

in schools, England and Wales emphasising the process of designing and making products, NYS emphasising problem-solving skills, how technology affects society and vocational training

- In England and Wales technology is seen as something for all children, an important component of a balanced, broad education intrinsically relevant to all regardless of academic ability or vocational leanings. It has a much narrower target audience in mind in NYS with an emphasis on vocational skills and training
- As a result of the non-compulsory nature of technology except in Grades 7 and 8, very few girls opt for technology, whilst here all girls from 5–16 (14 in Wales) have to study technology as part of the National Curriculum requirement
- The decision of the UK to focus on the processes has meant that the updating of vocational courses has lagged behind. There is a tendency for the same craft skills to be taught through a design and technology framework, whilst in NYS the latest advances in computer control, electronics and mechanical technology have been introduced.

As we move towards the end of the millennium it is natural to speculate on what kind of education will be most relevant for our children, most of whose lives will be spent in the 21st century. Most people seem to agree that technology is an important part of education for the future. However agreement over the form it should take or the opportunities it should provide and the purposes it is intended to meet is, as we have seen in this brief comparison with NYS, far from settled.

I would like to thank all the teachers and students in New York State who made me so welcome and treated my questions with patience and understanding.

■ References

- Clarke, K., (1991), Minister of State's speech at SCSST Press Launch of 'Technology in Context', DfE, London
- The Staté Education Department, 1987, *Technology Education: Introduction to Technology*, The State University of New York, Albany
- SCAA, 1994, *The National Curriculum Order for Technology (Design and Technology)*, SCAA, London

■ DATA's Guidance Materials for Design & Technology

Key Stage 3

In March this year, DATA published two packs of guidance materials to support the new Order for Design & Technology. Some 22 conferences were held across the country, to introduce teachers to the new Order and to DATA's support material.

Two Units of Work from the KS3 pack are reproduced here, so that readers can get a flavour of what is available. They were created by a writing team of Ali Farrell, Eileen Small, Mark Hudson and Barry Payne and have been widely praised for their breadth of coverage and their practical approach. The pack contains the following:

- 20 page booklet
- 32 Units of Work
- A Units of Work Framework
- A Pupils' Planning Sheet
- An A3 Planning checklist
- An A4 Level Descriptions card

Packs are still available at £7.50 each (£13.50 to non-members). Contact DATA to place your order.

Management & organisation of learning

Programme of Study focus

3 Designing skills

- b use design briefs
- e make proposals modifications
- j model ideas
- k develop plans and alternatives
- l evaluation skills

4 Making skills

- e use kits
- f use a variety of components
- i develop strategies for making
- j evaluate and test products
- k make improvements and modifications

Knowledge and Understanding

6 Control

- a design, use and interconnect systems
- c use switches
- e use inputs, control, outputs
- g analyse performance

9 Quality – identify and use criteria re:

- a meeting needs
- b fitness for purpose

10 Health and Safety

- a recognise hazards

- b gather information to assess risk
- c take action to control risk

Investigative, disassembly & evaluative activities (IDEAs)

- Hold a group discussion to evaluate existing greeting cards and to set up criteria to decide what makes a successful greeting card and how it can be made appropriate to the specific occasion
- Disassemble greeting cards to identify switching methods and control devices
- Investigate switch types/operation methods which will be appropriate to the product.

Focused practical tasks (FPTs)

- Manufacture and testing of a circuit
- Manufacture of a switch for specific situation
- Design and production of graphics for the greetings card
- Installing a circuit and switch in the greeting card (package and operation to suit the situation/ occasion).

Design and make assignments (DMAs)

- Design and make an electronic greeting card (suited to an occasion selected by the pupil) that uses a switch to operate either light or sound output
- This will involve pupils in the selection and production of appropriate circuit/components and the design and manufacture of a switch to operate to given requirements (e.g. when the card is opened/closed, a section or button pressed, or a part moved). The card should be produced to a high standard using graphic techniques or DTP.

Opportunities for IT

CAD/CAM – design, layout and manufacture of PCB

CAD – use a cutter plotter for the net of the greetings card

DTP – use of text and clip-art or paint software package to produce original artwork

Database – for identification of components and applications.

Assessment

When pupils are designing and making to what extent are they:

- generating ideas which draw upon external sources and the understanding of the characteristics of familiar products?
- clarifying their ideas through discussion, modelling and drawing?
- evaluating their own ideas, showing an understanding of the situation?
- working from plans they have produced, and modifying them in the light of difficulties?
- using a range of tools, materials and processes with increased precision and control?
- measuring and checking procedures, and suggesting alternatives?
- evaluating their own work by comparing it with their design intentions, and suggesting improvements?

Flashy Greetings

Time allocation 16hrs
Key Stage 3
Year 8/9

The Context

This activity focuses on designing and making greeting cards for a celebratory occasion.

The Activity

This focuses on designing and manufacturing a greeting card that uses a purpose-built switch to activate lights (LEDs) or sound when the card is opened or a simple movement is performed.

Starting Points/Stimulus

- Disassembly of a commercial greeting card and novelty devices which have a greeting function – include examples from other times and cultures
- Investigate switch types and their operation
- Construct, evaluate and modify a circuit to flash LEDs on and off.

Key Experiences

Pupils will have developed knowledge and understanding about:

- control – switch types and forms
- how switches work and how they are employed in circuits
- electronics – circuit concepts, continuity, components and applications, circuit design and layout
- graphics – layout, text, fonts and sizing, nets (developments), colour use and application

and developed skills/strategies in:

- designing – researching for a specific need
- materials appropriate for the construction of their ideas
- circuit production (PCB, soldering)
- graphics.

Extension Activities

- Extend switch restrictions to include other operational criteria
- Extend circuit requirements to include delay after closing/opening
- Extend material to switch manufacture or packaging the circuit
- Include production of original artwork by use of paint or CAD package.

Curricular Links

Science – control concepts
Art & Design – development of graphics techniques, perhaps through use of IT

Key Vocabulary

Switches
Circuit production
Integrated circuits
Graphics terminology – colour, shape, line, form, nets

Resources

PCB production (or Veroboard or similar)
Electronic components (LEDs, 555 timer or flashing LEDs, buzzers or piezo resistors, capacitors, presets)
Soldering equipment
Prototyping materials for switches (e.g. use of nuts, bolts, pop rivets, springs, sheet metal, copper tape, washers, PCB, paper fasteners, soldering, etc.)
Card
Graphics equipment
DTP/WP software

Project Overview

Unit of work **14**

Control

52

Management & organisation of learning

Programme of Study focus

3 Designing skills

- d consider needs/values
- f aesthetics, function, safety, reliability, cost
- g properties of materials
- l evaluation skills

4 Making skills

- b select tools/processes/materials
- d join/combine materials/components
- f variety of components
- g finishing techniques
- j evaluate/test

Knowledge and Understanding

5 Materials and Components

- a properties
- c combine/process/finish
- d heat treatment

8 Products and Applications re:

- a intended purpose
- b choice of materials/components
- c production processes
- d scientific principles

9 Quality – identify and use criteria re:

- a meeting needs
- b fitness for purpose

10 Health and Safety

- b use information to assess risk

Investigative, disassembly & evaluative activities (IDEAs)

- Evaluate the safety accessories available and consider how well they do their job as well as aesthetic considerations.
- Discuss in groups what an article would be like in order for pupils to wear it; draw up an agreed list of criteria against which to evaluate their product later.
- Look at construction techniques and methods of fastening.

Focused practical tasks (FPTs)

- Discuss ways of evaluating design as well as the product
- Demonstrate and practise threading a sewing machine, sewing straight lines and curves

- Demonstrate and practise using fabric paints and pens, possibly producing a sample board
- Teach pupils how to make simple patterns based on their design ideas, stressing the importance of accurate measuring.

Design and make assignments (DMAs)

- Design and make a fashionable safety accessory using textiles that would be worn by a young cyclist during winter months. Pupils will need to reconcile the potential conflict between the function of the safety accessory with fashion appeal so that a young person would enjoy wearing it.

Opportunities for IT

Database – research accident figures
CAD – designs to embellish their accessory

Assessment

When pupils are designing and making to what extent are they:

- using the information gained from their investigations to guide their design decisions?
- taking into account the views of users?
- setting their own criteria for evaluation?
- evaluating their work as it develops?
- using the sewing machine competently?
- considering the possible conflict between aesthetic appeal and function when making decisions?

Be Seen to be Safe!

Time allocation 8hrs
Key Stage 3
Year 7

The Context

The context focuses on the need to wear safety clothing whilst cycling, particularly during the winter, and the need for fashionable accessories that young people would be prepared to wear.

The Activity

The activity focuses on developing pupils' evaluative skills, particularly around existing products and from which new ideas might be generated.

Starting Points/Stimulus

In small groups:

- Discuss current figures relating to the number of cyclists injured according to age, and the design needs and opportunities that pupils can see
- Consider safety accessories currently

available, such as tabards, leg/arm/headbands, shoulder straps and reflective panels. Evaluate according to fitness for purpose, including aesthetic appeal.

Key Experiences

Pupils will have developed knowledge and understanding about:

- developing criteria for their design against which evaluations can be made
- the importance of considering the function as well as the aesthetic appeal of their designs
- components and processes that are used to produce commercial safety accessories
- some of the special finishes applied to fabrics
- use of a sewing machine

and developed skills/strategies in:

- evaluating their ideas and product as it develops
- selecting appropriate materials and equipment
- joining fabrics together
- using fabric paint and crayons
- using a sewing machine.

Extension Activities

- Discuss when safety clothing needs to be worn in school, what is appropriate and why
- Investigate other safety finishes applied to fabrics
- Design a poster to emphasise the importance of wearing safety clothing
- Research other forms of protective clothing and their applications

Curricular Links

Mathematics – measurement

Science – properties of materials, reflective fabrics, luminous paints

Art & Design – aesthetic awareness

Key Vocabulary

Aesthetics

Reflective material

Fabric finishes

Resources

Recent figures relating to accidents involving cyclists

Luminous fabric paints

Reflective fabrics

Selection of fastenings – Velcro, buckles, studs

General sewing equipment

Paper, pencils etc.

Project Overview

Unit of work **25**

Textiles