

It has long been agreed that it is important for the values underlying the uses of design and technology to be made explicit. This applies to pupil considerations of the design and technology of others (including other times and cultures) and to their own designing and making. In developing resources for the teaching and learning of design and technology the Nuffield Project has tried to address these areas through using case studies, developing evaluation techniques and detailing design and make tasks. This article describes each of these approaches.

■ Using Case Studies

To enable pupils to consider the design and technology of others the Project has produced a suite of case studies. The Project has worked with individual designers, design consultancies, major retailers, large industrial concerns and those working in the developing world to ensure both breadth and authenticity.

Each study describes:

- the **context** in which the design and technology takes place;
- the **need** or **opportunity** as it arises in that context;
- the **process** by which the need was met;
- the **skills** and **understanding** used;
- the **outcome** produced to meet the need.

Teachers will be able to use the case studies in a variety of ways:

- to provide particular technical understanding;
- to provide the opportunity to evaluate the effects of design and technology in action;
- as a starting point or support for a design and technology task;
- as a means of showing ways to do things.

The pupils are guided through the case study by three sorts of activity — Pause for thought, Questions to answer and Research.

Pause for thought helps the pupils think about what they have just read so that the following text will be more easy to understand. There is no need for the pupils to write down a response to this type of activity.

Questions to answer requires the pupil to stop reading and tackle the question. The range of possible responses is wide. The pupil may be

required to write down an answer, make a drawing or a model, discuss the study with other pupils or make a short presentation to the class.

Research requires the pupil to find out more and to write about what they have found out. This may involve using a library or talking to someone who is an expert. To do it properly will take quite a lot of time so pupils will probably need to do it as homework.

Pupils are encouraged to keep the following questions in mind when they read a study:

- Whose needs are being met?
- Which people are involved or affected —all of them not just the most obvious?
- How did the people set about their task?
- What technical knowledge did the people use?
- What skills did they use?
- What was produced? What happened as a result?
- Who benefited from the design and technology activity (the winners)?
- Who lost out because of the design and technology activity (the loser)?

■ Using Evaluation Techniques

To help pupils realise the values that are important in design and technology the Project has worked with Intermediate Technology in devising two sorts of evaluation technique which bring value considerations to the forefront.

Winners and Losers

This uses a target chart to record all those likely to be affected by an outcome of design and technology — both directly and indirectly. Pupils then colour winners — those who gain from the outcome — blue; and losers — those who suffer or lose out from the outcome —yellow. This gives an immediate visual picture of a winner–loser balance and also provides a useful basis for discussion. In helping pupils use this technique they are asked to develop arguments that losers could use to persuade winners not to implement the technology and vice versa.

Is it appropriate?

This uses a set of appropriateness criteria linked to a series of questions as shown below. These encourage pupils to consider whether a

The Nuffield Approach to Values in Design and Technology

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particular outcome of design and technology is suitable or beneficial to those who might use it or be affected by it.

Technology is appropriate if...

It suits the needs of local people.

It uses local material.

It uses local means of production.

It is not too expensive.

It generates income.

It increases self-reliance.

It uses renewable sources of energy.

It is culturally acceptable.

It is environmentally friendly.

It is controlled by the users.

You can check whether appropriate technology is being used by asking these questions:

Is it what the people need and want ?

Does raw material need to be transported ?

Do local people make it near where they live ?

Can the people afford to buy, run and maintain it ?

Are jobs created or people made redundant ?

Does it improve people's lives ?

What fuel does it use ?

Does it fit in with the way people live ?

Does it damage or improve the environment ?

Does it need outside experts ?

■ Identifying Value Considerations in Design and Make Tasks

In describing the teaching intentions and the learning outcomes of design and make tasks the Project has identified the following value areas that teachers should bring to the attention of pupils: technical, economic, environmental, social, moral and aesthetic.

The exact nature of these values will depend on the particular task being tackled. The Project believes it is important to state them clearly so that ways to consider them can be built into planning the teaching of the task from the outset. Here is a typical example of a Key Stage 3 design and make task and the values that can be considered through it.

Props!

The task

To use the resources of design and technology to provide a service for the performing arts, e.g. travelling theatres, local repertory companies, street theatres, video film companies.

Task setting

Props! is a small design company which offers a complete service to performing arts groups at minimum cost. Their motto is 'You put on the show, Props! keeps the costs low' This they do by specialising in the provision of costumes,

settings and scenery that can be used in a variety of flexible ways. The pupils' tasks, working individually or in teams for 'PROPS!' is to identify a client, explore the requirements of their performance and develop a range of products to meet their needs.

Overall aims

- To teach pupils how to investigate the visual effects and the stage setting requirements for a variety of dramatic productions.
- To teach pupils an understanding of how the visual elements of costume contribute to an expression of personality and character.
- To teach pupils an understanding of patterns for garments, the choice of fabrics to create particular effects and the techniques of making up costumes.
- To enable pupils to explore how they could provide this service at a minimum cost and make a business plan with a cash flow forecast.

Nature of the product and possible pupil outcomes

A large or small scale (depending on individual or team working) costume, set of costumes, or accessories such as hats or other headgear, cloaks, collars, cuffs and sashes for use on the stage of a dramatic production.

Possible outcomes of pupils' work might include:

- a range of accessories which can be adapted to different characters by simple reversal or folding techniques;
- versatile masks to accommodate different characters;

- accessories which change appearance and character with different colour and intensity of lighting.

The product should be accompanied by a report on investigations into the nature of dramatic and visual effects required by the performance and how these have been achieved by the products developed within the budget available.

Strategy Resource Task No 6

Evaluating outcomes - winners and losers

Through this resource task you will learn how to evaluate a design by thinking about how it will affect other people. It is a technique used by designers and engineers to think about the consequences of their work.

You will need to use the Resource Book entry on page 23 - Evaluating outcomes - winners and losers and a copy of the winners and losers target diagram.

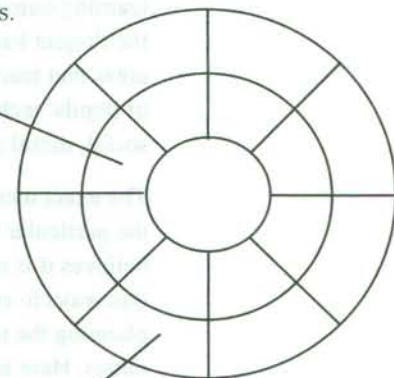
The Resource Book describes how a pupil used the target diagram to evaluate her design for a disposable waterproof hat. You will be able to use this technique to evaluate your designs. But first you can use this resource task to practice using the target diagram to think about the consequences designing an electric car.

Imagine that a company had produced a design for an electric car for use in cities. Write "electric car" in the middle of the target.

List all the groups of people who would be directly affected if this car were to be produced. You should be able to think of lots.

Write these people in the spaces round the first ring of the target. If there isn't enough room you will need to decide which are the most important and write them in the spaces.

Next list all the groups of people who would be indirectly affected. Again you should be able to think of lots. Write the most important ones in the outer ring.



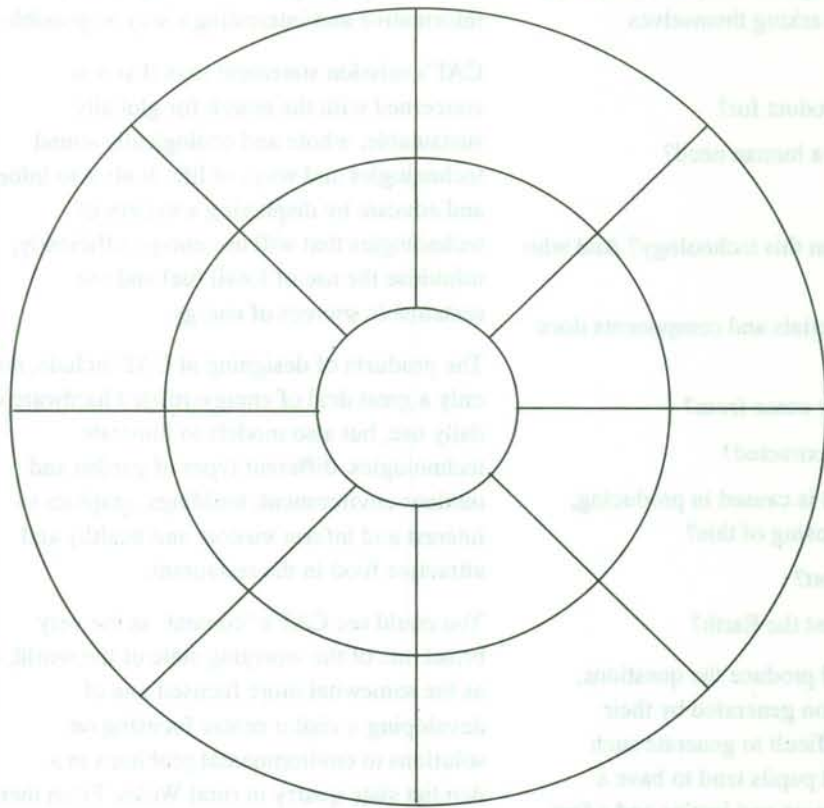
Look at each group and decide if they would be winners or losers if an electric car were to be produced. Highlight winners in one colour and losers in another.

Look at your chart and use it to decide whether developing a small electric car is a good idea.

If you think it is a good idea write down how you would persuade the losers to agree with you.

If you think it is a bad idea write down how you would persuade the winners to agree with you.

Winners and losers target chart



Write the design in the middle.

Write those directly affected by the design in the spaces in the first ring.

Write those indirectly affected by the design in the spaces in the outer ring.

Highlight the winners in one colour and the losers in another.

Use the colour balance to help you decide whether the idea is a good one or not.

Associated with the product should be 'PROP!' promotional literature.

The Values

Technical: safety and reliability are two important aspects of any product that Props provides.

Economic: performing arts budgets are always small and all costume design decisions must be affordable.

Moral: special effects that are frightening, gruesome or shocking are easily produced in the theatre. The appropriateness of these should be discussed.

Aesthetic: an appreciation of visual elements of costume that are significant in creating a

character can be developed through considering the effects of form, colour (in fabric and with lighting) and the effect of light and shade.

Social: the role of performing arts in providing recreation should be considered.

Environmental: street theatre can appear charming and attractive to some and an intrusion to others. Pupils should discuss how the provision for street performing can deal with this.

The Nuffield Design and Technology Project has developed the following materials for KS 3 which will be published by Longman in Spring 1994.

- A Resource Task File: a selection of short, focused activities designed to teach particular pieces of technical knowledge, design strategy, making skill or value appreciation.
- A Capability Task File: a selection of longer, more open tasks requiring designing, making and evaluating that have been designed to both teach and reveal pupil capability. They require pupils to use the knowledge, skill and understanding learned through Resource Tasks.
- A Student Study Guide: this will contain the Case Studies plus guidance for pupils on using the Nuffield approach to making progress in design and technology.
- A Design and Technology Resource Book: this will contain information about the knowledge and skills important in design and technology. Pupils will be able to use it for help in tackling both Resource and Capability tasks.
- A Teacher's Guide: this will help teachers use the materials in designing and managing their school's design and technology curriculum.
- A similar suite of materials suitable for use at KS 4 will be published in Spring 1995.