Lesson Plan

Date	
Period	
Class	Year 8:
Lesson	Lesson 1 – Introduction to modelling

Context of the lesson Where this fits into the "Big Picture"	In this unit Students are given the opportunity to revisit spreadsheets and remind themselves about the functionality and formulas covered in Year 7. This is an introductory lesson to remind students about using spreadsheets. It also provides the opportunity to assess their knowledge. Students are given the scenario of a school fete. They are asked to use the model to help them seek various solutions. They are introduced to the concept of 'goal seek'	
MLO for this lesson. What will pupils know/understand by the end of the lesson (teacher)	*Know:* The various components of a spreadsheet. *Understand:* How to use 'Goal Seek' *Be able to*: Use a model to test out different solutions	
MLO for this lesson. What will pupils know/understand by the end of the lesson (pupil)	*All pupils will:* Be able to use a spreadsheet and model at least one different scenario *Most pupils will:* Be able to use Goal Seek in order to solve a problem *Some pupls will*: Be able to clearly explain why Goal Seek is a suitable tool for use in spreadsheet modelling	
Teacher input/Activities. What the pupils should undertake with approximate timings.	<u>Introduction to the project</u> Explain to pupils that they are going to do a short project on spreadsheets. Explain that they have a short task to do to see how much they remember about spreadsheets from year 7. Hand out a copy of 'spreadsheet activity.doc' to all students. They should work on this individually. Go through the answers with the class.	7.5 mins
	<u>Teacher led discussion</u> Find out what pupils know by asking them to explain what they understand a model to be. If necessary, prompt by saying that • a model is a tool that enables you to put different data into the system and look at the outcomes this produces; • a model is a tool you can use to ask 'What if…?' questions by changing variables or formulae. Tell pupils that they can use a spreadsheet for modelling. Remind them that the benefits of using spreadsheets to create a model are: • speed; • accuracy; • automatic calculations; • the data put into the spreadsheet can be changed easily. Explain to pupils that in this unit they will learn: • to use a spreadsheet to generate models; • to ask questions of the models in order to analyse and present data; • to use techniques to generate more effective models; • to understand the relationship between input and output values in a model; • to discuss other types of modelling that can be used to simulate different events. Explain the objectives for this lesson.	5 mins

	Teacher led demonstration Ask pupils to load **School fete.xls** from the shared area. Show the same file on the large display and point out the cells containing money coming in, the cells with the costs to the organisers, the estimated number of people coming to the fete and the cell with the formula that calculates the overall profit or loss. As you indicate the different cells in the model, check pupils' understanding of the spreadsheet functions by asking selected pupils to say whether cells contain numeric data, labels or formulae. Ask pupils to identify which cells contain variables – numeric data that can be changed to different values. Check that pupils understand what is meant by income, expenditure, profit and loss.	5 mins
	Individual task Distribute **School fete worksheet.doc**. Say that this contains questions about how the model works and how it can be interrogated by changing the variables and asking 'What if…?' questions. Demonstrate how changing a variable will cause other values in the model to be recalculated, by changing the number of people who are expected to attend. Point out that the model now gives different figures for income and profit. Say that at the end of the lesson you will ask them about the effectiveness of this model and, as they work, they should think about this. As pupils work, circulate to assess their understanding. Ask these questions. • Which cells contain data, labels or formulae? • Which cells are dependent on other cells? • Which variables can be changed in the model? What does this tell us? • What other questions could we ask?	10 mins
	Answers to the worksheet Bring the class back together to check and discuss answers to the worksheet. Ask selected pupils to explain their 'What if…?' questions and to describe how they changed the model to find the answer. Demonstrate on the large display as each pupil explains the procedure. Ask other pupils to check if this is correct. Prompt for further explanation if the procedure is not clear. Before moving on to the next activity, ensure that you have explored the last 'What if…?' question with pupils. Check that the pupils understand that a good 'guesstimate' can be used as a starting point in the model for 'What if…?' questions and that a model is able to refine this 'guesstimate'.	5 mins.
	Teacher led demonstration on goal seek Ask pupils what they thought about the trial-and-improvement method for finding the break-even number of people. If necessary, prompt them by saying: • it can be slow getting to the answer; • it can be tedious; • it can be difficult to find a starting point. Tell pupils that, although they could use trial and improvement, spreadsheet software has tools that are more efficient. Explain that the Goal Seek… function in Microsoft Excel is one example. Demonstrate the Goal Seek… function by using it to calculate the number of people required to make neither a profit nor a loss at the school fete. Ask pupils to reflect on the processes which the spreadsheet is carrying out by asking these questions:	7.5 mins

	• What do you think is happening when the Goal Seek… function starts? • What do you think the message means when it indicates that Goal Seek… has 'found a solution'? • How do you think it found this solution? • Consider the answer it produces [128.6923077]. Can this be right? • Why do you think it produces an answer of a part of a person? • What are some of the limitations of using a computer model? Paired task Distribute **Goal seek.doc**. Ask pupils to think about the question. Ask a pupil to explain which cells will need to be changed. Ask another pupil to explain how to use the Goal Seek… function. Demonstrate on the large screen. Tell pupils to work in pairs, using the Goal Seek… function to complete the other questions. Go through the answers with the class	12.5 mins
Review/Summary At least 5 minutes before end.	Plenary: Reviewing the model Ask pupils to consider what makes a good model. Possible answers may include that it: • is easy to use; • is accurate; • simulates a real situation; • simulates a real situation which answers some questions. Ask pupils to reflect on the school fete model they have been using. Ask these questions. • Do you think the school fete model is a good model? • How accurate is it? • How could we find out? • How could it be improved? Draw out the following points. • The accuracy could be checked by trying out the model with test data. • It would be easy to add new variables, for example, to calculate income and purchases. • The rules of the model could be extended to take account of other factors such as weather, advertising and past enjoyment. • The model is limited because it is assumed that people will spend equal amounts or undertake the same activities. The accuracy could be checked by comparing the model with a real school fete	7.5 mins
Extension work	Find out how an IF..then statement can be used to indicate if a condition has been met: http://www.teach-ict.net/software/excel/with_sound/formula/if.html	
Homework	Using screen prints and instructions, create a help sheet to show year 7s how to use Goal Seek	
Materials required	• Spreadsheet activity.doc • Spreadsheet activity answers.doc • School fete.xls • School fete.doc • Goal seek.doc	