



Modelling & Simulation

Levelled Examples



Context:

Children used spreadsheets to identify patterns and relationships and answer 'What if?' questions.

What the children did:

Children created a spreadsheet to calculate the area and perimeter of different rectangles, using simple formulae.

e.g. $\text{area} = B4 * C4$
 $\text{perimeter} = (B4 + C4) * 2$

They used the spreadsheet to find the maximum area of a rectangle with a perimeter of 20cm.

	A	B	C	D	E
1	Area and perimeter of rectangles				
2					
3		Length (cms)	Width (cms)	Area (cms ²)	Perimeter (cms)
4		1	10	10	22
5		2	10	20	24
6		3	10	30	26
7		4	10	40	28
8		5	10	50	30
9		6	10	60	32
10		7	10	70	34
11		8			

$= (B4 + C4) * 2$

What the children said:

What length and width do we need to get a perimeter of 20cm?

Let's try all our number bonds to 10.

Pupils should:

- Know how to enter formulae, change data and predict the results.
- Know how to edit formulae.
- Know how to format cells to fix the number of decimal places.
- Know how to set up a spreadsheet to model a mathematical investigation.
- Know how to use the spreadsheet model to answer questions.

Next steps:

- Know how to adapt, or create a new model to answer new questions.
- Be able to develop a hypothesis and create a spreadsheet model to test it.

Suggested resources:

Spreadsheet software e.g. Microsoft Excel, Textease Spreadsheet, 2Investigate, 2Calculate, Number Magic

Example Cross Curricular Activities:

- Explore the relationship between area and perimeter using a spreadsheet (Mathematics).
- Create function machines in a spreadsheet to help younger children with their problem solving (Mathematics).
- Plan a family holiday or school trip, taking into account the cost of travel and accommodation at different times of year (Mathematics / Geography).
- Model the potential profit / loss in running a school fruit shop (Mathematics / PSHE).
- Create a spreadsheet to record the findings of an investigation of forces, to predict the effect of changes variables and test a hypothesis (Science).

Attainment target for ICT

Level 3

Pupils use ICT to save information and to find and use appropriate stored information, following straightforward lines of enquiry. They use ICT to generate, develop, organise and present their work. They share and exchange their ideas with others. They use sequences of instructions to control devices and achieve specific outcomes. They make appropriate choices when using ICT based models or simulations to help them find things out and solve problems. They describe their use of ICT and its use outside school.

Level 4

Pupils understand the need for care in framing questions when collecting, finding and interrogating information. They interpret their findings, question plausibility and recognise that poor quality information leads to unreliable results. They add to, amend and combine different forms of information from a variety of sources. They use ICT to present information in different forms and show they are aware of the intended audience and the need for quality in their presentations. They exchange information and ideas with others in a variety of ways, including using email. They use ICT systems to control events in a predetermined manner and to sense physical data. **They use ICT based models and simulations to explore patterns and relationships, and make predictions about the consequences of their decisions.** They compare their use of ICT with other methods and with its use outside school.

Level 5

Pupils select the information they need for different purposes, check its accuracy and organise it in a form suitable for processing. They use ICT to structure, refine and present information in different forms and styles for specific purposes and audiences. They exchange information and ideas with others in a variety of ways, including using email. They create sequences of instructions to control events, and understand the need to be precise when framing and sequencing instructions. They understand how ICT devices with sensors can be used to monitor and measure external events. They explore the effects of changing the variables in an ICT based model. They discuss their knowledge and experience of using ICT and their observations of its use outside school. They assess the use of ICT in their work and are able to reflect critically in order to make improvements in subsequent work.