Collins

真正上海数学

Real Shanghai Mathematics

1.1

Teacher Book

Unit Two: Addition and subtraction of numbers up to 10

TEACHING GOALS

Knowledge and skills

1. Know the meaning of additions with realistic examples of the combining model and the adding model. State the name of each component in an addition number sentence.
2. Begin to understand that even if two addends change places, the sum will not change.
3. Know the meaning of subtractions with realistic examples of the finding-remainder model and the part–whole model. State the name of each component in a subtraction number sentence.
4. Explore and perceive the relationship between addition and subtraction in real situations and on the number line: subtraction is the inverse operation of addition.
5. Explore and master additions and subtractions of numbers up to 10.
6. Use realistic examples to write down expressions like $\square + a = 10$, and find the addend; use realistic examples to write down expressions like $10 - \square = b$, and find the subtrahend.
7. Calculate adding or subtracting two numbers up to 10, and use two-step mixed operations with numbers up to 10.

Process and method

1. Begin to know the meaning of additions with realistic examples of the combining model and the adding model. Begin to know the meaning of subtractions with realistic examples of the finding-remainder model and the part–whole model.
2. Explore the different results of splitting numbers up to 10 with two-sided counters, and gain experience from mathematical exploration activities.
3. Experience the mathematical process of abstracting simple mathematics problems from real-life contexts, getting the result, then going back to the real-life context.
4. Improve the accuracy of calculation in learning addition and subtraction of numbers up to 10.

Emotional attitude and value

1. Feel the connection between mathematics and life, and perceive that mathematics is useful and interesting. Begin to know the value of mathematics.
2. During the learning and application of maths, stimulate interest, and develop a good learning attitude in mathematical learning. Have curiosity about mathematical phenomena in real life and the surrounding environment and a desire to explore mathematics.

DESIGN FOR TEACHING

Based on Unit One 'Numbers up to 10', learn addition and subtraction of numbers up to 10.

When learning addition and subtraction, it's very important for pupils to know the meaning of addition and subtraction. Regarding making ten, which is very important in the future, the textbook is arranged as 'combine and split' and 'games with 10' to help pupils study better.

Number bonds

TEACHING GOALS

1. State all the different results of splitting 10.
2. Master all the different results of splitting 10 in order.

KEY TEACHING POINTS

Split 10.

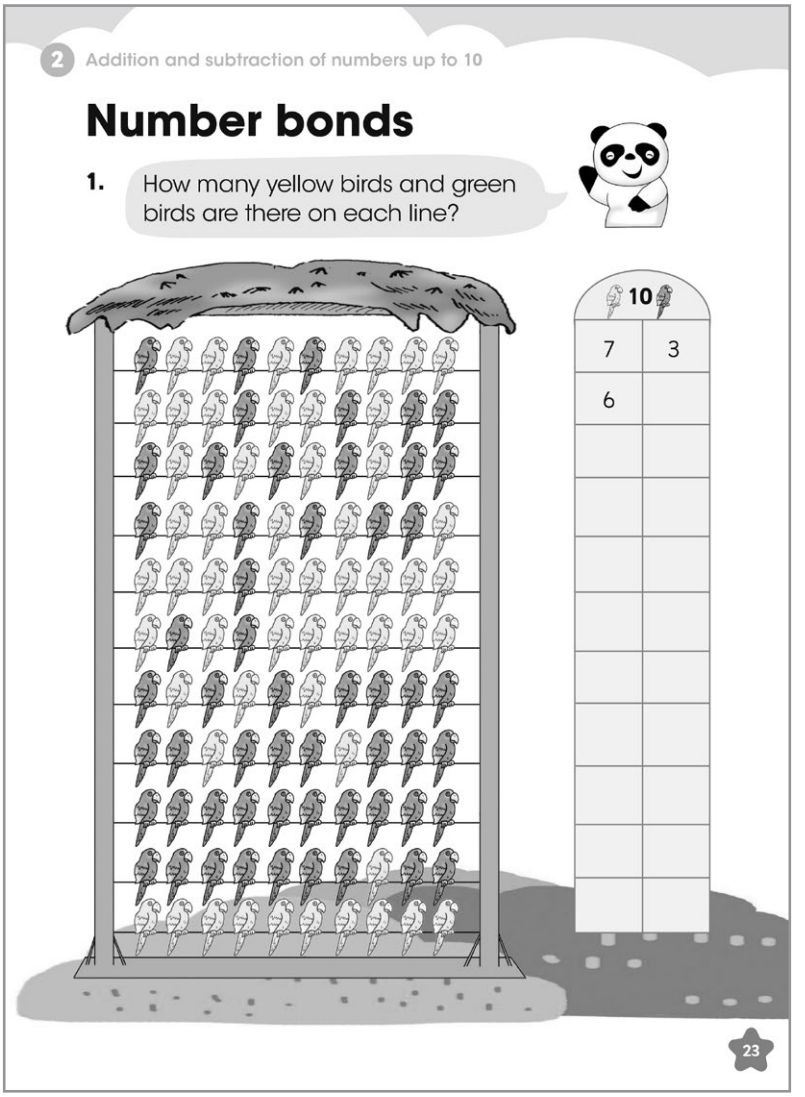
POTENTIAL BARRIERS

Splitting 10 in order.

NOTES FOR TEACHING

The aim of 'split and combine' is to find all the possible ways to split a given number into two numbers, and record them without missing any. This splitting is introduced using the scenario of 'green birds and yellow birds on perches'.

ADVICE FOR TEACHING



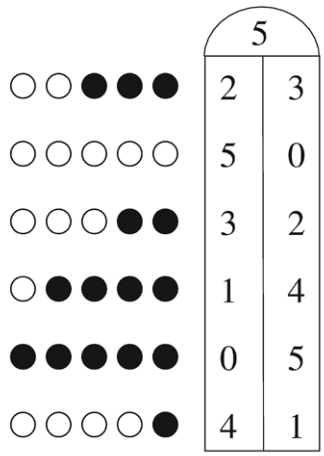
1. Question 1
   Show this question on the board.

   First, let pupils describe the bird cage: the birds are having a rest on the perches. The perches make up 11 floors. (11 doesn't appear in the textbook yet but pupils have experience of 11 in daily life.) There are 10 birds on each floor. Some are yellow and some are green. There is a table like a house. 10 is written on the roof. The number of yellow birds should be filled in the column below the yellow bird and the number of green birds should be filled in the column below the green bird. When pupils can understand the meaning of these, they can solve the problem independently. They can count yellow and green birds on each floor, then fill in the blanks. They can finish the 'splitting 10'.

2. Question 2
   This question is an exercise in 'splitting 10'. The key point is to find every possible result. Pupils can find each answer without missing any using two-sided counters by finding that the first answer is red (or blue), then decreasing by 1 red (or blue) every time, and increasing 1 blue (or red) every time, until all counters are blue (or red).

Use a magnetic board to demonstrate the question: show 5 two-sided counters in one line. How many different ways can you show them? Every time a pupil shows them one way, then fill in the number of red ones and blue ones in each row in the number building.

For example:



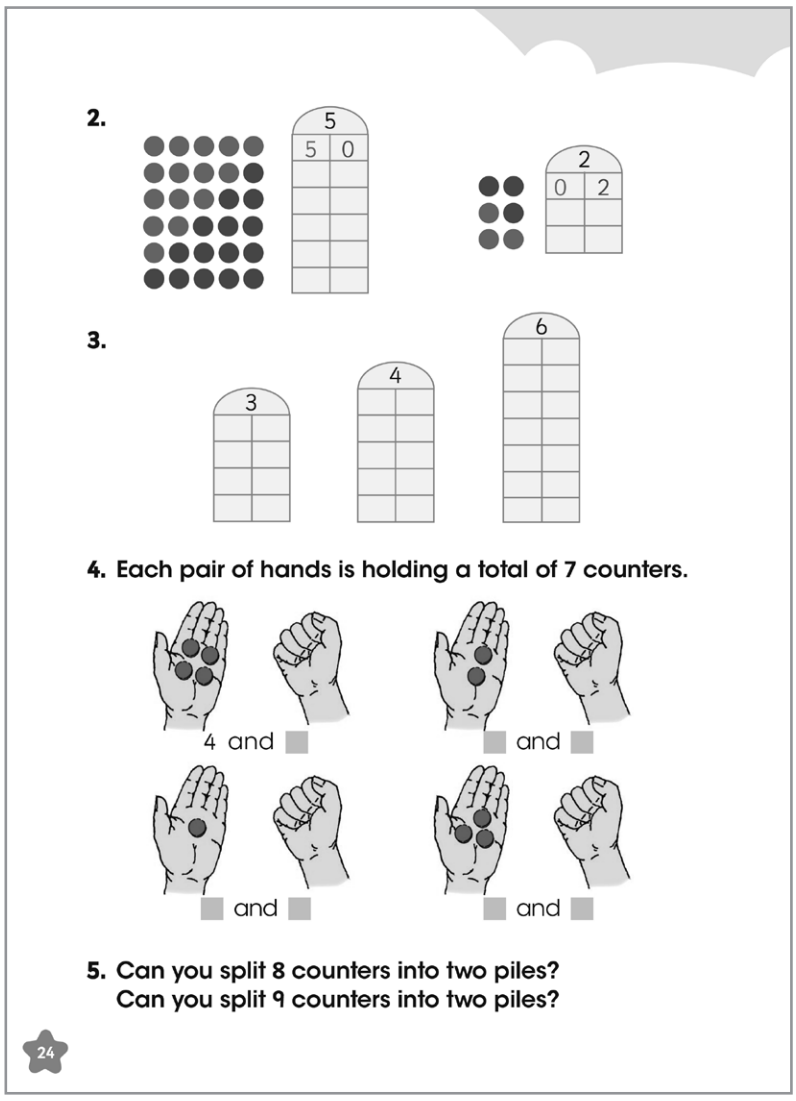
Ask the heuristic question: 'How can you be sure that there are clearly none missing?' After thinking, pupils can use the two-sided counter diagram beside the number 5 building in Question 2 to talk about what the diagram shows and to discover the features of this kind of picture.

3. Question 3
   Pupils can discover why some number buildings have more floors and some have fewer floors.

   Write a number building on the blackboard, like the number 4 building. Pupils show the number 4 building using two-sided counters. They can put 4 in 1 row. Then fill in all answers in the number building.

   Pupils should understand clearly before they do the exercise that the number in the roof is the sum of the two-sided counters.

   Before pupils start to do the exercises in the textbook, they should understand clearly that the number on the top of the number building is the number of all the two-sided counters in each row.



4. Question 4
   Pupils can find out more about splitting through the game of splitting numbers. Pupils have seven red counters across two hands and show the number in one hand. After counting the number, they can know how many counters are in the other hand by 'splitting numbers'. This game can help pupils understand 'splitting numbers' in different ways.

5. Question 5 continues the game from Question 4.

Addition

TEACHING GOALS

1. Know the meaning of addition through combining and find the answer by counting.
2. Know the meaning of each element in an addition sentence.
3. Begin to understand 'Even though two addends change their place, the sum will not change.'
4. Know addition further by the action of adding.
5. Know how to use symbols to represent adding (for example $\xrightarrow{+3}$) to represent (add 3), and express the meaning of $a \xrightarrow{+m} b$.
6. Describe scenarios by answering the questions 'What's the beginning?', 'What's the ending?' and 'What happened?'.
7. Calculate addition with numbers up to 10.

KEY TEACHING POINTS

Begin to know the meaning of addition through specific real-life examples of combining and adding, model and calculate addition with numbers up to 10.

POTENTIAL BARRIERS

The meaning of addition.

NOTES FOR TEACHING

1. Addition has many different kinds of model. Combining, adding into, and more than models are common in primary school. (For example: Alyssa has 3 sweets. Dylan has 3 more sweets than Alyssa. So Dylan has 3 + 3 sweets.) This lesson as an introduction to addition starts with combining, which means the union of two disjoint sets in the concept of set. The number of elements in the union is the result of the addition. The introduction starts by looking at the category concept. The set of little tigers and the set of adult tigers are two disjoint subsets. The union of them is the universal set of tigers. The tiger is a category concept for little tiger and adult tiger. Here the learning process is designed under the philosophy of construction. For example: let pupils construct the universal set of tigers, which is also the category concept from the two subsets of little tigers and adult tigers, so that the goal of construct addition can be achieved. Counting, as a main support for the introduction to learning addition, is a basic activity for knowing numbers. The result of addition can be found directly by counting the elements in the universal set (category concept), and can also be found by continuing to count. Count one of the subsets (adult tigers or little tigers), and then count the other subset (little tigers or adult tigers).
2. The actual meaning of addition is adding.
   a. The meaning of addition should be shown being put together from many different applied situations. Adding is the other meaning of combining. Adding also means continuing to count.
   b. The addition number sentence can be used, not only in static conditions, but also movement conditions. But using the number sentence (such as 3 + 2 = 5) you canot emphasise the movement enough. For movement situations, expressing $3 \xrightarrow{+2} 5$ is suitable. And here $3 \xrightarrow{+2} 5$ can also be said as 'adding 2 to 3 gets 5'. There is a clear distinction between the start state (3) and the end state (5) by 'adding 2' in the middle period above the arrow. It emphasises the order of time: this is before, that is after and this is what happened during the middle. The textbook introduces how to solve problems about the end state. Depending on the class's specific situation, lead pupils to solve problems about the 'middle action' and the 'start state'. For example:

      $3 \xrightarrow{+\square} 4$, and $3 \xrightarrow{+1} \square$

      This is preparation for solving number sentences such as 3 + □ = 4, and □ + 1 = 4 in the future.

ADVICE FOR TEACHING

1. Combine

a. Question 1
Ask: 'There are 2 adult tigers and 4 little tigers. How many tigers are there in total?' after pupils have observed the topic picture.

Pupils talk and discuss, then give the number sentence: 2 + 4 = 6. Introduce the name of the elements in an addition number sentence: 2 and 4 are addends; 6 is the sum; + is a plus sign; = is an equality sign. Teach how to read this number sentence. Ask: 'Can you write 4 + 2 = 6?' and give a hint to pupils, 'Even though two addends change their place, the sum will not change.'

b. Question 2
The first picture on the left indicates the requirements: look at the pictures and write the number sentence. For every picture you can write two number sentences about what it means.

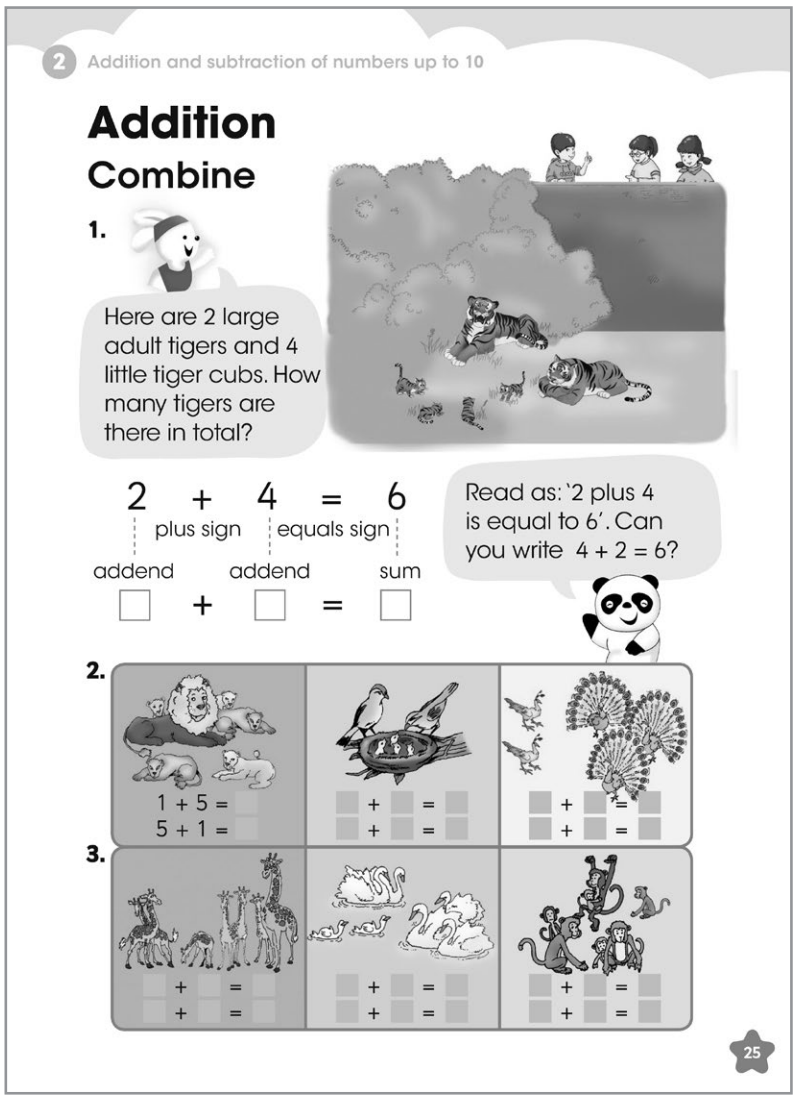
The picture on the left:
1 adult lion and 5 little lions 1 + 5
5 little lions and 1 adult lion 5 + 1

The picture in the middle:
2 adult birds and 4 little birds
2 + 4
4 little birds and 2 adult birds
4 + 2

The picture on the right:
3 male peacocks and 2 female peacocks
3 + 2
2 female peacocks and 3 male peacocks
2 + 3

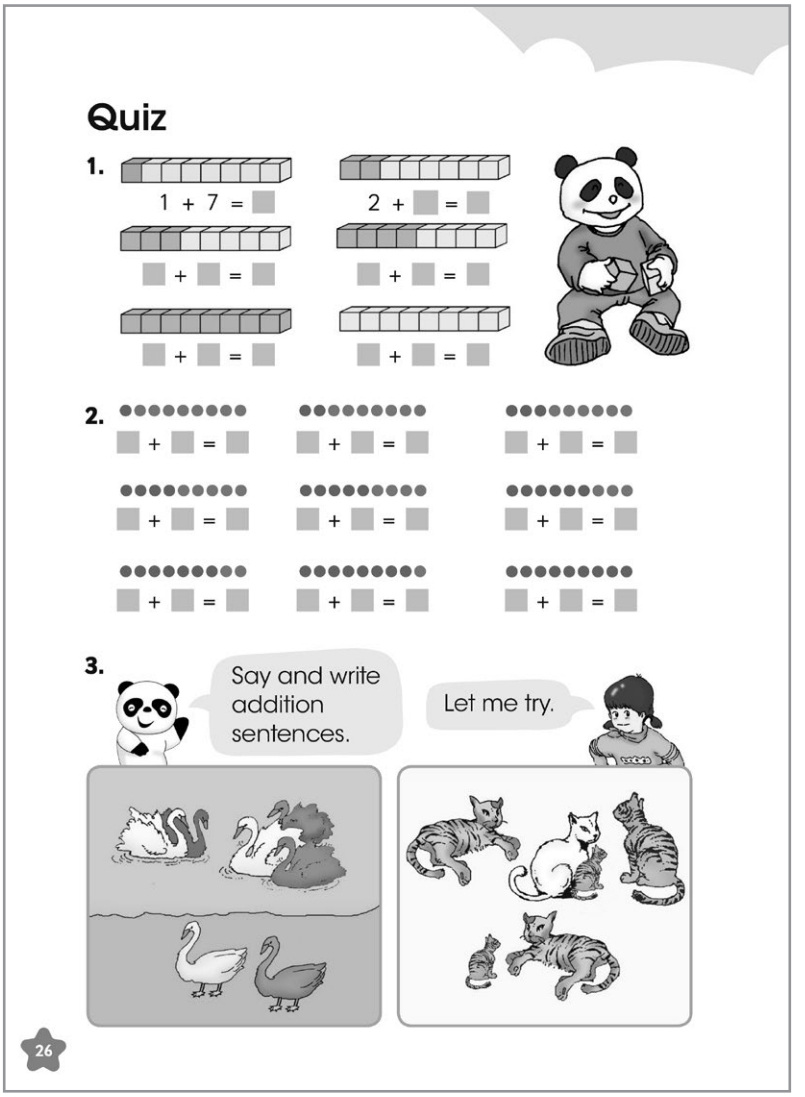
c. Question 3
The requirements are the same as Question 2.

d. There are further activities in the practice book.



2. Quiz

Compared to the previous page, the comprehension of addition is gradually becoming more abstract. The objects combined in Question 1 and Question 2 are no longer animals, but blocks, and then small counters. Question 3 asks pupils to look at things from different perspectives and write different addition number sentences. This is a good way to cultivate pupils' different ways of thinking.



a. Question 1
Panda connects two different coloured blocks. Question 1 indicates: the number of green blocks is the first addend, and the number of yellow blocks is the second addend.

b. Question 2
The blue counters are added to the red counters. Pupils can write addends according to the colour and choose one of them as the first addend.

c. Question 3
Pupils try to make a story after looking at the picture. And they write the number sentence according to the story.

The picture on the left
by colour: 4 black swans and 3 white swans.
4 + 3 = 7
3 + 4 = 7

by position: 5 are in the water and 2 are on the bank
5 + 2 = 7
2 + 5 = 7

The picture on the right
by colour
5 + 1 = 6
1 + 5 = 6

by size
2 + 4 = 6
4 + 2 = 6

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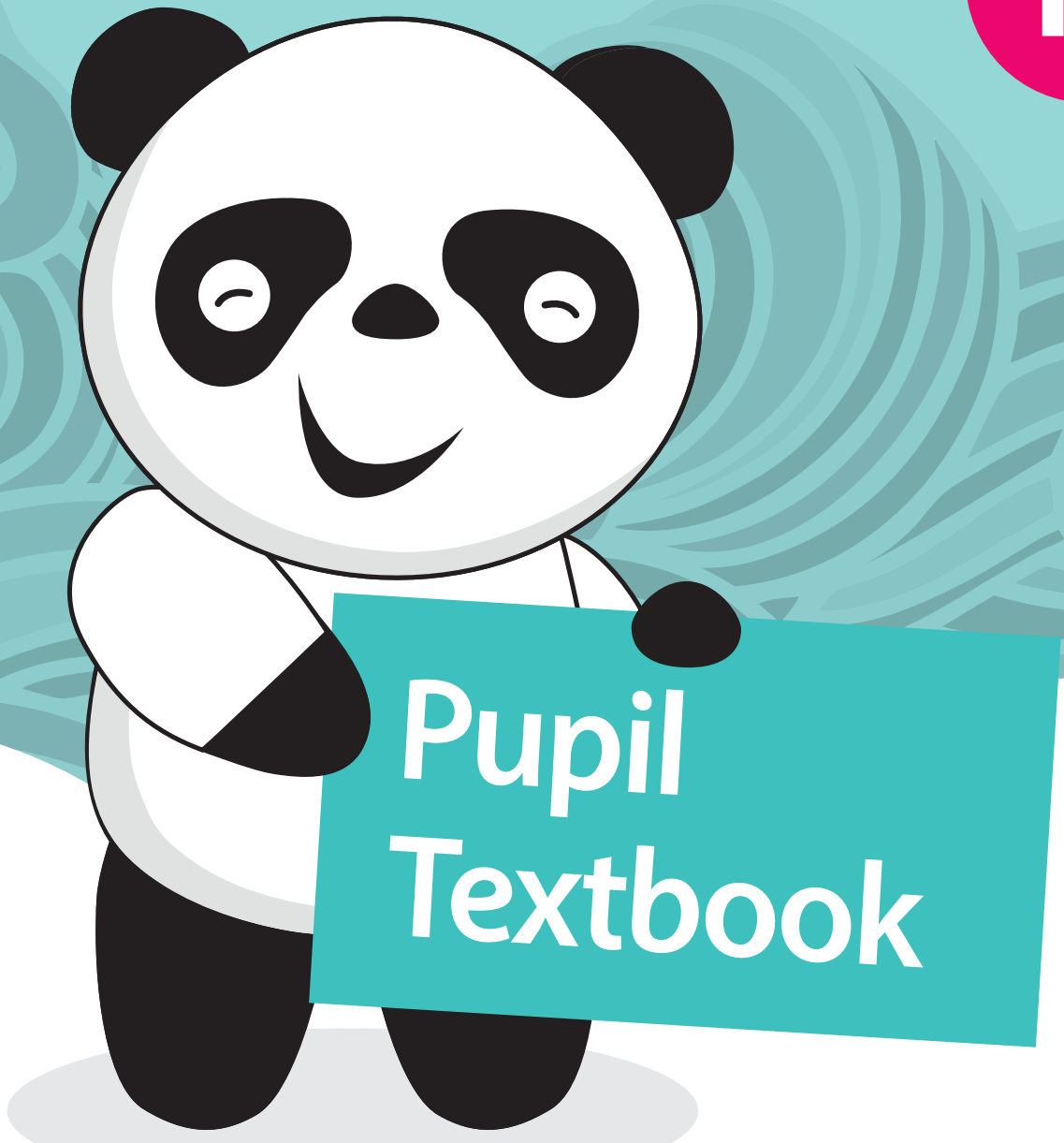
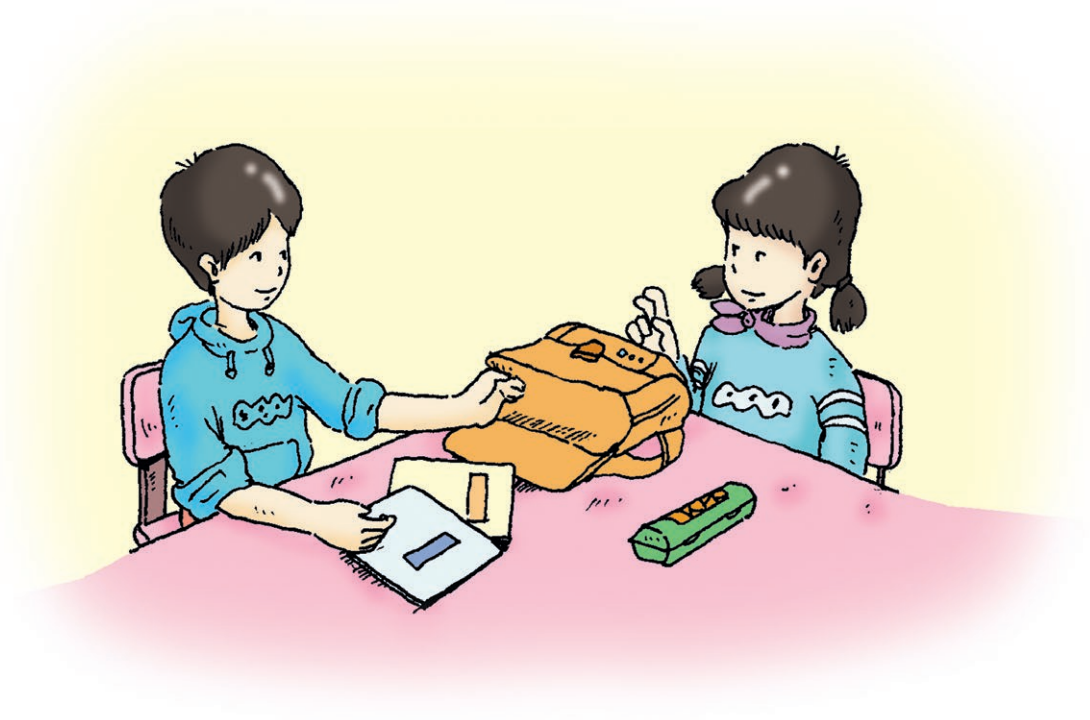
1.1



Contents

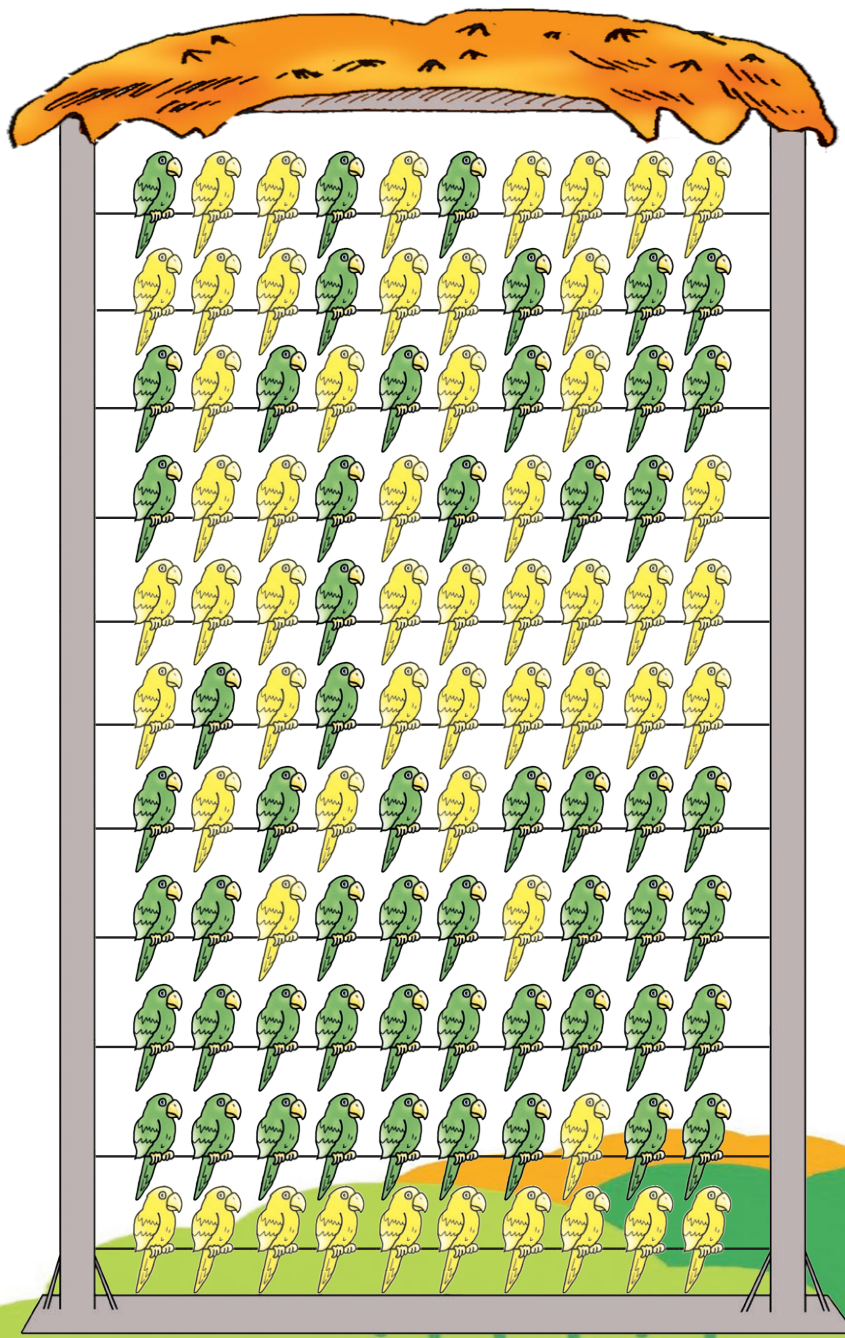
Unit Two

Addition and subtraction of numbers up to 10



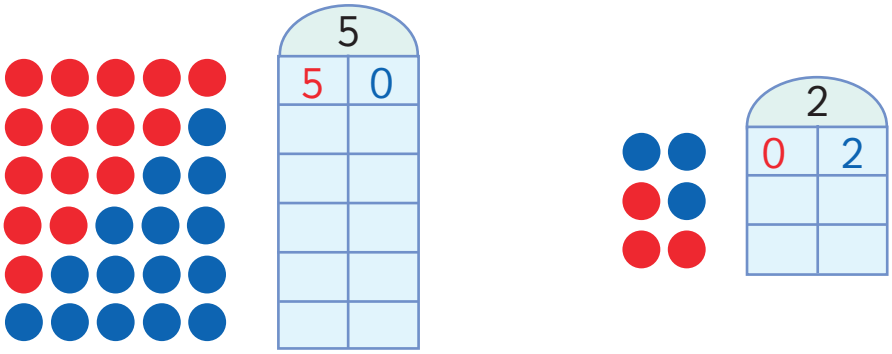
Number bonds

1. How many yellow birds and green birds are there on each line?

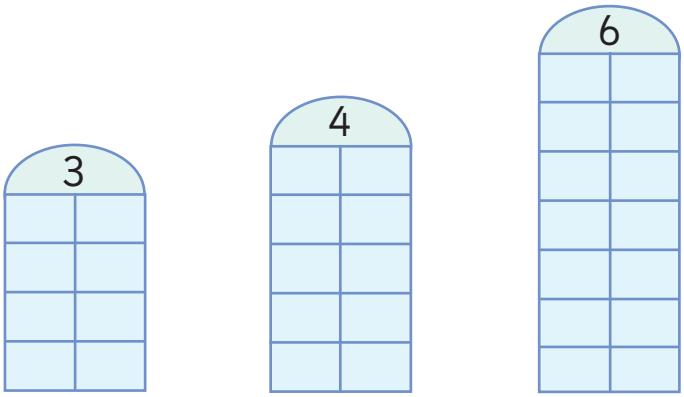


10	
7	3
6	

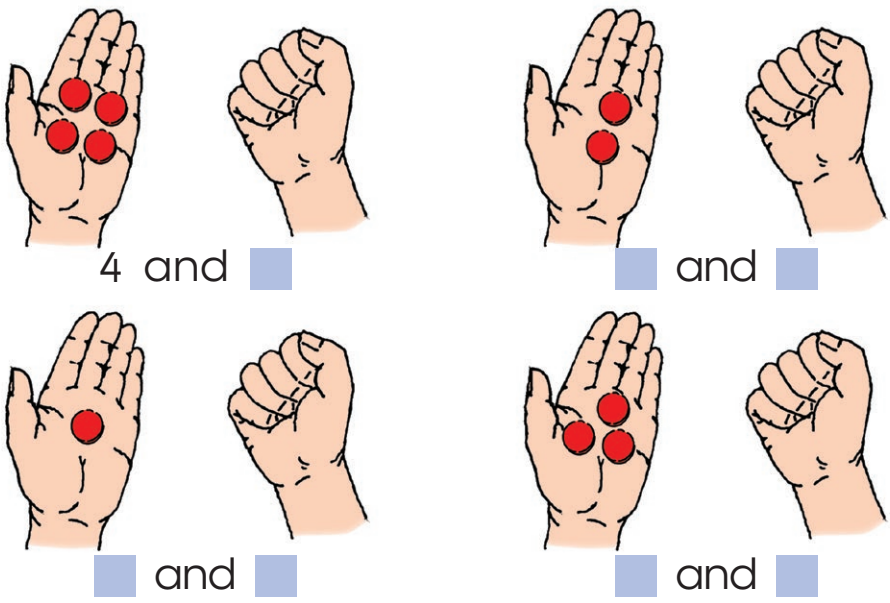
2.



3.



4. Each pair of hands is holding a total of 7 counters.



5. Can you split 8 counters into two piles?
Can you split 9 counters into two piles?

Addition

Combine

1.

Here are 2 large adult tigers and 4 little tiger cubs. How many tigers are there in total?

2 + 4 = 6

plus sign

equals sign

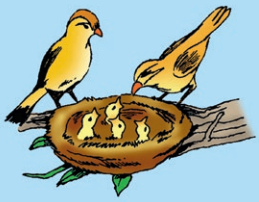
addend addend sum

□ + □ = □

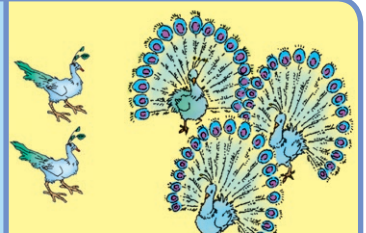
Read as: '2 plus 4 is equal to 6'. Can you write 4 + 2 = 6?

2.

1 + 5 = □
5 + 1 = □



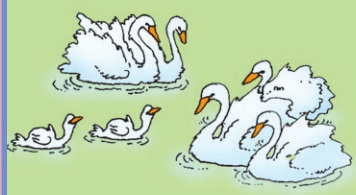
□ + □ = □
□ + □ = □



□ + □ = □
□ + □ = □

3.

□ + □ = □
□ + □ = □



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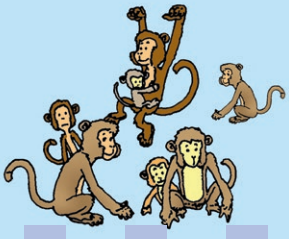


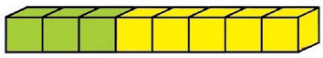
□ + □ = □
□ + □ = □

Quiz

1.

1 + 7 = ☐

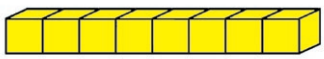
2 + ☐ = ☐



☐ + ☐ = ☐

☐ + ☐ = ☐

☐ + ☐ = ☐



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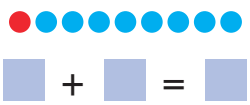
2.



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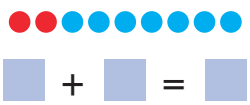

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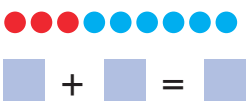

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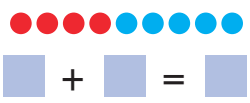

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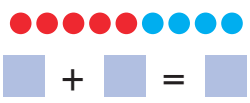

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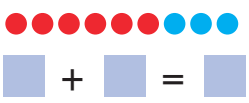

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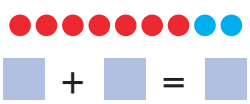

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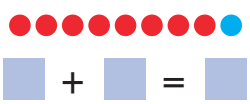

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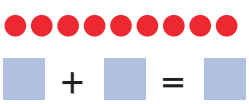

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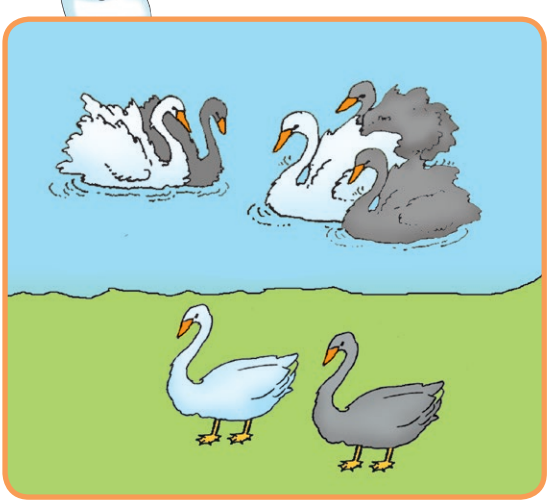
3.

Say and write addition sentences.

Let me try.



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Practice Book

1.1

Unit Two: Addition and subtraction of numbers up to 10

Exercise content	Self-assessment
1. Number bonds	
2. Addition	
3. Talk and calculate (1)	
4. Subtraction	
5. Talk and calculate (2)	
6. Addition and subtraction	
7. Addition and subtraction using a number line	
8. Games with numbers up to 10	
9. Adding three numbers and subtracting three numbers	
10. Mixed addition and subtraction	

1 Number bonds

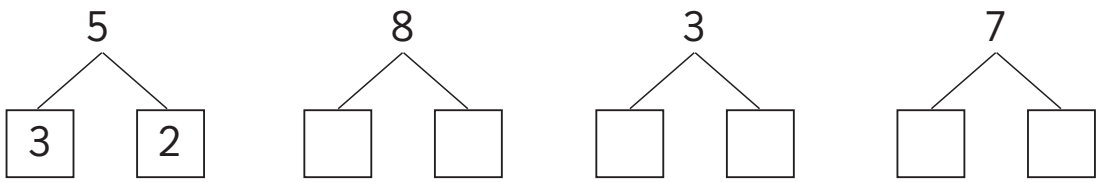
Textbook pages 22–23

1. Fill in the numbers to make 9.

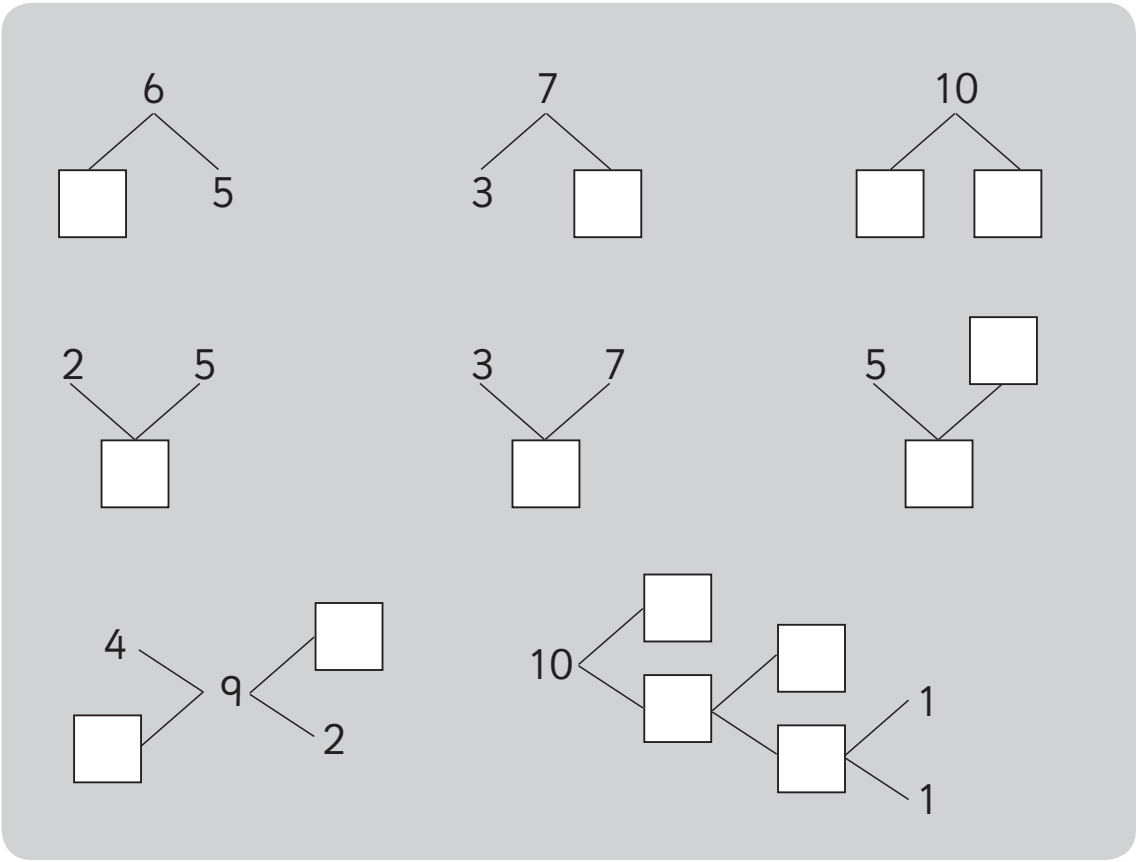
9

0	9
1	8
2	
3	
4	
5	
6	
7	
8	
9	

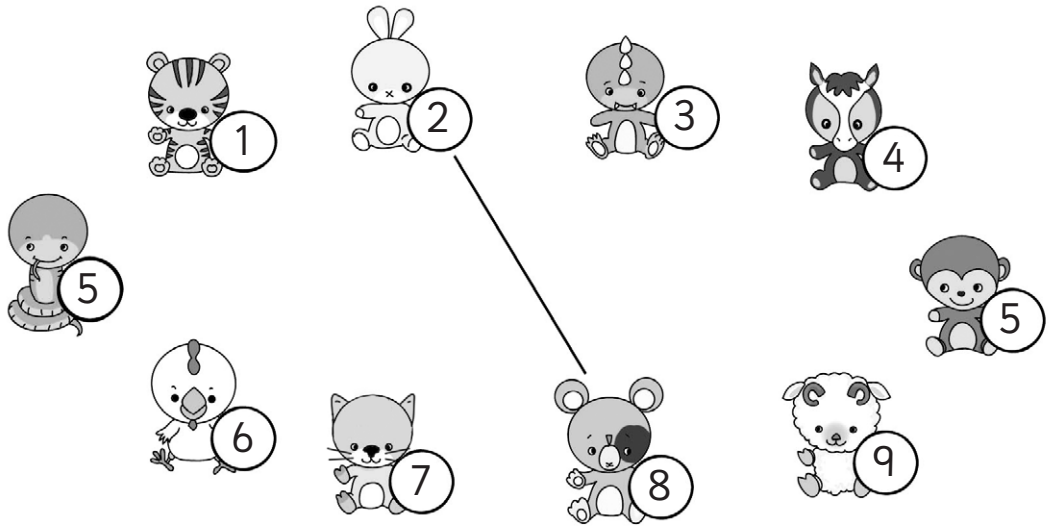
2. Guess the hidden numbers.



3. Write the correct numbers in the boxes.



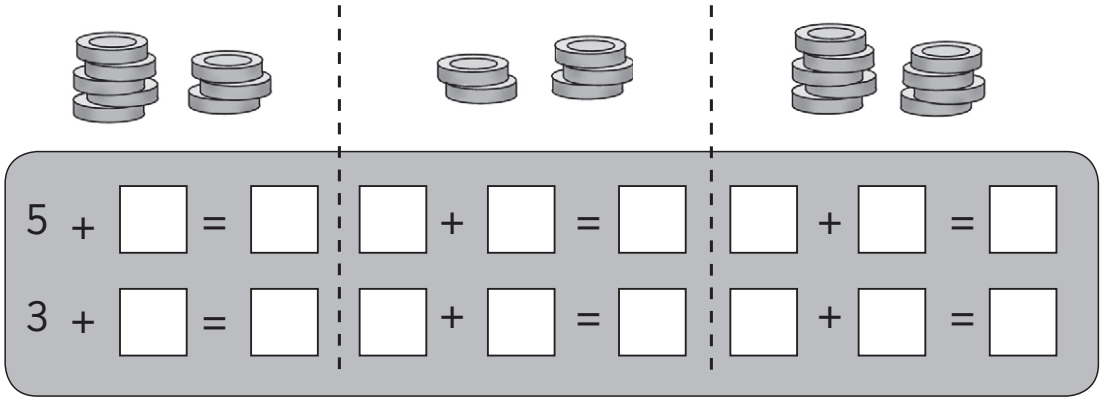
4. Draw lines to join pairs of numbers that make **10**.

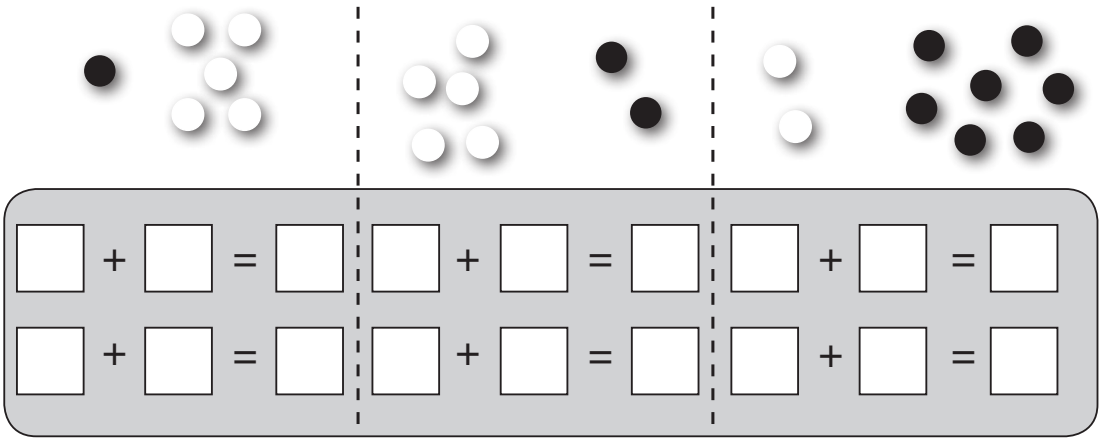


2 Addition

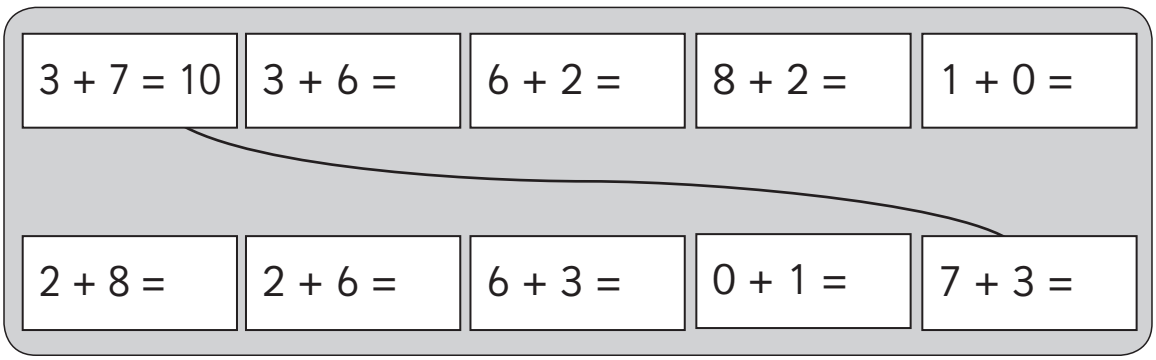
Textbook page 25

1. Talk about each picture, write the number sentence and calculate the answer.



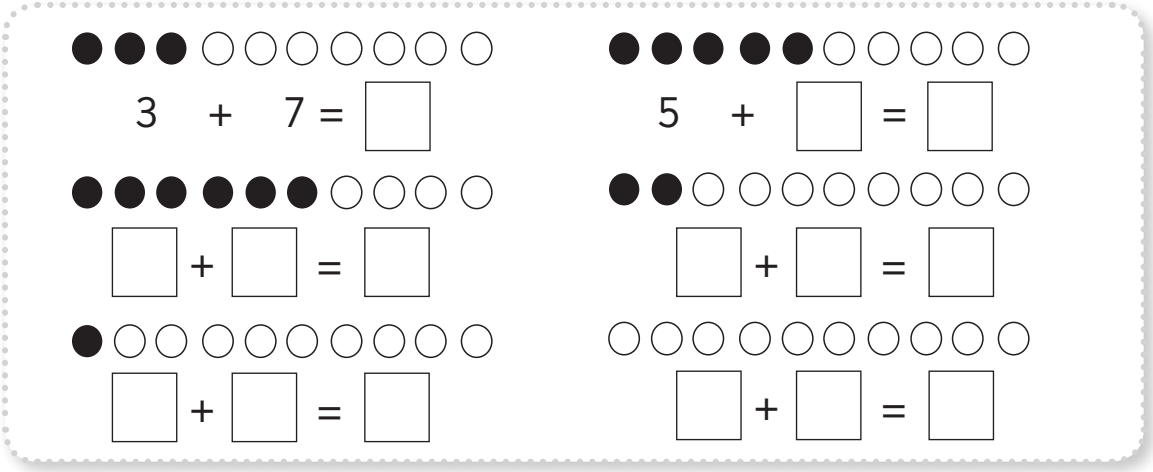


2. Link the number sentences where the addends have been exchanged, then calculate the answers.



Textbook page 26

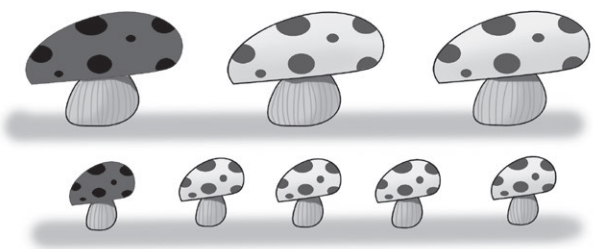
1. How many dots are there altogether?



2. Calculate.

3 + 4 =	7 + 1 =	2 + 3 =	7 + 0 =
5 + 1 =	2 + 4 =	2 + 2 =	4 + 6 =
0 + 5 =	4 + 4 =	7 + 3 =	3 + 6 =

3. Look at the picture, write the number sentences and calculate.



□ + □ = □ □ + □ = □

□ + □ = □ □ + □ = □