

The Relationship Between Addition and Subtraction

Understanding the operations of addition and subtraction and gaining fluency in carrying out these operations are goals of much of the number work students do in the elementary grades. Understanding the relationship between addition and subtraction deepens students' understanding of the operations and ability to use them to solve problems.

As you introduce story problems to students, avoid labeling them as addition or subtraction. A critical skill in solving problems is deciding what operation is needed. Further, many problems can be solved in a variety of ways, and students need to choose an operation that makes sense to them for each situation.

It is easy for adults to assume that certain situations are addition and others subtraction because they are used to thinking of them that way. However, students may use addition to solve problems that you think of as subtraction. (In fact, many adults also do this.) Consider the following problem:

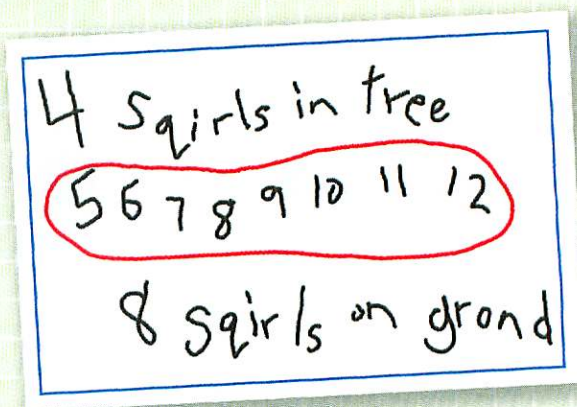
12 squirrels were on the ground. Then 4 of them ran up a tree. How many stayed on the ground?

Most of us learned to interpret this situation as subtraction, and we may naturally assume that students should also see it as subtraction. Students who use direct modeling of the actions to solve the problem will probably count out 12 objects, remove 4, and count how many remain. However, there are many other ways, such as the following, to solve this problem:

- Counting down 4 from 12 (11, 10, 9, 8)
- Counting on from 4 (5, 6, 7, 8, . . .) and keeping track of how many numbers are counted

- Using knowledge of number combinations and relationships (“I know $4 + 4 + 4$ is 12, and two 4s is 8.” or, “12 take away 2 is 10, so just take away 2 more; that’s 8.”)

Some of these methods are based on subtraction (moving from 12 down to 4), but others are based on addition (moving up from 4 to 12). The method chosen depends on a person’s mental model of the situation. Do you see this problem as a taking-away situation to be solved by subtraction, as an adding-on situation, or as a gap between 2 numbers that might be solved by either addition or subtraction, depending on which is easier in the particular situation? Any of these methods is appropriate for solving this problem. Addition is just as appropriate for solving this problem as subtraction, and, for many students, makes more sense.



Sample Student Work