

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

**Cambridge ICT Starters  
On Track**

Scheme of Work

4291  
Spreadsheets for a Purpose  
Stage 1 Module



UNIVERSITY *of* CAMBRIDGE  
International Examinations

## Introduction

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In this module students use spreadsheet software to create a working spreadsheet with a clear purpose. Students work methodically through a design and development process, being able to test, correct and modify the spreadsheet as they progress. They are able to create a final spreadsheet which suits its purpose and is presented in an appropriate way for its audience. They begin to understand how to evaluate their work and can assess how well their spreadsheet meets its objectives.

### What is assessed in this module?

Students will demonstrate how to:

- design a spreadsheet with a specific purpose
- create the spreadsheet
- enter data, text and formulae to a spreadsheet
- test the spreadsheet – check for errors and see that formulae are correct
- make corrections
- modify the spreadsheet to make it suitable for its purpose
- use titles, formatting and charts
- evaluate the spreadsheet: make suggestions for improvements and reasons for modifications

### 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
- variety of prepared spreadsheets showing a range of real life possibilities for spreadsheets
- variety of ideas for real life spreadsheets

### Underpinning Knowledge

Before commencing this module it is recommended that students

- have completed the Next Steps Module 'Exploring Spreadsheets' or know the basics of how to create a working spreadsheet
- understand that calculations can be represented as formulae

### General Principles and Procedures

The following are further suggestions and considerations:

- it can be a big leap for students to go from following instructions to designing and creating something by themselves and they will need to build up a number of skills to be able to do this
- students can find it difficult to be creative and to keep their ideas within their skills with the software. Practise and your guidance are essential so that students learn how to have ideas for spreadsheets which are achievable. This can be helped by providing tasks which are not too open-ended and which provide the student with easy options for spreadsheets
- the process the students go through to design, create, test, modify and evaluate a spreadsheet is complex, so the scenario (design brief) doesn't need to be. A simple working spreadsheet which suits its objective well and allows the student to fulfil all the Learning Objectives is better than a complex idea which the student finds difficult to create without support
- finding a meaningful real-life scenario for the spreadsheet which is of relevance and interest to the students is important and will help the students to know better what to include in their design

- although it is not essential for the assessment of this module, students may need to have knowledge of a wider range of functions to use within their spreadsheets. It would therefore be beneficial while practising to incorporate new functions into a relevant context, so that students can extend the possibilities for their spreadsheet design
- students are learning in this module how to design, test and evaluate their spreadsheets and may benefit from working with some formal methods (or at least within a structure) which could be provided by you or created by the group during lessons
- providing examples of good design, good testing methods and sound evaluation statements will help students to have clear objectives about what to produce
- encouraging regular 'User Testing' and class discussions will help students learn from each other

## Scheme of Work

Learning Objectives	Classroom Ideas	Resources	Notes
<b>Session Plan One</b>			
<ul style="list-style-type: none"> <li>• understand spreadsheets can be used to answer real-life questions</li> <li>• revise spreadsheet knowledge and skills</li> <li>• carry out basic calculations</li> </ul>	<ul style="list-style-type: none"> <li>• provide each student (or small groups) with a small bag of coloured sweets.</li> <li>• question:               <ul style="list-style-type: none"> <li>- which colour do you think is most common?</li> </ul> </li> <li>• students sort their sweets into colour groups and record the totals for each colour on a class chart</li> <li>• class discussion:               <ul style="list-style-type: none"> <li>- what questions do we want the spreadsheet to answer?</li> <li>- what information do we need to put in our spreadsheet? E.g. column headings, what data do we put in?</li> <li>- what calculations do we need to make on the spreadsheet</li> <li>- what results can be produced?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• small bags of different coloured sweets such as M&amp;Ms or Jelly Beans</li> <li>• class recording chart for student name and total number of sweets of each colour</li> <li>• the Centre for Technology and Teacher Education website has a unit plan detailing this activity including help sheets for Microsoft Excel. Collecting and Numerically Analyzing M&amp;M's Data - <a href="http://www.teacherlink.org/content/math/activities/ex-mmnumerical/guide.html">http://www.teacherlink.org/content/math/activities/ex-mmnumerical/guide.html</a></li> <li>• spreadsheet software such as Microsoft Excel, Microsoft Works, Claris Works</li> </ul>	<ul style="list-style-type: none"> <li>• the design brief produced by teacher and class from discussions can be very specific e.g. a sketch of the exact way it will look and what formulas to put where. So that students basically copy this to refresh their spreadsheet skills</li> <li>• assist students to recall learning from previous spreadsheet modules such as identifying and entering data into cells, entering, copying, and modifying formulae, designing a graph</li> <li>• students should avoid eating the data until the activity is completed!</li> </ul>

Learning Objectives	Classroom Ideas	Resources	Notes
<b>Session Plan One</b> Continued			
	<ul style="list-style-type: none"> <li>• by the end of the discussions the class should have a design brief sufficient to create the spreadsheet e.g. Each row will have a student's name in the first column; columns will have 'colour' headings; rows will have student name and student's totals for each colour. At the bottom of each 'colour' column a formula to calculate the TOTAL for each colour and so on...</li> <li>• students can also use functions, such as COUNT, AVERAGE, MEDIAN to further analyse the data</li> <li>• students can also create a simple bar chart or Pie chart to show arrangement of colours</li> <li>• class discussion: <ul style="list-style-type: none"> <li>- what did we find out?</li> <li>- did we answer our original questions?</li> <li>- what else can we use this spreadsheet to find out?</li> <li>- is there any way we can modify it to make it easier for someone else to see our findings?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>

Learning Objectives	Classroom Ideas	Resources	Notes
<b>Session Plan Two</b>			
<ul style="list-style-type: none"> <li>identify real world uses for spreadsheets</li> </ul>	<ul style="list-style-type: none"> <li>teacher demonstrates and explains the sample spreadsheets explaining their function (but not how they are created) concentrating on the questions they answer</li> <li>class discussions: <ul style="list-style-type: none"> <li>why are these useful?</li> <li>what other uses for a spreadsheet can you think of? (e.g. record hours for part-time job; display exam results in all subjects for a class; work out whether its cheaper to go to school by car or bus)</li> <li>what are the advantages of using a spreadsheet?</li> </ul> </li> <li>extension task: ask friends and family for examples of situations when they use spreadsheets. Build up a wall chart to display different uses and the different occupations that use spreadsheets. Add situations that students face which may benefit from the use of a spreadsheet</li> </ul>	<ul style="list-style-type: none"> <li>example spreadsheets: these should be spreadsheets which perform an obvious function which the students can understand e.g. <ul style="list-style-type: none"> <li>simple currency converter: to change their money into Euros or Dollars</li> <li>simple cost calculator: to work out the cost of going to an event like a concert e.g. ticket, travel, food...</li> <li>rainfall over the year: showing bar chart of how rainfall varies each month</li> <li>membership list</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>students will benefit from seeing examples of spreadsheets which are user friendly and look professional even if the function of the spreadsheet is a very basic one</li> <li>use a spreadsheet if... <ul style="list-style-type: none"> <li>you want to crunch numbers and perform automatic calculations</li> <li>you want to track a simple list of data</li> <li>you want to easily create charts and graphs of your data</li> <li>you want to create "What-if" scenarios</li> </ul> </li> <li>some possible spreadsheet uses: storing and querying financial information, budgeting, scheduling, inventory tracking, sorting, tracking information, buying a house, car, pet, household item, planning a party, itinerary, event and costing out a concert or camping trip</li> </ul>

Learning Objectives	Classroom Ideas	Resources	Notes
<b>Session Plan Three</b>			
<ul style="list-style-type: none"> <li>• work systematically</li> <li>• devise a method for producing a working spreadsheet</li> </ul>	<ul style="list-style-type: none"> <li>• teacher introduces criteria for success in this module: e.g. evidence for working through the 5 phases of development:               <ul style="list-style-type: none"> <li>- design</li> <li>- create</li> <li>- test</li> <li>- modify</li> <li>- evaluate</li> </ul> </li> <li>• class discuss for each phase the following:               <ul style="list-style-type: none"> <li>- what do I need to produce/do in this phase?</li> <li>- what do I need to provide to prove that I have done this stage well?</li> </ul> </li> <li>• (teacher can use versions of prepared spreadsheet at various stages as examples)</li> <li>• record discoveries on a class chart, listing tasks, outcomes and evidence required</li> </ul>	<ul style="list-style-type: none"> <li>• chart for devising a method</li> <li>• prepared spreadsheet with versions of it at each stage of its development</li> </ul>	<ul style="list-style-type: none"> <li>• drawing attention to the 5 phases required for success in the module Learning Objectives: Design, Create, Test, Modify, Evaluate, should help students to focus on having distinct outcomes for each phase</li> <li>• students will find it easier to produce evidence of each phase if outcomes and evidence required are clearly defined and if they have actually seen good examples of these</li> <li>• creating a staged method for the whole class to adopt will encourage students to develop good routines which will help them to produce work independently</li> <li>• the process the students go through is complex, so the scenario (design brief) doesn't need to be. Using simple examples will make it easier for students to see how they can do this by themselves</li> </ul>

Learning Objectives	Classroom Ideas	Resources	Notes
<b>Session Plan Four</b>			
<ul style="list-style-type: none"> <li>• use 'class method' (constructed in previous session)</li> <li>• design a spreadsheet</li> <li>• create a spreadsheet</li> <li>• test a spreadsheet</li> <li>• modify a spreadsheet</li> <li>• evaluate a spreadsheet</li> </ul>	<ul style="list-style-type: none"> <li>• students use the 'class method' they devised in previous session to create a very simple but useful spreadsheet (see example in resources)</li> <li>• they work through each of the phases producing the evidence required</li> <li>• sharing opportunity: students user test and evaluate other students work (or present their own to the group). Students look for ways their spreadsheet could have been improved either as a result of criticisms or as a result of seeing other spreadsheets</li> <li>• students modify their spreadsheets based on sharing opportunity and write a brief explanation of what they changed and why</li> <li>• students write 2 comments about what they change as a result</li> </ul>	<ul style="list-style-type: none"> <li>• very simple design brief for a spreadsheet e.g.</li> <li>• carpet calculator (which calculates square metres of carpet required for rectangular room)</li> </ul>	<ul style="list-style-type: none"> <li>• starting with a very simple scenario will allow students to concentrate on the process and evidence. It will also help students to adopt good routines</li> <li>• having a very simple design brief will also allow students time to think about other design features, such as: how it looks or presenting its results in a friendly way for its users</li> <li>• establishing good practice and encouraging students to see potential in even very simple ideas will help them develop skills which can be later applied to more complex spreadsheet scenarios</li> <li>• allowing time for discussions at end of sessions will allow students to reflect on new things learned and an opportunity to clarify areas of difficulty</li> </ul>

Learning Objectives	Classroom Ideas	Resources	Notes
<b>Session Plan Five</b>			
<ul style="list-style-type: none"> <li>• use 'class method' to create working spreadsheet</li> <li>• design a spreadsheet</li> <li>• create a spreadsheet</li> <li>• test a spreadsheet</li> <li>• modify a spreadsheet</li> <li>• evaluate a spreadsheet</li> </ul>	<ul style="list-style-type: none"> <li>• students use the 'class method' they devised in previous session to create a very simple but useful spreadsheet (see example in resources)</li> <li>• they work through each of the phases producing the evidence required</li> <li>• once fully complete, students write an information sheet to include: <ul style="list-style-type: none"> <li>- title</li> <li>- one sentence to explain 'What their spreadsheet was designed to do'.</li> <li>- one thing they modified to make it better</li> <li>- one sentence to explain how it works</li> <li>- one sentence to explain how it could be made better</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• choice of simple design briefs for a spreadsheet e.g. <ul style="list-style-type: none"> <li>- journey cost calculator</li> <li>- an event cost calculator</li> <li>- part-time job pay calculator</li> <li>- weekly temperature chart</li> <li>- monthly rainfall</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• practise will reinforce skills built in previous sessions – spreadsheet scenarios could be of increasing levels of difficulty</li> <li>• remind students to provide all the evidence for the 5 phases as part of their spreadsheet development process. By making this routine part of development – students will adopt good working practices and are more likely to spot errors</li> </ul>

Learning Objectives	Classroom Ideas	Resources	Notes
<b>Session Plan Six</b>			
<ul style="list-style-type: none"> <li>• evaluate a spreadsheet</li> </ul>	<ul style="list-style-type: none"> <li>• class discussion:               <ul style="list-style-type: none"> <li>- what makes a good evaluation?</li> <li>- what sort of comments should we make?</li> <li>- what are we looking for?</li> </ul> </li> <li>• class devise an evaluation sheet to use on spreadsheets (this should have space for writing against at least 3 evaluation criteria)</li> <li>• students use the evaluation sheet to evaluate each others work. (Students can leave the information sheets they produced next to the computer which displays their spreadsheet.) Students move around the room completing an evaluation sheet for each spreadsheet they view</li> <li>• class feedback – students get to see evaluations relating to their spreadsheet</li> </ul>	<ul style="list-style-type: none"> <li>• students completed spreadsheets and information sheets from previous session</li> </ul>	<ul style="list-style-type: none"> <li>• during evaluations and feedback it is important that students see this as a positive process by allowing time for discussion and/or modifications to be made</li> <li>• writing down simple evaluation statements about the work of others will help students do the same for their own work</li> <li>• encourage students to make positive comments as well as negative</li> <li>• allowing time for discussions at end of sessions will allow students to reflect on new things learned and give them an opportunity to clarify areas of difficulty</li> <li>• avoid students giving marks, percentages or ticks as a means of evaluation</li> </ul>

## Assessment Ideas

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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

Design a spreadsheet to calculate the cost of a trip for a class to go to a concert. (Items, number of students and costs can be given). Your spreadsheet should be able to answer the question 'How much will each student have to pay?'

Make a design (sketch and brief notes) for your spreadsheet showing how it will be arranged and what calculations (formulae) you will use. (1) Create your spreadsheet (2). Show evidence of how and what you have tested in your spreadsheet (3). Write down any modifications you need to make after testing your spreadsheet to make it better (5) and make the modifications (4). Write a sentence to explain how your spreadsheet answers the question 'How much will each student have to pay?' (1) and another sentence to explain what you could do to improve your spreadsheet (5)

Stage 1 Module – Spreadsheets for a Purpose	
1	Design a spreadsheet with a specific purpose
2	Create the spreadsheet
3	Test the spreadsheet
4	Modify the spreadsheet to make it suitable for its purpose
5	Evaluate the spreadsheet

Teachers should retain the following evidence for moderation:

- copy of original assignment
- students own design for the spreadsheet
- students saved spreadsheet (or printed with formulas) including any charts
- students evidence of testing and checking – this may be an annotated printout or a marked checklist produced by the students (or teacher evidence)
- students written evaluation
- students saved modified spreadsheet (or printed without formulas)