

NEWSLETTER

Issue 21 · 2026 · Math Success with DMTI



UNDERSTANDING MULTIPLICATION THROUGH UNITS AND ITERATION

Connecting representations and procedures.

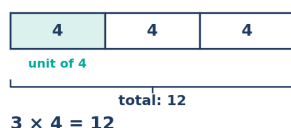
In today's edition, we explore:

- **Units and iteration:** what the numbers in 3×4 represent
- **Classroom tips:** questions about units, iterations, and totals
- **A worked example:** 7×8 in a bar model and an area model

Educators!

Consider 3×4 . Three represents the number of iterations, 4 is the unit being iterated, and 12 is the total. A bar model represents three iterations of the unit of 4. An area model represents the same product through a rectangle with dimensions 3 and 4.

Bar model: 3 iterations of the unit of 4



Area model: 3 by 4



Both models can help students examine the relationships among the quantities and connect those relationships to multiplication properties and procedures.

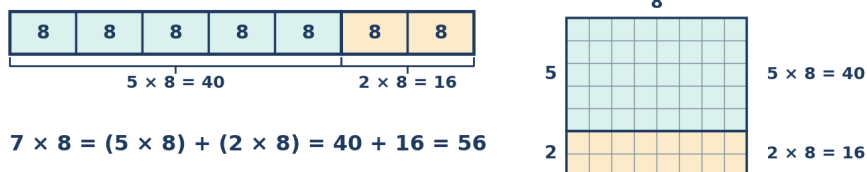
Classroom Tips

1. **Identify the unit and the iterations.** Ask, "What is the unit being iterated? How many iterations are represented? What is the total quantity?"
2. **Decompose.** Ask, "How could we decompose the unit or the number of iterations while preserving the total?"
3. **Connect the representations.** Ask, "How does the bar model or area model represent the same relationship as the equation?"

A Worked Example: 7×8

Seven iterations of the unit of 8 produce a total of 56. Decompose the seven iterations into five iterations and two iterations: $7 \times 8 = (5 \times 8) + (2 \times 8) = 40 + 16 = 56$.

7 iterations of the unit of 8, decomposed into 5 and 2 iterations



The bar model shows seven iterations of the unit of 8, decomposed into five iterations and two iterations. An area model represents the same relationship with a rectangle partitioned into 5×8 and 2×8 regions. Ask students, “What stayed the same? What changed? How do the two partial products compose the total?”

What Does the Research Say?

Research on children’s multiplication strategies describes a development from counting individual items toward operating on composite quantities (Mulligan & Mitchelmore, 1997). Research also indicates that conceptual understanding and procedural fluency can support one another as students learn mathematics (Rittle-Johnson et al., 2001).

Students develop multiplicative reasoning as they identify units, examine how those units are iterated, and connect these relationships to mathematical representations and procedures. Explicit instruction, feedback, and practice support the development of conceptual understanding and procedural fluency.

Keep developing mathematical thinkers.

More Information

Read DMT Insight 21 and download the Companion at mathsuccess.io/dmtinsights.

To share a classroom example or a question, contact us at contact@dmtinstitute.com.

For more information on professional development and curricular resources, visit mathsuccess.io.



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