Grade 1: Pennies on the Table

1.OA.A.1 - Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

12 pennies were on the table. Morgan took some pennies. Then there were 4 pennies on the table. How many pennies did Morgan take?

Answer: _____

Solution

Correct if student writes the number 8.

If Morgan were to put back the pennies she took, then together with the 4 pennies already there, the total would be 12. What number, when added to 4, makes 12? The answer is 8 because 12 − 4 = 8.

If students are having a hard time understanding the problem, you can act out the problem using pennies. Put 12 pennies on the table. Push 4 of the pennies off to the side, saying, "These are the pennies that are left." Then the other group is the pennies that Morgan took. When you pushed 4 pennies off to the side, you were "taking away 4," so the answer is found by subtracting 12 − 4.

Some students might draw a diagram to help them solve the problem—for example a diagram like this one. The diagram shows the 12 pennies as circles. The 4 pennies that are left have arrows pointing to them. The other pennies are the ones Morgan took. A student could simply count those 8 circles to find the answer to the problem. This approach of "counting all" works in the problem at hand, because the numbers are so small.
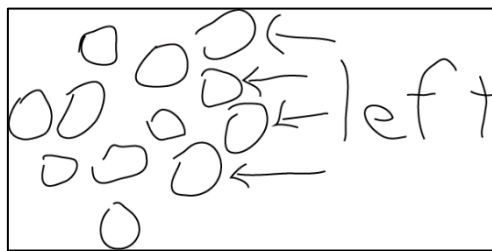
This tape diagram can also help make sense of the problem:

4 left   ? took

12
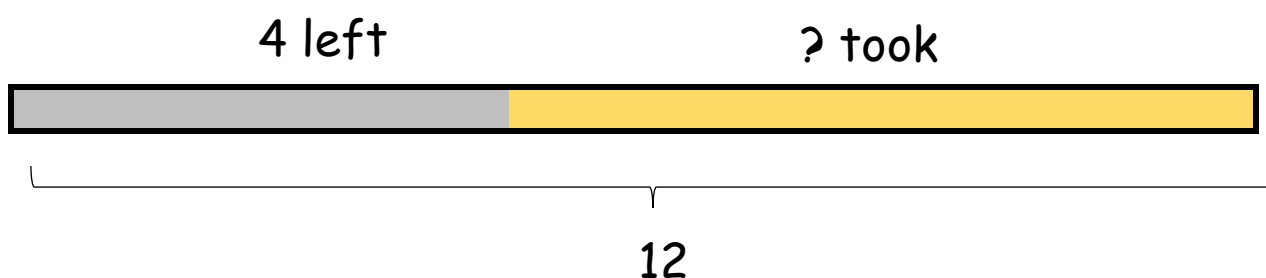
Finally, some students might write an equation to help them understand the problem. Any of the following equations would faithfully represent our problem. The ? stands for the unknown number of pennies.

$$12 - 4 = ? \qquad 12 - ? = 4 \qquad ? + 4 = 12 \qquad 4 + ? = 12.$$

- The first equation uses subtraction to directly find "the other part" of the original 12 pennies.

- The second equation uses subtraction to correctly show Morgan "taking away" an unknown number of pennies. This equation is perhaps the most literal way of representing the situation described in the problem.

- The two addition equations both show parts of 12, one part known and the other part unknown.

By the end of grade 1, students should be able to calculate the difference $12 - 4$ fairly quickly, if they don't know the answer from memory. By the end of grade 2, students should just know all of their single-digit sums from memory.

If the student doesn't know the value of $12 - 4$ offhand and struggles to calculate it, you can suggest subtracting the 4 in "two bites." That is, first subtract 2, then subtract another 2. The first subtraction is $12 - 2$, which is easier than $12 - 4$. The second subtraction is $10 - 2$, which is probably a more familiar problem also. When a student doesn't yet know the value of $12 - 4$ from memory, a mental process like this "two-bite approach" is preferable to drawing a picture and counting circles.

Elaboration on Alignment

This situation is "Take From with Change Unknown," a medium-difficulty situation type for addition and subtraction (centered at grade 1 in the K-2 progression table). The required calculation is a subtraction related to an addition fact. A doubles fact would have made the problem easier, but with a doubles fact, someone could get the question right for the wrong reason by writing one of the numbers stated in the problem. The intent was to choose an easy non-doubles fact crossing ten.

There is no illustration so that students have to model the situation internally or perhaps with a diagram.

Learn More

See a digital version of this task at Learning Heroes' Readiness Check:
https://bealearninghero.org/readiness-check

Name: _____

12 pennies were on the table. Morgan took some pennies. Then there were 4 pennies on the table. How many pennies did Morgan take?

Answer: _____