assignment package contents

assignment activity front sheet

ASSIGNMENT TITLE **Engineering graphics**

LEARNER'S NAME		ASSESSOR'S NAME		
DATE ISSUED	COMPLETION DATE		SUBMITTED ON	

Reference number for specification criteria	*Grading criteria*	*Date achieved*	*Evidence*	*Comments/feedback from assessor*
P1	interpret an engineering drawing/circuit/network diagram and sketches			
P2	produce an engineering drawing/circuit/network diagram and sketches			
P3	identify and use appropriate standards, symbols and conventions in the production of an engineering drawing/circuit/network diagram			

Learner declaration

I declare that all the work submitted for this assignment is my own work or, in the case of group work, the work of myself and the other members of the group in which I worked, and that no part of it has been copied from any source.

I understand that if any part of the work submitted for this assignment is found to be plagiarised, none of the work submitted will be allowed to count towards the assessment of the assignment.

Signed: Date:

assignment task

Engineering graphics

WHAT YOU WILL LEARN IN THIS ASSIGNMENT

You will undertake a range of activities designed to help your understanding of the graphical techniques used by engineers who work in a design, manufacturing or test environment.

ASSIGNMENT OBJECTIVES

In this assignment you will need to show that you can:

- work with drawings and diagrams that are used to communicate technical information in an engineering environment
- interpret the information contained within these drawings
- present graphical data to a standard acceptable for use in industry
- correctly use the standards, symbols and conventions applicable to engineering graphics.

WHAT YOU WILL DO IN THIS ASSIGNMENT

On an individual basis, produce notes, drawings, diagrams and sketches as solutions to a number of tasks.

Grading criteria		Tasks
P1	interpret an engineering drawing/circuit/network diagram and sketches	1A, 1B
P2	produce an engineering drawing/circuit/network diagram and sketches	2A, 2B
P3	identify and use appropriate standards, symbols and conventions in the production of an engineering drawing/circuit/network diagram	3

TASK INTRODUCTION

The packaging of food for sale in supermarkets is a highly automated process and uses special purpose machinery. Pneuno Systems Ltd (PSL) is a specialist sub-contractor that manufactures and supplies the pneumatic actuators and electronic control equipment fitted to these types of machine.

PSL is currently working on a project with a company called SuperPak to design a new range of machines that will pack snack foods in foil/clear wrappers three times faster than present machinery. The current design is nearly 10 years old and uses mainly mechanical devices to control its operation; the new machines will be fitted with electronic control panels, a PLC, and a data interface allowing a number of machines in the food factory to be networked to a central computer for monitoring purposes. When a machine fault is detected this will be picked up by the computer software and a resolution procedure instigated, for example shutting down the machine and sending a text message to a service technician.

The design process is at an advanced stage and a review meeting is being set up between PSL and SuperPak:

For SuperPak

- Chief designer
- Mechanical design engineer
- Manufacturing engineer
- Installation and commissioning manager

For PSL

- Project manager
- Pneumatic equipment/systems design engineer
- Electronic/network design engineer
- Trainee design engineer

Documentation and drawings

- Technical specification
- Detail and assembly drawings
- Pneumatic systems diagrams
- Electronic circuit diagrams
- Network diagram
- Installation and operating procedures documentation (in draft form).

You are nearing the end of the second year of an engineering apprenticeship with PSL, have just moved into the design department as a trainee and have been asked by your manager to sit in on the meeting with SuperPak so that you can learn about the design process. They do not expect you to make any significant contribution to the technical aspects of what will be discussed but are concerned that you create a good impression by appearing to be reasonably knowledgeable.

Before allowing you to take part, and knowing that you have just completed a National Certificate in Manufacturing Engineering at the local FE college, the PSL project manager sets a test which should confirm your confidence in working with engineering drawings and diagrams. They ask that you find answers to the following tasks and present them in a small portfolio of evidence. Notes can be handwritten or word processed, sketches should be hand drawn in 2D and 3D format, drawings and circuit diagrams can be hand drawn but are probably better done using 2D software packages.

TASK 1

1A Find a detail drawing of a single-part engineering component that is part of a larger assembly, is presented in 2D using orthographic projection and to drawing standard BS8888. From the drawing, identify and describe six pieces of technical information that relate to features of the component, such as datum positions, dimensions, tolerances, surface finish. For the larger assembly drawing, state the assembly requirements.

Or

Find a circuit diagram, presented in accordance with BS2917, for a pneumatic system which will produce reciprocating or sequential operation for two linear actuators. Identify and describe six pieces of technical information that relate to features of the circuit such as power source, conditioning device, flow lines, control valves, actuators

and sensors. By making reference to the diagram, describe the assembly requirements of the circuit.

Or

Find an electronic circuit diagram which is presented in accordance with BS3939. Identify and describe six pieces of technical information that relate to features of the circuit, such as power source, voltage regulation, connections and output characteristics. By making reference to the diagram, describe the assembly requirements of the circuit.

Or

In common with many other organisations, PSL uses an IT system featuring centralised servers, desktop PCs, Wi-Fi, portable PCs and data entry terminals in the workshops. Network cabling runs around the factory. For this type of system, find a network diagram presented in accordance with PP7307 that includes a range of hardware items. Identify six pieces of technical information that relate to features of the circuit. By making reference to the diagram, describe the assembly requirements of the network system.

1B Many designs start life as sketches on 'the back of an envelope'. Find an example of a design concept or initial idea that has been presented in this way and which uses several sketches to convey the message. Write notes to go with the 'envelope' in order to support the idea if it were to be considered for further development by a design review team.

One task from group (a) and Task **1b** provide evidence for grading criterion P1.

TASK 2

2A Find a single-part engineered component and produce a detail drawing of it in accordance with BS8888, properly presented using a template.

Or

Produce a pneumatic circuit diagram comprising at least 10 different components to a standard which is acceptable to industry.

Or

Produce an electronic circuit diagram comprising at least 10 different components to a standard which is acceptable to industry.

Or

After new packaging machines have been installed into a food processing plant, they are commissioned. Using network diagrams and test equipment, technicians carry out procedures to ensure that all the various machine and interface systems are functioning correctly. Construct your own example of a network diagram.

2B Go to this site:
http://www.pneu-store.co.uk/acatalog/Pneu_Store_Webshop_Standard_Cylinders_217.html

Pick one of the cylinders and make 2D and 3D sketches showing how it could be assembled into a packaging machine so that it moves a pivoted lever. Your sketches must include enough information for them to be used by a CAD draftsman who is going to produce detail drawings of the components used to locate the cylinder.

For Task 2a you will need to obtain witness statements or observation records to support your evidence, if it has been produced using a software package.

One task from group (a) and Task **2b** provide evidence for grading criterion P2.

TASK 3

In Unit 3: Engineering Project you identified and evaluated three potential solutions to the project specification and then selected the best option for development. To carry forward this development you will have produced engineering drawings or circuit/network diagrams which should have been presented using the correct BS standards, symbols and conventions. Identify these by adding brief notes to a copy of your original work.

If the drawings and diagrams are not to standard then make the necessary modifications to bring them up to scratch and add explanatory notes.

This task provides evidence for grading criterion P3.

GUIDANCE NOTES

Tasks 1 and 2 contain options and the intention is that the ones you choose will depend on the focus of the learning programme in which this unit is being delivered. For example, if you are on a manufacturing/mechanical programme, you will probably choose to interpret and produce engineering drawings, whilst if you are studying electrical/electronic engineering you are more likely to interpret and produce circuit diagrams.

All work involving drawings and circuit diagrams should be done on templates that you have designed. Ideally, produce these using a CAD package so that they can be saved and printed off for use with other units in your programme.

Engineering graphics

ASSIGNMENT OBJECTIVES

In this assignment learners will need to show that they can:

- work with drawings and diagrams that are used to communicate technical information in an engineering environment
- interpret the information contained within these drawings
- present graphical data to a standard acceptable for use in industry
- correctly use the standards, symbols and conventions applicable to engineering graphics.

WHAT YOUR LEARNERS WILL DO IN THIS ASSIGNMENT

On an individual basis, produce written notes, drawings, diagrams and sketches as solutions to a number of tasks.

WHAT THEY WILL LEARN IN THIS ASSIGNMENT

Learners will undertake a range of activities designed to help their understanding of the graphical communication techniques used by engineers who work in a design, manufacturing or test environment.

GUIDANCE NOTES

Tasks 1 and 2 contain options and the intention here is that the choice will depend on the focus of the learning programme in which this unit is being delivered. For example, a learner on a mechanical programme is likely to choose to interpret and produce engineering drawings, whilst a learner studying electrical/electronics is more likely to interpret and produce circuit diagrams.

Engineering graphics

TASK NUMBER, TASK DETAIL AND GRADING CRITERION/CRITERIA COVERED

Task 1: evidence for P1

Task 2: evidence for P2

Task 3: evidence for P3

GRADE/LEVEL

The work was graded P1, P2, P3

SAMPLE ANSWER

Some of this sample is presented in the context of mechanical/manufacturing engineering but the same general principles apply irrespective of the focus of the learning programme in which this unit is being delivered. These are that any drawings/diagrams looked at or produced are drawn to a relevant British Standard and are of sufficient quality/detail to be of use to someone working in industry. The web links in the unit delivery plan and Case study 2 provide information about drawing standards and examples of good practice.

TASK 1A

Print off a copy of a detail drawing of a component and using a marker pen, ring 6 pieces of technical information that appear on it e.g. the surface finish tick symbol. Then explain what each means.

The following link shows an example of a dimension applied to a component:
http://nvl.nist.gov/pub/nistpubs/jres/104/4/html/figures/mac_f0C4.gif

Having identified something like this in their own drawing the learner should be describing the features of this technical information, i.e.:

- the square with the A inside it indicates that the bottom surface of the component is a datum face.
- the distance to the top surface must be between 37.8 and 38.4 mm.
- the rectangle indicates that the top surface must be parallel to face A within a tolerance band of 0.08 mm.

Using the assembly drawing explain how the parts are put together, e.g. using alignment tools and jigs to hold the parts, torque tightening of screws, locking of nuts and bolts.

The following link shows an example of an assembly drawing:
http://www.public.iastate.edu/~emadsen/Portfolio%20I_files/image032.jpg

The learner could be describing the assembly features as:

- the flanged upper piece sits squarely on the bracket
- the two set screws would need to be torque tightened and fixed with Loctite as there is no form of mechanical locking present.

TASK 1B

The design sketches for this task could be those produced as evidence for P5 (produce design proposals which meet the requirements of a given PDS) in Unit 8: Engineering Design. These may already have been annotated but the aim in this assignment is to produce a proper set of notes which explain in detail how one of the design proposals works and the manufacturing implications. This also ties in with P7 of the design unit where the learner will be developing a final design solution. They will be presenting this solution in a formal way but if there are sketches involved then these can be used for this assignment.

The notes that the learner adds to the sketches should contain the following information:

- the purpose of the design and its operating principles
- materials and/or components to be used in its manufacture
- relevant standards and legislation which apply to the product
- manufacturing requirements, e.g. specialist tooling or assembly instructions
- an estimation of its manufacturing cost.

TASK 2A

The drawing should be produced using a template and will typically contain the following information:

- drawing number, title and company name
- name of person who produced it
- date of production
- projection symbol
- scale and units of measurement
- general tolerance on dimensions
- material
- guidance notes.

The following link gives an example of a template:
http://images.google.com/images?gbv=2&svnum=10&um=1&hl=en&q=engineering+drawing+template&sa=N&tab=wi

TASK 2B

The sketches will ideally be a combination of 2D and 3D with a requirement that they are produced freehand i.e. pencil on paper. The components should be presented in their correct proportions and with enough dimensions added to enable a CAD draftsman to produce a proper drawing of the assembly. The use of colour and shadowing to create a more accurate 3D effect is optional.

TASK 3

To prevent unnecessary duplication this task can use evidence produced for the Engineering Project (P6: implement the plan and produce the project solution). The learner should have identified and applied the correct symbols and standards in the production of drawings for their final design proposal. If the drawings and diagrams are not to standard the learner should be able to identify where there are errors and make the necessary corrections.

assignment activity front sheet

ASSIGNMENT TITLE **Effective communication**

LEARNER'S NAME		ASSESSOR'S NAME	
DATE ISSUED	COMPLETION DATE	SUBMITTED ON	

Reference number for specification criteria	*Grading criteria*	*Date achieved*	*Evidence*	*Comments/feedback from assessor*
P4	communicate information effectively in written work			
P5	communicate information effectively using verbal methods			
M1	evaluate a written communication method and identify ways in which it could be improved			
D1	justify their choice of a specific communication method and the reasons for not using a possible alternative			

Learner declaration

I declare that all the work submitted for this assignment is my own work or, in the case of group work, the work of myself and the other members of the group in which I worked, and that no part of it has been copied from any source.

I understand that if any part of the work submitted for this assignment is found to be plagiarised, none of the work submitted will be allowed to count towards the assessment of the assignment.

Signed: Date:

assignment task

Effective communication

WHAT YOU WILL LEARN IN THIS ASSIGNMENT

You will undertake a range of activities designed to help your understanding and use of verbal and written communication techniques used by engineers who work in a design, manufacturing or test environment.

ASSIGNMENT OBJECTIVES

In this assignment you will need to show that you can:

- communicate information effectively in writing
- communicate information effectively when speaking
- appraise written work and identify strategies for improving it
- reflect on, and evaluate a particular method used to communicate engineering information.

WHAT YOU WILL DO IN THIS ASSIGNMENT

On an individual basis, produce solutions to a number of tasks involving reading, writing and speaking.

Grading criteria		Tasks
P4	communicate information effectively in written work	1
P5	communicate information effectively using verbal methods	2
M1	evaluate a written communication method and identify ways in which it could be improved	3
D1	justify their choice of a specific communication method and the reasons for not using a possible alternative	4

TASK INTRODUCTION

In Unit 3: Engineering Project there is a requirement to produce a written report and to make a verbal presentation - refer to learning outcome 4 and grading criteria P8 and P9.

http://www.edexcel.org.uk/VirtualContent/103787/U3_Engineering_Project.pdf

The evidence generated for these two activities can be used as source material for the tasks that follow.

Engineers write reports about tasks that they have undertaken but it is not just the final report that is important - it is also necessary to have a full record of all the information used in its preparation. Data has to be collected, collated, edited and stored, so that it can be referred to at a later date. An engineering report may contain information obtained from a number of different sources and in varying formats, e.g. notes, word processed text, test results, email correspondence, transcripts of telephone calls and face-to-face discussions, drawings, diagrams and charts.

TASK 1

Put together a portfolio which contains evidence to prove that you can do all of the following:

- research information and make notes about what you found out
- ask people questions and write a transcript of what they said
- assess a problem and present the steps to its solution as a flow diagram
- use a diary/logbook to plan and record progress when solving an engineering problem
- write a business letter to an engineering supplier requesting information about a product
- send and receive emails containing technical information
- write a technical report which has a style and format acceptable to industry
- use graphs, charts and diagrams to help get the message across in a technical report
- proof-read a technical report and make corrections where necessary.

This task provides evidence for grading criterion P4.

TASK 2

Put together a portfolio which contains evidence to prove that you can do all of the following:

- talk to an engineer and make a transcript of the conversation
- discuss a technical issue with a colleague
- argue a point verbally without upsetting anyone or causing tension
- listen to someone making a presentation about a technical subject and write up notes about what was said
- deliver a short presentation to a group using visual aids
- use body language to reinforce a point in a verbal presentation.

For all these activities you will need to obtain witness statements or observation records to support your evidence.

This task provides evidence for grading criterion P5.

TASK 3

In Task 1 you wrote a technical report which was based on your project. The way in which the report was put together should have been discussed with your teacher/tutor. If you kept a record of these discussions - particularly your strategies on how to improve the communication methods within it (e.g., the use of images, graphical techniques and style of writing), then you can use this as acceptable evidence.

If the report is so good that there was or is no scope to improve it, then you will need to look at the written work of someone else where improvements are required in order to bring it up to industry standard. Appraise the work and identify how it could be enhanced.

The evidence to be presented for this task should be:

- A 500-word document outlining the strategy that you used to improve your communication method. Cut and paste into your text examples of 'before and after'.

Or

- A 500-word document outlining the strategy that could be used to improve the communication method used by the other person in presenting their work. Cut and paste samples of good practice into your text.

This task provides evidence for grading criterion M1.

TASK 4

Grading criteria P8 and P9 in the Engineering Project unit require that you prepare a written report and make a verbal presentation. Using either of these as a data resource, think about your choice of communication methods and why you picked them. You will have used a range of techniques, e.g. drawings, graphics, writing, speaking, for this task, home in on just one of them and use it for further investigation.

Evidence to be presented:

- copies of notes of consultations you had with your teacher/tutor or other people about the chosen communication method
- copies of initial outlines and drafts relating to how you intended to communicate information
- a 500-word statement justifying why you chose one particular method of communication and the reasons for not using an alternative
- any further evidence that you can find, e.g. a witness statement relating to your decision making.

This task provides evidence for grading criterion D1.

GUIDANCE NOTES

The tasks in this assignment draw on evidence associated with your engineering project. It is important that you hold regular review meetings with your project supervisor and plan your work schedule so that you are not wasting valuable time by duplicating activities. When you make handwritten notes, be sure to keep them in a folder. Anything produced in an 'e' format should be saved using a properly designed file structure.

Effective communication

ASSIGNMENT OBJECTIVES

In this assignment learners will need to show that they can:

- communicate information effectively in writing
- communicate information effectively when speaking
- appraise written work and identify strategies for improving it
- reflect on, and evaluate a particular method used to communicate engineering information.

WHAT YOUR LEARNERS WILL DO IN THIS ASSIGNMENT

On an individual basis, learners will produce solutions to a number of tasks involving reading, writing and speaking.

WHAT THEY WILL LEARN IN THIS ASSIGNMENT

Learners will undertake a range of activities designed to help their understanding and use of the verbal and written communication techniques used by engineers who work in a design, manufacturing or test environment.

GUIDANCE NOTES

The tasks in this assignment draw on evidence associated with the learner's engineering project. It is important that they hold regular review meetings with the teacher/tutor/project supervisor and plan their work schedule so that they are not wasting valuable time by duplicating activities.

When making handwritten notes they should be kept in a folder and anything produced in an 'e' format saved using a properly designed file structure. Learners should be keeping any type of evidence relating to the tasks so that it can be held for later editing and proper presentation.

Where the learner is making a verbal presentation, the teacher/tutor should complete a witness statement or observation record to confirm competence. These could also be supported by digital images, for example to illustrate use of body language. Some teachers/tutors may wish to capture confirmation of effective verbal communication by making a video of the learner in action but this approach should be treated with caution because external verifiers have prescribed amounts of time to look at evidence. Any video work would need to be easily accessible from a DVD.

Effective communication

TASK NUMBER, TASK DETAIL AND GRADING CRITERION/CRITERIA COVERED

Task 1: evidence for P4
Task 2: evidence for P5
Task 3: evidence for M1
Task 4: evidence for D1

GRADE / LEVEL

The work was graded P4, P5, M1, D1

SAMPLE ANSWER

These sample answers contain comments of a generic nature because each learner will be producing individual evidence based on their project with no two portfolios the same.

TASK 1

There are 9 prescriptive elements to this task and the learner should carry them out on an individual basis but with guidance from the teacher/tutor. All of the evidence should be within the portfolio produced for the engineering project unit and can tracked using a pro-forma:

No.	Task element	Page/ref No.	Learner sig.	Tutor sig.	Date
1	Research information and make notes				
2	Ask people questions and write a transcript				
3	Assess a problem and present the steps to its solution				
4	Use a diary/logbook to plan and record progress				
5	Write a business letter to an engineering supplier				
6	Send and receive emails				
7	Write a technical report				
8	Use graphs, charts and diagrams				
9	Proof-read a technical report				

A good way to track amendments to a document made when proof-reading is to use the track changes/markup commands found within MS Word. 'Before' and 'after' printouts could be presented as evidence.

TASK 2

There are 6 prescriptive elements to this task and the learner should carry them out on an individual basis with guidance from the teacher/tutor.

Talk to an engineer

Learners will have already done this when they researched information for Assignment 2 of the Business Systems unit and should be able to look back to notes taken at the time.

The transcript should be about 400 words long and contain the following elements:

- date of discussion
- name of company, engineer and learner
- engineer's job title
- title of topic being discussed, e.g. design modification to a hydraulic control valve
- points discussed
- conclusions/actions.

The transcript can be handwritten or word processed but should be more than just a set of jottings taken at the time of the conversation.

Discuss a technical issue with a colleague

The issue can be programme or job related and should contain specific technical detail, e.g. the operating characteristics of an electronic power supply or the results of experimental testing carried out in another unit of the programme. The teacher/tutor needs to be party to the discussion (about 5 minutes) so that an observation record can be signed off.

Argue a point verbally

This can be linked to the technical discussion or could be based on conversations with the teacher/tutor when deciding on a topic for the engineering project unit. The learner should be demonstrating that:

- they have prepared their case
- any data presented is accurate
- they are prepared to listen to the other side's point of view
- they can remain calm
- they can agree to disagree
- they are prepared to return to the discussion at a later date if there is still disagreement
- whether they win or lose, they behave with respect.

Listen to someone making a presentation

Notes taken in a classroom teaching situation are valid evidence provided that they are not just simple copying from the board. A better option would be to take notes when another learner is making their verbal presentation and to home in on the following elements:

- topic, name of presenter and date taken
- short paragraphs for each part of the presentation
- conclusion/action.

The notes can be handwritten or word processed but should be more than just a set of jottings and of about 500 words.

Deliver a short presentation - Use body language to reinforce a point in verbal presentation

This links very closely to Unit 3 Engineering Project - grading criterion P9 and there is no reason why the evidence presented for the project cannot be used for this unit, thus saving time and duplication. The verbal presentation need be no longer than 10 minutes (including questions) with a limit placed on the number of PowerPoint slides used. Learners should be guided in the preparation of these slides so that they focus on technical content rather than artistic presentation. Simple bullet points which appear un-dramatically against a plain background are what they should be encouraged to produce. Confident learners may decide not to use any form of presentation graphics and to just rely on their speaking ability - this is acceptable provided that they use some form of visual aid.

When assessing this task a matrix can be used to record each learner's efforts.

This is an example:

Feature	Feedback
Introduction	
Main content	
Finishing up	
Answering questions	
Engaging with the audience	
Getting the message across	
Slides easy to read	
Quality of slides	

Presenter reading slides	
Eye contact	
Clarity of speech	
Use of body language	

TASK 3

To achieve the criterion M1 the learner must use their skills and understanding of communication methods to appraise written work and identify enhancements. This can be their own work or that of someone else. In both cases the important thing to pick up on is that they are carrying out proper evaluation against criteria. It will not be good enough if they just use bland statements such as:

1. The font used was too big and not clear, so I changed it.
2. The report was badly laid out, so I used more paragraphs.
3. My spelling is not very good and I used the spell checker.
4. The digital images looked good but needed changing.

For point 1 they should be saying:

'When I first wrote the report, I used Times New Roman size 14 but my tutor showed me examples of reports written in industry and the current preference seems to be Trebuchet MS size 10 (12 for headings) - this font is easier to read and looks up-to-date - before I changed the font it looked like this:

'When I first wrote the report, I used Times New Roman size 14 but my tutor showed me examples of reports written in industry and the current preference seems to be Trebuchet MS size 10 (12 for headings). This font is easier to read and looks up to date - before I changed the font it looked like this:'

For point 2 they could be saying:

'The first page of the report was one long paragraph because I just kept typing. I knew what it meant but when a colleague read it through, they were confused. I have now broken it down into shorter ones and used indenting on paragraph 3 to draw attention to an important point.'

For point 3 they could be saying:

'The original document was spell checked but my tutor picked up on several mistakes, e.g. writing there when I should have said their. I got round the problem by taking my document into work and asking an engineer who is good at spelling and grammar to read it through for me.'

For point 4 they could be saying:

'In the first draft of the report, I pasted in some digital images to make it look interesting but when I showed it to an engineer at work they could not link them to the text and had to ask me what they were about. In this second version I have given each image a reference number and put these into the text. I also put a list of images in the contents page.'

TASK 4

If the learner is aiming for criterion D1 they should:

- assume the role of a final year apprentice working in a design/development environment
- regard the teacher/tutor as a senior engineer in a company - there to offer strategic guidance but not to get involved at a detailed level
- fully justify any decisions made.

The learner should pick up on just one specific communication method used, for example how they presented their drawings.

They could write the following:

When I started on the project I did some of the drawings on paper as I was not very good at using a CAD package and thought it might be quicker to draw by hand. I am a bit untidy and when my tutor looked at them, they said that some of what I had drawn was wrong and changes would be needed. I ended up completely redrawing the first component which took a long time. In further discussion with my tutor it was agreed that I would be given help to practise using a 2D CAD package so that my work could be done on the computer. This would allow me to easily edit and change things without having to redraw. The other reason why I decided to move to a CAD system was because it also had a 3D function and my tutor suggested that for the verbal presentation it might look good if some of the graphics were presented this way. A friend of mine who uses 3D CAD at work helped me prepare for the presentation.

As the time allowed for the verbal presentation was restricted to 5 minutes and I had a number of drawings which I wanted to show to people it seemed easier to present them using the multimedia projector rather that handing around paper copies for people to look at. By projecting them on the big screen I was able to pick out detail from the drawings, highlight it using the interactive whiteboard pens and answer questions from people.

Another reason why the drawings were done in CAD was because my training manger at work wants me to develop the product further by manufacturing all the parts I designed and putting them together as a prototype. I will be working with a manufacturing engineer who is going to help me convert the drawings using a CAM package into instructions for a CNC machine. If I had kept with paper drawings this would have been much more difficult.

The marketing department at work are interested in what I have developed and want me to talk to them in non-technical terms about the product. I think using 3D visualisations is a really good way to show them the product because virtual images can be animated on the screen (you can't do this with paper drawings) and it's easier for a non-engineer to understand what they are looking at.

assignment activity front sheet

ASSIGNMENT TITLE **Engineering information and ICT**

LEARNER'S NAME		ASSESSOR'S NAME	
DATE ISSUED	COMPLETION DATE	SUBMITTED ON	

Reference number for specification criteria	*Grading criteria*	*Date achieved*	*Evidence*	*Comments/feedback from assessor*
P6	identify and use appropriate information sources to solve an engineering task			
P7	select and use appropriate ICT software packages and hardware devices to present information			
M2	review the information sources obtained to solve an engineering task and explain why some sources have been used but others rejected			
M3	use an ICT software package and its tools to prepare and present clearly laid out work			
D2	critically evaluate their use of an ICT presentation method and identify an alternative approach			

Learner declaration

I declare that all the work submitted for this assignment is my own work or, in the case of group work, the work of myself and the other members of the group in which I worked, and that no part of it has been copied from any source.

I understand that if any part of the work submitted for this assignment is found to be plagiarised, none of the work submitted will be allowed to count towards the assessment of the assignment.

Signed: Date:

assignment task

Engineering information and ICT

WHAT YOU WILL LEARN IN THIS ASSIGNMENT

You will undertake a range of activities designed to help your understanding of the way information sources and ICT are used by engineers who work in a design, manufacturing or test environment.

ASSIGNMENT OBJECTIVES

In this assignment you will need to show that you can:

- research and record technical information held in both paper-based and computer-based data banks
- interpret, edit and review technical information
- explain your strategy for picking some information sources and rejecting others
- use software packages to produce text, charts, drawings and presentation graphics which are to industry standard
- reflect on, and evaluate the way that ICT has been used to present technical information.

WHAT YOU WILL DO IN THIS ASSIGNMENT

On an individual basis, produce written answers to a number of tasks.

Grading criteria		Tasks
P6	identify and use appropriate information sources to solve an engineering task	1
P7	select and use appropriate ICT software packages and hardware devices to present information	2
M2	review the information sources obtained to solve an engineering task and explain why some sources have been used but others rejected	3
M3	use an ICT software package and its tools to prepare and present clearly laid out work	4
D2	critically evaluate their use of an ICT presentation method and identify an alternative approach	5

TASK INTRODUCTION

In the first assessment activity, you were given an overview about the design and manufacture of a food packaging machine. Two companies (SuperPak and PSL) were involved in the project with a significant amount of engineering information being passed between them. This information can be broadly classified as:

- given data, e.g. the technical specification of the machine
- researched data, e.g. material specifications, product standards, design data.

assignment task

You are still working in the design department of PSL as a trainee and have now been asked by your manager to work with a designer on a new project. Before starting work on it, and knowing that you recently completed a National Certificate in Manufacturing Engineering at the local FE College, your manager sets a test to confirm your confidence in finding, using and presenting engineering data. They ask that you find answers to some tasks and present them in a small portfolio of evidence.

In Unit 3: Engineering Project there is a requirement to come up with ideas for a project solution, to evaluate them and then to develop one to a finish - refer to learning outcomes 1 and 3 and grading criteria P3 and P6.
http://www.edexcel.org.uk/VirtualContent/103787/U3_Engineering_Project.pdf

The evidence generated for these activities can be used as source material for the tasks which follow.

TASK 1

Put together a portfolio which contains evidence to prove that you did all of the following when working on your project:

- identified, accessed and used a range of non-computer-based information
- identified, accessed and used a range of computer-based information
- identified data sheets and used information from them
- identified a CD-ROM database and used information from it
- identified manufacturers' catalogues and used information from them
- found information on the internet and edited it
- collated numerical data into a spreadsheet
- annotated your technical report with references to data sources
- correctly used the information found when carrying out your project.

This task provides evidence for grading criterion P6.

TASK 2

Put together a portfolio which contains evidence to prove that you did all of the following when working on your project:

- selected the correct IT hardware and software packages for use in an engineering situation
- used a software package to word process a document
- used a software package to produce a 2D drawing
- handled and processed data using software packages
- used a simulation software package
- communicated using e-systems
- used a computer system to present information in written, numerical and graphical forms
- prepared and made a visual presentation using a software package and multimedia facility.

This task provides evidence for grading criterion P7.

TASK 3

In Task 1 you presented evidence to show that you could find and use engineering information gathered from a range of sources, e.g. reading off the tensile strength of titanium alloy from a mechanical properties of solids data table and using the value in a stress calculation.

The evidence to be presented for this task should be:

- A 500-word document explaining why some information sources were accepted for use and others were rejected. This should include cut and pasted examples of material taken from these sources.

This task provides evidence for grading criterion M2.

TASK 4

In Task 2 you were asked to prove that you could use IT equipment and software packages to prepare and present information.

The evidence to be presented for this task should be examples of clearly laid out work prepared using a word processing software package and showing:

- consistent use of font and colour
- consistency in the alignment of text
- consistent positioning on the page of text, graphics and charts
- the use of colour highlighting to make work easier to read
- graphs which are correctly annotated with titles, legends and data labels

This task provides evidence for grading criterion M3.

TASK 5

This task builds on Tasks 2 (P7) and 4 (M3) of this unit.

Grading criterion P8 and P9 in the Engineering Project unit require that you prepare a written report and make a verbal presentation. Using these as a data resource, think about your choice of presentation methods and why you picked them.

Method of communication	**Writing**	**Verbal**
Method of presentation (some examples)	Notes	Speaking with peers/supervisor
	Lists/diagrams	Listening
	Logbook	One to one conversation
	Document	Group conversation
	Graphs/charts	Speaking using technical language
	Report	Presentation supported by visual aids
	Portfolio	Presentation supported by ICT

The evidence to be presented for this task should be:

- A 500-word document, relating to your project, which evaluates your use of an ICT presentation method and identifies an alternative approach.

This task provides evidence for grading criterion D2.

GUIDANCE NOTES

The tasks in this assignment draw on evidence associated with your engineering project. It is important that you hold regular review meetings with your project supervisor and plan your work schedule so that you are not wasting valuable time by duplicating activities. When you make handwritten notes, be sure to keep them in a folder. Anything produced in an 'e' format should be saved using a properly designed file structure.

Engineering information and ICT

ASSIGNMENT OBJECTIVES

In this assignment learners will need to show that they can:

- research and record technical information held in both paper-based and computer-based data banks
- interpret, edit and review technical information
- explain your strategy for picking some information sources and rejecting others
- use software packages to produce text, charts, drawings and presentation graphics which are to industry standard
- reflect on, and evaluate the way that ICT has been used to present technical information.

WHAT YOUR LEARNERS WILL DO IN THIS ASSIGNMENT

On an individual basis, produce written answers to a number of tasks.

WHAT THEY WILL LEARN IN THIS ASSIGNMENT

Learners will undertake a range of activities designed to help their understanding of the way information sources and ICT are used by engineers who work in a design, manufacturing or test environment.

GUIDANCE NOTES

These sample answers contain comments of a generic nature because each learner will be producing individual evidence based on their project with no two portfolios the same.

Engineering information and ICT

TASK NUMBER, TASK DETAIL AND GRADING CRITERION/CRITERIA COVERED

Task 1: evidence for P6

Task 2: evidence for P7

Task 3: evidence for M2

Task 4: evidence for M3

Task 5: evidence for D2

GRADE / LEVEL

The work was graded P6, P7, M2, M3, D2.

SAMPLE ANSWER

TASK 1

There are 9 prescriptive elements to this task and the learner should carry them out on an individual basis but with guidance from the teacher/tutor. All of the evidence should be within the portfolio produced for the engineering project unit and can tracked using a pro-forma:

No.	Task element	Page/ref No.	Learner sig.	Tutor sig.	Date
1	Identify, access and use a range of non-computer-based information				
2	Identify, access and use a range of computer-based information				
3	Extract information from data sheets				
4	Use a CD-ROM database				
5	Identify manufacturers' catalogues and use information from them				
6	Find and edit information on the internet				
7	Collate numerical data into a spreadsheet				
8	Annotate a technical report with references to data sources				
9	Correctly use engineering information				

TASK 2

There are 8 prescriptive elements to this task and the learner should carry them out on an individual basis with guidance from the teacher/tutor. All of the evidence can be sourced from activities carried out for the Engineering Project unit and can tracked using a pro-forma:

No.	Task element	Page/ref No.	Learner sig.	Tutor sig.	Date
1	Select the correct IT hardware and software packages for use in an engineering situation				
2	Use a software package to word process a document				
3	Use a software package to produce a 2D drawing				
4	Handle and process data using a software package				
5	Use a simulation software package				
6	Communicate using e-systems				
7	Use computer systems to present information in written, numerical and graphical forms				
8	Prepare and make a visual presentation using a software package and multimedia facility				

TASK 3

This task links closely to P6 and achievement might well be explicit if the tasks undertaken for P6 have been satisfactorily completed. In their review of whether to accept or reject an information source, learners could be considering the following:

- Is it up to date?
- Is it free or do you have to pay?
- Are the properties and dimensions expressed in the correct units, i.e. SI?
- How easy was it to get to the required data, e.g. trawling through many pages of a paper-based catalogue or using a website with a good search facility?
- When using a person as an information source, did they have the correct expert knowledge?
- Is the information being presented accurate - e.g. a primary or secondary source?

A learner response might be:

In my project one of the components I designed was made from mild steel and a stress calculation was needed. To do this I needed to find the tensile strength of the steel. I decided to use the MatWeb database because it is freely available and does not require registration. The front page is very easy to work with and the materials have been set out in categories which we have looked at in the Engineering materials unit.

The front page may be accessed from http://www.matweb.com/index.asp?ckck=1 [front page included in learner work].

It is really easy to navigate your way through to the property that you want. Another thing I liked about the site is that the properties are given in SI and Imperial units. Several other places I looked only gave them in Imperial units.

I did try this site http://tpsx.arc.nasa.gov but you have to be registered to use it, the front page looked confusing because there was a lot of text to read, and it was not as easy to find the categories.

Another source I tried was www.wikipedia.com but the page listing the strengths of materials was not as clear to follow because all the different types of materials were mixed up.

TASK 4

There are 5 prescriptive elements to this task and the learner should carry them out on an individual basis with guidance from the teacher/tutor. All of the evidence can be sourced from the engineering project written report and tracked using a pro-forma. Evidence from other sources can also be used.

No.	Task element	Page/ref No.	Learner sig.	Tutor sig.	Date
1	Consistent use of font and colour				
2	Consistency in text alignment				
3	Consistent positioning of text, graphics and charts				
4	Using colour highlighting to make work easier to read				
5	Graphs which are correctly annotated with titles, legends and data labels.				

An example of writing/presentation that would not achieve M3:

For my project I decided to investigate a safety problem involved with car travel. On narrow, winding country roads when approaching a blind bend it is difficult to see oncoming vehicles until they are nearly on you. Yesterday on their way to work my design office manager almost had a head on collision at a right hand bend and has come up with a scheme to solve the problem by setting up a warning system. They know I am at college and thought it would be a one good to follow up. The specification for the project is that:

Approaching the bend a driver will see an active display screen mounted on a short pole.

If a vehicle approaches from the opposite direction a warning message will be flashed on the screen

Sensors each side of the bend will detect vehicle movements

Powered independently of mains electricity supply using batteries or solar panels

A video camera or some other device will be set up to prevent vandalism

There will be night and day brightness settings on the display.

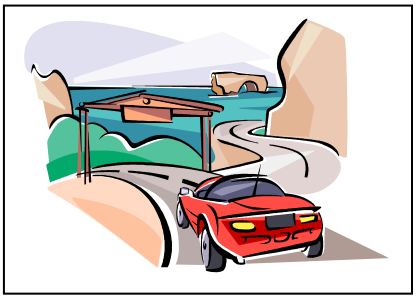
If the system goes faulty it should fail safe

An example of writing/presentation which would achieve M3:

Project overview

For my project I decided to investigate a safety problem involved with car travel.

On narrow, winding country roads when approaching a blind bend it is difficult to see oncoming vehicles until they are nearly on you. Yesterday on their way to work my design office manager almost had a head on collision at a right hand bend and has come up with a scheme to solve the problem by setting up a warning system. They know I am at college and thought it would be a good one to follow up.



Project specification

Approaching the bend a driver will see an active display screen mounted on a short pole.

If a vehicle approaches from the opposite direction a warning message will be flashed on the screen.

Sensors each side of the bend will detect vehicle movements.

Powered independently of mains electricity supply using:

Batteries

Solar energy.

Video camera or some other device set up to prevent vandalism.

There will be night and day brightness settings on the display.

If the system goes faulty it should fail safe

TASK 5

Criterion D2 requires learners to critically evaluate their use of an ICT presentation method and identify an alternative approach. This criterion is about the method of presentation and not the method of communication. To achieve D2, learners should consider the overall approach taken to presenting a particular part of their project and come up with an alternative.

A learner response might be:

When I finished my project I kept a copy of the written report on file for future use. I produced it using Microsoft Word and it contains a lot of technical writing and a small amount of graphics. My training manager at work wants me to develop the product I designed and thinks it would be a good idea if I presented the report to the marketing department. I think that they will find the technical content too detailed.

A better way to present it is to take the report and convert it into a PowerPoint presentation. The 2D CAD drawings which I included in the report can be converted into 3D visualisations which are a really good way to show people the product because virtual images can be animated on the screen (you can't do this with paper drawings) and it's easier for a non-engineer to understand what they are looking at.

By projecting the whole thing on the big screen I will be able to pick out detail from the text and drawings, highlight it using the whiteboard pens and answer questions from

people. I will also include a short video clip showing a typical application for the product I have designed.

Microsoft Word is great package for writing reports because you can import charts and graphics into the text but when you have to discuss a report with a group of people everyone will need a paper copy to look at. In many situations this is ok but it does mean that if people come up with ideas for amendments the writer of the report will need to collate them after the meeting by going through the marked up texts. By using a multimedia approach people can sit round and discuss the material, bounce off ideas with the presenter and mark them up using an interactive whiteboard. When everyone has had their say I can save the marked up presentation as a new file, take it away and make the alterations to the originals.