

Table 2 — Links to other Nuffield materials

Section title	Booklet page no	Student's Bk pg no	Worksheet Useful in pack	Res Task	Worksheet titles comments
Booklet 1					
Talking about needs and wants	p1	p2			
Finding out needs and wants					
PIES	p3	p4		SRT 5	
Using interviews	p4	p3		SRT 4	
Recording what people do	p5	p2		SRT 3	
Design Brief	p6	p9	✓	SRT 1	Writing a design brief
Specification	p8	p11	✓	SRT2	Writing a specification
Getting Design Ideas					
Brainstorming	p10	p13		SRT 11	
Drawing from nature	p11	p15		SRT 13	
Making connections	p12	p15		SRT 12, 16	
Attribute analysis	p14	p16	✓	SRT 14, FRT 3	Attribute analysis
Booklet 2					
Developing design ideas		Chpt 1			
Using annotated sketches	p1	p18			
Using 3D mock-ups	p3	p20		SRT 28	
Working models	p4	p33			
Testing taste	p5	p160		FRT 4-6	
Reviewing your work	p6				
First review	p7		✓		First Review
Second Review	p8		✓		Second Review
Communicating design ideas	p9	Chpt 2			
Presentation drawings	p9	p53		CRT 8-12	Useful in guiding through evaluation
Working drawing	p11	p53		CRT 1-7	
Packaging	p12	p60		RMRT 9	
Booklet 3					
Planning	p1	p45			Writing on separate small pieces of paper, then ordering them and sticking down to form a flow chart may help students who find it difficult to plan
Making					
Using the food processor	p3	p168			Clear instructions are given for using these pieces of equipment
Using the oven	p5	p170			
Using the pillar drill	p6	p88			Useful checklists and safety reminders for students across the ability range
Fitting parts together	p8	p94			
Cutting fabric	p9	p122			
Using the sewing machine	p10	p124			
Making changes	p12	p32/137			
Booklet 4					
Evaluating products					
User trips	p1	p47	✓	SRT 37	
Using the specification	p3	p48	✓		Third Review 1
Winners and Losers	p5	p49	✓	SRT 38	Third Review 2
Is it appropriate?	p7	p50	✓	SRT 39	Third Review 3
Evaluating yourself	p9				Understanding what keeps you back
Other worksheets (Not previously mentioned)					
My making skills					This is a record of tools used for resistant materials. Useful for all.
Generic template plus clip text					A pro-forma for use in a variety of ways. The clip text will give you some ideas – or add your own titles.

Teacher's Guide

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Nuffield Design & Technology at Key Stage 3

The Mainstream Approach

The Nuffield approach to teaching design and technology uses three key methods.

Resource Tasks: (contained in the *Teacher's File*) these are the focused practical tasks of the National Curriculum. They are short practical activities, designed to make students think and to help them acquire the knowledge and skill they need to design and make. The Resource Tasks all follow the same format so that students quickly become familiar with how the materials works. The Resource Tasks are fully photocopyable for use in the classroom.

Case Studies: some contained in the *Teacher's File*, some contained in the *Student's Book* and some available as free downloads from the website. These Case Studies include design and technology from other times and in other cultures, and all except those in the *Student's Book* are photocopyable to form A5 booklets.

Capability Tasks: (contained in the *Teacher's File*)

These involve designing and making a product that works and they take a lot longer than either resource Tasks or Case Studies. These are the designing and making assignments of the National Curriculum. In the process of designing and making students use what they have learned in Resource Tasks and Case Studies. Teachers can organise lessons so that students do related Resource Tasks and Case Studies as part of the Capability Task. In this way the teacher can make sure that students are successful in their designing and making and develop a constructively critical view of technology in society. There are 26 Capability Tasks in the *Teacher's File* presented in a framework that enables teachers to use them as they stand or make small adjustments. Teachers can also put their existing projects into this framework or use the framework for writing completely new designing and making assignments exactly suited to their needs.

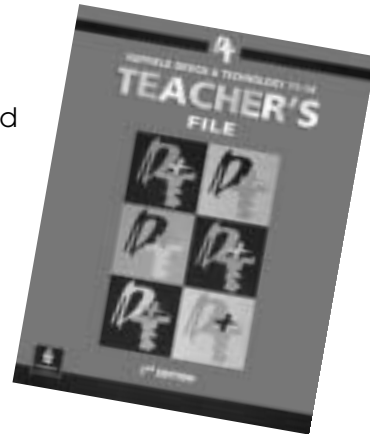


Table 1 — Links to National curriculum Programme of Study

Booklet	Topic	Programme of Study
Booklet 1 Deciding what to design and made	Talking about needs and wants	Design skills a identify appropriate sources of information that will help in their designing d consider the needs and values of intended users, and develop criteria for their design to guide thinking and form the basis for evaluation
	Finding our needs and wants	a identify appropriate sources of information that will help in their designing
	Writing a design brief	Design skills b use design briefs to guide design thinking
	Writing a specification	Design skills c develop a specification for their product
	Getting design ideas	Design skills e generate design proposals that match stated design criteria and modify proposals to improve them
Booklet 2 Developing and communicating ideas	Developing design ideas	Design skills j explore, develop and communicate their design ideas by modelling their ideas in an increasing variety of ways including the use of IT
	Reviewing your ideas	Design skills evaluate their design ideas as these develop, bearing in mind the users and purposes for which the product is intended, and indicated ways of improving their ideas Making skills j evaluate their products as these develop, including testing performance against specified criteria k implement improvements they have identified and take on-going action to ensure that their products meet the specification and their original intentions
	Communicating design ideas	Design skills j explore, develop and communicate their design ideas by modelling their ideas in an increasing variety of ways including the use of IT
Booklet 3 Planning and making	Planning	Making skills i develop a clear idea of what has to be done and propose an outline plan that includes the materials, equipment and processes to be used, and suggests alternative methods of making if first attempts fail
	Making	Making skills a identify appropriate sources of information that will help in their designing b select appropriate materials tools and equipment
Booklet 4 Evaluating	Evaluating products	Design skills d consider the needs and values of intended users, and develop criteria for their design to guide thinking and evaluation f consider the aesthetics, function, safety, reliability and cost of their design Quality: to help just the quality of a product including: a how far it meets a clear need b its fitness for purpose c whether it is an appropriate use of resources d its impact beyond the purpose for which it was designed

As a general guide for making up worksheets:

- keep them simple and directed as one task;
- be explicit about the outcome required.

Additional worksheet ideas

- ◆ To teach key words and their meanings

There are aimed specifically at directing the students' attention to the key words and/or their meanings, for example:

- our need for feeling safe and cared for are our ... **emotional** ... needs (Booklet 1);
- a target chart is ... **a chart for deciding who is a winner and who is a loser** (Booklet 4).

The **bold** text is omitted from the worksheet.

- ◆ To teach ideas and concepts

These direct students' attention to the different ideas and concepts in the booklets. A sentence can be taken from the text with specific words missing and by comparing with the text these words can be added, for example:

- when you are ... **thirsty** ... you need a drink (Booklet 1);
- quick tasting tests will help you ... **develop** ... food product ideas (Booklet 2).

- ◆ To support particular activities

These are designed to be specific to the task in hand and use the type of questions and statements used in the booklets, for example:

Will my design idea work? I think it will work because ... **the colours are bright and it moves up and down OK** ... (Booklet 2).

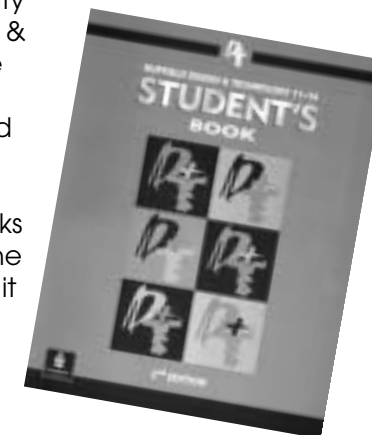
When using the sewing machine I use the ... **foot pedal** ... to control the speed (Booklet 3).

Student's Book

The *Student's Book* is a sort of "everything you wanted to know but were afraid to ask" work. It gives depth to the requirements summarised in the National Curriculum. Students can use it in several ways — as support material for Resource Tasks, as background reading for Capability Tasks, and as a textbook for revision with a collection of tables (Chooser Charts) that summarise useful information for making design decisions.

Whole key stage planning made possible

The head of department has the responsibility for ensuring that there is appropriate design & technology across the entire key stage. The overall experience needs to be broad and balanced. The teaching and learning should enable all students to make progress and provide for differentiation. The Nuffield approach is to select a set of Capability Tasks to form a sequence across the key stage. The sequence can be scrutinised to ensure that it provides for breadth, balance and progression. Class teachers can ensure differentiation in the way they negotiate with students their individual responses to Capability Tasks. The *Teacher's Guide* helps heads of department meet their planning responsibilities easily and efficiently. The *Teacher's Guide* is included in the *Teacher's File*.



The Learning Support Pack

These materials have been developed for the Nuffield Design & Technology Project as supplementary material to be used in conjunction with the main materials or as a teaching resource in its own right.

Although this pack is intended as learning support material it can be used equally well as a general introduction to the process of designing and making across the whole ability range at the beginning of KS3 in Year 7.

The pack consists of the following.

◆ A set of four booklets entitled:

- 1 Deciding what to design and make
- 2 Developing and communicating design ideas
- 3 Planning and making
- 4 Evaluating

Each booklet has a list of key words used in the test with a clear definition.

◆ A set of photocopiable worksheets that can be used to help students develop the skills needed for the various stages involved in designing and making.

This pack and the National Curriculum

Teaching through the four booklets will enable you to visit many of the key elements of the KS3 design and technology programme of study as indicated by the table on page 11.

This pack and the main course materials

The relationship between the main course materials and the learning support pack is summarised in the table on page 12. The pack provides opportunities to use the Nuffield approach with a wide ability range.

Using the materials

The support required by students is dependent upon the type and degree of difficulty being experienced. Three principal ways of using the materials have been identified:

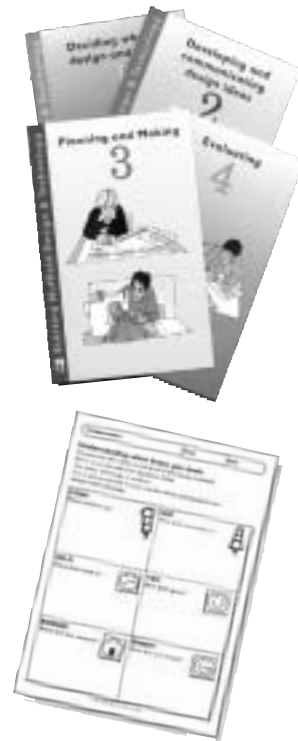
- ◆ helping individual students;
- ◆ working with small groups;
- ◆ for whole class teaching.

In each case the degree of support will vary from minimal to sustained. The suggestions made in this guide are offered as possible starting points.

Helping individual students with special needs

◆ With adult support

The booklets are ideal for non-specialist support whether in the classroom or at home. Specialist vocabulary is clearly explained at the back and the illustrations frequently show an example of the intended outcome.



◆ Cloze procedure

Select key words with design and technology meanings; place in a sentence and then omit these words in the written version of the sentence. Students fill in the blanks. Some students may need a list from which to choose the words to fill in the blanks.

For example:

“I get ideas for new products from existing products by using

Answer is 'attribute analysis'.

◆ Guess the word (20 questions style)

Students have to identify the design and technology word someone is thinking of by asking a set number of questions to which the answer can only be “yes” or “no”. The aim is to identify the word with the least questions asked.

Making your own worksheets

The last 2 pages of the Worksheet booklet are a worksheet template and clip text to enable you to construct worksheets to support students designing and making under the following board headings:

My collection

My interview

My records

Our brainstorm

My first ideas

My annotated sketches

My 3D models

My presentation drawing

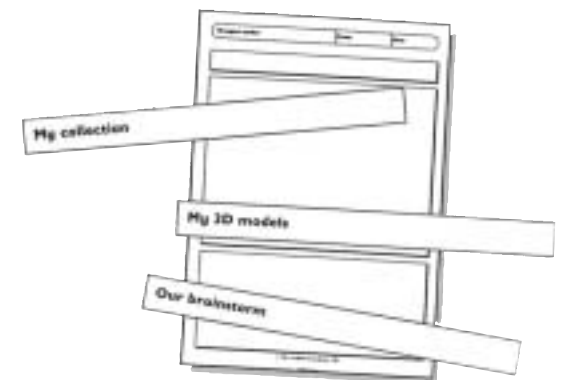
My working drawing

My stages of making

My final product

How this helped me in my designing

From this I have learned



Ideas for teaching Key Word Lists

◆ Wordsearch

A wordsearch puzzle, provided by you or students, familiarises students with design and technology vocabulary and focuses attention on the sequence of the letters thus aiding spelling.

◆ Using the word in a sentence

This is frequently used alongside a wordsearch activity. Four or five words from the wordsearch must each be put in different design and technology sentence.

◆ Matching pairs

Design and technology words are put in a random order in one column and the meanings in another. Words have to be matched to the correct meaning. This can be done using lines to match pairs, as a cut and paste activity, or the words and correct meanings written.

◆ Crosswords

Crosswords can be constructed using the definitions as clues. There are computer programs available to do this or a simplified 'crossword' can be constructed with the boxes running horizontally. If you can manage it, the initial letters can form a word reading down.

For example

- 1 summary of aims of the design and kind of product needed
- 2 feelings
- 3 statement describe what a product has to do, what it has to look like and other requirements
- 4 question and answer session
- 5 chart for planning ahead
- 6 about the content of food

1	D	E	S	I	G	N		B	R	I	E	F	
2	E	M	O	T	I	O	N						
3	S	P	E	C	I	F	I	C	A	T	I	O	N
4	I	N	T	E	R	V	I	E	W				
5	G	A	N	T	T								
6	N	U	T	R	I	T	I	O	N				

◆ For catching up

Students who have been absent can cover missed work either in the classroom or at home Even if the student has been absent for some time or is new to the school, the relevant booklet(s) can be read and tasks set so that the students is able to engage in the subsequent design and make activities in a meaningful way.

◆ For reinforcement

Use the mini-tasks set in the booklets as new ways to give practice for students who have not understood a particular strategy. Remember each one is targeted to develop specific skills.

◆ With a tape recording

Record the booklets. Use short tapes so that there is one book per tape. Use other students who read clearly to record them. Encourage use of the tape will reading the booklet when the simplified text is too difficult.

◆ For acquiring a specialist vocabulary

Using the Key Word lists as an aid for spelling will support the acquisition of specialist vocabulary. This saves teacher time and encourages independence.

◆ As a guide

Use as a guide to the whole, or part, of the design and make process to help students proceed independently. The booklets will structure the process of making choices and provide easy access to each stage of Capability Tasks and enable students to work at their own pace.

◆ As a checklist

Students can use the booklets as a checklist at the end of each stage in the designing and making process to when collating work at the end of a project.

◆ As reading material

Use the booklets as reading material. Many students with poor reading skills enjoy reading non-fiction books.

◆ For evaluating in a new way

Use the review sheets to help individuals evaluate their work when students are at different stages in the design process.

Working with small groups of students with special needs

◆ For discussion

Small group discussion ideas are given in Booklet 1. Larger sheets of paper, jumbo felt tips, someone acting as a scribe, can facilitate a group recording their discussion notes to present to the class.

◆ For teaching new strategies

Working together when learning new strategies builds confidence and allows those who are not sure how to begin to be aided by another. Interview questions, PIES activities, design briefs, specifications, brainstorming and attribute analysis can all be done in a small group. Annotating design ideas could be taught in pairs. Having someone ask questions about the design may highlight areas that need explanation.

◆ When introducing topics

When introducing a new section, for example “Deciding what to design and make”, ask groups to read the book (a page each in turn, or listen to a tape recording while following the text). List the possible strategies they could use from the book and highlight the ones that they think are the most appropriate. Class discussion could follow. This supports the process of choosing the most suitable strategies for the task when working independently.

◆ On a circus

Having a series of activities to do in turn is one answer to a lack of equipment. Practical activities interwoven with written or drawn tasks help students with a short attention span and keeps interest levels high. Designing and planning can be interspersed with practical Resources Tasks (focused practical tasks).

◆ When evaluating

Encouraging students to evaluate each other's ideas and products in a positive and constructive way is an important part of the design process. Groups could use the review sheets as a basis for this or could be asked to give 3 things they like and 3 things they think could be improved. User trips, winners and losers, and making an ‘Is it appropriate?’ checklist are ideal group activities.

◆ For monitoring progress

With partners (or in threes) students can show their work at various stages in the designing and making process. Partners are encouraged to make positive comments on work done and make suggestions. They are responsible for encouraging and helping to overcome problems.

For whole class teaching

◆ As a step-by-step guide

Whole class teaching is supported by the concise, step by step guide to designing and making. Different concepts and ideas are in simplified text on separate pages of the booklets so designing and making is broken down into manageable steps.

◆ For introducing a Capability Task (designing and making assignment)

Students can develop their understanding and ideas about the task by following Booklets 1 and 2. Individual students can read a page aloud and this can be discussed by the class. As concepts and ideas are developed, through class discussion, they can be written up on the white board or on sheets of paper and pinned to a board.

◆ Using students' ideas

Ideas from class discussion may be displayed in the class to act as a general resource and reminder for developing the Capability Task. Additional resource material can be gained from:

Nuffield Student's Book;

CD ROMs (always check suitability of content for task in hand);
a wide variety of magazines, books and catalogues.

◆ Using worksheets

As the class progress through the booklets, worksheets are introduced to help the students reinforce and develop their own understanding of the concepts involved, for example:

- Key words worksheets can be used to direct students to check on the meaning of words (at the back of the booklets);
- the Design brief worksheet for introducing this important concept (after class discussion).

The worksheets support the students' understanding of the booklet content and assist them in the development of ideas. Each page, or section, of a booklet may be supplemented with suitable worksheets:

- from this pack (see Table 2 on page 12 of this guide);
- or produced in-house (for additional worksheet ideas see page 12 of this guide).

◆ As homework

The booklets and worksheets are an inexpensive resource that can be used for homework purposes. They are presented in a manner that gives students access to the work involved and also to their parents or guardians.