

Unit 12 Systems: integrating applications to find solutions

About the unit

In this unit pupils work as a team to set up, organise and run a fundraising event that must make a profit (this is the constraint). They use a wide range of ICT to solve the problems associated with planning such an event. This provides them with the opportunity to develop further their expertise in the use of spreadsheets and databases, together with word-processing, presentation and desktop publishing software, vector and bitmap-based graphics software and e-mail. This is a controlled, integrated project involving whole-class decisions and combined data to establish the requirements of a system.

This unit is expected to take approximately 12 hours.

Where the unit fits in

This unit builds on skills developed during key stage 2 and years 7 and 8 in the application of spreadsheets, presentation software, databases, desktop publishing, e-mail and imaging software.

Expectations

At the end of this unit

most pupils will: select information needed for different purposes, check its accuracy and organise and prepare it in a form suitable for processing; use ICT to structure, refine and present information in different forms and styles for specific purposes and audiences; exchange information and ideas with others in a variety of ways including the use of e-mail and explore the effects of changing the variables in an ICT-based model; discuss their knowledge and experience of using ICT, its use outside school, and assess its use in working practices

some pupils will not have made so much progress and will: develop and refine work, using information from a range of sources; use ICT-based models to make predictions, vary the rules within them and assess the validity of these models; discuss the application of ICT-based solutions to aspects of the world of work

some pupils will have progressed further and will: combine information from a variety of ICT-based and other sources for display and presentation to different audiences; select and use suitable information systems, translating enquiries expressed in ordinary language into forms required by a system; design ICT-based models and procedures, with variables, in order to meet identified needs and consider the limitations of ICT tools and information sources and the results they produce; discuss the wider use of ICT in an informed way

Prior learning

It is helpful if pupils have:

- prior experience of using word-processing, spreadsheet, desktop-publishing, data-handling and bitmap graphics software
- an understanding of the use of e-mail

Language for learning

Through the activities in this unit pupils will be able to understand, use and spell correctly:

- *bitmap and vector graphics*
- *address book*
- *merge-printing or mail-merge*
- *standard letters*

Speaking and listening – through the activities pupils could:

- discuss and question what they are learning and how it is relevant in other contexts or when using different variables
- describe how the work was undertaken and what led to the conclusion
- discuss and respond to initial ideas and information, carry out the tasks and then review and refine ideas

Writing – through the activities pupils could:

- organise facts/ideas/information in appropriate sequence
- show relationships between ideas by links which show purpose, and reservations

Resources

Resources include:

- internet access
- software – spreadsheet, flat-file data handling, word processing with mail-merge facility, presentation package, vector-based graphics, bitmap-based graphics, desktop publishing, e-mail with address book facility

Extension and enrichment

Visits to, or participation in, similar fundraising events.

Pupils should learn:

Pupils:

Activity 1

- to reach a decision on the nature of the event
- to identify the component tasks
- to allocate ICT-based solutions to each of the identified problems
- Hold a brainstorming session with the whole class to decide about the nature of the fundraising event; follow this with groups of pupils identifying each of the component tasks associated with organising an event of that kind, including appropriate deadlines and timescales.
- Hold a plenary session allocating ICT-based solutions to each of the tasks.
- Ask the pupils to complete a plan showing each of the tasks and the timing, *eg financial model/record/accounting system enabling prediction and evaluation, publicity, ticketing, sponsorship.*
- Explain to pupils how to discuss and question what they are learning and how it is relevant in other contexts.
- split an overall problem into component tasks
- justify the application of ICT solutions to identified problems
- use more speculative types of questions which show engagement with subject concepts
- A fundraising event gives the necessary inputs and outputs for a proper financial model, but will need an initial budget.
- The event can be real or fictional. Real events would need to be organised by each class in the year group independently. Ideas could include a class disco, a sponsored walk, an exchange sale, a refugee crisis appeal. Fictional events could include a school fete or other large-scale event, but should be chosen from situations with which pupils are familiar.
- The event would need to take place between activities 6 and 8 so that preceding activities could be used to carry out each of the tasks associated with its organisation, and the last activity will be an evaluation and final financial result.
- Homework could include a description of the key issues and solutions for the event.

Pupils should learn:

Pupils:

Activity 2

- to identify the rules governing the model that will determine the profit or loss of the event
- to construct the financial model for the event using spreadsheet software
- to use the model to prepare a budget for the event
- Using homework, discuss with the class definitions of mathematical models that will allow both predictive and real data for evaluation. Ask the pupils to work in groups to identify all the contributory costs, *eg insurance, caretaker overtime, publicity, printing and other expenses*, and income, *eg tickets, sponsorship*.
- Agree a common overall layout for the spreadsheet. Review with the class spreadsheet rules and formulae as they apply to the model for the event. Ask pupils to then build the spreadsheet.
- Pupils should test the spreadsheet works correctly by using appropriate test data.
- Once the spreadsheet is complete, ask pupils to test a number of hypotheses/ scenarios to evaluate the model, *eg break-even point on ticket sales*.
- identify rules governing a model
- enter formulae and parameters into a spreadsheet
- use a spreadsheet model
- Ensure that realistic costs are researched prior to the spreadsheet activity for the chosen event, and that if the event planned is actually to take place then all arrangements are made with clearance from the relevant authorities.
- The aim is to make the largest possible profit, and the income will depend on the nature of the event, such as entry charges or sponsorship rate, *eg ticket price and the numbers sold (information that is used to predict profit) and the number of tickets required as well as real data entered after the event to show profit*.
- Extension activity: more able pupils might be introduced to absolute cell references for fixed data, *eg number of people allowed into the venue, percentage profit margin*.
- Homework could be a report on the financial model.

Pupils should learn:

Pupils:

Activity 3

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| <ul style="list-style-type: none"> • to use a vector graphics program to design a simple logo • the importance of choosing particular file types for graphics • to use an image manipulation program • to combine both vector-based and bitmap-based images for use in printed material | <ul style="list-style-type: none"> • Revise the differences between bitmap and vector image manipulation. Discuss when it is appropriate to use each. • Suggest that the class works on a simple graphic to test techniques, perhaps by working on a prepared graphic, which includes a variety of objects to be manipulated. Demonstrate to the class the main features and tools of a vector graphics program. Working in groups, ask pupils to create designs for a logo, within certain parameters, <i>eg three-colour limit, clarity, including text below logo</i>. • Hold a plenary session to choose the most suitable logo for use in all the publicity material and on tickets and letter headings. The class could choose a simple logo for all or pupils could use their own. Show pupils how to change the size of the completed logo while retaining aspect. Include rotation and transformation, <i>eg for T-shirt printing</i>. | <ul style="list-style-type: none"> • produce a simple design using a vector graphics program • understand the importance of file types • manipulate an image for a variety of purposes • combine different types of images for use in different situations | <ul style="list-style-type: none"> • Homework could be sketching a draft design of a logo on paper. • Logo designs should be kept simple and preferably use a maximum of three colours. Part of the design criteria should be its appearance when printed in monochrome. • Scalability without loss of clarity is the main objective of using a vector graphics program for this activity. Using vector graphics for a logo allows rescaling for a variety of uses requiring different sizing, <i>eg programme/tickets/letterheads</i>. Make good use of prompt sheets for using a key set of tools. • Image manipulation software should not be too sophisticated but capable of applying a standard range of filters and effects to selected parts of an image, saving in a variety of different file formats and colour depths. |
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Pupils should learn:

Pupils:

Activity 4

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| <ul style="list-style-type: none"> • to design the structure for a simple flat-file database (revision) • to enter data into a database (revision) • to design simple standard letters for mail-merging • the difference between database fields and standard field codes • to incorporate the corporate identity graphics into the design of standard letters • to test the output from mail-merge printing • to incorporate existing graphics files into designs for other documents | <ul style="list-style-type: none"> • Discuss a prepared database and revise database concepts. The prepared data file should have 10 names and addresses of potential sponsors and guests/helpers. Explain to pupils how to discuss and respond to initial ideas, carry out the task and then review and refine ideas. • Demonstrate how to send a prepared letter to all contacts, using the mail-merge process from initial layout of the standard letters to incorporation of field codes (both standard ones, <i>eg date</i>, and fields from the database). Demonstrate how one particular group, <i>eg sponsors</i>, is selected. • Ask groups of pupils to produce two standard letters incorporating logo graphics, one to sponsors and one to guests, and use conditional merging depending on type of letter and type of entry in the database. | <ul style="list-style-type: none"> • understand how file structures relate to the requirements of a system • enter data into a database • insert fields into a standard letter • incorporate graphic designs into a standard letter • incorporate graphic designs into word-processed documents • undertake conditional merging of data into standard letters • contribute to sustained group work to carry out and report on a task | <ul style="list-style-type: none"> • Arrive at an agreed format for the file to ensure that all groups use the same fields and field types. Output from different groups can then be used with consistency, <i>eg a standard letter to a potential sponsor from one group and a standard letter to a potential helper from another group</i>. The data file is mainly for information rather than query but needs to distinguish between two groups, <i>eg guests/helpers or sponsors</i>. • Homework could be to design a letterhead using the logo. • The logo designed in activity 3 can be incorporated into letterhead template designs for each type of standard letter. • Homework could be writing the text of the letters. |
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Activity 5

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| <ul style="list-style-type: none"> • to apply desktop publishing techniques to the production of posters and related documents | <ul style="list-style-type: none"> • Revise with the class the operation of the chosen desktop publishing program. Discuss styles for the intended audiences, and the need to maintain the same identity for the posters, tickets, programmes and other printed material. • Ask groups of pupils to work on the production of posters, tickets and programmes for the event. • Ask each group to describe how the work was undertaken and what led to the conclusions. | <ul style="list-style-type: none"> • incorporate graphics files into a variety of documents • produce a range of documents for different purposes • explain the process of the work using subject terminology and concepts | <ul style="list-style-type: none"> • This is an opportunity to utilise existing DTP skills and to adopt an overall design that can be adapted for several different types of printed material. • The detailed programmes/publicity leaflets would not be printed until towards the end of activity 6 when the results of the mailing are known, <i>eg who has agreed to be a sponsor</i>. |
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Learning objectives

Pupils should learn:

Possible teaching activities**Learning outcomes**

Pupils:

Points to note**Activity 6**

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| <ul style="list-style-type: none"> • to update a database with new information for each record (into pre-existing fields) • to interrogate a database to produce reports • to use e-mail address book entries for sending e-mails to a circulation list | <ul style="list-style-type: none"> • Review with the class the replies to the standard letter mailings. Introduce the use of an e-mail address book. • Ask groups of pupils to update the database as a result of the replies, including e-mail contacts, followed by transferring e-mail addresses to an address book. • Ask groups of pupils to compile a distribution list for each type of respondee to the mailings and then send standard e-mails to each distribution list. | <ul style="list-style-type: none"> • update and amend a database • produce reports from a database • use an e-mail address book • use a presentation program for a short, automated presentation | <ul style="list-style-type: none"> • The updated database will now contain a full list of sponsors and helpers and any other category appropriate for the chosen event. • The sending of standard e-mails to different distribution lists is a similar operation to the original mail-merge, but using a different technology. • The programmes can be printed out at this stage. |
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Activity 7

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| <ul style="list-style-type: none"> • The event takes place (either fictional or real). | <ul style="list-style-type: none"> • If the event is fictional, example data will be needed to complete the financial model. |
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Activity 8

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| <ul style="list-style-type: none"> • to evaluate the planning and organisation of the event, and the ways in which these have been enhanced through the use of ICT • to discuss and respond to virtual ideas, carry out the task and then review and refine ideas | <ul style="list-style-type: none"> • Discuss with the class the way the event proceeded, and the effectiveness of the ICT solutions employed, together with final data in the spreadsheet. Ask each group to write a report designed to facilitate the running of similar events in the future. • Explain to pupils how to organise information in an appropriate sequence, group sentences into paragraphs that have a clear form, link ideas and paragraphs into continuous text. • Explain to pupils how to show relationships between ideas that show purpose. | <ul style="list-style-type: none"> • produce a report on the overall effectiveness of a system • understand the advantages and limitations of a variety of ICT-based solutions • write a coherent, continuous text and link ideas into sentences showing more complex connections | <ul style="list-style-type: none"> • If the event was fictional, then a report needs to be prepared for this activity that details all the main features of what should have happened, <i>eg tickets sold, money raised, actual expenses incurred</i>. • Homework could be completion of the report. |
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