Unit 6B Spreadsheet modelling

ABOUT THE UNIT

In this unit children learn to use a spreadsheet to explore a mathematical model.

Children will be taught to use formulae in spreadsheets to answer 'what if ...?' questions. They will explore how changes in a spreadsheet affect results and identify simple rules.

Children will apply what they have learnt in this unit when exploring mathematical and scientific models.

WHERE THE UNIT FITS IN

This unit builds on Unit 5D 'Introduction to spreadsheets'.
This unit assumes that children:
- can calculate total costs
- can recognise number patterns
- know the formula for the area of a rectangle.

TECHNICAL VOCABULARY

- spreadsheet
- cell
- formula
- calculate
- data
- model

RESOURCES

- spreadsheet software
- a variety of receipts

EXPECTATIONS

at the end of this unit

most children will: explore the effects of changing data in a spreadsheet

some children will not have made so much progress and will: use a spreadsheet to calculate totals

some children will have progressed further and will: explore the effects of changing data in a spreadsheet; make predictions and use a spreadsheet to test them

QCA

LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES	LEARNING OUTCOMES	POINTS TO NOTE

SETTING THE SCENE

CHILDREN SHOULD LEARN

- **key idea:** that mathematical models can be explored using a spreadsheet

◆ Remind the children about their earlier work with spreadsheets and discuss mathematical investigations they have carried out. Tell them they are going to use a spreadsheet to explore a mathematical problem.

CHILDREN

- understand that spreadsheets can be used to explore mathemetical models

SHORT FOCUSED TASKS

- **technique:** to identify formulae and enter them into a spreadsheet

◆ Remind children how to enter a formula into a spreadsheet, such as '=c2/c3'. Ask the children to identify the formulae they would need to enter to calculate:
  – the area of a rectangle;
  – the perimeter of a rectangle.
◆ Ask the children to set up a spreadsheet to work out the area and perimeter of a rectangle. The length and width of the rectangle should appear so that the values can be changed.
◆ Ask the children to explore what happens when the data in the two cells is changed.

- identify and enter the correct formulae into cells, modify the data, make predictions of changes and check them

Children who find the work difficult could be given a prompt sheet showing cell references.

More able children could try more complex formulae such as '=2*(10–c2)' to find the lowest values.

- **technique:** to copy cells

◆ Show the class how to copy fomulae from one cell to another. Ask the children to create a set of multiplication tables such as:

number A	number B	number A x number B
4	1	4
4	2	8

The spreadsheet should extend number B to 12. Ask the children to investigate changing number A.

- copy formulae to create tables of results

Children could be shown how to use and copy a formula such as '=C3+1' to produce a second column of figures.

- **technique:** to use a spreadsheet to draw a graph

◆ Show the class how to create graphs using the spreadsheet. Ask the children to investigate graphs such as $y = x^2$, $y = 2x$, $y = x + 3$.

- create graphs

INTEGRATED TASK

- to change the data and formulae in a spreadsheet to answer 'what if ...?' questions and check predictions

◆ Ask the children to use a spreadsheet model to find out the maximum area that can be included in a rectangular field of fixed perimeter. Ask them to set up formulae in a spreadsheet and to try whole numbers for one side first. Ask them to look at a graph of the areas to see where the maximum point is.

- create and use a spreadsheet to identify an optimum shape

Children may guess that the answer is a square, but they should be encouraged to list their predictions using the spreadsheet model.

More able children could be given a perimeter which produces side lengths which are not whole numbers.