

Primary Technology Project Report: Using Construction Sets for Learning Science and Technology Throughout The Primary Years

This short report is a summary of the conduct and results of an eight-year study which followed the work of a group of children in this aspect of science and technology. As a summary, it lacks some of the detail and polish which some readers might expect and yet it contains some useful advice for primary teachers and coordinators of design and technology and science. The focus is the children's experience of and response to construction sets. Gender is a strong theme within the report but, like other questions such as the interaction between science concepts and the affects of teaching styles, assumptions are made.

The report contains some useful elements but is not always easy to read as a result of its structure. It moves sharply from an overview to lists of recommended activities to a summary of results and a series of tabulated results. It reminded me of a summary paper which might be produced within the project to inform co-researchers. The result is that I had to read and skim through the report more than once before I grasped the links between the various elements mentioned above. A bibliography might have easily been included to assist readers interested to explore ideas further.

This report will be of interest to all those who deal with primary science and design and technology and who, like these classroom researchers, have seen the power of construction kits to assist children's learning and self-confidence. Gender is a significant issue, and this report provides more indication that there are gender considerations here and that to ignore them may be doing both boys and girls a major disservice. If there is an assumption in schools that boys are in some way better suited to work with these materials this study provides further evidence to dispel it. There is evidence here that there are important and different aspects of construction, mechanics and control that require attention for both boys and girls.

A series of 'working papers' within the document form a useful bank of ideas. These give detailed advice about the sort of construction activity which might be tackled progressively by primary aged children. Each provides ideas for activities and approaches in the classroom with a given age range. These could easily be adapted by primary colleagues and made more meaningful to your school's needs. Advice given is sound though many teachers and coordinators would want to know exactly which elements of the National Curriculum Programmes of Study are being dealt with. Criteria are provided for assessment of models but no explanation is given for their intended use. These might form an interesting basis for further work in school. It was very pleasing to see that the document includes examples for Year 7 and a useful reminder of the importance of transition to science and design and technology.

The researchers advocate that children's models be kept on display for at least 24 hours and photographed so that children can discuss them. Like many teachers I have long held the view that we lose a lot when we insist that the model is disassembled at the end of the lesson because we only have one set and the next group is waiting. Perhaps we need detailed research evidence to say that classrooms need more construction materials simply to allow models to be used for educational purposes (reinforcing those scientific concepts) after construction. I would love to hear more about the results of discussions with and among children about their models.

If we are going to raise standards in design and technology we will need to move the profession to a position where teachers can confidently address the needs of all children in design and technology and science. Primary professionals have limited time to devote to issues like gender in science and design and technology. Thus we need a community of teachers and researchers engaged in educational research which can give meaningful assistance to teachers seeking to raise education standards still further. Such a community may be growing around the subject of primary science (see Primary Science Review, Association of Science Education) in the primary years, but the picture looks less healthy with respect to

*Reviewed by Alan
Cross, Lecturer in
Education, University
of Manchester*

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design and technology at Key Stages 1 and 2. Journals like *The Journal of Design and Technology Education* have an important part to play as does the sort of research in this report.

This research report will be useful to primary teachers using construction kits in science, design and technology or indeed any other subject. It importantly points to a need for progression in children's experience and our expectations of them. At a time when much is expected of primary teachers and courses can be very expensive it represents value for money. This report contributes to what must be an ongoing inquiry about the use of resources and to our thoughts about the needs of girls and boys in science and technology.

The report mentions another version of the paper in IDATER 95 pp4 -9 which should be recommended to all those interested in classroom research in design and technology.

IDATER 95 reports the proceedings of the International Conference on Design and Technology Educational Research and Curriculum Development (1995). The proceedings are published annually by the Department of Design and Technology, Loughborough University of Technology, Loughborough, Leicestershire, LE11 3TU.

Primary Technology Project Report: Using Construction Sets for Learning Science and Technology Throughout The Primary Years

Christine Brown
£2.50 plus 50p p+p

Appropriate content	////	Generic use	=
Pupil/student use	///	One of a series	
Teacher resource	///	Photocopiable	
Visuals	NA	Pupil/student activities	=
Overall style	///	Cross-curricular	=

Key Ideas for Designing and Making

Georgina Stein
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Orders: 01582
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*Reviewed by Faith
Graham*

Key Ideas for Designing and Making

This book is colourful and inviting to the intended audience of primary teachers who are coordinators of technology. It is a slim paperback which is full of ideas of what teachers can do to enable their pupils to meet the National Curriculum programmes of study for design and technology.

The book is helpfully structured, providing a double page spread on each topic for design and make assignments, showing good quality finished pupils' products. The aims are usefully listed and may be incorporated into the teachers' planning as learning objectives. The introduction to each activity outlines its aim and what the pupils must do. Usable suggestions are made for what pupils may do throughout each stage of the design process. Clear coloured

diagrams are given for detailed aspects of the task which would enable all non-specialists to carry it out. On the next pair of pages, informative guidance is provided for focused practical tasks and investigative and evaluative activities. Ideas for worthwhile extension activities are provided.

The book contains sections on buildings, food, weather, toys and games, transport, containers, the sea, animals, celebration and textiles. Many of these would fit in with topics currently in use in schools and would provide relevant ways to include technology. The contents of the book are ideal for busy primary school teachers and provide a source of ready ideas for planning and teaching design and technology. This is a particular strength of the book and makes it very useful.

One weakness is that on occasion another design and make activity occurs during the focused practical task. This could lead to confusion.

Initially, the book states that pupils must consider the purpose of the finished product and the needs and wishes of the consumer. Some evidence of this is seen, but teachers are not given any guidance on doing this. In addition, opportunities to link with information technology to write up the results of tasting or evaluating other criteria for designs in simple spreadsheets are not capitalised upon.

Teachers will find this book easy to read, well laid out with colourful and attractive pictures of pupils' work and helpful for planning and teaching design and technology.

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Saturday 22 November 1997

Making Marks 2: Resist Dyeing Friday 6 March 1998
Saturday 7 March 1998

Participants will engage in a range of focused practical tasks to develop knowledge, skills and understanding of materials. These skills will then be applied to craft-based designing and making assignments. Together, these will provide ideal exemplar material upon which to base work with pupils at Key Stages 3 and 4. There will also be an opportunity to meet a maker, who will be providing an insight into the professional world of designing and making.

Fee: £79 per workshop (includes materials, coffee, lunch and tea).

Venue: Regional Technology Centre, Spencer Centre, Northampton.

For further information and a booking form contact: Diane Battams, NIAS Training, Spencer Centre, Lewis Road, Northampton NN5 7BJ. Tel: 01604 758758. (All workshops must be booked in advance).

Key Ideas for Designing and Making

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Appropriate content	////	Generic use	
Pupil/student use	//	One of a series	⇐
Teacher resource	////	Photocopiable	⇐
Visuals	////	Pupil/student activities	⇐

D&T Challenges Student Book 3 (9)

The D&T Challenges Students' Books and Teacher's Resources have been produced by the Royal College of Art Schools Technology Project and published in association with the Channel 4 Schools television series Real Life Design to support the design and technology curriculum at Key Stage 3.

The blue Students' book is intended for use with Year 9 students and has two main sections. The first section contains twelve Challenges, each of which is based on a different focus area. It presents Design and Make Activities in a way that is likely to stimulate student interest. Challenges range from the designing of a new bread product to the designing and making of a product to meet a fastening need. There is also the opportunity for students to set up a mini-enterprise. All of these are likely to appeal to the majority of 14 year olds.

Students are supported through each Challenge by a range of activities which stimulate research and further investigation. Information included gives an insight into aspects of Industrial practice and Case Studies are used to illustrate the application of similar challenges in the 'real world of manufacturing'.

The second section, called 'Designing and Manufacturing', aims to develop the generic knowledge and skills required to successfully carry out the assignments given in the first part. In this section students are encouraged to consider alternative methods of planning and to develop an awareness of the issues related to product development and manufacturing. The language used is effective without being too technical at this stage. The information and guidance contained in the second section build on previous knowledge and provide a firm foundation on which to build at Key Stage 4. Throughout the book coloured arrows indicate supporting page references within each section as well as in the other books available in the series.

This book offers an excellent framework for any design and technology department to develop appropriate and coherent schemes of work for Year 9 students. It offers

inspiration for teachers struggling to find imaginative design and make tasks as well as supplying relevant and appropriate knowledge related to industrial practice which is not always easy to find. Although it would be possible for students to work through a Challenge using the book, as a teacher, it is more likely that I would use it to support whole class/group activities.

If this book does have a weakness it is that it focuses principally on process and consequently relies on the availability of additional resources.

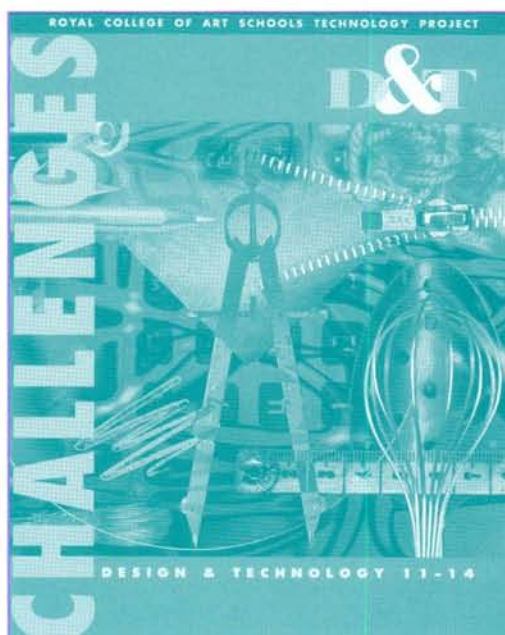
The layout is lively and visually attractive. Each section is well illustrated and the text is varied, therefore making it accessible to students of all abilities. The cost of the book is extremely reasonable and for any department yet to make a purchase this is definitely a resource I would recommend for Key Stage 3.

Reviewed by Susan Stanley, Acting Head of Sixth Form, Sir Wilfred Martineau College, Birmingham

D&T Challenges Student Book 3 (9)

RCA Schools Technology Project
Hodder & Stoughton Educational: £7.99
ISBN: 0 340 63929 6
Orders: 01235 400 400

Appropriate content	/////	Generic use	⇐
Pupil/student use	/////	One of a series	⇐
Teacher resource	/////	Photocopiable	
Visuals	/////	Pupil/student activities	⇐
Overall style	/////	Cross-curricular	⇐



D&T Challenges Teacher's Resource 3 (9)

The D&T Challenges Teacher's Resource 3 accompanies the blue Key Stage 3 students' book and contains detailed teaching notes to ensure maximum benefit from the designing and making assignments in the students' book. It gives guidance on how to manage the Challenges successfully, with additional information to support Designing and Manufacturing. A further section deals with a number of teaching and learning issues at Key Stage 3: Special Educational Needs, Systems and Control, Gender and End of Key Stage Assessment. A chart showing coverage of the National Curriculum Programmes of Study through the use of the Challenges and associated tasks is also included.

This book is clearly a welcome resource which offers teachers support in delivering designing and making assignments with a greater emphasis on designing for manufacture. It provides information and photocopiable student activity sheets which enable aspects of the design and technology curriculum such as costing, quality issues and planning for production to be tackled with greater confidence.

The Challenges in the students' book are basically presented in this Teacher's Resource as schemes of work. The layout of each follows the same format with headings which highlight the key features of the DMA, suggested time allocation, resources, opportunities for differentiation as well as homework ideas. The Teaching and Learning Issues section, which provides a framework for the delivery of Systems and Control, also includes End of Key Stage 3 Assessment and has a detailed student assessment sheet for each of the Challenges.

The strength of this book is the support it gives to introducing manufacturing and industrial practice at Key Stage 3 in a way which is accessible to teachers and students. It has a spiral binding which makes photocopying easier. The teacher notes are presented in landscape format which is useful because it enables the reader to view across more than one page. The photocopiable student activity sheets

are portrait and are therefore more easily identified.

It might be considered quite an expensive resource at £25.00 but since only one copy would need to be purchased, I think it is excellent value for money. For any department seeking to develop their Key Stage 3 curriculum this is definitely a resource I would recommend.

Reviewed by Susan Stanley, Acting Head of Sixth Form, Sir Wilfred Martineau College, Birmingham

D&T Challenges Teacher's Resource 3 (9)

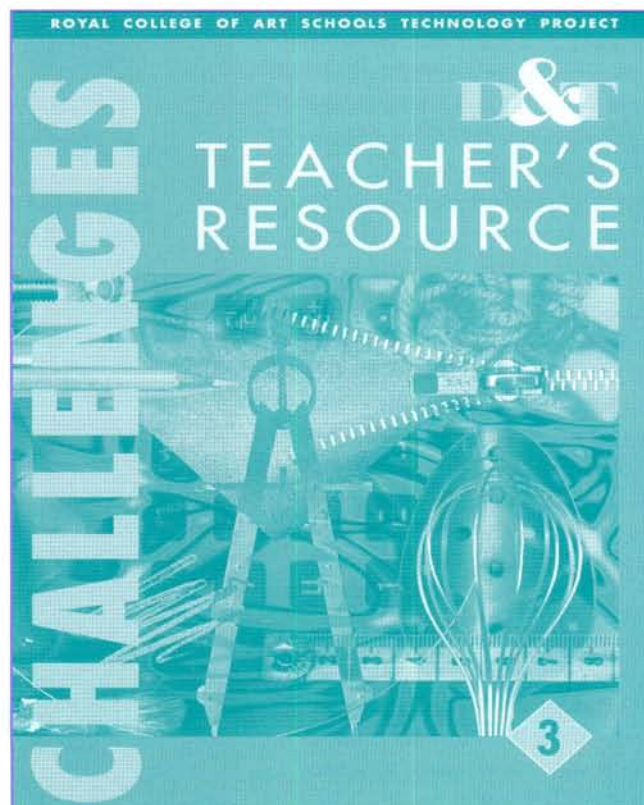
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Appropriate content	/////	Generic use	←
Pupil/student use	NA	One of a series	←
Teacher resource	/////	Photocopiable	←
Visuals	/////	Pupil/student activities	←
Overall style	/////	Cross-curricular	←



Reviewed by David Foster, Head of Technology, Tibshelf School, Derbyshire

Collins Design and Technology Foundation Course: Resistant Materials Systems and Control

In my opinion, this book is an excellent resource. Throughout the 110 pages, there are elements that, combined with children's experiences of, will more than equip them for design and technology success. The authors have devised a colourful format that will be of obvious appeal to children. The format is friendly and begs to be browsed. The book comprises two parts: the first 65 pages cover Resistant Materials, while the last 45 pages cover Systems and Control. The main chapter areas cover 'Designing', 'Materials', 'Working with Materials', 'Systems and Control', and 'Products and Product Design'.

I was particularly impressed by the layout which all readers will find easy to follow. The first chapter, dealing with designing, is very full and would provide the opportunity for any pupil to begin to solve problems with confidence. The process of designing is taken apart very effectively and the component areas are discussed clearly. I know that pupils feel supported when books show actual examples of youngsters like themselves working through the various stages of project work. It is pleasing to note that the youngsters portrayed in the book represent a considered gender and racial balance which must encourage positive messages among the intended readership.

Choosing the most appropriate material for a design is often problematic. Ideally the pupils would have access to a wide range of materials as they progress through Key Stage 3. Perhaps we as teachers restrict their access to a wide range because of the sometimes prohibitive cost of experimentation or due to time restrictions. This book allows the reader to explore the characteristics of most of the common materials that we would wish pupils to encounter in a straightforward, easy to understand (and remember) manner. Woods, Metals and Plastics are included, followed by a well thought out chapter on 'Working with Materials'. This includes information about joining materials and the use of effective surface finishes.

In the latter chapters concerning 'Systems and Control' the material is consistently well presented with many illustrations including colour photographs and diagrams which are combined with effective linking text. This variety of approach is vital today as our audience, as we are all too aware, is well used to seeing quality presentations in both video and magazine formats.

The chapter on 'Products and Product Design' is excellent. It details the actual design process undertaken by the Berol company as it researched the market and decided to develop a new range of coloured pencils and graphics materials to enable a significant market penetration within three years. The example works because it clearly demonstrates the design process in the real life situation. At this point the book returns to its starting point – designing. One thing is obvious: there are many starting points for designing and more than one appropriate structure to enable effective designing to be done.

This book is a gem. As a preparation for pupils for Key Stage 3 and into Key Stage 4, it is excellent. Class sets are well worth consideration, as are the other books in the series, 'Communicating Design' aimed at the Graphic Products course and 'Electronic Products' aimed at the Control Technology course.

Collins Design and Technology Foundation Course: Resistant Materials Systems and Control

Mike Finney, Colin Chapman and Michael Horsely

Collins Educational: £8.95

ISBN 0003273520

Orders: 0141 306 3455

Appropriate content	/////	Generic use	↔
Pupil/student use	/////	One of a series	↔
Teacher resource	/////	Photocopiable	
Visuals	/////	Pupil/student activities	↔
Overall style	/////	Cross-curricular	

*Reviewed by Ali
Farrell, Independent
Technology
Education Consultant*

Teaching Food Technology in Secondary Schools

Initially I thought that the title for this book was wrong. "Teaching Food Technology in Secondary Schools" gives the impression that the book provides materials with which to teach food technology. However, having read the book I would accept that it is very much about helping teachers, lecturers and those in training to gain a clear understanding about food technology in order that they might develop good practice. As such it is well focused, appropriate for the target audience and provides some very useful perspectives.

The book is edited by Marion Rutland who has a background in developing good practice in food technology herself – as a teacher, an advisor, and currently working in teacher education as Senior Lecturer in Education (Technology), Roehampton Institute. The contributors also, between them, span an impressive range of roles as practising educators either through classroom teaching, advisory work or within curriculum development projects.

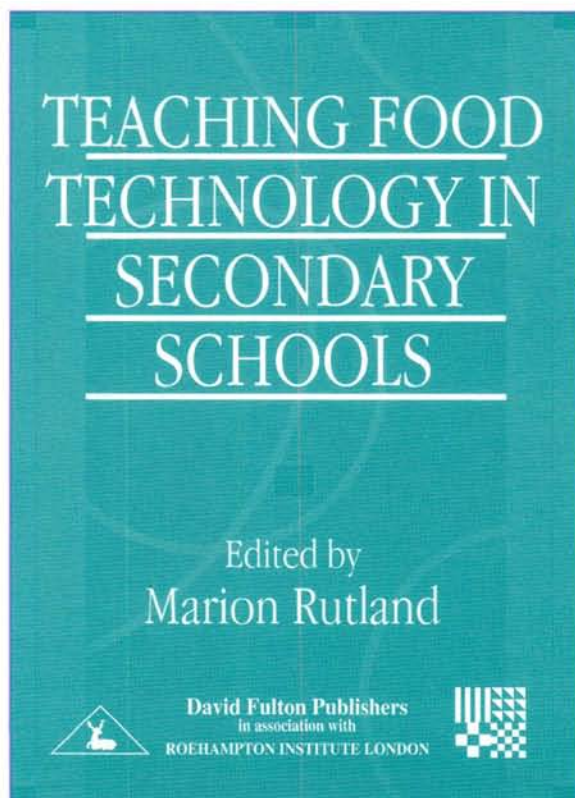
In the introduction Marion explains that the book is her attempt to:

- put the present situation regarding food technology in schools into perspective
- trace the roots of the subject up to the present day, using the past to help us to understand the present
- consider today's National Curriculum context
- provide some guidelines for the future.

Section 1 provides an overview of the historical development and rationale for the teaching of food in schools. Specifically, it identifies issues which have been raised about the subject in the past and which explain necessary changes and developments, notably the role of food within the National Curriculum. Section 2 considers classroom applications and explores issues related to curriculum planning. Section 3 focuses on a range of recent teaching materials from the Nuffield, Royal College of Art and Science with Technology projects. Section 4 turns to industry practices, considering these within the classroom perspective and discussing materials and strategies for using the industrial context to support and extend students' understanding of food product development and manufacture. The book concludes with a final section on the use of IT within food technology teaching – a hugely important inclusion given the development and use of new technologies generally and their potential scope as a resource within education. It is good to see so many examples which are specifically relevant to food technology.

A section on guidelines for the future, although indicated in the introduction, does not materialise as such which I think is a pity. A concluding paper which identified issues and priorities for the future of the subject and included the topic of future teacher training and resourcing needs of food technology would have been welcome.

As a set of papers the book is appropriately presented and readable by specialists and non-specialists alike, presenting a valuable overview for both. A useful glossary of terms used in the book and a bibliography are included. References made to relevant research and further reading are particularly



useful for those studying this area, whether teachers in initial training or those taking further studies as part of professional development.

At £15.99 it represents good value for money either as an individual purchase or for a department where it would make a good central reference resource for anyone in the team. This book is an important read for those who teach food technology as well as those who do not, but who might wish to better understand this aspect of the design and technology curriculum. It is not difficult to dip in and out of and probably lends itself more to this than a one-sitting read.

It is timely that the book has been published during a period of National Curriculum stability, since stability prompts reflection and readiness for continuing development. In this light it is valuable to have a collection of papers which highlight (often hard won) achievements in food technology and celebrate some of the good practice. I particularly appreciate that, whilst food technology's sometimes rocky ride to

acceptance within all sectors of the design and technology fraternity is not ignored, the book is not a defensive one. It concentrates positively on a range of the initiatives and approaches and demonstrates exemplary practice in this developing curriculum discipline. In so doing it surely underlines that food technology – applying design and technology knowledge, skills and understanding to develop ideas into food products – has now established itself as a valid part of the design and technology curriculum.

Teaching Food Technology in Secondary Schools

Marion Rutland (Ed.)

David Fulton Publishers: £15.99

ISBN: 1 85346 426 0

Orders: 0171 405 5606

Appropriate content	////	Generic use	⇐
Pupil/student use	N/A	One of a series	
Teacher resource	////	Photocopiable	
Visuals	////	Pupil/student activities	
Overall style	////	Cross-curricular	⇐

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Reviewed by Richard Foulger, Coordinator KS4 and Post 16 Technology, Hove Park School

Design and Technology (2nd Ed.)

This book was first published in 1991. Originally designed to cover the requirements of the GCSE (Years 10 and 11), it also covered the requirements of the Old Order National Curriculum, Key Stage 4.

The original was comprehensive, well organised and illustrated, with plenty of problem-solving exercises for pupils.

This second edition (1996) has been revised and updated to take account of the new National Curriculum for Design and Technology. In doing so, it has lost nothing of its original style or value as a thoroughly readable reference book.

As with the original, pupils should find it an easy book to read or peruse because of the simple layout. Students are recommended to read Chapter 1, which describes the stages in the design process, before looking up information.

All diagrams, photographs and illustrations are clear, precise, visually stimulating, well annotated and relevant.

There are plenty of questions, mostly of a problem-solving nature, which accompany each chapter. Particularly noteworthy is the Project Index (Revised) which lists a wide range of project briefs and examples of completed projects, all of which are covered in the book, photographed and page referenced. This should prove to be a source of stimulation to any pupil looking for examples or ideas, particularly as the photographs are of projects produced by pupils and therefore more acceptable to pupils.

Although essentially designed as a pupil reference book, teachers may also find it useful, particularly where clear illustrations are essential. It does have a generic use but the contents are more specifically useful to courses leading to examinations in Product Design, Resistant Material Graphic Products and, perhaps to a lesser extent, Electronics and Systems Control.

The contents of the book are virtually the same as the original version, covering the stages of the Design Process, Aesthetics, Ergonomics, Structures, Mechanisms,

Pneumatics, Control and Electronics, Materials and Manufactured Products.

The final chapter in the original version, 'Energy', has been replaced by the more relevant 'Manufactured Products', covering Design Quality, the Market, Society and the Environment, Manufactured Products and Methods of Manufacture, Consumer Choice and Product Analysis (including assembling and disassembling).

Apart from the final chapter, there are a number of other less obvious changes. Some consist of adding or removing minor details, and others the removal, replacement or relocation of pages. There are also some changes to Chapters 4,5 and 6, which mainly concern the coverage of Systems Approach and Control.

This remains a thoroughly readable and informative reference book for students (and teachers) working at Key Stage 4. It could also be useful as a revision base for 'A' Level Design and Technology students.

Priced at £12.95, it is a valuable addition to any technology book shelf, reference library or class set.

Design and Technology (2nd Ed.)

James Garratt

Cambridge University Press: £12.95

ISBN: 0 521 55607 4

Orders: 01223 312393

Appropriate content	/////	Generic use	←
Pupil/student use	/////	One of a series	
Teacher resource	/////	Photocopiable	
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Overall style	/////	Cross-curricular	

Guidelines for contributors

The **Journal of Design and Technology Education** is the professional journal of the Design and Technology Association. DATA is the recognised professional association which represents all those involved in design and technology education. The journal provides a forum for the exchange of views on design and technology education and welcomes contributions to all sections. Published papers become the copyright of the Design and Technology Association, unless otherwise agreed.

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The journal has three sections:

- Research
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The research papers published will emphasise the provision of a better understanding of design and technology and the improvement of the quality of design and technology education in schools, colleges and universities. Papers for the research section should usually be between 3,000-5,000 words though in exceptional circumstances papers of a maximum of 8,000 words will be considered. The curriculum development section has a number of sub-sections focusing on particular areas (primary, secondary, initial teacher education, special needs, etc). This section may contain reports of a less formal kind on aspects of interest to those involved in design and technology. Papers for the curriculum development section should be 1,000-3,000 words long.

Refereeing policy

Both the research and curriculum development sections of the journal are refereed and the normal academic criteria will apply. Each submission is read by the section editor and at least two other members of the editorial board, which meets three times a year. Contributors should note that there is likely to be a delay of several weeks between the acknowledgement of receipt of their work and notification of the decision of the editorial board.

Each article must be accompanied by an abstract of 100-150 words, as well as six key words for indexing. The author's name, title, current post and contact details, as well as the section for which the article is intended, should be stated on a separate sheet so that the article is suitable for double-blind reviewing. Please note that the editor-in-chief may, at his discretion, place the article in a different section from that suggested by the author.

Footnotes to the text should be avoided where possible but, if essential, should be placed at the end of the paper. Full references must be supplied for all articles in the following standard forms:

GRONLUND, N. E. and LINN, R. L. (1990). *Measurement and Evaluation in Teaching* (6th edn) New York: Macmillan.

ROBERTS, T. (1991). 'Gender and the influence of evaluation on self-assessments in achievement settings', *Psychological Bulletin*, 109, 2, 297-308.

Submission of material

All contributions should be supplied as word-processed text on disk, in an Apple Mac or IBM-compatible PC format (Microsoft Word), with 2 typescript copies, double spaced, typed on one side of the paper. Pages should be numbered consecutively. Figures, tables and other illustrations should also be supplied on disk. Where typescript copies only can be supplied, tables and figures should be placed on separate sheets and not included within the text. Please include photographs (with captions) where possible. Any illustrations (planning sheets, pupils' work, etc) should be on separate sheets, clearly labelled, and should be as clear as possible to assist reproduction. Typescripts and disks will not normally be returned to contributors unless sufficient postage has been sent.

The author should retain a copy of the article and supporting material since the editor takes no responsibility for material which may be lost in the post.

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Reviews

The reviews section reviews books, software (including CD-ROMs) and teaching resources which are relevant to design and technology. Material for review should be sent to the reviews editor at the above address.