Cambridge NATIONALS

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CAMBRIDGE NATIONALS IN ENGINEERING

R106 - PRODUCT ANALYISIS AND RESEARCH

DELIVERY GUIDE

VERSION 1

OCR
Oxford Cambridge and RSA

CONTENTS

To give us feedback on, or ideas feedback text the OCR resources you have used, email resourcesfeedback@ocr.org.uk

INTRODUCTION

This Delivery Guide has been developed to provide practitioners with a variety of creative and practical ideas to support the delivery of this qualification. The Guide is a collection of lesson ideas with associated activities, which you may find helpful as you plan your lessons.

OCR has collaborated with current practitioners to ensure that the ideas put forward in this Delivery Guide are practical, realistic and dynamic. The Guide is structured by learning objective so you can see how each activity helps you cover the specification.

We appreciate that practitioners are knowledgeable in relation to what works for them and their learners. Therefore, the resources we have produced should not restrict or impact on practitioners' creativity to deliver excellent learning opportunities.

Whether you are an experienced practitioner or new to the sector, we hope you find something in this guide which will help you to deliver excellent learning opportunities.

If you have any feedback on this Delivery Guide or suggestions for other resources you would like OCR to develop, please email resourcesfeedback@ocr.org.uk.

PLEASE NOTE

The activities suggested in this Delivery Guide MUST NOT be used for assessment purposes. (This includes the Consolidation suggested activities).

The timings for the suggested activities in this Delivery Guide DO NOT relate to the Guided Learning Hours (GLHs) for each unit.

Assessment guidance can be found within the Unit document available from www.ocr.org.uk.

The latest version of this Delivery Guide can be downloaded from the OCR website

OPPORTUNITIES FOR ENGLISH AND MATHS SKILLS DEVELOPMENT

We believe that being able to make good progress in English and maths is essential to learners in both of these contexts and on a range of learning programmes. To help you enable your learners to progress in these subjects, we have signposted opportunities for English and maths skills practice within this resource. These suggestions are for guidance only. They are not designed to replace your own subject knowledge and expertise in deciding what is most appropriate for your learners.

KEY

English

Maths

UNIT R106 - PRODUCT ANALYSIS AND RESEARCH

Guided learning hours : 30

PURPOSE OF THE UNIT

This unit will enable learners to perform effective product analysis. They will research existing solutions and assess the development of engineered products. Learners will develop dextrous skills and gain practical experience of product assembly and disassembly to appreciate manufacturing processes, design features and materials used. This unit develops learner's creativity and critical analysis through an understanding of the principles behind good design. What makes a good product sell is considered by analysing existing solutions.

On completion of this unit, learners will understand how to perform effective product analysis and evaluation through research and product assembly and disassembly procedures to appreciate product design features.

Learners studying for the Certificate will be able to apply knowledge and understanding gained in this unit to help develop their skills further during the completion of units R107 and R108.

Learning Outcome — The learner will:
LO1: Know how commercial production methods, quality and legislation impact on the design of products and components
LO2: Be able to research existing products
LO3: Be able to analyse an existing product through disassembly

LO1 - KNOW HOW COMMERCIAL PRODUCTION METHODS, QUALITY AND LEGISLATION IMPACT ON THE DESIGN OF PRODUCTS AND COMPONENTS

Learning Outcome — The learner will:
LO1: Know how commercial production methods, quality and legislation impact on the design of products and components

Suggested content	Suggested activities	Suggested timings	Possible relevance to
1 Commercial production methods 	If possible, an industrial visit could be used to highlight a range of production methods including one-off, batch and mass production. Automatic and manual production methods could also be identified. If a visit is not possible then suitable videos could be shown to learners of manufacturing taking place (eg http://www.youtube.com/watch?v=DTWnQDAhp9k which shows job, batch and flow production taking place). Learners could independently research a range of commercial production methods and present their findings.	3 hours	R111
2 Manufacturing processes and design 	Manufacturing processes and their impact on design decisions might also be seen as part of an industrial visit. Manufacturing processes will include moulding, pressing/forming, shaping (including computer numeric control), machining, finishing and assembly. If a visit is not possible then learners might be shown suitable videos of manufacturing processes and asked to research their impact on design decisions. The following video shows injection moulding taking place: http://www.youtube.com/watch?v=y1Zhpdx-XtA	3 hours	R110 (LO4) R111
3 End of life considerations 	The teacher might begin with a class discussion about the end of life implications for products including recycling of materials, reusing components and safe disposal of toxic hazards. The relationship with design might also be made. Suitable case studies might be used and researched such as the car, personal computer or mobile telephone. Learners could be asked to identify which components are recycled, reused and disposed of, and how this takes place. For the example of the mobile phone this might be: case (recycled), printed circuit board (reused), battery (disposed). Recycling websites might be useful, including http://www.recycling-guide.org.uk/ See Lesson Element End of Life Considerations	3 hours	R112 (LO4)

Suggested content	Suggested activities	Suggested timings	Possible relevance to
4 Product conformity 	Learners could undertake a research study of the importance of products conforming to legislation and quality standards including British Standards, European Conformity (CE) and Waste Electrical and Electronic Equipment Directive (WEEE). Websites might be useful (eg WEEE Directive: http://www.environment-agency.gov.uk/business/topics/waste/139283.aspx) The teacher might develop a class discussion about the importance of protecting designs from being copied including how patents and copyrights are used. A commercial case study (eg Apple iPhone, Dyson vacuum cleaner) might be used for learners to investigate product conformity, and how the product design is protected.	3 hours	

LO2 - BE ABLE TO RESEARCH EXISTING PRODUCTS

Learning Outcome — The learner will:
LO2: Be able to research existing products

Suggested content	Suggested activities	Suggested timings	Possible relevance to
1 Research methods for product analysis 	The teacher might begin with a class discussion about how research can be used to investigate existing products. The differences between primary and secondary methods, along with examples of each could be included: Primary research methods: physical analysis, questioning and surveys; Secondary research sources: internet/online, books, literature, manuals, images, drawings. Learners could undertake a class-based activity which includes both primary and secondary research methods (eg primary: questioning class colleagues, secondary: looking at images) See Lesson Element Research methods for Product Analysis	3 hours	
2 Analysing existing products 	The teacher might use a case study of an existing product for learners to analyse. For the product learners should identify strengths and weakness of: finish, aesthetics, meeting user needs, durability, sustainability, life cycle, energy use and power sources. The product used might be physical, shown as a video or as a picture or drawing.	3 hours	R109
3 Summarising and presenting research outcomes 	Learners could use a suitable example, possibly linked to previous product research, on which to present their findings. They might be encouraged to us a range of methods including: charts/diagrams/tables, digital evidence, sketches and annotations. This lends itself to developing the use of ICT and software skills such as PowerPoint. Learners might undertake this as an individual or group activity culminating in a presentation to the rest of the group – which might be oral, a poster or even interactive video.	3 hours	

LO3 - BE ABLE TO ANALYSE AN EXISTING PRODUCT THROUGH DISASSEMBLY

Learning Outcome — The learner will:
LO3: Be able to analyse an existing product through disassembly

Suggested content	Suggested activities	Suggested timings	Possible relevance to
1 Disassembly methods and procedures 	The teacher might begin with a class discussion of the importance of preparing for product disassembly in order to ensure safety and also that the product is not damaged. The importance of a structured approach should be included. Learners could be introduced to manufacturer's maintenance instructions and manuals with key points being identified. Learners could also produce a simple disassembly procedure to include a sequence, tools required and safety considerations. See Lesson Element Disassembly methods and procedures	3 hours	
2 Safe product disassembly 	Learners could undertake the disassembly of a physical item as a practical activity. This will build upon preceding learner guidance of taking a structured approach using manufacturer's instructions and manuals where available. Learners will need to consider safe use of appropriate tools including: screwdrivers, pliers, cutters, spanners, and measuring equipment.	3 hours	
3 Analysing products through disassembly 	For the disassembled item learners could identify, analyse and document their findings about the product including: components, assembly methods, materials, production methods and maintenance considerations. They may be able to use ICT skills already developed for presenting research outcomes to present a product analysis for the physical item that has been disassembled. This might include a PowerPoint or poster presentation with photographs and annotations.	3 hours	R110 (LO4) R111

POSSIBLE INTERNET SOURCES

Source	Website
YouTube	www.youtube.com
Recycling Guide	http://www.recycling-guide.org.uk/
WEEE Directive	http://www.environment-agency.gov.uk/business/topics/waste/139283.aspx

Contact us

Staff at the OCR Customer Contact Centre are available to take your call between 8am and 5.30pm, Monday to Friday.

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