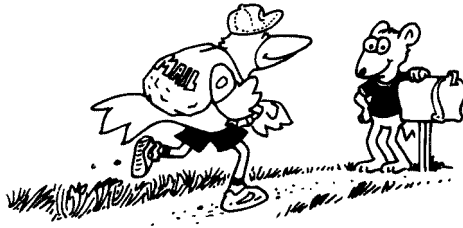


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# Notes to the Teacher



This is the second in a series of books designed to help students become confident problem-solvers:

Get Your Hands on Problem Solving, Level 1  
**Get Your Hands on Problem Solving Too**  
Get Your Hands on Problem Solving, Year 3

The activities in this series introduce to non-routine logic and maths story problems, plus a four-step plan and seven strategies for solving them. One of the strategies – act out with objects – is often used in combination with the other strategies: Look for a pattern, make a picture, use logical thinking, guess and check, make a table and make an organised list.

These strategies are tools that students can use for solving a variety of problems. The activities in this book help children develop a sense of which strategies will be most useful for solving given problems. Learning to use the strategies helps children build confidence in their ability to solve problems.

## Contents


This book presents logic and maths story problems at a simple level. The stories often show humorous animal characters in situations that are familiar to children.

There are six sections of story problems that can be used to introduce the problem-solving process and strategies. Each section includes six story-problem activity sheets, plus teaching plans for the first two story problems. The teaching plans give sample teacher-and-student dialogues that model the problem-solving process and the use of the strategy being introduced. Some also suggest that children act out the problem with objects.

Examples:

### Teaching plan

**Teaching plan for story problem 1**

**Look for a pattern**  
Act out with 

Give children some dinosaurs and a copy of page 3.

**Find out and talk about it**

- What are the Dancing Dinos doing? Lining up for the show.
- What colours are the dinos? Blue, green and red.
- What order are the dinos in? Blue, green, green, red, blue, green, green, red.
- What do we know about how the dinos keep lining up? They keep lining up in the same order until there are 20 dinos on the stage.
- What do we have to find out to solve this problem? How many green dinos there are on the stage when there are 20 dinos in total.

**Use strategies**

- To help us solve this problem, we can look for a pattern in it. In a pattern, something happens again and again in the same way.
- Would it help to use play dinos to act out the story problem and figure out the pattern? Yes.
- Acting out a problem with objects is a good way to solve some problems.

**Solve it**


- Let's use the dinos to act out the problem. What colours of dinosaurs shall we use? Green, blue, and red.
- Do you see a pattern in the line of dinosaurs? Blue, green, green, red – repeated again and again.
- How many dinosaurs were on stage at the beginning of the problem? 12. If the dinos keep lining up until there are 20 dancers on stage, how many more dinos will get in line? Eight.
- If the dinos keep lining up in the same order, what colours will the next eight dinos be? Blue, green, green, red, blue, green, green, red.
- How many green dinos are there on the stage? Ten.

**Check it**

Read the problem again and have the children check to see if the number of dinosaurs matches the conditions of the problem.


### Story problem activity sheet

Name \_\_\_\_\_

**Look for a pattern**  
Act out with 

**1 Dancing Dinos**

The Dancing Dinos are getting ready for the show. They are lined up in this order: blue, green, green, red, blue, green, green, red, blue, green, green, red. The dinos keep lining up in the same order until there are 20 dancers on the stage. How many green dinos are on the stage?



Write the number: \_\_\_\_\_

**Your turn**

If there are 30 dinosaurs in the line, how many blue dinosaurs will there be on the stage?

In each section, the first and second problem and teaching plans introduce the children to two different types of problems that they can solve with the same strategy. There are two more problems of each type within the section.

The story-problem activity sheets name the strategy or strategies being introduced, and, when appropriate, show an icon of the objects children can use to act out the problem. They give one story problem, plus a Doing more or Your turn activity for the children to do after they have solved the story problem. The Doing more activities are extensions of the problem, and the Your turn activities encourage children to create their own problems for their peers to solve.

There are further 16 practice story problems on pages 49–64, which can be used for further assessment or for additional practice. Children will be able to choose the strategy or strategies they think will be most helpful for solving the problem.

The objects suggested for the story problems in this book are plastic or paper dinosaurs; plastic or paper play coins; and coloured linking cubes or squares of paper. Pictures for paper dinosaurs and coins are provided on pages xiii and xiv.

The four-step plan and problem-solving strategies that will be used for solving the story problems are explained on pages vii–ix.

In the Cross-reference chart on page x, a strategy is suggested for each problem. However, children should be encouraged to use whatever strategy they find most helpful, including ones that they devise themselves.

Assessment ideas are given on page xi, and solutions are provided on pages xv–xvi. If you wish to create more problems similar to those included in this book, the children’s books listed on page xii may provide a rich resource for familiar characters and contexts.

## **Teaching Suggestions**

It is recommended that children work together in pairs. This kind of grouping allows children to talk about what they are thinking and how they are solving the problems.

Give each child a copy of the story-problem activity sheet, and a supply of dinosaurs, linking cubes or play money if any are suggested. (The story problems often use dinosaurs and linking cubes in a variety of colours, so you may want to let the children colour the paper cut-outs prior to the activities).

Begin by reading the story problem to the children. Some children may need to hear it several times to retain the information. Invite the children to say the problem in their own words.

Then guide the children through the problem-solving process, following the teaching plan or your own plan for that story problem. (In the teaching plans provided, the dialogues include sample questions you might ask, and, in italics, some possible answers children might give.) Begin by asking questions to help the children find out all the information they will need to solve the problem. Next, talk about the strategies, or tools, that can be used to solve the problem. Help the children use the strategies, and encourage them to talk about their thinking as they solve the problem. At this stage, the development of maths language and reasoning is more important than getting the right answer. The children may even discover their own unique ways of solving the problem that they will use again and again. They are building a library of ways to think about and solve problems, and at the same time are building confidence in themselves as problem-solvers.

If you are working with young children, you may simply want to let them work out the problems with manipulatives, then talk about their answers. With older children, you may want to have them record their answers as suggested on the activity sheet.

After the children have solved a story problem, re-read the story while they check to see that their solutions meet all the conditions given in the problem.

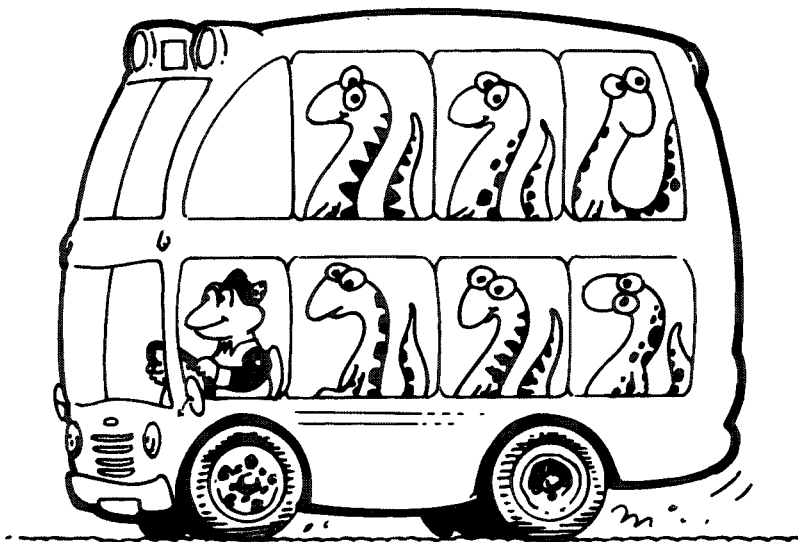
## A four-step plan for problem-solving

Step one is to **FIND OUT AND TALK ABOUT IT**. In this beginning step, children find out what the problem means and what questions must be answered to solve it. It is important that children know the meaning of all the words used in the story problem and understand what is going on in the problem. They should also learn how to find out each piece of important information.

Step two is to choose and **USE STRATEGIES**. In this step, children begin to think about the tools they can use to solve the problem and which tools will be most helpful.

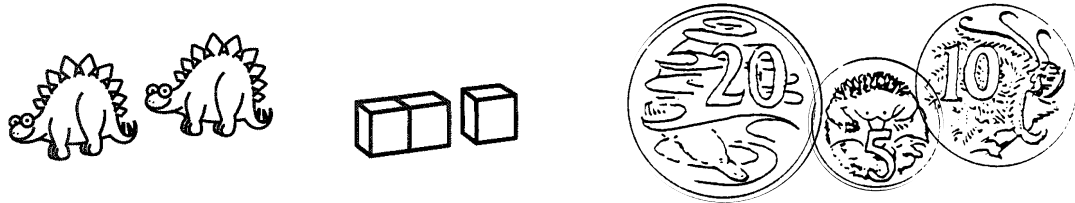
Step three is to **SOLVE IT**. In this step, children use the strategy and any objects suggested to find a solution to the problem. On many of the student activity pages, pictures or tables or organised lists have been started to introduce the strategy to the children. Help the children complete them and use them to solve the problem. The children can also record their solutions in the ways suggested on the students pages.

Step four is to **CHECK IT**. In this step, the children should review their work and solution while you re-read the problem. They need to make sure their solution fits with the clues and information given in the problem.



# Problem-solving strategies

**Act out with objects** • Children will use dinosaurs, linking cubes and play coins to act out many of the story problems in this book. Being able to act out the story with these objects helps children visualise what is going on in the problem, understand the underlying maths concepts and work out the solution.



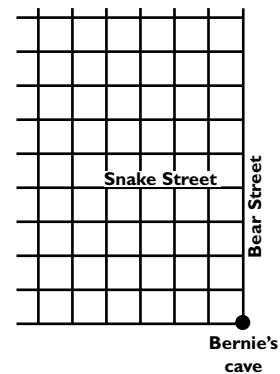
**Look for a pattern** • A pattern is a regular, systematic repetition. Identifying the pattern helps the problem-solver predict what will 'come next'. In story problems 1–6, children will identify and continue visual patterns and number patterns.

3

### Ice-skating on ... Flora's pond

Flora Frog is teaching dinos to ice-skate on her pond. There are 25 dinos. They are lined up in this order: yellow, yellow, blue, blue, green, yellow, yellow, blue, blue, green, and so on. How many blue dinos are there in the line?

**Make a picture** • Making pictures or diagrams, such as number lines and maps, can be very useful for solving some problems. In story problems 7–12, children will be completing pictures of floors in a building (a type of number line) or other map-like drawings to solve the problems.



**Use logical thinking** • Logical reasoning is used in all problem-solving. Logical thinking is especially needed, however, for the types of problems that include or imply conditional statements such as 'if ... then', or 'if ... then ... else'. Story problems 13–18 give some clues, and the children will use 'if ... then' thinking to fill in missing information and solve the problems.

13

### Dinos out for a ride

A yellow dino, a red dino and 2 blue dinos are out for a ride in a car. The dino who is driving is not yellow or blue. A blue dino is sitting behind a yellow dino. What colour is each dino in the car?

**Guess and check** • In some story problems, information is given in an indirect way. Students have to make a guess for one number, or a sum of numbers, in order to work out the problem. Then they check to see if the solution is correct. If not, they use the information from the incorrect guess to make another more informed guess. Children use this strategy to solve story problems 19–24.

four 50-cent pieces, eight 10-cent pieces

$$50 + 50 + 50 + 50 + 10 + 10 + 10 + 10 + 10 + 10 + 10 + 10$$

$$= \$2.80 \text{ too low}$$

five 50-cent pieces, ten 10-cent pieces

$$50 + 50 + 50 + 50 + 50 + 10 + 10 + 10 + 10 + 10 + 10 + 10$$

$$+ 10 + 10 + 10 = \$3.50 \text{ yes}$$

**Make a table** • Problem-solvers find that making tables helps them organise and keep track of information, discover missing information and identify data that is asked for the problem. The recording spaces for story problems 25–30 show the beginnings of tables. Problem-solvers will find that tables can be made in many different forms, for example T-charts, vertical tables and horizontal tables.

1 dollar	50 cents	10 cents
1	1	0
1	0	5

**Make an organised list** • Making an organised list helps problem-solvers organise and keep track of their work with the data. This kind of step-by-step approach to solving the problem makes it easier for the problem-solver to review what steps have been taken and pinpoint what steps still need to be completed. An organised approach is particularly helpful when a problem-solver needs to find ALL of the possible solutions; for example, all the ways that a group of coloured bears can be combined in pairs. The recording spaces for story problems 31–36 show the beginnings of organised lists.

Picture	Colours of dinos
1	blue, blue
2	
3	