Graphic Representations of Word Problems

by

Verena Sharkey
New Castle School District

Problem solving is the ultimate goal for learning to manipulate numbers or deal with the so-called basic facts. Unfortunately, most people are not born with the ability to pull solutions to problems from either their minds or their backgrounds. This being the fact, problem-solving skills must be acquired and it becomes the responsibility of the teacher to help students learn some methods which will be reliable for finding solutions to most types of problems.

Making pictures or graphic representations of problems is one method of instructing students which can be started in the primary grades and carried through secondary school and college. Graph paper is an excellent medium for instructing students in graphic representations of problems. For primary students, large block graph paper should be used. However, for the sake of space in this paper, most examples will use centimetre paper. Rather than use pages of explanation of the method, examples will be shown using a variety of problems in the first through sixth grade level.

Problem 1. Six birds sat on a fence. Four birds flew away. How many were left?

Method. Enclose six blocks on a sheet of graph paper. Darken four blocks and count the remaining blocks.

Write the number sentence 6 - 4 = ☐
6 - 4 = 2.

Problem 2. On a trip through the city, Beth counted 25 red cars and Dave counted 18 blue cars. How many more red cars than blue cars were counted?

Method. Have students enclose or cut out 25 blocks to represent red cars and 18 to represent blue cars. In this case, cutting would be preferable because the 18 could be placed over the 25 and the remainder counted. Then write the number sentence

$$25 - 18 = \square$$

$$25 - 18 = 7.$$

Problem 3. Jean has 12 apples. She puts 4 apples in each bag. How many bags does she need?

Method. Enclose 12 blocks and then circle sets of 4. Count the sets of four to determine the number of bags needed.
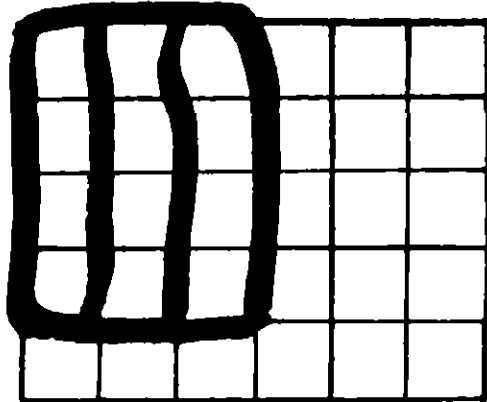
Then write the number sentence:

$$12 \div 4 = \square$$

$$12 \div 4 = 3.$$

Problem 4. James made a pan of fudge. First he put 5/8 cup of sugar in the pan and then added 1/8 cup more. How much sugar did he use in the fudge?

Method. Enclose a strip of 8 blocks. Darken 5 of them to show 5/8, then darken 1 more block to show 1/8 and add the number of darkened blocks.
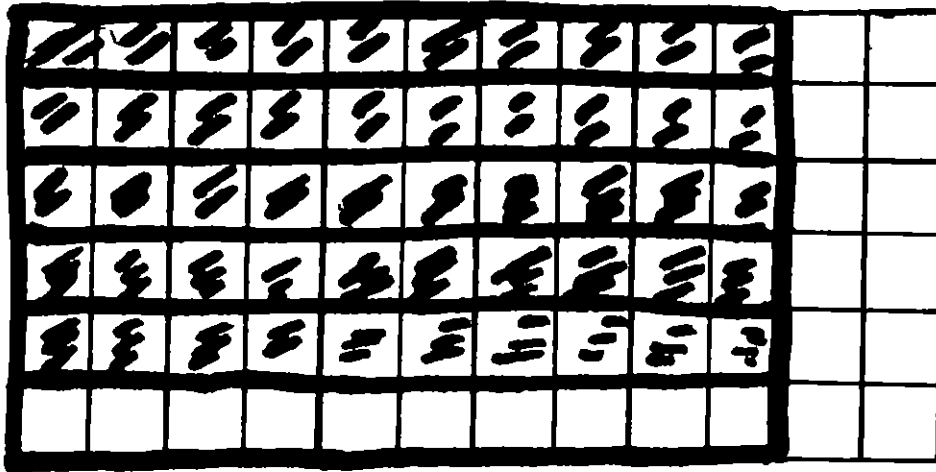
Then write the number sentence:

$$\frac{5}{8} + \frac{1}{8} = \square$$

$$\frac{5}{8} + \frac{1}{8} = \frac{6}{8}$$

Problem 5. There are 60 minutes in an hour. How many minutes are there in 5/6 of an hour?
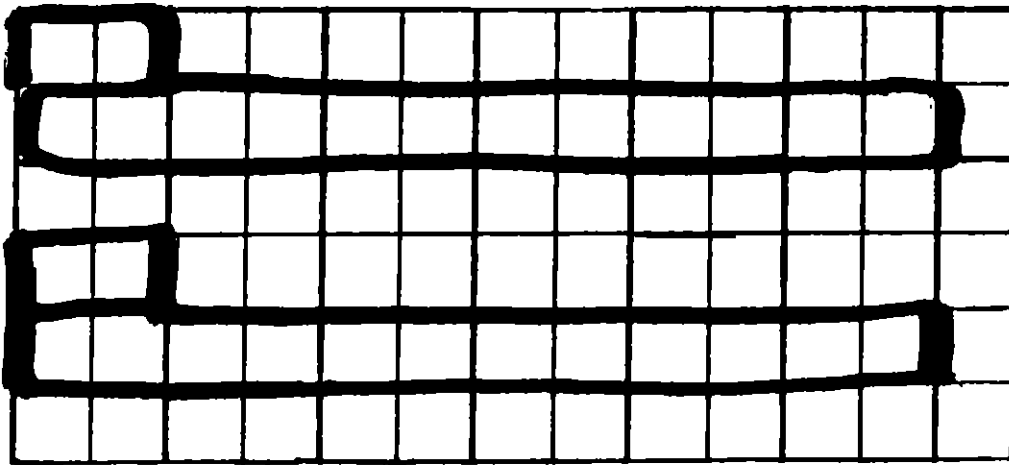
Method. On graph paper, enclose 60 blocks, then mark off six even sets. Darken five of the six sets and count the blocks.

Write the number sentence: 5/6 x 60   = ☐
                            5/6 x 60/1 = 50 .

Problem 6. Ann rode her bike 2 kilometres in 12 minutes. At the same rate, how long will it take her to go 8 kilometres?

Method Shown.

Write number sentence: $\frac{2}{12} = \frac{8}{\square}$

$\frac{2}{12} = \frac{8}{48}$

Graphing, of course, is only one skill which is helpful in solving word problems. In developing the skill of graphing, the teacher plays an important role in teaching students how to relate the problem to the graph. The graphing method presents students with a successful experience in problem solving that can be applied throughout the grades.