SPRINGBOARD 6 LESSON 23
USING A CALCULATOR TO SOLVE PROBLEMS 1

TOTAL TIME

45 MINUTES

Objectives:

■ Use a calculator to solve problems, choosing the appropriate operation

■ Explain and record the solution to a problem

Vocabulary:

■ operation

■ 'Show your method'

By the end of the lesson the children should be able to:

■ explain the solution to a problem, identify and record the sequence of operations, and use a calculator to find and check their solution.

Resources:

■ calculators

■ OHP calculator

■ OHT 23.1

■ Activity Sheet 23.1

■ Activity Sheet 23.2

ORAL AND MENTAL STARTER

10 MINUTES

Show OHT 23.1, and give out calculators.

Explain that the OHT shows a set of prices for a range of different items. Point to each item explaining that you want the children to find out the cost of one apple, one golf ball, one metre of ribbon, etc. They can use their calculators.

Point to 6 apples.

Q: What is the cost of one apple?
Q: What operation did you use?

Invite a child to use the OHP calculator to demonstrate the calculation. Get the children to repeat the sequence on their calculators. Explain that the children are to describe their calculation in a sentence and give the cost of each item. Give as an example: **'The operation I used was divide by 6 to get an answer of 16p per apple.'**

Quickly repeat this process for one golf ball, one fence post, one spoon, and one fork.

Q: Which cost more, 4 spoons or 6 forks?

Discuss the children's methods and explore the following two methods:

Multiplying the cost of one spoon by 4 and the cost of one fork by 6.
Halving the cost of 12 forks and halving the cost of 8 spoons.

Agree that 4 spoons cost the same as 6 forks.

Q: How can we work out the cost of one metre of ribbon?

Discuss the children's answers and explore different methods.

Ask the children to decide for which of the items the cost of 'one' can be calculated without using a calculator.

Q: How can we work out the cost of one cucumber?

Q: How can we work out the cost of one minute of talk time?

Discuss the children's methods and establish how they can recognise when it is sensible not to use a calculator.

MAIN TEACHING ACTIVITY

Give out Activity Sheet 23.1. Ask the children to read the question carefully.

Q: What information can we enter in to the table?

Tell the children to work in pairs to enter the information from the question on to the table. Confirm that the whole first column, the first two cells of the second column, and the last cell in the end column can all be completed.

Use the following questions to help the children to complete the table. Invite the children to explain where they should record the answer to each question in the table. Say that for each question, even though the children can use their calculator, they should show their method of calculation in the box.

Q: How many calories did Sajit burn by running?

Q: How many calories did Sajit burn by cycling?

Q: How many calories did Sajit burn by rowing?

Discuss the children's methods and the calculation they used for each question. Establish that Sajit burned 132 calories by rowing.

Q: How many minutes did Sajit row for if she burned 132 calories?

Establish that Sajit rowed for 12 minutes and that the calculation the children should record in the 'Show your method' box is 132 ÷ 11.

Q: Where should we record the answer to this question?

Identify the box with a picture of a pencil next to it. Explain that this is the answer box and only the answer should be put here. Tell the children that they should record all their calculations in the larger 'Show your method' box.

Agree that 12 should go in the answer box and that this answer tells us that Sajit rowed for 12 minutes.

Give out Activity Sheet 23.2.

Explain that the children are to plan an exercise routine lasting for 25 minutes. The calories they burn each minute is the same as for Sajit. Say that they can choose to exercise for as long as they wish on each activity but they must each do some rowing, running, and cycling.

Tell the children to use the table to record how long they will exercise on each activity.

Get the children to work out how many calories they will burn for their exercise programme, recording their calculations in the 'Show your method' box.

PLENARY

Discuss the children's programmes and compare the number of calories burned.

Q: Who burned the most calories?

Q: Does the child who runs for the longest time burn the most calories?

Identify the child who has the longest exercise time for running and compare this with the other programmes.

> **Remember:**
> - Some calculations can be done easily without a calculator.
> - Use the 'Show your method' boxes to record your calculations.
> - Questions with tables and charts need reading carefully.

LESSON 23 RELATED TEST QUESTION
2002 TEST A (NON-CALCULATOR PAPER)

6

A shop sells greetings cards.

Each card has a price code on it.

These are the codes.

code	price
AA	75p
BB	£1.15
CC	£1.55
DD	£1.70
EE	£1.99

Tina buys two cards.

One card has code **AA** on it.
The other card has code **DD** on it.

How much does Tina pay?

£ [ ]

Omar buys a card. He pays with a £2 coin.

He gets 45p change.

What is the **code** on his card?

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GUIDANCE FROM MARK SCHEME

Question	Requirement	Additional Guidance
6a	£2.45	*Accept £2.45 **OR** £2 45*
		***Do not** accept £245 **OR** £245p*
6b	CC	*Accept 'C'*
		***Do not** accept £1.55*

ANALYSIS OF CHILDREN'S ANSWERS

Although question 6 on Test A was generally answered well, many children, particularly those working at level 3 used £.p notation unconventionally. For part (b), the most common incorrect answer given by level 3 children was BB. Too many of these children did not read the table correctly or could not work out the difference between £2 and 45p.

Part (a) of question 6 on Test B was answered well. Only one quarter of children working at level 3 were awarded both part (b) marks. Children used a variety of methods, including written column methods for multiplication and subtraction. Many children did not use a calculator method for part (b); they were confused by the instruction 'show your method'.

LESSON 23 RELATED TEST QUESTION
2002 TEST B (CALCULATOR PAPER)

6

A box of four balls costs **£2.96**

How much does each ball cost?

[ ]

Dean and Alex buy **3 boxes** of balls between them.

Dean pays **£4.50**

How much must Alex pay?

Show your **method**. You may get a mark.

£ [ ]

Question	Requirement	Additional Guidance
6a	74p **OR** £0.74	*Accept 74 **OR** 0.74 **OR** £0.74p **OR** 0 74 or £.74 **OR** £.74p **OR** £0 74 **OR** .74*
		***Do not** accept £74p **OR** £74 **OR** 0.74p*
6b	Award **TWO** marks for the correct answer of £4.38	*Accept for **TWO** marks £4.38p **OR** £4 38*
	If the answer is incorrect, award **ONE** mark for evidence of an appropriate method, e.g. 2.95 × 3 = 8.88 8.88 − 4.50	*Accept for **ONE** mark £438 **OR** £438p as evidence of an appropriate method. Answer need not be obtained for the award of the mark.*

IMPLICATIONS FOR PLANNING

Lessons should be planned to include the interpretation of information presented in tables. Children should be taught how to identify and highlight the information they need to answer the questions.

Children should be taught how to use the correct conventions for notation such as £.p.

Children should be presented with word problems that include more information than is necessary for solving the problem.

There should be planned teaching activities that involve the use of calculators, with children being taught how to record their calculations and methods of solution.