Unit 5 Family Support Materials

Multiplicative Comparison and Measurement

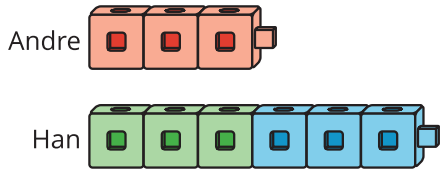
In this unit, students make sense of multiplication as a way to compare quantities. They use this understanding to convert units of measurement and to solve problems about measurement.

Section A: Multiplicative Comparison

In this section, students learn to compare quantities in terms of multiplication. In a multiplicative comparison, the underlying question is “how many times as many?” (In contrast, in an additive comparison, the question is "how many more (or less)?")

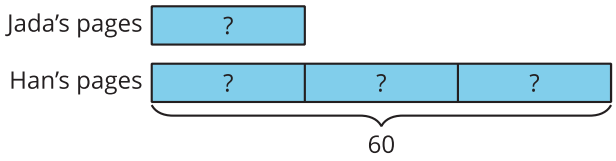
Students begin with comparisons that involve small factors and familiar situations, using familiar multiplicative comparison language (such as “twice,” or “twice as many”).

For example, students learn that they can compare the numbers of cubes in the image by saying, “Han has 2 times (or twice) as many cubes as Andre.”



Students write multiplication equations to express comparisons. As the problems become more complex, they reason, with given diagrams (or diagrams they draw), and use division to find an unknown factor.

Jada read some pages. Han read 60 pages altogether. The diagram shows how their pages compare.
How many times the number of Jada's pages did Han read?



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Section B: Measurement Conversion

In this section, students expand their knowledge of units of measurement from earlier grades. Previously, they learned that there are 100 centimeters in 1 meter. Here, they relate centimeters and meters in terms of multiplication—1 meter is 100 times as long as 1 centimeter—and use this reasoning to convert any number of meters to centimeters.

Students also relate other units of measurement in terms of multiplication: meters and kilometers, grams and kilograms, milliliters and liters, ounces and pounds, and seconds, minutes, and hours. They then solve problems that involve converting a larger unit to a smaller unit.

Section C: Let's Put it to Work

In this section, students use multiplicative comparison and measurement conversion to solve multi-step problems. They convert units of length, weight, and capacity in the metric system and customary system (working with length units such as yards, feet, and inches, and capacity units such as gallons, quarts, and cups).

As they solve problems, students develop their sense of the relative sizes of these units.

For a potluck party, Priya and three other relatives are bringing mango lassi (MAYNG-goh LAH-see).
Who prepared the most mango lassi?
How many cups of lassi did all the guests bring?



guest	amount of mango lassi
Priya	10 cups
Uncle	3 quarts
Cousin	8 cups
Grandma	2 gallons

Students also solve problems in geometric contexts. They analyze the relationship between the side lengths and the perimeters of quadrilaterals and perform unit conversion along the way.

Try it at home!

Near the end of the unit, ask your fourth grader to solve the following problem:

A paint store sold 79 gallons of paint the first week it opened. The following week, the paint store sold 4 times as many gallons of paint. How many gallons of paint did the paint store sell in the second week?

Questions that may be helpful as they work:

- Can you draw a diagram to show the multiplicative comparison?
- Can you write an equation that goes along with the story problem?
- How would you convert the amount of gallons to quarts? To cups?

Solution:
The store sold 316 gallons of paint in the second week.

Sample Responses:

- A diagram that shows the multiplicative comparison.
- $4 \times 79 = 316$
- I know each gallon has 4 quarts, so I can multiply 316 by 4 to get 1,264 quarts of paint. I know that there are 4 cups in each quart, so I can multiply 1,264 by 4. Or I can multiply 316 by 16 to get the same answer, because I know that there are 16 cups in each gallon.