



## Unit 6B: Spreadsheet Modelling

### About this 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 this 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.

### Vocabulary:

Spreadsheet | cell | formula | calculate | data | model

### Resources:

Spreadsheet software | a variety of receipts

### Expectations: at the end of this unit,

*Most pupils will be able to:* explore the effects of changing data in a spreadsheet.

*Some pupils will only be able to:* use a spreadsheet to calculate totals.

*Some pupils will also be able to:* explore the effects of changing data in a spreadsheet; make predictions and use a spreadsheet to test them.

*These units have been adapted from material available on the QCA Schemes of Work website*



Learning Objectives <i>Pupils should learn...</i>	Possible Activities	Learning Outcomes <i>Pupils can...</i>	Consider
<b>Setting the Scene</b> <ul style="list-style-type: none"><li>• <b>key idea:</b> that mathematical models can be explored using a spreadsheet</li><li>• 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.</li><li>• Understand that spreadsheets can be used to explore mathematical models.</li></ul>			
<b>Short Focused Tasks</b> <ul style="list-style-type: none"><li>• <b>technique:</b> to identify formulae and enter them into a spreadsheet.</li><li>• 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: <i>the area of a rectangle;</i> <i>the perimeter of a rectangle.</i></li><li>• 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.</li><li>• Ask the children to explore what happens when the data in the two cells is changed.</li><li>• Identify and enter the correct formulae into cells, modify the data, make predictions of changes and check them.</li><li>• Children who find the work difficult could be given a prompt sheet showing cell references.</li><li>• More able children could try more complex formulae such as '=2*(10-c2)' to find the lowest values.</li></ul>			

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Learning Objectives <i>Pupils should learn...</i>	Possible Activities	Learning Outcomes <i>Pupils can...</i>	Consider									
<b>Short Focused Tasks</b>												
<ul style="list-style-type: none"> <li>• <b>technique:</b> to copy cells.</li> </ul>	<ul style="list-style-type: none"> <li>• Show the class how to copy formulae from one cell to another. Ask the children to create a set of multiplication tables such as:</li> </ul> <table border="1" data-bbox="645 580 1167 687"> <thead> <tr> <th>number A</th> <th>number B</th> <th>number A x number B</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>1</td> <td>4</td> </tr> <tr> <td>4</td> <td>2</td> <td>8</td> </tr> </tbody> </table> <p>The spreadsheet should extend number B to 12. Ask the children to investigate changing number A.</p>	number A	number B	number A x number B	4	1	4	4	2	8	<ul style="list-style-type: none"> <li>• Copy formulae to create tables of results.</li> </ul>	<ul style="list-style-type: none"> <li>• Children could be shown how to use and copy a formula such as '=C3+1' to produce a second column of figures.</li> </ul>
number A	number B	number A x number B										
4	1	4										
4	2	8										
<ul style="list-style-type: none"> <li>• <b>technique:</b> to use a spreadsheet to draw a graph.</li> </ul>	<ul style="list-style-type: none"> <li>• Show the class how to create graphs using the spreadsheet. Ask the children to investigate graphs such as <math>y = x^2</math>, <math>y = 2x</math>, <math>y = x + 3</math>.</li> </ul>	<ul style="list-style-type: none"> <li>• Create graphs.</li> </ul>										
<ul style="list-style-type: none"> <li>• to change the data and formulae in a spreadsheet to answer 'what if ...?'</li> <li>• questions and check predictions.</li> </ul>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Create and use a spreadsheet to identify an optimum shape.</li> </ul>	<ul style="list-style-type: none"> <li>• Children may guess that the answer is a square, but they should be encouraged to list their predictions using the spreadsheet model.</li> <li>• More able children could be given a perimeter which produces side lengths which are not whole numbers.</li> </ul>									

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Learning Objectives Pupils should learn...	Possible Activities	Learning Outcomes <i>Pupils can...</i>	Consider
<b>Assessment Task</b>			
<ul style="list-style-type: none"> <li>• <b>key idea:</b> that mathematical models can be explored using a spreadsheet.</li> <li>• technique: to identify formulae and enter them into a spreadsheet.</li> <li>• to copy cells.</li> <li>• to use a spreadsheet to draw a graph.</li> <li>• to change the data and formulae in a spreadsheet to answer 'what if ...?' questions and check predictions.</li> </ul>	<ul style="list-style-type: none"> <li>• Ask the children to use their knowledge of spreadsheets to help them run a fruit tuck shop at the school.</li> <li>• They could list the fruit on offer and the days of the week the shop was open. Formulae could be entered on the cost of each item, the amount sold, the profit made on each type of fruit etc. They could look for patterns, which is the most popular, least popular etc. Graphs could be drawn and questions answered such as, what would happen if the cost of a particular fruit was increased/decreased, if the days were reduced which ones take the most/least money. Is that a pattern that is consistent from week to week? etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand that spreadsheets can be used to explore mathematical models.</li> <li>• Identify and enter the correct formulae into cells, modify the data, make predictions of changes and check them.</li> <li>• Copy formulae to create tables of results.</li> <li>• Create graphs.</li> </ul>	<ul style="list-style-type: none"> <li>• A similar exercise could be done with ticket sales for a school concert. Where the Year 6 children keep a spreadsheet for the whole school. They enter Year Groups and times for the concert and work out, totals for each performance, profit from ticket sales, which class sold the most, how many chairs are needed for each event. If one performance is full how many spaces are left in others and when etc.</li> </ul>

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