

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 Key characteristics of National Curriculum level	Expansion of level description	Illustration What might pupils do?
<p>Rules: Pupils understand the overall structure of a model is determined by the rules (formulae) of the model and make simple models.</p>	5	<p>They explore the effects of changing the variables in an ICT-based model.</p> <p>Combining the features of a model to understand the overall structure.</p>	<p>Pupils understand the overall structure of the model, variables and rules, and that rules govern the behaviour of a model. They organise data suitable for processing.</p> <p>Pupils create simple models using a range of variables. Pupils understand that changing data (data within variables and variables themselves) can change the way in which the model behaves and pupils can predict some of the effects of these changes.</p>	<ul style="list-style-type: none"> Set up or alter variables within a model to compare the relative cost of different mobile phone providers (Unit 8.4 lessons 2, 3).
<p>Validity: Pupils improve the validity and efficiency of models by: varying rules; and comparing results with other reliable data sources.</p>	6	<p>They use ICT-based models to make predictions and vary the rules within the models. They assess the validity of these models by comparing their behaviour with information from other sources.</p> <p>Integration and efficiency of model by critical evaluation.</p>	<p>Pupils create models to solve a given task and explore validity by changing variables and rules. Pupils identify appropriate information sources to compare with the model behaviour.</p> <p>Pupils understand that a model consists of three main stages, input data, process of data (rules) and output (charts, data, etc.). The type of output data is considered in relation to the audience, e.g. a report on the profitability of a fundraising venture includes forecasts of various scenarios (line charts). Linking these charts from the report to the model allows changes in the model to be efficiently integrated into the report.</p>	<ul style="list-style-type: none"> Pupils may use absolute variables to increase efficiency, e.g. an absolute cell reference for VAT enables the whole model to be updated quickly with various VAT rates. (National Curriculum in Action). From case study 9.3: Pupils set up a financial plan based around a theatre booking system to model ticket pricing. The plan includes information on possible income and expenditure to be available on the school intranet or a file in the school library (so that pupils are finding information for themselves). (Bearing in mind that the production must not make a loss) pupils decide what price to set for the tickets. Pupils investigate the effect of different prices for seats. They consider the impact of a pricing structure depending on age/income. They ascertain the costs involved.