

SPRINGBOARD 6 LESSON 6 PROBLEM SOLVING 2

TOTAL TIME

30
MINUTES

Objectives:

- Develop calculator skills and use a calculator effectively

Vocabulary:

- round up
- round down

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

- solve problems in context using a calculator;
- interpret a calculator display when solving problems such as – ‘196 children and 15 adults went on a school trip. Buses seat 57 people. How many buses are needed?’

Resources:

- Resource Sheets 6.1 and 6.2

ORAL AND MENTAL STARTER

5
MINUTES

Give the children Resource Sheet 6.1.
In pairs, ask them to sort the questions into three sets.

Q: Which questions can you do in your head?

Q: Which questions definitely require a calculator?

Q: Which questions are you less sure you can do mentally?

Emphasise that ‘mentally’ can include jottings or working out.

Q: Which questions would we definitely answer mentally?

Discuss the questions the children suggest and ask for their mental methods. Ask the children if they needed to make any jottings to explain their methods.

Q: Which questions would we definitely answer using a calculator?

Discuss the questions and ask the children why they need a calculator.

Discuss any remaining questions in turn to establish whether any of the children can offer a mental method. Identify the questions that you would want the children to answer using mental strategies, e.g. 15% of £4.80. Emphasise those mental strategies that are appropriate for such questions and the role of jottings.

MAIN TEACHING ACTIVITY

Refer to Question 4 on the Resource Sheet 6.1. Read it through with the children.

Q: What information is in the question?

Get the children to identify the costs of the tickets and discuss the separate cost for the 7 adults and the cost for the 17 children.

Q: What calculation do we need, to find the total cost for the 7 adults?

Discuss the operation required and record: $£3.60 \times 7$. Establish that this is less than $£28$ ($£4 \times 7$).

Q: What calculation do we need, to find the total cost for the 17 children?

Discuss the operation required and record: $85p \times 17$ children. Establish that this is less than $£17$ ($£1 \times 17$).

Q: What do we need to do now to answer the question?

Get the children to describe the steps, adding the cost for the adults to the cost for the children and that the total will be less than $£45$ ($£28 + £17$).

Now ask the children to use their calculators to calculate the cost for 7 adults.

Q: What is the cost for 7 adults?

Ensure children can interpret 25.2 on the calculator as $£25.20$. Record the answer.

Q: What would 25.7 and 25.07 on the display mean if the answers are in pounds?

Check that children can interpret these correctly.

Q: What is the cost for 17 children?

If the children produce a display of 1445, establish that this is a number of pence and that to get the answer in pounds we need to enter 85p as 0.85. Alternatively, divide 1445 by 100 to change the pence into pounds. Record the answer.

Q: What is the total cost for the tickets?

Record $£25.20 + £14.45$ and work through the addition with the children.

Compare the answer $£39.65$ to the estimate of $£45$.

Give the children Resource Sheet 6.2. In pairs, get the children to answer each question in a sentence and show their working to each part.

Work through the question on Resource Sheet 6.2 with the children. Discuss what they record and what methods they use. Establish that two steps are required to solve it.

PLENARY



Present the following two questions on the board.

'300 children are going on a trip by coach. Each coach can hold 45 children. How many coaches are needed?'

'Sarah has saved £48. How many posters can she buy for £3.75 each?'

Ask the children how they would solve these problems, and record their suggested calculations on the board.

Q: What estimates could we make for each question?

Discuss possible estimates such as $300 \div 50 = 6$ coaches and $48 \div 4 = 12$ posters. In each case discuss whether the children think the estimate is too small or too big.

Get the children to carry out the calculations using a calculator:

$300 \div 45 = 6.6666666$ coaches; $48 \div 3.75 = 12.8$ posters. Discuss each in turn.

Q: What does 6.666666 coaches mean?

Establish that the answer means 6 coaches are not enough by calculating 6×45 . Explain that we need to round up.

Q: Does 12.8 posters mean that Sarah can buy 13 posters?

Establish that Sarah does not have enough money to buy 13 posters by calculating $13 \times £3.75$. Explain that we need to round down.

Remember:

Always re-read the question to decide if you round the answer on the display up or down. Always check you are right by doing another calculation.

LESSON 6 RELATED TEST QUESTION
2000 TEST B (CALCULATOR) PAPER

9



Chris saves **50p** coins.
 He has saved **45** of them.

How much money has Chris saved?

1 mark

Michelle has saved **£8.40** in **20p** coins.

How many **20p** coins does Michelle have?

2 marks

MARK SCHEME

(a) £22.50 **OR** 2250p

Accept £22.50p **OR** 22.50 **OR** 2250 **OR** 22.50. **Do not** accept £2250 **OR** £22.5.

1 mark

(b) Award **TWO** marks for the correct answer of 42.

If the answer is incorrect, award **ONE** mark for evidence of appropriate method, e.g.

$840 \div 20$ **OR** $8.4 \div 0.2$.

Accept for **ONE** mark, £42 **OR** 42p as evidence of an appropriate method.

Answer need not be obtained for the award of the mark.

No method mark is awarded for $8.40 \div 20$ alone.

Up to 2 marks

ANALYSIS OF CHILDREN'S ANSWERS

- Children think that 'show your method' means that they must not use the calculator.
- Children demonstrated that they could use the calculator for calculating amounts but then misinterpreted the answer displayed on the calculator.
- There were children who used efficient written methods rather than an appropriate calculator method.

IMPLICATIONS FOR PLANNING

- In lessons where calculators are available, children should be encouraged to record those calculations they carried out.
- Oral and mental starters should include calculator-based activities where children discuss their methods and solutions.
- Calculator lessons should include time for children to interpret calculator displays for unit conversions, time and money calculations.
- Lessons should be planned to compare mental, written or calculator methods, and include teaching on the effective and efficient use of a calculator, in particular, emphasising how and when it should be used.