

Assignment title	Product performance
Assessor	Miss Chagger
Date issued	5 th January 2015 – 23 rd January 2015
Final deadline	
Duration (approx)	2 hours
Qualification suite covered	BTEC Level 1/Level 2 First Award in Engineering
Units covered	Unit 2: Investigating an Engineered Product
Learning aims covered	Learning aim A: Understand the performance requirements of an engineered product
Scenario	<p>A local engineering company has asked you to investigate an appropriate engineered product and to identify, outline and explain:</p> <ul style="list-style-type: none"> • why it is shaped as it is • what its function is – whether it works • what attributes would persuade users to choose the product and why • technical attributes that make the product fit for purpose. <p>The product you investigate must have a minimum of two different components.</p>
Task 1	<p>Technical specification for an engineered product</p> <p>Analyse the selected engineered product and produce a written technical specification for it. Your technical specification should be structured with the following headings:</p> <p><u>Basic</u></p> <ul style="list-style-type: none"> • Form • Function • User requirements <p><u>Advanced</u></p> <ul style="list-style-type: none"> • Performance requirements • Material and component requirements • Ease of manufacture • Ease of maintenance • Legal and safety requirements
Evidence you must produce for this task	<ul style="list-style-type: none"> • Written report • Photographs of the engineered product that are annotated or referred to in the report may be used.

Criteria covered by this task:

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Outline relevant basic and advanced specification criteria for an engineered product.	2	2A.P1
Explain the importance of basic and advanced specification criteria for an engineered product.	2	2A.M1

Sources of information	<p>Textbooks</p> <p>Clarke, S. et al. (2012) <i>BTEC First in Engineering Student Book</i>, Harlow: Pearson Education, 978 1 44690 243 1.</p> <p>Godfrey, N. and Wallis, S. (2004) <i>GCSE Engineering</i>, Cheltenham: Nelson Thornes, 978 0 74878 551 3</p> <p>Tooley, M. (2010) <i>BTEC First Engineering</i>, 2nd Edition, Oxford: Newnes, 978 1 85617 685 9.</p> <p>Tooley, M. et al. (2008) <i>Edexcel Diploma: Engineering Level 2 Higher Diploma Student Book</i>, Oxford: Heinemann, 978 0 43575 620 8.</p> <p>Tooley, M. (2002) <i>Engineering GCSE</i>, Oxford: Newnes, 978 0 75066 576 6</p> <p>Wallis, S. et al. (2010) <i>BTEC First Engineering</i>, London: Hodder Education, 978 1 44411 052 4.</p> <p>Websites</p> <p>http://www.technologystudent.com http://www.technologystudent.com/designpro/spec1.htm http://dandtforschool.webs.com/A%20Level/GP%20AS%20Product%20Investigation-3%20Pin%20Plug.pdf</p> <p>Other sources</p> <ul style="list-style-type: none"> • Refer to the product's operating instruction booklet to identify the features or use of the product. • Identify the manufacturer of the product, log on to their website, and research the product's construction, standards met, etc. <p>Note to assessors</p> <p>We are committed to ensuring that teachers/tutors and learners have a choice of resources to support their teaching and study.</p> <p>We would encourage them to use relevant resources for your local area such as local employers, newspapers and council websites.</p> <p>Resources from various publishers are available to support delivery and training for all Pearson and BTEC qualifications so that learners and teachers/tutors can select those that best suit their needs.</p> <p>Above are some examples of textbooks and websites. Further useful resources may be found at www.edexcel.com/resources.</p>
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If you have not achieved the Level 2 criteria, your work will be assessed to determine if the

following Level 1 criteria have been met.

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Identify relevant basic specification criteria for an engineered product.	2	1A.1

Assignment title	Materials and components
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Assessor	Miss Chagger
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Date issued	26 th January 2015
Final deadline	13 th February 2015
Duration (approx)	3 hours

Qualification suite covered	BTEC Level 1/Level 2 First Award in Engineering
Units covered	Unit 2: Investigating an Engineered Product
Learning aims covered	Learning aim B: Understand the selection of specific materials for use in the components that make up an engineered product

Scenario	<p>The manager of the local engineering company you are working for has asked you to develop your investigation of the engineered product you looked at in Assignment 1 (Product performance) by disassembling it. He has asked you to discuss the materials used in its component parts, describing properties and qualities, environmental impact and possible alternative materials.</p> <p>The product you use must have a minimum of two components.</p>
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Task 1	<p>Selection, use and impact of different materials in an engineered product</p> <p>Disassemble the engineered product and then produce a written report that contains:</p> <ul style="list-style-type: none"> • a brief description of two component parts in the product • the name, properties and qualities of the materials the each component is made from • environmental impact details for the materials used, including extraction/processing and disposal after their useful lifespan • details of alternative materials that could be used in the product.
Evidence you must produce for this task	<ul style="list-style-type: none"> • Written report • Photographs of each component that are annotated or referred to in the report may be used.

Criteria covered by this task:		
To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Describe the engineering properties, qualities and environmental impact of materials in two components of an engineered product and suggest alternatives.	2	2B.P2
Compare and contrast the materials used in two components in	2	2B.M2

an engineered product with reference to engineering properties, qualities, environmental impact and alternatives.		
Evaluate the fitness for purpose of materials used in two components of an engineered product in relation to possible alternative materials making reference to properties, qualities, environmental impact and alternatives.	2	2B.D1

Sources of information	<p>Textbooks</p> <p>Clarke, S. et al. (2012) <i>BTEC First in Engineering Student Book</i>, Harlow: Pearson Education, 978 1 44690 243 1.</p> <p>Godfrey, N. and Wallis, S. (2004) <i>GCSE Engineering</i>, Cheltenham: Nelson Thornes, 978 0 74878 551 3</p> <p>Gregg R. Bruce et al. (2003) <i>Modern Materials and Manufacturing Processes</i>, 3rd Edition, Harlow: Pearson Prentice Hall, 978 0 13094 698 0</p> <p>Tooley, M. (2010) <i>BTEC First Engineering</i>, 2nd Edition, Oxford: Newnes, 978 1 85617 685 9.</p> <p>Tooley, M. et al. (2008) <i>Edexcel Diploma: Engineering Level 2 Higher Diploma Student Book</i>, Oxford: Heinemann, 978 0 43575 620 8.</p> <p>Tooley, M. (2002) <i>Engineering GCSE</i>, Oxford: Newnes, 978 0 75066 576 6</p> <p>Wallis, S. et al. (2010) <i>BTEC First Engineering</i>, London: Hodder Education, 978 1 44411 052 4.</p> <p>Websites</p> <p>http://science.howstuffworks.com/plastic4 http://www.bbc.co.uk/schools/gcsebitesize/design/resistantmaterials http://www.chemguide.co.uk/inorganic/extraction/iron.html http://www.technologystudent.com</p> <p>Other sources</p> <ul style="list-style-type: none"> • The website of the manufacturer of the product • The product's technical specification <p>Note to assessors</p> <p>We are committed to ensuring that teachers/tutors and learners have a choice of resources to support their teaching and study.</p> <p>We would encourage them to use relevant resources for your local area such as local employers, newspapers and council websites.</p> <p>Resources from various publishers are available to support delivery and training for all Pearson and BTEC qualifications so that learners and teachers/tutors can select those that best suit their needs.</p> <p>Above are some examples of textbooks and websites. Further useful resources may be found at www.edexcel.com/resources/Pages/default.aspx.</p>
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If you have not achieved the Level 2 criteria, your work will be assessed to determine if the following Level 1 criteria have been met.

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Identify materials used in two component parts of an engineered product, stating engineering properties for each.	2	1B.2

Assignment title	Manufacturing processes
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Assessor	16 th February 2015
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Date issued	13 th March 2015
Final deadline	
Duration (approx)	3 hours

Qualification suite covered	BTEC Level 1/Level 2 First Award in Engineering
Units covered	Unit 2: Investigating an Engineered Product
Learning aims covered	Learning aim C: Understand the selection and use of manufacturing processes in an engineered product

Scenario	<p>The manager of the local engineering company you are working for is happy with the investigation work you completed on your engineered product in Assignments 1 (Product performance) and 2 (Materials and components). He would now like you to discuss manufacturing processes to determine which ones were used, and why, during the manufacture of the product's components.</p> <p>The selected product must have a minimum of two components.</p>
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Task 1	<p>Research the engineered product you have been given/selected [<i>delete as appropriate</i>] and then produce a written report detailing the production processes used to manufacture the product's components. The report should include the following information:</p> <ul style="list-style-type: none"> • A description of the processes used • Why these processes were selected, with reference to the manufacturing needs of the product • The relative impact on the environment of the processes used, including energy, resources, waste production and pollution • A summary that weighs up the advantages and disadvantages of each process, based on the information provided in the earlier sections of the report
Evidence you must produce for this task	A written report, including technical information and diagrams of the processes

Criteria covered by this task:

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Describe two production processes used in the manufacture of components in an engineered product.	2	2C.P3
Explain reasons for the selection and use of two production processes used in the manufacture of components in an engineered product.	2	2C.M3

Compare and contrast the production processes used in the manufacture of components in an engineered product in terms of their environmental impact and the manufacturing need.	2	2C.D2
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Sources of information	<p>Books</p> <p>Clarke, S. et al. (2012) <i>BTEC First in Engineering Student Book</i>, Harlow: Pearson Education, 978 1 44690 243 1.</p> <p>Godfrey, N. and Wallis, S. (2004) <i>GCSE Engineering</i>, Cheltenham: Nelson Thornes, 978 0 74878 551 3</p> <p>Gregg R. Bruce et al. (2003) <i>Modern Materials and Manufacturing Processes</i>, 3rd Edition, Harlow: Pearson Prentice Hall, 978 0 13094 698 0</p> <p>Tooley, M. (2010) <i>BTEC First Engineering</i>, 2nd Edition, Oxford: Newnes, 978 1 85617 685 9.</p> <p>Tooley, M. et al. (2008) <i>Edexcel Diploma: Engineering Level 2 Higher Diploma Student Book</i>, Oxford: Heinemann, 978 0 43575 620 8.</p> <p>Tooley, M. (2002) <i>Engineering GCSE</i>, Oxford: Newnes, 978 0 75066 576 6</p> <p>Wallis, S. et al. (2010) <i>BTEC First Engineering</i>, London: Hodder Education, 978 1 44411 052 4.</p> <p>Websites</p> <p>http://science.howstuffworks.com/plastic4 http://www.bbc.co.uk/schools/gcsebitesize/design/resistantmaterials http://www.chemguide.co.uk/inorganic/extraction/iron.html http://www.technologystudent.com</p> <p>Note to assessors</p> <p>We are committed to ensuring that teachers/tutors and learners have a choice of resources to support their teaching and study.</p> <p>We would encourage them to use relevant resources for your local area such as local employers, newspapers and council websites.</p> <p>Resources from various publishers are available to support delivery and training for all Pearson and BTEC qualifications so that learners and teachers/tutors can select those that best suit their needs.</p> <p>Above are some examples of textbooks and websites. Further useful resources may be found at www.edexcel.com/resources.</p>
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If you have not achieved the Level 2 criteria, your work will be assessed to determine if the following Level 1 criteria have been met.

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Outline two production processes used in the manufacture of components in an engineered product.	2	1C.3

Assignment title	Quality
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Assessor	Miss J Chagger
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Date issued	16 th March 2015
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Final deadline	10 th April 2015
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Duration (approx)	2 hours
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Qualification suite covered	BTEC Level 1/Level 2 First Award in Engineering
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Units covered	Unit 2: Investigating an Engineered Product
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Learning aims covered	Learning aim D: Understand the quality issues related to an engineered product
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Scenario	To follow on from Assignments 1–3, covering Learning aims A–C, the manager of the local engineering company you are working for wants you to explain the reasons for quality-control (QC) checks and quality assurance (QA) systems. He would like you to record what checks should be made on your selected product and how these checks could improve quality.
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Task 1	Investigate quality control and quality assurance for your selected engineered product. Using your product as an example, produce a written report that includes: <ul style="list-style-type: none"> • information on when, where and how QC checks are carried out and why these checks can help to improve the quality of your engineered product • information on why and how a specific QA system should be used during the manufacture of your engineered product and how the QC checks form part of this system • a review of whether the QA system for your engineered product is fit for purpose • a summary that considers the strengths and weaknesses of the QC checks and QA system for your engineered product, based on the information provided in the earlier sections of the report.
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Evidence you must produce for this task	A written report that includes technical information and diagrams.
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Criteria covered by this task:

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Explain how quality-control (QC) checks can help to improve the quality of an engineered product.	2	2D.P4
Explain why a specific quality-assurance (QA) system should be used during the manufacture of an engineered product.	2	2D.P5

Analyse the fitness for purpose of a quality-assurance (QA) system for an engineered product.	2	2D.M4
Evaluate the use of the quality-control (QC) checks and quality-assurance (QA) systems for an engineered product.	2	2D.D3

Sources of information	<p>Textbooks</p> <p>Clarke, S. et al. (2012) <i>BTEC First in Engineering Student Book</i>, Harlow: Pearson Education, 978 1 44690 243 1.</p> <p>Godfrey, N. and Wallis, S. (2004) <i>GCSE Engineering</i>, Cheltenham: Nelson Thornes, 978 0 74878 551 3</p> <p>Gregg R. Bruce et al. (2003) <i>Modern Materials and Manufacturing Processes</i>, 3rd Edition, Harlow: Pearson Prentice Hall, 978 0 13094 698 0</p> <p>Tooley, M. (2010) <i>BTEC First Engineering</i>, 2nd Edition, Oxford: Newnes, 978 1 85617 685 9.</p> <p>Tooley, M. et al. (2008) <i>Edexcel Diploma: Engineering Level 2 Higher Diploma Student Book</i>, Oxford: Heinemann, 978 0 43575 620 8.</p> <p>Tooley, M. (2002) <i>Engineering GCSE</i>, Oxford: Newnes, 978 0 75066 576 6</p> <p>Wallis, S. et al. (2010) <i>BTEC First Engineering</i>, London: Hodder Education, 978 1 44411 052 4.</p> <p>Websites</p> <p>http://science.howstuffworks.com/plastic4 www.bbc.co.uk/schools/gcsebitesize/design/resistantmaterials www.chemguide.co.uk/inorganic/extraction/iron.html www.technologystudent.com http://tutor2u.net/business/production/quality_control.htm or http://tutor2u.net/business/production/quality_introduction.htm</p> <p>Note to assessors</p> <p>We are committed to ensuring that teachers/tutors and learners have a choice of resources to support their teaching and study.</p> <p>We would encourage them to use relevant resources for your local area such as local employers, newspapers and council websites.</p> <p>Resources from various publishers are available to support delivery and training for all Pearson and BTEC qualifications so that learners and teachers/tutors can select those that best suit their needs.</p> <p>Above are some examples of textbooks and websites. Further useful resources may be found at www.edexcel.com/resources.</p>
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To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Identify quality-control (QC) checks that could be made during the manufacture of an engineered product.	2	1D.4
Outline the quality-assurance (QA) system that could be used during the manufacture of an engineered product.	2	1D.5

Assignment title	Preparing for and carrying out an engineering activity
Assessor	Miss Chagger
Date issued	24 th November 2014
Final deadline	19 th December 2014
Duration (approx)	6 hours
Qualification suite covered	BTEC Level 1/Level 2 First Award in Engineering
Units covered	Unit 3: Health and Safety in Engineering
Learning aims covered	Learning aim B: Know how to follow procedures and undertake a work activity safely
Scenario	<p>You have been asked to prepare for and carry out a new engineering work activity in a workshop, using a range of tools and equipment. You need to investigate the personal protective equipment (PPE) required to carry out the activity safely. You must also assess the potential hazards and risks of the activity.</p> <p>To carry out the activity you will use PPE, a range of marking out equipment, hand tools and machinery.</p>
Task 1	<p>Staying safe</p> <ol style="list-style-type: none"> 1. Research the Personal Protective Equipment at Work Regulations. Use your research to produce a presentation showing the types of PPE that can be used to protect parts of the body, and hazards that could harm parts of the body. You should use annotated examples and research PPE and hazards for the: <ul style="list-style-type: none"> • eyes • head • hands and arms • legs and feet • lungs. 2. Next you will need to look at various processes carried out in engineering workshops. Identify specific types of PPE that will be needed for: <ul style="list-style-type: none"> • handling steel plates and bars • preparing and marking out steel plates • drilling holes with a pillar drill • milling a smooth face on a square bar • knurling a grip on to a round bar.

	<p>3. Add your findings from part 2 to the presentation and provide reasons why you have chosen these items of PPE for each activity or process. How do they protect the person that is carrying out each process?</p> <p>4. Select one piece of PPE that is used in more than one activity or process. Use the internet to research the manufacturer’s specification and instructions for the use of the PPE product. Compare the manufacturer’s guidelines to the requirements of the Personal Protective Equipment at Work Regulations.</p> <p>Produce a short report discussing whether the manufacturer’s guidelines adhere to the regulations and how well the item of PPE meets the needs of the user.</p> <p>5. Using the HSE guidance booklet ‘Five Steps to Risk Assessment’, complete a risk assessment for one of the following machining activities:</p> <ul style="list-style-type: none"> • drilling holes with a pillar drill • milling a smooth face on a square bar • knurling a grip onto a round bar. <p>6. Using your risk assessment and your choice of PPE, prepare for and complete the machining activity safely (refer to the specification for Unit 3, Topic B3: Engineering work activity)</p>
Evidence you must produce for this task	<ul style="list-style-type: none"> • presentation • report • risk assessment • detailed Learner Observation Record • annotated photographs recording how you prepared for, and carried out, the engineering work activity safely

Criteria covered by this task:		
To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Describe the personal protective equipment to be used when handling materials and equipment in an engineering workplace.	3	2B.P3
Complete an accurate risk assessment for one engineering activity.	3	2B.P4
Prepare for, and carry out, an engineering activity safely.	3	2B.P5
Explain why personal protective equipment is required for different processes in an engineering workplace.	3	2B.M3
Evaluate personal protective equipment in an engineering workplace, reporting how well the PPE manufacturer’s guidelines adhere to the appropriate regulations.	3	2B.D2

Sources of information	<p>Textbooks</p> <p>Clarke, S. et al. (2012) <i>BTEC First in Engineering Student Book</i>, Harlow: Pearson Education, 978 1 44690 243 1.</p> <p>Health and Safety Executive (2006) <i>Essentials of Health and Safety at Work</i>, 4th Edition, London: HSE Books, 978 0 71766 179 4</p> <p>Health and Safety Executive (2004), <i>Health and Safety in Engineering</i></p>
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Workshops, 2nd Edition, London: HSE Books, 978 0 71761 717 3

Tooley, M. (2010) *BTEC First Engineering*, 2nd Edition, Oxford: Newnes, 978 1 85617 685 9.

Tooley, M. et al. (2008) *Edexcel Diploma: Engineering Level 2 Higher Diploma Student Book*, Oxford: Heinemann, 978 0 43575 620 8.

Wallis, S. et al. (2010) *BTEC First Engineering*, London: Hodder Education, 978 1 44411 052 4.

Websites

<http://www.hse.gov.uk/risk/fivesteps.htm>

Health and Safety Executive (Five steps to risk assessment)

Note to assessors

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If you have not achieved the Level 2 criteria, your work will be assessed to determine if the following Level 1 criteria have been met.

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Outline procedures for handling materials and equipment for a given engineering activity.	3	1B.3
Identify risks associated with one engineering activity.	3	1B.4
Prepare the work area appropriately for a given engineering activity.	3	1B.5

Assignment title	Accident and emergency procedures and workplace roles and responsibilities
Assessor	Miss Chagger
Date issued	24 TH November 2013
Final deadline	19 th December 2014
Duration (approx)	4 hours over 2 weeks
Qualification suite covered	BTEC Level 1/Level 2 First Award in Engineering
Units covered	Unit 3: Health and Safety in Engineering
Learning aims covered	Learning aim A: Understand safe and effective working in an engineering workplace
Scenario	You have just become a Health and Safety Officer in a local engineering company that specialises in manufacturing large drums for printing presses. Previously you worked in a large, modern, steel manufacturing plant, so for your first task your Team Leader wants you to investigate whether the company's accident, emergency and health and safety policies and procedures are up to modern standards and report back to him. You should use methods that will get the health and safety message across to other employees.
Task 1	<p>Produce a presentation that provides details about the specific accident and emergency procedures/actions to be followed in response to a fire in the engineering workshop caused by a machine tool overheating. Ensure that you make it clear why it is so important to follow these accident and emergency procedures.</p> <p>In your presentation, ensure that you also cover:</p> <ul style="list-style-type: none"> • the identification of appropriately qualified persons (i.e. First Aider, Fire Warden) • the use of fire extinguishers (types and applications) • how a fire alarm would be raised • what a fire alarm would sound like • the evacuation procedure • escape routes and muster points • location and provision of First Aid • routines for reporting the fire • any possible changes to the accident and emergency procedure document following the incident (i.e. contents, purpose, legal requirements, improvements etc)
Evidence you must produce for this task	<ul style="list-style-type: none"> • PowerPoint® presentation

Task 2	<p>Research and become familiar with the basics of the:</p> <ul style="list-style-type: none"> • Health & Safety at Work Act and related legislation • Personal Protective Equipment at Work Regulations • Manual Handling Operations Regulations • Use of Work Equipment Regulations • Display Screen at Work Regulations • Control of Substances Hazardous to Health (COSHH) • Reporting of Injuries Diseases and Dangerous Occurrences Regulations (RIDDOR) • other relevant workplace policies and procedures. <p>Use this research to produce a leaflet or poster that provides details about the roles and responsibilities of employees (including own and others' health and safety) and employers under the legislation, policy and procedures required when handling materials and equipment in an engineering workshop.</p> <p>Make sure that your leaflet or poster states the actual legislation/regulations and ensure you clearly show why it is so important that employees and employers adhere to the correct legislation, policy and procedures.</p>
Evidence you must produce for this task	<ul style="list-style-type: none"> • leaflet or poster • research notes.

Criteria covered by this assignment:		
To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Explain how accident and emergency procedures are used in an engineering workplace.	3	2A.P1
Outline the roles and responsibilities of self and others under the legislation, policy and procedures required for an engineering workplace.	3	2A.P2
Explain the importance of following accident and emergency procedures in response to an incident in an engineering workplace.	3	2A.M1
Explain the roles and responsibilities of self and others under the legislation, policy and procedures required for an engineering workplace.	3	2A.M2
Explain the importance of employees and employers adhering to correct legislation, policy and procedures in an engineering workplace.	3	2A.D1

Sources of information	<p>Textbooks</p> <p>Clarke, S. et al. (2012) <i>BTEC First in Engineering Student Book</i>, Harlow: Pearson Education, 978 1 44690 243 1.</p> <p>Health and Safety Executive (2006) <i>Essentials of Health and Safety at Work</i>, 4th Edition, London: HSE Books, 978 0 71766 179 4</p> <p>Health and Safety Executive (2004), <i>Health and Safety in Engineering Workshops</i>, 2nd Edition, London: HSE Books, 978 0 71761 717 3</p> <p>Tooley, M. (2010) <i>BTEC First Engineering</i>, 2nd Edition, Oxford: Newnes, 978 1 85617 685 9.</p> <p>Tooley, M. et al. (2008) <i>Edexcel Diploma: Engineering Level 2 Higher Diploma Student Book</i>, Oxford: Heinemann, 978 0 43575 620 8.</p> <p>Wallis, S. et al. (2010) <i>BTEC First Engineering</i>, London: Hodder Education, 978 1 44411 052 4.</p> <p>Websites</p> <p>http://www.hse.gov.uk Health and Safety Executive</p> <p>Note to assessors</p> <p>We are committed to ensuring that teachers/tutors and learners have a choice of resources to support their teaching and study.</p> <p>We would encourage them to use relevant resources for your local area such as local employers, newspapers and council websites.</p> <p>Resources from various publishers are available to support delivery and training for all Pearson and BTEC qualifications so that learners and teachers/tutors can select those that best suit their needs.</p> <p>Above are some examples of textbooks and websites. Further useful resources may be found at www.edexcel.com/resources.</p>
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To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Outline the actions that need to be taken if there is an accident in an engineering workplace.	3	1A.1
Identify the key features of legislation, policy and procedures for an engineering workplace.	3	1A.2

Assignment title	Safe use of computer-aided manufacture techniques
Assessor	Miss J Chagger
Date issued	18 th May 2015
Final deadline	12 th June 2015
Duration (approx)	4 hours over 2 weeks
Qualification suite covered	BTEC Level 1/Level 2 First Award in Engineering
Units covered	Unit 6: Computer-aided Engineering
Learning aims covered	Learning aim B: Use a CAM system to manufacture an engineering component
Scenario	<p>You are working as a trainee in a small engineering company. You have been using CAD to produce engineering drawings; the company owner is aware of this, and now wants you to look at how the company could make better use of CNC techniques in its manufacturing operations.</p> <p>The company owner has asked you to select an example of an engineering component and to produce it on one of the CNC machines currently available. He wants you to report back to him on the advantages and disadvantages of the company using CAM techniques to manufacture engineering components, as he needs to make some urgent investment decisions.</p>
Task	<p>Using a CAM system</p> <p>Your teacher/tutor will provide you with a CAD drawing for an engineered component (or you could use the CAD drawing you produced for Learning aim A, Task 1 – check this with your teacher/tutor). The drawing will show that the engineered component has compliance and accuracy requirements.</p> <p>You now need to produce the engineered component using CNC techniques. To do this you will need to:</p> <ul style="list-style-type: none"> • carry out a risk assessment before machining • convert CAD data into an appropriate CNC program • simulate machining of the component • load the program into a CNC machine and set the offsets/tool changes/speeds and feeds • machine the component, manually adjusting the speeds and feeds accordingly • inspect your component using appropriate measuring equipment and describe how your component is fit for purpose and conforms to specification • simulate machining of the component again, identifying errors/improvements (such as cutter paths, depth of cut etc) in the CNC program and suggesting solutions.

	When complete, produce a presentation detailing what the advantages and disadvantages of the company using a CAM system to produce different types of engineering components would be.
Evidence you must produce for this task	<ul style="list-style-type: none"> • Completed risk assessment template • Annotated photographs • Annotated screen grabs • A compliance/accuracy report with embedded inspection charts • Presentation slides

Criteria covered by this task:		
To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Produce an engineering component by converting CAD data into an appropriate CNC program and loading the program into a CNC machine.	6	2B.P4
Describe how the component produced meets the design specification.	6	2B.P5
Simulate component production, identify improvements in programs and suggest solutions.	6	2B.M2
Evaluate CAM as a means of producing different engineered components.	6	2B.D2

Sources of information	<p>Textbooks</p> <p>Clarke, S. et al. (2012) <i>BTEC First in Engineering Student Book</i>, Harlow: Pearson Education, 978 1 44690 243 1.</p> <p>Tooley, M. (2010) <i>BTEC First Engineering</i>, 2nd Edition, Oxford: Newnes, 978 1 85617 685 9.</p> <p>Wallis, S. et al. (2010) <i>BTEC First Engineering</i>, London: Hodder Education, 978 1 44411 052 4.</p> <p>Websites</p> <p>www.hse.gov.uk/risk/</p> <p>www.technologystudent.com/cam/camex.htm</p> <p>Note to assessors</p> <p>We are committed to ensuring that teachers/tutors and learners have a choice of resources to support their teaching and study.</p> <p>We would encourage them to use relevant resources for your local area such as local employers, newspapers and council websites.</p> <p>Resources from various publishers are available to support delivery and training for all Pearson and BTEC qualifications so that learners and teachers/tutors can select those that best suit their needs.</p> <p>Above are some examples of textbooks and websites. Further useful resources may be found at www.edexcel.com/resources.</p>
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If you have not achieved the Level 2 criteria, your work will be assessed to determine if the following Level 1 criteria have been met.

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Load CAD data from a drawing into a CNC machine in order to produce an engineering component.	6	1B.4
Check a component, produced using a CNC machine, for conformity with the design specification.	6	1B.5

Assignment title	CAD drawing and modification techniques
Assessor	Miss J Chagger
Date issued	13 th April 2015
Final deadline	15 th May 2015
Duration (approx)	6 hours over 2 weeks
Qualification suite covered	BTEC Level 1/Level 2 First Award in Engineering
Units covered	Unit 6: Computer-aided Engineering
Learning aims covered	Learning aim A: Use a CAD system to produce engineering drawings
Scenario	<p>You are working as a trainee in a small engineering company. You have been using CAD to produce drawings alongside colleagues who use more traditional sketching techniques.</p> <p>The company owner wants to introduce CAD to the company more widely; as a result you have been asked to produce drawings of a selected engineering component and a circuit diagram using a CAD system. You will then need to use these to produce a written guide for your colleagues that describes CAD drawing and modification commands.</p>
Task 1	<p>CAD engineering component drawing</p> <p>In conjunction with your tutor, select an engineering component (or a sketch of an engineering component) and produce a CAD drawing of it. In your evidence you should show that you have:</p> <ul style="list-style-type: none"> • used an appropriate template • used a basic range of CAD drawing and editing commands • used the correct tools to produce the correct geometry • used the correct tools to manipulate views on screen • used a range of further CAD commands including co-ordinates, features and modification techniques • used dimensioning and hatching techniques • produced a drawing that meets the expected standard (BS 8888) • saved the drawing in the correct format • printed/plotted a hard copy of the drawing.
Evidence you must produce for this task	<ul style="list-style-type: none"> • CAD drawing • Learner observation record • Annotated screen grabs

Criteria covered by this task:

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Produce a fully dimensioned CAD drawing of an engineering component using basic and further CAD commands and BS conventions.	6	2A.P1

Task 2	<p>Circuit diagram</p> <p>In conjunction with your tutor, select a circuit (or a sketch of a circuit diagram) and produce a circuit diagram of it, using a CAD system. In your evidence you should show that you have:</p> <ul style="list-style-type: none"> used standard symbols used a range of drawing, insertion and editing techniques to complete your circuit diagram used the correct tools to produce the correct geometry annotated the circuit diagram to include component names/descriptions used a full range of CAD commands including co-ordinates and features produced a drawing that meets the expected standard (e.g. BS 2917, BS EN 60617) saved the drawing data in the correct format printed/plotted a hard copy of the drawing.
Evidence you must produce for this task	<ul style="list-style-type: none"> CAD circuit diagram Learner observation record Annotated screen grabs

Criteria covered by this task:		
To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Produce a circuit diagram fully labelling all components using basic and further CAD commands and BS conventions.	6	2A.P2

Task 3	<p>CAD user guide</p> <p>Produce a short written guide for your colleagues to show how and why CAD should be used to produce engineering component drawings and circuit diagrams. You will need to provide information on:</p> <ul style="list-style-type: none"> how to use at least five different CAD drawing and modification commands when producing engineering component drawings and circuit diagrams the relative importance and benefits of these five CAD drawing and modification commands when producing engineering component drawings and circuit diagrams why CAD should be used to produce these kinds of drawings rather than traditional sketching techniques. <p>You may find it useful to use annotated screen grabs within your guide.</p>
Evidence you must produce for this task	Written guide to CAD with annotated screen grabs

Criteria covered by this task:

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Describe drawing and modification commands used to produce engineering component and circuit diagrams.	6	2A.P3
Explain the importance of drawing and modification commands and the benefits when used to produce engineering components and circuit diagrams.	6	2A.M1
Justify the use of CAD in the production of engineering component drawings and circuit diagrams.	6	2A.D1

Sources of information	<p>Books</p> <p>Byrnes, D. (2011) <i>AutoCAD 2012 for Dummies</i>, Chichester: John Wiley & Sons, 978 1 11802 440 9.</p> <p>Cheng, R.K.C. (2004) <i>Using Pro/Desktop 8</i>, New York: Delmar Cengage Learning, 978 1 40186 024 0.</p> <p>Clarke, S. et al. (2012) <i>BTEC First in Engineering Student Book</i>, Harlow: Pearson Education, 978 1 44690 243 1.</p> <p>Ostrowsky, O. (1989) <i>Engineering Drawing with CAD Applications</i>, Oxford: Butterworth-Heinemann, 978-0-34050-411-6</p> <p>Tooley, M. (2010) <i>BTEC First Engineering</i>, 2nd Edition, Oxford: Newnes, 978 1 85617 685 9. hfhf – fhfh</p> <p>Wallis, S. et al. (2010) <i>BTEC First Engineering</i>, London: Hodder Education, 978 1 44411 052 4.</p> <p>Websites</p> <p>www.cadtutor.net – free AutoCAD tutorials</p> <p>www.ptc.com/for/education/schools/curriculum – desktop training materials and classroom projects</p> <p>www.new-wave-concepts.com – publisher of electronics CAD software</p> <p>www.technologystudent.com – information sheets and exercises to enhance the study, understanding and teaching of design and technology</p> <p>www.the-warren.org – Warren School, Design & Technology department</p> <p>Note to assessors</p> <p>We are committed to ensuring that teachers/tutors and learners have a choice of resources to support their teaching and study.</p> <p>We would encourage them to use relevant resources for your local area such as local employers, newspapers and council websites.</p> <p>Resources from various publishers are available to support delivery and training for all Pearson and BTEC qualifications so that learners and teachers/tutors can select those that best suit their needs.</p> <p>Above are some examples of textbooks and websites. Further useful resources may be found at www.edexcel.com/resources.</p>
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If you have not achieved the Level 2 criteria, your work will be assessed to determine if the following Level 1 criteria have been met.

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Produce a CAD drawing of an engineering component using a CAD system.	6	1A.1
Produce a circuit diagram using a CAD system.	6	1A.2
Identify drawing and modification commands used to produce engineering component and circuit diagrams.	6	1A.3

Assignment title	Accident and emergency procedures and workplace roles and responsibilities
Assessor	Miss Chagger
Date issued	24 th November 2014
Final deadline	19 th December 2014
Duration (approx)	4 hours over 2 weeks
Qualification suite covered	BTEC Level 1/Level 2 First Award in Engineering
Units covered	Unit 3: Health and Safety in Engineering
Learning aims covered	Learning aim A: Understand safe and effective working in an engineering workplace
Scenario	You have just become a Health and Safety Officer in a local engineering company that specialises in manufacturing large drums for printing presses. Previously you worked in a large, modern, steel manufacturing plant, so for your first task your Team Leader wants you to investigate whether the company's accident, emergency and health and safety policies and procedures are up to modern standards and report back to him. You should use methods that will get the health and safety message across to other employees.
Task 1	<p>Produce a presentation that provides details about the specific accident and emergency procedures/actions to be followed in response to a fire in the engineering workshop caused by a machine tool overheating. Ensure that you make it clear why it is so important to follow these accident and emergency procedures.</p> <p>In your presentation, ensure that you also cover:</p> <ul style="list-style-type: none"> • the identification of appropriately qualified persons (i.e. First Aider, Fire Warden) • the use of fire extinguishers (types and applications) • how a fire alarm would be raised • what a fire alarm would sound like • the evacuation procedure • escape routes and muster points • location and provision of First Aid • routines for reporting the fire • any possible changes to the accident and emergency procedure document following the incident (i.e. contents, purpose, legal requirements, improvements etc)
Evidence you must produce for this task	<ul style="list-style-type: none"> • PowerPoint® presentation

Task 2	<p>Research and become familiar with the basics of the:</p> <ul style="list-style-type: none"> • Health & Safety at Work Act and related legislation • Personal Protective Equipment at Work Regulations • Manual Handling Operations Regulations • Use of Work Equipment Regulations • Display Screen at Work Regulations • Control of Substances Hazardous to Health (COSHH) • Reporting of Injuries Diseases and Dangerous Occurrences Regulations (RIDDOR) • other relevant workplace policies and procedures. <p>Use this research to produce a leaflet or poster that provides details about the roles and responsibilities of employees (including own and others' health and safety) and employers under the legislation, policy and procedures required when handling materials and equipment in an engineering workshop.</p> <p>Make sure that your leaflet or poster states the actual legislation/regulations and ensure you clearly show why it is so important that employees and employers adhere to the correct legislation, policy and procedures.</p>
Evidence you must produce for this task	<ul style="list-style-type: none"> • leaflet or poster • research notes.

Criteria covered by this assignment:		
To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Explain how accident and emergency procedures are used in an engineering workplace.	3	2A.P1
Outline the roles and responsibilities of self and others under the legislation, policy and procedures required for an engineering workplace.	3	2A.P2
Explain the importance of following accident and emergency procedures in response to an incident in an engineering workplace.	3	2A.M1
Explain the roles and responsibilities of self and others under the legislation, policy and procedures required for an engineering workplace.	3	2A.M2
Explain the importance of employees and employers adhering to correct legislation, policy and procedures in an engineering workplace.	3	2A.D1

Sources of information	<p>Textbooks</p> <p>Clarke, S. et al. (2012) <i>BTEC First in Engineering Student Book</i>, Harlow: Pearson Education, 978 1 44690 243 1.</p> <p>Health and Safety Executive (2006) <i>Essentials of Health and Safety at Work</i>, 4th Edition, London: HSE Books, 978 0 71766 179 4</p> <p>Health and Safety Executive (2004), <i>Health and Safety in Engineering Workshops</i>, 2nd Edition, London: HSE Books, 978 0 71761 717 3</p> <p>Tooley, M. (2010) <i>BTEC First Engineering</i>, 2nd Edition, Oxford: Newnes, 978 1 85617 685 9.</p> <p>Tooley, M. et al. (2008) <i>Edexcel Diploma: Engineering Level 2 Higher Diploma Student Book</i>, Oxford: Heinemann, 978 0 43575 620 8.</p> <p>Wallis, S. et al. (2010) <i>BTEC First Engineering</i>, London: Hodder Education, 978 1 44411 052 4.</p> <p>Websites</p> <p>http://www.hse.gov.uk Health and Safety Executive</p> <p>Note to assessors</p> <p>We are committed to ensuring that teachers/tutors and learners have a choice of resources to support their teaching and study.</p> <p>We would encourage them to use relevant resources for your local area such as local employers, newspapers and council websites.</p> <p>Resources from various publishers are available to support delivery and training for all Pearson and BTEC qualifications so that learners and teachers/tutors can select those that best suit their needs.</p> <p>Above are some examples of textbooks and websites. Further useful resources may be found at www.edexcel.com/resources.</p>
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If you have not achieved the Level 2 criteria, your work will be assessed to determine if the following Level 1 criteria have been met.

To achieve the criteria you must show that you are able to:	Unit	Criterion reference
Outline the actions that need to be taken if there is an accident in an engineering workplace.	3	1A.1
Identify the key features of legislation, policy and procedures for an engineering workplace.	3	1A.2