

Unit 9C Using ICT to link with the world outside school

Focus: ICT (food, resistant materials and textiles)

About the unit

The main aim of this unit is to give pupils an opportunity to use ICT to work collaboratively on a design and make project. ICT has transformed the way that pupils can work in teams and gain access to expertise outside the classroom by using e-mail, conferencing and electronic whiteboards. Team projects can be undertaken with other schools, and shared design software means that pupils can work on projects together.

Teachers can choose from two design and make assignments (DMAs) on the themes 'Corporate identity' or 'Going public'. In both DMAs, pupils work as a team to design and make a coordinated range of promotional products, *eg for a local event or a commercial company*. They use ICT effectively to help them work collaboratively on the project, drawing on expertise and help from outside the school, and using CAD/CAM (computer-aided design and manufacture).

Pupils gain the knowledge, skills and understanding they need to carry out the DMA successfully through product evaluation activities and focused practical tasks. They:

- use ICT to research and analyse information and expertise from outside school
- work collaboratively or remotely on a design project, *eg using e-mail and fax*
- use conferencing to work on joint projects with a group of partners outside school
- develop teamwork skills
- find out about the benefits and drawbacks of face-to-face and remote communication
- use CAD/CAM

Where the unit fits in

This unit is expected to take 12–19 hours.

This is one of three units that focus on using ICT: one in year 7 on using ICT to support researching and designing; one in year 8 on using ICT to support making; and this one in year 9 on using ICT to forge links with the world outside school. These units ensure progression in using ICT effectively when designing and making.

This unit gives activities for all materials areas, with the same DMAs covering all three areas so that pupils can work in teams. It is important that the department plans as a team so that pupils are able to draw on knowledge, skills and understanding from across the units to reinforce their learning and avoid unnecessary repetition. However, the DMAs can also be used in one focus area only.

The product evaluation activities and focused practical tasks from this unit could be integrated with units from years 7, 8 and 9. ICT should be seen as part of every unit of work, not just the focus of one unit. This unit has been kept separate to clarify the new aspects of the D&T programme of study for 2000.

If activities from this unit are integrated with other units, *eg unit 9B 'Designing for markets', unit 9E 'Ensuring quality production'*, teachers can choose to do the DMA from either unit, but not both. The unit could be taught as one unit with unit 9F 'Moving on to key stage 4'. Some of the optional activities are suitable for later in year 9.

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 using e-mail; discuss their knowledge and experience of using ICT to support designing and making and their experience of using ICT outside school; be aware of the benefits and possible negative effects of ICT; develop their knowledge and understanding of how others work, through working as a team; work towards agreed outcomes with others who are in different locations, following corporate decisions made by their team; use software that allows collaborative and interactive working

some pupils will not have made so much progress and will: understand the need for care when using questions to collect, find and analyse information; use ICT to present information and show an awareness of the intended audience; exchange information and ideas with others, including using e-mail; compare their use of ICT to support designing and making with the use of other methods, and compare their own use of ICT to how it is used outside school; work towards common goals in small teams

some pupils will have progressed further and will: use a range of strategies to develop and refine their work, using information from a range of sources they have identified; present their ideas in a variety of ways and demonstrate a clear sense of audience; exchange information and ideas with others in a number of ways, conferencing effectively to move their project forward; try out and compare different ways of developing and passing on information about their design ideas and proposals, and the products they have made; discuss the wider impact of ICT on society; adapt their own work so that all members of a team can contribute effectively; recognise the impact of new technologies on methods of working in the world outside school

Prior learning

It is helpful if pupils have:

- learnt the advantages and disadvantages of using ICT to develop and model designs
- used ICT when generating, developing, modelling and communicating design ideas
- used 2-D draw/paint software to produce accurate drawings and high-quality images
- recognised that all software programs have preset patterns and limitations
- accessed existing computer databases to look for information on materials/ingredients and processes
- used spreadsheets for modelling, *eg for costing materials, components or ingredients*
- learnt how ICT can be used to plan making, inform the making process, or make products using CAM (computer-aided manufacture)

Pupils should have gained the above knowledge, skills and understanding in years 7 and 8, through unit 7C ‘Using ICT to support researching and designing’ and unit 8C ‘Using ICT to support making’, or similar projects.

Language for learning

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

- ICT, *eg CMC, computer-mediated communications, e-mail, internet, fax, interrogate, database, survey, questionnaire*
- teamwork, *eg collaborate, conferencing, remote, manufacturing, global teams*

Speaking and listening – through the activities pupils could:

- solve a problem, consider alternatives, structure plans and organise group activity

Reading – through the activities pupils could:

- identify what information is needed, and draw together information from different sources

Resources

Resources include:

- case studies of products designed by global or remote design teams
- internet access, e-mail software, conferencing software or fax machine
- e-mail, fax or conferencing links to a project partner, *eg another school, an expert, community liaison officer, company, organisation*

- product ranges made in a variety of materials or pictures/photographs of them, illustrating coordination and communication of corporate identity
- information, *eg leaflets, posters, slides*, on local attractions and services
- a list of possible starting points for research
- CAD/CAM equipment
- database and survey software
- useful websites, *eg www.dtonline.org; www.nutrition.org.uk; www.design-council.org.uk; www.engc.org.uk; www.iee.org.uk; www.easynet.co.uk/ift; www.setnet.org.uk; www.youngeng.org; www.dotfood.com*

Future learning

Pupils could go on to further units using ICT in year 9.

Through unit 9B ‘Designing for markets’, pupils:

- learn how ICT influences designing and manufacturing in industry, and how computer-controlled systems are used in industry and commerce

Through unit 9E ‘Ensuring quality production’, pupils:

- use CNC (computer numerically controlled) equipment, *eg CAD/CAM*, to support making and to control production, where appropriate
- increase their understanding of how ICT influences manufacturing in industry, and how computer-controlled systems are used in industry and commerce

Through unit 9F ‘Moving on to key stage 4’, pupils:

- work with others and make effective use of visits, designers-in-residence and community projects

The understanding developed in this unit forms an important part of every design and make assignment, and the knowledge and skills are also an important part of the key stage 4 programme of study. Pupils will learn to:

- 1g) use graphic techniques and ICT, including CAD (computer-aided design), to generate, develop, model and communicate design proposals
- 2d) use CAM in single-item production and in batch or volume production
- 2e) simulate production and assembly lines, including the use of ICT (Extracts from the D&T key stage 4 programme of study)

Out-of-school activities and homework

Pupils could:

- find an example of a product that is designed and manufactured by a global team. They could list the advantages and disadvantages of this style of product design
- write, or illustrate, ‘a guide to design and technology teamwork’, with simple advice on how to work well together on a project
- consider the use of e-mail, audio conferencing, video conferencing and remote manufacturing in their D&T work. They could draw a chart to show their possible uses, ‘hot tips’ for using them effectively, and things to avoid

Links with other subjects

- ICT: links with year 9 unit 14 ‘Global communication: negotiating and transferring data’, in which pupils in two or more locations collect and negotiate data.
- English: selecting information sources, seeking opinions, producing plans, writing instructions.

Learning objectives

Pupils should learn:

Possible teaching activities**Learning outcomes**

Pupils:

Points to note**DESIGN AND MAKE ASSIGNMENT (DMA)**

- to use ICT effectively when working on a collaborative project, by applying the knowledge, skills and understanding they developed during the product evaluation activities and focused practical tasks

Set the pupils a DMA in which they use ICT to help them work collaboratively on a design and make project, and use e-mail, fax or conferencing to access expertise and help from others outside school. They should also be required to use CAD/CAM.

Examples

These example DMAs have been written so they can be copied and given directly to pupils. However, a more specific context and background information should be added so that the DMAs are appropriate for your pupils.

Corporate identity

Souvenirs and collectables, *eg T-shirts, 3-D signs and models*, are used to promote events, pop stars, cartoon characters and even schools. Design and make a coordinated range of promotional products for a special occasion or a client. You should work in a team and produce at least three different products using a range of materials.

Going public

Every community has its local attractions and services. These may be historical, recreational, commercial or public. These are publicised in different ways to make local people and visitors aware of them. As a team, design and make a range of products in different materials to help publicise an event, attraction or service in your local community.

- select information sources that will help with ideas for their design, drawing on a range of social and cultural settings
- seek the opinions of potential users of the product
- write full technical reports, including CAD drawing files that they have imported
- produce plans that specify the exact details of how a product is made through each making stage
- write manufacturing instructions, *eg for remote manufacturing*, to be followed by others, showing awareness of others' situation and skills
- consider and reflect on the design criteria as closely as possible, working within the constraints
- prioritise and reconcile decisions on materials, time and production
- adapt manufacturing methods to changing circumstances
- use hand-tools and CAM equipment competently
- work effectively within a team, discussing and responding to information, working on designing and making aspects, and reviewing product outcomes



Health and safety – pupils will probably undertake different tasks, using a variety of tools and equipment, so some self-management of health and safety will need to be undertaken. Safety could be emphasised as a criterion for assessment

■ essential activities

○ optional activities

Pupils should learn:

Pupils:

PRODUCT EVALUATION

Organise a range of activities that give pupils an opportunity to:

- find out about products that have been designed by global or remote design teams
- find out the benefits and drawbacks of face-to-face and remote communication

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| <ul style="list-style-type: none"> ■ how different members of a design team work in different locations | <ul style="list-style-type: none"> ■ Discuss with the pupils a video or case study of designers and manufacturers working as a remote team, eg <i>'Invention by design'</i> by Henry Petroski, a book about the design of the Boeing 777. Ask them <ul style="list-style-type: none"> – Who is in the team in the case study? – Where do they work? – How do they discuss and exchange ideas? – How do they use computers to help with their work? – What new skills might they need? | <ul style="list-style-type: none"> ■ describe simply how a product is designed and manufactured by a remote team, and reflect critically on their own and others' use of ICT, eg <i>what new skills they need, how they discuss their work</i> |
| <ul style="list-style-type: none"> ■ that there are benefits and drawbacks to a remote style of working for designers and manufacturers | <ul style="list-style-type: none"> ■ Discuss with the pupils what it must be like for designers to work in different locations and the benefits and drawbacks of working in this way. Ask the pupils to draw on their experience of using e-mail or fax to discuss ideas with other people. | <ul style="list-style-type: none"> ■ discuss their views and experiences with others and explore the effects of the widespread use of ICT on individuals, communities and society, eg <i>sharing their experience of talking to an e-mail penpal</i> ■ talk about how they might use ICT in their future work and how they would judge its effectiveness |

■ essential activities

○ optional activities

Pupils should learn:

Pupils:

FOCUSED PRACTICAL TASKS (FPTs)

These practical tasks should focus on the knowledge, skills and understanding outlined in 'About the unit'. They should give pupils an opportunity to practise any new skills they will need during the DMA, eg *how to use ICT for research*.

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| <ul style="list-style-type: none"> ■ how to collect, enter and analyse quantitative and qualitative information, checking its accuracy ■ how to select appropriate information sources and to use and refine search methods to obtain information that is well matched to the purpose, questioning its plausibility, relevance and accuracy | <ul style="list-style-type: none"> ■ Show the pupils how to access information sources to find resources for their project, eg a website or CD-ROM to find information on materials, design history, products, inventors, costs, technical information, lifestyles, environments. This could involve revision of strategies for searching, or short preparatory tasks (working as individuals or in small groups). ■ Discuss with the pupils how they might access information from experts outside the school, eg by e-mailing a technical expert at a local company, faxing a questionnaire to users, and how they can ensure that this method works well. | <ul style="list-style-type: none"> ■ collect appropriate information for their projects, eg examples of corporate logos, company information ■ contact an expert outside the school to gain information and make a judgement about the relevance of this to their project |
| <ul style="list-style-type: none"> ■ how to use research to communicate, share and exchange information effectively | <ul style="list-style-type: none"> ■ Ask the pupils to evaluate a range of research tools and information sources, eg from the internet, using survey software to generate questionnaires and present the information collected. | <ul style="list-style-type: none"> ■ use research tools and survey software, eg to produce a questionnaire and present data collected |
| <ul style="list-style-type: none"> ○ how to organise conferencing effectively to achieve objectives | <ul style="list-style-type: none"> ○ Set up a short activity in which the pupils work collaboratively on a team project using conferencing, eg making a product using remote manufacturing centres. Ask them to evaluate their experience and discuss useful guidelines to follow. | <ul style="list-style-type: none"> ○ show themselves to be effective team members, taking an active part in planning, participating in and evaluating conferencing, eg they send design ideas for a corporate logo and discuss these during conferencing |
| <ul style="list-style-type: none"> ○ how to interpret, reorganise, display and share information in a variety of forms that are appropriate to the purpose | <ul style="list-style-type: none"> ○ Discuss with the pupils how they will decide the simplest and most effective way to share information and communicate with others, eg by fax, using attachments in e-mails to share computer files, using tools like 'track changes' in a word-processed file so that multiple users can suggest content. | <ul style="list-style-type: none"> ○ develop independence and discrimination in their use of ICT and present instructions clearly for others to follow, eg fax a production plan for a promotional product, with clear instructions on manufacturing methods so that others can make it |

■ essential activities

○ optional activities