone, in pairs, or with a group of teachers. You may prepare groups of ten sticks before the activity to save time. If you have colleagues to work with, take turns subtracting with place value materials. Discuss your responses to the questions.

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

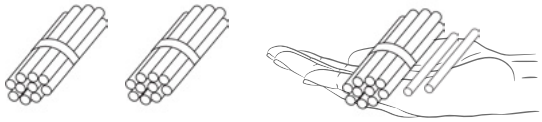
Materials needed: Place value manipulatives (e.g., sticks with rubber bands or strings to group them; base 10 blocks).

Instructions

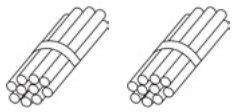
- Read a story: ***Bintu picked 32 oranges from a tree. She gave 12 oranges to her friend, and she wants to find out how many she has left.***
- ***What math operation should we use for this problem?*** (Subtraction)
- ***How can we use place value manipulatives to find the number of oranges Bintu has left?***
- Count out 32 sticks to represent the oranges Bintu picked:



- Remove 12 sticks to represent the oranges Bintu gave away:



- Count the sticks that remain: "10, 20"

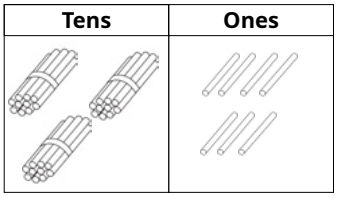
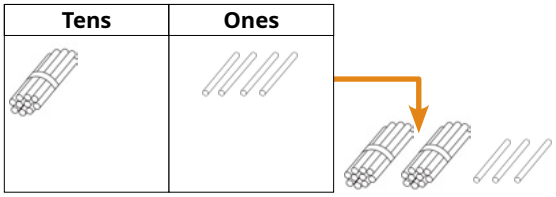
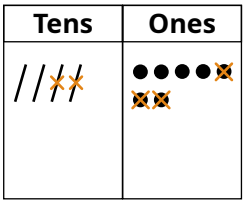
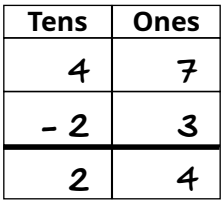


- Note that this means Bintu has 20 oranges left.
- Write a subtraction sentence for the problem: 32 – 12 = 20

What Do Children Learn about the Standard Algorithm for Subtraction?

Children should have a good understanding of the place value of tens and ones before they learn the standard algorithm for subtracting two-digit numbers. As with two-digit addition, students should spend time practicing with materials before doing vertical subtraction. This helps them understand the process they use in the standard algorithm, and helps them avoid making mistakes.

Children typically learn two-digit addition before learning two-digit subtraction, so their place value skills have already been strengthened. From their work with one-digit numbers, they should already understand that addition and subtraction are opposite actions—they "undo" each other. Adding and subtracting two-digit numbers strengthens this understanding.

Children should be able to . . .	What does this mean?	Example
Subtract numbers up to 99 using place value materials	Subtract using place value materials representing tens and ones.	Q: ***What is 37 – 23?*** A: I can show the first number, then remove the second number. First I count out 37:  Then I remove 23:  37 – 23 = 14
Subtract numbers up to 99 using a place value chart	Use a place value chart to subtract two-digit numbers written in columns.	 
Subtract numbers up to 99 using the standard algorithm for subtraction	Write a vertical subtraction problem with the digits in columns based on place value. Subtract the ones and then the tens.	58 – 27 = 31 59 – 4 = 55

Reflection

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

- Look at the last subtraction problem in the table: 59 – 4 = 55
  - » What mistakes do you think students might make when solving this vertical subtraction problem?
  - » How would you address these mistakes?
  - » What materials could you use to show 59 – 4?
  - » How would these materials help students understand better?

Teaching Practice

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

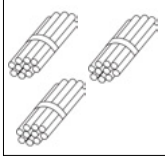
ACTIVITY: SUBTRACT TWO-DIGIT NUMBERS WITH STICKS

Purpose: Subtract two-digit numbers using the place value of 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.

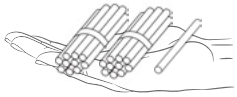
Instructions

- Give each pair of students a set of 40 sticks and a place value chart.
- Read the story: ***There were 34 children playing football. 21 of them went home. We want to find out how many football players were left.***
- Discuss: ***How can we solve this problem? How do you know?*** (Example: **Subtract** because we want to find how many remained after some children left.)
- Say: ***We will use our sticks to subtract the children who went home, and find out how many were left.***
- Ask students to show the total number of football players in their place value chart:

Tens	Ones
	

- Check students' work and support them if needed.
- Say: ***21 children went home. How can we show that they left using our sticks?***
- Ask students to take away the 21 students who went home.

Tens	Ones
	



- Ask: ***How many football players are left? How do you know?***
- Count the sticks by tens and ones: "10, 11, 12, 13"
- Say: ***There are 13 football players left. We found the answer by taking away the tens and ones.***
- Write a horizontal subtraction sentence for the problem on the board: 34 – 21 = 13
- Repeat with other two-digit subtraction problems without regrouping (e.g., 35 – 10 = 25, 28 – 6 = 22).

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