Unit 6: Spreadsheets – design and use (LEVEL 2)

Learning outcomes

By completing this unit candidates will develop a thorough knowledge and understanding of how to create and use spreadsheets.

Candidates will be able to:

- design a spreadsheet to meet the needs of an organisation

- create the spreadsheet according to the design and format it to make it user friendly

- sort data and use simple filters

- carry out modelling activities using a spreadsheet

- analyse data using appropriate graphs/charts

- create macros to automate procedures in a spreadsheet.

It is anticipated that a candidate will require 60 guided learning hours to complete this unit.

Assessment objectives	Knowledge, understanding and skills

1 Design a spreadsheet to meet the needs of an organisation	Design a spreadsheet and include:
	• user requirements (purpose and audience)
	• sketch diagram of spreadsheet layout
	• cell formats
	• formulas eg: arithmetic operators: +, -, *, / and brackets
	• functions eg:
	  o arithmetic and statistical functions such as SUM, AVERAGE, MAX, MIN, MEDIAN, MODE, COUNT, COUNTIF
	  o mathematical/trigonometric functions, eg SIN, COS, TAN, LOG, POWER, RND
	  o rounding functions, such as INTEGER, ROUNDUP and ROUNDDOWN, TRUNC
	  o logical functions, such as IF, AND, OR and NOT, including nested IF statements
	  o lookup functions, such as VLOOKUP, HLOOKUP, MATCH
	  o reference functions, such as ROW, COLUMN
	  o text functions, such as LEFT, MID, RIGHT, LEN, VALUE, TEXT, CONCATENATE, FIND
	  o date and time functions, such as TODAY, NOW, YEAR, MONTH, DAY
	• referencing eg: relative and/or absolute cell referencing

2 Create the spreadsheet according to the design and format it to make it user friendly	Using the design, create the spreadsheet, including eg: • text and background colour and cell borders to distinguish between different types of cell (eg cells to input data, cells which automatically calculate) • adjust row/column width/height, hide and show columns/rows and merge cells (continued)

Assessment objectives	Knowledge, understanding and skills
2 Cont. Create the spreadsheet according to the design and format it to make it user friendly	• change the direction of text in a cell and set text to wrap in a cell • use more complex features eg conditional formatting, comments, worksheet protection, validation (with useful feedback to users) • use of worksheets eg: multiple worksheets in a workbook, linked sheets
3 Sort data and use simple filters	Sort/filter the data, eg: • sort data on **at least one** field • filter data on **at least one** field, customising the filter if necessary eg by using greater/less than on numeric fields and begins with, contains or ends with on text fields
4 Carry out modelling activities using a spreadsheet	Change variables to experiment with different outcomes, eg: • predict outcomes • experiment with different data sets by changing variables
5 Analyse data using appropriate graphs/charts	Present data from the spreadsheet in a graphical form, eg: • create different types of graphs eg line graph, bar chart and pie chart • create at least one comparative chart(s)/graph(s) • create appropriate types of graph/chart for different types of data (understanding the difference between continuous and discrete data)
6 Create macros to automate procedures in a spreadsheet	Use macros to automate tasks in the spreadsheet, eg: • create at least one macro to automate task(s), eg save and print, reset a form, move to a different sheet • access and print out the macro code • show an understanding of the functions of specific items of macro code • create keyboard shortcuts and buttons to run the macro(s)

Assessment

This unit is centre assessed and externally moderated.

In order to achieve this unit, candidates must produce a portfolio of evidence showing that they have met all of the assessment objectives.

Portfolios of work must be produced independently. They will need to be made available, together with witness statements and any other supporting documentation, to the OCR Visiting Moderator when required.

Centres must confirm to OCR that the evidence produced by candidates is authentic. An OCR Centre Authentication Form is provided in the Centre Handbook and includes a declaration for assessors to sign. It is a requirement of the QCA Common Criteria for all Qualifications that proof of authentication is received.

Guidance on assessment and evidence requirements

The precise functions will depend on the software used, but a sufficiently advanced spreadsheet package that offers all eight categories of function should be used.

Candidates may provide portfolio evidence for this unit using a range of suitable and appropriate techniques. These will include written or typed descriptions and screenshots and printouts of spreadsheets created, showing both data and formulae. There is no requirement for candidates to describe in detail how they create their spreadsheets.

Candidates will need considerable practice using the different spreadsheet features, perhaps by following structured tasks set by the centre.

The spreadsheets for this unit must be more complex than the simple one used in Unit 1. The work carried out and evidenced in this unit will extend significantly from that which was carried out in Unit 1.

For Assessment Objective 1, candidates must provide details of the design of their spreadsheet, including the purpose and audience of the spreadsheet. Their designs will most likely take the form of sketch diagrams, demonstrating the layout of the spreadsheet, cell formats, formulae and functions to be used. Candidates must refer to the list of possible functions and use a range from different categories (the range of functions listed in the assessment objectives table is not exhaustive. Candidates may be credited with the use of other functions instead of those listed). To achieve the higher grades, absolute cell referencing must be used.

For Assessment Objective 2 formulae must be clearly seen from printouts. Provided the columns are sufficiently wide there should be no need for candidates to describe individual formulae, although a simple description of the purpose of the sheet and how it is used is important evidence towards assessing the extent to which the spreadsheet meets the intended purpose.

The formatting features required by Assessment Objective 2 may be demonstrated in a single sheet or across a number of different sheets in one workbook. Most formatting can be seen clearly from a printout of a spreadsheet, so there is no need for the candidate to add written explanation or screenshots of methods used. Where a skill is evidenced once, it can be credited. A witness statement might be used to describe how user-friendly the final spreadsheet is.

Only simple sorting and filtering is required for Assessment Objective 3. When setting customised filters it is not necessary to use all the different comparisons. For example, a filter using 'less than' is sufficient demonstration of a custom filter on a numeric field. A filter using 'begins with' is sufficient demonstration for a text field. Other comparisons such as 'less than or equal to' or 'not equal to' or 'does not begin with' are acceptable options.

Assessment Objective 4 requires candidates to use their spreadsheet as a model, to experiment with data and find solutions to problems. For example, in a budget spreadsheet they may experiment with different expenditure to meet a particular budget. Evidence must include at least two printouts showing that some variables have been changed. Short explanation(s) of this is required.

Assessment Objective 5 requires candidates to analyse data using tables, graphs and/or charts. Whilst it is expected that some conclusions will be drawn by candidates it is not necessary for a report of results to be written up.

Evidence for the macros produced for Assessment Objective 6 should comprise a printout of the macro code. Where a button is used to run the macro an annotated screenshot is required. For higher grades candidates should provide a minimum of one sentence describing what the macro does and how it can be run. They will also annotate the macro code to show the purpose of at least three lines, eg 'this line prints the sheet'.

Signposting to Key Skills

✓   The unit contains opportunities for developing the Key Skill, and possibly for generating portfolio evidence, if teaching and learning is focused on that aim.

Key Skill reference		Key Skill reference		Key Skill reference	
C2.1a	✓	ICT2.1	✓	N2.1	✓
C2.1b	✓	ICT2.2	✓	N2.2	✓
C2.2		ICT2.3	✓	N2.3	✓
C2.3	✓				

Mapping to National Occupational Standards

National Occupational Standards	Reference ID	Title
IT Users (e-skills UK)	MSU2	Make selective use of IT Level 2
IT Users (e-skills UK)	MSU3	Make selective use of IT Level 3
IT Practitioners and Professionals (e-skills UK)	ICTSDCC	Software development - component creation
IT Practitioners and Professionals (e-skills UK)	ICTSDD	Software development - design
IT Users (e-skills UK)	SS2	Spreadsheet software Level 2
IT Users (e-skills UK)	SS3	Spreadsheet software Level 3

Resources

This section provides suggestions of suitable resources. The list is neither prescriptive nor exhaustive, and candidates should be encouraged to gather information from a variety of sources. Some suggested resources are intended for Tutor use. The resources in this section were correct at the time of production.

Books

Pat Heathcote   *Successful ICT Projects in Excel*
                       Payne-Gallway ISBN: 1903112710

Liberty Hall   *GCSE in Applied ICT Support Pack 2 Spreadsheets*
                       ISBN: 1 84224 114 1

Liberty Hall   *GNVQ ICT Unit 7 Numerical Modelling*
                       ISBN: 1 84224 048 x

CD-Roms and computer software

Microsoft Excel

Lotus 123

Websites

http://microsoft.com/uk/education/tech-support/step-by-step/
A site providing advice if you are experiencing technical problems or want to learn more about what you can do with your computer software

http://www.censusatschool.ntu.ac.uk/
An international children's census. Collecting and disseminating real data for use by teachers and pupils in data-handling, ICT, and across the curriculum for learning and teaching

http://www.msofficeusers.org/

http://www.improveyourexcel.com/
Excel reference site

http://www.statistics.gov.uk/
This is an official site for UK statistics. Summaries and detailed data releases are published free of charge

http://www.nomisweb.co.uk/
This is an official labour market statistics site for local and national areas

http://www.neighbourhood.statistics.gov.uk
An official site for local statistics (neighbourhood regeneration, employment, crime etc)

Grading

Assessment Objective	Pass	Merit	Distinction
AO1 Design a spreadsheet to meet the needs of an organisation	Candidates will produce a basic design for a spreadsheet in line with identified user requirements. The design will include basic details of: spreadsheet layout, cell formats, formulae including at least two of +, -, * and /,and different functions from at least two categories. Relative cell referencing will be used. Not all choices will be appropriate.	Candidates will produce a design for a spreadsheet in line with identified user requirements. The design will include details of: spreadsheet layout, cell formats, formulae including +, -, * and / ,and different functions from at least three categories. This will include the use of one IF statement. Relative or absolute cell referencing will be used. Most choices will be appropriate.	Candidates will produce detailed designs for a spreadsheet in line with identified user requirements. The design will include comprehensive details of: spreadsheet layout, cell formats, formulae including +, -, *, / ,and brackets and different functions from at least four categories. This will include the use of one IF statement. Relative and absolute cell referencing will be used. All choices will be appropriate.
AO2 Create the spreadsheet according to the design and format it to make it user friendly	Candidates will create a functional spreadsheet. The spreadsheet may contain only one sheet. Candidates will use text and background colour and cell borders although these may not show the different types of cell in the most helpful way. They will adjust row height or column width and will merge cells. They will set the direction of text in a cell. They will add at least one example of help for the user, such as an instruction on the sheet, a cell comment, an input message or validation, although this may not be of a high quality.	Candidates will create a functional spreadsheet. The spreadsheet will contain more than one sheet. Candidates will use text and background colour and cell borders to distinguish between different types of cell (eg cells to input data, cells which automatically calculate). They will adjust row height or column width, hide and show rows or columns and will merge cells. They will set the direction of text in a cell and will set some text to wrap in a cell. They will add help for a new user. This help will include at least one cell comment and appropriate validation in at least one row/column. They will use conditional formatting.	Candidates will create a functional spreadsheet. The spreadsheet will contain more than one linked sheet. Candidates will appropriately use text and background colour and cell borders to distinguish between different types of cell (eg cells to input data, cells which automatically calculate). They will adjust row height or column width, hide and show rows or columns and will merge cells. They will set the direction of text in a cell and will set some text to wrap in a cell. They will add sufficient help to enable a beginner to use it with ease. This help will include suitable cell comments and validation with useful feedback to users. They will set cells for input from a drop-down list. (continued)

Assessment Objective	Pass	Merit	Distinction
AO2 Cont. Create the spreadsheet according to the design and format it to make it user friendly			They will use conditional formatting to make the output clearer. They will use worksheet protection to prevent a user changing/deleting formula.
AO3 Sort data and use simple filters	Candidates will sort data using one field. They will filter data using one field.	Candidates will sort data using at least two fields. They will filter data using at least two fields.	Candidates will sort data using at least two fields. They will filter data using at least two fields. They will customise at least one filter.
AO4 Carry out modelling activities using a spreadsheet	Candidates will change variables in their spreadsheet and make simple predictions.	Candidates will change variables in their spreadsheet and make predictions and/or decisions. They will write about their investigation and the results they find.	Candidates will change variables in their spreadsheet and make suitable predictions and decisions. They will write about their investigations and the results they find.
AO5 Analyse data using appropriate graphs/charts	Candidates will create at least two different types of graph/chart. These may not be the most appropriate type of chart for the data and may not be well labelled.	Candidates will create at least one example of each type of graph from line graph, bar chart and pie chart. At least one of these should compare values. Graphs should be given titles and appropriate axis labels.	Candidates will create at least one good example of each type of graph from line graph, bar chart and pie chart. At least one of these should compare values. Graphs should be given titles and appropriate axis labels.
AO6 Create macros to automate procedures in a spreadsheet	Candidates will record a simple macro to automate at least one task. They will enable this macro to be run by either keyboard shortcut or a button on the sheet or on the toolbar. They will access the macro code and print it out.	Candidates will record a macro to automate a sequence of at least two tasks. They will enable this macro to be run by both a keyboard shortcut and a button on the sheet or on the toolbar. They will access the macro code and print it out. They will describe what the macro does and how it can be run.	Candidates will record two macros to automate a sequence of tasks. They will enable this macro to be run by both a keyboard shortcut and a button on the sheet or on the toolbar. They will access the macro code and print it out. They will describe what the macro does and how it can be run. They will annotate the macro code to show the function of at least three items of code.