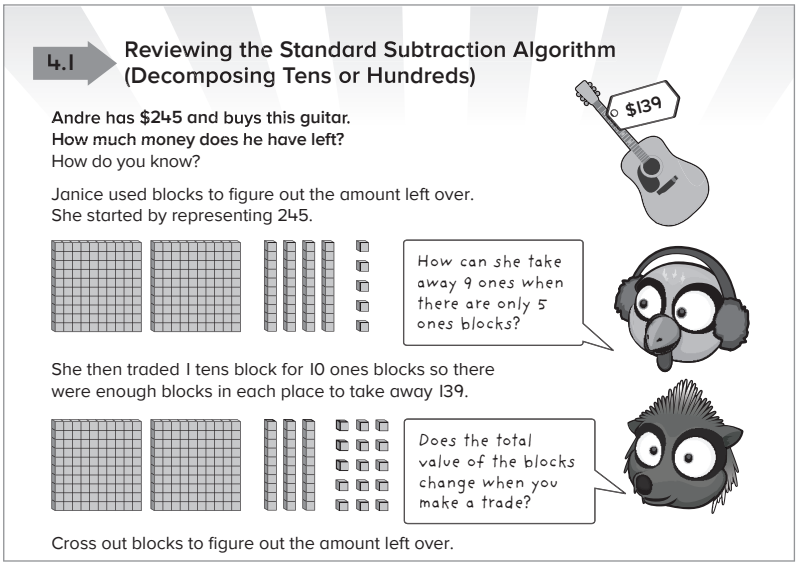
ORIGO STEPPING STONES

Core Focus

- Reviewing, extending, and consolidating use of the standard subtraction algorithm
- Exploring decomposition and regrouping (especially involving zeros)
- Reviewing the relationship between multiplication and division to find whole number quotients and remainders
- Investigating multiplication and division patterns using the greatest multiple

Subtraction

- Students further develop their skill using the **standard subtraction algorithm** — the familiar paper-and-pencil procedure for subtracting multidigit numbers that was introduced toward the end of Grade 3.
- What used to be called "borrowing" is now **decomposition** or **regrouping**. Decomposition involves pulling numbers apart to make them easier to work with. This same idea, which used to be called "carrying", is also used in the **standard addition algorithm**.



In this lesson, students review the standard subtraction algorithm to find the difference between numbers involving two and three digits.

- Because students have already had a lot of experience with **decomposing** and **composing** numbers mentally, they should find that the **standard subtraction algorithm** makes good sense.

Step 1	Step 2	Step 3	Step 4
Look at the digits in each place. Can you subtract each place easily?	You need 1 ten to help subtract the ones. Cross out the 4 tens and write 3 tens.	Cross out the ones digit and write the new number. 245 is now written as 2 hundreds, 3 tens, and 15 ones.	Subtract the ones. Subtract the tens. Then subtract the hundreds.
H T O 2 4 5 − 1 3 9	H T O 2 ~~4~~ 3 5 − 1 3 9	H T O 2 ~~4~~ 3 ~~5~~ 15 − 1 3 9	H T O 2 ~~4~~ 3 ~~5~~ 15 − 1 3 9 1 0 6

Here, the above problem is presented using the standard subtraction algorithm.

Ideas for Home

- Practice regrouping three-digit numbers by asking your child to think of different ways to regroup the same quantity. E.g. 504 = 4 hundreds, 9 tens, 14 ones; or 4 hundreds, 8 tens, 24 ones; or 3 hundreds, 18 tens, 24 ones, etc.
- When practicing the subtraction algorithm, ask your child to use the place-value language modeled in Steps 1–4 while solving. Substitute "carry" and "borrow" with **regroup**.

Glossary

- The **standard algorithm** is the familiar paper-and-pencil procedure for adding and subtracting multidigit numbers that most adults were taught in school.
- Students **decompose** (pull apart) and **compose** (put together) numbers to make them more convenient to compute mentally and to use the algorithm.

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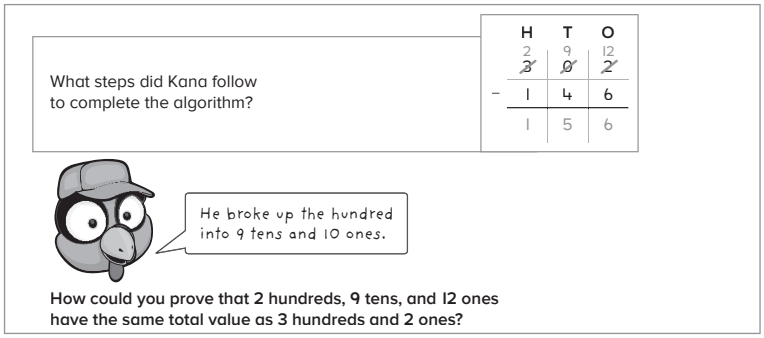
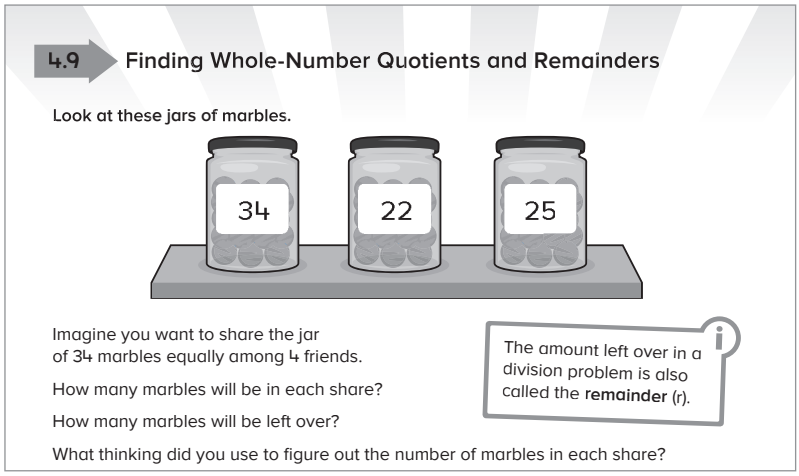
- Subtraction that requires **decomposing** in multiple places and subtraction where the **decomposition** involves zero are sometimes more challenging for students.



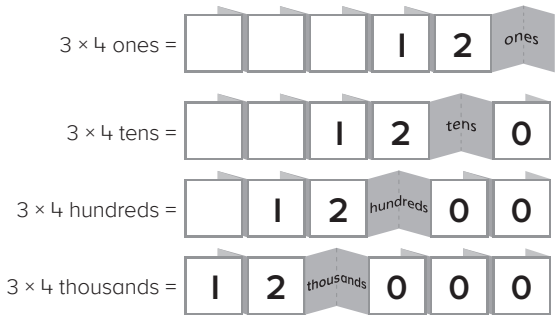
Multiplication and Division

- Reviewing the relationship between multiplication and division is essential as students extend their understanding of division. In this module, students encounter division situations where, after sharing, there is an amount left over; the term **remainder** is introduced.



In this lesson, students find whole-number quotients and determine the amount leftover or remaining.

- Students explore patterns involving place value in multiplication and division. The numeral expander provides a place-value model that discourages inaccurate explanations like "I add zeros when I multiply by multiples of 10."



12 ÷ 4 = 3

120 ÷ 4 = 30

1,200 ÷ 4 = 300

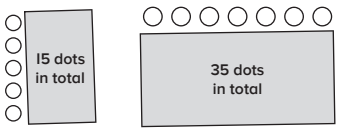
This numeral expander shows that 3 x 4 tens equals 12 tens, which is the same as 120, etc. Accurate place-value language supports deep understanding of multiplying and dividing by magnitudes of ten.

Ideas for Home

- To practice division facts, also work on reviewing basic multiplication facts until they are known automatically.
- Practice real-life problems with remainders. E.g. "I want to divide 22 cards evenly among six friends, what is 22 ÷ 6?"
- If this is challenging, model using multiplication, say, "I need to get close to 22 using multiplication times 6. 5 × 6 = 30, is too big. 2 × 6 = 12, is too small. 3 × 6 = 18 is close but there are 4 left over. Since 4 is smaller than 6, I cannot make another group of 6, so 22 ÷ 6 = 3 with a remainder of 4."

Glossary

- Partially covered **arrays** show the total and either the number of groups or the number in each group to represent division.



- A **division equation** is made up of the dividend (total), the divisor, and the quotient (the number of groups and the number in each group).

35 ÷ 7 = 5

or

15 ÷ 5 = 3

120815