



# SAMPLE

**OCR Level 2 Principal Learning in Engineering**

**F548**

Unit F548: The engineered world

**Sample Paper**

Candidate  
Name

Centre  
Number

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Candidate  
Number

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### INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and candidate number in the boxes above.

### INFORMATION FOR CANDIDATES

- The total number of marks for this paper is 60.

For Examiner's Use

1	
2	
3	
4	
5	
6	
Total	

## Format for viva voce examination of OCR Level 2 Unit F548 Diploma in Engineering

The examination should be conducted in a quiet location where there will be no interruptions and the learner has no distractions, external contacts or access to unauthorised materials.

The centre is required to provide a digital recorder that can store up to 15 minutes of video of the viva voce. The profiles of the learner and presenter should be clearly visible on camera. An independent invigilator must also be present.

Additionally the presenter is required to record, using brief notes, the key points raised by the learner, using the pages in this answer booklet.

- Before the examination starts the learner should be asked to complete the front cover of this booklet
- The presenter should check the learner has their personal work book compiled for this unit
- Check with the learner which engineer, engineering achievement and sector they are going to talk about

Before recording the viva voce the presenter should:

1. Ask the learner to be seated.
2. Explain the format of the exam to the learner by reading to them the following information:
  - Your examination (the viva voce) will last for 15 minutes
  - Firstly I will ask you to state your name,
  - centre number and your candidate number as soon as we start
  - I will be asking you some specific questions, there are five in all, which you must try to answer
  - You will be talking about some aspects of the research you have undertaken
  - You can refer to your personal workbook if you feel it would help
  - You must remember to speak clearly and confidently
  - While you are talking I will be making brief notes of what you say in this booklet.
3. Ask the learner if they are ready to begin

The presenter will then say -

“You have a maximum of 15 minutes to answer the questions. I will tell you when there is 2 minutes left.”

The camera will then be switched on and an indication will be given to the learner and presenter that the examination has started.

The presenter will then say -

“Can you please tell me your name, centre number and your candidate number and please remember to talk clearly?”

Thank you. Now the first question is -

1. (a) “Please identify the engineering achievement that you have researched.”

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- (b) “Explain the economic effects which have resulted from this engineering achievement.”

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2. “Please tell me about the human or social issues which have driven the development of the engineering achievement you have researched.”

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3. (a) “Now, please tell me which engineering sectors you have studied.”

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(b) “Please explain the merits of registration schemes associated with different engineering trades.”

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4. “Now, for one of the sectors you have studied, please tell me about the basic duties and responsibilities of a professional person.”

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5. “Now, please explain the impact of sustainability on resources and the way engineering considers **green issues**.”

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6. “Finally, I am going to give you a workplace scenario.”

(The presenter gives the learner a printed copy of the workplace scenario and also reads the scenario out)

“Sam works as a semi-skilled production operator and has had thirty-seven days off work in the last six months due to a variety of illnesses. The employer, who has to meet tight delivery deadlines to supply car components, has spoken to Sam on each occasion asking for improved attendance. Due to a recent family bereavement, Sam has been absent for another nine days. The employer has called Sam in to discuss this latest prolonged absence and intends to terminate Sam’s employment.”

“Now I am going to ask you a question about the workplace scenario.”

“What would you advise Sam to do under these circumstances?”

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After the learner has finished speaking the presenter then says –

“The examination is over and the camera will now be switched off.”

At no time should the presenter enter into any discussion on how well a learner has done.
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**Principal Learning**

**OCR Level 2 Principal Learning in  
Engineering**

**[F548]**

Unit F548: The engineered world

**Sample Model Solutions and Mark Scheme**

The maximum mark for this paper is [60].

SAMPLE

## Marking Criteria

<b>Band 1</b>	<b>Band 2</b>	<b>Band 3</b>
<p>Has briefly identified an engineering achievement and given a limited explanation of the economic effects which resulted from this achievement. <b>[1 2 3]</b></p>	<p>Has identified an engineering achievement and given some information of the economic effects which resulted from this achievement. <b>[4 5 6]</b></p>	<p>Has clearly identified an engineering achievement and given detailed information of the economic effects which resulted from this achievement <b>[7 8 9 10]</b></p>
<p>Has given limited evidence of thinking about human and social issues that drove the achievement. <b>[1 2 3]</b></p>	<p>Has give some evidence of thinking about human and social issues that drove the achievement. <b>[4 5 6]</b></p>	<p>Has given detailed evidence of thinking about human and social issues that drove the achievement. <b>[7 8 9 10]</b></p>
<p>Has briefly identified one sector and briefly explained the basic duties and responsibilities of a professional person. <b>[1 2 3]</b></p>	<p>Has identified one sector and explained the basic duties and responsibilities of a professional person. <b>[4 5 6]</b></p>	<p>Has clearly identified one sector and given a detailed explanation of the basic duties and responsibilities of a professional person. <b>[7 8 9 10]</b></p>
<p>Has briefly identified sectors that have been studied and given a limited explanation of the merits of registration schemes associated with different engineering trades. <b>[1 2 3]</b></p>	<p>Has identified sectors that have been studied and given an explanation of the merits of registration schemes associated with different engineering trades. <b>[4 5 6]</b></p>	<p>Has clearly identified sectors that have been studied and given a detailed explanation of the merits of registration schemes associated with different engineering trades. <b>[7 8 9 10]</b></p>
<p>Has briefly explained the impact of sustainability on resources and one way in which engineering considers 'green' issues. <b>[1 2 3]</b></p>	<p>Has explained the impact of sustainability on resources and at least two ways in which engineering considers 'green' issues. <b>[4 5 6]</b></p>	<p>Has given a detailed explanation of the impact of sustainability on resources and two ways in which engineering considers 'green' issues. <b>[7 8 9 10]</b></p>
<p>Has briefly explained the basic rights and responsibilities of an employee and employer. <b>[1 2 3]</b></p>	<p>Has explained the basic rights and responsibilities of an employee and employer. <b>[4 5 6]</b></p>	<p>Has given a detailed explanation of the basic rights and responsibilities of an employee and employer. <b>[7 8 9 10]</b></p>

## Model Sample Assessment

Peter, a learner, chose to research and consider the development of microwave ovens.

Example prompts	Dialogue
Tell me about the achievement you have studied and its economic effects	
	I looked at the development of microwave ovens. I thought it was an everyday item which has had a big impact on the way we live but when I looked into it I found it is based on one of the most important engineering developments of the 20 <sup>th</sup> century.
OK, Can you explain what this important development was?	
	Microwave ovens use a device called a cavity magnetron to generate microwaves. These high frequency waves can vibrate water molecules in food so fast that they heat up making the food hot. The device now common in kitchens was originally developed for a portable radar system.
What factors drove the original development?	
	In WW2, the early radar system used by Britain used long wave signals. While it worked well it had serious drawbacks. It needed very large aerials and power supplies so it was not portable or directional and could not detect objects smaller than the wavelength of the system. Microwave radar overcame those problems
Why was a new radar so important?	
	Submarines were sinking supply ships and they could easily slip away under cover of night or fog. Harry Randall and John Boot of Birmingham University in February 1940 developed the cavity magnetron which generates radio waves only a few centimetres long. Their device was 100 times more powerful than earlier magnetrons and in May 1940 a plane carrying prototype radar detected a submarine periscope at six miles in darkness.
Tell me about the human or social issues which drove this development	
	This invention made submarines vulnerable to attack everywhere; it turned the tide of the war in the Atlantic and consequently the result of the war. The effects on our lives today are immeasurable. Democracy prevailed but the political map of the entire world changed, Britain lost its empire and the USA became the new superpower.

Example prompts	Dialogue
What about use in cookers?	<p>The heating effect of microwave energy was known from the start but not used in a commercially viable oven until the 1970's; nowadays they sell for a few pounds. They have revolutionised the way we prepare food which can be pre cooked and chilled and then reheated on demand. They take less space than conventional ovens and heat the food very quickly. A whole range of new ready made meals and food products have become available for use in microwave ovens. Some people are concerned that the changes to our diet are not healthy</p>
Did you find anything else about registration schemes	<p>In my research I found the British Agrochemical Standards Inspection Scheme (BASIS) which seemed to me to give the merits of registration schemes.</p> <p>To a business BASIS registration means that:</p> <ul style="list-style-type: none"> <li>▪ distributors can demonstrate to those enforcing the Food and Environment Protection Act that they are taking all reasonable precautions to abide by the law as it relates to storage, transport and competence of staff involved in the UK Crop Protection Industry</li> <li>▪ stores and staff are assessed annually with a report sent direct to the distributor, drawing attention to any shortcomings. This minimises the risk of possible prosecution and subsequent fines and/or improvement notices from the enforcement agencies</li> <li>▪ there is provision of expert advice and regular auditing can help to maintain good management practices and efficiency</li> <li>▪ companies have access to an independent organisation which acts as a co-ordinator and arbitrator between various regulatory and approving authorities</li> <li>▪ distributors can keep abreast of current and pending regulations using BASIS as a source of contact to update, clarify, interpret and advise on legislative matters as they relate to the storage, transport, sale and advice of pesticides</li> <li>▪ distributors ensure that, by their support, their interests are considered in the running of BASIS.</li> </ul> <p>To the Agrochemical industry BASIS registration demonstrates an industry which:</p> <ul style="list-style-type: none"> <li>▪ seriously adopts higher standards, thereby ensuring that the requirements of current legislation are met</li> <li>▪ invests its own money in maintaining a self-regulatory body to help it keep abreast of standards</li> <li>▪ takes very seriously all the implications of environmental issues by voluntarily offering its businesses to annual audits.</li> </ul>

Example prompts	Dialogue
	<p>After this I found out about the Gas industry in some report which asked the question -</p> <p>What is the Gas Industry Registration Scheme?</p> <p>The given answer was</p> <p>The Gas Industry Registration Scheme (GIRS) has been developed to allow Utility Infrastructure Providers (UIP's) to carry out installation, commissioning and connection of gas mains and services to be adopted by Gas Transporters (GTs). Any UIP wishing to carry out work must be accredited under this scheme. All the GTs on mainland UK recognise this scheme and, provided that UIP's hold the appropriate scope of accreditation, will allow that UIP to tender for, and if successful, undertake installation and commissioning of gas mains and services work. Under the terms of a pre-start adoption agreement, once the work has been completed the host GT will adopt the system for the remainder of its lifetime.</p> <p>I could not do any more on this because I ran out of time.</p>
OK thank you for that. Now can you tell me about jobs you have researched?	
	Well, firstly I looked at a fitter's job.
What do they do?	
	A fitter builds and repairs equipment in a factory such as pumps, conveyors, gearboxes and machinery. They carry out routine maintenance, checking that machines work correctly and changing worn out parts.
What else can you tell me about the job?	
	They have to know about health and safety and work in a safe manner. They sometimes work shifts. It is quite skilled work and people learn on the job and at college as an apprentice. They need some more qualifications to get a higher grade job. It is an important job because they keep factories working.
OK what other jobs have you learnt about?	
	I learnt about electronics technicians, who install or repair instrumentation and control systems, they also create programmes for PLC controllers.
Can you tell me a bit more about the kind of thing they do?	
	This job is changing all the time with the development of new systems though the essential electronic knowledge doesn't change so much. Some technicians get to build prototype systems and products. They need to study electronics and

Example prompts	Dialogue
	similar subjects at college. To understand electronics fully you need to be quite good at maths.
OK <pause>	
	I also found out about production engineers. This is a very important branch of engineering. Designing things is OK but you need to know the best way to make the product. That is the production engineer's job. They need to know about mechanisms, structures and the way materials behave when processed. They have to go to university to get the qualifications they need to do the job. Afterwards they gain experience in a particular industry and have professional recognition.
Can you list the merits of registration schemes associated with different engineering trades?	
	<p>Registration would raise the status of engineers.</p> <p>Provides customers with confidence in the abilities of members of the register.</p> <p>Pre-qualification for some tenders would be simplified.</p> <p>Better employment prospects for members of the register.</p> <p>Registration would restrict the trading ability of unprofessional unqualified engineers.</p> <p>Registration would protect the public interest.</p>
Explain the impact of sustainability on engineering.	
	<p>I thought a good example of this is the effect on the environment in extracting metals and minerals. Mobile phone parts use the rare metal Tantalum for small capacitors and thousands of tons of rock have to be mined to get just a few hundred grams.</p> <p>This uses a lot of energy and damages the landscape.</p> <p>There is no substitute for tantalum so recycling schemes might be the only answer.</p>
OK, so are you talking about conservation?	
	I think energy and energy sources need conserving. Apart from energy used in industry about 30% of energy used in the UK is in homes and most of that goes on heating and lighting. Engineering could develop better building materials and insulators and efficient heating and lighting systems for buildings could save a lot of energy. Some renewable systems such as small scale photovoltaic panels could provide enough energy for lighting in houses.

Example prompts	Dialogue
Will you now explain how engineering can provide a solution?	
	<p>The biggest resource is energy and energy sources. Most engineering processes use massive amounts of energy for heating, or electric motors. Generally conserving energy means not wasting energy or having inefficient processes. Engineering can find more efficient ways to do things like lean manufacturing and better process designs</p>
Please explain the term “green issues” in the context of engineering	<p>Green issues are the ones linked to recycling and using energy more efficiently. We call something green if it is environmentally friendly</p>
Tell me what you think about the rights and responsibilities of employees and employers	
	<p>Well it doesn't look very fair at first. It is not Sam's fault he has been off. But it is not clear how many minor illnesses Sam has had.</p> <ul style="list-style-type: none"> <li>▪ If he is a member of a Union he could ask for the union representative to go with him.</li> <li>▪ There is nothing to say that Sam is not competent at doing the job.</li> <li>▪ There may be reasons for the absence that the employer does not know about.</li> <li>▪ There are laws about unfair dismissal that the employer must make sure they comply with. The Employment Act of 2002 is one example.</li> <li>▪ The employer must show that the termination would be fair and for this to be the case the employer must have followed the correct procedures. The procedures might have been three verbal warnings followed by two written warnings.</li> <li>▪ There ought to be a policy on attendance and a list of steps that the employer should go through in order to terminate someone's employment.</li> <li>▪ When the employer spoke to Sam about his attendance, did he write this down and explain the possible consequences of continued absence.</li> <li>▪ We need to know whether the company has an attendance policy that is being used with all employees.</li> <li>▪ Did an accident at work cause an illness?</li> <li>▪ If it was a work accident Sam could consider claiming against the company. The employer might want to take this into account.</li> </ul> <p>Can Sam's illness be classed as a disability? If so, then the employer would have to make sure he is working within the Disability Discrimination Act. I think this was 1955.</p>

Example prompts	Dialogue
	<ul style="list-style-type: none"> <li>▪ Sam would have a case if he could show he was being discriminated against because of a disability.</li> </ul> <p>Nine days seems a lot of time for a family bereavement but we do not know who in the family died or the circumstances. I would not expect the employer to give Sam nine days extra holiday but the employer does not seem very sympathetic. We do not know if Sam was given permission for the time off or just called in sick. There is no legal amount of time a person should have off, but two or three days are typical amounts for this situation.</p>

SAMPLE

## Marking Scheme for the dialogue with Peter

<b>Band 1</b>	<b>Band 2</b>	<b>Band 3</b>	<b>Marks Awarded</b>
Has briefly identified an engineering achievement and given a limited explanation of the economic effects which resulted from this achievement. <b>[1 2 3]</b>	Has identified an engineering achievement and given some information of the economic effects which resulted from this achievement. <b>[4 5 6]</b>	Has clearly identified an engineering achievement and given detailed information of the economic effects which resulted from this achievement <b>[7 8 9 10]</b>	6
Has given limited evidence of thinking about human and social issues that drove the achievement. <b>[1 2 3]</b>	Has give some evidence of thinking about human and social issues that drove the achievement. <b>[4 5 6]</b>	Has given detailed evidence of thinking about human and social issues that drove the achievement. <b>[7 8 9 10]</b>	6
Has briefly identified one sector and briefly explained the basic duties and responsibilities of a professional person. <b>[1 2 3]</b>	Has identified one sector and explained the basic duties and responsibilities of a professional person. <b>[4 5 6]</b>	Has clearly identified one sector and given a detailed explanation of the basic duties and responsibilities of a professional person. <b>[7 8 9 10]</b>	6
Has briefly identified sectors that have been studied and given a limited explanation of the merits of registration schemes associated with different engineering trades. <b>[1 2 3]</b>	Has identified sectors that have been studied and given an explanation of the merits of registration schemes associated with different engineering trades. <b>[4 5 6]</b>	Has clearly identified sectors that have been studied and given a detailed explanation of the merits of registration schemes associated with different engineering trades. <b>[7 8 9 10]</b>	7
Has briefly explained the impact of sustainability on resources and one way in which engineering considers 'green' issues. <b>[1 2 3]</b>	Has explained the impact of sustainability on resources and at least two ways in which engineering considers 'green' issues. <b>[4 5 6]</b>	Has given a detailed explanation of the impact of sustainability on resources and two ways in which engineering considers 'green' issues. <b>[7 8 9 10]</b>	6

<p>Has briefly explained the basic rights and responsibilities of an employee and employer.</p> <p><b>[1 2 3]</b></p>	<p>Has explained the basic rights and responsibilities of an employee and employer.</p> <p><b>[4 5 6]</b></p>	<p>Has given a detailed explanation of the basic rights and responsibilities of an employee and employer.</p> <p><b>[7 8 9 10]</b></p>	<p>9</p>
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**Total 40/60**

SAMPLE

# 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.

ALL THESE MATERIALS MAY BE PHOTOCOPIED. Any photocopying will be done under the terms of the Copyright Designs and Patents Act 1988 solely for the purposes of assessment.

# Contents

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<b>LEARNER INFORMATION</b>	<b>3</b>
<b>Model Assignment</b> This section contains the assignment background which learners will need to be familiar with in order to complete the tasks.	<b>4</b>
<b>Tasks</b> This section contains all the tasks learners must complete before submission for assessment.	<b>5 - 6</b>
<b>TUTOR INFORMATION</b>	<b>7</b>
<b>Guidance for centres</b> This section provides general guidance to centre staff on the preparation and completion of the assignment.	<b>8 - 9</b>
<b>Notes for tutors</b> This section provides additional guidance and support to centre staff for each task. It is not intended for use by learners.	<b>10 - 12</b>

# Model Assignment: Learner Information

OCR Level 2 Principal Learning in Engineering

Unit F549: Engineering design

# Model Assignment

## Description of model assignment.

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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

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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

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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](http://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

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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

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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
<p><b>Task 1</b> Product investigation</p>	<p>Identification of the key functional criteria used in the design of the chosen engineered product</p> <p>Knowledge of the strengths and weaknesses of comparative products including the needs of the user and manufacturer.</p> <p>Use suitable tools and equipment safely and correctly to disassemble engineered products, and record evidence of their use</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 1.1,1.2</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE 4</li> </ul>
<p><b>Task 2</b> Developing, communicating and testing a new product design</p>	<p>Record the results of investigation and research into the legislation relevant to the selected product.</p> <p>Research relevant standards and draw conclusions on the implications of these standards</p> <p>Identify possible alternatives and improvements to the selected product and produce a design brief for these improvements</p> <p>Produce a fully justified design specification for the improved product</p> <p>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</p> <p>Set success criteria, devise suitable tests to prove the developed design</p> <p>Organise time and resources, analyse and evaluate information. Present the results of the tests in an appropriate format</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 2.1</li> <li>• 3.1, 3.2,</li> <li>• 4.1, 5.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE2, CT5, IE4, IE6</li> </ul>

# Model Assignment

## Issued September 2008

OCR Level 2 Principal Learning in Engineering  
Unit F550: Engineering applications of computers

**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 F550: Engineering applications of computers    M/501/1885

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

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# Model Assignment: Learner Information

OCR Level 2 Principal Learning in Engineering

Unit F550: Engineering applications of computers

# Model Assignment

## Description of model assignment.

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For this task you will have the opportunity to investigate and experience the use of computers in a range of engineering applications. Working within the context of 'modern domestic products' you will develop your understanding of how computers have enabled advances in the way engineering manufacturing and maintenance tasks are performed.

You will learn about expert systems, which are computer programs that contain some of the subject-specific knowledge of one or more human experts. In addition, you will also develop an understanding of embedded systems and why they are used in modern domestic products.

You will also gain knowledge and understanding of the way computer based communication systems are used within engineering.

You will provide evidence of your experiences which will consist of a research report including screen shots, digital evidence, analysis and comments.

**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: Use of computers in engineering, manufacturing and process control

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### Assessment criteria 1.1 , 1.2, 1.3, 1.4

For a selected modern domestic product you will demonstrate your knowledge and understanding of the way computers are used in engineering, manufacturing and process control.

To do this you will need to explain using examples linked to the chosen modern domestic product how computers are used:

- to design new products
- during production and in process control
- for stock control
  - monitoring of material levels, bar code readers, resources, components (JIT) inputs, and outputs and order points
- for financial control

## Task 2: Simple control programmes

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### Assessment criteria 2.1, 2.2, 2.3, 2.4, 2.5

You will identify a simple control system used within your selected domestic product.

For your selected control system you will:

- provide an analysis of the control problem using systems terminology
- construct a simulation of the control system
  - use appropriate input switches and sensors
  - use appropriate output devices
  - develop a suitable control program
  - test the system and prove correct operation

### Task 3: Simple expert systems for problem solving and maintenance operations in engineering

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#### Assessment criteria 3.1, 3.2, 3.3, 3.4, 3.5

For your selected modern domestic product you should:

- identify where 'expert systems' may be used e.g. factory scheduling, maintenance, and electronic testing
- for **one** 'expert system' you should explain:
  - what the 'expert system' is and its function
  - how to input data into the system
  - select suitable parameters for operation of the system
  - interpret results obtained and use them to modify engineering features/operations
- explain how and why computers are used in maintenance operations

### Task 4: Computer based communication systems and data communication

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#### Assessment criterion 4.1

For your selected modern domestic product you will demonstrate your knowledge and understanding of computer based communication systems to communicate data.

**You will need to:**

- identify and explain giving specific examples, the use of computer based communication systems that exchange data during design, manufacture and maintenance of the modern domestic product.
- these may include:
  - use of laptop computers to access and communicate information
  - use of Personal Digital assistants (PDAs) to record digital images, annotations and dialogue in real time as it happens
  - use of third generation mobile phones to record information in real time as it happens
  - download and transfer information from communications devices in a form which is usable and accessible for engineering reports and portfolios (Bluetooth, SMS multi media messages)
  - email

#### Assessment Evidence

You should produce **one** research report with evidence for each of the four tasks. The report may include screen shots, digital evidence, analysis and comments.

# Model Assignment: Tutor Information

OCR Level 2 Principal Learning in Engineering  
Unit F550: Engineering applications of computers

# 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](http://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 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; there is no time limit for this.

## 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 60 guided learning hour (glh) to complete all the tasks. The amount of time will vary slightly depending in the nature of the tasks and the ability of the 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 assignment**

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 descriptors 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, tutors 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 presenter must be satisfied that the work submitted for assessment is the learner's own work.

# Notes for Tutors

## Introduction to the Tasks

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The tasks have been designed to enable learners to demonstrate their knowledge and understanding of engineering applications of computers.

Learners must be provided with the opportunity to investigate and experience the use of computers in a range of engineering applications, including 'expert systems' for problem solving, diagnostics, maintenance operations, process control and manufacturing.

The unit also enables a learner to understand how computers have enabled advances in the way engineering tasks are performed.

Learners should also understand why embedded systems are used in modern domestic products, how computer systems are used in maintenance operations and have a knowledge and understanding of the way computer based communication systems are used to exchange data.

Learners are required to undertake an assignment in which they analyse a modern domestic product (which must contain an embedded computer system) in terms of the use made of computers in its design, process control, manufacturing and maintenance.

Learners will require guidance with the selection of the domestic product to ensure it has the scope to allow learners access to all aspects of the assessment criteria.

These could include such domestic products as:

- vacuum cleaners
- washing machines
- tumble dryers
- digital cameras
- digital radios
- DVD recorders/players
- games consoles

**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 materials and applications that are chosen for study
- the range of information/resources students 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
<p><b>Task 1</b></p> <p>Use of computers in engineering manufacturing and process control</p>	<p>Explanations of how computers are used:</p> <ul style="list-style-type: none"> <li>• to design new products</li> <li>• in production and process control</li> <li>• for stock control</li> </ul> <p>for financial control</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 1.1, 1.2, 1.3, 1.4</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE4</li> </ul>
<p><b>Task 2</b></p> <p>Simple control programmes</p>	<p>Provides evidence of:</p> <p>analysis of a problem in systems terminology</p> <p>recognition and use of input switches and sensors</p> <p>recognition and use of output devices</p> <p>use of linear, symbolic or flow-chart programming including conditional sequencing</p> <p>simulation of a control system</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 2.1,2.2, 2.3, 2.4 ,2.5</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• CT1</li> <li>• CT5</li> </ul>

<p><b>Task 3</b></p> <p>Simple expert systems for problem solving and maintenance operations in engineering</p>	<p>show understanding of what is meant by the term 'expert system'</p> <p>show understanding how to input data into an expert system</p> <p>select suitable parameters for problem solving.</p> <p>interpret results and use them to modify engineering features.</p> <p>explain how and why computers are used in maintenance operations</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 3.1, 3.2, 3.3, 3.4, 3.5</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• none</li> </ul>
<p><b>Task 4</b></p> <p>Computer based communication systems and data communication</p>	<p>Demonstrate understanding of the use of modern consumer products to communicate and exchange data during design, manufacture and maintenance</p>	<p><b>Assessment Criterion</b></p> <ul style="list-style-type: none"> <li>• 4.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE6</li> </ul>

# Model Assignment

## Issued September 2008

OCR Level 2 Principal Learning in Engineering

Unit F551: Producing engineering solutions

**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 objectives 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 F551: Producing engineering solutions    A/501/1887

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<b>Notes for tutors</b> This section provides additional guidance and support to centre staff for each task. It is not intended for use by learners.	<b>10 - 12</b>

# Model Assignment: Learner Information

OCR Level 2 Principal Learning in Engineering  
Unit F551: Producing engineering solutions

# Model Assignment

## Description of model Assignment

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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.

Within Unit F549 Level 2 of the Diploma in Engineering you were asked to work as part of the engineering research and development team to carryout a review of the existing lamp design as well as competitors products. You then identified possible improvements to the existing product and designed a replacement.

The directors of OCR Lighting Solutions Ltd have now approved your design. They have instructed you to manufacture your lamp design. You will need to produce a single lamp which will be demonstrated to the directors for final approval prior to full production taking place.

**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: Planning for safe production

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The directors of OCR Lighting Ltd have instructed you to manufacture the lamp which you designed as part of your work in Unit F549 Level 2 of the Diploma in Engineering. In order to manufacture the product safely and efficiently you need to produce a detailed production plan.

### Assessment Criteria 1.1, 1.2

#### Your task is to:

- produce a detailed production plan. The plan should contain:
  - your starting documentation (working drawings)
  - detail relating to the selection of suitable materials, standard components
  - manufacturing processes to be used
  - detail relating to quality control
  - health and safety issues related to the production
  - a risk assessment for the manufacture of the lamp.

## Task 2: Making, reviewing, modifying and quality control

---

### Assessment Criteria 2.1, 2.2, 2.3, 3.1

#### Your task is to:

- use your production plan to manufacture the lamp.

#### You will need to:

- produce a high quality and accurate outcome that demonstrates your effective making skills
- record and review your progress during making, adapt ideas as circumstances change, and update your production plan in order to produce a high quality and accurate outcome
- record and review the use and outcomes of quality control procedures
- check the performance of your risk assessment and make any necessary modifications
- provide real time and photographic evidence of your safe and efficient use of:
  - hand tools
  - machinery
  - other equipment

- you will need to annotate the evidence to explain:
  - your use of tools, machines and equipment
  - adherence to Health and Safety requirements
  - the effectiveness of your Risk Assessment
  - the outcomes of quality checks you used during production, installation and during maintenance
  - your observations of your own progress during production

# Model Assignment: Tutor Information

OCR Level 2 Principal Learning in Engineering

Unit F551: Producing engineering solutions

# 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](http://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 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; there is no time limit for this.

## 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 presenters to authenticate the work confidently. Further guidance on **controlled conditions** is provided within the OCR Principal Learning Handbook.

3.2 In this unit it is recommended that learners spend 30glh on the acquisition of knowledge, skills and understanding. The remaining 30glh will take the form of controlled assessment where learners produce the appropriate evidence

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 assignment**

- 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 descriptors 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, tutors 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 presenter must be satisfied that the work submitted for assessment is the learner's own work.

# Notes for Tutors

## Introduction to the Tasks

---

This is a practical unit and the task has been designed to enable learners to demonstrate their knowledge and understanding of both planning and the production of a quality engineered solution using their own plan in a safe, effective and efficient manner.

During production they will need review their own progress, adapt to circumstances as they change and undertake appropriate quality checks and also review and adjust their risk assessment as appropriate.

It is likely that the assignment will link directly with the sector in which the learner has most experience and these activities could be carried out in the context of production, maintenance, installation and commissioning.

Learners may use the brief, specification and working drawings which they produced in Level 2 Unit F549 of the Diploma in Engineering or alternatively centres can provide a set of engineering drawings and instructions.

Guidance should be given by the presenter to ensure learners undertake a task of appropriate demand to ensure learners have access to all the assessment criteria.

Consideration should be given to the following:

- capability of the engineered solution to show its fitness for purpose
- centre engineering resources
- access to specialist equipment
- material availability
- time restrictions
- health and safety issues
- capability of the engineered solution to be
- other centre resources such as photography and ICT

**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 materials and processes that are chosen for study
- the range of information/resources students 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
<p><b>Task 1</b></p> <p>Planning for safe production</p>	<p>a detailed production plan containing;</p> <ul style="list-style-type: none"> <li>• starting documentation (working drawings)</li> <li>• detail relating to the selection of suitable materials, standard components</li> <li>• information regarding manufacturing processes to be used</li> <li>• detail relating to quality control</li> <li>• health and safety issues related to the production</li> <li>• a risk assessment for the manufacture of the lamp.</li> </ul>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 1.1, 1.2</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• SM3</li> <li>• SM4</li> </ul>
<p><b>Task 2</b></p> <p>Making, reviewing, modifying and quality control</p>	<p>the production of a high quality product which is fit for purpose</p> <p>detailed review of progress during making, adaptation of ideas and production plan as circumstances change</p> <p>check materials and components at commencement of operations, at critical stages during the activities and on completion of the activities</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 2.1, 2.2, 2.3</li> <li>• 3.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• RL3</li> <li>• CT5</li> <li>• CT6</li> </ul>

# Model Assignment

## Issued September 2008

OCR Level 2 Principal Learning in Engineering

Unit F552: Construct electronic and electrical systems

**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 objectives 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 F552: Construct electronic and electrical systems                      F/501/1888

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

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# Model Assignment: Learner Information

OCR Level 2 Principal Learning in Engineering

Unit F552: Construct electronic and electrical systems

# Model Assignment

## Description of model assignment.

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This is a practical based unit providing you with the opportunity to learn and apply the basic principles and techniques used in the construction of electronic and electrical systems.

The tasks for this unit will be in the form of a timed 'Design Challenge' activity.

It will take place in three 2-hour sessions lasting for 6 hours in total and be based in a design studio or workshop.

You will use your knowledge of electrical and electronic components to develop a prototype system in order to solve a design problem, given to you by your presenter.

This design problem will be linked to one of the sector skill areas.

All of your evidence will be presented in a 'workbook' which will be provided by OCR.

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

# Tasks

Prior to completion of the 'Design Challenge' you will undertake a number of teaching and learning activities designed to develop your knowledge and understanding of electronic and electrical principles. The assessment task will take place at the end of the unit and will be a 6-hour design challenge activity, undertaken in three, 2-hour sessions.

All of your evidence from the 'Design Challenge' will be presented in a 'workbook' which will be provided by OCR.

Photographs will be taken at set times during the 'Design Challenge' to record your progress. Additional photographs can be taken and stuck into your workbook to allow you to explain aspects of your designing and making. These must be annotated by you to gain credit.

The 'Design Challenge' activity and the workbook are divided up into numbered sections and for each section you will have a set time to undertake the work required and record details in the workbook.

Your presenter will read to you detailed instructions of what to do in each section which are provided in a 'script'. The detailed instructions will also include details of the time allowed for each of the sections.

The 'Design Challenge' is based on a theme or scenario similar to the examples given below:

## Example Design Challenge 1

Landrover vehicles are often used in 'off road' environments.

A warning system is required to alert drivers if the vehicle is tilting at an angle that may result in the vehicle rolling.

You are to design a system that would give a clear indication to the driver of the potential rolling hazard using either visual and/or audible indication.

## Example Design Challenge 2

Public transport systems such as buses can often become overcrowded during rush hour.

A system to count the number of passengers boarding and leaving a bus is required to ensure that all passengers are able to travel safely.

You are to design a system that would give a clear indication to the driver of the overcrowding hazard using either visual and/or audible indication.

You will record your responses using a range of techniques including text, digital photography, screen dumps, freehand sketches and/or CAD drawing in the appropriate sections of the workbook.

Photographs will be taken and fixed to your workbook at set times during the 'Design Challenge'. The workbooks are there to support you and also to assist in the assessment of your work.

It is not your responsibility to take the photographs or fix them in you workbook it is the responsibility of your presenter.

You may wish to take additional photographs and fix them in your workbook yourself during the 'Design Challenge'. This is acceptable and you may find this method a good way of communicating your experiences to the assessor. You should note that it is your **annotation** which will be rewarded and not the photographs.

During the 'Design Challenge' activity you will be expected to demonstrate knowledge and understanding of electronic and electrical principles and will be assessed against the following tasks and assessment criteria.

## Task 1: Electronic and electrical principles

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### Assessment Criteria 1.1, 1.2

In response to the context given within the 'Design Challenge' you will apply your knowledge of electronic and electrical principles and demonstrate your safe working procedures.

You will describe and apply basic electronic and electrical principles.

Your descriptions will be of proposed circuit(s) operation and may include details of:

- current
- electro motive force (emf)
- potential difference
- resistance
- power
- energy

Describe, apply and justify the need for safe working procedures.

You will give details of your justified selection of the:

- tools
- equipment
- manufacturing processes

which are appropriate to your selected circuit design(s).

Your descriptions might include your consideration of:

- visual inspection of equipment
- Portable Appliance Testing (PAT) compliance
- selection of test equipment

You will work in a safe and appropriate manner that considers the needs of others giving specific details in your workbook.

You will indicate the safe use of manually operated tools which may include:

- soldering iron
- wire cutters
- wire strippers
- pliers
- screwdrivers
- de-soldering tools
- manual drills
- pcb drills

## Task 2: Operating principles of electronic and electrical components

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### Assessment Criteria 2.1, 2.2, 2.3

In response to the context given within the 'Design Challenge' you will demonstrate knowledge and understanding of the operating principles of a range of electronic and electrical components.

You will identify and describe the properties of a range of electronic and electrical components.

You will be able to justify the selection of appropriate components based upon their properties required to manufacture your circuit(s) which may include some of the following:

- resistors - types (fixed, variable, thermistor, light dependent), tolerances, colour code
- capacitors - types, values, colour code
- semi-conductors - diodes, transistors, Integrated Circuits
- operational amplifiers, timers, logic gates, counters, PICs
- audio/Visual Indicators- lamps, LEDs, buzzers
- cells and batteries
- copper wire
- plugs and sockets
- switches

You will use calculations to independently identify and select component values and to justify your selection of component values and component types.

## Task 3: Circuit construction

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### Assessment Criterion 3.1

In response to the context given within the 'Design Challenge' you will need to be able to demonstrate knowledge and understanding of various methods of circuit construction.

You will be able to identify, design and construct circuit(s) using suitable methods of circuit construction for prototype activity.

You will demonstrate knowledge and application in the construction of circuits which may include:

- soldering techniques
- stripboards
- protoboards
- breadboards
- PCB

You will construct an appropriate circuit for the given context which might include:

- audio
- optical
- transistor (sensors and switches)
- alarm
- logic
- counting

## Task 4: Testing and fault finding

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### Assessment Criterion 4.1

In response to the context given within the 'Design Challenge' you will need to identify and justify the selection of appropriate testing, test equipment and fault finding methods. Use them and act upon the outcome.

You will make simple calculations to modify a circuit to enable correct operation.

You will select and use appropriate test equipment and test methods which may include:

- power supplies
- multi-meters
- logic probes

You will undertake appropriate circuit testing which may include:

- checking construction against circuit diagrams
- continuity
- visual inspection
- expected values

# Model Assignment: Tutor Information

OCR Level 2 Principal Learning in Engineering

Unit F552: Construct electronic and electrical systems

# 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](http://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 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; there is no time limit for this subject to the overall guided learning hours for this unit.

2.3 Learners should be aware of the format of the 'Design Challenge', the timings, restrictions involved and the content and layout of the workbook and the use of photographic evidence.

## 3 Before and during the assignment

3.1. Centres are responsible for ensuring they are in receipt of workbooks and the presenter script prior to the commencement of the 'Design Challenge'.

3.2. The focus of the activity should be set by the presenter in conjunction with the learner and engineering sector. **The details of the focus of activity should not under any circumstances be made know to any learners prior to the commencement of the 1<sup>st</sup> session of the 'Design Challenge'.**

3.3. Each centre is required to provide appropriate means of digitally capturing learner achievements at set points during the 'Design Challenge'. Prompt printing and a method of securely attaching the digital images into the learner's workbook should be provided. This is a centre responsibility and not that of the learner.

- 3.4. Security of the workbooks before, between sessions and afterwards and also prior and during marking is essential to secure the validity and reliability of the assessment, provide good manageability for all involved and allow the presenter to confidently authenticate the work.
- 3.5. Once marked by the centre the 'Design Challenge' will be moderated externally by OCR in accordance with QCA's Code of Practice.

#### 4 When completing the assignment

- 4.1. 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.
- 4.2. In this unit it is recommended that learners spend 24glh on the acquisition of knowledge, skills and understanding. The remaining 6glh will take the form of controlled assessment where learners produce the appropriate evidence.
- 4.3. Each learner must produce individual and authentic evidence. Centre staff may give support and guidance to learners during the initial 24glh. This support and guidance should focus on checking that learners understand what is expected of them. It is not acceptable for presenters to provide model answers or to work through answers in detail.
- 4.4. During the 'Design Challenge' the centre staff must adopt the role of script reader and supervisor, including that of monitoring with regard to Health and Safety. It is essential that all staff ensure they do not undertake any 'teaching' activity.
- 4.5. Learners may use information from any relevant source to help them with producing evidence for the tasks.
- 4.6. Learners will need to be given free access to all appropriate tools, equipment and facilities to enable them to fully demonstrate their individual capabilities.

#### 5 After completing the assignments

- 5.1 It is the responsibility of the centre to ensure that the learner's work is marked by a competent person. This person must apply the marking criteria clearly outlined in this unit.
- 5.2 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 descriptors provided within the unit. For further information about assessment please refer to the section on Assessment and Moderation in the Principal Learning Handbook.
- 5.3 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.

## **6 Presentation of work**

- 6.1 Learners will present the evidence within a 'workbook' which will be provided by OCR, using a range of techniques including text, digital photography, screen dumps, freehand sketches and CAD drawing.
- 6.2 Photographic record of proceedings at various scripted points during the 'Design Challenge' is the centre's responsibility. This serves as stimulus for the learner during the 'Design Challenge' and a detailed visual record of learner achievement.
- 6.3 No additional materials will be required for the presentation of learner evidence.

## **7 Acceptable evidence**

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

## **8 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 presenter must be satisfied that the work submitted for assessment is the learner's own work.

# Notes for Tutors

## Introduction to the Tasks

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**These guidance notes must be used in conjunction with the unit specification and Principal Learning Handbook, OCR Design Challenge workbook and presenters script.**

The workbook and the script have been designed to enable learners to demonstrate and record their knowledge, understanding and application of the principles and techniques used in the construction of electronic and electrical systems.

The tasks have been designed so that all of the assessment criteria in Unit F552 are fully addressed.

## Scope of permitted Model Assignment modification

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The model assignment takes the form of an exemplar 'Design Challenge' activity. Two examples of suitable 'Design Challenges' are given below:

### Example Design Challenge 1

Landrover vehicles are often used in 'off road' environments.

A warning system is required to alert drivers if the vehicle is tilting at an angle that may result in the vehicle rolling.

You are to design a system that would give a clear indication to the driver of the potential rolling hazard using either visual and/or audible indication.

### Example Design Challenge 2

Public transport systems such as buses can often become overcrowded during rush hour.

A system to count the number of passengers boarding and leaving a bus is required to ensure that all passengers are able to travel safely.

You are to design a system that would give a clear indication to the driver of the overcrowding hazard using either visual and / or audible indication.

Either design challenge may be used in its entirety, modified or a different scenario substituted.

This model assignment is in no way prescriptive and centres are encouraged to construct scenarios more appropriate to their individual circumstances.

If Centres write their own assignments to suit the learners and a specific engineering sector, choose different or adapt other assignments (e.g. Landrover TrackNAv Challenge) they **must** ensure there is sufficient scope and challenge in the scenario set to enable learners full access to all of the assessment criteria.

When creating assignment scenarios for the 'Design Challenge' it is advisable to do so in conjunction with the script and the learner workbook to ensure full matching of the 'Design Challenge' to the assessment criteria.

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
<p><b>Task 1</b></p> <p>Electronic and electrical principles</p>	<p><b>Initial thoughts</b> Learners' carry out an analysis of a design problem which identifies possible concepts for solution. Generation of a design brief, consideration of user and environment. Generation of a product design specification.</p> <p><b>Initial ideas</b> Learners use a 'systems approach' to identify possible Input, Process/Control, and Output components for the design of the circuit. Evaluation of identified components.</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 1.1, 1.2</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul>
<p><b>Task 2</b></p> <p>Operating principles of electronic and electrical components</p>	<p><b>Design Development</b> Circuit developed using identified components. Calculations used to select suitable component values and anticipate circuit test data. Initial circuit diagram produced. Component selection justified.</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 2.1, 2.2, 2.3</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul>
<p><b>Task 3</b></p> <p>Circuit construction</p>	<p><b>Circuit Prototype Assembly and Testing</b> Action Plan – learners plan for the construction of the prototype circuit including risk assessment.  Circuits constructed using a suitable circuit prototyping method justified by the learner.</p>	<p><b>Assessment Criterion</b></p> <ul style="list-style-type: none"> <li>• 3.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE4</li> </ul>

<b>Task 4</b>  Testing and fault finding	<b>Circuit testing</b> Appropriate test equipment and test methods identified by learner. Operation of circuit checked against expected values. Possible modifications to circuit identified and final circuit diagram produced. Expected values for circuit testing given. Circuit operation evaluated against specification and initial design problem.	<b>Assessment Criterion</b>  • 4.1  <b>PLTS</b>  • IE1 • IE4 • IE6
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# Model Assignment

## Issued September 2008

OCR Level 2 Principal Learning in Engineering

Unit F553: Manufacturing engineering

**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 objectives 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 F553: Manufacturing engineering      J/501/1889

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

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# Model Assignment: Learner Information

OCR Level 2 Principal Learning in Engineering

Unit F553: Manufacturing engineering

# Model Assignment

## Description of model assignment.

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In this unit you will work as part of a team to consider how multiples of an engineered component or product could be manufactured by a team.

Then, as an individual, you will detail appropriate quality control checks and explain the procedures of setting up a complex CNC machining operation to include the associated risks for the manufacture of multiple, identical components.

As an individual you will then manufacture **five** identical components of the product using a CNC machine.

This is a practical unit during which you will be guided and supported during the practical activities.

You will use your existing knowledge of taking readings, recording findings and analysing data.

**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: Planning for manufacture as part of a team

---

### Assessment Criteria 1.1, 1.2

#### Your task as part of a team is to:

- contribute to the production of a manufacturing plan for the production of multiples of an engineered component or product using a CNC machine

#### You will need as part of a team to:

- suggest additional and/or alternative methods of manufacture based on your own knowledge and experience and fully justify the correct procedures to be adopted
- co-operate with others in reaching agreement in order to achieve the desired outcome.

You must record your contributions in the appropriate section of the workbook provided by OCR. Annotated digital evidence should be used to support your contributions.

## Task 2: Quality checks

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### Assessment Criterion 2.1

#### Your task is to individually:

- design, describe, select and then use at least **six** different quality checks for the manufacture of the component or product using a CNC machine.

#### You will need to individually:

- include details of tolerances
- take and record readings during and after manufacture
- analyse the performance of the machining operation from the data obtained

You must record your readings, suggestions and justifications in the appropriate sections of the workbook provided by OCR.

## Task 3: Programming, setting up and using CNC machines

---

### Assessment Criteria 3.1, 3.2, 3.3, 3.4, 3.5

#### Your task is to individually:

- program and set up a CNC machining operation for the manufacture of your product or component
- review the machining process on screen and act on the outcome(s)
- record details of the machining procedures for the product or component
- consider safety in the planning and execution of the machining procedures
- manufacture **five** identical components on the CNC machine in a safe and confident manner.

You will provide evidence of your activities, the manufactured products /components and all other observations in the appropriate sections of the workbook provided by OCR.

# Model Assignment: Tutor Information

OCR Level 2 Principal Learning in Engineering

Unit F553: Manufacturing engineering

# 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](http://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 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 *Candidate Information* section of this assignment or the centre adapted Model Assignment.

2.2 Learners may carry out preparations prior to undertaking the tasks; there is no time limit for this.

## 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 In this unit it is recommended that learners spend 15glh on the acquisition of knowledge, skills and understanding. The remaining 15glh will take the form of controlled assessment where learners produce the appropriate evidence

3.3 Each candidate 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 presenters 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 assignment**

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 descriptors 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 Learners will complete of all sections of the workbook provided by OCR

5.2 Supporting digital evidence should be included in the workbook. This must be annotated by the learner in order to gain credit against the assessment criteria.

#### **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 and understanding of programming and setting up a complex CNC machining operation including the associated health and safety risks and then operate the CNC machine to manufacture **five** identical components or products.

Initially learners will work as part of a team to consider how multiples of an engineered component or product could be manufactured by a team.

Learners will then go on, with appropriate guidance and support, to individually manufacture **five** identical products or components using a CNC machine.

Learners will need to review the machining process on screen and act on the outcome. They will consider safety both in their planning and during the manufacture.

Evidence will be submitted by the completion of all sections of the downloadable workbook provided by OCR.

Supporting digital evidence should be included in the downloadable workbook. This must be annotated by the learner in order to gain rewards against the assessment criteria.

Learner's individual evidence must include:

- the design of an appropriate set of quality checks and the means by which they would be undertaken
- details of the programming and setting up of a CNC machining operation
- evidence of the manufacture of a batch of **five** products using a CNC machine
- details of what tolerances would be acceptable for the engineered component or product being produced
- evidence of the application of a minimum of **six** quality control checks
- analysis of and use of the statistical data from all **six** of the quality checks
- suggested modifications and improvements to the machining operation in the light of the learners findings
- consideration of health and safety in relation to the practical activity and the industrial equivalent

Resources for managing Health and Safety can be found in the Quality Improvement Agency (QIA) presenter resources; National Teaching and Learning Programme: 'Engineering'.

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

## Scope of permitted Model Assignment modification

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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 to 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.

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
<p><b>Task 1</b></p> <p>Planning for manufacture as part of a team</p>	<p>Specific detail will vary depending on the product selected from those prescribed and detailed by OCR.</p> <p>Details and justifies the chosen manufacturing processes and produces a production plan for the prescribed product.</p> <p>Decide how multiples of the product could be manufactured by a team.</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 1.1, 1.2</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE1</li> <li>• TW1</li> <li>• TW2</li> <li>• TW5</li> </ul>
<p><b>Task 2</b></p> <p>Quality checks</p>	<p>Detailed descriptions of <b>six</b> quality checks for the chosen component.</p> <p>Production of a record of results of quality checks during manufacture.</p> <p>Uses the gathered statistical data to analyse the performance of the machining operation.</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 2.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• CT1</li> <li>• IE4</li> </ul>

<p><b>Task 3</b></p> <p>Programming, setting up and using CNC machines</p>	<p>Evidence of the set up of the CNC machining operation for manufacture of the product or component</p> <p>Evidence of the review the machining process on screen and of acting upon the outcome.</p> <p>Detailed record of the machining procedures for the product or component</p> <p>Consideration of safety in the planning and execution of the machining procedures</p> <p>The manufacture of five identical components on the CNC machine in a safe and confident manner.</p>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 3.1, 3.2, 3.3, 3.4, 3.5</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• SM4</li> </ul>
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# Model Assignment

## Issued September 2008

OCR Level 2 Principal Learning in Engineering

Unit F554: Maintenance

**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 objectives 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 F554: Maintenance                      L/501/18932

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

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# Model Assignment: Learner Information

OCR Level 2 Principal Learning in Engineering

Unit F554: Maintenance

# Model Assignment

## Description of Model Assignment.

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This unit is assessed using **two** separate assignments.

### Assignment 1

OCR Performance Sport Ltd. is a specialist supplier of 'off road' cycles. The company have a number of outlets across the UK. These outlets provide both sales and maintenance facilities for the company's customers.

You are employed by the company to carry out routine maintenance and repair to the customer's cycles. The company recommends that an annual maintenance programme be carried out by its staff and in addition recommends that customers carry out a monthly maintenance program to ensure the cycle functions correctly.

A customer has arranged to deliver their cycle to your workshop for its annual maintenance. You are to carry out the maintenance of the cycle. You will follow the established maintenance procedures that are detailed in the manuals provided by the company.

In addition to your normal duties you will prepare a maintenance plan which will be used by customers when undertaking the monthly maintenance checks.

### Assignment 2

The company is reviewing its maintenance procedures. You have been asked to take part in this review process.

You are to carry out a reliability study of an engineered component that is used in the production of the company's products. The study will use statistical methods to analyse failure trends.

Having carried out the reliability study, you will identify an example where a component or system failure can be attributed to poor maintenance. The impact and implications of poor maintenance procedures for both the user and manufacturer should be explained in a report to the directors of the company.

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

# Tasks

## Assignment 1

### Task: Maintenance procedures of an engineered product or system

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#### Assessment Criteria 1.1, 1.2, 1.3, 1.4

#### Your task is to:

- carry out the annual maintenance on the cycle. You should:
  - use manuals, manufacturers' information and data to inform the correct procedure
  - undertake the routine maintenance operation and/or use diagnostic routines
  - use appropriate tools and equipment safely and effectively
- produce a maintenance plan which will be used by customers when undertaking the monthly maintenance checks. The plan should detail:
  - maintenance procedures
  - tools and equipment required
  - appropriate safety considerations
- the maintenance plan produced should be tested and modified as necessary.

#### You will produce a two-part report which contains:

- a) evidence of the routine maintenance of the cycle including reference to the tools, information and procedures used. This should contain photographic evidence along with supporting learner comments relating to each of the procedures undertaken, together with information about the tools and equipment used.
- b) a copy of the maintenance plan produced which should detail the maintenance procedures, tools and equipment required and information relating to appropriate safety considerations. Information relating to the testing and modification of the plan should be included.

## Task: Implications of poor maintenance

### Assignment 2

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#### Assessment Criteria 2.1, 3.1, 3.2, 3.3

#### Your task is to:

- carry out a reliability study of an engineered component that is used in the production of the company's products. The product studied should be different to that maintained in assignment 1
- use statistical methods to analyse failure trends for the engineered component you identified. Show by means of calculation:
  - mean time to failure (MTTF)
  - mean time to repair (MTTR)
  - mean time between failure (MTBF)
- identify an example where a component or system failure can be attributed to poor maintenance.
- explain the impact and implications of poor maintenance procedures for both the user and manufacturer.

#### You will produce a two-part report which contains:

- a) an evaluation of the reliability of the identified component or system. The failure trends for the component should be analysed using statistical methods
- b) an explanation of the impact and implications of poor maintenance procedures for both the user and manufacturer. This should be linked to the identified example where a component or system failure can be attributed to poor maintenance procedures

# Model Assignment: Tutor Information

OCR Level 2 Principal Learning in Engineering

Unit F554: Maintenance

# 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](http://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 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 presenters 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.
- 3.6 Learners must be guided on the use of information from other sources to ensure that confidentiality is maintained at all times.

#### **4 After completing the assignment**

- 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 descriptors 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

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The tasks have been designed to enable learners to demonstrate their knowledge and understanding of basic principles and techniques of engineering maintenance. Whilst working safely learners will experience carrying out maintenance and diagnostic procedures using manufacturers' information and data sheets.

The learner will also have opportunity to learn about the methods used to analyse failure trends and develop knowledge and understanding of the implications if products or equipment are not properly maintained.

Learners need to be given opportunity to consider:

- personal injury
- inconvenience
- user responsibilities
- financial impact
- legal issues
- damage to reputation
- damage to personnel
- damage to equipment
- damage to property
- loss of production through downtime

Learners will also need to understand the factors that contribute to the failure of mechanical and electrical systems and know their causes e.g.:

- maladjustment
- mal-operation
- run to failure
- stress fracture
- fatigue, wear
- embrittlement
- overloading
- seizure
- anodic and chemical corrosion
- lubrication failure
- fouling
- vibration
- poor implementation of the method statement

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

## Scope of permitted Model Assignment modification

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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 carryout 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 students 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
<b>Assignment 1 Task</b> Maintenance procedures of an engineered product or system	<ul style="list-style-type: none"> <li>• evidence of use of manuals, manufacturer's information and data to inform the correct procedure for the routine maintenance of an engineered product or system.</li> <li>• carry out routine maintenance operations and/or diagnostic routines on an engineered product or system.</li> <li>• use appropriate tools and equipment safely and effectively.</li> <li>• evidence of development of a maintenance procedure for an engineered product or system. Testing of the procedure, making any necessary modifications and re-testing.</li> </ul>	<b>Assessment Criteria</b> <ul style="list-style-type: none"> <li>• 1.1, 1.2, 1.3, 1.4</li> </ul> <b>PLTS</b> <ul style="list-style-type: none"> <li>• SM3</li> <li>• SM4</li> </ul>
<b>Assignment 2 Task</b> Implications of poor maintenance	<ul style="list-style-type: none"> <li>• evidence of the carrying out of a reliability study of an engineered component that is used in the production of the company's products. (The product examined should be different to that examined in task 1)</li> <li>• the use of statistical methods to analyse failure trends for the engineered component. Showing by means of calculation:               <ul style="list-style-type: none"> <li>○ mean time to failure (MTTF)</li> <li>○ mean time to repair (MTTR)</li> <li>○ mean time between failure (MTBF)</li> </ul> </li> </ul> <p>identification of an example where a component or system failure can be attributed to poor maintenance. The impact and implications of poor maintenance procedures for both the user and manufacturer should be explained.</p>	<b>Assessment Criteria</b> <ul style="list-style-type: none"> <li>• 2.1</li> <li>• 3.1, 3.2, 3.3, 3.4</li> </ul> <b>PLTS</b> <ul style="list-style-type: none"> <li>• IE2</li> <li>• RL2</li> <li>• RL5</li> </ul>

# Model Assignment

## Issued September 2008

OCR Level 2 Principal Learning in Engineering

Unit F555: Innovation, enterprise and technological advance

**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 objectives and provide sufficient opportunity for learners to demonstrate achievement across the full range of marks.

**The scheme codes for these qualifications are:**

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

**The QCA Accreditation Number for this unit is:**

Unit F555: innovation, enterprise and technological advance                      R/501/1894

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

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<b>TUTOR INFORMATION</b> <b>Guidance for centres</b> This section provides general guidance to centre staff on the preparation and completion of the assignment.	8 9 - 10
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# Model Assignment: Learner Information

OCR Level 2 Principal Learning in Engineering

Unit F555: Innovation, enterprise and technological advance

# Model Assignment

## Description of Model Assignment.

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This unit is about innovation and creativity and how it has been at the forefront of engineering developments from the 20th century into the 21st century. It is also about their relative importance which is set to increase significantly in the future.

In this unit you will understand the importance of the development of new ideas and how new ideas are intellectually protected.

You will understand the ways in which businesses benefit and profit from new ideas and the way in which new ideas and developments effect technological change in the home, businesses, the economy and society.

**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: Innovation and creativity in engineering

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### Assessment Criterion 1.1

#### Your task is to:

- select a product from the list of products identified by OCR. In relation to the product you have chosen you will detail and justify how creativity and innovation benefit:
  - the home
  - businesses
  - the economy
  - society

You will record all your research, findings, observations, analysis and individual conclusions in a workbook provided by OCR

## Task 2: Protection of new ideas

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### Assessment Criterion 2.1

#### Your task is to:

- for the product you have chosen you will detail and justify how ideas and new developments are protected and what this means in real terms for example 'intellectual property'

#### You will investigate:

- costs involved
- process of application and registration
- effects on other products
- effects on manufacturing
- issues with regards to advertising
- other legal related issues
- consumer issues

You will record all your research, findings, observations, analysis and individual conclusions in a workbook provided by OCR.

## Task 3: Research, development and raising finance

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### Assessment Criterion 3.1

#### Your task is to:

- explore the roles of research and development (R&D) and raising finance when developing new products
  - explain the interrelationship between R&D and raising finance
  - explain the effects that R&D and raising finance have on the manufacture of a product
  
- research the different methods and the advantages and disadvantages of:
  - initial research costs
  - development costs
  - different and alternative methods of financing
  - advertising of the product before, during and after manufacture
  - safe disposal at the end of the products working life
  - depreciation of plant
  - effects of manufacturing turnover

You will record all your research, findings, observations, analysis and individual conclusions in a workbook provided by OCR.

## Task 4: Developments in materials and processes

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### Assessment Criteria 4.1, 4.2

#### Your task is to:

- research new engineering materials, technologies and processes and assess their impact on new products
  
- understand the effects and impact of new engineering materials, new engineering technologies and new engineering processes:
  - in the home
  - in the workplace
  - on the built environment

You will record all your research, findings, observations, analysis and individual conclusions in a workbook provided by OCR

## Task 5: Social and sustainability issues

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### Assessment Criterion 5.1

#### Your task is to:

- research and explain the environmental and social impact of engineering and sustainability of resources
- explain the effects, impacts, advantages, disadvantages of:
  - the use of different materials
  - the use of newer and older technologies
  - a variety of different processing methods
  - different methods of extraction
  - safe disposal of materials during and after manufacture
  - different forms of energy supply

You will record all your research, findings, observations, analysis and individual conclusions in a workbook provided by OCR

# Model Assignment: Tutor Information

OCR Level 2 Principal Learning in Engineering

Unit F555: Innovation, enterprise and technological advance



# Guidance for Centres

## 1

1.1 OCR model assignments are issued free to participating centres and are also available to download from our website: [www.ocr.org.uk](http://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 60 guided learning hours (glh) to complete all of the tasks. The amount of time may vary 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 presenters 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.
- 3.6 Learners must be guided on the use of information from other sources to ensure that confidentiality is maintained at all times.

#### **4 After completing the assignment**

- 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 descriptors 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.

# Notes for Tutors

## Introduction to the Tasks

---

The tasks have been designed to enable learners to demonstrate their knowledge and understanding of innovation and creativity and how it has been at the forefront of engineering developments from the 20th century into the 21st century.

It is also about their relative importance which is set to increase significantly in the future.

The learner is required to complete a research assignment based on a specific product.

Learners will select from a list of products identified by OCR which will be updated on a two yearly cycle. This will give continuity over a two year course and give presenters planning time.

Learners should record all their research, findings, observations, analysis and individual conclusions in a downloadable workbook provided by OCR.

The sections of the workbook match the assessment criteria for the unit and prompts are provided for each section of the workbook to elicit appropriate responses from learners as well as accommodating extended learner findings and evaluations.

The learner should have the workbook available throughout their study of the unit and may return to an earlier section in the light of any new discoveries. Should it be necessary to illustrate a particular point, photos, sketches, drawings and other presentation methods may be used.

Teachers/tutors/presenters should note that the assessment criteria are accessed solely by the learners' completion of a workbook, the learners' individual responses to the specific set prompts and additional graphical evidence supported by learner annotations

The model assignment has been designed so that all of the assessment criteria in Unit F555 are addressed.

**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.

No changes to the assessment criteria are allowed.

The model assignments can be changed in terms of:

- the product selected
- the range of research materials
- 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
<p><b>Task 1</b></p> <p>Innovation and creativity in engineering</p>	<p>Related to the chosen product the learner will:</p> <ul style="list-style-type: none"> <li>• Detail and justify how creativity and innovation benefit engineering in respect of:               <ul style="list-style-type: none"> <li>○ technological change in the home</li> <li>○ businesses</li> <li>○ the economy</li> <li>○ society</li> </ul> </li> </ul>	<p><b>Assessment Criterion</b></p> <ul style="list-style-type: none"> <li>• 1.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE4</li> </ul>
<p><b>Task 2</b></p> <p>Protection of new ideas</p>	<p>Detail how protection of the design idea has been achieved and what this means in real terms e.g. intellectual property.</p>	<p><b>Assessment Criterion</b></p> <ul style="list-style-type: none"> <li>• 2.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul>
<p><b>Task 3</b></p> <p>Research, development and raising finance</p>	<p>Relate specific details of the research, development and raising finance when developing new products in respect of:</p> <ul style="list-style-type: none"> <li>• initial research costs</li> <li>• development costs</li> <li>• different and alternative methods of financing</li> <li>• advertising of the product before, during and after manufacture</li> <li>• safe disposal at the end of the products working life</li> </ul>	<p><b>Assessment Criterion</b></p> <ul style="list-style-type: none"> <li>• 3.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• None</li> </ul>

	<ul style="list-style-type: none"> <li>• depreciation of plant</li> <li>• effects of manufacturing turnover</li> </ul>	
<p><b>Task 4</b></p> <p>Developments in materials and processes</p>	<p>Explain and justify the impact and effects of engineering technological development in respect of:</p> <ul style="list-style-type: none"> <li>• new engineering materials</li> <li>• new engineering technologies</li> <li>• new engineering processes: <ul style="list-style-type: none"> <li>○ in the home</li> <li>○ in the workplace</li> <li>○ on the built environment</li> </ul> </li> </ul>	<p><b>Assessment Criteria</b></p> <ul style="list-style-type: none"> <li>• 4.1, 4.2</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE3</li> <li>• IE4</li> <li>• IE5</li> <li>• IE6</li> </ul>
<p><b>Task 5</b></p> <p>Social and sustainability issues</p>	<p>Explain and evidence the environmental and social impact of engineering and sustainability of resources.</p> <p>Explain the effects, impacts, advantages, disadvantages of:</p> <ul style="list-style-type: none"> <li>• the use of different materials;</li> <li>• the use of newer and older technologies;</li> <li>• a variety of different processing methods;</li> <li>• different methods of extraction;</li> <li>• safe disposal of materials during and after manufacture;</li> <li>• different forms of energy supply.</li> </ul>	<p><b>Assessment Criterion</b></p> <ul style="list-style-type: none"> <li>• 5.1</li> </ul> <p><b>PLTS</b></p> <ul style="list-style-type: none"> <li>• IE3</li> <li>• IE4</li> </ul>