

Math Background

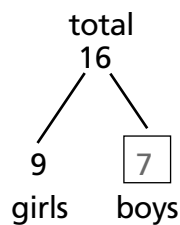
Some Types of Word Problems

Unknown Partner Problems

- In “unknown partner” problems, one of the partners is not given—it is unknown. Unknown partner problems can involve *put together*, *take apart*, *change plus*, and *change minus* situations. *Change plus* and *change minus* problems provide a quantity which is modified by a change—something is added or subtracted—which results in a new quantity.

Unknown Partner: Put Together

Stacy invited 9 girls and some boys to her party. 16 children were invited in all. How many boys were invited?

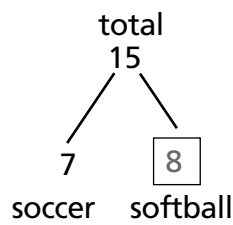


$$9 + \boxed{7} = 16$$

girls boys total

Unknown Partner: Take Apart

There were 15 people at the park. 7 were playing soccer. The others were playing softball. How many people were playing softball?



$$15 - 7 = \boxed{8}$$

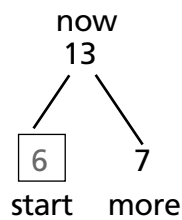
total soccer softball

Unknown Start Problems

- In “unknown start” problems, the starting number is the unknown number.

Unknown Start: Change Plus

Greta’s chicken laid some eggs. Then the chicken laid 7 more. Now Greta has 13 eggs. How many eggs did the chicken lay at the start?



situation equation:

$$\boxed{6} + 7 = 13$$

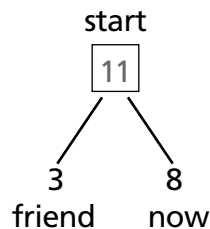
start more now

solution equations:

$$7 + \boxed{6} = 13$$
$$13 - 7 = \boxed{6}$$

Unknown Start: Change Minus

Patricia was carrying some books. Her friend took 3 of them. Patricia has 8 books left. How many books was she carrying at first?



situation equation:

$$\boxed{11} - 3 = 8$$

start friend now

solution equations:

$$8 + 3 = \boxed{11}$$

Patterns in Unknown Partner Problems

As students explore the different problem structures described above, they begin to see the following general patterns:

- If the total is unknown, it can be found by adding the partners.
- If one of the partners is unknown, it can be found by subtracting the known partner from the total, or adding on from the known partner to the total.

Teaching Unit 2 (Continued)

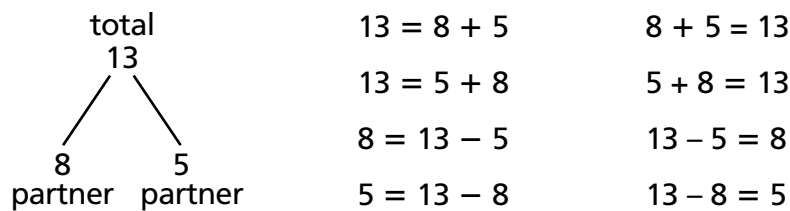
Representation

Using Math Tools to Represent Word Problems

Students should be encouraged to use a variety of solution strategies for the word problems in this unit. However, the lessons do present math tools that are useful for organizing the information in the problems and finding the solution. These tools become especially important when the focus shifts later in this unit, from word problems with single-digit numbers to those with multi-digit numbers.

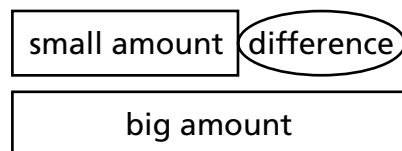
Math Tool: Math Mountains

Students use Math Mountains to show a total and two partners. The total is written at the top of the mountain, and the partners are written at the bottom. Students can imagine that the total splits into two parts that roll down opposite sides of the mountain. Eight equations can be written for a given Math Mountain.



Math Tool: Comparison Bars

Comparison problems involve one quantity that is more than or less than another quantity. The unknown in a comparison problem may be the smaller quantity, the larger quantity, or the difference between quantities. Making Comparison Bars can help students organize the information in the problem and figure out how to find the unknown.



To solve a particular comparison problem, students must ask themselves: *Who has more (or fewer)?* and *How many more (or fewer)?* They can use this information to label a set of Comparison Bars. For example, consider the problem:

Louis ate 14 crackers.

Walt ate 5 fewer crackers than Louis.

How many crackers did Walt eat?

