



# Design and Technology

**GCSE 2012**

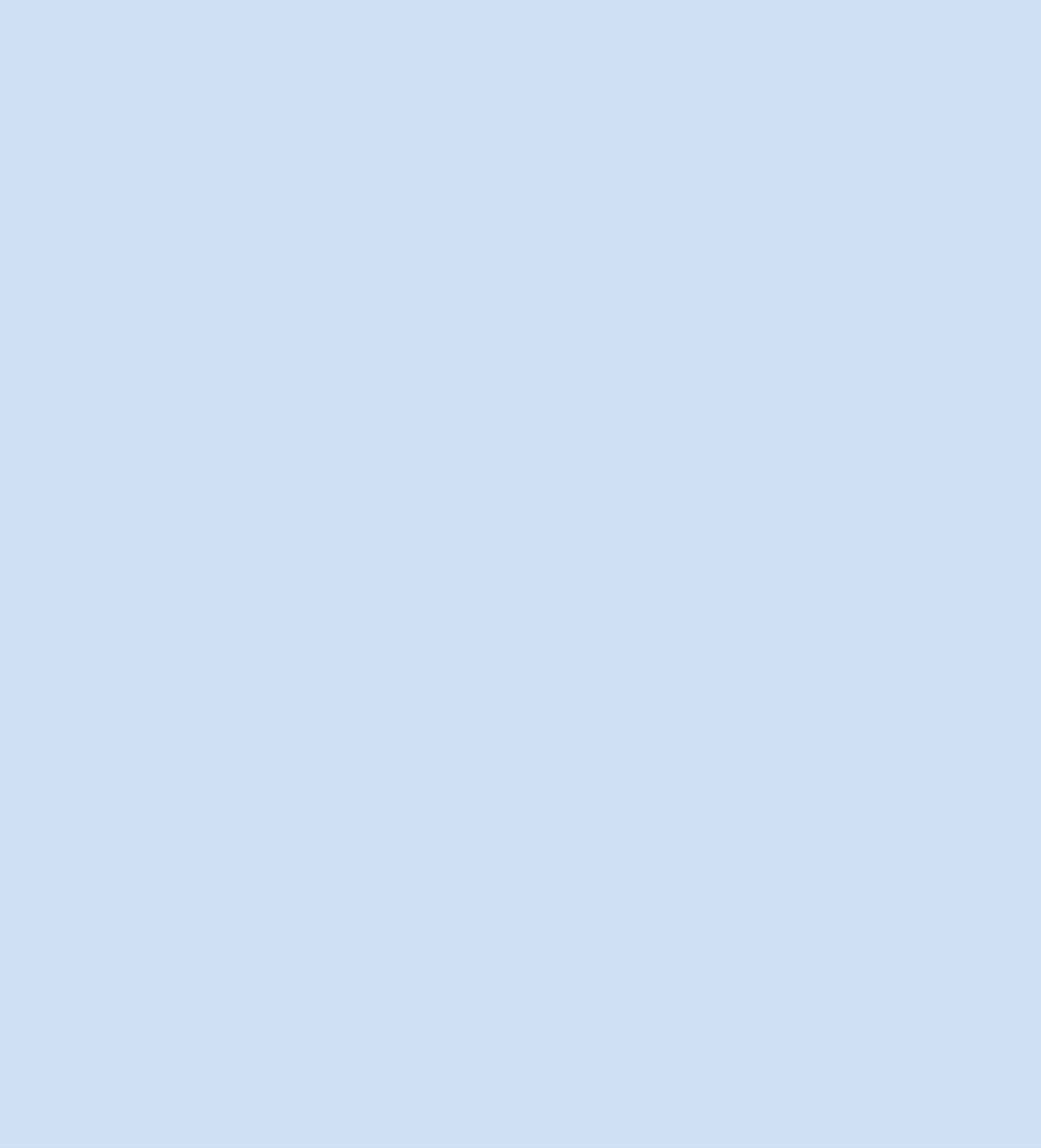
## **D&T: Resistant Materials**

Teachers' Handbook

J306

Version 1

October 2012



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# INTRODUCTION

OCR's GCSE in Design and Technology: Resistant Materials entered first teaching in September 2009.

We have improved the quality of our GCSEs for teachers and students alike. We've made improvements in two key areas: updated and relevant content and a focus on developing students' personal, learning and thinking skills.

In addition and in response to reforms announced by the Government and in response to Ofqual mandated changes to GCSEs, unitised assessment of this qualification is being replaced by linear assessment from September 2012. This means that candidates commencing a two year course from September 2012 will take all of their GCSE units at the end of the course in June 2014.

The main changes are:

- Controlled assessment and examinations will be summative
- Examinations provide opportunity for extended writing and more varied question types
- All GCSEs will meet the requirements of the Equality Act.

OCR offers a range of support materials, developed following extensive research and consultation with teachers. We've designed them to save you time when preparing for the specification and to support you while teaching them.

It is important to make the point that this Teacher Handbook plays a secondary role to the specifications themselves. The GCSE Design and Technology: Resistant Materials specification is the document on which assessment is based: it specifies what content and skills need to be covered. At all times therefore, the Teacher Handbook should be read in conjunction with the Specification. If clarification on a particular point is sought, then that clarification must be found in the Specification itself.

# SUBJECT SPECIFIC GUIDANCE

This document is designed to support delivery of GCSE Design and Technology: Resistant Materials (J306) and. We hope you will find it useful in planning your delivery and assessment opportunities.

There are three units available for Design and Technology: Resistant Materials. They are:

- Unit A561: Introduction to designing and making (controlled assessment)
- Unit A563: Making quality products (controlled assessment)
- Unit A565: Sustainable and technical aspects of designing and making

GCSE candidates must take all three units (in any order) whilst short course candidates only take units A561 and A562 (in any order).

These documents do not seek to prescribe how the subject should be delivered. They merely seek to show the breadth and range of learning opportunities within this subject area. We hope centres will use these as a starting point for developing inspiring and innovative courses that meet the needs of their students.

## UNIT A565: SUSTAINABLE AND TECHNICAL ASPECTS OF DESIGNING AND MAKING

This unit aims to develop a candidate's knowledge and understanding of sustainability, environmental concerns, cultural, moral and social issues. Candidates will look at how Design and Technology has evolved through examination of the products from the past and present. Candidates need to consider how future designs will impact on the world in which we live. They will need to study examples of both old and new products in order that they gain awareness and understanding of recent trends and innovations in design and production, labelling, packaging and the impact that the design of such products is having on the environment, society and the economy.

Candidates will need to consider how future designs/

products will impact on the world in which we live. By looking at old and new products candidates will gain awareness and understanding of trends and innovations in design and manufacture, labeling, packaging and the impact that the design of such products is having on the environment, society and the economy.

Moral, cultural, economic, environmental and sustainability issues are inherent in design and technology.

Candidates will need a knowledge and understanding of:

- Designing and making quality manufactured products
- Planning production with consideration of the use of time and resources
- Performance characteristics of different materials including 'Smart' and modern
- Tools and equipment, including new technologies, used to make quality manufactured products
- Processes and techniques used to make quality manufactured products, both decorative and functional
- The impact that the use of graphic products has on the environment, including the need to consider sustainability
- Health and Safety issues.

The paper consists of questions that focus on sustainability and technical aspects of design and making.

80 marks

40% of the total GCSE marks

1 hour 30 minutes written paper

Section A consists of 15 short answer questions and one question which may involve sketching, annotation, short sentences and extended writing. This section will focus on sustainability, product analysis and design.

Section B consists of three questions which may involve sketching, annotation, short sentences and extended writing. This section will focus on the technical aspects of working with materials, tools and equipment and design of products.

This unit will be externally assessed.

## BANDED MARK SCHEME

It is to be expected that in of the paper some questions will require detailed written responses and will be answered through a banded mark scheme. Banded mark schemes do require a more detailed and technical answer that uses the correct subject specialist terminology and also takes into account the quality of written communication. The questions will have an asterisk(\*) to show this.

For example:

### **Level 1 (1-2 marks)**

A basic analysis, showing some understanding. There will be little or no use of specialist terms. Answers may be ambiguous or disorganised. Errors of grammar, punctuation and spelling may be intrusive.

### **Level 2 (3-4 marks)**

Adequate analysis, showing understanding. Candidates can provide a description using some specialist terminology although these may not be always used appropriately. The information will be presented for the most part in a structured format. There may be occasional errors in spelling, grammar and punctuation.

### **Level 3 (5-6 marks)**

Thorough analysis, showing clear understanding. Specialist terms will be used appropriately and correctly. The information will be presented in a structured format. The candidate will demonstrate the accurate use of spelling, punctuation and grammar.

0 marks = no response worthy of credit.

# RESOURCES

## UNIT A561: INTRODUCTION TO DESIGNING AND MAKING AND UNIT A563: MAKING QUALITY PRODUCTS

### FOR INSPIRATION

Design Secrets: Products Rockport publications  
ISBN 1-56496-476-0

Classics of design Brown Ref Group  
ISBN 1 84044 101 1

Designs of the times Rolovision  
ISBN 12 88046 816 7

The Dream catalog Cassell  
ISBN 0 304 35903 3

Century Makers Weidenfield & Nicolson  
ISBN 0 297 82435 X

Alessi The Dream Factory Konemann  
ISBN 3 8290 1377 9

[http://en.wikipedia.org/wiki/Famous\\_industrial\\_designers](http://en.wikipedia.org/wiki/Famous_industrial_designers)

<http://directory.designer.am/>

[www.flos.com](http://www.flos.com)

[www.designdirectory.co.uk/ind.htm](http://www.designdirectory.co.uk/ind.htm)

### FOR TECHNICAL KNOWLEDGE AND UNDERSTANDING

Model making. Materials and Methods. Crowood press  
ISBN 878 1 84787 0176

Product Modelling Oxford University Press  
ISBN 13 978 0198327615

Materials Rotovision  
ISBN 978 2 940361 50 2

### BOOKS

Resistant Materials Technology for GCSE Hodder Education ISBN 978 0340 98196 2

This book has been specifically written to match this specification by principal examiners for GCSE Design and Technology. Chapter 9 contains information relevant to this unit and is very highly recommended for all students.

OCR design and Technology for A Level Hodder Education ISBN 978 0340 96634 1

Although this book is aimed at GCE AS and A2 level, P108-139 is a very good section relevant to this unit of work. A very good resource for more able students.

Skills in Resistant Materials Technology Heinemann ISBN 0435 75044 5

Although this book is aimed at KS3, It contains some good section relevant to this unit of work:

- P18-19 Disassembly, product analysis and mass production
- P26-27 Quality control, quality assurance and testing

A good resource for less able students.

GCSE Design and Technology Resistant Materials The Revision guide Coordination Group publications ISBN 978 184146 792 4

Contains many sections relevant to this unit of work. An excellent revision guide.

The Sustainability Handbook for Design & Technology Teachers Practical Action Publishing ISBN 978-1- 85339-670-0

An excellent teacher resource.

Experimental Eco Design Rotovision ISBN 2-88046-817-5

### DVD'S AND FILMS

[www.recyclezone.org.uk](http://www.recyclezone.org.uk)

[www.recycle-more.co.uk](http://www.recycle-more.co.uk)

[www.wasteonline.org.uk](http://www.wasteonline.org.uk)

[www.triad.org.uk](http://www.triad.org.uk)

[www.carbonfootprint.co.uk](http://www.carbonfootprint.co.uk)

[www.stepin.org.uk](http://www.stepin.org.uk)

[www.sda-uk.org](http://www.sda-uk.org)

[www.pumpkintv.co.uk](http://www.pumpkintv.co.uk)

**BOOKS**

Resistant Materials Technology for GCSE Hodder Education ISBN 978 0340 98196 2

This book has been specifically written to match this specification by principal examiners for GCSE Design and Technology. Highly recommended for all students.

OCR Design and Technology for A Level Hodder Education ISBN 978 0340 96634 1

Although this book is aimed at GCE AS and A2 level It does cover much of the content of this unit. A very good resource to use with the most able students.

Skills in Resistant Materials Technology Heinemann ISBN 0435 75044 5

Although this book is aimed at KS3, it contains many sections covering the content of this unit of work. A good resource for less able students.

GCSE Design and Technology Resistant Materials The Revision guide Coordination Group publications ISBN 978 184146 792 4

An excellent revision guide.

GCSE D & T Resistant Materials Total Revision Collins ISBN 0-00-711204-1

This book was written to match a previous GCSE specification but contains much of the content for this unit.

Design in the Making: Resistant Materials Longman ISBN 0-582-36589-9

Covers some of the content of this unit in a very simple way.

Design and Technology Nelson ISBN 0-17-448277-9  
Contains much of the content of this unit.

**INTERACTIVE WHITEBOARD RESOURCES**

Boardworks Ltd Unit 5-7, The Gallery, 54 Marston Street, Oxford, OX4 1LF KS4

Resistant Materials resources covering much of the content of this unit.

**RESISTANT MATERIAL SUPPLIERS**

Technology Enhancement Programme Unit 10 IO Centre Waltham Cross, Herts. EN9 1AS Includes Modern and Smart materials

K&M Unit 24 Holbrook Industrial Estate, New Street, Halfway, Sheffield, S20 3GH Technology Supplies  
Phoenix House, Tern Hill, Market Drayton Shropshire TF9 3PX Hindleys 24 Orgreave Place, Dore House Business Park, Sheffield S13 9LU

**CD'S, DVD'S AND FILMS**

Tribal Education and Technology 1-4 Portland Square, Bristol, BS2 8RR

Zigzag Education Unit 3 Greenway Business Centre, Doncaster Rd., Bristol, BS10 5PY

Focus Educational Software Ltd. PO Box 52, Truro, Cornwall, TR1 1ZJ

Birchfield Interactive Ltd. Room 55, The Media Centre, Freeport SWC 1643, Cardiff, CF5 6ZZ

Classroom Video Ltd St. Thomas Court, Thomas Lane, Bristol, BS1 6JG

**PHOTOCOPY MASTERS**

P&I LTD P.O. Box 62, Newton-le-willows, WA3 2RF

Classroom resources Ltd. PO Box 1489, Bristol, BS99 3QJ

**WALL CHARTS**

Daydream Education Unit 1, Central Park, Western Avenue, Bridgeend, CF31 3RH

Genesis Images 20 Clarence Road, Redhill, RH1 6NG

## OTHER FORMS OF SUPPORT

In order to help you implement the new GCSE Design and Technology: Resistant Materials Specification effectively, OCR offers a comprehensive package of support. This includes:

### PUBLISHED RESOURCES

OCR offers centres a wealth of quality published support with a fantastic choice of 'Official Publisher Partner' and 'Approved Publication' resources, all endorsed by OCR for use with OCR specifications.

### PUBLISHER PARTNERS

OCR works in close collaboration with three Publisher Partners; Hodder Education, Heinemann and Oxford University Press (OUP) to ensure centres have access to:

- Better published support, available when you need it, tailored to OCR specifications
- Quality resources produced in consultation with OCR subject teams, which are linked to OCR's teacher support materials
- More resources for specifications with lower candidate entries
- Materials that are subject to a thorough quality assurance process to achieve endorsement

Hodder Education is the publisher partner for OCR GCSE Design and Technology: Electronics and Control Systems.



Hodder Education has produced the following resources for OCR GCSE Design and Technology: Resistant Materials.

OCR Resistant Materials for GCSE Student's Book  
David Carlson, Harry King, Steve Pinnock, Editor:  
ISBN: 978 0340 98196 2  
27/032009

OCR Design and Technology for GCSE Dynamic Learning Network Edition CD-ROM  
ISBN: 978 0340 98203 7  
(Available April 2009)

## APPROVED PUBLICATIONS

OCR still endorses other publisher materials, which undergo a thorough quality assurance process to achieve endorsement. By offering a choice of endorsed materials, centres can be assured of quality support for all OCR qualifications.



## ENDORSEMENT

OCR endorses a range of publisher materials to provide quality support for centres delivering its qualifications. You can be confident that materials branded with OCR's "Official Publishing Partner" or "Approved publication" logos have undergone a thorough quality assurance process to achieve endorsement. All responsibility for the content of the publisher's materials rests with the publisher.

These endorsements do not mean that the materials are the only suitable resources available or necessary to achieve an OCR qualification. Any resource lists which are produced by OCR shall include a range of appropriate texts.

## PROFESSIONAL DEVELOPMENT

The 2012-13 OCR Professional Development Programme offers more accessible and more cost effective training, with the same valued content that you expect from us.

At OCR, we are constantly looking for ways in which we can improve the support we offer to teachers. Most recently we have been considering the increasing challenges that schools face in releasing teachers for INSET, and how OCR can make its professional development programme more accessible and convenient for all.

From September 2012, our new improved programme will include:

- FREE online professional development units available when and where you want them
- FREE live web broadcasts of professional development events
- FREE face to face training for GCSE controlled assessment and GCE coursework
- A series of 'not to be missed' premier professional development events.

For more information, please email [training@ocr.org.uk](mailto:training@ocr.org.uk) or visit [www.ocr.org.uk/training](http://www.ocr.org.uk/training).

## OCR SOCIAL

Visit our social media site (<http://www.social.ocr.org.uk>). By registering you will have free access to a dedicated platform where teachers can engage with each other - and OCR - to share best practice, offer guidance and access a range of support materials produced by other teachers; such as lesson plans, presentations, videos and links to other helpful sites.

## INTERCHANGE

OCR Interchange has been developed to help you to carry out day to day administration functions online, quickly and easily. The site allows you to register and enter candidates online. In addition, you can gain immediate and free access to candidate information at your convenience. Sign up at <https://interchange.ocr.org.uk>

# FREQUENTLY ASKED QUESTIONS

## UNIT A511: INTRODUCTION TO DESIGNING AND MAKING

*Is this a compulsory unit?*

This unit is compulsory for a GCSE in Design and Technology: Resistant Materials (J306). It is also one of two units that must be studied for a GCSE (Short course) in Design and Technology: Resistant Materials (J046).

*What is this unit worth?*

This unit is worth 30% of the GCSE in Design and Technology: Resistant Materials (J306) qualification and 60% of the GCSE (Short course) in Design and Technology: Resistant Materials (J046).

*What is the entry code for this unit?*

The entry code for this unit is A561.

*How is this unit assessed?*

This unit is internally marked and externally moderated. Teachers should use the published marking criteria for Unit A561.

*Will candidates be able to re-enter units?*

Yes. Controlled assessment units can be carried forward with the moderator mark from one session to the next i.e. June 2014 to June 2015. There is a separate 'carry over' code to re-enter the unit.

*Are the timings conducted by a stop watch?*

No. The timings are recommended. Although OCR cannot monitor application, it is expected that candidates from a range of centres are given the same time exposure and opportunities as other candidates. It does however need to be flexible and accommodate candidate illness etc.

*Is teaching time included in the 20 hour time allowance?*

No, see OCR sample scheme of work for this unit to see how teaching can run alongside the controlled assessment and not be recorded.

*Can staff still run after school workshops to make sure practical work is completed?*

Skills can be developed after school however; the work must be completed in lesson time to make the assessment fair and equal.

*Are candidates free to make what they want?*

Candidates must select one of the published themes as a starting point. Once selected, the candidate needs to choose a specific product for design development.

*Can all candidates from one centre work on the same theme?*

Yes, but candidates need to identify their own brief, user group and how the product will be developed and the prototype manufactured.

*Can candidates develop the outcome from Unit A561 in Unit A563?*

No. These are two separate units, each of which has its own theme list to select from. However, products can be linked eg storage in A561 can be used to store items made in A563.

*Will the theme lists change each year?*

No. Every two years the themes will be reviewed. Initially it is anticipated that extra themes will be added. Centres will always have two years notice of any themes being removed.

*Can candidates work in teams to produce one product?*

Yes, as long as work from each candidate is clearly identifiable and assessed appropriately.

*Can students complete the whole portfolio on a power point and not print the design sheets saving on paper and ink?*

Yes. Individual students are free to select the way in which they wish present their portfolio which can be in either be on paper or in a digital form. Hand sketching and design solutions are expected to form part of the range of design skills shown, and must be scanned into an electronic portfolio. It is expected that digital work will be sent to the moderator in an approved format, such as a CD / pen drive, or posted directly into OCR's digital repository. Photos of the finished prototype product (minimum 2 photos) should be included in paper and digital portfolios. A list of acceptable digital file formats is included in the specification.

*Can the candidate handwrite the whole portfolio?*

Yes, but the examination actively encourages the candidate to be confident and effective users of ICT. Where appropriate candidates should be given the opportunity to use ICT to further their experience of CAD CAM, data handling and word processing and digital presentation. These sheets can be printed and included in a paper portfolio.

*Can the centre produce framework sheets for the candidates to complete?*

These need to be limited in their use. They are very helpful for SEN and EAL candidates, but need to be used with caution for high achievers as 'filling in boxes' can limit their thinking and creativity.

*To avoid a lot of writing can candidates use sound bites and video clips?*

Yes, but they need to be focused, precise and relevant. This facility is only available to candidates producing a digital portfolio.

*In this unit, there is not much time to produce a quality outcome capable of testing. What are you expecting from candidates?*

That candidates use a range of skills and processes to work skilfully and safely to shape, form and finish materials and assemble components.

*The specification refers to candidates producing a prototype in A561 and producing a product in A563. What is the difference?*

A prototype might be used to demonstrate an understanding of the manufacture of a product, to test its effectiveness to a limited degree, might be made of materials that are less durable, easier to work, but otherwise similar to the product. Products produced in A563 will be made to fulfil a purpose and be durable.

*Is there a limit to the number of photographs used in a portfolio?*

No. Photographs are a very efficient and effective way of monitoring progress and showing the quality and success of the prototype product. It is recommended that photographs are used within the portfolio to show how the practical progresses throughout the various stages of construction and at the end of the process, to show details of the completed prototype product.

*Do teaching staff still mark the candidates work?*

Yes. It is still the responsibility of the centre to standardise the marks in the cohort and submit the marks to the board. A sample will be requested for moderation.

*How does this sit with the timed activities?*

The evidence must still represent 20 hours work. Certain sections may be replaced with better quality work.

*Is there a text book for this unit?*

Yes. The recommended text book is GCSE Design and Technology: Resistant Materials published by Hodder. This book covers all three units of the GCSE in Design and Technology: Resistant Materials (J306) qualification.

## **UNIT A565: SUSTAINABLE AND TECHNICAL ASPECTS OF DESIGNING AND MAKING**

*Is this a compulsory unit?*

This unit is compulsory for a GCSE in Design and Technology: Resistant Materials (J306).

*What is this unit worth?*

This unit is worth 40% of the GCSE in Design and Technology: Resistant Materials (J306) qualification.

*What is the entry code for this unit?*

The entry code for this unit is A565.

*How is this unit assessed?*

This unit is assessed by a 90 minute written test. The test is externally set and marked.

*What is the structure of the test?*

The test is divided into sections A and B and worth 80 marks. Section A consists of fifteen short answer questions and one longer question. Section B consists of three questions requiring answers that may involve sketching, annotation, short sentences or more extended writing.

*Is the test tiered?*

No. All candidates take the same test.

*Are exemplar test questions available?*

Yes. Exemplar questions are available on the OCR website and past test papers will also be made available on the website.

*How is it best to teach the unit A565 content?*

This Unit should be delivered through a number of mini tasks. These tasks would in some cases be ideally linked to unit 1 or 3.

*What is a banded mark scheme?*

With questions that require a detailed written response and that are marked out of six or more marks a banded mark scheme is applied. These require a more detailed and technical answer that uses subject specialist terminology and also takes into account the use of spelling, Punctuation and grammar.

*Will students lose marks for bad spelling, punctuation and grammar?*

On the more detailed response questions where a banded mark scheme is applied, marks can be lost for poorly written and unclear responses.

*Is there a text book for this unit?*

Yes. The recommended text book is GCSE Design and Technology: Resistant Materials published by Hodder. This book covers all three units of the GCSE in Design and Technology: Resistant Materials (J306) qualification.

## **UNIT A563: MAKING QUALITY PRODUCTS**

*Is this a compulsory unit?*

This unit is compulsory for a GCSE in Design and Technology: Resistant Materials (J306). It cannot be taken as part of the GCSE (Short course) in Design and Technology: Resistant Materials (J046).

*What is this unit worth?*

This unit is worth 30% of the GCSE in Design and Technology: Resistant Materials (J306) qualification.

*What is the entry code for this unit?*

The entry code for this unit is A563.

*How is this unit assessed?*

This unit is assessed by a 20 hour controlled assessment task.

*The assessment scheme refers to "response to a brief" but OCR provides a set of themes. What is the candidate's starting point?*

The assessment will start from a simple brief. The teacher may choose to set a single brief or allow candidates to develop their own brief from the theme. This allows the teacher to adjust the exercise to local conditions, facilities, candidates' capabilities and time. Evolution of the brief is not part of the timed assessment.

*What about research?*

Local conditions will apply here: candidates may be asked to conduct their own research outside the timed assessment or the centre may provide research materials around a theme. Candidates will be assessed on developing a specification as a result of analysis; this must be his/her own work.

*How many design ideas would be appropriate?*

There can be no fixed answer to this question – it depends on the type and scale of the design exercise.

*What is "a range" of appropriate strategies for communication?*

This is an opportunity for candidates to demonstrate competence using various media and candidates will be rewarded for doing so. Discernment should be shown in using strategies that are appropriate and assist communication.

*Is a written plan required?*

No, a record of the key stages of making will be sufficient. However without some form of planning it is unlikely that a candidate will succeed in making a quality product. This plan can be a working, evolving document.

*How many materials/processes should a candidate use?*

There is no fixed number of materials or processes, but candidates should be encouraged to demonstrate skill and competence commensurate with the programme of study for this specification.

*What are the limits of teacher intervention?*

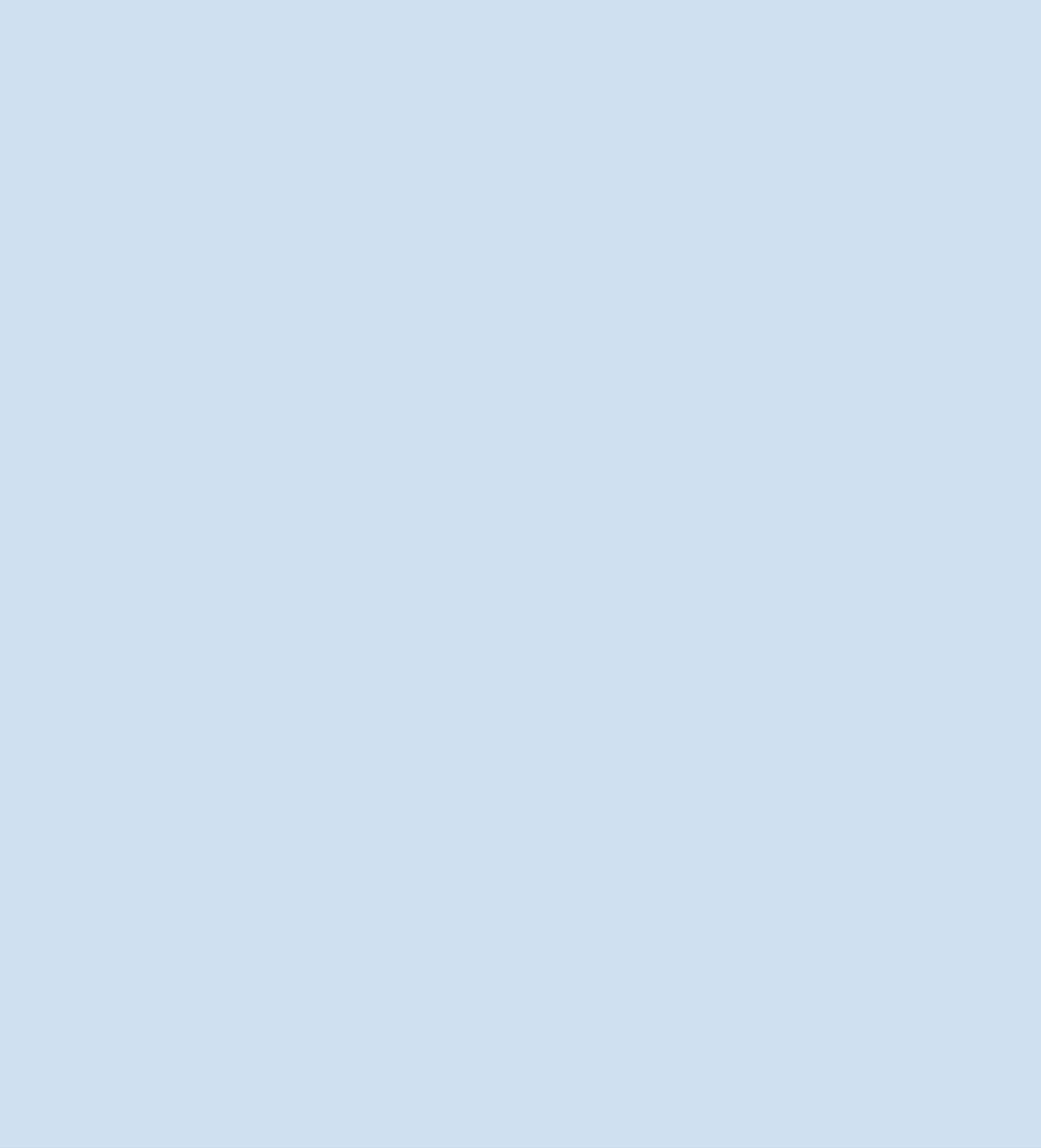
Teachers and support staff have a duty to ensure good Health and Safety practices. Work can be discussed but candidates must reach their own judgements and conclusions; staff cannot provide specific advice on improvements to meet assessment criteria. See Section 5.3.2 Feedback Control. If direct assistance is given this must be clearly recorded and not included within assessment.

*A candidate needs to test his/her work outside the controlled environment. Is this permissible?*

There will be circumstances where testing is most appropriate outside the controlled environment. In this case the teacher must be satisfied that the work submitted is the candidate's own and be able to authenticate it using the specified procedure.

*The sample Scheme of Work subdivides the 20 hour time allocation for this assessment. How closely can candidates be guided on use of time?*

As with any controlled assessment, use of time is in the candidate's control. While the sample scheme intersperses assessment sessions with teaching sessions, candidates may choose to extend or contract the time on different sections as they see fit.



## Contact us

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