

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

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**Cambridge ICT Starters
Next Steps**

Scheme of Work

4280
Exploring Spreadsheets
Stage 1 Module



UNIVERSITY *of* CAMBRIDGE
International Examinations

Introduction

In this module, students are introduced to spreadsheet software. They learn to enter data, text and formulae into cells. They copy data, replicate formulae and understand that spreadsheets carry out calculations automatically. They learn to use spreadsheet software to create graphs or charts. They begin to understand the power of spreadsheets for modelling situations and how data and formulae can be modified to test out predictions or work out what happens when something is changed.

What is Assessed in This Module?

Students will demonstrate how to:

- enter labels and numbers into a spreadsheet
- enter simple formulae, including SUM
- copy formulae
- use the 'show formula' option
- check for accuracy in their spreadsheets
- create a graph
- modify data
- use a spreadsheet to answer a modelled scenario ('what if')

To Start This Module You Will Need

- any spreadsheet software can be used to deliver this module including MS Excel or the spreadsheet from AppleWorks
- prepared example spreadsheets
- prepared data for entering into spreadsheets
- formula crib sheet – showing the format for simple formulas

Underpinning Knowledge

Before commencing this module it is recommended that students have

- basic mathematical knowledge of formulae
- the ability to copy and paste
- the ability to use the keyboard to enter text and data accurately
- the ability to retrieve stored work

General Principles and Procedures

The following are further suggestions and considerations:

- some students may need some support when using simple formulas in the spreadsheet and in understanding the order of operations or use of brackets or selections
- problems which require students to go through several stages of working should be delivered in stages
- as a matter of good practice students should be encouraged to use titles/labels to describe the data in the rows and columns of their spreadsheet
- students will benefit from practising on spreadsheets which have a meaningful context
- it is advisable to explain fully what information a spreadsheet displays, as this is not always obvious to a student
- encouraging students to discuss with each other what a particular formula is doing will help them to understand the spreadsheet they are creating
- students may also benefit from the teacher taking time to show and discuss how formulae change when they are copied to a new location

- students can be shown the 'show formulae option' to assist in checking formulae
- this module can be linked with subjects like Mathematics where, for example, spreadsheets can be used for solving formulae by trial and error
- encouraging students to adopt good routines for checking data entry and formulas will help improve the accuracy of their work e.g. enter data, check each row and tick if correct. Use a calculator to verify whether a formula has been entered correctly
- using correct terminology when discussing spreadsheets will reinforce learning and improve students' familiarity with the software
- when dealing with money, it may be necessary to change the default options in the spreadsheet software to match the currency that students are used to. Also, when dealing with decimals (full stop or comma? and the number of decimal places?) the spreadsheet will need to reflect what the student is used to. The students are not required to be able to change this for themselves. Saving a working template with all the required settings should help to address this problem

Scheme of Work

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan One			
<ul style="list-style-type: none"> become familiar with the look of a spreadsheet recognise key terminology move around spreadsheet 	<ul style="list-style-type: none"> teacher demonstrates key features and terminology used in spreadsheets: introduce the terms 'cell', 'row', and 'column' to practise using cell references students can: <ul style="list-style-type: none"> play a game to be the first to place a number in the correct cell e.g. put the number 100 in X10 answer questions e.g. What is the last row or the last column? play a game (in pairs) of 'Battleships'. Set the boundaries e.g. A;20 – H;20. Each student picks three cells and writes down the references. Students take it in turns to call out references until all three cells have been hit (battleships sunk) 	<ul style="list-style-type: none"> prepared games 	<ul style="list-style-type: none"> using the correct terminology when talking about spreadsheets will help students adopt the new terms more quickly students often find it interesting to locate boundaries, e.g. looking for the last cell reference on a spreadsheet or discussing what happens to the references once the alphabet is used up e.g. what comes after z1 playing games can help students discover new skills e.g. how to get to cell reference by typing it into the navigation box rather than moving the cursor

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan Two			
<ul style="list-style-type: none"> • enter data and text into cells • use the SUM formula (or button) 	<ul style="list-style-type: none"> • students copy a shopping list into the spreadsheet software • students use cell formatting to change the way their shopping list looks e.g. add colour to cells, or change the text colour • teacher demonstrates the SUM formula (or button) to show how the shopping list can be added up to give the number of items on the shopping list • demonstrate the 'show formula' option – so that students can 'see' what the SUM formula is doing • students practise this by entering other lists: <ul style="list-style-type: none"> - how many hours per week they watch TV or do homework (this would give 7 rows - one for each day of the week and 2 columns) • this could be followed up by a larger class activity collating all the data from the whole class in a new spreadsheet 	<ul style="list-style-type: none"> • a shopping list (items and quantity) • ideas for other lists 	<ul style="list-style-type: none"> • students may need to be shown how to make cells bigger or change the colour of cells and text – these are relatively easy skills which the students enjoy to use • it will help the students to understand the benefits of using a spreadsheet if the subjects chosen for their lists are either relevant to other areas of study or cover topics that the students are interested in. This will also enable them to talk about what the totals mean • encourage students to talk about the results of any calculations, so that they get used to explaining in words what a particular calculation means e.g. 'this is how many items I have on my shopping list' • if using the SUM button, care needs to be taken with the mouse/cursor to prevent other references being included

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan Three			
<ul style="list-style-type: none"> • construct simple formulae • copy formula from one cell to another • copy formula to a range of cells 	<ul style="list-style-type: none"> • teacher demonstrates how to use formulae to add, subtract, multiply and divide. • students complete exercise sheet to solve problems using the four rules • students create a simple spreadsheet to work out the cost of different quantities of an item e.g. 3 columns quantity, cost & total; 1 pen is 15p so first row will be 1,0.15 so formula in C3 [= A2*B2] • students can use copy formula to fill in prices for all quantities up to 100 • students can check accuracy by asking each other questions like: 'how much for 37 pencils?' and checking other random entries with a calculator • students discuss how the copy formula function works • students practise this with other examples 	<ul style="list-style-type: none"> • formula sheet e.g. what an add formula looks like • exercise sheet with problems using the four rules involving large numbers • a list of questions to be asked from their spreadsheet e.g. how much does it cost for 75 pencils? 	<ul style="list-style-type: none"> • students can be shown how to enter numbers with decimal places, e.g. relating to recording currency and measurements • students will be encouraged to use 'copy' to a range of cells (for both cell contents and formula) if the number of items they have to work with is great

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan Four			
<ul style="list-style-type: none"> • create graphs • understand how to use a spreadsheet to answer 'what if' problems 	<ul style="list-style-type: none"> • students enter data from the class, such as: what is your favourite football team • students use the spreadsheet to create a graph which shows their results. Students discuss their results and draw some simple conclusions, like: 'x is the most popular' • the students modify their spreadsheet to answer questions like: 'what if 7 more students liked a certain team. Students make the necessary modifications to their spreadsheets and redraw the graph • students discuss how their spreadsheets and graphs have changed 	<ul style="list-style-type: none"> • some sample data 	<ul style="list-style-type: none"> • using text and headings on the spreadsheet in the appropriate places makes it easier to use and read and talk about results • there is a rich supply of data sources for schools on the internet which can be used to make data more interesting • starting with very simple 'what if scenarios' will help students develop the skills they need naturally

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan Four Continued			
	<ul style="list-style-type: none"> • students work on practical 'what if' problems using spreadsheets which contain formulae e.g.: <ul style="list-style-type: none"> - a toy manufacturer has created a new game but he needs to work out how much the game will cost to produce. The game requires different quantities of some parts (so that formulae will be needed). Students create and use a simple spreadsheet to work out the cost of a complete game - they should then modify their spreadsheet to answer: 'what if' the manufacturer can get the parts from another supplier for different prices – what's the new cost of the game? - they should then modify their spreadsheet to answer: 'what if' the manufacturer has left out packaging – what is the new cost of the game? - students talk or write about their findings: some simple summary statements like: 'the game costs...', 'if the toy producer uses the new supplier it will cost (more or less?)', 'if the producers add packages it will cost ...' 	<ul style="list-style-type: none"> • a list of parts and prices and quantities for producing a game 	

Assessment Activity

To show how the Assessment Idea fully incorporates the Learning Objectives tested, the Assessment Idea is cross-referenced with the Learning Objective table below.

Assessment Idea

For assessment of this module students can be provided with a partially completed spreadsheet for a real-life situation, such as the items and costs of food and drinks for a class party. Students can enter the remaining labels, data (1) and formulae to complete the spreadsheet. (2) They can produce a graph which shows some information from the spreadsheet e.g. a pie chart to show how the final cost is made up. (3) Merit students can be asked to modify an aspect of their spreadsheet (4) to answer a 'what if' question e.g. what if 5 more students came along? (5)

Stage 1 Module – Exploring Spreadsheets	
1	Enter labels and numbers into a spreadsheet
2	Enter and copy simple formulae
3	Create a graph
4	Modify Data
5	Use a spreadsheet to answer a modelled scenario ('what if')

Teachers should retain the following evidence for moderation:

- copy of original task
- students printed spreadsheet with formulas showing (or saved spreadsheet file)
- students modified spreadsheet and students answers to modelling scenario

Resource List

Books

Title	Author	Publisher	ISBN	Year
Excel 2002 Step by Step	Frye, C	Microsoft Press International	073561296X	2001

Websites

Microsoft Excel Product Resources Page :

<http://www.microsoft.com/education/default.asp?ID=Excel>

Office Tips for Teachers

<http://www.microsoft.com/education/default.asp?ID=ClassTips>

Spreadsheets and Maths (subscription site)

<http://www.mathsonline.co.uk/nonmembers/resource/spread/>

Becta - Modelling resources

<http://curriculum.becta.org.uk/docserver.php?docid=354>

Interactive Spreadsheets

<http://www.mathsnet.net/embedded/index.html>

Spreadsheet resources

<http://www.wgfl.westminster.gov.uk/wgfl/dir/show/allsouls/ssheets/ssheet.html>

Spreadsheet - A Variety of Activities!

<http://www.fi.edu/fellows/fellow4/may99/spreadsheet.html>

Computing Modelling - example spreadsheets

<http://www.devon.gov.uk/dcs/ict/models/index.html>

CD ROM's and Software

MS Excel – spreadsheet software	MS Office/Microsoft	
The Model Shop - graphical modelling	Sherston	http://www2.sherston.com/Products/ProductDetail.asp?ProdId=103
Textease Spreadsheet - spreadsheet software	Softease	http://www.textease.com/spreadsheet