Unit 15 Systems: managing a project

About the unit

This unit is designed to develop the skills needed to carry out a project systematically. The project is designing a front-of-house ticketing system for a theatre.

Pupils learn to plan the stages of a project, and use a flow chart to record their decisions. They use a design specification as the basis for their work and criteria to evaluate their success. They develop many skills, in particular time management and problem solving. At the end of the unit they produce a written report summarising their project and its success.

The project is limited to three tasks; this allows teachers to ensure their class learns project methods as a whole group. Differentiation is achieved through the work carried out by individual pupils for each of the tasks set within the framework of this unit.

This unit is expected to take approximately 16 hours.

Where the unit fits in

This unit is a bridging unit from key stage 3 to key stage 4. It builds on generic skills learnt in previous units. There are opportunities for more able pupils to demonstrate higher order skills, *eg producing user guides for others*. The unit prepares pupils for methodical approaches to project management and group work for key stage 4.

Expectations

At the end of this unit

most pupils will: produce a project report where the work is carried out through closely following a systematic approach (each stage of the system is well documented and presented, the final solution is effectively applied and the solution is workable); use a variety of ICT tools and information sources; provide evidence of evaluation with suggestions for improvement; consider the benefits and limitations of the ICT tools and use this to inform their evaluation of the project's success

some pupils will not have made so much progress and will: produce a project report where the work is carried out following a systematic approach (each stage of the system is documented and presented, the final solution is applied, with assistance, and presented for a specific purpose and audience); use a variety of ICT tools and information sources; provide evidence of evaluation

some pupils will have progressed further and will: produce a project report using a systematic approach that has undergone improvement through critical evaluation at each stage (each stage of the system is well documented and presented, the final solution is effectively applied and the solution is workable and repeatable); provide evidence of independent working and evaluation at each stage of the system, with evidence used to inform future judgements of the quality of the work; include a concise and clear user guide for use by others in managing a different school event

Language for learning

Through the activities in this unit pupils will be able to understand, use and spell correctly:
* *Gantt*
* *POI (point of information)*

Speaking and listening – through the activities pupils could:
* ask different sorts of questions to extend thinking and refine ideas
* discuss and evaluate conflicting evidence to arrive at a considered viewpoint
* follow an argument, making notes which are then used effectively
* solve a problem, consider alternatives, structure plans and organise group activity

Resources

Resources include:
* networked resources including printers and internet connection
* scanners, digital cameras
* a variety of generic tools used in previous units

Learning objectives	Possible teaching activities	Learning outcomes	Points to note
Pupils should learn:		Pupils:	

Activity 1

• that problems need to be approached systematically with clearly defined stages of development • to ask different sorts of questions to extend thinking and refine ideas	• Explain to the class that they are going to be responsible for the administration of a school drama production. • Divide the class into groups and ask them to hold a brainstorming session to identify the main areas of work involved in such a project. • Collate pupils' ideas from the groups to decide the order in which the tasks should be done. Ask pupils to record this information in their workbooks for later reference.	• understand that projects need to be approached systematically	• Although a school drama production is exemplified here, this scheme may be applied to any school event that involves financial planning, good communication and data handling.
• that to develop a solution effectively an accurately specified problem is needed	• Using the idea of a school drama production, introduce the concept of defining a problem by example. Ask pupils, in open discussion, to draft a statement of the problem. The final statement could be 'Our school is going to put on a drama production that will need promoting and financial planning. The school must at least break even and ideally make a profit.'	• consider the nature of a problem and produce reports showing clear definitions of expected outcomes	• A statement of the problem should form the first page of the report – project outline. Limit pupils to two sides of A4 initially and homework could be to refine the report to one side of A4. Emphasise the need for structure, *eg headings, bullet points*. It may be helpful to include a handout with points to note about the desired structure.

Activity 2

• that to manage the project effectively it is necessary to analyse the processes and outcomes required to achieve the solution and the order in which these tasks need to be carried out • that solutions can be represented as a system flow diagram.	• Explain that defining the problem and identifying the criteria for success are part of the systems approach to solving problems. Explain that there are several stages: – definition of the problem – analysis of needs – planning the process – information gathering – design – implementation – evaluation • Explain that this process can be represented as a flow chart and supply relevant examples. • Explain how to follow a demonstration, make appropriate notes, and discuss and evaluate conflicting evidence to arrive at a considered viewpoint. • Ask pupils to work in small groups and analyse the processes and outcomes involved in solving this problem. Using the flow chart examples, ask them to construct their own flow diagram for these tasks. • To reinforce the need for a systematic approach, ask pupils to compare their initial brainstorming results against their flow diagrams. Emphasise the advantages of using a structured approach.	• produce the solution to the problem by breaking it into processes and outcomes • can represent these diagrammatically	• Pupils would find a worksheet with the different elements of a flow diagram useful. • Pupils should identify a number of processes and outcomes which must include, *eg cost analysis or modelling of finances, front-of-house information, ticketing system*. These three are used later in the project.

Learning objectives	Possible teaching activities	Learning outcomes	Points to note
Pupils should learn:		Pupils:	
• that each process and outcome must have well-defined criteria for success to allow for evaluation	• For each identified task, ask pupils to give one or more criteria for its success, and guide pupils by providing relevant examples.	• specify criteria for success for all tasks to enable later evaluation	• Criteria for success may include, *eg:* – *ticket price can be set based on results of modelling* – *databases can be easily updated and accessed* – *posters contain accurate and detailed information* – *mail shots can be made through use of a mail-merge facility which is simple to use*

Activity 3

• that a design specification is needed for each task to implement the solution effectively	• For each task identified in the design specification, ask pupils to identify the key characteristics, content or elements required in order to satisfy the previously defined criteria for success. • Ask them to present their conclusions in the form of a flow diagram. If necessary, cover components of a flow diagram at this point. • Give an example of one possible flow diagram for a task and hold a discussion about its structure.	• understand the need for clear design specifications • present these as a flow diagram	

Activity 4

• that to implement a solution effectively it is necessary to apply project management methods, including time management, when organising their work	• Introduce the concept of project and time management through examples. Ensure pupils are aware that some tasks have to be performed concurrently and others sequentially. • Explain to pupils how to solve a problem, consider alternatives, structure plans and organise group activity. • Demonstrate the use of a Gantt diagram to represent the process pictorially. • Ask pupils to use their flow diagrams to construct their own Gantt diagram. • Give pupils a Gantt diagram based on the main three tasks identified in activities 2 and 3. This is the one that will be used for the rest of the project but the actual tasks are those that pupils identified in the first part of activity 2. • Conclude the planning stage by discussing the advantages of a systematic approach to project work.	• contribute to group work to design, plan, carry out and report back on a task • understand the role of project management and time management • demonstrate initial preparation to ensure that during implementation of a solution all elements of the design are included in an effective procedure	• Reference must be made to previously stated learning outcomes. This is an important point since it allows for differentiation in attainment.

Learning objectives Pupils should learn:	Possible teaching activities	Learning outcomes Pupils:	Points to note
Activity 5			
• to implement a design • to review their work in progress critically and adapt it as appropriate • that work completed needs to be evaluated against original criteria and specifications • that revisions to the solution need to be documented for future improvements	• Using data provided, ask pupils to implement their financial modelling design. • Encourage the pupils to attempt more sophisticated models. The more able pupils should be looking at 'what if' scenarios and the possible automation of some tasks for other users. All pupils should attempt to produce a user guide to the model as homework and evaluate it against the original criteria. • Ask pupils to make records of their actions and decisions in adapting their design as they work. • At the start of each lesson, allow time to review spreadsheet methods in the light of previous and ongoing work.	• are critical of their own work and use their findings constructively • are able to evaluate their work appropriately • make revisions to their work based on the outcome of an evaluation • discuss and evaluate conflicting evidence	• The data should be provided in different ways. The information required for a simple financial model should be clear. The more able pupils should also have available indirect information that requires deduction and some extra analysis. It would even be appropriate to search for information elsewhere, such as the drama department and library, to encourage more in-depth research.
Activity 6			
• to review their work in progress critically and adapt it as appropriate • that work completed needs to be evaluated against original criteria and specifications • that revisions to the solution need to be documented for future improvements	• Using the information provided on the forthcoming event, ask pupils to implement their front-of-house information system. • Encourage the pupils to attempt a variety of methods of communicating the information. The more able pupils should be attempting to create a web-based or point of information system (POI) using presentation software. User guides should be made to allow the system to be reapplied to a different event. These could be carried out as homework. • At the start of each lesson allow time to review presentation methods in the light of previous and ongoing work.	• are critical of their own work and use their findings constructively • are able to evaluate their work appropriately • make revisions to their work based on the outcome of an evaluation	
Activity 7			
• to review their work in progress critically and adapt it as appropriate • that work completed needs to be evaluated against original criteria and specifications • that revisions to the solution need to be documented for future improvements	• Ask pupils to implement their designs for ticketing. • Encourage the pupils to develop the solution so that it covers several different sale routes, *eg phone, fax, e-mail and in person*. The more able pupils should be creating seating plans that can be used to keep track of seats sold interactively, databases to record sales not made in person, mail-merge systems to print tickets or addresses and a possible accounting system to keep track of running sales and expenditure. • At the start of each lesson allow time to review the methods used in light of previous and ongoing work.	• are critical of their own work and use their findings constructively • are able to evaluate their work appropriately • make revisions to their work based on the outcome of an evaluation	• Homework could involve writing guides to using the system.
Activity 8			
• how to evaluate and present projects	• Refer back to the original criteria for success of the overall project and those relating to each design element and use a few examples to show what the evaluation involves, pointing out areas of success, areas of weakness and possible changes that could be made. • Ask pupils to work on presenting their projects, evaluations and user documentation, if appropriate, to achieve higher levels of attainment.	• complete a project that demonstrates clear and coherent presentation • demonstrate evaluation in the system development • show how through evaluation improvements can be made or future developments identified	