
UNIT A: APPLICATION OF NEW TECHNOLOGY IN MANUFACTURING (6293)



About This Unit

Technology affects every stage in the manufacture of products. In this unit you will learn about the use of technology in manufacturing by studying the manufacturing process for a selected product. You will learn how ‘new’ technologies have helped companies to develop their manufacturing processes and improve the quality of their products and the service they offer customers.

This unit will help you to understand:

- the organisation of manufacturing;
- the manufacturing process – from design to dispatch;
- the effects of information/control technology on manufacturing companies;
- the effects of technological development on materials and components.

This unit links well with Foundation Unit B: *Working with a design brief* where you will be considering new design ideas, and with Foundation Unit C: *Manufacturing products* where you may use some of the new technology and materials you have looked at here.

You will have the chance to develop your Key Skills while working towards this unit by the use of information technology and a variety of communications techniques.

This unit is assessed through your portfolio work and an external assessment.



What You Need To Learn

The Organisation of Manufacturing

The business of manufacturing covers the making of many different products, processes to make the products, and companies who make the products. But there are similarities among the activities so we can group them into sectors. Well-known sectors you will need to be aware of are:

- chemical;
- engineering;
- food;

- paper;
- printing;
- textiles.

When you look at a product, you must be able to identify which sector has made the product.

Making a product involves a number of important stages and activities. These can be generally grouped as:

- design;
- marketing;
- production planning;
- material supply and control;
- processing – production;
- assembly and finishing;
- packaging and dispatch.

When you look at a product, you must be able to identify the main stages and activities in making the product.

New Technologies

You will need to learn about the new technologies associated with manufactured products. Typical areas of new technology you will need to consider are listed below.

Information technology, including:

- technology for sourcing data and handling data, for example databases and internet sites;
- CAD (computer-aided design) techniques, for example used in printed circuit board layout and drafting and modelling;
- CAM (computer-aided manufacture), for example used in integrated manufacturing techniques;
- telecommunications technology, for example cellular phone networks.

New materials and components, including:

- polymers, such as plastics, adhesives and coatings;
- modern metals and composites, such as alloys;
- new foodstuffs and methods of preparation;
- new computer technology, such as microprocessors and memory devices;
- new electronic technology, such as integrated circuits and chips and display devices.

Control technology, including:

- automation, such as that used for quality monitoring, process control, computer-numerical-control programming;
- robotics, such as that used for continuous operation, improved reproducibility, speed, work in hazardous environments;
- programmable logic controllers, such as those used for customised controls in appliances.

You will need to learn about the effects of new technology on making a chosen product. Factors to consider are:

- the role the technology plays in the process and the product;
- the technology or process it replaced;
- the benefits of using the technology;
- the implications of using the technology for the product and the company.

Impact of New Technology on Manufacturing

You will need to know about the impact of new technology on manufacturing. You will need to consider factors such as:

- improved methods and efficiency in manufacturing;
- availability of new products and cheaper selling prices;
- better use of materials and other environmental impacts.

Assessment Evidence		
<p>You need to answer test questions to show how well you understand how new technology and materials are used in the manufacturing industry.</p> <p>In addition, in your portfolio, you need to produce a summary of the manufacturing process for a chosen product. In the summary you should:</p> <ul style="list-style-type: none"> • identify the manufacturing sector that makes the product • identify the main materials used • include a diagram showing the key stages of production from material delivery to dispatch • describe the effects and benefits of new technologies on the manufacturing process 		
<p>To achieve a portfolio Pass you must show you can:</p> <p>P1 identify the key stages and activities in making the product</p> <p>P2 seek and use appropriate sources of information to explain the types of new technology and materials used in the product and its manufacture</p> <p>P3 use appropriate technical language to explain the changes brought about by new technology showing how it has affected your chosen product.</p>	<p>To achieve a portfolio Merit you must also show you can:</p> <p>M1 describe the main effects that technology has had on the manufacturing sector that makes your chosen product</p> <p>M2 plan your investigation carefully, showing how you responded to changes in circumstances</p> <p>M3 present your summary clearly using a range of original work and information.</p>	<p>To achieve a portfolio Distinction you must also show you can:</p> <p>D1 consider the usefulness of your methods of investigation and resulting information</p> <p>D2 evaluate the use of new technology in your chosen product and its effects</p> <p>D3 suggest new products or manufacturing methods that might be developed using new technology.</p>

Guidance For Teachers

Teaching Strategies

This unit is concerned with the way technology affects products and companies. A good focus is interesting developments that have changed the ways items are produced. The positive aspects of technology should be stressed.

New technology has affected all stages of the manufacturing process from customer enquiries to final dispatch and eventual tracking of products. Many companies have websites on the Internet, these are a good starting point for obtaining information.

It is helpful if students have seen a modern production process. Students should appreciate that changing technologies affect many aspects of manufacturing, including sales, production planning and operations. For example, examining stock and delivery frequency could help to reinforce the idea of JIT (just-in-time) manufacturing.

When examining a product it is useful if it can be taken apart and examined. This helps introduce a practical activity into the unit and provides information about materials and components. Evidence could take the form of a sectioned display that is annotated by students.

Good simulations of automation and other new technologies can be achieved by using the equipment available from educational suppliers.

Assessment Strategies

All GNVQ students produce portfolio work as part of teaching and learning. The portfolio provides the evidence for internal assessment for most units. This unit is common to the six-unit and the Part One awards. Please note that the assessment requirements for these two qualifications are different.

Each unit in the Part One award combines portfolio evidence with a test to arrive at Pass, Merit and Distinction grades. All three compulsory units have this combination.

When grading student evidence you should consider the following general qualities that distinguish between the three grades:

- increasing depth and breadth of understanding;
- increasing coherence, evaluation and analysis;
- increasing independence and originality.

For this unit you should also consider the following qualities that help distinguish between grades:

- increasing understanding of manufacturing and the production process;
- increasing understanding of the effects of new technology.

There is usually a variety of evidence equivalent to that stated in the assessment evidence that will show these qualities.

Pass

For Pass, students are expected to demonstrate that they can, with minimum guidance, investigate the manufacturing process for a chosen product.

They should be capable of showing a good understanding of the manufacturing process, the stages of production and the main materials used. Students should show they are able to describe the main materials that make up the product.

Students could pick up the obvious changes brought about by the new technology used.

Merit

The assessment grid suggests that students could show greater awareness and understanding of the production process by using diagrammatic representations. These must be originated by the student, though limited guidance is acceptable.

The focus here is on determining a broader and deeper understanding of the manufacturing process, and rewarding a slightly more independent approach taken by students.

At Merit, students will need to show a more sophisticated understanding of the influence of new technology. This could be done by giving a fuller account of the influences and including less obvious implications. This would show more insight by expanding on the obvious changes needed for Pass.

Distinction

At Distinction, you should be seeing well-considered approaches to the work, involving a variety of ideas and concepts. Students should be able to relate the different aspects of the manufacturing process to each other, backing this up with valid explanations or conclusions. This will allow them to demonstrate a more profound grasp of the manufacturing process studied, showing you both a broader and deeper understanding of the manufacturing involved in making the chosen product.

Breadth of understanding relates to students' ability to view the manufacturing process in relation to other manufacturing sectors.



Key Skills Guidance

This guidance is specific to this unit, but for planning and delivery purposes, it should be read in the context of the whole GNVQ. Please refer to the introduction to the whole qualification for further information.

The section on signposts indicates opportunities to achieve aspects of key skills that can be incorporated naturally into candidates' learning programmes. Candidates should be encouraged both to develop and to produce evidence for these aspects of the key skills, but they may need to develop additional evidence elsewhere to ensure that the requirements of the key skills units are fully met.

Signposts	
<i>When candidates are:</i>	<i>There may be opportunities for them to develop the following key skills evidence:</i>
<ul style="list-style-type: none">• seeking appropriate sources of information to explain the types of new technology and materials used in the product and its manufacture and finding out about the changes brought about by new technology by, eg visiting an organisation and talking to professionals	C2.1a Contribute to a discussion about a straightforward subject
<ul style="list-style-type: none">• seeking appropriate sources of information to explain the types of new technology and materials used in the product and its manufacture and finding out about the changes brought about by new technology from, eg textbooks, trade literature, CD-ROMs, internet sites	C2.2 Read and summarise information from two extended documents about a straightforward subject. One of the documents should include at least one image
<ul style="list-style-type: none">• presenting their summary of the manufacturing process as an oral presentation with supporting notes	C2.1b Give a short talk about a straightforward subject, using an image C2.3 Write two different types of documents about straightforward subjects. One piece of writing should be an extended document and include at least one image

<ul style="list-style-type: none"> • seeking appropriate sources of information to explain the types of new technology and materials used in the product and its manufacture and finding out about the changes brought about by new technology from, eg textbooks, trade literature, CD-ROMs, internet sites 	IT2.1 Search for and select information for two different purposes
<ul style="list-style-type: none"> • presenting their summary of the manufacturing process as an oral presentation with supporting notes 	IT2.2 Explore and develop information, and derive new information, for two different purposes IT2.3 Present combined information for two different purposes. Include at least one example of text, one example of images and one example of numbers