
OCR GCSE IN DESIGN AND TECHNOLOGY:

ELECTRONIC PRODUCTS	1953
FOOD TECHNOLOGY	1954
GRAPHIC PRODUCTS	1955
RESISTANT MATERIALS TECHNOLOGY	1956
SYSTEMS AND CONTROL TECHNOLOGY	1957
TEXTILES TECHNOLOGY	1958
INDUSTRIAL TECHNOLOGY	1959
ELECTRONIC PRODUCTS (SHORT COURSE)	1053
FOOD TECHNOLOGY (SHORT COURSE)	1054
GRAPHIC PRODUCTS (SHORT COURSE)	1055
RESISTANT MATERIALS TECHNOLOGY (SHORT COURSE)	1056
TEXTILES TECHNOLOGY (SHORT COURSE)	1058

OCR ENTRY LEVEL CERTIFICATE IN DESIGN AND TECHNOLOGY:

FOOD TECHNOLOGY	3960
GRAPHIC PRODUCTS	3961
RESISTANT MATERIALS TECHNOLOGY	3962
TEXTILES TECHNOLOGY	3964

TEACHER GUIDE

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1 Introduction

This support guide has been designed to assist Design and Technology teachers embarking on new GCSE specifications for first examination in 2003.

This OCR document should in no way be seen as an additional bureaucratic burden for teachers. Its purpose is to assist and provide further guidance and help. The contents draw on individual specifications and contain no additional mandatory requirement on teachers or candidates.

This guide includes information pertinent to all specifications and can be freely photocopied if required.

1.1 GLOSSARY OF TERMS

Specification	A term which essentially replaces 'syllabus'. Expect a specification to 'specify' more of what is required of the candidate
Entry Level	Part of the National Qualifications Framework. Was referred to as Certificate of Achievement
Foundation Level	As part of the National Qualifications Framework, this is awarded to candidates who gain grades G to D
Intermediate Level	As part of the National Qualifications Framework, this is awarded to candidates who gain grades C to A*
Key Skills	Co Communication N Application of Number IT Information Technology WO Working with Others LP Improving own Learning and Performance PS Problem Solving
NC	National Curriculum
PoS	Programme of Study
ICT	Information and Communication Technology
SpaG	Spelling, punctuation and grammar. Now replaced with an assessment of the candidates ability to communicate their design thinking
Internal Assessment	A term which replaces Coursework
Smart Material	Modern materials developed for specialised applications. Smart materials have the ability to 'think' and respond to certain conditions.
Manufactured components	Pre-manufactured items which are necessary to complete a product. Manufactured components are bought in and are used as purchased, for example, 'Velcro', 'Puff-pastry', hinges, and electrical switches.

2 Specification Titles

2.1 FULL COURSES

OCR GCSE in Design and Technology (Electronic Products)	1953 (1459)
OCR GCSE in Design and Technology (Food Technology)	1954 (1460)
OCR GCSE in Design and Technology (Graphic Products)	1955 (1461)
OCR GCSE in Design and Technology (Resistant Materials Technology)	1956 (1462)
OCR GCSE in Design and Technology (Systems and Control Technology)	1957 (1463)
OCR GCSE in Design and Technology (Textiles Technology)	1958 (1464)
OCR GCSE in Design and Technology (Industrial Technology)	1959 (1469)

2.2 SHORT COURSES

OCR GCSE (Short Course) in Design and Technology (Electronic Products)	1053 (3459)
OCR GCSE (Short Course) in Design and Technology (Food Technology)	1054 (3460)
OCR GCSE (Short Course) in Design and Technology (Graphic Products)	1055 (3461)
OCR GCSE (Short Course) in Design and Technology (Resistant Materials Technology)	1056 (3462)
OCR GCSE (Short Course) in Design and Technology (Textiles Technology)	1058 (3464)

2.3 THEMES FOR 2003

Electronic Products	(1953) Supermarket Checkouts
Food Technology	(1954) Electrical Equipment – mixers, blenders and processors
Graphic Products	(1955) Children’s Activity Packs
Resistant Materials Technology	(1956) Garden Furniture
Textiles Technology	(1958) Textiles for Teenage Fashion Wear

All the above specifications are available on OCR’s website :

Home page - www.ocr.org.uk

From the home page access the specifications through:

- Qualifications;
- GCSEs, VGCSEs and Entry Level Certificates (formerly Certificates of Achievement);
- New GCSEs and Entry Level Certificates (formerly Certificates of Achievement);
- Then scroll down to the appropriate specification.

3.1 GUIDANCE FOR TEACHERS ON THE COURSEWORK TASK

This guidance has been written to reflect the linear format of the Internal Assessment Objectives. However, within focus areas of Design and Technology, some stages may interrelate and be cyclical in approach.

This specification requires candidates to produce an electronic product that can be marketed. The underlying influence on the project should be that the product will be the first of a batch of 50, realised in school/college with the facilities that are available. The candidate will realise the first, or the prototype of this Electronic Product.

When identifying the need for the project, candidates must consider the situation in which the product would be used and should give details of the likely user. The design brief must be clearly stated. Research into the brief should include market research to investigate the views of potential users and a review of existing similar products. The results should be analysed making use of ICT facilities. Research material must be relevant to the brief and should be evaluated by the candidate. The conclusions drawn from the research should inform the specification which must be detailed and should include a reference to the batch production of the article.

Candidates should consider a range of solutions, both for the circuitry and the product casing, and these should be evaluated against the requirements of the specification. Reasons for selecting the chosen ideas must be clearly stated. With regard to the selection of an appropriate case for the product, either individually designed cases manufactured by the candidates or commercially made boxes are acceptable. It must be remembered however that with a purchased case it is the work that is put into modifying the basic box to allow it to accommodate the circuitry which gains credit. Where appropriate, candidates should consider the use of 'smart' and modern materials.

In order to check the suitability of the circuit and its casing 2D and 3D modelling and computer simulation should be considered. The development of the product should include all essential items which convert the circuit into a marketable product. The candidate will also provide details of a suitable system to ensure control over the quality of batch production.

To avoid costly and time consuming mistakes it is important that detailed planning is completed before the making takes place. The making should provide clear evidence of the candidates competence and could include the use of computer aided manufacturing. Appropriate ICT work should be used in the production of Printed Circuit Boards (P.C.B's). Once completed the product and control system must be tested and evaluated against the specification and suggestions for improvement should be made.

ICT should be used throughout the activities of designing and making where appropriate.

The final outcome should be a high quality 3 dimensional marketable electronics product capable of being produced in quantity.

3.2 EXEMPLAR COURSEWORK TASKS: ELECTRONIC PRODUCTS

Candidates may select one of the following statements as a starting point for the coursework project. Through investigating the statement, candidates can devise their own design brief based on their interests and ability.

It is not compulsory to select an area of design from this list. Teachers and/or candidates can devise their own starting point. OCR coursework consultants are available to advise, if required.

- 1 The manager of a garden centre is trying to cut down labour costs involved in the business. Possible areas to be looked at are the temperature control, humidity control and plant watering.
- 2 A photographer wants to take pictures of a badger feeding at night. Not wanting to disturb the animal it is important to take the picture automatically.
- 3 Deaf competitors at swimming galas have difficulty in hearing the starter.
- 4 A keen gardener with a small greenhouse wants to go away on a two weeks holiday and requires an automatic plant watering system.
- 5 A small ensemble requires a portable device to help them get the timing of the music correct.
- 6 Consider the problem of caravan theft.
- 7 The scoreboards traditionally used for some sports such as snooker or darts have a number of disadvantages. Investigate.
- 8 Traditional spirit levels used in the building industry are accurate and reliable. An electronic level might have some advantages though, such as an easy to read display.
- 9 Employees in a shop often have to walk to the storeroom behind the shop with messages. Some kind of two-way voice communications system (intercom) between the two rooms would be very useful.
- 10 A small musical group requires a portable instrument tuner.
- 11 Car theft is increasing and some deterrent is an advantage. Design an alarm system which can be simply fitted to most cars but which uses a range of sensors to detect any attempt to tamper with the car.
- 12 Personal stereos and CD players are very popular and are ideally suited for individual listening. Sometimes, however, it is useful to amplify sound so that a small group of people can listen together.
- 13 A small business requires only a limited number of employees to have access to a certain room.

- 14** Some amateur musicians like to make cassette recordings of their practice sessions. Design a simple audio mixer which can combine the signals from two or three microphones.
- 15** A digital stopwatch is used at athletics tracks to time races. Investigate event timing.
- 16** Home computers can be used to record changes in temperature and sunlight. Investigate.
- 17** As an alternative to the traditional dice, for use on board games, it would be very useful to have an electronic dice which would display a number after the initial roll.
- 18** Cycle theft is increasing and a deterrent could be an advantage.
- 19** A random number generator for a mini lottery is needed for a school fate.
- 20** Many keen gardeners make use of their greenhouses throughout the year. Design a heating control system.
- 21** Many houses suffer from a damp problem that usually shows itself on the wallpaper or plasterwork. Provide a way for the householder to identify and possibly trace the problem.

3.3 EXPANSION OF AN EXEMPLAR COURSEWORK TASK

Task 18: Cycle theft is increasing and a deterrent could be an advantage.

Internal Assessment Objective 1:

Identification of a need or opportunity leading to a design brief

- An evaluation of the need for additional security for a cycle or its equipment when it is left for a short time.
- Consideration of the market possibilities for such a device and who would be the likely users.
- A clear statement of the problem and what the candidate intends to design and make as a marketable product.

Internal Assessment Objective 2:

Research into the design brief which results in a specification.

- Consider how cycles may be secured or what easily removed items should be protected.
- A survey, the results of which are analysed to determine the users requirements.
- Information, evaluated, to show how existing products satisfy the needs of the intended user.
- Relevant data evaluated.
- A specification developed from the research data, which includes the capability to manufacture the product using batch production methods.

Internal Assessment Objective 3:

Generation of design proposals.

- A collection of annotated sketches, systems and circuit diagrams illustrating a range of proposals suitable for the security devise.
- The proposed ideas are evaluated against the specification in order to illustrate their suitability; some proposals may require modification in order to satisfy the fitness for purpose.
- The most promising ideas are clearly selected for further development.
- Design proposals are presented using a range of graphic techniques and ICT including computer-aided design, to generate, develop, model and communicate design ideas. Two and three-dimensional modelling could be used.

Internal Assessment Objective 4:

Product Development.

- The chosen circuit must be tested to ensure that it meets the original brief. CAD packages may be used or a suitable prototyping system. Modifications may be required to meet the specification.
- The circuit should be converted into a PCB design, suitable for batch production.
- An investigation into the most appropriate methods for securing the PCB, battery, sensor, output device etc. into the casing, with reasoned decisions for choice.
- The possibilities and implications for batch production are considered and recorded.
- A system to provide control over the manufacturing of the product should be developed. This should enable uniformity of the product throughout the batch to be maintained.
- Final details of the product should be presented using a range of graphic techniques and ITC including CAD, to develop, model and communicate the ideas.

Internal Assessment Objective 5:

Product Planning and Realisation.

- A plan of action is produced specifying an effective order for the sequence of manufacture. The plan may include resource implications for the product.
- The making demonstrates the economic and efficient use of production tools and materials, including the flexibility to adapt to changing circumstances.
- Safe working procedures are evident during the making.
- A range of appropriate skills and techniques including computer-aided manufacturing are used effectively to produce a quality product.

Internal Assessment Objective 6:

Evaluation and Testing.

- The product is tested to ensure that it meets the original need and is fit for its intended purpose. The intended user should be involved in this process.
- The product is evaluated against the original specification.
- The control system itself should be evaluated.
- Proposals for further development are suggested with illustrations to show where improvements could be made to both the product and control system, used to aid the batch production process.

4.1 GUIDANCE FOR TEACHERS ON THE ON THE COURSEWORK TASK

This guidance has been written to reflect the linear format of the Internal Assessment Objectives. However, within focus areas of Design and Technology, some stages may interrelate and be cyclical in approach.

This specification requires candidates to produce a food product that can be marketed. The underlying influence on the project should be that the product would be the first of a batch of 50, realized in school/college with the facilities that are available. The candidate will realise the first, or the prototype of this food product.

The type of product selected should be challenging, but realistic in terms of resources and time available. Candidates are actively encouraged to think about the needs/requirements of the user group and the situation the product will be used in. It is vital that a design brief is established at the beginning of the process, to enable candidates to focus their research. (Some Centres provide the candidates with a design situation as a starting point, others allow individuals to recognise their own design need/opportunity.)

Having established a design brief, candidates need to extend their understanding of the situation by collecting, documenting and analysing relevant data. Candidates should be encouraged to use ICT where appropriate. Digital cameras, scanned and downloaded images, Internet and CD-ROM access can all provide opportunities for candidates to document information. Feedback from the intended user group about the requirements and expectations of the product can be obtained via a survey or in-depth interview. Product analysis of similar products already available can inform opinions about human interaction, product functions, value for money etc. The design specification provides a clear understanding of all the major design requirements needed to make the product successful. The candidate should acknowledge the considerations for quantity production as part of the specification.

Quick Initial design ideas can be developed and modelled. Trialling will provide additional details about possible solutions. The final design selection needs to be discussed and justified against the original design specification. Where appropriate, candidates should consider the use of 'smart' and modern materials. . (They test food and other materials, production methods and packaging. The results need to be recorded and decisions justified.)

During the product development section, candidates need to develop their idea towards a final product; exact quantities, sizes and shapes/forms of components are established. ICT may be used to show costing, nutritional information and record consumer preference etc. Candidates are to select and use appropriate devices that can be used as part of a system to maintain consistency during the manufacture of their product. The success of this device is assessed during the evaluation report.

Candidates need to plan the order of work, the processes, tools and equipment to be used. Time plans help to keep the candidate on target. Using a range of skills and techniques, candidates are expected to make a quality product that meets the requirements of the design specification.

The evaluation report provides the opportunity for the candidate to analyse the outcome against the original specification and whether they have used the correct materials, equipment etc. Full product testing will establish the success of the product and consumer/user group opinions will inform suitable modifications and further product development. An evaluation of the system designed to maintain consistency during production would establish its effectiveness and need for further improvements.

4.2 EXEMPLAR COURSEWORK TASKS: FOOD TECHNOLOGY

Candidates may select one of the following statements as a starting point for the coursework project. Through investigating the statement, candidates can devise their own design brief based on their interests and ability.

It is not compulsory to select an area of design from the list. Teachers and/or candidates can devise their own starting point. OCR coursework consultants are available for advice if required.

- 1** A large supermarket chain has found that many people today have special dietary requirements whose needs are not always met in the range of products they offer.
- 2** A number of people today buy food products according to their ethnic or moral beliefs. Investigate.
- 3** The market for between-meal snacks grows continually. A food manufacturer is keen to meet this demand.
- 4** Many food manufacturers have responded to the demand made by returning holidaymakers by developing a range of food products from different cultures. Investigate.
- 5** Many nutritionists are concerned how little fruit and vegetables are eaten today. Investigate.
- 6** As concern about the health of the nation increases, supermarket chains have responded by selling healthier food products. Research shows that many people still continue to eat food products that do not always meet the current dietary recommendations.
- 7** Many people celebrate special occasions. Food manufacturers are always keen for new ideas to increase their sales of novelty foods.
- 8** Staple foods form important basis for many food products. Food manufacturers are always keen for new ideas to increase their sales of food products made from staple foods.
- 9** As family lifestyles and eating patterns continually change, food manufacturers have responded by developing a range of 'ready to eat' food products.
- 10** Milk, eggs and cheese form important ingredients for many food products. Food manufacturers are always keen for new ideas to increase their sales of food products made from these protein foods.

- 11** Because of changes in our society there is now an increasing demand for 'single portion' food products. A supermarket chain is keen to respond to this situation.
- 12** The market for microwavable food products grows continually. A food manufacturer is keen to meet this demand.
- 13** For food manufacturers producing cakes, biscuits and pastries to maintain their competitiveness they have to have to update continually their image and find ways of meeting the changing needs of their customers.
- 14** The market for desserts grows continually. A food manufacturer is keen to meet this demand.

4.3 EXPANSION OF AN EXEMPLAR COURSEWORK TASK

Task 3: The market for between meal snacks grows continually. A food manufacturer is keen to meet the demand.

Internal Assessment Objective 1:

Identification of a need or opportunity leading to a design brief.

- A brief description of the need for between-meal snack, i.e. why has the demand increased and how have the manufacturers responded to this need?
- A consideration of the potential user group for the product. A clear statement of a design brief that will lead to a marketable product.

Internal Assessment Objective 2:

Research into design brief resulting in a specification.

- Examine the intended purpose of the product.
- Distribute appropriate questionnaires to a group of not more than 12 people. Analyse the responses to identify user needs.
- Evaluate existing products against the identified users needs.
- Evaluate existing products against the identified users needs – six products in a chart with a conclusion. Two products in detail.
- Consider a range of information associated with packing/labelling.
- Collect and record other information relevant to the design brief, e.g. chilling, freezing.
- Write a design specification which includes the capability for the product to be batch produced.

Internal Assessment Objective 3:

Generation of Design Solutions

- Produce an action plan.
- Consider a range of product proposals four, (if the products are complex, e.g. lemon meringue pie), to five proposals would be sufficient.
- For each proposal there should be evidence of:
 - 1 Listing of ingredients and accurate costing;
 - 2 A clear explanation of how the existing recipe has been adapted;
 - 3 Nutritional analysis.
- Evaluation of each proposal showing evidence of tasting and testing and consideration against specification.
- Explanation of final design proposal and why other possible proposals are rejected.

Internal Assessment Objective 4:

Adapt design proposal.

- Apply further testing, testing and modifications. Explain all the changes made with reasons. Include costings. Nutritional analysis (if appropriate).
- Implications of quantity manufacture – consideration of:
 - * Batch production;
 - * Use of pre-manufactured components, additives;
 - * Methods of control;
 - * Costing the final product for sale;
 - * Scaling up of ingredients;
 - * Use of large industrial equipment.
- Design a control system for production of the final product.
- Design a product specification.

Internal Assessment Objective 5:

Product Planning and Realisation

- Produce a plan of action for production of the final product.
- Produce a final marketable product (product and packing idea – 2D net shape to scale, including the internal packaging).

Internal Assessment Objective 6:

Evaluation and Testing

- Test and taste using five intended users.
- Evaluate planning and use of resources.
- Analyse the performance of the control system.
- Suggest proposals for further development, (e.g. how product could be developed into a range), modifications or improvements for both product and control system.

5.1 GUIDANCE FOR TEACHERS ON THE COURSEWORK TASK

This guidance has been written to reflect the linear format of the Internal Assessment Objectives. However, within focus areas of Design and Technology, some stages may interrelate and be cyclical in approach.

This specification requires candidates to produce a Graphic product that can be marketed. The underlying influence on the project should be that the product would be the first of a batch of 50, realised in school/college with the facilities that are available. The candidate will realise the first, or the prototype of this product.

Graphic products meet a wide range of needs in areas such as advertising, promotion, marketing, packaging and the communication of information. They should be commercially viable products in their own right; capable of being tested and fully used for their intended purpose.

Projects should be based around the use of graphics materials and skills. The use of other materials is permitted, but only as a supplement to the core materials of paper, card, foamboard, and thin sheet plastics. Where appropriate, the use of suitable 'smart' and modern materials should be considered.

Materials such as rigid foam and balsa wood are considered as supplementary materials.

A Graphic Product should not be a model of a product only capable of giving a visual impression that does not function in the way that the actual product would. For example, a concept model of a torch. Resistant materials should be used in a support role, for example to produce a mould for vacuum forming thin polystyrene sheet.

The type of project selected should be challenging, but realistic in terms of resources and time available. Candidates are actively encouraged to think about the needs/requirements of the user group and the situation the product will be used in. It is vital that a design brief is established at the beginning of the process, to enable candidates to focus their research. (Some Centres provide the candidates with a set theme as a starting point, others allow individuals to recognise their own design need/opportunity.)

Having established a design brief, candidates need to extend their understanding of the situation by collecting, documenting and analysing relevant data. Candidates should be encouraged to use ICT where appropriate. Digital cameras scanned and down loaded images, Internet and CD-ROM access can all provide opportunities for candidates to document information. Feedback from the intended user group about the requirements and expectations of the product can be obtained via a survey or in-depth interview. Product analysis of similar products already available can inform opinions about human interaction, product functions, value for money etc. The design specification provides a clear understanding of all the major design requirements needed to make the product successful. The candidate should acknowledge the considerations for quantity production as part of the specification.

Quick initial design sketches can be developed and modelled using CAD. Annotation can provide additional details about possible solutions. The final design selection needs to be discussed and justified against the original design specification. Where appropriate, candidates should consider the use of 'smart' and modern materials.

During the product development section, candidates need to develop their idea towards a final product. They test materials, production methods and surface finishes. The results need to be recorded and decisions justified. Exact sizes and shapes of components are established. Prepared spreadsheets may be used to show the costing for one single item and/or batch of ten etc. Tessellating can be used to determine economic use of materials. ICT can be used to create a realistic representation of the finished product. Candidates are to design and make a simple device such as a jig, former or template that can be used as part of a system to maintain consistency during the manufacture of their product. The success of this device is assessed during the evaluation report.

Prior to realisation, candidates need to plan the order of manufacture, the processes, tools and equipment to be used. Time plans help to keep the candidate on target. Using a range of skills and techniques, candidates are expected to make a quality product that meets the requirements of the design specification.

The evaluation report provides the opportunity for the candidate to analyse the outcome against the original specification and whether they have used the correct materials, equipment etc. Full product testing will establish the success of the product and consumer/user group opinions will inform suitable modifications and further product development. An evaluation of the system designed to maintain consistency during production would establish its effectiveness and need for further improvements.

5.2 EXEMPLAR COURSEWORK TASKS: GRAPHIC PRODUCTS

Candidates may select one of the following statements as a starting point for the coursework project. Through investigating the statement, candidates can devise their own design brief based on their interests and ability.

It is not compulsory to select an area of design from this list. Teachers and/or candidates can devise their own starting point. OCR coursework consultants are available for advice if required.

- 1** A Company that specialises in producing printed and die-cut card products is looking to launch a new range of self-assembly card creatures. They require a design suitable for die-cut manufacture that will be printed in full colour, and that will include all necessary assembly instructions.

- 2** As a creative person, you have been approached to write, illustrate and produce a new book. These are the publisher's requirements:
 - A simple pop-up book suitable for young children;
 - Suitable for use by parents when teaching their children to read;
 - To be short but interesting;
 - To contain a maximum of two mechanisms.

- 3** A local printing firm is planning to launch a range of greeting cards. They must:

 - Feature some form of card engineering;
 - Have an appropriate theme.
- 4** Fashion dolls have a number of accessories available, but their cost is quite high. Design and make a product that:

 - Can be sold alongside the doll's accessories;
 - Has a low cost;
 - Is suitable for self assembly.
- 5** A multi-national company produces a different 3D promotional product each year to be sent to existing and potential customers. As this gift is intended to be used in an office environment, its intended use needs to be explored. The product must answer the following points:

 - It must promote the company and its products;
 - It must be capable of being sent flat-packed through the post;
 - It must be easy to assemble without the use of adhesives.
- 6** Fast food outlets often sell children's meals in attractive containers. These containers are:

 - Supplied flat-pack;
 - Ready for rapid assembly without the use of adhesives.
- 7** Music and video stores use eye-catching three-dimensional stands situated near to cash tills to promote new releases. These stands:

 - Support and display being promoted;
 - Are designed to have a short 'product life';
 - Are distributed to the stores for self-assembly.
- 8** Visitor's Centres are to be found throughout the country, and range from wildlife conservation areas to inner-city industrial sites, and to historic houses set in country estates. These "Visitor's Centres" are frequently used for group visits. For a site of your choice, design and make a graphic product to meet the needs of visitors.
- 9** The packaging of chocolate confectionery:

 - Is often exciting and innovative;
 - Frequently involves a theme;
 - Demonstrates many diverse styles and types.
- 10** Collectable scale models are popular and cover a range of subjects. A Company requires a design that:

 - Is capable of being assembled by the user;
 - Includes clear instructions.
- 11** A game's manufacturer requires a board game to meet the following points:

 - Must be self contained;
 - Suitable for use when travelling.

- 12 Cosmetics packaging can be exciting and original, but far too frequently the product is housed in a rectangular box. A new range of cosmetics is about to be launched and the manufacturer is looking for a totally new design.
- 13 As part of a new publicity campaign, a new car manufacturer wishes to display their vehicle brochures in a range of retail outlets. They require a temporary promotional stand that is suitable for postal dispatch to outlets around the world.
- 14 Teachers use many different types of visual aids to enable students to learn. Your local primary school requires a 3-dimensional resource that provides a solution to the learning of telling the time.
- 15 A Company, which sells model trains and slot racing car sets, wishes to expand its range of model kits for trackside buildings.
- 16 The design of packaging offers many challenges concerning form, function, construction and presentation.
- 17 A food company is to introduce a range of healthy foods with a natural theme. The packaging for this range must:
 - Promote healthy eating;
 - Be environmentally friendly.
- 18 A visitors guide is to be produced for your local town. To make the guide more interesting it has been decided that it must include the following feature:
 - Some form of interactive mechanism or pop-up.
- 19 A travel company is to produce an Internet Web Site. To promote this new facility, they require a counter top graphic product to advertise the Web Site address in its shops.
- 20 A local primary school needs a number of small tabletop Puppet Theatres to be used by pupils for the performance of their own short plays.
- 21 To help raise funds, a charity is to place card collection boxes in Banks and Post Offices. The collection box must be capable of being sent to locations through the post.

5.3 EXPANSION OF AN EXEMPLAR COURSEWORK TASK

Task 16: The design of packaging for unusual shapes

Internal Assessment Objective 1:

Identification of a need leading to design brief.

- An analysis of unusual shaped products that may need preserving and protecting during transportation – candidates use text, drawing, photographs.
- A consideration of the range and type of user for such a product.
- A clear statement of the problem and what the candidate intends to design and make as a marketable product.

Internal Assessment Objective 2:

Research into design brief resulting in a specification.

- An identification of the possible features of the product to provide preservation and protection during transport, image and information.
- Survey and analysis of available existing packaging.
- A collection and analysis of information on how existing products solve this problem.
- A specification that lists the design requirements of the intended product including capability to manufacture in quantity.

Internal Assessment Objective 3:

Generation of design proposals.

- A collection of annotated sketches showing a range of appropriate solutions.
- Two and/or three dimensional models are made to help with product development.
- The proposed ideas are evaluated against the specification and good/bad points are identified.
- The best ideas are chosen considering the need and their fitness for purpose.
- The final design proposal is presented using a combination of text, graphical techniques and computer generated images.

Internal Assessment Objective 4:

Product Development.

- An investigation into possible suitable materials including any testing relevant to the intended product purpose. Choice of material based on investigation and testing.
- Suitable construction methods and available manufactured items are considered and recorded following modelling and testing.
- Considering the investigation and testing, modifications are made to the chosen design to improve the product.
- The possibilities and implications for quantity manufacture are considered and recorded.
- Final details of materials, production methods and manufactured items required are recorded using a combination of text, graphical techniques and computer images.

Internal Assessment Objective 5:

Product Planning and Realisation.

- A plan of action is produced specifying an effective order for manufacture of the product considering materials, tools and equipment.
- Making is carried out demonstrating the economic and efficient use of materials, tools and equipment. Modifications may be made during making in response to changes in circumstances.
- Safe working practice is evident during making.
- An appropriate range of skills and techniques is used to produce a quality product.

Internal Assessment Objective 6:

Evaluation and Testing.

- The outcome is evaluated against the original specification.
- Its fitness for purpose is tested on the intended user group.
- Proposals for further development are suggested with illustrations to show where improvements could be made.
- The performance of the planned control system for the manufacture of the product is analysed against their production of a single product.

6.1 GUIDANCE FOR TEACHERS ON THE COURSEWORK TASK

This guidance has been written to reflect the linear format of the Internal Assessment Objectives. However, within focus areas of Design and Technology, some stages may interrelate and be cyclical in approach.

This specification requires candidates to produce a Resistant Materials product that can be marketed. The underlying influence on the project should be that the product would be the first of a batch of 50, realised in school/college with the facilities that are available. The candidate will realise the first, or the prototype of this product.

The type of project selected should be challenging, but realistic in terms of resources and time available. Candidates are actively encouraged to think about the needs/requirements of the user group and the situation the product will be used in. It is vital that a design brief is established at the beginning of the process, to enable candidates to focus their research. (Some Centres provide the candidates with a design situation as a starting point, others allow individuals to recognise their own design need/opportunity.)

Having established a design brief, candidates need to extend their understanding of the situation by collecting, documenting and analysing relevant data. Candidates should be encouraged to use ICT where appropriate. Digital cameras, scanned and down loaded images, Internet and CD-ROM access can all provide opportunities for candidates to document information. Feedback from the intended user group about the requirements and expectations of the product can be obtained via a survey or in-depth interview. Product analysis of similar products already available can inform opinions about human interaction, product functions, value for money etc. The design specification provides a clear understanding of all the major design requirements needed to make the product successful. The candidate should acknowledge the considerations for quantity production as part of the specification.

Quick initial design sketches can be developed and modelled using CAD. Annotation can provide additional details about possible solutions. The final design selection needs to be discussed and justified against the original design specification. Where appropriate, candidates should consider the use of 'smart' and modern materials.

During the product development section, candidates need to develop their idea towards a final product. They test materials, production methods and surface finishes. The results need to be recorded and decisions justified. Exact sizes and shapes of components are established. Prepared spreadsheets may be used to show the costing for one single item and/or batch of ten etc. Tessellating can be used to determine economic use of materials. ICT can be used to test a component design prior to CAM manufacture. 3D modelling tools can create realistic representation of the finished product. Candidates are to design and make a simple device such as a jig, former or template that can be used as part of a system to maintain consistency during the manufacture of their product. The success of this device is assessed during the evaluation report.

Prior to realisation, candidates need to plan the order of manufacture, the processes, tools and equipment to be used. Time plans help to keep the candidate on target. Using a range of skills and techniques, candidates are expected to make a quality product that meets the requirements of the design specification.

The evaluation report provides the opportunity for the candidate to analyse the outcome against the original specification and whether they have used the correct materials, equipment etc. Full product testing will establish the success of the product and consumer/user group opinions will inform suitable modifications and further product development. An evaluation of the system designed to maintain consistency during production would establish its effectiveness and need for further improvements.

6.2 EXEMPLAR COURSEWORK TASKS: RESISTANT MATERIALS TECHNOLOGY

Candidates may select one of the following statements as a starting point for the coursework project. Through investigating the statement, candidates can devise their own design brief based on their interests and ability.

It is not compulsory to select an area of design from this list. Teachers and/or candidates can devise their own starting point. OCR coursework consultants are available for advice if required.

- 1 Mechanical toys continue to provide interest, humour and fascination for all ages.
- 2 Puppets have been used as a form of entertainment throughout history. Children gain great pleasure from making the puppet carry out different movements.
- 3 'Sit on' or 'push along' toys are very popular with toddlers. They can help develop the child's balance and co-ordination.
- 4 Puzzles are great fun for the whole family. They can be challenging and competitive.
- 5 An unusual money storage system may encourage children to save their pocket money.
- 6 Educational toys can help young children learn important information in a fun and pleasurable way.
- 7 There is an ever-increasing need for visual aids to help in the understanding of a process or concept.
- 8 Body adornment continues to be a mode of self-expression and individuality.
- 9 Mobiles and wind chimes are designed to be visually attractive and help to reduce the stress of modern living.
- 10 The storage of small items can be a problem in many homes.
- 11 Photograph frames and mirror frames can enhance interiors and become objects of desire.
- 12 Many pets become bored and their owners seek activities to amuse them.

- 13 A garden centre is considering launching a range of products suitable for a small town garden.
- 14 A city gallery is considering launching a range of products suitable for 'special occasion' presents.
- 15 Weather vanes / house signs / door furniture, provide decorative and functional features to the outside of the property.
- 16 Elderly people often have difficulty carrying out every day tasks due to reduced mobility from conditions such as arthritis.
- 17 Litter is an ever-increasing problem in today's society.
- 18 Expensive sports equipment is often dumped in the garage or in the corner of the bedroom when not in use.
- 19 The security of personal possessions can be a problem when camping or caravanning.
- 20 Displaying examples of student's work has become part of school life. It enhances the environment and provides an area of interest for parents, teachers and pupils. Display systems can be moved or adapted to cater for different demands.
- 21 The number of reported vehicle thefts is on the increase. It is important to deter the 'would-be-thieves' as well as preventing them driving the vehicle away.
- 22 During the re-building of motor vehicle, kart and model engines, specialist tools are often required.
- 23 Vehicles occasionally breakdown during a long distance journey and an emergency tool kit can be very helpful.
- 24 When servicing a motorcycle, mechanics need to make sure that the motorcycle is stable and will not fall over.

6.3 EXPANSION OF AN EXEMPLAR COURSEWORK TASK

Task 1: Mechanical toys continue to provide interest, humour and fascination for all ages.

Internal Assessment Objective 1:

Identification of a need or opportunity leading to a design brief.

- A brief description of the range of mechanical toys available and the situation they are used in.
- The development of a design brief which can develop into the construction of a marketable product. For example:
 - * Design and make a mechanical toy based on the theme of sporting activities;
 - * Design and make a mechanical toy suitable for young children to play with;
 - * Design and make a mechanical toy to be included in the RSPB gift catalogue;
 - * Design and make a humorous mechanical toy.
- A consideration of the needs of the user group for this kind of product.

Internal Assessment Objective 2:

Research into design brief which results in a specification.

- Relevant data to include an identification of the various mechanisms that provide different types of movement. Information about health and safety when designing for specific user groups and an acknowledgement of ergonomic and anthropometric requirements.
- An analysis of similar products already available. Recording factual information and making personal comments about suitability etc.
- An interview or questionnaire to help establish what the user group requires from such a product. - Full analysis and conclusions.
- A specification that lists the design requirements of the product including an acknowledgement that batch production of the final solution must be considered. (N.B. The device, designed to maintain consistency, will be used and evaluated as part of the project.)

Internal Assessment Objective 3:

Generation of design proposals

- A collection of quick annotated sketches showing a range of appropriate solutions.
- Two and/or three-dimensional models to help develop solutions.
- The development of favoured solutions working out the types of mechanisms to achieve the required movements, brief comments about suitable materials, etc.
- An evaluation of the proposed ideas against the original design specification and the final solution fully justified against the needs of the user group.

Internal Assessment Objective 4:

Product Development.

- An investigation into possible suitable construction materials. Rejection selection should be based on personal testing or experimentation.
- An investigation into possible construction methods, processes and workshop equipment. Rejection/selection should be fully justified.
- Computer modelling, or fabricating a prototype may help develop the concept and improve the design.
- The size and shape of each component should be decided and recorded. This may take the form of a working drawing using CAD.
- An investigation of material costs and availability. An investigation of items that need to be purchased, such as hinges, gears, handles, switches etc.
- The possibilities for batch production should be investigated and documented. Candidates are encouraged to design and make a simple jig, former or template that will be used during the construction process as a system to maintain consistency.
- Full details of materials, production methods and pre-manufactured items required are recorded using a range of graphic techniques and ICT using CAD.

Internal Assessment Objective 5:

Product Planning and Realisation

- A plan of action showing the order of manufacture and final details of materials, tools and equipment. This is usually in the form of a flow chart. Time charts help to focus the activity and set weekly targets.
- During construction, material should be cut economically. Safe working procedures should be followed and the device produced to aid in the consistency during manufacture should be used.
- Marks are awarded for an appropriate range of skills and techniques used to make a quality product that functions as intended.

Internal Assessment Objective 6:

Evaluation and Product Testing

- The mechanical toy is evaluated against the original specification.
- The product's fitness for purpose is tested in the situation it was designed for. Individuals from the user group should be given the opportunity to use the product and make comments.
- The success of the planned control system (jig, former, template) for the manufacture of the product is analysed against their production of a single product.
- As a result of the testing, proposals for further development are suggested and explained.

7.1 GUIDANCE FOR TEACHERS ON THE COURSEWORK TASK

This guidance has been written to reflect the linear format of the Internal Assessment Objectives. However, within focus areas of Design and Technology, some stages may interrelate and be cyclical in approach.

This specification requires candidates to produce a Systems and Control Technology product that can be marketed. The underlying influence on the project should be that the product would be the first of a batch of 50, realised in school/college with the facilities that are available. The candidate will realise the first, or the prototype of this product.

The type of project selected should be challenging, but realistic in terms of resources and time available. Candidates are actively encouraged to think about the needs/requirements of the user group and the situation the product will be used in. It is vital that a design brief is established at the beginning of the process, to enable candidates to focus their research. (Some Centres provide the candidates with a design situation as a starting point, others allow individuals to recognise their own design need/opportunity.)

Having established a design brief, candidates need to extend their understanding of the situation by collecting, documenting and analysing relevant data. Candidates should be encouraged to use ICT where appropriate. Digital cameras, scanned and down loaded images, Internet and CD-ROM access can all provide opportunities for candidates to document information. Feedback from the intended user group about the requirements and expectations of the product can be obtained via a survey or in-depth interview. Product analysis of similar products already available can inform opinions about human interaction, product functions, value for money etc. The design specification provides a clear understanding of all the major design requirements needed to make the product successful. The candidate should acknowledge the considerations for quantity production as part of the specification.

Quick initial design sketches can be developed and modelled using CAD. Annotation can provide additional details about possible solutions. The final design selection needs to be discussed and justified against the original design specification. Where appropriate, candidates should consider the use of 'smart' and modern materials.

During the product development section, candidates need to develop their idea towards a final product. They test control systems, materials and production methods. The results need to be recorded and decisions justified. Exact sizes and shapes of components are established. Prepared spreadsheets may be used to show the costing for one single item and/or batch of ten etc. ICT can be used to test the design of a system prior to manufacture. 3D modelling tools can create realistic representation of the finished product. Candidates are to design and make a simple device such as a jig, former or template that can be used as part of a system to maintain consistency during the manufacture of their product. The success of this device is assessed during the evaluation report.

Prior to realisation, candidates need to plan the order of manufacture, the processes, tools and equipment to be used. Time plans help to keep the candidate on target. Using a range of skills and techniques, candidates are expected to make a quality product that meets the requirements of the design specification.

The evaluation report provides the opportunity for the candidate to analyse the outcome against the original specification and whether they have used the correct materials, equipment etc. Full product testing will establish the success of the product and consumer/user group opinions will inform suitable modifications and further product development. An evaluation of the system designed to maintain consistency during production would establish its effectiveness and need for further improvements.

7.2 EXEMPLAR COURSEWORK TASKS: SYSTEMS AND CONTROL TECHNOLOGY

Candidates may select one of the following statements as a starting point for the coursework project. Through investigating the statement, candidates can devise their own design brief based on their interests and ability.

It is not compulsory to select an area of design from this list. Teachers and/or candidates can devise their own starting point. OCR coursework consultants are available for advice if required.

- 1 Gardening is an ever increasingly popular hobby with many gardeners wanting to grow plants from hot and humid parts of the world. These types of plants require a very accurately controlled environment that can only be achieved within a greenhouse.
- 2 Telescope astronomy requires the operator to constantly re-adjust their telescope position to keep the object being observed in view.
- 3 A primary school is collecting aluminium drink cans for charity. To reduce storage space it is necessary to crush the cans flat.
- 4 A keen gardener wishing to make the most of household waste decides to use teabags on the compost heap. It is found though that the bags require shredding before putting them on the heap. Investigate.
- 5 A golf club wish to retrieve lost golf balls from a lake. Investigate.
- 6 The accurate measuring and recording of weather data is important for many jobs and hobbies.
- 7 Keeping fish in outdoor ponds is a common pastime. A build-up of algae in the water is a problem that can affect the health of fish. Investigate.
- 8 A primary school has a pet hamster that has a habit of escaping.
- 9 A farmer has noticed that his free range chickens will all go back to the hen house on their own at dusk. He still has to shut the door each night to secure them from foxes. Investigate.

- 10 The design and technology department have introduced a recreational course in woodcarving during lunchtimes. Many students have been encountering problems holding their material when carving irregular shapes.
- 11 The local home for the elderly have indicated that many of their residents have difficulties when they have to open food cans in their own kitchens.
- 12 A local woodworking company have normally paid to have their wood shavings and/or sawdust removed from their premises at regular intervals. They have now realised that they could sell the waste for fuel if it was in a more compact form.
- 13 The art department has just invested in some new cameras and developing equipment for its students. Investigate opportunities for control devices.
- 14 Modern garages can often be cramped for space and this can make it difficult to get in and out of the car whilst it is in the garage. To ease the problem the car needs to be parked as close as possible to the nearside wall of the garage giving the driver more space on his/her side. Investigate.
- 15 Keeping tropical fish can be a time consuming task. One of the most important tasks is feeding the fish at the same time every day.
- 16 Mountain bikes are expensive and popular items to own and many are stolen each year. Design and make an alarm device to reduce the cases of theft.
- 17 Photography course. The developing of photographs requires quite accurate timing.
- 18 Many keen gardeners make use of their greenhouses throughout the year. This can prove difficult during the winter months with the onset of cold weather.
- 19 Babies often wake and start crying. Normally if the baby does not need feeding or changing, the parent can gently rock the baby back to sleep.
- 20 Many cat owners have installed a cat-flap into an exterior door to give the pet freedom to leave and enter the house without disturbing its owner. Investigate the possibilities of a device that will enable the owner to restrict either exit or entrance through the cat-flap at any given time or times.

7.3 EXPANSION OF AN EXEMPLAR COURSEWORK TASK

Task 7: Keeping fish in outdoor ponds is a common pastime. A build-up of algae in the water is a problem that can affect the health of the fish. Investigate.

Internal Assessment Objective 1:

Identification of a need or opportunity leading to a design brief.

- An analysis of ponds and fish keeping with particular emphasis on the problems of algae build-up in the water.
- A consideration of the range and type of user for such a product.
- A clear statement of the problem and a precise design brief of a marketable product.

Internal Assessment Objective 2:

Research into the Design brief which results in a specification.

- An identification of the possible features of the product necessary to accurately detect a dangerous build-up of algae.
- A collection and analysis of information on how existing products solve this problem, or similar problems.
- A collection and analysis of relevant data that may help to solve the problem – sensing equipment, display methods, computer interfacing methods for display of information for example.
- A specification that lists the design requirements of the intended product including the capability for it to be batch produced.

Internal Assessment Objective 3:

Generation of design proposals.

- A collection of annotated sketches showing a range of appropriate solutions. This would include both the method of detecting/displaying algae levels and also any form of packaging.
- Two and/or three dimensional models are made to help with product development.
- The proposed ideas are evaluated against the specification and good/bad points are identified.
- The best ideas are chosen considering the need and their fitness for purpose.
- The final design proposal is presented using a combination of text, graphical techniques and CAD (computer aided design).

Internal Assessment Objective 4:

Product Development.

- An investigation into possible suitable materials including any testing relevant to the intended product purpose. Choice of material is to be based on investigation and testing. This may cover materials for the casing or packaging of the product, for example.
- Suitable production methods and the use of pre-manufactured standard components are investigated and recorded using a variety of methods including ICT. Electronic components are typical of pre-manufactured standard parts.
- Modelling and testing to include two and/or three dimensional models. Computer simulations and tests as well as bench testing. This could involve CAD to provide detailed drawings of the product or part of the product that could be linked to CAM, or using software to design electronic circuits or programmable chip design.
- Modifications to be made following analysis of results which lead to an improved design. Testing may highlight faults with circuit design or with tolerances in assembling component parts.
- The necessary control system is designed to allow for production in batch quantity.
- Full details of materials, production methods and pre-manufactured items required are recorded using a range of graphic techniques and ICT including CAD.

Internal Assessment Objective 5:

Product Planning and Realisation.

- A plan of action is produced specifying an effective order for manufacture of the product considering materials, tools and equipment.
- The realisation is carried out demonstrating the economic and efficient use of materials, tools and equipment. Modifications may be made during making in response to changes in circumstances. It is a good idea to record these changes.
- A range of skills and techniques are evident along with safe working procedures.
- The product meets the requirements of the design specification.

Internal Assessment Objective 6:

Evaluation and Testing.

- The outcome is evaluated against the original specification.
- Its fitness for purpose is tested on the intended user group.
- Proposals for further development are suggested with illustrations to show where improvements could be made.
- The performance of the manufacturing control system is analysed after use and modifications suggested.

8.1 GUIDANCE FOR TEACHERS ON THE COURSEWORK TASK

This guidance has been written to reflect the linear format of the Internal Assessment Objectives. However, within focus areas of Design and Technology, some stages may interrelate and be cyclical in approach.

This specification requires candidates to produce a Textile Product that can be marketed. The underlying influence on the project should be that the product would be the first of a batch of 50, realised in school/college with the facilities that are available. The candidate will realise the first, or the prototype of this Textile Product.

The type of project selected should be challenging, but realistic in terms of resources and time available. Candidates are actively encouraged to think about the needs/requirements of the user group and the situation the product will be used in. It is vital that a design brief is established at the beginning of the process, to enable candidates to focus their research. (Some Centres provide the candidates with a design situation as a starting point, others allow individuals to recognise their own design need/opportunity.)

Having established a design brief, candidates need to extend their understanding of the situation by collecting, documenting and analysing relevant data. Candidates should be encouraged to use ICT where appropriate. Digital cameras, scanned and down loaded images, Internet and CD-ROM access can all provide opportunities for candidates to document information. Feedback from the intended user group about the requirements and expectations of the product can be obtained via a survey or in-depth interview. Product analysis of similar products already available can inform opinions about human interaction, product functions, value for money etc. The design specification provides a clear understanding of all the major design requirements needed to make the product successful. The candidate should acknowledge the considerations for quantity production as part of the specification.

Quick initial design sketches can be developed and modelled using CAD. Annotation can provide additional details about possible solutions. The final design selection needs to be discussed and justified against the original design specification. Where appropriate, candidates should consider the use of 'smart' and modern materials.

During the product development section, candidates need to develop their idea towards a final product. They test materials and production methods. The results need to be recorded and decisions justified. Appropriate pre-manufactured components are selected. Prepared spreadsheets may be used to show the costing for one single item and/or batch of ten etc. ICT can be used to ensure economic use of materials and to test a design prior to manufacture. 3D modelling tools can create realistic representation of the finished product. Candidates are to design and make a simple device such as a pattern block, screen printing stencil or template that can be used as part of a system to maintain consistency during the manufacture of their product. The success of this device is assessed during the evaluation report.

Prior to realisation, candidates need to plan the order of manufacture, the processes, tools and equipment to be used. Time plans help to keep the candidate on target. Using a range of skills and techniques, candidates are expected to make a quality product that meets the requirements of the design specification.

The evaluation report provides the opportunity for the candidate to analyse the outcome against the original specification and whether they have used the correct materials, equipment etc. Full product testing will establish the success of the product and consumer/user group opinions will inform suitable modifications and further product development. An evaluation of the system designed to maintain consistency during production would establish its effectiveness and need for further improvements.

8.2 EXEMPLAR COURSEWORK TASKS: TEXTILES TECHNOLOGY

Candidates may select one of the following statements as a starting point for the coursework project. Through investigating the statements, candidates can devise their own design brief based on their interests and ability.

It is not compulsory to select an area of design from the list. Teachers and/or candidates can devise their own starting point. OCR coursework consultants are available for advice if required.

- 1 Many trades' people need their hands free yet their tools close at hand.
- 2 Travelling at home and abroad can quite often broaden views regarding the use of colour in clothing and household items. Develop and produce a textile product that owes its origins to a particular region or country that could be sold in a tourist shop. Investigate.
- 3 The fashion world continues to shock often at great expense. Using textile materials gathered from recycling, develop a garment to be worn on the catwalks of the year 2010
- 4 Mountain biking is a popular activity for many young people today. Carrying food and protective/spare clothing for the day could make the biker unstable. Investigate the possibilities for marketing a textile product solution.
- 5 The owner of a local retail outlet, which specialises in the manufacture of items for special occasions, has asked you to design an item of clothing or an accessory.
- 6 Investigate how Cultural Influences and trends in society affect fashion and furnishings.
- 7 Investigate toys that help children to learn.
- 8 'Looking Great' is a company who wish to increase their market share of teenage fashion sales.
- 9 A new restaurant is about to open in your area and needs a corporate identity. You have been asked to provide design ideas for the uniforms of male and female staff.
- 10 Theme parks and other tourist attractions often promote themselves through the production and sale of textile items.

- 11 Sports and leisure equipment often has to be carried or stored when not in use.
- 12 Older people can find difficulty in keeping warm in winter.
- 13 The natural look in colours and fabrics is very fashionable in interior design and home decoration.
- 14 A sportswear manufacturer is interested in diversifying into the teenage casual wear market. Present a collection of clothes designs and a sample of one of the garments you think would be popular with this fashion group.
- 15 A high street retailer wants to introduce a range of summer hats for young children.
- 16 Creative textile work is a popular pastime. Design and develop a kit containing the materials and instructions for a particular technique that could be sold commercially.
- 17 Aboriginal and ethnic designs have considerable fashion appeal to teenagers. Develop designs for a range of beachwear and accessories based on this theme.
- 18 Pets need warmth and comfort. Design a range of items that would fulfil this purpose.
- 19 A manufacturer wishes to include a bag in its childcare and wear range.
- 20 A hotel chain requires a decorative statement for their foyer.

8.3 EXPANSION OF AN EXEMPLAR COURSEWORK TASK

Task 14: A sportswear manufacturer is interested in diversifying into the teenage casual wear market. Present a collection of clothes designs and a sample of one of the garments you think would be popular with this fashion group.

Internal Assessment Objective 1:

Identification of a need or opportunity leading to a design brief.

- Description of the range of users in the teen market.
- Identification of season/theme.
- A statement of what is to be designed and what might be included in the collection. Which item(s) might be made up.

Internal Assessment Objective 2:

Research into design brief resulting in a specification.

- Identification of types purposes and function of casualwear.
- Market research survey of what is currently available locally materials, construction and costs. Evaluation of results.
- Survey of possible users – analysis and evaluation of results.
- Specification listing design requirements – possible selection of fabrics, construction and evidence of awareness of manufacturing potential. Reference quantity manufacture.

Internal Assessment Objective 3:

Generation of Design Solution.

- Collection of annotated sketches (using templates) showing range of possible designs and outcomes.
- Some paper modelling, shapes and patterns. Evaluation of fitness for purpose, colourways, fastenings, design details.
- Review against specification and make final choice of design for production with fabric probabilities/construction methods.
- Presentation of final design proposal using combination of text, graphic, computer generated images.

Internal Assessment Objective 4:

Product Development.

- Fabric/thread choice made after appropriate comparative testing for strength/flexibility/aftercare/aesthetics.
- Investigation of construction methods and suitability for purpose.
- Make modifications to chosen design as a result of testing. Identify quality control points and match production method to be used.
- Identify and record any changes, which may have to be made for quantity manufacture, including pattern/template to be used.
- Presentation of final design with details of fabrics, thread, fastenings, construction techniques, using text, graphic techniques, ICT etc.

Internal Assessment Objective 5:

Product Planning and Realisation.

- Draw up a detailed plan of action giving appropriate order of work, approximate timings, materials, quantities, equipment, tools and other resources to be used.
- Make up chosen design to highest possible quality, demonstrating safe, effective and accurate use of materials, tools and equipment. Record any changes or modifications that have to be made.
- Demonstrate an appropriate range of skills and techniques to complete a quality product in the given time.

Internal Assessment Objective 6:

Evaluation and Testing.

- The outcome (designs and garment) are evaluated against the original specification. Meaningful conclusions are drawn.
- Garment is tested in use for fitness for purpose.
- Review use of materials, tools and equipment and make recommendations/proposals for modification/improvement, to:
 - * product;
 - * template or pattern.
- Analysis of performance of their planned control system in the product sample.

9.1 COURSEWORK TASKS: INDUSTRIAL TECHNOLOGY CAPABILITY TASKS

This specification requires candidates to complete one of the following six Industrial Technology capability tasks.

If, however, candidates wish to develop their own Industrial Technology capability task then it **must** conform to the criteria given below **and** be submitted for approval.

To seek approval, Centres should use Coursework Task Proposal Forms supplied to Centres in a Coursework Administration Pack or download the form from the OCR website:
www.ocr.org.uk

OCR coursework consultants are available for advice, if required.

9.2 INDUSTRIAL TECHNOLOGY CAPABILITY TASK CRITERIA

- The device produced must be capable of manufacturing or assisting in the manufacture of another product. It is the product being produced and NOT the device itself that forms the 'production in quantity' requirement of this specification.
- The device should be capable of producing the product in consistent quantity and quality.
- The device must be a quality 'engineered product'
- The proposal should be achievable by the candidate in 40 hours.

9.2.1 Embossing Tool for Business Cards

Candidates are required to:

Design and make a hand operated embossing tool for business cards.

Candidates are **not** required to design or make the embossing die. For trialling, testing and evaluating a standard 6mm DIA mild steel washer can be used as the embossing die and this can be secured to the tool using any suitable adhesive. Candidates should be advised that for best results when embossing card, they should lightly spray the card with water to dampen it.

Points to consider in relation to assessment objective 1 to ensure that candidates are assisted towards a sound start:

- Research should be carried out into the embossing process, the terms used in embossing, how the process is applied to a range of materials and into business cards, their uses, and their method of manufacture;
- The product design specification should be appropriate to the product and to the application of the product within a quantity production system for business cards in order that repeated quality and accuracy can be assured;
- Candidates should identify and collect appropriate data from the investigation, analysis and evaluation of existing similar products.

9.2.2 An Injection Moulding Die

Candidates are required to:

Design and make an injection-moulding die to produce small plastic artefacts or components.

The component produced by the moulding die should be determined by the candidate as a result of research, but it should be one that has a three dimensional form, such as a container or connecting piece for a tubular structure. For testing and evaluating an ordinary hot melt glue gun can be used to make prototype components using PVA hot melt glue.

Points to consider in relation to assessment objective 1 to ensure that candidates are assisted towards a sound start:

- Research should be carried out into the process of injection moulding and its wide commercial application;
- Candidates should carry out experiments and trials around the injection moulding process using hot melt PVA glue;
- Candidates should ensure that their product application for the injection moulding process is suitable and achievable;
- The product design specification should be appropriate to the application of the product and should take into account a system for quality production of the moulded components and how repeated quality and accuracy can be assured;
- Candidates should identify and collect appropriate data from the investigation, analysis and evaluation of existing similar products.

9.2.3 A Hole Punch For Sheet Aluminium

Candidates are required to:

Design and make a hand operated hole punch for aluminium that can be used by Key Stage 3 pupils in schools to enable them to make their own 'bolt together' modelling kit.

Points to consider in relation to assessment objective 1 to ensure that candidates are assisted towards a sound start:

- Research should be carried out into the processes of punching holes through sheet metal materials that are used industrially in the manufacture of cars and domestic appliances such as cookers and washing machines;
- Research should be carried out into the application of prototyping kits within technology education and consideration given to the following points:
- The thickness of the material that is appropriate, and/ or how thin material could be suitably stiffened; the range of sizes of sheet and strip material used for construction; the range of hole sizes required;
- The product design specification should be appropriate to the application of the product and should take into account a system for quantity production and how repeated quality and positional accuracy of holes can be assured;
- Candidates should identify and collect appropriate data from the investigation, analysis and evaluation of existing similar products.

9.2.4 A Pneumatically Operated Clamp

Candidates are required to:

Design and make a low pressure pneumatic clamp that will act as a 'third hand' for holding printed circuit boards to assist in their manufacture.

Candidates may use either an installed pneumatic system or a low pressure 'foot pump and pop bottle' type of system. Pneumatic cylinders or 'air muscles' may be used.

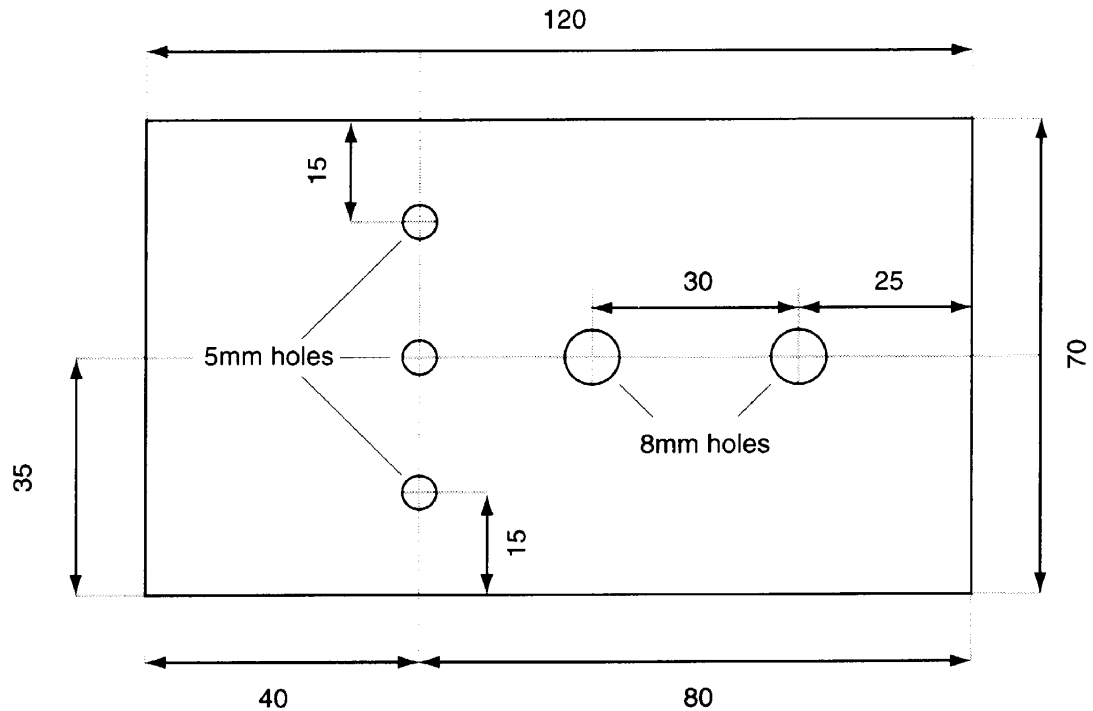
Points to consider in relation to assessment objective 1 to ensure that candidates are assisted towards a sound start:

- Research should be carried out into the application of pneumatic systems within manufacturing industry. This research should be limited to areas associated with clamping and work holding;
- Candidates should carry out experiments and trials to determine the appropriate clamping forces for holding PCB boards and how these might be achieved through mechanical interfacing using low pressure pneumatics. Low pressure can be regarded as typically 3 bar;
- The product design specification should be appropriate to the application of the product and should take into account a system for quantity production of PCBs and how repeated quality and accuracy can be assured;
- Candidates should identify and collect appropriate data from the investigation, analysis and evaluation of existing similar products.

9.2.5 A Quick Release Clamp

In production situations, material often has to be secured and released quickly to carry out various operations.

A manufacturer of control panels needs to drill a series of 5mm and 8mm holes in 3mm thick plastic and plastic laminate material measuring 120mm x 70mm. (See diagram).



Because a large number of control panels have to be produced, a quick release clamp, for drilling will hold up to four at a time. To ensure consistency of hold alignment a 6mm thick metal template, with the hole positions drilled, will be placed over the plastic sheets.

The metal template and plastic sheets will be clamped together securely before being transferred to a drilling machine where the assembly will be held by hand.

Candidates are required to:

Design and make a suitable quick release clamp method and jig(s) that will quickly and consistently align and clamp the sheets with the template.

Because the number of plastic sheets may vary the clamp must have some way of accommodating between one and four sheets at a time along with the template.

For testing purposes the template can be made from 6mm plywood or MDF.

If the chosen design requires the use of two or more identical clamps then only one should be produced.

Points to consider in relation to assessment objective 1 to ensure that candidates are assisted towards a sound start:

- Research should be carried out into the use of clamping devices within manufacturing industry;
- Candidates should carry out experiments and trials to determine the appropriate clamping force required for the application;
- The product design specification should be appropriate to the application of the product and should take into account a system that enables the repeated processing of several control panels under one template with consistent quality and accuracy;
- It is not required to produce a system to mass produce the quick release clamp;
- Candidates should identify and collect appropriate data from the investigation, analysis and evaluation of existing similar products.

9.2.6 An Adjustable Storage And Display System

Modern retailing requires maximum use to be made of space.

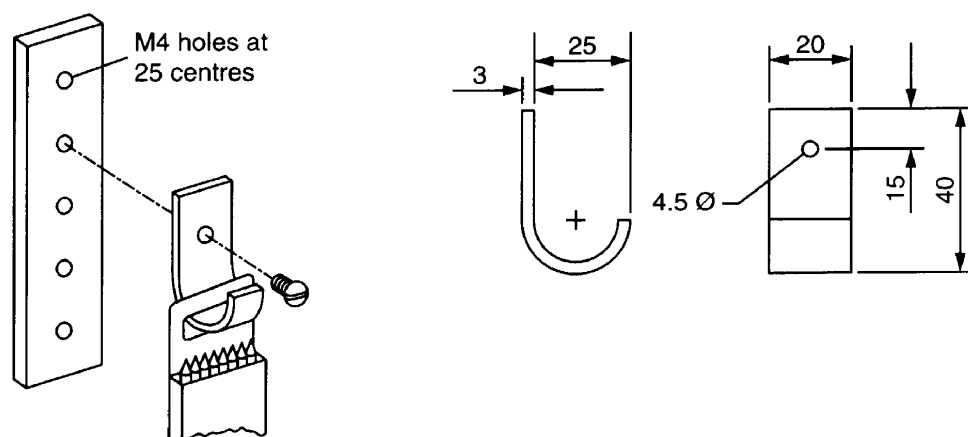
Storage and display units are often combined so that customers can see the product and easily remove it from the display.

An office consumable manufacturer has decided to package products in clear plastic sleeves. Each sleeve has an identical slotted top to enable it to be attached to a storage/display unit.

The chosen unit has a series of vertical strips with M4 tapped holes at 25mm centres.

Hooks (see diagram) are attached to the vertical bars in the required positions with an M4 round head machine screw.

The product sleeves are attached, via the slotted top, to the hook.



Since all the sleeves have the same size slot a number of identical hooks are required.

Candidates are required to:

Design and make a suitable device that will produce a number of hooks from 20 X 3mm aluminium strip.

Points to consider in relation to assessment objective 1 to ensure that candidates are assisted towards a sound start:

- Research should be carried out into the use of folding machines within manufacturing industry;
- The product design specification should be appropriate to the application of the product and should take into account a system that enables the repeated manufacture of identical hooks;
- It is not required to produce a system to mass produce the bending device.

9.3 EXPANSION OF CAPABILITY TASKS

9.3.1 Additional Information Applicable To All Industrial Technology Capability Tasks

In addition to information contained elsewhere in the specification candidates' design folders should show evidence of:

- Consideration of the systems and technologies associated with industrial manufacturing in quantity and an understanding of the application of control to systems both technological and process;
- The appropriate application of mathematical and scientific knowledge and understanding;
- Where applicable, calculations in respect of levers, cams, pulleys, gears, velocity ratio, mechanical advantage etc;
- Where pneumatic systems are employed, calculations in respect of force and system operating pressures etc;
- Where electrical or electronic systems are employed, calculations in respect of voltage, current flow and components etc;
- Appropriately charted results and conclusions drawn from trials and experiments that may have been carried out in relation to the performance of materials, components and/or systems etc. Data logging software and spreadsheets should be used where appropriate.

10 Entry Level - Design and Technology Key Features

- The principle of the Entry level is to reward positive achievement. The Entry level is targeted at Grade G candidates and below.
- Greater teacher intervention is expected and is acceptable. Coursework should be teacher guided to reflect the abilities of the candidate. When coursework is being assessed marks should only be awarded for the candidate's own contributions.
- Specifications for the Entry level are available for Textile Technology (3964), Food Technology (3960), Graphic Products (3961) and Resistant Materials (3962).
- The specification covers the National Curriculum Key stage 4 Programmes of Study for Design & Technology.
- Prior learning should have taken place at key stage 3. This should then be used to build & reinforce at Entry Level.
- Coursework tasks for the Entry level are the same as for GCSE Design & Technology and are listed in the specification.
- Each Entry Level qualification has a Coursework Consultant. They are available to give help and advice.
- Centres are expected to use the coursework tasks set by the Board. If a candidate has a special interest and does not wish to follow the OCR set tasks then the Centre must complete the form in the specification Appendix and contact the Board or their regional Coursework Consultant.
- The Entry level has been designed to be co-teachable with GCSE groups or taught with a discreet group of candidates.

10.1 DESIGN AND TECHNOLOGY – ENTRY LEVEL PROGRESSION THROUGH INTERNALLY ASSESSED WORK

UNIT 1

Detailed study of **one** existing product

Objective 1

Determining a design brief for a manufactured product

(Situation, user, design brief satisfied by the product)



Objective 2

Detailed study of the existing product leading to a specification it meets.

(Examine intended use, how product meets the needs of the users)



Objective 3

Understanding & recording of design decisions for the existing
manufactured product.

(At this point candidates must have a design brief for the product they are intending to design & make)

Unit 2

Objective 4

Initial ideas



Objective 5

Planning & Making

Unit 3

Objective 6

Evaluation and testing of the final product

- The content is less than GCSE
- A group of candidates can follow the same coursework task
- The coursework task should be clearly stated
- The Entry Level is 100% coursework in the form of a single project divided into three units (six objectives)
- Certification title is 'OCR Entry Level Certification in Design & Technology (subject)
- Cost
- Coursework is assessed out of a total of 100 marks (no SPAG & no presentation marks available)
- There are three levels of attainment – Level 1 (Pass) , Level 2 (Merit) , Level 3 (Distinction)
- Coursework should reflect approximately 20 – 25 hours of work
- The Entry level can be taught over 1 or 2 years
- Candidates can be entered for more than one Entry level qualification
- Candidates can be dual entered for Entry Level & GCSE.

10.2 MODERATION

- The coursework is internally marked by the centre and externally moderated by OCR
- Moderation is by post for Food Technology. Other Entry Levels are moderated by a visiting moderator where possible.

10.3 THE SAMPLE FOR MODERATION

- Should be chosen by the centre
- Should be a maximum of 6 pieces of work
- Should reflect a range of 2 top , 2 middle and 2 from the bottom band where possible
- All work should be seen by the moderator if fewer than 6 candidates
- Whilst the specification allows for transfer between GCSE and Entry level, it is important that the structure of the work submitted for assessment criteria described in the six assessment objectives.

10.4 THE PRESENTATION OF COURSEWORK

- Work can be presented on A4 and/ or A3 paper
- Teachers should encourage candidates to clearly label each of the six objectives. The use of proformas are particularly useful
- Sheets should be securely fastened and clearly labelled with the candidates name and number , plus centre number
- The use of ICT in the coursework is a requirement.

11 Smart/Modern Materials

The term ‘modern and smart’ materials goes across all materials areas in the National Curriculum Programme of Study. It is essentially shorthand for studying new developments in materials, which will effect the way pupils think about designing and making. It is about keeping design and technology up to date. The programme of study requires pupils to be taught about the working characteristics and application of modern and smart materials.

11.1 WHAT IS A SMART/MODERN MATERIAL?

Modern materials are developed through the invention of new or improved processes, for example, as a result of ‘man’ made materials/ingredients or human intervention, in other words not naturally occurring changes. They are altered to perform a particular function. Many smart and modern materials are developed for specialised applications but some eventually become available for general use.

Smart materials respond to differences in temperature or light and change in some way. They are called ‘smart’ because they sense conditions in their environment and respond to those conditions. Smart materials appear to ‘think’ and some have a ‘memory’ as they revert back to their original state. The term ‘smart’ can be ambiguous as in some cases it is difficult to distinguish between modern and smart.

11.1.1 Food Smart/Modern Materials

Many naturally occurring food ingredients are smart in that they respond to heat and light and some changes are reversible. Such working characteristics are already frequently exploited in food technology.

Modified starches respond to differences in temperatures, for example, they swell (thickening) in hot water or when heated, but return to a flow when cool. This working characteristic is used in pizza toppings. The topping thickens when heated in the oven and so does not run off the base, but on slight cooling the topping is runny again ready for eating. Other modified starches are used in instant desserts which thicken without heating, but do not return to their original state.

Examples of modern food materials include genetically modified foods, anti-oxidants, modified enzymes, probiotic yoghurts/drinks, TVP, Quorn and Tofu.

11.1.2 Textiles Smart/Modern Materials

Fibre and fabric technological developments have created a whole range of smart and modern textiles which can be used in many applications. These textiles have been used in functional sportswear, medical and safetywear and fashion clothing. Smart fabrics have been developed which can create a sense of well being – they have anti-stress or calm-inducing properties. *Aristoc*, for example, has developed a range of well-being tights micro encapsulated with fragrant oils, moisturisers or vitamins.

Smart textiles have a number of medical uses. Fabrics can be encapsulated with substances required by the body or antiseptics. Allergy control fabrics can be used in bedding for people with breathing problems caused by dust mites.

Other smart textiles include sanitised fabrics for sportswear and socks which have anti-microbial protection. Anti-bacterial and anti-fungal fabrics have been used in clothing, linens, towels and carpets. Many synthetic fibres now have moisture management properties.

SOFTSWITCH technology is currently under development. It combines composite and conductive textile technology to produce wearable electronic fabrics. Further information can be found at www.softswitch.co.uk.

NADCAT Smart materials pack of fibres and fabric posters including information, project ideas and visuals. £12 Contact details: NADCAT, Ashfield Business Centre, The Idlewells, Sutton in Ashfield, Nottinghamshire NG17 1BP Tel: 01623 440088 Fax: 01623 442102 Website: www.nadcat.co.uk

11.1.3 Resistant Materials, Graphic Products, Electronic Products And Systems And Control Smart/Modern Materials

Examples of these smart and modern materials include conductive polymers, colour-changing liquid crystals and motion control gels.

Although there is a fine dividing line between modern and smart materials, several increasingly common materials, such as shape memory alloys (SMA), exhibit behaviour characterised by intelligent responses within a defined product context. Graphite-loaded polymer can provide a self-regulating heating element. As the material warms, it expands and reduces conductivity between the graphic particles. SMAs can be conditioned to change structure (and shape) at pre-determined temperatures – producing desirable shape changes in garments interwoven with SMA wire.

Many modern and smart materials perform essential roles in a wide range of ubiquitous products. Motion control gels (e.g. smart grease) regulate the movement of components in contact to provide the right ‘feel’ or desirable characteristics. Sliding microscope barrels, variable resistors and slow spring-return CD drawers all incorporate motion control gels.

Displays can include the use of electroluminescent panels, which provide the opportunity of innovative design.

Electronic devices such as PIC chips provide the opportunity for students to build ‘smart’ functions into their products.

‘Klett’ - (self-bonding corrugated card) can be used to develop new packaging systems. Thermochromic inks can provide surfaces that react to temperature. Similarly new plastic materials can be used which also change colour with temperature and these can be used in a wide range of applications.

Modern and smart materials are increasingly available in generic forms for DandT pupils. They can push forward the boundaries of designing and making through the use of SMAs (smart wire and smart springs), liquid crystal technology (thermochromic film), motion control gel (smart grease), optically embossed film (lenticular sheet) and many more which will be available soon.

TEP (Technology Enhancement Project) Smart Materials Pack £6.80 Contact details:
Technology Teaching Resources, Middlesex University, Trent Park, Bramley Road, London
N14 4YZ Tel: 020 8447 1342 Fax: 020 8477 0340 Website: www.tep.org.uk

12 Internal Assessment Objectives 1-6

12.1 INTERNAL ASSESSMENT OBJECTIVE 1

TOTAL MARKS: 4

Identification of a need or opportunity leading to a Design Brief	Level of Response	Mark Range
<p>Candidates will need to:</p> <ul style="list-style-type: none">• Provide a description of the design need using various means of communication;• Identify the range of users and the market for which the product is intended;• Develop a design brief for a marketable product.	A statement of what is to be made.	0-1
	Some consideration of the design need or the intended user/users leading to a design brief.	2
	Consideration of both the design need and the intended user/users leading to a clear design brief of a marketable product	3
	Detailed description of both the design need and user/users leading to a clear and precise design brief of a marketable product.	4
	Total	4

12.2 INTERNAL ASSESSMENT OBJECTIVE 2

TOTAL MARKS: 12

Research into the Design Brief which results in a Specification	Level of Response		Mark Range	
<p>Candidates will need to:</p> <ul style="list-style-type: none"> Examine the intended purpose, form and function of the product; Undertake appropriate surveys, identifying and evaluating how existing products fulfill the needs of their intended users; Identify and collect data relevant to the product(s) and its users; Develop a detailed specification and criteria that includes the capability for batch production. 	Limited research of intended use. Some recognition of existing products. A specification identifying some basic requirements.	[1] [1] [1]	0-3	
	Intended use of product examined with some data identified or collected. Existing products identified with some evaluation. A specification identifying some key features including a suggestion of how more than one could be made	[2] [2] [2]		4-6
	Intended use of product examined with data identified and collected. Existing products identified and evaluated considering some of the needs of the intended user/users. A detailed specification containing some reference to a system required to manufacture in batches.	[3] [3] [3]		
	Intended use of product fully examined with relevant data identified and collected. Existing products identified and fully evaluated against the needs of the intended user/users. Analysis of the research and information sources leading to a detailed design specification that would provide a system to ensure control over the production of the product in batches.	[4] [4] [4]	10-12	
	Total			12

Please Note

The marks shown in (brackets) are the maximum that can be given for each of the level of response statements.

12.3 INTERNAL ASSESSMENT OBJECTIVE 3

TOTAL MARKS: 12

Generation of design proposals	Level of Response		Mark Range
Candidates will need to: <ul style="list-style-type: none"> • Generate a range of design proposals; • Check design proposals against design specification and review and modify them if necessary; • Identify chosen design proposal for product development; • Present design solutions using a range of graphic techniques and ICT including computer-aided design (CAD), to generate, develop, model and communicate design proposals. 	One or more solutions proposed.	[1]	0-3
	Little or no evaluation.	[1]	
	The work displays a low standard of communication techniques	[1]	
	Several solutions proposed	[2]	4-6
	A cursory evaluation. Unsupported choice of design proposal.	[2]	
	Communication will be of a reasonable standard using a limited number of techniques.	[2]	
	A range of appropriate solutions proposed.	[3]	7-9
	Design proposal chosen, supported by clear evaluation.	[3]	
	Communication will be of a good standard, using a range of appropriate techniques.	[3]	
	A wide range of appropriate solutions proposed.	[4]	10-12
	Design proposal chosen as a result of detailed evaluation and consideration of the need and fitness for purpose.	[4]	
	Communication will be of a high quality, using a wide range of appropriate techniques.	[4]	
Total		12	

Please Note

The marks shown in (brackets) are the maximum that can be given for each of the level of response statements

Product Development	Level of Response		Mark Range
<p>Candidates will need to:</p> <ul style="list-style-type: none"> • As a result of investigation, testing or trialling, make reasoned decisions about: <ul style="list-style-type: none"> - Materials; - Production methods; - Pre-manufactured standard components. • Consider how materials are prepared for manufacture and how pre-manufactured standard components are used; • By modelling, apply test procedures ensuring the product meets the original design brief and its fitness for purpose; • Consider when developing the product, the implications for quantity manufacture of: <ul style="list-style-type: none"> - Materials and components; - Tools, equipment and processes; - Critical dimensions and tolerances • Develop a control system to be used in the manufacture of their product; • Be flexible and adaptable in responding to changing circumstances and new opportunities; • Make any necessary modifications to the chosen design; • Give details of the final design including a final product specification; • Present design solutions using a range of graphic techniques and ICT including computer-aided design (CAD), to develop, model and communicate design proposals. 	Some materials and production methods identified.	[1]	0-3
	Has attempted to model part of final solution.	[1]	
	Limited details given for final solution.	[1]	
	As a result of investigations some decisions made about materials, production methods function and pre-manufactured items.	[2]	4-6
	Has used modelling to check that the product meets the design brief.	[2]	
	Some important details given about the final product and how more than one of the product could be made	[2]	
	Some testing and trialling resulting in decisions about materials, production methods and pre-manufactured items.	[3]	7-9
	Used modelling and testing to ensure that the product meets the design brief.	[3]	
	Most details given about final product and the control system needed to produce the product in quantity.	[3]	
	Appropriate testing and trialling resulting in reasoned decisions about materials, production methods and pre-manufactured items.	[4]	10-12
Has used modelling and test procedures to identify any necessary modifications and to ensure the product meets the design brief.	[4]		
Full details about the final product and the control system needed to produce the product in quantity.	[4]		
Total			12

Please Note

The marks shown in (brackets) are the maximum that can be given for each of the level of response statements.

Product Planning and Realisation	Level of Response		Mark Range
<p>Candidates will need to:</p> <ul style="list-style-type: none"> Produce a plan of action which considers: materials, pre-manufactured items, equipment, processes and health and safety issues against an order of work and the need to make products that match the design specification; Select and use tools, equipment and processes effectively and safely; Economically prepare materials/ pre-manufactured items for production, allowing for waste and fine finish; Complete a quality outcome suitable for the intended user or users, ensure that their outcome functions effectively; Be prepared to adapt working procedures in response to changing circumstances; Use a range of skills and techniques appropriate to the task; Where appropriate apply a range of industrial techniques when working with familiar materials and processes. 	Little or no planning.	[3]	0-13
	Has used a limited range of materials, tools and equipment	[3]	
	With frequent prompting uses basic skills and techniques appropriate to the task. Little understanding of safe working practices.	[3]	
	The product will exhibit a low standard of outcome and may not be successfully completed.	[4]	
	Planning will have been restricted to the immediate task and will have relied on prompting.	[6]	14-26
	Has overcome problems as they arise using appropriate materials, tools and equipment.	[6]	
	With some guidance has used a range of skills and techniques appropriate to the task. Reasonable understanding of safe working procedures.	[6]	
	The product will exhibit a reasonable standard of outcome, be mainly complete and will satisfy the specification with a limited degree of success.	[8]	

	<p>Most of the realisation will have been planned in advance</p> <p>Has made economic and efficient use of materials, tools and equipment modifying the application of these if appropriate.</p> <p>With a normal level of supervision, has combined a range of skills and techniques appropriate to the task. Good understanding of safe working procedures.</p> <p>The product will exhibit a good standard of outcome, will be complete and will function as intended.</p>	<p>[9]</p> <p>[9]</p> <p>[9]</p> <p>[12]</p>	<p>27-39</p>
	<p>The realisation will have been thoroughly planned to specify an effective order for the sequence of operations.</p> <p>Resourceful and adaptable with materials, tools and equipment and to a high degree of precision.</p> <p>Has independently combined a range of skills and techniques appropriate to the task. High understanding of safe working procedures.</p> <p>The product will be completed to a high quality and will fully meet the requirements of the final product specification.</p>	<p>[12]</p> <p>[12]</p> <p>[12]</p> <p>[16]</p>	<p>40-52</p>
Total			52

Please Note

The marks shown in (brackets) are the maximum that can be given for each of the level of response statements.

In this objective a candidate may be awarded marks within an identified range for each statement. For example statements with a max mark of (9) may be awarded 7, 8 or 9 marks.

Evaluation and Testing	Level of Response		Mark Range
Candidates will need to: <ul style="list-style-type: none"> • Evaluate their products to ensure that they are of a suitable quality for intended users; • Carry out testing, resulting in reasoned conclusions that suggest any necessary modifications to improve the product; • Review whether they have used resources appropriately e.g. time, materials, equipment, and production methods; • Analyse the performance of their manufacturing control system in the production of the prototype. 	Relevant un-supported comment with some reference to the specification.	[1]	0-2
	No evidence of testing	[1]	
	Some supported comment with reference to the specification and use of resources.	[2]	3-4
	Superficial testing with a conclusion.	[2]	
	Relevant comments with reference to the specification and use of resources.	[3]	5-6
	Relevant testing with few conclusions, leading to a possible modification or improvement of product and/or system designed to control manufacture.	[3]	
Critical evaluation related to the specification and use of resources	[4]	7-8	
Detailed testing with meaningful conclusions leading to proposals for further development, modification or improvements of product and system designed to control manufacture.	[4]		
Total			8

Please Note

The marks shown in (brackets) are the maximum that can be given for each of the level of response statements

12.7 ASSESSMENT OF OVERALL PRESENTATION OF COURSEWORK PROJECT

Performance Criteria	Mark Range
Below threshold performance	0
Threshold performance Candidates present their ideas with reasonable care in a format that can be followed.	1
Intermediate performance Candidates present their ideas with care in an appropriate sequence.	2-3
High performance Candidates present their ideas adeptly in a logical and concise way.	4-5

13 Student Progress Review

Student Progress Review

Many Centres already provide candidates with systems that assist candidates in meeting targets.

Some teachers may find this progress review useful. The words are taken directly from the specification that is obviously aimed at teachers. Through teaching further amplification can be given to candidates to ensure their understanding.

Candidates should be reminded that they will be awarded marks for the way they communicate their design thinking. If, as demonstrated in the coursework, their design thinking is logical, concise with ideas presented clearly and adeptly they will be awarded up to 5 marks.

14 Internal Assessment Comment Sheets

14.1 INTERNAL ASSESSMENT OBJECTIVE 1

TOTAL MARKS: 4

Identification of a need or opportunity leading to a Design Brief

Have YOU?	Yes ✓	Teachers Comments	Date	Date	Date
Provided a description of the design need using various means of communication.					
Identified the range of users for which the product is intended					
Identified the market for which the product is intended					
Develop a design brief for a marketable product.					

14.2 INTERNAL ASSESSMENT OBJECTIVE 2

TOTAL MARKS: 12

Research into the Design Brief which results in a Specification

Have YOU?	Yes ✓	Teachers Comments	Date	Date	Date
Examined the intended purpose, form and function of the product?					
Undertaken appropriate surveys, identifying and evaluating how existing products fulfill the needs of their intended users?					
Identified and collected data relevant to the product(s)?					
Identified and collected data relevant to the users of the product(s)?					
Developed a detailed specification?					
Does your detailed specification include the capability for batch production?					

14.3 INTERNAL ASSESSMENT OBJECTIVE 3

TOTAL MARKS: 12

Generation of design proposals

Have YOU?	Yes ✓	Teachers Comments	Date	Date	Date
Generated a range of design proposals?					
Checked your design proposals against design specification and review and modify them if necessary?					
Identified your chosen design proposal for product development?					
Generated, developed, modelled and presented your design solutions using a range of graphic techniques and ICT including computer-aided design (CAD)?					

14.4 INTERNAL ASSESSMENT OBJECTIVE 4

TOTAL MARKS: 12

Product Development

Have YOU?	Yes ✓	Teachers Comments	Date	Date	Date
As a result of investigation, testing or trialling, made reasoned decisions about: Materials? Production methods? Pre-manufactured standard components?					
Considered how materials are prepared for manufacture and how pre-manufactured standard components are used?					
Used modelling and test procedures to ensure that the product meets the original design brief and its fitness for purpose?					
Considered materials and components when developing the product and any implications for quantity manufacture?					
Considered tools, equipment and processes when developing the product, any implications for quantity manufacture?					

Considered critical dimensions and tolerances when developing the product and any implications for quantity manufacture?					
Developed a control system to be used in the manufacture of their product?					
Been flexible and adaptable in responding to changing circumstances and new opportunities?					
Made all necessary modifications to the chosen design.					
Given details of the final design including a final product specification?					
Presented design solutions using a range of graphic techniques and ICT including computer-aided design (CAD)?					

14.5 INTERNAL ASSESSMENT OBJECTIVE 5

TOTAL MARKS: 52

Product Planning and Realisation

Have YOU?	Yes ✓	Teachers Comments	Date	Date	Date
Produced a plan of action which considers: Materials Pre-manufactured items Equipment Processes Health and safety issues Against an order of work and the need to make products that match the design specification?					
Selected and used : Tools Equipment Processes Effectively and safely?					
Economically prepared materials/ pre-manufactured items for production, allowing for waste and fine finish?					

Completed a quality outcome suitable for the intended user or users?					
Ensured that you product functions effectively?					
Been prepared to adapt working procedures in response to changing circumstances?					
Used a range of skills and techniques appropriate to the task?					
Where appropriate, applied a range of industrial techniques when working with familiar materials and processes?					

14.6 INTERNAL ASSESSMENT OBJECTIVE 6

TOTAL MARKS: 8

Evaluation and Testing

Have YOU?	Yes ✓	Teachers Comments	Date	Date	Date
Evaluated your products to ensure that they are of a suitable quality for intended users?					
Carried out testing, resulting in reasoned conclusions that suggest any necessary modifications to improve the product?					
Reviewed whether you have used resources appropriately e.g. time, materials, equipment, and production methods?					
Analysed the performance of your manufacturing control system in the production of the prototype?					

15 Details of Proposed Coursework Capability Task

DESIGN AND TECHNOLOGY: INDUSTRIAL TECHNOLOGY (1959) ONLY

Name of Centre		Centre Number	
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Title of Proposal

Details of Proposal (See specification section 9 for the criteria to which the Capability Task must conform)
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Signature of teacher		Date	
-----------------------------	--	-------------	--

For Official Use

Comments
Approved by the Coursework Consultant? Yes / No
Consultant's signature

It is a requirement of the specification that coursework Capability Tasks must be submitted for approval for Centres **not** wishing to use one of the Capability Tasks set by OCR.

A copy of this form must be submitted for each task approval, not later than six weeks before the task is due to be started.

16 Website Support

A large number of useful websites can easily be accessed through the following educational website: www.lynx-linnet.com

Once connected to the Internet enter www.lynx-linnet.com.

A Welcome screen will appear. Either 'mouse' over the triangles clicking on the Lynx Education site or scroll down the screen and click on the Lynx Education button.

At the top of the home page there is a menu bar. Click on WebLynx.

This will take you to a list of focus areas. Select a focus area by clicking on the focus area title. You will then given a list of useful sites in alphabetical order. Click on the site title to enter that website.

17 Coursework Administration Pack

This Coursework Administration Pack is designed to accompany the OCR GCSE Design & Technology specifications (Full and Short Courses) for teaching from September 2001.

The forms in this pack are for use with the following specifications:

- **Design and Technology: Electronic Products** 1953
- **Design and Technology: Food Technology** 1954
- **Design and Technology: Graphic Products** 1955
- **Design and Technology: Resistant Materials Technology** 1956
- **Design and Technology: Systems and Control Technology** 1957
- **Design and Technology: Textiles Technology** 1958
- **Design and Technology: Industrial Technology** 1959

- **Design and Technology: Electronic Products (short course)** 1053
- **Design and Technology: Food Technology (short course)** 1054
- **Design and Technology: Graphic Products (short course)** 1055
- **Design and Technology: Resistant Materials Technology (short course)** 1056
- **Design and Technology: Textiles Technology (short course)** 1058

Guidance on the assessment of coursework will be found in Section D of the specification.

A master copy of all GCSE Administration Packs will be sent to Examinations Officers during 2002.

Centres are permitted to copy materials from this booklet for their own internal use.

Contents:

Compulsory Recording Materials

Coursework Summary Form

These materials will **not** automatically be sent out annually.

All forms may be photocopied and used as required. Additional copies may be downloaded from the OCR website www.ocr.org.uk.

Compulsory Recording Materials

Coursework Summary Form: The information required on this form must be sent to the Moderator with the MS1. A print-out from a suitable software package is an acceptable alternative to this form if the same information is given.

Internal Standardisation

Where more than one teacher in the Centre has marked the work for a particular coursework component, the Centre must standardise the marking in order to ensure that candidates who have demonstrated the same level of attainment receive the same mark, and that the rank order of the coursework marks for the Centre as a whole is appropriate.

Submission of Marks

OCR will send Centres internal assessment mark sheets (MS1) for the submission of coursework marks, along with instructions for completing and returning the mark sheets. Coursework marks may also be submitted electronically by EDI. The dates for despatch of MS1 mark sheets and for submission of coursework marks are given on the Key Dates poster for each session. Centres must ensure that they keep a copy of their coursework marks.

Moderation

Moderator address labels will be sent to Centres shortly before the coursework mark submission date. Where the Centre has eleven or fewer candidates entered for a coursework component all the candidates' work should be sent to the Moderator with a copy of the Coursework Summary Form. Where there are more than eleven candidates, the Centre should send all marks to the Moderator by the mark submission deadline and keep the work secure. The Moderator, once he/she has received the marks from the Centre, will contact the Centre to request a sample of work. Centres should respond promptly to any requests for work from the Moderator. A report on the outcome of the moderation will be sent to Centres at the time results are issued.

General Coursework Regulations and Procedures

General coursework regulations and procedures including those concerning lost or incomplete coursework are given in the *OCR Handbook for Centres*.

Coursework Enquiries

Coursework enquiries for Design & Technology should be sent to OCR at the following address:

Administrative Officer (Manufacturing, Engineering & Technology Team)

OCR

Mill Wharf

Mill Street

BIRMINGHAM

B6 4BU

Correspondence should be marked 'Coursework Enquiry' with the corresponding specification code.

**DESIGN & TECHNOLOGY: ELECTRONIC PRODUCTS (1953)
 COURSEWORK SUMMARY FORM
 GCSE EXAMINATIONS**



Please read the instructions printed overleaf before completing this form.

Centre Number					Centre Name		Year	2	0	0
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Candidate Number	Candidate Name	Teaching Set/Group	DESIGN & TECHNOLOGY: ELECTRONIC PRODUCTS MARKS							Total (Max 105)
			AO1 (Max 4)	AO2 (Max 12)	AO3 (Max 12)	AO4 (Max 12)	AO5 (Max 52)	AO6 (Max 8)	Present (Max 5)	

INSTRUCTIONS FOR COMPLETION

A Marking and Internal Moderation

- 1 Teachers must be thoroughly familiar with the appropriate sections of the syllabus and with the General Coursework regulations.
- 2 Complete the information at the head of the form.
- 3 List the candidates in an order which will allow ease of transfer of marks to the computer-printed mark sheet (Form MS1) at a later stage (ie in candidate index number order, where this is known). The teaching group/set should also be shown.
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- 5 Where more than one teacher has entered candidates for this syllabus, carry out internal standardisation to ensure that the total mark awarded to each candidate reflects a single valid and reliable order of merit.
- 6 All Coursework must be annotated in accordance with OCR's guidelines.
- 7 Award marks for presentation in accordance with the following table.

Maximum mark for presentation	5
Performance lower than threshold performance	0
Threshold performance	1
Intermediate performance	2-3
High performance	4-5

- 8 Ensure that the addition of marks is independently checked.
- 9 Retain all forms securely pending further instructions from OCR. A copy of this completed form needs to be retained in the Centre.

B External Moderation

Documents will be sent to you in April for the purposes of external moderation.

C General comments or particular points concerning individual candidates.

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**DESIGN & TECHNOLOGY: GRAPHIC PRODUCTS (1055) – SHORT COURSE
 COURSEWORK SUMMARY FORM
 GCSE EXAMINATIONS**



Please read the instructions printed overleaf before completing this form.

Centre Number						Centre Name				Year	2	0	0
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Candidate Number	Candidate Name	Teaching Set/Group	DESIGN & TECHNOLOGY: GRAPHIC PRODUCTS MARKS							Total (Max 105)
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Electrical & Electronic Symbols

Primary cell	Battery	Terminal a.c. supply	Fuse	Microphone	Loudspeaker	Buzzer	Heating element	Lamp	Light dependent resistor	Photo diode	Thermistor
Junction of conductors	Double junction	Crossing of conductors with no electrical connection	AND	NOT (inverter)	MOT (inverter)	OR	NAND	NOR	Semiconductor diode	Light emitting diode	Breakdown diode
Resistor	Variable resistor	Potentiometer	Polarised capacitor	Polarised capacitor with pre-set adjustment	Aerial	Transformer with magnetic core	Switch	Break contact	Relay coil	Make contact	Spring return
Earth	Generator	Motor	Annunciator	Voltmeter	Oscilloscope	NPN transistor	PNP transistor	Operational amplifier	R/S bistable	Schmitt inverter	Operational amplifier

ELECTRONICS
Education

SYSTEMS FILE

FOR FURTHER INFORMATION REFER TO B.S.I. PUBLICATIONS PP7303 BS3939
 The IEE is a registered charity
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Posters are available from Educational Activities, The Institution of Electrical Engineers
 Michael Faraday House, Six Hills Way, Stevenage, Herts SG1 2AY. Telephone (01438) 313311
 ** Resistor with linear variability - (R.S.I.)

