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Ages 8-10 Years



BRAIN BENDERS

**CHALLENGING MATHS
PROBLEMS FOR
PRIMARY STUDENTS**

1

SAMPLE



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Teachers' Notes

What is this book about?

This book contains twenty-six photocopiable mathematical problems. The problems have been written and presented to suit a range of abilities and ways of thinking and learning in junior primary school. Problem solving is an important part of the mathematics curriculum and this book has been designed to help students become familiar with, and put into practice, a range of problem solving techniques. The strategies which this book encourages students to use and develop are: guess and check, looking for patterns, drawing pictures and modelling objects, listing and eliminating possibilities, filling in grids, using timelines and making assumptions and estimates and judging the reasonableness of them. The problems are also designed to highlight the importance of reading mathematical language carefully.

Why have we written this book?

We have both been primary school teachers and are aware of the kind of support materials that busy teachers need. Over the years, we have collected the mathematical problems that appear in this book, and have shared many of them with our peers. It is their promptings that have brought about the publishing of this collection. The problems that appear in this book will add flavour and interest to a mathematics programme. They will create discussion and debate and stimulate mathematical thought. It is our belief that children exposed to such problems as the ones in this book, will develop greater powers to solve problems, investigate information and make decisions inside as well as outside of the classroom. Most of these problems do not have immediately obvious answers. Their solutions might well include group discussion, or time to think them over at school or at home.

What is different about this book?

In spite of the fact that the types of problems that we have published have existed for a long time, are enjoyed by children and are an integral part of the curricula, it seems that not all teachers are using them. We think that one of the reasons for this is that they have not been made available in a 'ready-to-use' format. We have published this book in what we believe is a 'ready-to-use' format: using a large font for creating overhead transparencies, mainly limiting one problem to one page, and providing answers which focus on the step-by-step methods which children are likely to use to solve the problems. We are aware that there are more sophisticated and sometimes shorter explanations of answers to some of the problems, but we have chosen to explain the answers in ways that we think children will best understand them.

How might you use this book?

Teachers can use these problems in a variety of ways. Some teachers have found it effective to give their students a problem at the end of a mathematics lesson as a starter discussion for the following day. Students are often sufficiently interested in the problems to discuss them at home. The most important thing for teachers to realise, is that if the problems are at the right level for their students, then they will not be solved immediately but will require some thought and possibly some discussion and debate. At the back of the book we have created a Brain Buster section which includes more difficult mathematical problems. You may use the problems which appear in this section as you wish. They could, for example, be used to extend more able students or to occupy fast finishers.

We hope that you and your students enjoy solving these problems.

Barry Brocas and Brenda Bicknell

Brain Bender 1

How do you rate this Brain Bender?

- Brain Boring! Easy on the Brain! Brain Bending! Super Dooper Brain Bending!

Marbles in a Jar

On Monday, Troy put one marble in a jar. Each day after that, he doubled the number of marbles in the jar. After six days, the jar was full of marbles.

How many days did it take before the jar was half-full of marbles?

Monday Tuesday Wednesday Thursday Friday Saturday

_____ days

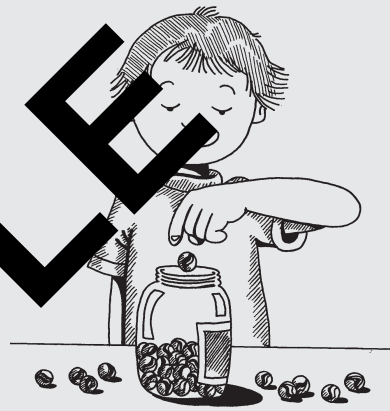


Answer ►

Marbles in a Jar

If the jar was full after six days, then it must have been half-full the previous day, because each day Troy doubled the number of marbles that he placed in the jar.

So the answer is five days.



Name the Pets

Four pets are kept in cages in a back yard as shown below.

There is a rabbit, a hen, a guinea pig and a rooster.

Their names are Chip, Tommy, Dale and Mickey.

Use the clues below to match the names to the pets.

Clue 1 The guinea pig is next to the hen and the rooster.

Clue 2 Dale is opposite the guinea pig.

Clue 3 The hen is called Chip.

Clue 4 Mickey is opposite the hen.

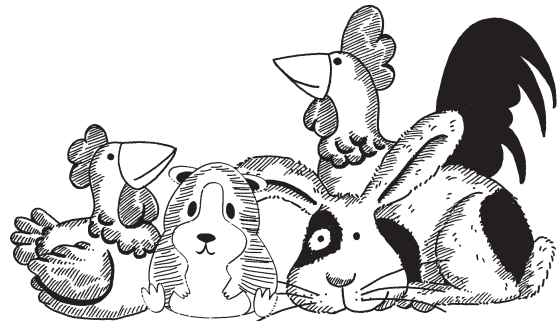


Rabbit

Hen

Guinea Pig

Rooster



Answer ▶

Name the Pets

The clues lead to the following deductions:

The first clue tells us that the rabbit must be opposite the guinea pig, so the rabbit's name is Dale (the second clue).

The hen and the rooster must be opposite each other (the first clue), so the rooster's name is Mickey. We can tell this from the fourth clue.

We are told that the hen's name is Chip (the third clue), so the guinea pig's name must be Tommy.

So the answer is:

Rabbit	Dale
Hen	Chip
Guinea Pig	Tommy
Rooster	Mickey

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