NEWSLETTER

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RATIO TABLES: MORE THAN FILLING IN BOXES

DMT Insight 47 · Ratio Tables: Building Multiplicative and Proportional Reasoning

Educators!

One bag holds 4 apples. A student builds a ratio table and writes:

Bags	1	2	3
Apples	4	6	8

+ 2 + 2

The student sees a pattern: “It goes up by 2 each time.” The numbers follow a pattern, but the multiplicative relationship has been lost.

The question to ask is not simply, “What comes next?” Ask, “What does 1 represent, and how does this column relate to it?”

What the Student Is Doing

The student is using an additive relationship. That relationship works in many earlier situations, but it does not preserve 4 apples per bag.

What the Ratio Table Should Show

Every column in a ratio table records the same multiplicative relationship. If 1 corresponds to 4, then 2 corresponds to 8 and 3 corresponds to 12.

Students need to understand the unit relationship and be able to reason back to it. Early on, writing the column for 1 helps. Later, students reason from any known pair: if 4 corresponds to 20, then 2 corresponds to 10, 1 corresponds to 5, and 8 corresponds to 40.

Three Questions to Ask

1. **What is the unit?** “What does one represent?”
2. **What do you already know?** “How could you use it to build what you need?”
3. **How are the strategies related?** “How are these two ways alike? Which is more efficient?”

Try This Tomorrow

> One bag holds 3 apples. Show this table and ask: “How could you build 7?”

Bags	1	5	10	7
Apples	3	15	30	?

Two ways to build 7

$7 = 5 + 2$

$7 = 10 - 3$

Record two ways students build 7. Then ask: “What relationship does each strategy use? Which is more efficient for this problem?”

Across the Grades

- Grades 3-4: compose and decompose whole-number multiplication and division relationships
- Grade 5: extend the same multiplicative structure to decimals and powers of 10
- Grades 6-7: use the same relationships with unit rates and proportional relationships

From the Research

Research on multiplicative and proportional reasoning shows that students need to reason about relationships among quantities, not only apply procedures. Read the full DMT Insight for the research and references.

Keep developing mathematical thinkers.

More Information

This is a quick overview. To download DMT Insight 47 and the coaching Companion, go to DMT Insights at mathsuccess.io/dmtinsights.

Do you want to share ideas or contribute a teaching tip or story for the next newsletter? Please email us at mathsuccess@dmtinstitute.com.

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