

# Primary Mathematics Programs

For the BBC Model B



**Metric units of weight**  
**Recipes**



## Loading and running instructions

The program is for the BBC Model B Microcomputer.

### *Using a cassette*

- 1 Put the cassette in the recorder and rewind to the start if necessary.
- 2 If you are using a BBC micro fitted with a disk interface, type \*TAPE and press **RETURN**.
- 3 Type CHAIN" " and press **RETURN**.  
Play the cassette recorder. Follow the instructions on the screen when the program starts.

### *Using a disk*

- 1 Insert the disk in the drive.
- 2 Hold down **SHIFT** and tap the **BREAK** key. This should start the disk automatically. Follow the instructions on the screen when the menu appears.

As from June 1986 this  
disk is also compatible  
with BBC B Plus and  
Master 128.



**Scottish Primary Mathematics Group**

# Primary Mathematics Programs

# Metric Units of Weight

**and**

# Recipes



**Heinemann Educational Books**

Heinemann Educational Books Ltd  
22 Bedford Square, London WC1B 3HH

LONDON EDINBURGH MELBOURNE AUCKLAND  
HONG KONG SINGAPORE KUALA LUMPUR NEW DELHI  
IBADAN NAIROBI JOHANNESBURG  
PORTSMOUTH (NH) KINGSTON

ISBN 0 435 02731 X (BBC Disc)  
0 435 02730 1 (BBC Cassette)

© Scottish Primary Mathematics Group 1984

First published 1984

Reprinted 1985

### **Copyright notice**

All rights reserved.

These materials, both text and computer programs, are fully protected by international copyright. They may not be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the prior permission of the copyright owner.



Programmed by Five Ways Software Ltd.

Filmset by Northumberland Press Ltd, Gateshead  
Printed in Great Britain by  
Paradigm Print, Gateshead

# Contents

<b>Metric units of weight</b>	<i>page</i> 4
About the program	4
Context	5
Using the program	5
Follow-up work	6
Worksheets	6
Appendix 1: Detailed description of the program	7
Appendix 2: Acceptable estimates	12
<b>Recipes</b>	13
About the program	13
Context	13
Program description	14
Using the program	16
Follow-up work	17
Appendix 3: Recipes in the program	17

# Metric units of weight

## About the program

The program is intended for use by 9–13 year-olds, who are familiar with metric units of weight and have had practical experience of using them.

The aims of the program are

- 1 to give the children practice in choosing appropriate units.
- 2 to provide an experience which will help them to improve their estimation of weights in metric units.

The children choose an appropriate metric unit for weighing a familiar object (Fig. 1). They are then asked to estimate the weight of the object using the chosen unit (Fig. 2).

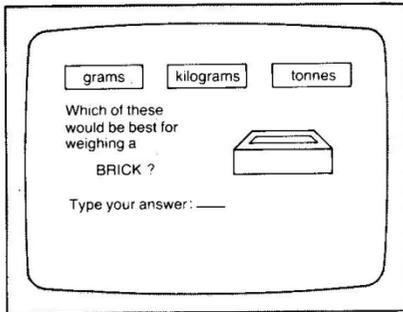


Fig. 1

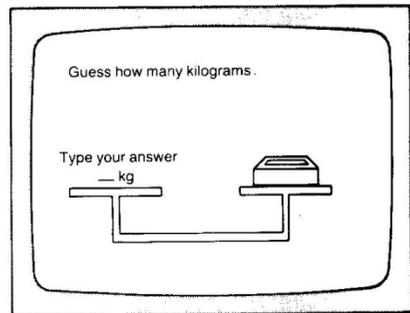


Fig. 2

A detailed description of the program is supplied in Appendix 1. Three *worksheets* are also provided along with these notes. They can be used as a follow-up to the program.

## Context

The children should have had as much previous experience as possible of actual weighing, in grams or kilograms, using a balance or scales. Teachers may wish to revise such work before pupils use the program. Tonnes could be revised by discussion of the weights of heavy objects such as a bus, lorry, ship, etc.

Teachers using the SPMG course *Primary Mathematics—A development through activity*, should find that the program suits pupils who have completed the Stage 4 weight section in which the tonne is introduced. The program can also be used by pupils not using the SPMG series. Pupils older and younger than the usual Stage 4 age group have successfully used the program.

## Using the program

If the program is used by a small group of 2–4 children it is likely that worthwhile discussion will be generated by the choice of units and estimating activities.

An individual child could also use the program. This might be the best approach for someone who had used it before with little success.

The program may be used for demonstration/discussion by the teacher using a large TV monitor with a larger group or the whole class.

Teachers should make sure that pupils know that they should press the **RETURN** key after typing in an answer. They should also be told to report back after finishing the program.

A detailed description of the program is given in Appendix 1. A list of the range of values for each weight which the computer will accept is given in Appendix 2.

## Follow-up work

There is a score screen for pupils at the end of the program which is followed by some advice about what they should do next. The most immediate follow-up would be for pupils who did not know their own weight to use bathroom scales to find out.

Pupils with good scores are advised to ask their teacher if they should do Weight Worksheet 1. The worksheets should be tackled on another day, perhaps after using the program once more.

Pupils whose choice of units was good but whose estimates were poor are directed to try the program again. This might best be done individually after a lapse of time, and preceded by discussion about approximate weights with the teacher and the group.

Pupils with poor scores are told to find out more about using metric units of weight. Such pupils really require practical work in weighing using grams and kilograms before trying the program again.

## Worksheets

Three worksheets are provided at the centre of these notes. They should be detached and may then be reproduced for use by pupils.

*Worksheet 1* provides twelve cartoons of familiar objects and asks pupils to suggest a suitable unit for weighing each one.

*Worksheets 2 and 3* remind pupils of the approximate weight of each object presented in the program and then asks the pupils to choose a suitable estimate from the answers provided for the weight of a *related* object. They should be able to decide whether the new object is heavier or lighter than the one in the program and make a reasonable choice from the alternatives provided.

Answers to the worksheets are given below:

### *Worksheet 1*

sheep—kg

bus—tonnes

potatoes—kg

computer—kg or g

paperback—g

your auntie—kg

mouse—g

hippopotamus—tonnes

fruit gums—g

tissues—g

sofa—kg

lemonade—kg or g

### Worksheet 2

- 1 furniture van—3 to 5 tonnes
- 2 pekinese—8 to 12 kg
- 3 ruler—approximately 25 g
- 4 tea—roughly 120 g
- 5 pail of sand—about 12 kg

### Worksheet 3

- 1 sugar cube—2–3 g
- 2 TV monitor—approximately 11 kg (Microvitec!)
- 3 blue whale—100–180 tonnes
- 4 lamb—3–8 kg
- 5 rugby team—around 1 tonne

One method of answering the last question on Worksheet 3 is to take the average weight of one player as  $(55 + 85) \div 2$ , i.e. 70 kg, and multiply by 15. This gives just over 1 tonne.

## Appendix 1: Detailed description of the program

- 1 The first screen after the titles reminds children of the three metric units (Fig. 3).

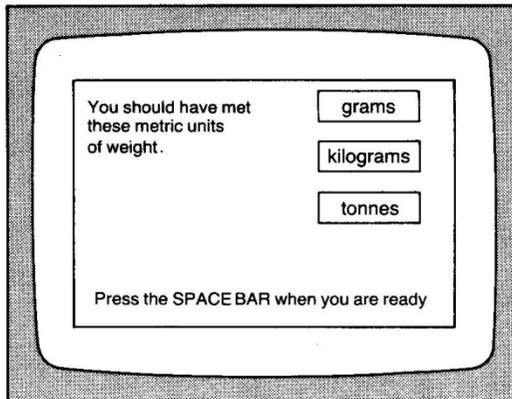


Fig. 3

The message 'Press the SPACE BAR when you are ready' appears at the foot of the screen. When this is pressed the program moves to the first object to be 'weighed'.

- 2 There are ten objects altogether in the program. These are detailed in Appendix 2. One typical object is a 'brick'. The following screen (Fig. 4) asks children to choose a suitable unit of weight.

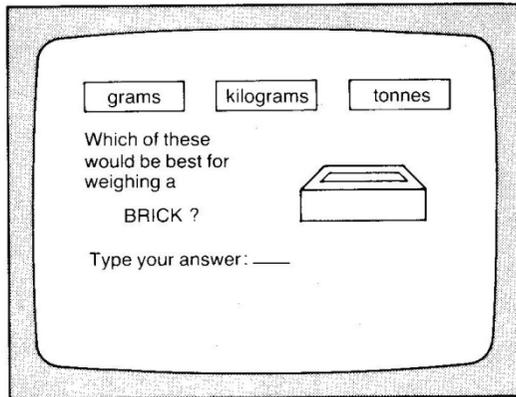


Fig. 4

Pupils should type in an answer and press **RETURN**. If the correct answer, in this case kilograms, is given then a message appears to confirm the choice. This message varies but usually is something like 'A good choice'.

If a wrong answer is given, grams or tonnes in this case, the message is typically along the lines of

No! A tonne is for very heavy weights.

Not a good choice. A gram is a very light unit.

**3** The following names of units are accepted

gram	kilogram	tonne
grams	kilograms	tonnes
gramme	kilogramme	
grammes	kilogrammes	

'Kilo' is not accepted here.

If the entry is mis-spelled then, as long as the first two letters are recognizable (gr or ki or to), the program will correct the spelling. If the answer is a wrong choice or the first two letters are incorrect then the message 'Try again' appears. When the correct unit is finally chosen the **SPACE BAR** moves the program on to the next screen (Fig. 5).

**4** The screen is cleared except for the cartoon of the object itself which now appears on one side of a pair of scales. The children are then invited to estimate its weight.

After discussion the children should enter an estimate which may be just a guess at first. The program will accept a range of values for each weight. These appear in Appendix 2. For example, any input

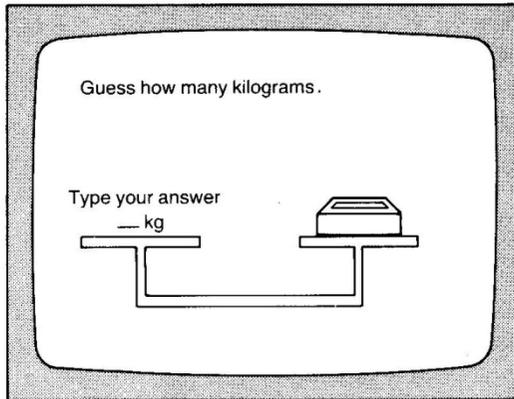


Fig. 5

from 2 to 4 kilograms is acceptable for the brick. On typing in a weight in this range and pressing **RETURN** a success message will appear at the top as follows:

Well done. A brick weighs from  
2 to 4 kilograms.

If the weight input is too light or too heavy the scales will move to show this (Fig. 6).

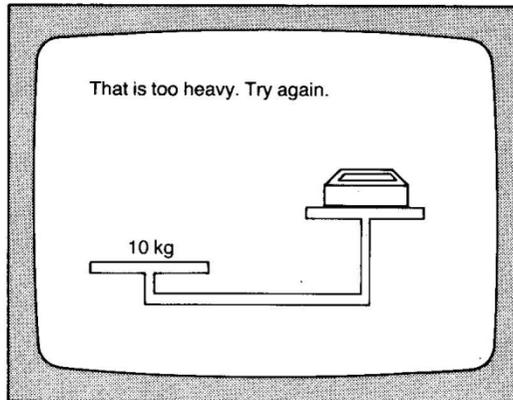


Fig. 6

The scales then return to a level position and another try is offered. The children should adjust their answer until they find a weight in the acceptable range.

After 5 wrong estimates, either *all* too low or *all* too high, the message

Try making your estimate much <sup>heavier</sup> lighter  
appears at the top.

After a correct input, the **SPACE BAR** can be pressed to move on.

- 5 The children are presented with a new object to estimate as before.

The final object is 'yourself'. This one is treated differently at the estimation stage. The following message appears:

What is your age?

This is followed by

Estimate your weight in kilograms.

If a weight less than 20 kg or more than 85 kg is input by a child of 14 or under then the input is not accepted. Typing in a weight within this range brings up the message:

A 12 year old should weigh between

26 and 54 kg.

Check your weight when you  
have finished the program.

When an age greater than 14 has been input the message after estimating reads

Average weights of adults are

Men 50 to 100 kilograms

Women 46 to 81 kilograms

The program continues after the **SPACE BAR** has been pressed.

- 6 The score for the program is then given as follows:

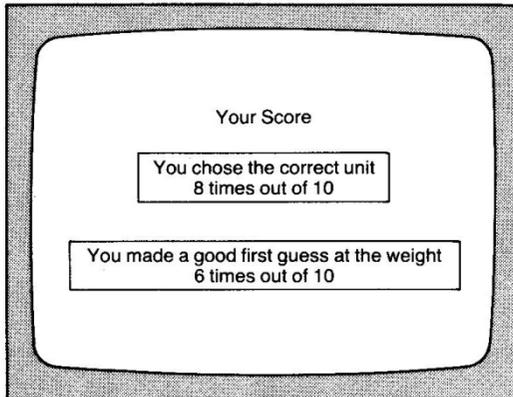
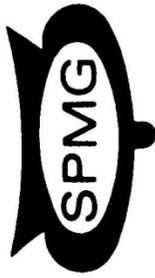


Fig. 7

- 7 On pressing the **SPACE BAR** advice is given about what to do next. If the child has chosen the correct unit first at least 7 times out of 10

# Weight Worksheets

These worksheets can be removed from the booklet and duplicated for use in class. They are © Scottish Primary Mathematics Group and may be used only in the institution for which the program was purchased.



# Primary Mathematics Programs

## Weight Worksheet 1

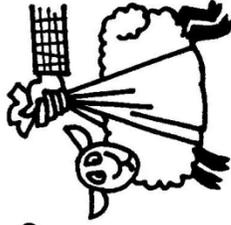
grams

kilograms

tonnes

Which unit would be best for weighing

a sheep



a paperback



a tube of  
fruit gums



a bus



your  
auntie



a box of tissues





# Primary Mathematics Programs

## Weight Worksheet 2

---

- 1 A large car weighs about 1 tonne.

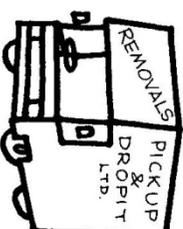


1 or 2 tonnes

3 to 5 tonnes

10 to 14 tonnes

Estimate the weight of a furniture van.



- 2 A Labrador weighs about 28 kg.



around

8 to 12 kg

15 to 20 kg

20 to 30 kg

Estimate the weight of a Pekinese.



- 3 A pencil weighs

Estimate the weight of a long ruler.

- 1 A full box of matches weighs about 12 grams.



Estimate the weight of a sugar cube.



2 to 3 g

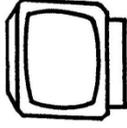
5 to 8 g

10 to 15g

- 2 A brick weighs between 2 and 4 kilograms.



Estimate the weight of the TV monitor.



approximately

3 kg

11 kg

22 kg

- 3 An adult elephant weighs from 2 to 10 tonnes.



Estimate the weight of an adult blue whale.



5 to 12 tonnes

50 to 80 tonnes

100 to 180 tonnes

- 4 A new baby weighs from 2.5 to 5 kg.



Estimate the weight of a new-born lamb.



1 to 2 kg

3 to 8 kg

10 to 15 kg

- 5 Fit young men of 22 weigh from 55 to 85 kg.



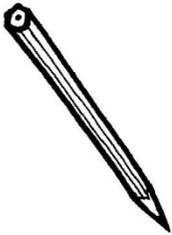
Estimate the weight of a whole rugby team (15 men).



around

$\frac{1}{2}$  tonne

10 tonnes

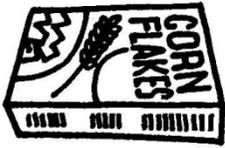


approximately

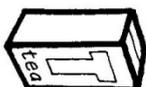


- 4 A large packet of cornflakes weighs about 500 g.

Estimate the weight of a packet of tea.



roughly



- 5 A pail of water weighs about 8 kg.

Estimate the weight of the same pail full of sand.



about

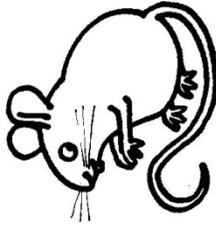




a bag of potatoes



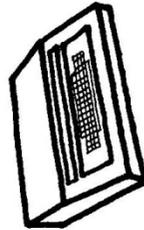
a mouse



a sofa



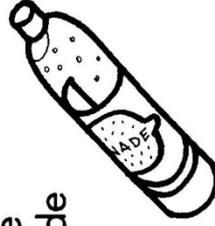
the computer



a hippopotamus



a big bottle  
of lemonade





and also has given an acceptable estimate first time at least 3 times out of 10 then the message reads:

Ask your teacher if you  
should do Weight Worksheet 1

Correct choice of unit 7 times or more coupled with 2 or less first time acceptable estimates gives the message:

Tell your teacher that you  
should try this program again.

The intention is that this be done on another day, perhaps after discussion with the teacher about weights of other objects.

Pupils who do not choose a suitable unit 7 times at least are advised to:

Tell your teacher that you  
need to know more about  
using metric units of weight.

Such pupils really require further practical work in weighing.

8 The final message of the program is:

Goodbye.

### Special keys

**CTRL B** will re-start the program from the beginning.

**CTRL BREAK** will end the program.

**SHIFT BREAK** will re-run the menu if you are using a disk.

## Appendix 2: Acceptable estimates

This list gives the acceptable estimates for the weight of objects in the program. It is possible to find objects of the kind listed below whose weights lie outside the acceptable ranges, e.g. *Guinness Book of Records*-type elephants weighing 10 tonnes, etc. The weight ranges have been chosen as typical weights.

<i>Object</i>	<i>Acceptable units</i>	<i>Acceptable range of values for weight</i>
Brick	Kilograms	2–4 kg
New pencil	Grams	2–10 g
Large packet of cornflakes	Grams (Kilograms)	250–750 g
Large car	Tonnes Kilograms	1–2 tonnes 1000–2000 kg
Box of matches	Grams	7–20 g
Labrador	Kilograms	24–32 kg
New baby	Kilograms	2–5 kg
Pail of water	Kilograms	4–10 kg
Elephant	Tonnes Kilograms	2–7 tonnes 2000–7000 kg
Yourself (under 15 years old)	Kilograms	20–85 kg

---

# Recipes

## About the program

The program simulates the measuring out of ingredients for four different recipes and the setting of cooking temperature and timer. It is intended for the 9 to 13 year-old age group.

The aims of the program are

- 1 to present children with the problems of interpreting a variety of scales;
- 2 to give practice in reading scales in a 'realistic' context.

## Context

Pupils using the program should have previous practical experience of weighing in grams using 'kitchen'-type scales and of measuring volumes in millilitres. The program is intended to give a wider experience of scales marked in different ways. *It should not be used to introduce scale reading or to replace practical measuring activities.*

Teachers may wish to remind pupils of an appropriate strategy for using an unfamiliar scale: they should first of all find out what each interval on the scale represents. The first weighing scale used in the program is shown in Fig. 8 although teachers may wish to discuss an easier one to make the point about finding out what each interval represents.

4 intervals represent 100 grams  
1 interval represents 25 grams

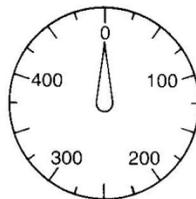


Fig. 8

Teachers using the SPMG series *Primary Mathematics—A development through activity* should find that the program is suited to pupils who have

successfully completed the units on weight and volume in Stage 4. The program has been used profitably by children both younger and older than the usual Stage 4 age group. In particular, younger children have enjoyed using the program.

## Program description

The children choose one of four possible recipes. The ingredients for the chosen recipe are then displayed on the screen. (A listing of each recipe is given in Appendix 3.)

The pupils 'measure out' the ingredients one by one and finally set cooking temperature and timer. The scales used are illustrated in Fig. 9. One interval on each scale represents 25 g, 20 ml, 20 °C, and 10 minutes respectively.

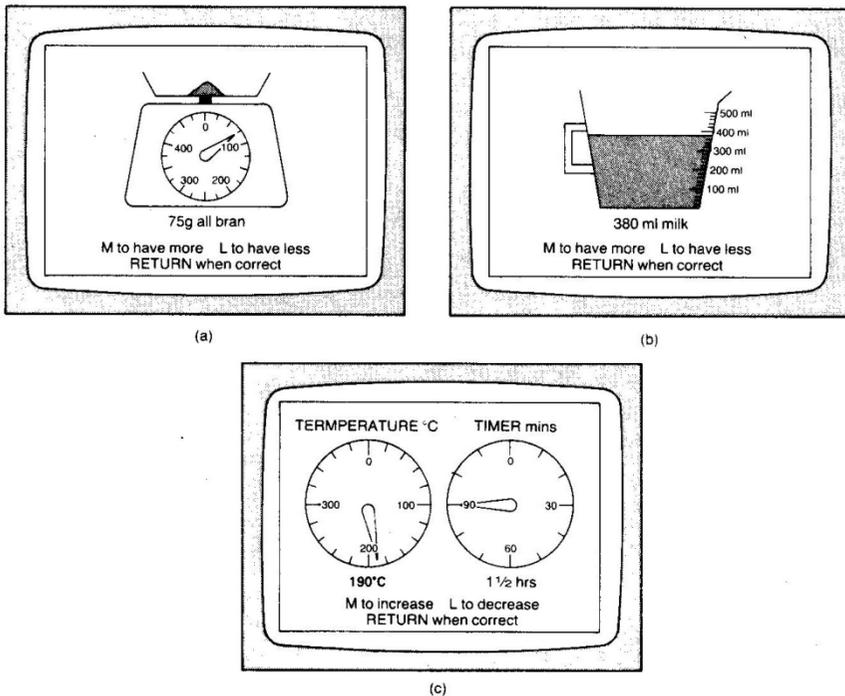
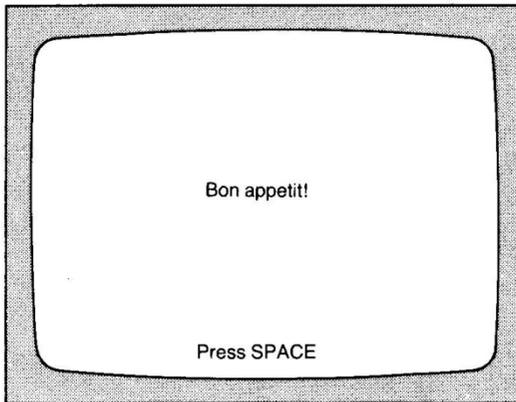


Fig. 9

Pressing **M** will increase the amount of ingredient and/or the pointer reading on the scale. A correct 'measurement' is rewarded by the re-appearance of the recipe with a ✓ beside the appropriate ingredient. If the scale is set incorrectly at first two further tries are offered. If the reading is still wrong after this then the correct reading will be shown on the scales. After that a X appears beside the ingredient or working instruction on the recipe list.

When all the scale readings have been set the message 'COOKING' appears. This is soon swallowed up by a 'gobbler' which leaves behind a message varying from 'That was very tasty!' to 'That tasted awful!', depending on how many mistakes were made in following the recipe.

The next screen offers pupils another recipe. If N for 'No' is pressed the 'Goodbye' screen appears (Fig. 10).



*Fig. 10*

If either the **SPACE BAR** or the teacher's keys **CTRL B** are pressed, the program will restart for another group of pupils. The teacher's keys **CTRL F** end the program. However, the teacher's keys **CTRL T** will bring up a summary of pupil results. These show the recipes attempted with a ✓ or X beside the ingredients to indicate correct and incorrect scale settings (Fig. 11).

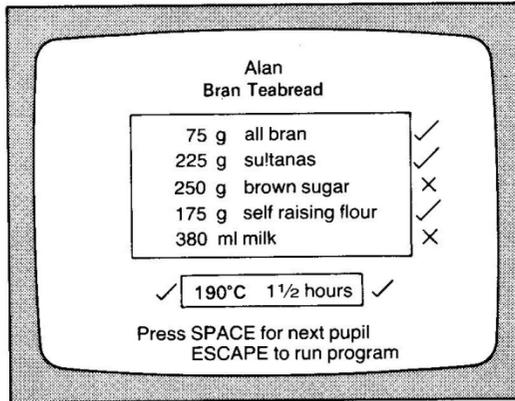


Fig. 11

This summary should allow teachers to check up on individual or group difficulties. Once viewed, the information on this screen is lost from the program. The next time the summary is presented it will show results for pupils who have used the program subsequently. The score summary becomes available from any point in the program after the first recipe has been completed.

## Using the program

The program is suitable for a small group of two or three pupils who will benefit from discussing the scale readings with each other. An individual pupil might also use the program. Pupils should be encouraged to count scale divisions on the screen and work out the value of each interval before 'measuring out' the ingredients.

As there are four recipes, teachers may want to tell pupils how many they should attempt before they start a particular session. Attempting all four at one sitting is probably not the best way of using this program. The recipes are listed in approximate order of difficulty although they could be tackled in any order.

Teachers should remind pupils to press **RETURN** after they input an answer and to report back when their session is completed.

## Follow-up work

Some pupils may be eager to try out the recipes for themselves. They should be warned that these particular ones have been adapted from real recipes to highlight scale reading difficulties and will not necessarily work out in practice. They would be better advised to use a recipe book.

Pupils who fail to cope with the scale reading in the program are in need of further teaching and practical measuring activities using scales.

For those pupils who use the program successfully but make occasional mistakes, practice on worksheets where readings are taken from drawn scales would be of benefit.

## Appendix 3: Recipes used in the program

### *Shortbread*

150 g flour  
25 g ground rice  
50 g caster sugar  
100 g butter

160°C    50 minutes

### *Butter Snaps*

100 g butter  
50 g caster sugar  
175 g flour

150°C    25 minutes

### *Bran Teabread*

75 g All Bran  
225 g sultanas  
250 g brown sugar  
175 g self-raising flour  
380 ml milk

190°C    1½ hours

### *Chocolate Fudge*

450 g caster sugar  
125 g grated chocolate  
50 g raisins  
280 ml water  
460 ml condensed milk

120°C    15 minutes





## Primary Mathematics Programs

These programs are part of a series for teaching and learning mathematics. They have been developed by the Scottish Primary Mathematics Group, authors of the famous *SPMG PRIMARY MATHEMATICS* scheme used with great enthusiasm in thousands of schools.

The programs are for the Acorn BBC Model B microcomputer (disc or cassette versions). 'Issue One' includes:

*Pack 1* **Metric units of weight plus Recipes**  
(2 programs)

*Pack 2* **Area** (2 programs)

*Pack 3* **Shape 1** (4 programs)

*Pack 4* **Postman** (1 program)

Each Pack is available individually, or as a combined **Issue One Pack**.

More information, or details of future Issues, can be obtained from:

SPMG Information Service  
The Windmill Press  
Kingswood  
Tadworth  
Surrey KT20 6TG



Heinemann Educational Books