

INSTRUCTIONAL GUIDANCE: DECOMPOSING NUMBERS

Teaching guidance & background

In a nutshell

Decomposition is the ability to break a whole number into smaller parts in different ways.

In decomposition tasks, students are shown a whole amount, one visible part, and one hidden or missing part. Students work out the missing part using understanding of part-part-whole relationships.

In Foundation, decomposition tasks often involve small quantities using blocks, counters, fingers, or dot patterns alongside numerals. Students first solve smaller decomposition tasks within 5 before progressing towards larger quantities within 10.

As students develop, they increasingly recognise smaller number combinations automatically and rely less on counting-by-ones.

As students move into Year 1, decomposition skills are increasingly represented through knowledge of number combinations (addition and subtraction 'number facts').

What it looks like

Identifying a missing part when given the whole and one part

- ▶ The missing part is ____.
- ▶ ____ and ____ make ____.
- ▶ I need ____ more to make ____.

Using counters, blocks, fingers, dot patterns, part-part-whole mats, or ten-frames

- ▶ I used ____ to help me work it out.
- ▶ I counted on from / added ____.

Recognising smaller number combinations automatically within 5 and then within 10

- ▶ I know it is ____ without counting.
- ▶ Another way we can break apart ____ is ____ and ____.

Explaining how parts combine to make a whole

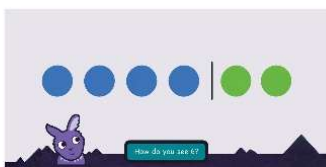
- ▶ The parts combine to make ____.
- ▶ ____ plus ____ equals ____.
- ▶ ____ take away ____ equals ____.

Why does it matter?

- Decomposition tasks are linked to early mathematics success and later arithmetic achievement.
- Decomposition supports the development of non-verbal arithmetic, which develops before children can solve symbolic or verbal arithmetic problems.
- Small decomposition tasks within 5 can often be solved using perceptual or informal strategies, while larger quantities increasingly require formal counting strategies.
- Strong part-part-whole understanding supports mental computation and arithmetic fluency.

Goal of instruction

The goal of instruction is to develop strong part-part-whole understanding by helping students recognise that numbers can be broken apart and combined in different ways.



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Effective decomposition instruction:

- explicitly teaches the relationship between parts and wholes, drawing on visible, hidden, or missing parts
- helps students identify the whole, the known part or visible parts, and the missing part
- gradually increases difficulty through:
 - moving from decomposition tasks within 5 to within 10
 - beginning with visible parts before moving to hidden or missing parts
 - moving from concrete materials, to drawings and visual representations, to numerals
 - increasing reliance on numerals alongside quantities, before moving to numerals alone
- supports students to move from counting-all strategies towards recognising number relationships more efficiently
- teaches students to use precise part-whole language, such as:
 - "The whole is ____."
 - "The parts are ____ and ____."
 - "____ and ____ make ____."
 - "____ is ____ and ____."
 - "The missing part is ____."

Teachers explicitly model decomposition tasks using a **Modelling, Guided Practice and Supported Independent Practice** approach. Instruction should include modelling how to identify the whole, recognise visible parts, and determine the missing part.

Concrete and visual materials such as counters, blocks, fingers, dot patterns, part-part-whole mats, five-frames and ten-frames should be used to develop conceptual understanding before gradually reducing reliance on materials as students develop fluency. Number tracks may be used later as an optional support for counting on.

Different representations serve different instructional purposes. Part-part-whole mats help students see the whole, known part, and missing part. Dot patterns, dominoes, five-frames and ten-frames help students recognise parts within structured quantities. Fingers provide an accessible way to show small combinations. Stern number tracks can support counting-on to find missing parts, such as $7 = 5 + \underline{\quad}$.

Counting-all may be appropriate when students are first checking a quantity. However, instruction should gradually support students to use known part-whole relationships more efficiently.

Guided practice should include multiple opportunities to respond, immediate feedback, and regular checks for understanding to ensure students understand how parts combine to make a whole rather than relying solely on counting-by-ones.

Independent practice and review activities should provide repeated practice solving missing part and decomposition tasks across increasing number ranges to build fluency, accuracy, efficiency, and long-term retention.

This section supports consistent teacher language and student explanations. Representations are included here because they should be paired with precise stem sentences; the goal is for students to see, say, show, and eventually write the same part-whole relationship.