

DMT COMPANION

Insight 45 · 2026 · for teachers, coaches, principals, and families



WHY SUBTRACTION IS NOT JUST ADDITION BACKWARD

Connecting situations, models, equations, and procedures

How to Use This

This Companion is for anyone working with DMT Insight 45. The Insight reviews the research on subtraction situations, student errors, and procedures. Use the models and questions in this Companion to examine how students reason about subtraction. Start with the three questions that follow.

Key Idea • Subtraction describes relationships among quantities. The unknown may be a remaining quantity, a missing quantity, or the difference between two quantities.

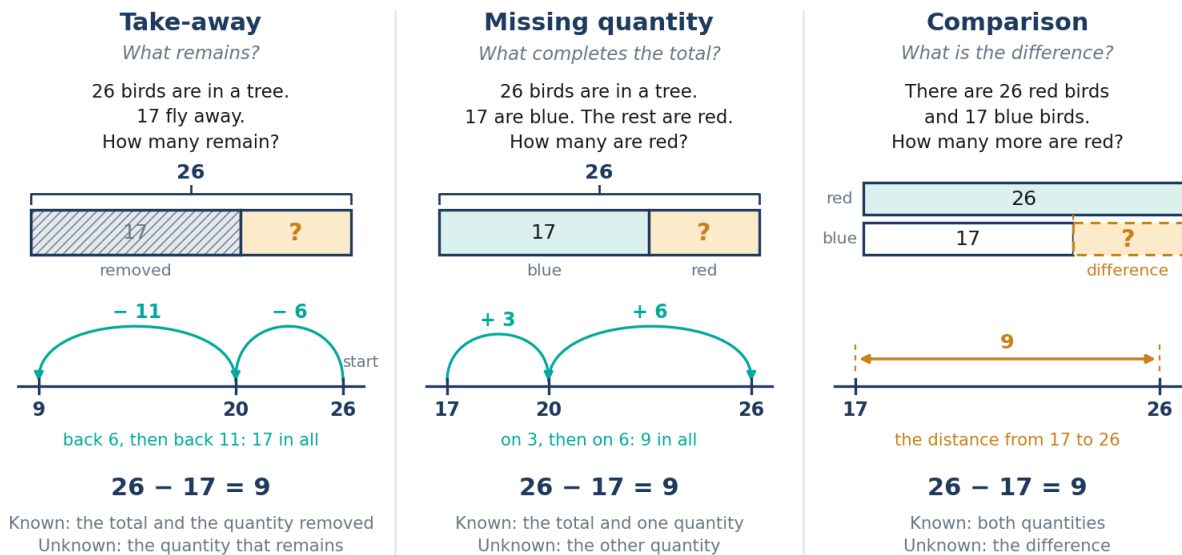
Three Guiding Questions

Answer these before you read the Insight, then again afterward.

1. When your students solve $26 - 17$, can they say what the 9 represents in the situation?
2. Which subtraction situations do your students see most often: take-away, missing quantity, or comparison?
3. When students decompose a ten or a hundred, can they say what unit changed and whether the total quantity changed?

One Equation, Three Situations

The equation $26 - 17 = 9$ can represent three different situations. A quantity may be removed from a total. An unknown quantity may complete a total. Two quantities may be compared to determine their difference.



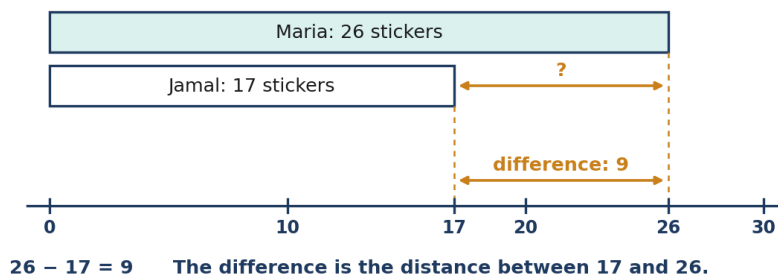
The equation is the same. What the quantities represent is different.

The symbols alone do not tell us what 26, 17, and 9 represent. Before students calculate, ask what each quantity represents and which quantity is unknown.

Key Idea • The situation determines what each quantity represents.

Worked Examples: The Model and the Questions to Ask

Example 1 • comparison: the difference between two quantities



Maria has 26 stickers, and Jamal has 17. Nothing is removed. Two quantities are compared.

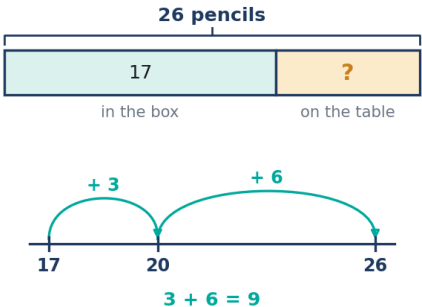
The questions to ask:

“What does each bar represent? Where is the difference in the model?”

“How far is it from 17 to 26 on the number line?”

“What does the 9 represent in this situation?”

Example 2 • missing quantity: one relationship, three equations



One relationship, three equations

$17 + ? = 26$
 $26 - 17 = ?$
 $26 - ? = 17$

total 26, quantities 17 and 9

There are 26 pencils. 17 are in the box. The rest are on the table. A student can add on from 17 or subtract 17 from 26.

The questions to ask:

“Could addition help you find the missing quantity? How?”

“Which equations describe this model? How are they related?”

Example 3 • multi-digit subtraction: decompose a unit

274



↓ decompose 1 ten into 10 ones



$200 + 60 + 14 = 274$. The quantity is equal.

The written procedure records the decomposition

	6	14	
2	7	4	14 ones – 8 ones = 6 ones
– 1	3	8	6 tens – 3 tens = 3 tens
			2 hundreds – 1 hundred = 1 hundred
1	3	6	

What unit was decomposed? Did the total quantity change?

In $274 - 138$, we decompose one ten into ten ones, and the quantity stays the same.

The questions to ask:

“What unit was decomposed? How many ones do we now have?”

“Did the total quantity change? How do you know?”

Key Idea • A model earns its place when it makes the relationship among the quantities visible.

What Student Errors Can Reveal

A response is evidence of how a student is reasoning, not a diagnosis.

274

− 138

144

ones

tens

hundreds

“Eight minus four is four.”

“Seven minus three is four.”

“Two minus one is one.”

8 − 4, not 4 − 8

7 tens − 3 tens

2 hundreds − 1 hundred

a student’s response

The correct difference is 136.

The student subtracts the smaller digit from the larger digit in each place. An estimate, $270 - 140 = 130$, also shows that 144 is too large.

What You See	Possible Interpretation	Ask
$274 - 138 = 144$	The student may be subtracting digit by digit without attending to the value of the units in each place.	“Can you take 8 ones from 4 ones? What unit could you decompose?”
“It says ‘more,’ so I add.” $26 + 17 = 43$	The student may be choosing an operation from a word in the problem.	“Who has more? Show both quantities with bar models. Where is the difference?”
$17 - 26 = 9$	The student may be treating subtraction as if the order of the quantities does not matter.	“Which quantity are you starting with? Which quantity is being subtracted?”
Counts back by ones from 26, seventeen times	The student understands take-away and is not yet using tens or a known relationship.	“Can you use a ten to make the counting more efficient? Could you also find the difference by counting up from 17 to 26?”

Key Idea • An incorrect answer can provide evidence of how a student is reasoning. Ask what relationship or procedure produced the answer before correcting it.

The Language Shift

Ask the question on the left, and also the one on the right. The right column connects the calculation to the quantities and their relationship.

Instead of asking only	Also ask
“What is $26 - 17$?”	“What does each quantity represent?”
“Which operation should you use?”	“How are the quantities related?”
“Borrow from the tens.”	“What unit can we decompose? How does the quantity stay equal?”
“What is the answer?”	“What does the difference represent?”
“Follow the steps.”	“How does the written procedure show what happened to the units?”

What to look for in a classroom:

- Students say what each quantity represents before they calculate.
- Students connect a bar model or number line to the quantities in the problem.
- Students relate $26 - 17 = 9$ to $17 + 9 = 26$.
- Students say which unit was decomposed and that the total quantity stayed equal.

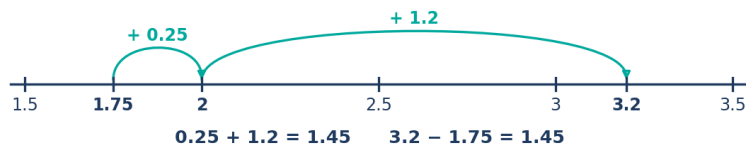
Across the Grades

Subtraction continues across mathematics. The relationships stay the same. The quantities and units change.

Grade band	Example	Model	The shift it asks for
Grades K-2	Represent take-away, missing-quantity, and comparison situations, and connect them to addition and subtraction equations.	Collections, bar model, number line	From “take away” to what the quantities represent
Grades 3-5	Use place-value relationships to subtract multi-digit numbers, and extend the reasoning to differences of fractions and decimals.	Place-value model, bar model, number line	From “borrow” to decomposing a unit while the quantity stays equal
Grades 6-8	Reason about differences of integers and rational numbers, and connect subtraction to distance, additive inverses, and unknown quantities in equations	Number line, bar model, equations	From subtraction as removal to difference as distance and as adding the additive inverse

The same relationship with decimals:

A ribbon is 3.2 meters long. Another is 1.75 meters long. How much longer is the first ribbon? The comparison is the same as for 26 and 17: the difference is the distance from 1.75 to 3.2.



Key Idea • What do the quantities represent? The question returns with fractions, decimals, integers, and equations.

Continue With DMT Insight 45

Read DMT Insight 45 for the research behind this Companion. Find it at mathsuccess.io/dmtinsights.

Try this for a week. Give students three situations that use the same two quantities: one take-away, one missing quantity, and one comparison. Before anyone calculates, ask, “What does each quantity represent?” Listen for whether students can explain why the same equation represents all three situations, even though the quantities have different meanings.