Model Assignment

Issued September 2008

OCR Level 2 Principal Learning in Engineering

Unit F549: Engineering design

Please note:

This OCR model assignment may be used to provide evidence for the unit above. Alternatively, centres may 'tailor' the assignment within permitted parameters (see 'Notes for Tutors). It is the centre's responsibility to ensure that any adaptations made to this assignment allow learners to meet all the assessment criteria and provide sufficient opportunity for learners to demonstrate achievement across the full range of marks.

The scheme codes for these qualifications are:

OCR Level 2 Principal Learning in Engineering 500/2399/8

The QCA Accreditation Number for this unit is:

Unit F549: Engineering design K/501/1884

This OCR model assignment remains live for the life of these qualifications.

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Model Assignment

Description of model assignment.

OCR Lighting Solutions Ltd. is a specialist company involved in the design and manufacture of lighting solutions for the workplace. As part of its existing product range the company design and manufacture aluminium desk lamps. The lamps can be adjusted by the user to allow them to target the direction of the light.

The lamps have been very popular but analysis of sales figures shows that the number of lamps being sold has declined in the last 6 months. The directors of the company have asked you, as part of the engineering research and development team, to carry out a review of the existing lamp design as well as competitors' products.

You are to identify possible improvements to the existing product and then undertake the design of a replacement product. Your final design proposal will need to be communicated using appropriate presentation and modelling techniques to allow it to be assessed by the company directors.

It is possible to link this unit with Level 2 Unit F551: Producing engineering solutions. If you choose to do this, you will have the opportunity to manufacture the lamp.

Read through all of the following tasks carefully, so that you know what you will need to do to complete this assignment.

Tasks

Task 1: Product investigation

OCR Lighting Solutions Ltd. is a specialist company involved in the design and manufacture of lighting solutions for the workplace. As part of its existing product range the company design and manufacture aluminium desk lamps. Sales figures show that the number of lamps being sold has declined in the last 6 months. The directors of the company have asked you, as part of the research and development team, to carry out a review of the existing lamp design as well as competitors' products.

Assessment Criteria 1.1, 1.2

Your task is to:

- disassemble the existing lamp
- give a detailed description of its function, considering needs of the user, how the product is manufactured and identify key criteria used in its design
- identify at least two comparative products. Establish the strengths and weaknesses of these products including consideration of the user and the manufacturer.

You will need to produce:

- a design portfolio which should contain:
    - a detailed description of the existing lamp and the comparative products you researched
    - an identification of the key functional criteria used in the design of the existing lamp
    - an analysis of the strengths and weaknesses of the existing lamp and comparative products, including the needs of the user and manufacturer
    - any scientific, mathematical and materials issues that underpin the design of the chosen and comparative products

Task 2: Developing, communicating and testing a new product design

Having read your report the directors have asked that you undertake the re-design of the existing lamp in order to develop a new product.

Assessment Criteria 2.1, 3.1, 3.2, 4.1, 5.1

Your task is to:

- use your research to identify possible improvements to the existing lamp
- investigation and research relevant legislation and product standards
- produce a design brief and justified specification for a new lamp which incorporates the possible improvements to the existing design
- generate design ideas for the new lamp using appropriate methods of communication
- devise suitable tests and set success criteria to prove the final design proposal

You will need to:

- present in your design portfolio:
  - a detailed report

- present in your design proposal to the directors of the company

  - an identification of possible alternatives and improvements to the existing lamp design

  - research and investigate the product standards and legislation which will apply when designing a replacement for the existing lamp

  - the production of a design brief and a fully justified design specification for the improved product

  - the generation and presentation of design ideas for the new product using a variety of techniques which may include:
    - sketching
    - formal drawing including orthographic, exploded and pictorial
    - the use of a variety of ICT applications
    - 2D and 3D modelling
    - digital photography

  - the testing of your design proposal which may include:
    - selection of appropriate success criteria
    - detailed record of tests undertaken to prove the design and the chosen materials including measurement, mathematical calculation and calibration
    - analysis and evaluation of information gained

  - a clear conclusion that justifies the final design proposal.

Model Assignment: Tutor Information

OCR Level 2 Principal Learning in Engineering

Unit F549: Engineering design

Guidance for Centres

1 General

1.1 OCR model assignments are issued free to participating centres and are also available to download from our website: www.ocr.org.uk.

1.2 Centres may choose to:

- use OCR model assignments for formal summative assessment of learners
- tailor OCR model assignments for formal summative assessment of learners

It is intended that this model assignment can be used by centres without modification. However, in order to provide appropriate contextualisation, improve access or increase local relevance, centres may 'tailor' the model assignments within set parameters. Details of the scope of adaptation are provided in the 'Notes for Tutors' section of this document.

1.3 This assignment has been designed to meet the full assessment requirements of the unit. Learners will need to take part in a planned learning programme that covers the underpinning knowledge and skills of the unit.

2 Before carrying out the assignment

2.1 Learners should be provided with a copy of the *Learner Information* section of this assignment or the centre adapted model assignment.

2.2 Learners may carry out preparations prior to undertaking the tasks.

3 When completing the assignment

3.1. All assessment evidence must be produced under **controlled conditions** so that the overall level of permit control secures validity and reliability, provides good manageability for all involved and allows teachers to authenticate the work confidently. Further guidance on **controlled conditions** is provided within the OCR Principal Learning Handbook.

3.2. Learners should be allowed 30 guided learning hours (glh) to complete all of the tasks. The amount of time may vary slightly depending on the nature of the tasks and the ability of individual learners. It is suggested that evidence is produced in several sessions.

3.3. Each learner must produce individual and authentic evidence for each task within the assignment.

3.4. Centre staff may give support and guidance to learners. This support and guidance should focus on checking that learners understand what is expected of them. It is not acceptable for tutors to provide model answers or to work through answers in detail.

3.5. Learners may use information from any relevant source to help them with producing evidence for the tasks.

4 After completing the assignments

4.1 Learners' evidence is assessed by the centre's assessor against the qualification specification contained in the Principal Learning Handbook. When marking learners' work, centres **must** use the marking criteria provided within the unit. For further information about assessment please refer to the section on Assessment and Moderation in the Principal Learning Handbook.

4.2 Assessors' decisions should be quality assured across the centre through internal moderation. For further information about internal moderation please refer to the section on Assessment and Moderation in the Principal Learning Handbook.

5 Presentation of work

5.1 Centres may wish to discourage learners from excessive use of plastic wallets for presentation of their evidence as this may hinder the assessment process. Instead centres may wish to encourage learners to present their work so that it is easily accessible, e.g. spiral bound, stapled booklet, CD-ROM.

6 Acceptable evidence

6.1 For guidance on generation and collection of evidence please refer to the section on Assessment and Moderation in the Principal Learning Handbook.

7 Plagiarism and unauthorised collaboration

7.1 Centres should have adequate procedures in place to ensure that plagiarism and unauthorised collaboration are identified and responded to.

7.2 When supervising tasks, teachers are expected to:

- offer learners advice about how best to approach such tasks
- inform learners of the ramifications of unfair practice
- exercise continuing supervision of work in order to monitor progress and to prevent plagiarism
- ensure all copied materials is suitably acknowledged
- ensure copied material is not given credit in the assessment process

7.3 As with all controlled assessments, the teacher/tutor presenter must be satisfied that the work submitted for assessment is the learner's own work.

Notes for Tutors

Introduction to the Tasks

The tasks have been designed to enable learners to demonstrate their knowledge, understanding and ability to investigate the function of engineered products and the components required to assemble the engineered product.

This research is then used to consider improvements to the design of the chosen engineered product. These improvements are then incorporated in a product design brief and specification. The improved design is then tested using appropriate 2D and 3D modelling techniques.

Learners will need to use a variety of presentational techniques. Modelling, for example could be through the use of a software package such as ProDesktop but it is **essential** that screen shots are saved so that the process can be fully documented for assessment purposes.

Learners will need to apply scientific and mathematical considerations to their design improvements and, if appropriate, within their testing.

When guiding learners in the selection of products to research, you must ensure opportunity is provided for the learner to:

- have access to actual chosen and comparative engineered products (these will normally have a 'sector' focus)
- have the knowledge and tools necessary to disassemble the products
- be able to obtain information about the products

These guidance notes should be used in conjunction with the unit specification and Principal Learning Handbook.

Scope of permitted model assignment modification

The model assignment is self-contained in its present form. The set of tasks form a coherent whole addressing all the assessment criteria.

It is permissible to contextualise or carry out modification of this model assignment in order provide appropriate contextualisation, improve access or increase local relevance. However, centres must take great care when 'tailoring' tasks to ensure that modifications do not result in the over direction of learners, devalue the applied nature of the work or deny the learner the opportunity to generate evidence for all the assessment criteria at all levels of outcome.

No changes to the assessment criteria are allowed.

The model assignments can be changed in terms of the following:

- the products that are chosen for study
- the range of information/resources learners have access to
- each specific task linked to a particular assessment criteria may be appropriately contextualised

When completing this model assignment it may be possible to generate evidence for completing a task in a variety of formats. This list is not exhaustive and will depend on the approach taken to complete the task or model assignment. In some cases the task or model assignment will require a specific format for the outcome and this will be clearly marked in the table.

Depending on the approach taken to the model assignments it may also be possible to demonstrate additional PLTS coverage and some additional opportunities have been listed below.

Task activity	Nature of evidence generated	Potential Assessment Criteria coverage
Task 1 Product investigation	Identification of the key functional criteria used in the design of the chosen engineered product Knowledge of the strengths and weaknesses of comparative products including the needs of the user and manufacturer. Use suitable tools and equipment safely and correctly to disassemble engineered products, and record evidence of their use	**Assessment Criteria** • 1.1,1.2 **PLTS** • IE 4
Task 2 Developing, communicating and testing a new product design	Record the results of investigation and research into the legislation relevant to the selected product. Research relevant standards and draw conclusions on the implications of these standards Identify possible alternatives and improvements to the selected product and produce a design brief for these improvements Produce a fully justified design specification for the improved product Produce a wide range of innovative and creative design ideas which show clear development of the improved solution from early design ideas through to working drawings Set success criteria, devise suitable tests to prove the developed design Organise time and resources, analyse and evaluate information. Present the results of the tests in an appropriate format	**Assessment Criteria** • 2.1 • 3.1, 3.2, • 4.1, 5.1 **PLTS** • IE2, CT5, IE4, IE6