

## SPRINGBOARD 6 LESSON 24

### USING A CALCULATOR TO SOLVE PROBLEMS 2

**TOTAL TIME****Objectives:**

- Use a calculator to solve problems, choosing the appropriate operation
- Explain and record the solution to a problem

**Vocabulary:**

- perimeter
- area
- scale

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

- identify the information needed to solve a multi-step problem and the calculations required at each stage;
- record calculations when using a calculator.

**Resources:**

- calculators
- OHP calculator
- OHT 24.1
- Resource Sheet 24.1
- Activity Sheet 24.1

**ORAL AND MENTAL STARTER**

Give out Resource Sheet 24.1. Explain that this is a floor plan of a flat. Discuss the diagram and the meaning of 'Not to scale'.

**Q: How many doors and windows are there in the flat?**

Discuss the children's responses and explanations for the position of doors and windows.

Say that you are going to give the children some information about the flat and about some of the items in it. Tell the children that you want them to record this information on the Resource Sheet.

The dimensions of the flat are 16m by 9m.

The kitchen cost £3 500 to equip.

There are 3 plug sockets in each room, two in the hall and none in the bathroom.

The size of the dining room is 4m by 3m.

The carpet in the dining room cost £360.

The bathroom cost £2 100 to equip.  
 The size of the bathroom is 3m by 2m.  
 There is a radiator in each room, apart from the kitchen and hallway.

Explain that you want them to use their Resource Sheet to answer the following questions:

**Q: How much did the kitchen and bathroom cost altogether?**

**Q: How many radiators are in the flat?**

**Q: How many plug sockets are in the flat?**

**Q: What is the perimeter of the flat?**

**Q: What is the area of the dining room?**

Collect and discuss the answers.

### MAIN TEACHING ACTIVITY



Show OHT 24.1 and give out Activity Sheet 24.1. Explain that not all of the information is on the Activity Sheet.

Ask a child to read question A.

**Q: What information do you think is missing?**

Establish that one piece of missing information is the amount of money Jason is paid for one hour's work.

Say that Jason is paid £5.60 each hour and ask the children to record this information on the Activity Sheet.

**Q: Can we answer the question now?**

Establish that we still need to know how many hours Jason worked during the week.

Tell the children that the working out boxes may give us some clues to the number of hours worked by Jason.

**Q: How many hours did Jason work on Monday?**

Agree that the number of hours worked by Jason on Monday was 8 hours.

**Q: How many hours did Jason work on Tuesday?**

Agree that the number of hours worked by Jason on Tuesday was 4 hours.

**Q: Over the week how many hours did Jason work?**

Agree that the number of hours worked by Jason was 31 hours.

**Q: What calculation should we carry out in the first working out box?**

Establish that the calculation should be  $5.60 \times 8$ . Get the children to record this

calculation in the working out box and then carry out the calculation using their calculators. Confirm their answer using the OHP calculator. Ensure that children recognise that entering  $5.60 \times 8$  and  $5.6 \times 8$  on the calculator give the same answers. Establish that the answer 44.8 on the calculator display is interpreted as £44.80 in the context of this problem.

Get the children to work in pairs to work out how much Jason was paid each day. Say that they should record their calculation in the working out boxes.

**Q: How much was Jason paid for his week's work?**

Agree that Jason was paid £173.60.

**Q: Where should we record this answer?**

Agree that it should go in the box at the bottom of the page.

**Q: Is there a way that we can check this answer using a different calculation?**

Remind the children that Jason has worked for 31 hours at an hourly rate of £5.60 and that the answer could be obtained by calculating  $£5.60 \times 31$ .

Explain to the children that this Activity Sheet is designed to help them set out the solution to a problem. Say that you now want them to work on a similar problem using the box below question B to record their calculations. Point out that this box is not set out in the same way and that the children will have to decide how they are going to set out their work.

Ask the children to read question B and get them to work on the question in pairs. Encourage them to set out their working in the box by breaking down the problem into steps, as in the previous problem. Use the following questions to support their working.

**Q: How do you work out the cost of 8 rolls of wallpaper?**

**Q: What is the cost of one of the rolls sold at half price?**

Discuss the children's recording of the problem and the steps they have developed. Establish that the calculation needed is  $4.80 \times 8 + 2.40 \times 3$ . Emphasise that they should always record their calculations even when they are using a calculator.

**PLENARY**



Return to the problem of Jason and the number of hours he worked. Explain that during one week he worked at the weekend. Explain that on a Saturday Jason is paid  $1\frac{1}{2}$  hours' wages for every hour he works and that on a Sunday he is paid 2 hours' wages for every hour that he works.

**Q: How much would Jason be paid if he worked 5 hours on Saturday and 6 hours on Sunday?**

Agree that the answer would be £109.20 and discuss the children's methods.

Say that one weekend Jason was paid 20 hours' wages.

**Q: How many hours could Jason have actually worked on Saturday and Sunday?**

Establish that there are many solutions to this problem. For example, he could have worked 4 hours on Saturday and 7 hours on Sunday. Discuss the children's responses.

**Remember:**

- Read the question carefully to make sure you understand what calculations to do.
- Word problems often require several steps, always write the calculation down for each step.
- Show all your steps in the 'Show your method' box.

**LESSON 24 RELATED TEST QUESTION  
2002 TEST A (NON-CALCULATOR PAPER)**

4

Asif, Vicky and Nita go to town by bus.

This is what they pay.



How much **more** does Nita pay than Asif?

Vicky then takes **another** bus from town to visit her auntie.

She pays **90p** on this bus.

How much has Vicky paid **altogether** for her two bus tickets?

**LESSON 24 RELATED TEST QUESTION  
2002 TEST B (CALCULATOR PAPER)**

14



The table shows the cost of coach tickets to different cities.

		Hull	York	Leeds
Adult	single	£12.50	£15.60	£10.25
	return	£23.75	£28.50	£19.30
Child	single	£8.50	£10.80	£8.25
	return	£14.90	£17.90	£14.75

What is the total cost for a **return** journey to York for one adult and two children?

How much **more** does it cost for two adults to make a **single** journey to Hull than to Leeds?

**GUIDANCE FROM MARK SCHEME**

Question	Requirement	Additional Guidance
4a	80p OR £0.80	Accept £0.80p OR 0.80 OR 80 OR £.80 OR £.80p OR £0 80 OR .80 OR 0 80 <b>Do not accept</b> £80p OR £80 OR £0.8 OR 0.80p
4b	£2.25 OR 225p	Accept £2.25p OR 2.25 OR 225 OR £2 25 <b>Do not accept</b> £225p OR £225

Question	Requirement	Additional Guidance
14a	£64.30	Accept £64.30p OR £64 30 <b>Do not accept</b> £6430 OR £6430p OR £64.3
14b	£4.50	Accept £4.50 OR £4 50 <b>Do not accept</b> £450 OR £450p OR £4.5 If the final '0' is missing from both answers, ie answers given are £64.3 and £4.5 respectively, award <b>ONE</b> mark only in 14b.

**ANALYSIS OF CHILDREN'S ANSWERS**

- Nearly half the children working at level 3 answered question 4, part (a), correctly. A common wrong answer was 60p, the difference between the costs of Asif's and Vicky's tickets. Another was 90p, suggesting an incorrect calculation. Part (b) had more correct answers but there was further evidence that the wrong information was used by children.
- A significant proportion of children at all levels used a written method to answer both parts of question 14. A common error on part (a) was to calculate the fare for one child, not two. Children were less successful when answering part (b). A common error was to find the difference in cost for one adult. A high proportion of children working at level 3 gave no answer to part (b).

**IMPLICATIONS FOR PLANNING**

- Lessons should be planned to develop children's skills at reading and re-reading questions carefully and interpreting the information accurately. Word problems provide the opportunity to introduce children to unfamiliar vocabulary.
- Children should be presented with questions that have incomplete or missing information to focus their attention on what is needed and what can be discarded.
- Children should be encouraged to highlight or underline key words in questions.
- Children should be taught how to record the calculations needed for each step when using a calculator to solve a multi-step problem.