

## Progression guide for models and modelling (Developing ideas and making things happen)

Concepts	Aspects of level	Models and modelling aspect of National Curriculum level description	Expansion of level description	Illustration What might pupils do?
		Key characteristics of National Curriculum level		
				<ul style="list-style-type: none"> <li>• They compare model results to a previous year's figures.</li> <li>• They investigate the relationship between increased ticket price and the number of tickets sold.</li> <li>• They create a simulation of a hall seating plan for booking seats.</li> <li>• They calculate how many tickets can be sold for one performance (remembering fire regulations and how many people can be accommodated in the hall).</li> <li>• They consider whether seats can be numbered so that people can book the front row.</li> </ul>
<p><b>Scope:</b> Model parameters are identified, e.g. rules; variables and assumptions made; efficient methods of testing including user feedback and validity checks.</p>	7	<p>They design ICT-based models and procedures with variables to meet particular needs.</p> <p><b>Scope, define, implement and refine, audience and user feedback.</b></p>	<p>Pupils scope and choose appropriate ICT tools to provide answers required to solve a problem, by the creation of a model. Pupils can define the problem to identify variables, the relationships between variables and the outcome, and the type of outcome relevant to the audience. Various scenarios are identified that will enable extensive testing of the model. Input (preferably regular) – process – testing – output.</p> <p>Pupils might automate test data generation to test and refine the model, e.g. randomised data is produced repetitively by using macros. The model is also refined from user feedback, e.g. the user interface may be designed with dropdown menus for ease of use.</p> <p>Assumptions are explicitly expressed, e.g. the birth rate of rabbits is a constant % of the population.</p>	<ul style="list-style-type: none"> <li>• Pupils further develop the financial plan and hall seating system in order to combine them. The ticket booking system would need to meet criteria identified initially by an external user and be effectively tailored to the needs and requirements of that user.</li> <li>• Assumptions can also be drawn out, i.e. people tend to buy tickets in pairs, very few single tickets are sold, people want to sit next to each other – and the effect on how tickets are sold, ratio of adults and children buying tickets, etc. (See case study 9.3.)</li> </ul>