

Composing and Decomposing Numbers: math lesson, Kindergarten – download the PDF

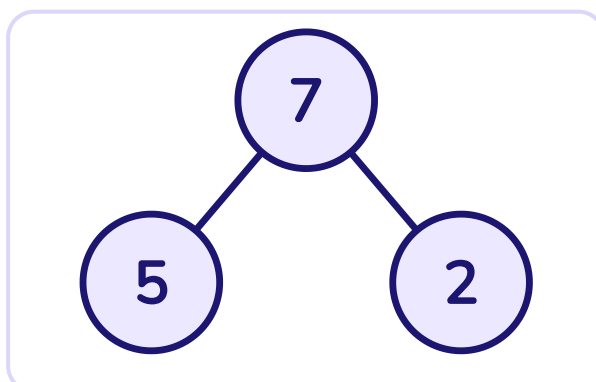
Have you ever shared a box of 7 crayons with a friend? You kept some and gave some away, but there were still 7 crayons in all. That is the big idea of this chapter: a number is built from smaller **parts**, and you can break it apart or put the parts back together. Let's get ready to **compose** and **decompose** numbers!

1. Numbers are made of parts

D Decompose and compose

To **decompose** a number means to break it apart into smaller parts. To **compose** a number means to put parts together to make it. The number stays the same, only the groups change.

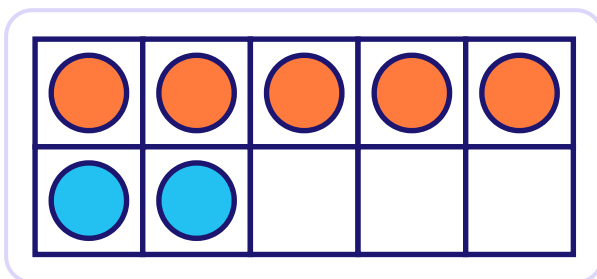
Look at the number bond below. The big number goes on top. The two parts go on the bottom. Together, the parts make the whole.



We can say it with words: *five and two make seven*. We can also write it with an equation: $7 = 5 + 2$. The equal sign means “is the same as.” You can also write it backwards: $5 + 2 = 7$.

2. Breaking apart numbers to 10

A **ten frame** is a box with two rows of five squares. It helps you see a number without counting one by one. Put orange counters in the frame first, then blue counters for the second part.



E Example

The frame above has 5 orange counters and 2 blue counters. How many counters are there in all?

The top row is full: that is 5. Two more counters are in the bottom row. So $5 + 2 = 7$. There are 7 counters in all, and we can break 7 into 5 and 2.

The same number can be broken apart in more than one way. For example, 6 can be $1 + 5$, $2 + 4$, $3 + 3$, $4 + 2$ or $5 + 1$. Each way uses two parts, and each way makes 6.

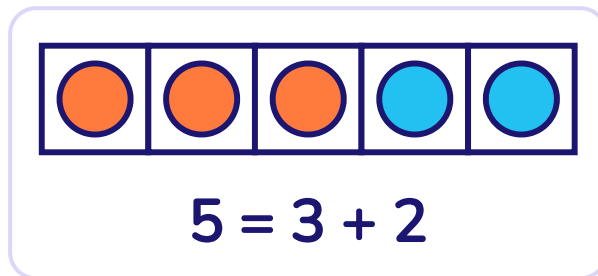


Be careful

Parts are always **smaller** than the whole (or equal to it when one part is zero). If someone says $6 = 4 + 4$, check it: 4 and 4 make 8, not 6!

3. Making 5 in different ways

Five is a friendly number because you have five fingers on each hand. You can show 5 with some fingers up and some fingers down. Here is a row of 5 squares with 3 orange counters and 2 blue counters.



Way	Equation	Parts
1	$5 = 1 + 4$	1 and 4
2	$5 = 2 + 3$	2 and 3
3	$5 = 3 + 2$	3 and 2
4	$5 = 4 + 1$	4 and 1

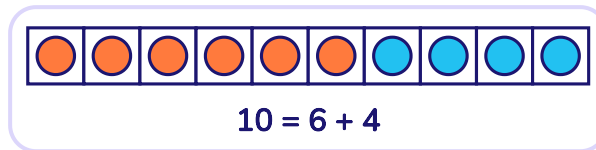
M

How to find the missing part

1. Say the whole number, for example 5.
2. Show the part you know, for example 2 fingers or 2 counters.
3. Count how many more you need to reach the whole.
4. That number is the missing part: $2 + 3 = 5$.

4. Number pairs that make 10

Ten is a special number, because it fills a whole ten frame. Two numbers that add up to 10 are called a **pair that makes 10**.



Part	1	2	3	4	5	6	7	8	9
Other part	9	8	7	6	5	4	3	2	1

P Rule to remember

If you know one part of 10, the other part is what is missing from the full ten frame.
When one part goes up by 1, the other part goes down by 1.

E Example

A ten frame has 8 counters. How many empty spaces are left?

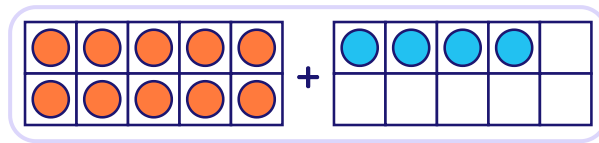
We need to find the missing part: $8 + \square = 10$. Count the empty squares: there are 2.
So $8 + 2 = 10$. The pair 8 and 2 makes 10.

! Zyro's tip

On my planet we say: "Fill the frame!" If you know how many counters are in the frame, the empty squares tell you the partner number that makes 10.

5. Teen numbers: ten ones and some ones

The numbers from 11 to 19 are called **teen numbers**. Every teen number is made of **one ten** and some extra **ones**. One ten means a full ten frame, which is 10 ones.



The picture shows a full frame and 4 more counters. We say “ten and four,” and we write $10 + 4 = 14$. The word *fourteen* even sounds like “four” and “teen.”

6. Composing teen numbers 11 to 19

To **compose** a teen number, start with the full ten and add the extra ones.

M

How to compose a teen number

1. Fill a ten frame with 10 counters.
2. Put the extra counters in a second frame.
3. Count the extra ones.
4. Write the equation: $10 + \text{extra ones} = \text{teen number}$.

E

Example

Nora has a full box of 10 pencils and 6 more pencils on the desk. How many pencils does she have?

The full box is 10. The extra pencils are 6. So $10 + 6 = 16$. Nora has 16 pencils.

Teen number	Ten and ones	Equation
11	ten and 1	$10 + 1 = 11$
12	ten and 2	$10 + 2 = 12$
13	ten and 3	$10 + 3 = 13$
15	ten and 5	$10 + 5 = 15$
17	ten and 7	$10 + 7 = 17$
19	ten and 9	$10 + 9 = 19$

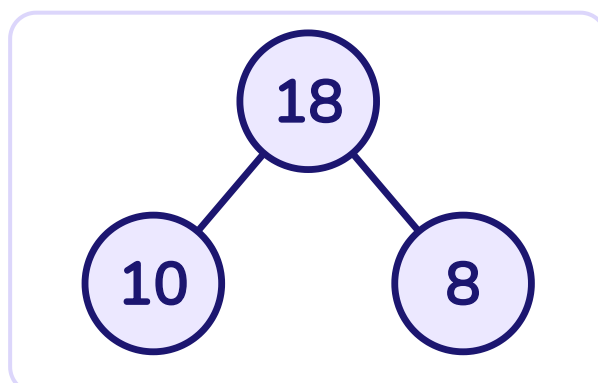
7. Decomposing teen numbers

To **decompose** a teen number, break it into a ten and some ones. Take away the full ten, and the counters that are left are the extra ones.

E Example

Break apart 18 into a ten and some ones.

18 is a full ten frame and 8 more counters. So $18 = 10 + 8$. The ten is 10 and the extra ones are 8.





Be careful

The number 12 is **not** $10 + 1$. It is a ten and **two** ones: $12 = 10 + 2$. Always count the extra counters one by one.

8. Drawings and equations for number pairs

You can show a number pair in three ways: with a drawing, with words, and with an equation. All three tell the same story.

- **Drawing:** draw circles, and use two colors for the two parts.
- **Words:** “Four and three make seven.”
- **Equation:** $4 + 3 = 7$ or $7 = 4 + 3$.



Example

Draw 9 circles using two colors. Write an equation.

Draw 6 red circles and 3 yellow circles. Count them all: 9. The equation is $9 = 6 + 3$.

Practice makes you faster. Soon you will know that 3 and 2 make 5, that 7 and 3 make 10, and that a ten and 5 ones make 15!

Key takeaways

- To **decompose** a number is to break it into parts. To **compose** it is to put the parts together.
- A number can be broken apart in more than one way: $5 = 1 + 4 = 2 + 3$.
- Pairs that make 10: 1 and 9, 2 and 8, 3 and 7, 4 and 6, 5 and 5.
- A full ten frame is one ten. A teen number is a ten and some ones: $10 + 4 = 14$.
- Show a number pair with a drawing, with words, or with an equation like $7 = 5 + 2$.



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