After watching the *Subtraction Procedure* video, make sense of the mathematics by taking a closer look at the problem situation and solution. Use the comments and questions in bold to help you solve the problems and learn more about subtracting big numbers.

Problem: Zander and K.T. are volunteering at a greenhouse and they noticed a mistake in the delivery log. Yesterday the greenhouse started with 523 plants and sent out 189 plants. The logbook says that 523 plants – 189 plants = 466 plants, but Zander and K.T. know this is incorrect! What should the logbook say about how many plants are left?

How did KT use estimation strategies to find the error in the logbook? K.T. knew that 523 – 100 = 423. That is less than 466, the answer in the logbook, and K.T. still needs to subtract another 89 plants.

What subtraction mistake did Zander discover when looking in the logbook? Zander looked at each place value and noticed that someone subtracted the smaller number in each place from the larger number. This is incorrect.

Logbook error:	Incorrect thinking:	
523	ones place	$9 - 3 = 6$
- 189	tens place	$8 - 2 = 6$
466	hundreds place	$5 - 1 = 4$

Using a model to solve a subtraction problem helps make sense of the procedure. This video uses flats of 100 plants, rows of 10 plants, and individual plants.

How can you represent 523 with flats, rows, and individual plants?
You can represent 523 by looking at the number of hundreds, the number of tens, and the number of ones in 523.
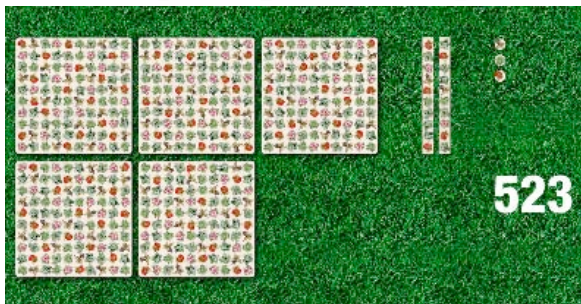
The hundreds place is represented by 5 flats, each containing 100 plants.

The tens place is represented by 2 rows, each containing ten plants.
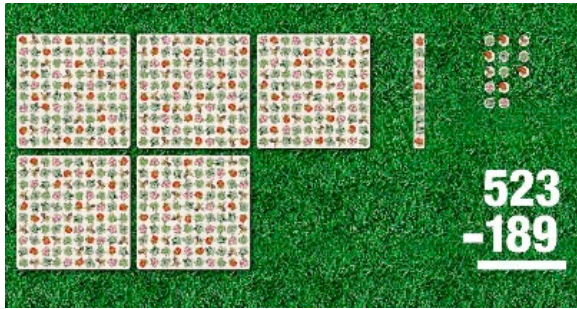
The ones place is represented by three individual plants.

MakingSense

**The greenhouse started with 523 plants and sent out 189 plants. Explain how to subtract 189 using the model.**
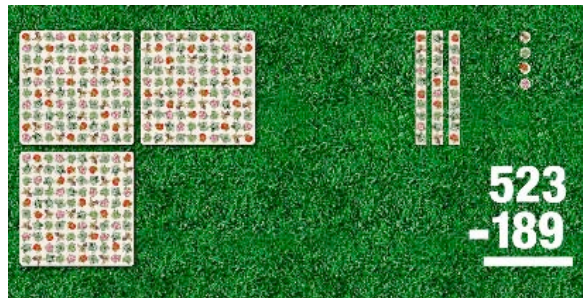

Start with the ones place. There are 3 individual plants (3 ones) in 523, but you need to subtract 9. You can trade one row of ten plants (one ten) for 10 individual plants (10 ones). Combine these and you have 13 individual plants.

Subtract 9 from 13, leaving 4 individual plants (4 ones). Next, you need to subtract 8 rows of plants (8 tens) but there is only one row of plants (1 ten).
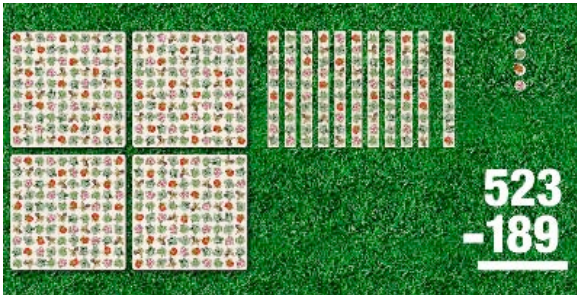
Trade one flat of 100 plants (one hundred) for 10 rows of plants (10 tens). That gives you 11 rows of plants (11 tens).

Eleven tens minus 8 tens is 3 tens. Finally, you reach the hundreds place. You have 4 flats left and need to subtract one flat (100).

400 – 100 is 300 so you have 3 full flats of 100 plants left. Looking at all the places, you have 3 full flats (300), 3 rows (30), and 4 individual plants (4) or 334 plants.

This model helps make sense of the paper-and-pencil subtraction procedure. Solve the problem again, but this time record each step with paper and pencil.

MakingSense

PROBLEM SOLVED
MAKING SENSE OF MATHEMATICS

Start with the ones place. There are only 3 ones (3 individual plants), but you need to subtract 9. You can trade one ten (one row of ten plants) for 10 ones (10 individual plants). That gives you 13 ones (13 individual plants).

Record this action by changing 2 tens and 3 ones to 1 ten and 13 ones. Subtract 9 from 13 to get 4. Record the four in the ones place of the answer.

SUBTRACTING BIG NUMBERS

Next, you need to subtract 8 tens (8 rows of plants), but there is only one ten (one row of plants). Trade 1 hundred (one flat of plants) for 10 tens (10 rows of plants). This gives you 11 tens (11 rows of plants).

Record this action by changing 5 hundreds to 4 hundreds and 1 ten to 11 tens. 11 tens minus 8 tens is 3 tens. Record 3 tens in the tens place of the answer.

SUBTRACTING BIG NUMBERS

In the final step, subtract 1 hundred from 4 hundreds to get 3 hundreds.

Record the 3 hundreds in the hundreds place of the answer.

The final answer is 334.

SUBTRACTING BIG NUMBERS

Use models to help you visualize what is taking place with the pencil and paper subtraction procedure. The paper and pencil procedure is just recording each action completed with the model. Plants were used as a model in this video, but you could also use money, drawings, or blocks.

MakingSense