XSQA

Arrangements for:

Higher National Certificate in Food Science and Technology

Group Award Code: G9DD 15

Validation date: June 2009

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Acknowledgement

History of changes

It is anticipated that changes will take place during the life of the qualification, and this section will record these changes. This document is the latest version and incorporates the changes summarised below.

Version number	Description	Date
04	**Revision of Unit**: F1RJ 34 Business Management: An Introduction (finish date 31/07/2021) has been replaced by J1BV 34 Business Management: An Introduction (start date 01/08/2018)	31/08/18
03	Titles of Units F6VD 34 and F6VC 34 amended by removal of numeral 1 in line with QDT agreement.	26/04/10
02	Inclusion of full Unit specifications.	23/12/09

Contents

1   Introduction

This is the Arrangements Document for the HNC in Food Science and Technology G9DD 15 which was validated in June 2009. This document includes: background information on the development of the Group Award, its aims, guidance on access, details of the Group Award structure, and guidance on delivery.

The HNC in Food Science and Technology is a new national award. It has been developed using the revised Design Principles for HN qualifications and replaces the locally devised HNC Food Technology G1EH 15 which was based on design principles which have now been superseded.

The HNC in Food Science and Technology is designed to prepare candidates for employment in a scientific or technical capacity in the food and drink industry. It will provide them with the technical and scientific skills required by the food and drink industry and give them relevant background knowledge and understanding to help them make the best use of these skills in a commercial environment

The intention is that an HND in Food Science and Technology will also be available as a national award and would replace the existing locally devised HND Food Technology G1SX 16. This will enable candidates who complete the HNC in Food Science and Technology to progress, if they wished, to the HND in Food Science and Technology.

A Qualifications Development Team (QDT) was established to develop then national award HNC in Food Science and Technology, which consisted of representatives from centres, industry, higher education, Improve (the Sector Skills Council), Royal Environment Health Institute of Scotland (REHIS), the Education Food and Drink Partnership, and SQA.

2   Rationale for the development of the Group Award(s)

2.1   Summary of main reasons and justification

This section begins by summarising the main reasons for the development of the HNC in Food Science and Technology. It concentrates initially on the importance of the food and drink industry and the shortage of people to fill technical and scientific posts in the industry. It then examines the current provision of courses to prepare people for entry into this occupational area. This further explanation includes details of the employer consultation undertaken on behalf of the QDT which, as well as providing support for the award, gives information on the employment opportunities available to successful candidates. This section also covers the nature and purpose of the award and the title.

The main justification for the award is economic. It is based on two inter-related factors:

♦   the importance of food and drink manufacturing to the UK economy — and to the Scottish economy
♦   the shortage of technical and skilled workers in the food and drink manufacturing industry

There are other important reasons for the introduction of this award. The previous HNC/HND Food Technology was one of the few post-school qualifications in Scotland specifically designed to prepare people for entry into technical positions in the food and drink manufacturing industry. If the requirements of the food and drink manufacturing industry are to be met, then it is important that a suitable replacement for this award is introduced. The HNC/HND Food Technology had been in existence for some time so the development of the new award provided an opportunity to review previous provision to ensure that its replacement is an up to date and viable award which meets the demands of employers and is seen as attractive and worthwhile to actual and potential candidates.

All the above factors are important drivers for the development of a new award in their own right but they are given added significance by the fact that, as noted earlier, the previous HNC/HND in Food Technology was due for replacement as part of SQA's HN Modernisation programme. This modernisation programme applies to all HN awards offered by SQA, and regardless of other circumstances, it means that a review of the previous award had to be undertaken.

2.2   Food and Drink manufacturing

Data from the Food and Drink Federation indicates that food and drink manufacturing is the single largest manufacturing sector in the UK. In 2003, it employed about half a million people which is equivalent to one in seven of the manufacturing workforce.[1] At that time, there were about 9,000 food and drink manufacturing enterprises in the UK. In 2006, 49,000 people were employed in the food and drink manufacturing sector in Scotland, about 12% of the total industry workforce in the UK.[2] Again, food and drink is the largest manufacturing sector in Scotland.

The productivity of the industry, measured by Gross Value Added per employee, is the second highest among industrial sectors in the UK.[3] It is competitive internationally: a study by Jagger et al (2005) showed that the UK came second of 16 countries in total factor productivity for the food industry.[4] The industry is also important because of its connections with other industries. It buys two-thirds of UK agricultural output, for example.[5]

There are over 1,500 food and drink manufacturing workplaces in Scotland. The industry in Scotland accounts for 11% of the turnover of the GB food and drink manufacturing sector. The largest concentration of employment is in Aberdeenshire (11%) but just over a quarter of Scottish employment in food and drink manufacturing is in Glasgow City (11%), South Lanarkshire (9%) and North Lanarkshire (6%).[6]

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[1] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, Improve, July 2006, section 3.2, page 9
[2] ibid
[3] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.3, page 12
[4] quoted in Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.6, page 17
[5] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.2, page 11
[6] The Food and Drink Manufacturing Sector in Scotland: Labour Market Information Profile 2008, Improve, 2008

In common with other manufacturing industries, employment in the food and drink sector has been contracting with the industry losing about 10,000 jobs per annum in recent years. This fall is, however, substantially less than that of manufacturing industry as a whole.[7]

Overall, therefore, food and drink manufacturing is an important sector in both the UK and the Scottish economies. This implies a need for suitably skilled and qualified personnel which, in turn, suggests a need for qualifications which will prepare people for employment in the industry.

Before examining the demand for qualified personnel in more detail, it is worth identifying some of the key characteristics of the food and drink manufacturing industry. The following discussion is not intended to be comprehensive; rather it aims to highlight the complexity of the industry and to illustrate the kind of factors which impact on the design of any award intended for people wishing to take up employment in businesses engaged in food and drink manufacturing.

- The sector is diverse. It covers a wide range of food products such as bakery, meat and fish, beverages and dairy produce. Bakery is the dominant sub-sector in the UK and in Scotland.[8]
- Although most businesses in the sector are small, employment is concentrated in a few large firms: 60% of employees in the sector work for companies employing more than 200 people.[9]
- The industry has to respond to rapidly changing consumer demands, often mediated through large supermarkets which require food manufacturers to meet orders which can change on a daily basis and must be delivered as late as possible to minimise storage and other costs.[10]
- Food products can, if proper safeguards are not taken, damage the health of consumers in ways which can be fatal.[11] This means that regulation is a key aspect of the industry.
- Food production and consumption can have significant implications for society as a whole. Concerns about health and nutrition for example can impact directly on food businesses.[12]
- The industry has a history of being ready to adapt to new technology to meet customer expectations.[13]

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[7] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.2, page 10

[8] The Food and Drink Manufacturing Sector in Scotland: Labour Market Information Profile 2008, op cit

[9] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.4, page 13

[10] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 4.1, page 18

[11] ibid

[12] ibid

[13] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 3.1, page 8

The food and drink industry is also characterised by a number of trends and counter trends which can appear, in some ways, to be contradictory. For instance, while there is increasing concern about health and nutrition, the consumption of 'junk food' remains unaffected. Another example is global sourcing by food businesses while consumers think locally and seem to wish to continue to access local and regional variations through farmers' markets and other outlets.[14]

From factors such as the above, four drivers for change in the food and drink industry in the future can be identified.[15] They, too, affect the design of any new course for potential entrants to the industry. They are:

♦ consumer change – stemming from changes in incomes, population, tastes and lifestyles among consumers
♦ changing technology – this covers new products and processes but also includes new storage and distribution systems
♦ market power – this includes increased market concentration among retailers which, coupled with globalisation, can lead to new routes to market
♦ continuing regulation – this covers factors such as health and nutrition, international trading patterns and the environment all of which are the subject of national and international regulation.

Overall, therefore, food and drink manufacturing is an important industry in Scotland and the UK. Of itself, this could justify the development of a course to prepare people to enter the industry. The nature of the industry is such that awards have to take account of the particular characteristics of the industry and ensure that successful candidates can play a part in ensuring that the industry copes with the challenges it will face in the future.

2.3 Shortage of skilled and technical personnel

The current situation in the food and drink industry provides a further justification for this HNC in Food Science and Technology. Present estimates and forecasts indicate that the industry is experiencing, and will experience, a shortage of suitable people to meet the requirements of food businesses. The Improve (2006) report, *Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers,* states specifically: 'There is a shortage of technical (food scientists and technologists, engineers, electricians) and skilled workers (bakers, butchers, fishmongers, cheese makers) and employers report clear skills issues at management and supervisory levels — especially in operational people management and softer skills such as leadership, motivation and confidence building. These problems are evident across the whole UK food and drink manufacturing industry.' [page 3]. The report also points out that if the sector is to boost its industry, its productivity and competitiveness, 'the quality and supply of technical, practical and craft skills must be increased'. [16]

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[14] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 4.2
[15] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit, section 4.3 page 19
[16] The Supply of Training and Skills with the UK Food and Drink Manufacturing Sector: Stage 2 of the Sector Skills Assessment: Assessment of Current Provision, Improve (2006), page iii

The shortage of food scientists and technologists in particular is further emphasised by a survey in 2006 based on 170 interviews with businesses in the food and drink sector.[17] It found that 53% of food and beverage companies have a vacancy for food scientists or technologists. It noted also that 'food scientists and technologists are an important and significant occupational group within the sector".[18] The study estimated that there are 8,650 food science and technology roles in the UK, the bulk of which are posts with manufacturers/producers. Examples of the roles involved included 'quality assurance', 'production', 'process control', and 'management'.[19] The study concludes that up to one in four food science and technology roles were vacant.[20]

The current shortage of technical personnel is likely to be exacerbated in the future. Estimates suggest that replacement demands will mean that the industry will need to recruit about 118,000 workers in the period to 2014. Forecasts indicate also that there will be a transition to a higher skills level workforce.[21] In common with other employment sectors, the food and drink industry is affected by changing age profile of the UK population. This means that a higher proportion of employees are eligible to retire from the industry than might otherwise have been the case. This, in turn, means a greater demand for staff to replace those leaving.[22]

These actual and potential shortages have been recognised by the industry which has made efforts to encourage people to apply for courses in food science. For example, a press release from Improve in Scotland in late 2007 aimed at school leavers pointed out 'if you go to specialise in food science, you are going to be in high demand'.[23]

Another indication of the seriousness with which the industry views the potential shortage of skilled personnel is the establishment of the Education, Food and Drink Partnership (EFD Partnership) based at the University of Abertay, Dundee. It was founded in 2006 and was the Outcome of a strategic initiative led by the University of Abertay and funded by the Scottish Funding Council in which a group of Universities and Colleges examined food and drink education in higher and further education in Scotland. The partnership consists of key education providers for the food and drinks industry in Scotland and includes, among others, the University of Abertay, Glasgow Caledonian University, Scottish Agricultural College, Glasgow Metropolitan College and Forth Valley College. The 2006 Report which led to the founding of the EFD Partnership drew attention to the declining numbers of FE and HE providers in Scotland and to the fact that the number of skill shortage vacancies in the food and drink industry is higher than the number of candidates embarking on educational courses relevant to the industry. [24]

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[17] Research to Investigate the UK Requirement for Food Scientists and Technologists, Summary Report, Improve 2006
[18] op cit page 8
[19] ibid
[20] op cit page 9
[21] Demand for Skills in the UK Food and Drink Manufacturing Sector: Stage 1 of the Sector Skills Agreement: Demand Drivers, op cit page 3
[22] Investigation into the Impact of an Ageing Workforce on the Food and Drink Manufacturing Industry, Improve, 2006
[23] News Release Improve 21 November 2007 (quote from Operations Manager, Kelvin Thomson)
[24] Presentation by Dr Daan Kiezebrink, EFD Partnership, to the Food Advisory Board at Glasgow Metropolitan College, 5 May 2009

The HNC in Food Science and Technology offers an entry route into technical posts in the food and drink industry and, as such, is a response to these current and future shortages of food scientists and technologists in the food and drink manufacturing industry.

2.4 Employer consultation

Whilst the above research suggests that there will be significant employment opportunities for people who have qualifications in food science and technology, it does not necessarily demonstrate that the HNC in Food Science and Technology is a suitable award. It does not show that the award will actually meet the needs of employers in the food and drink industry and enable candidates to develop the skills, knowledge and understanding which they will need to take advantage of these opportunities. For this reason, with the assistance of Improve, specific research on the award was carried out on behalf of the QDT.

Consultation was undertaken during October 2008. A summary of responses is issued as a separate document (see Appendix 1). Representatives from 33 food businesses with operations in Scotland replied. This is a respectable return for a survey of this nature and respondents included many of the major employers in the industry. All those who replied said that they would be prepared to consider a holder of the HNC in Food Science and Technology for employment. Question 2.1b of the consultation asked respondents to indicate the types of posts which holders of an HNC might take up in their organisations. Examples included food technologist, process technologist, quality assurance and technical. The survey, therefore, provides evidence that the award will meet the requirements of employers for the type of technical jobs for which there is a shortage. The survey also gives an indication of the types of jobs which will be open to successful candidates. In addition, the consultation provided support for the proposed structure of the HNC in Food Science and Technology — and this is explored later in this document.

This formal consultation for the development of HNC in Food Science and Technology has also been supplemented by anecdotal and other evidence, much of it drawn from the experience of members of the QDT, their contacts and their networks within the food and drink industry in Scotland. By its very nature this is difficult to record and quantify, but the main message is that it would be to the detriment of the food and drinks industry in Scotland if no replacement was available for the previous HNC Food Technology.

One example of this less formal consultation is meetings of the Food Industry Advisory Board of Glasgow Metropolitan College. A meeting of this Board (5 May 2009) discussed, and were very supportive, of the proposals for the HNC in Food Science and Technology.

In addition, the HNC in Food Science and Technology can also provide the first step towards professional work within the food and drink industry, such as that undertaken by the Royal Environment Health Institute of Scotland (REHIS).

2.5   Other related provision

It has been shown that there is a demand for food scientists and technologists from the food and drink industry and that there is evidence that employers believe that the proposed HNC will meet this demand. There is, therefore, a justification for the new award.

However, the case for any new award does not depend solely on demand factors. It is also affected by supply side considerations. It is important, therefore, to consider other provision in this area.

It has already been explained that this award will replace the locally devised HNC Food Technology G1EH 15, which was offered by Glasgow Metropolitan College and, in recent years, it was the only award of its type available in Scotland. G1EH 15 also formed the first year of the HND Food Technology G1SX 16 — also the only award of its type available in Scotland in the recent past. However, further back in time, Scottish Agricultural College (SAC) offered equivalent awards. SAC revalidated its HNC/HND Food Technology in 1996 and again in May 2003 when the course title was changed to HNC/HND in Food Science and Technology. SAC then made the decision not to revalidate for October 2007 using the new HN Design Principles.

The HNC in Food Science and Technology G9DD 15 is therefore the only national award in this occupational area in Scotland. There are no equivalent locally devised awards.

Also, in the past, there have been related awards at HNC level including HNC Baking Technology, HNC Craft Bakery Production and HNC Supervisory Management for the Food Industry. In addition, there was an HND in Baking Technology and Bakery Process Management. However, all of these awards have now been discontinued.

Degree courses linked to the food and drink industry are offered by three Higher Education Institutions in Scotland. The provision is summarised below:

HE institution	Courses relevant to the Food and Drink industry
Glasgow Caledonian University	BSc/BSc Hons Food Bioscience
Scottish Agricultural College	BSc/BSc Hons Applied Bioscience (Food Science)
University of Abertay	BSc/BSc Hons Food and Consumer Science BSc/BSc Hons Food Nutrition and Health BSc/BSc Hons Food Product Design DipHE Food and Consumer Studies (NB - the three degree courses have a common programme in years 1 and 2 which is equivalent to the DipHE)
Heriot Watt University	BSc Food Science and Management

The emphasis of these courses varies and, as a result, so does the content. There is limited emphasis in the first two years of all these programmes on food processing and food production technology.

At HNC level, therefore, there are no courses which are the direct equivalent of the HNC in Food Science and Technology — although there are other courses which aim to prepare candidates for entry into the food and drinks industry. This indicates that the demand from the food and drink industry for suitably qualified personnel was not fully met by the supply of courses. This reinforced the case for the HNC in Food Science and Technology.

The lack of suitable courses is a matter of concern to the food and drinks industry. A conference sponsored by Improve in September 2008 noted 'the fragility of supply provision of quality food scientists and technologists' and that the industry is 'becoming more dependent on recruiting food scientists and technologists from overseas because we cannot train or attract enough from within our own educational institutions'. [25] The formation of the Education Food and Drink Partnership illustrates that this concern is shared by educational providers.

2.6   Current and recent provision in Food Technology and HN level

The table below, taken from official SQA statistics, gives details of number of awards in HNC and HND Food Technology over recent years. The data before 2005/6 covers two locally devised HN awards in Food Technology; one offered at Glasgow Metropolitan College and the other by Scottish Agricultural College (SAC). SAC discontinued its award which did not operate after 2005/6.

Year Award	2000/1	2001/2	2002/3	2003/4	2004/5	2005/6	2006/7	2007/8	2008/9
HNC Food Tech	2	0	7	4	5	5	2	3	2
HND Food Tech	15	5	15	20	29	12	23	3	13

This table emphasises that most candidates progress from the HNC to the HND and that, for most candidates, an HND is the intended exit point.

Further information has been gathered on 11 candidates who completed the HND Food Technology at Glasgow Metropolitan College in 2008 and the post-HND destinations of these are shown below:

Destination	No. of candidates
Employment in the food and drink industry	4
Further study in a course directly related to the food and drink industry	3
Further study in a course linked to manufacturing (Quality Assurance)	1
Non food and drink industry employment	2
Employment but in an unknown capacity	1

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[25] The Future of Food Science and Technology: A Summary, Improve 2008, page 8

This supports the view that the current provision does fit candidates for employment in the food and drink industry. It also suggests that successful HND candidates who choose to progress to further study remain committed to employment in the food and drink industry. Although the numbers are small, the table reinforces the importance of providing a course at HN level which meets the needs of the food and drink industry.

The next table, also based on HND candidates from Glasgow Metropolitan College, gives some further destination information. It covers candidates who completed an HND in Food Technology during 2006 and 2007 and illustrates the type of employment open to candidates. In addition, it also supports the view that the previous award was able to supply trained personnel to the food and drink industry and that there is a strong background on which the HNC in Food Science and Technology can build.

Position	Industry sector
Technical	Distillation; shellfish processing; Sausage casing; plant bakery
Technologist	Poultry processing; sandwich production; frozen foods
Product Development	Fish smokers
Laboratory Analyst	Dairy; meat processing
Laboratory Manager	Microbiology company
Food Safety Officer	Local authority
Trainee Environmental Health Officer	(via University)
Health and Safety Officer	HSE
Home Economics Teacher	Education (via university)

2.7   Nature and purpose of the Award

It is apparent from the foregoing that the HNC in Food Science and Technology is intended to prepare candidates for employment in technical positions in the food and drink industry. The industry is currently experiencing a shortage of food scientists and technologists and this shortage is expected to continue. The HNC in Food Science and Technology is intended to help to close this gap.

The award replaces an existing award which is no longer offered. There are few other post-school courses in Scotland aimed at the food and drink industry and the proposed new award will prevent a further decline in the number of food and drink industry courses available in Scotland. There are no HNC awards directly equivalent to the new proposal currently offered by institutions based in Scotland.

As well as meeting the needs of employers, the HNC in Food Science and Technology must be attractive to potential candidates and provide a valid and engaging learning experience for those who elect to come on the course. The food and drink industry itself recognises that it 'does not have a very high profile among young people'[26] and the HNC in Food Science and Technology has been developed with this in mind and to try to address this problem.

The award is an HNC at SCQF level 7. It is anticipated that the Units in this award will become part of the first year of an HND in Food Science and Technology.

2.8 Title of the Award

This has been the subject of considerable debate in the QDT and elsewhere - for example, at the Food Manufacture Advisory Board for Glasgow Metropolitan College. There was agreement on the criteria for the title, ie it must:

♦ accurately describe the award
♦ convey an image which is attractive to potential candidates

However, it has not been easy to come to a consensus on a title which would satisfy both these criteria.

During the initial phase of development the working title 'HNC in Food Manufacture' was used. This approach was confirmed at a meeting of the Food Manufacture Advisory Board for Glasgow Metropolitan College held on 16 September 2008. This title was the subject of a question in the employer consultation and did find favour with respondents — with almost 80% feeling that the title reflected the requirements/job roles of the food manufacturing industry (although there were a number of comments about its suitability). One difficulty with this finding is that respondents are, by definition, already participants in the food and drink industry. The QDT were concerned that their views might not coincide with those of potential candidates who are not yet involved with the food and drink industry. In particular, the reference to 'manufacture' could be off-putting as courses relating to manufacturing industry are recognised as having difficulties in recruiting sufficient candidates of a suitable calibre. It is also widely believed that one way of overcoming this problem is to devise a title which is appealing to potential candidates. Several members of the QDT, in fact, had experience of courses where a change in title had led to improved candidate recruitment.

This doubt about the title 'HNC Food Manufacture' among QDT members mirrors the concerns of Improve and others about the image of the food and drinks industry (and of manufacturing industry as a whole) among potential applicants to further and higher education. We have already illustrated the need to ensure that there are sufficient suitable courses related to the food and drink industry which are attractive to potential entrants.

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[26] News Release Improve 21 November 2007 op cit (quote from Operations Manager, Kelvin Thomson)

The QDT therefore decided to canvass opinions among current candidates at Glasgow Metropolitan College to try to gain as wide a perspective opinion as possible. Whilst there was no consensus, the most popular option was 'HNC in Food Science and Technology'. The QDT decided to opt for this title for three main reasons:

♦   it reflects the content of the award as a whole
♦   the word 'technology' reflects the practical processing which is the key to the award (and does not have the adverse connotations associated with the term 'manufacture')
♦   the inclusion of 'science' in titles of other awards has led to improved uptake in HE courses recently.

The title also has the benefit of using a term which is well recognised within the food and drink industry. The reports already cited in this document refer regularly to 'food scientists and technologists' and the demand and supply of those who can fill these roles. In addition, the information on candidate employment given earlier shows that the title HNC in Food Science and Technology is also consistent with the types of employment roles in the food and drink industry which are likely to be open to those who successfully complete the HNC award. In addition, the Food Industry Advisory Board for Glasgow Metropolitan College at a meeting on 5 May 2009 expressed support for the title HNC in Food Science and Technology.

3   Aims of the Group Award

3.1   General aims of the Group Award

The general aims of the HNC in Food Science and Technology are to:

1   provide a programme of study which will enable candidates to progress to courses at SCQF level 8 such as HND in Food Science and Technology and to professional qualifications relevant to the food and drink industry
2   enable candidates to develop study and research skills which will help them to become independent learners
3   enable candidates to develop practical scientific and technological skills to industry standards
4   develop transferable skills to the standards expected by employers which candidates will need to function effectively in the dynamic contemporary labour market
5   enable candidates to contribute to the demand for trained personnel by employers

3.2   Specific aims of the Group Award

The specific aims of the HNC in Food Science and Technology are to:

1   prepare candidates for employment in a technical or scientific capacity in the food and drink industry
2   develop a broad overview and understanding of the way the food and drink industry operates, the processes it uses and the products that it makes
3   develop practical laboratory skills required in the modern food and drink industry

4   develop practical skills in the technology of food processing
     provide the underpinning scientific knowledge and understanding required to
     function effectively in the modern food and drink industry
5   provide knowledge and understanding of food processing techniques and their
     use in the modern food and drink industry
6   enable candidates to develop a knowledge and understanding of the principles
     of food safety sufficient to gain the REHIS Intermediate Food Hygiene
     Certificate
7   give candidates, through optional Units, the chance to develop other relevant
     skills, knowledge and understanding

3.3   Target groups

The target client group are people who wish to enter the food and drinks industry in
a technical capacity. It is expected that this group will predominantly consist of
young people who have recently left school either immediately prior to entering the
course or after having completed a programme of suitable Units at National
Certificate level.

The award would also be suitable for mature candidates wishing to return to further
education.

It is expected that the target group will have an interest in working in a
scientific/technical capacity and will probably have studied science or related
subjects at school or elsewhere prior to beginning this award.

However, it is recognised that there may be candidates who are interested in
working in the food and drink industry but who have a limited formal background in
science and technology. This could, for example, be the result of an individual
changing her/his career aspirations so that choices made earlier about school
subjects are no longer entirely appropriate for the new direction the individual
wishes to take. Bearing in mind the importance of attracting candidates to courses
related to the food and drink industry, the new award has been designed to allow
those in this category to form part of the target group for the course.

3.4   Employment opportunities

The first general aim of the HNC in Food Science and Technology is to provide a
programme of study which will enable candidates to progress to courses at SCQF
level 8 such as HND in Food Science and Technology and to professional
qualifications relevant to the food and drink industry. However, one of the key
specific aims of the award is to prepare candidates for employment in a technical or
scientific capacity in the food and drink industry.

As outlined earlier, there is a shortage of suitable people to meet the requirements of
food businesses. There is a shortage of technical (food scientists and technologists,
engineers, electricians) and skilled workers (bakers, butchers, fishmongers, cheese
makers) and employers report clear skills issues at management and supervisory
levels — especially in operational people management and softer skills such as
leadership, motivation and confidence building. These problems are evident across
the whole UK food and drink manufacturing industry, with up to one in four food
science and technology roles vacant. The current shortage of technical personnel is
likely to be exacerbated in the future, with estimates suggesting that replacement
demands will mean that the industry will need to recruit about 118,000 workers in
the period to 2014.

Candidates who wish to take up employment on successfully completing the HNC in Food Science and Technology could secure positions in quality assurance or food laboratory technician at a junior level in a food manufacturing company. Also as a technician in the food industry supporting product development, production operations, plant hygiene, raw materials and packaging supply chain

4 Access to Group Award

4.1 Recommended access

Applicants for the HNC in Food Science and Technology should have one of the following:

♦ One pass at an appropriate Higher Grade preferably Chemistry or Biology plus three Standard Grades in relevant subjects at band 3 or above
♦ One pass at appropriate Higher Grade preferably Chemistry or Biology plus passes in three NQ Course Units in relevant subjects at SCQF level 5 or above
♦ An appropriate group of National Certificate Units at SCQF level 5/6 such as the NQ Food Science and Technology
♦ Other equivalent qualifications or experience

These entry requirements deliberately leave considerable discretion to the centre. The final category, for example, allows applicants to be considered on an individual basis which can take into account particular circumstances, qualifications, experience and interests. This will allow consideration of candidates who have an interest in a career in the food and drink industry and who have demonstrated a capacity and willingness to undertake an award at SCQF level 7.

4.2 Core Skills entry profile

Candidates should have achieved the equivalent of the following Core Skills:

♦ *Communication* at SCQF level 5
♦ *Numeracy* at SCQF level 4
♦ *Information and Communication Technology* (ICT) at SCQF level 4
♦ *Problem Solving* at SCQF level 4
♦ *Working with Others* at SCQF level 4.

Candidates who do not have English as their first language should be able to demonstrate a facility with English equivalent to that of SQA Units at SCQF level 5 such as *F1J0 40 ESOL: Developing Basic Listening and Speaking Skills* or *F1J1 40 ESOL: Developing Basic Reading and Writing Skills*.

5 Group Award structure

5.1 Framework

5.1.1 The structure of the HNC in Food Science and Technology is as follows:

Unit title	Unit code	SQA credit value	SCQF level
Mandatory Units			
Food Industry Principles: An Introduction	F6VF 34	1	7
Food Industry Practices: An Introduction	F6VE 34	1	7
Food Manufacturing: Processing Practices at Ambient Temperatures	F6VG 34	1	7
Food Manufacturing: Processing Practices at Sub-Ambient Temperatures	F6VJ 34	1	7
Food Manufacturing: Processing Practices at Elevated Temperatures	F6VH 34	1	7
Microbiology of Foods 1	F6VL 34	1	7
Food Composition	F6VD 34	1	7
Food Hygiene Intermediate	F4TL 34	1	7
Graded Unit 1	F7EW 34	1	7
Total Mandatory Units		**9**	
Optional Units			
Science for the Food Industry: An Introduction	F6VB 33	1	6
Food Analysis	F6VC 34	1	7
Microbiology of Foods 2	F6VM 34	1	7
Legislation and the Food Industry	F6VK 34	1	7
Fundamentals of Quality	DV9T 34	1	7
Business Management: an Introduction	J1BV 34*	1	7
Using Software Applications Packages	D85F 34	1	7
Total Optional Units		**3**	
Total Credits for HNC		**12**	

The HNC in Food Science and Technology is awarded to candidates who achieve the nine mandatory Units (72 SCQF credit points) and who achieve any three Units from the list of optional Units (24 SCQF credit points).

Successful candidates gain a total of 96 SCQF credit points from the HNC in Food Science and Technology. All 72 SCQF points from the mandatory Units will be at SCQF level 7. The remaining 24 SCQF points from the optional Units will be at SCQF level 7 or will be a combination of SCQF level 6 and SCQF level 7, depending on the options selected.

The remainder of this section now covers a number of factors related to the structure of the award, including employer consultation and the structure; balance between mandatory and optional Units; choice of mandatory Units; choice of optional Units; aims and the structure; relationship between the structure and the title; the Graded Unit; Core Skills; and national occupational standards.

5.1.2 Employer consultation and the structure

The structure takes account of the feedback from the employer consultation. (As explained earlier, a summary of the consultation response is issued as a separate document). One of the questions asked respondents to rate the value of different subject areas to people taking up a post within their organisation. The areas most highly rated as essential were:

♦ Food Hygiene [rated as essential by 92% of respondents]
♦ General Understanding of the Food Manufacturing Industry [73%]
♦ Food Manufacturing at all Temperatures [53%]
♦ Microbiology Principles and Practice [44%]
♦ Food Composition and Analysis [37%]
♦ Practical Pilot Plant Manufacturing [37%]
♦ Understanding Basic Scientific Principles [33%]

It is worth noting that for all topic areas, more than 85% of respondents rated them as 'essential' or 'beneficial'. This rating was over 90% for all except the final two topics in the list above. The mandatory and optional Units in the HNC in Food Science and Technology reflect directly the importance attached to them by respondents in the consultation shown in the following table. The Graded Unit integrates the course as a whole and it, too, reflects the balance of support indicated above. The table shows that the majority of the mandatory Units in the HNC in Food Science and Technology (ie seven of the nine Units, including the Graded Unit) are directly linked to topics which over half the employers in the consultation rated as essential to people in their organisations. It shows also that the mandatory section covers each of the five most valued topics from the consultation.

Consultation subject	Relevant mandatory Units	Relevant optional Units
Food Hygiene	F4TL 34: Food Hygiene Intermediate	
General Understanding of the Food Manufacturing Industry	F6VF 34: Food Industry Principles: An Introduction F6VE 34: Food Industry Practices: An Introduction	F6VK 34: Legislation and the Food Industry F1RJ 34:Business Management: An Introduction DV9T 34: Fundamentals of Quality D85F 34: Using Software Applications Package
Food Manufacturing at all Temperatures	F6VG 34: Food Manufacturing: Processing Practices at Ambient Temperatures F6VJ 34: Food Manufacturing: Processing Practices at Sub-Ambient Temperatures F6VH 34: Food Manufacturing: Processing Practices at Elevated Temperatures	
Microbiology Principles and Practice	F6VM 34: Microbiology of Foods 1	F6VM 34: Microbiology of Foods 2
Food Composition and Analysis	F6VD 34: Food Composition	F6VC 34: Food Analysis
Understanding Basic Scientific Principles		F6VB 33: Science for the Food Industry: An Introduction

Practical work which includes the use of pilot plant equipment, as well as laboratory work, has been incorporated into many of the Units in the HNC. This is to emphasise the close link between knowledge and understanding and the development of practical skills relevant to the food and drink industry.

The consultation also provided support for the view among QDT members — they were firmly of the view, based on substantial experience of the food and drink industry, that processing should be at the heart of the HNC in Food Science and Technology. And furthermore, the structure is consistent with views expressed by the Food Industry Advisory Board at Glasgow Metropolitan College, eg:

♦ It agreed that an introductory Unit covering the role of the food and drink industry would be essential. The two Units *Food Industry Principles: An Introduction* and *Food Industry Practices: An Introduction* are designed to provide this essential background for candidates — and these Units have been developed in such a way that they can be delivered at an early stage of the award.
♦ It discussed and supported the proposed structure, giving further confirmation that the HNC in Food Science and Technology meets the requirements of the food and drink industry in Scotland.

5.1.3 Balance between mandatory and optional Units

The employer consultation discussed earlier was a significant influence on the way in which the HNC in Food Science and Technology has been structured, particularly the decision on whether a topic should be included and whether it should form part of the mandatory or the optional Units in the award.

Other factors were taken into account when determining the way in which the award was structured between mandatory and optional Units. Firstly, it was felt that the candidates should have some discretion to select Units which would match their particular preferences particularly in terms of anticipated career development. Also, a mandatory and options structure gives some flexibility to the award. It is relatively straightforward, for example, to incorporate additional optional Units into this award to meet changing/future industry needs.

It was also felt that any choice of optional Units had to be meaningful in terms of the amount of choice that candidates could have. This requirement had to be balanced against the need to make sure that the mandatory Units cover the essential knowledge, skills and understanding which candidates taking the HNC in Food Science and Technology will require.

Furthermore, these factors had to be weighed against the wishes expressed in the employer consultation and the aims of the award. The aims of the award emphasise the technology of food and drink processing which reinforces the conclusions of the employer consultation. Between them, they point to mandatory Units on the general background of the food and drink industry, food hygiene, different methods of food processing and underpinning scientific knowledge and understanding of microbiology and of food chemistry. Including the mandatory Graded Unit, these topics could be covered by nine Units. This would leave three optional Units which would allow for sufficient flexibility and choice.

5.1.4 Choice of mandatory Units

In deciding which Units would be appropriate to meet the topic areas selected for the mandatory section of this award, the QDT had to bear in mind that this is a specialised award and there are no equivalent awards currently available at HNC level. In addition, Units from previous awards were written in a Unit format no longer valid. In this situation, the only feasible way forward for most mandatory Units was to develop new Unit specifications. The one exception is *F4TL 34: Food Hygiene Intermediate*. This Unit is particularly suitable for inclusion in the HNC. The aim of the Unit is to develop knowledge and understanding of food safety which means that it would meet key aims of the HNC and match the findings of the employer consultation. In addition, this Unit is equivalent to the REHIS Intermediate Food Hygiene Certificate. It thus adds value to the HNC in Food Science and Technology as successful candidates will gain professional recognition in an area of critical importance to the food and drink industry. Furthermore, it may open up employment opportunities for candidates who may wish to pursue a career in food hygiene and inspection. It is clear from the information given earlier that this is a career path which appeals to some candidates.

5.1.5 Choice of optional Units

The QDT had also to consider which Units to include in the available options. A number of different criteria were used:

a   the HNC in Food Science and Technology is expected to be part of the first year of an HND in Food Science and Technology
b   there is a need to ensure that candidates who may lack suitable background, especially in scientific subjects, are able to cope with the demands of the HNC
c   there should be opportunities for candidates to develop general transferable skills, knowledge and understanding which will be of value to them as candidates and as future employees
d   there should be opportunities for candidates to further develop the skills, knowledge and understanding gained in the mandatory Units
e   there should be opportunities for candidates, particularly those who wish to exit at HNC level, to develop skills, knowledge and understanding which would help them enhance their attractiveness to potential employers

These various criteria overlap and several of the optional Units meet more than one of them as the following table shows.

Unit code	Optional Unit	Criterion for optional Units				
		a	b	c	d	e
F6VB 33	Science for the Food Industry: An Introduction		✓			
F6VC 34	Food Analysis	✓			✓	✓
F6VM 34	Microbiology of Foods 2	✓			✓	✓
F6VK 34	Legislation and the Food Industry	✓			✓	✓
DV9T 34	Fundamentals of Quality	✓		✓		✓
J1BV 34	Business Management: an Introduction	✓		✓		✓
D85F34	Using Software Applications Packages			✓		✓

The application of each criterion is now illustrated:

Criterion a: For many candidates, the HNC in Food Science and Technology represents the first year of a two year programme which will culminate in an HND award. Although circumstances have led to the separation of the development of the HNC and the HND, it was important to ensure that the HNC structure would provide the basis for a first year study programme leading to an HND. One consequence of this is that Units which may be optional in an HNC award may be mandatory in an HND award. This applies in particular to the development of scientific knowledge and understanding and associated practical laboratory skills. For this reason, the optional Units, *Microbiology of Foods 2* and *Food Analysis* are included. The former follows on from *Microbiology of Foods 1* while the latter develops *Food Composition*. It is expected that the HND in Food Science and Technology will include Units which allow candidates to further extend their work in Food Composition and Food Analysis. In both these cases, new Unit specifications have been developed for the same reasons as the development of the new mandatory Units in underpinning scientific skills, knowledge and understanding.

Criterion b: There was a concern that some candidates may come to the HNC with an interest in pursuing a career in the food and drink industry but lacking sufficient background in scientific subjects, particularly Biology and Chemistry. This may prejudice their ability to successfully complete some of the mandatory Units — in particular *Microbiology of Foods 1* and *Food Composition*. To solve this difficulty, a solution was adopted which is used in other SQA science and technology based awards at HN level (such as the HNC Applied Sciences). Introductory Units at SCQF level 6 are included in the HNC framework as optional Units, eg the framework for the HNC Applied Sciences includes a Unit at SCQF level 6, *DX29 33: Fundamental Chemistry: An Introduction*. Candidates who enter the award without a suitable grounding in science or technology are able to take introductory Units like this in order to gain the skills, knowledge and understanding needed for entry into mandatory science or technology based Units. These introductory Units are pitched at SCQF level 6 and it is expected that candidates who already have suitable achievements in the subjects concerned will not take these options. However, this solution has the merit of enabling candidates who will benefit from Units like this to get credit for the work they do. It has also additional benefits, eg it widens access to the course which is important for awards targeted at the food and drink industry; it reduces the possibility that candidates will be discouraged by having to undertake additional preparation for some Units, etc. The specialist nature of the HNC in Food Science and Technology meant that again it was necessary to develop a Unit specifically designed to provide fundamental scientific skills, knowledge and understanding for the food and drink industry.

Criterion c: Candidates have the chance to develop transferable skills which may help them gain employment and also help them during their study for the HNC. Skills in Information and Communication Technology (ICT) are a particularly good example of this. *D85F 34: Using Software Applications Packages* is a well established Unit used in a number of HN awards. It is practically oriented and enables candidates to develop ICT skills in using software, eg spreadsheets and presentation software.

Criterion d: Optional Units can enable candidates to further develop skills, knowledge and understanding from mandatory Units. The optional Units, *Microbiology of Foods 2* and *Food Analysis* meet this purpose whilst the Unit *Food Legislation and the Food Industry* links with *F4TL: 34 Food Hygiene Intermediate*. Once again, the specialist nature of the food and drink industry means that a new Unit specification has been developed for *Food Legislation and the Food Industry*.

Criterion e: Optional Units in this HNC award also offer the opportunity to develop further skills which may enhance their prospects for employment. It is felt that this criterion could be met by using existing SQA Units but, since candidates only require three optional Units, it was thought that a limited number of Units like this would be appropriate. *F1RJ 34: Business Management: An Introduction* and *DV9T 34: Fundamentals of Quality* are Units which are designed to convey key underpinning concepts and both are at SCQF level 7. Both these Units also help candidates build on mandatory Units such as *Food Industry Principles: An Introduction* and *Food Industry Practices: An Introduction*

5.1.6   Aims and the structure

Another key factor which affects the structure is that the Units comprising the award enable candidates to meet the aims of the award. The tables at Section 5.2 show how the general and specific aims of the HNC in Food Science and Technology match to the Units which make up the award. These tables confirm that all the aims of the award will be met by the mandatory Units. The optional Units provide further means by which some aims can be met. This depends, of course, on which options a candidate attempts.

5.1.7   Relationship between the structure and the title

The structure of the HNC in Food Science and Technology must be consistent with the title of the award. The difficulties of choosing a suitable title have been outlined earlier. The mandatory Units in the structure do directly cover Food Science (eg *Microbiology of Foods 1* and *Food Composition*) and Technology (the three food manufacturing Units) while other mandatory Units (*Food Industry Principles: An Introduction*, *Food Industry Practices: An Introduction* and the Graded Unit) include both food science and food technology topics. In this way the title does match the structure of the HNC. The title is also compatible with the findings of the employer consultation in that the three topics rated as most valuable can all be grouped under the heading of 'food science and technology'.

5.1.8   Graded Unit

The Graded Unit for the HNC in Food Science and Technology is a practical assignment which seeks to '*provide candidates with an opportunity to undertake a project to demonstrate that they possess scientific and technological skills relevant to the contemporary food and drink industry*'.

It is designed to prepare candidates for posts in the food and drink industry and the QDT were unanimous that a Graded Unit based on practical assignment was the best way to consolidate and integrate the various Units which make up the award. The practical assignment in the Graded Unit has been designed to enable candidates to 'carry out some practical work and to apply some scientific principles'. The practical work can include food processing activities so that the Graded Unit also covers both food science and technology.

The Graded Unit focuses primarily on the mandatory Units in the HNC and this ensures that it does not prejudice the status of optional Units. It is a mandatory Unit and including optional Units would effectively make them mandatory.

However, the Graded Unit is designed to enable candidates to choose a practical assignment. This again is deliberate as it enables candidates to choose a topic which is consistent with their interests and aspirations. Candidates who wish to exit into employment can choose a project linked to their preferred employment role for example while those hoping to progress to the HND should, if they wish, be able to select a practical assignment which will lay the foundation for their work in the following year. The Graded Unit thus adds variety and flexibility to the HNC in Food Science and Technology. Candidates undertake the HNC Graded Unit towards the end of the award, thus ensuring that they have the maximum opportunity to integrate the Units in the award.

The Graded Unit also helps to develop the skills candidates will need in industry. They are obliged to draw conclusions from their practical assignment and, depending on their choice of project, may be able to recommendations.

5.1.9 National Occupational Standards (NOS)

National Occupational Standards (NOS) for the food and drink industry were considered when developing the structure of the award. There is a range of SVQ and NVQ awards based on these standards. These awards are designed for those working in the food and drink industry and many are linked directly to the skills development and training needs of sub-sectors in the industry. They are not, therefore, directly comparable to the aims of the HNC in Food Science and Technology.

However, Improve, the Sector Skills Council (SSC) for the food and drink industry, has developed a suite of Units based on the national occupational standards. This is part of the work associated with the introduction of Vocationally Linked Qualifications (VLQs) in England and Wales. These Units are at three different levels, with level 3 closely matching HNC. These Units have a more general focus than the specialised S/NVQ Units and are intended to be used in courses preparing people for entry into the food and drink industry.

In many respects these Units represent a parallel development to the HNC in Food Science and Technology. Because they are linked to the NOS, it is possible to use them to show how the Units in the HNC relate to the national standards. Details contained in Appendix 2 show the relationship between the HNC Units and relevant Improve Units, most of which are at level 3. This shows that there is a link between the HN Units and the Improve Units — therefore a link between the HNC and the NOS.

5.2 Mapping information

5.2.1 HNC in Food Science and Technology: mapping of general aims to Units

The following table confirms that all Units in the HNC in Food Science and Technology align to all the general aims of the award.

Unit code	Unit title	Aim 1	Aim 2	Aim 3	Aim 4	Aim 5
	Mandatory Units					
F6VF 34	Food Industry Principles: An Introduction	✓	✓	✓	✓	✓
F6VE 34	Food Industry Practices: An Introduction	✓	✓	✓	✓	✓
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures	✓	✓	✓	✓	✓
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures	✓	✓	✓	✓	✓
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures	✓	✓	✓	✓	✓
F6VL 34	Microbiology of Foods 1	✓	✓	✓	✓	✓
F6VD 34	Food Composition	✓	✓		✓	✓
F4TL 34	Food Hygiene Intermediate	✓	✓			✓
F7EW 34	Graded Unit 1	✓	✓	✓	✓	✓
	Optional Units					
F6VB 33	Science for the Food Industry: An Introduction	✓	✓	✓	✓	✓
F6VC 34	Food Analysis	✓	✓	✓	✓	✓
F6VM 34	Microbiology of Foods 2	✓	✓	✓	✓	✓
F6VK 34	Legislation and the Food Industry	✓	✓		✓	✓
DV9T 34	Fundamentals of Quality	✓	✓	✓	✓	✓
FIRJ 34	Business Management: An Introduction	✓	✓		✓	✓
D85F 34	Using Software Applications Packages	✓	✓	✓	✓	✓

5.2.2 HNC in Food Science and Technology: mapping of specific aims to Units

The following table shows how the specific aims of the HNC in Food Science and Technology align to the Units in the award.
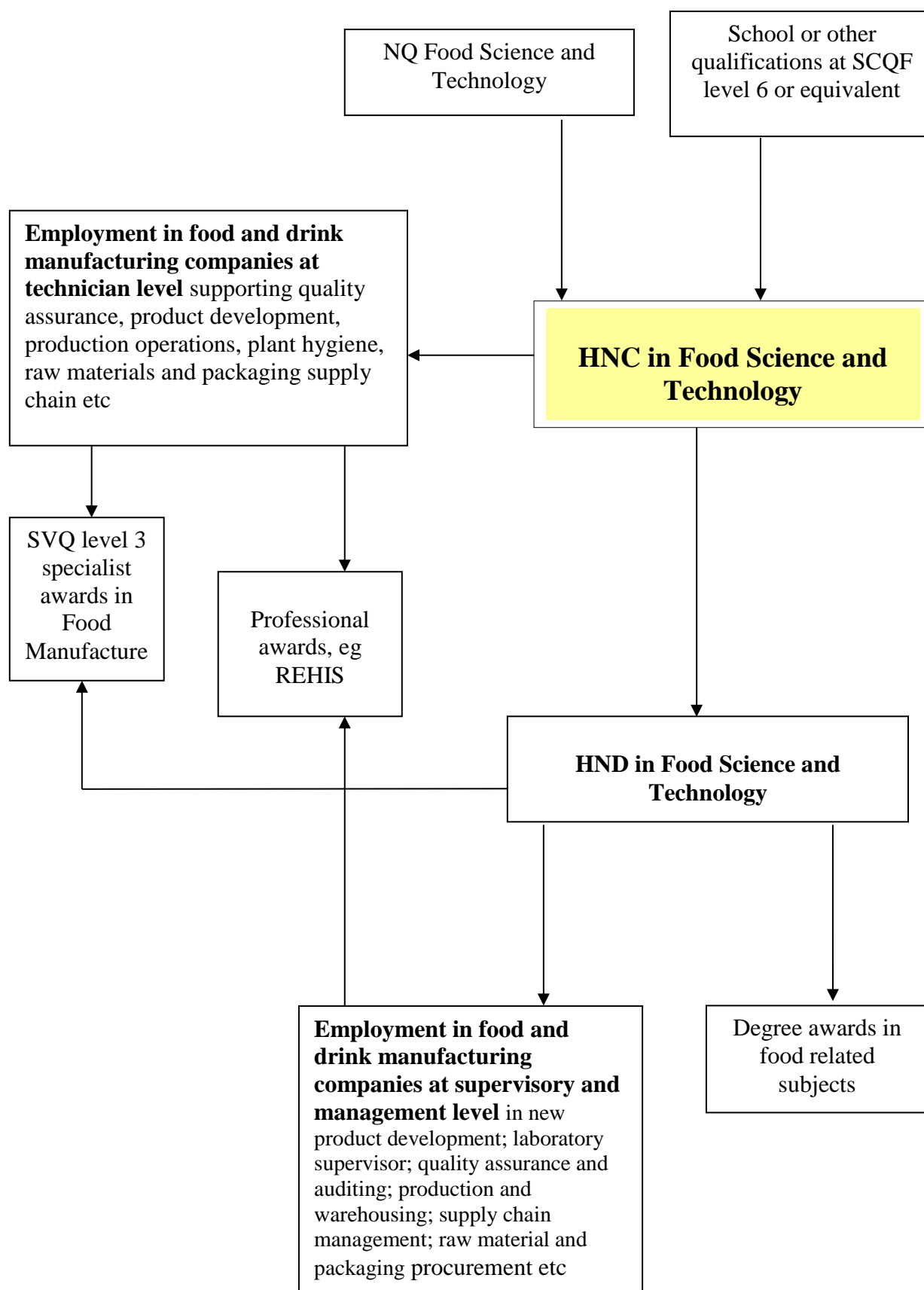
Unit code	Unit title	Aim 1	Aim 2	Aim 3	Aim 4	Aim 5	Aim 6	Aim 7	Aim 8
	Mandatory Units								
F6VF 34	Food Industry Principles: An Introduction	✓	✓			✓	✓		
F6VE 34	Food Industry Practices: An Introduction	✓	✓		✓		✓		
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures	✓			✓		✓		
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures	✓			✓		✓		
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures	✓			✓		✓		
F6VL 34	Microbiology of Foods 1	✓		✓		✓			
F6VD 34	Food Composition	✓				✓			
F4TL 34	Food Hygiene Intermediate	✓	✓					✓	
F7EW 34	Graded Unit 1	✓	✓		✓	✓	✓		
	Optional Units								
F6VB 33	Science for the Food Industry: An Introduction	✓		✓		✓			✓
F6VC 34	Food Analysis	✓		✓		✓			✓
F6VM 34	Microbiology of Foods 2	✓		✓		✓			✓
F6VK 33	Legislation and the Food Industry	✓				✓			✓
DV9T 34	Fundamentals of Quality	✓							✓
F1RJ 34	Business Management: An Introduction	✓							✓
D85F 34	Using Software Applications Packages	✓							✓

5.3 Articulation, professional recognition and credit transfer

The following diagram illustrates possible progression and articulation routes from the HNC in Food Science and Technology. It is important to bear in mind some points which have been made earlier.

♦ The HNC in Food Science and Technology is seen as the first part of a two stage process which will lead to the availability of an HNC and an HND in Food Science and Technology.
♦ For equivalent courses in the past, the anticipated exit point for most candidates is with an HND award.
♦ It has been shown also that the HNC in Food Science and Technology has an emphasis on food production which differentiates it from other courses preparing candidates for entry into technical and scientific posts in the food and drink industry. This situation is also likely to apply to the HND award.

Progression and articulation routes for HNC in Food Science and Technology

```
┌─────────────────────────┐         ┌─────────────────────────┐
│  NQ Food Science and    │         │  School or other        │
│  Technology             │         │  qualifications at SCQF │
│                         │         │  level 6 or equivalent  │
└───────────┬─────────────┘         └───────────┬─────────────┘
            │                                   │
            ▼                                   ▼
┌──────────────────────────────┐     ┌─────────────────────────────┐
│ Employment in food and drink │     │  HNC in Food Science and    │
│ manufacturing companies at   │◄────│  Technology                 │
│ technician level supporting  │     │                             │
│ quality assurance, product   │     └───────────┬─────────────────┘
│ development, production       │                 │
│ operations, plant hygiene,   │                 │
│ raw materials and packaging  │                 │
│ supply chain etc             │                 │
└───┬──────────────────┬───────┘                 │
    │                  │                         │
    ▼                  ▼                         ▼
┌──────────┐   ┌──────────────┐       ┌─────────────────────────┐
│ SVQ level│   │ Professional │       │ HND in Food Science and │
│ 3        │   │ awards, eg   │       │ Technology              │
│ specialist│  │ REHIS        │       └──────┬──────────┬───────┘
│ awards in│   └──────────────┘              │          │
│ Food     │                                 │          │
│ Manufacture│                               ▼          ▼
└──────────┘                         ┌──────────────┐ ┌──────────────┐
                                     │ Employment   │ │ Degree awards│
                                     │ in food and  │ │ in food      │
                                     │ drink ...    │ │ related      │
                                     └──────────────┘ │ subjects     │
                                                      └──────────────┘
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Employment in food and drink manufacturing companies at technician level supporting quality assurance, product development, production operations, plant hygiene, raw materials and packaging supply chain etc

SVQ level 3 specialist awards in Food Manufacture

Professional awards, eg REHIS

NQ Food Science and Technology

School or other qualifications at SCQF level 6 or equivalent

HNC in Food Science and Technology

HND in Food Science and Technology

Employment in food and drink manufacturing companies at supervisory and management level in new product development; laboratory supervisor; quality assurance and auditing; production and warehousing; supply chain management; raw material and packaging procurement etc

Degree awards in food related subjects

This diagram shows that the most likely progression for candidates completing the HNC in Food Science and Technology will be into the HND programme although some candidates may exit into employment. HND candidates are likely to move into employment in the food and drink industry or in related professional capacity.

The table based on HND candidates from Glasgow Metropolitan College who completed an HND (see Section 2.6) illustrates the type of employment openings which candidates can take up.

Candidates who do move into employment may take occupationally related qualifications such as Scottish Vocational Qualifications or ones leading to membership of professional bodies such as REHIS. There are a number of level 3 SVQ awards which seek to develop specialist skills in various aspects of Food Manufacture. They may be more suited to HNC candidates who wish to develop particular specialist skills relevant to the position they have taken up.

Candidates who wish to do so may also progress into a degree programme targeted at the food and drink industry. The information on the 2008 cohort at Glasgow Metropolitan College (given earlier) shows that progression into Higher Education is a possible route for candidates who have completed an HND. The HNC in Food Science and Technology is thus a stepping stone on this route.

6 Approaches to delivery and assessment

6.1 Approaches to delivery

The delivery of the HNC in Food Science and Technology should reflect the main purposes of the award. The award seeks to develop underpinning skills and knowledge which will prepare successful candidates for entry into the food and drink industry. As a result, and as discussed earlier, this award consists of a mixture of knowledge/understanding Units and practical Units. Where new Units have been developed, the aim is that, wherever possible, knowledge/understanding and related practical work are combined in the same Unit. This means that delivery of the Units can be practically oriented to enable candidates to develop key practical skills in laboratory work, for example, but can recognise the theoretical and conceptual ideas to which these skills relate.

Practical work also provides opportunities for candidates to work in groups. This is particularly likely in the mandatory food manufacturing Units. This has a number of benefits including the opportunity to gather evidence for the Core Skill of *Working with Others* and developing other 'soft skills' which employers value. Candidates who exit after completing this HNC will have a basis on which they can build in their subsequent employment — while those who progress to the HND will be able to further develop these skills during their second year.

The newly developed Units are also closely related to the requirements of the food and drink industry. Throughout, these Units require candidates to consider how the material in them applies to the food and drink industry. This too will affect the methods of delivery used in the Units. It will be possible for candidates to go and find information for themselves, eg on the structure of the food and drink industry. Whilst on other occasions, delivery methods may involve exposition of material to candidates, perhaps as a precursor to practical work

The emphasis on practical work in the delivery of the award has other benefits. It enables candidates to become aware of the vital importance of safe hygienic working practices; health and safety; cleaning and disinfection; and personal hygiene within the food and drink industry. In their practical work, both in food processing and in the laboratory, candidates will be expected to display good practice and this will lay the secure foundation which they will need to become successful members of the food and drink industry.

A range of delivery methods can therefore be used for the HNC in Food Science and Technology. This can help to encourage candidates to see the relevance of the material they are studying and help to keep them interested and engaged. The range of different methods offers a challenge to candidates and also helps them to think for themselves.

Furthermore, it is important that delivery enables candidates to progress throughout the course. The order in which the Units are delivered can play a vital role in this; hence the structure of the course has been designed to permit this to take place. The actual programme followed will depend on the situation at the delivering centre but the structure suggests that delivery could follow a broad general pattern as follows:

♦ The two general Units, ie *Food Industry Principles: An Introduction* and *Food Industry Practices: An Introduction*, have been designed to be delivered at the start of the award. This should ensure that candidates are aware of the food and drink industry and what it entails from the outset. These Units set the scene for the more specialist Units in food manufacturing.
♦ It is expected that candidates who wish to take the optional Unit *Science for the Food Industry: An Introduction* will have the opportunity to do so at the start of the award. This will allow the Units which provide essential underpinning scientific knowledge and understanding, ie *Microbiology of Foods 1* and *Food Composition*, to be delivered soon after the two general Units and before the specialist food manufacturing Units. This approach will allow optional Units in science subjects to be programmed towards the end of the course.
♦ The Graded Unit, as already indicated, will take place towards the end of the course, by which time candidates are likely to have completed all the other mandatory Units in the framework. Undertaking these other mandatory Units should also give candidates a number of ideas for suitable projects, although they will need advice and guidance from tutors on which project to choose.

Appendix 3 illustrates a possible delivery sequence for the HNC in Food Science and Technology. This Appendix also includes some explanation to indicate why this sequence is appropriate. It would, however, be possible to structure the delivery on the Units in other ways if desired.

The delivery sequence found at Appendix 3 is structured in a way which will permit candidates to move easily into the HND in Food Science and Technology — and it is intended that all the Units in the HNC in Food Science and Technology will also be in the framework for the HND in Food Science and Technology. As mentioned previously, some Units which are optional in the HNC may become mandatory in the HND, eg *Microbiology of Foods 2* and *Food Analysis*.

This sequence of delivery should also permit the development of Core Skills. There are, as Appendix 4 shows, a number of opportunities for candidates to gather evidence for Core Skills throughout the award. The Graded Unit is particularly important in this respect because of the number of opportunities that it offers for Core Skills. The Graded Unit can provide an opportunity for candidates to extend their Core Skills evidence gathering and to consolidate evidence that they have gathered from other Units.

The minimum requirement for an SQA HND award is 30 credits and HND candidates normally follow a programme of 15 SQA credits during the first year. The structure of the HNC in Food Science and Technology allows candidates to attempt a programme consisting of a mix of mandatory and optional Units to the value of 15 credits. At the end of year 1, candidates intending to progress to the HND in Food Science and Technology will, have been able to achieve the 12 credits for the HNC in Food Science and Technology plus three further credits drawn from the optional Units in the HNC framework.

The year 1 programme for the HNC in Food Science and Technology can be organised in a way that will enable candidates who wish to do so to progress to an HND. The relatively small number of optional Units in the HNC framework should help to make this transition as smooth as possible. There may be scope to review the Year 1 programme in subsequent sessions once the HND framework is agreed.

6.2 Approaches to assessment

The Units also permit a range of different assessment methods. The actual assessment instruments used are developed by the delivering centre, however Appendix 5 shows an Assessment Planner which summarises the methods recommended in the Unit specifications and confirms that a range of different assessment instruments are likely to be used. In line with the practical emphasis of many of the Units in the framework, the assessments are also predominantly practically based. Practical assessments make use of observation checklists to ensure that candidates do exhibit safe, clean and hygienic food practices. In the food manufacturing Units, for example, candidates are required to record and present the results of their practical work using tables and graphs (where appropriate) and to include all necessary calculations. Candidates are also expected to draw some conclusions from the practical work — in particular about its applicability to larger scale industrial situations. In this way, the assessment reinforces delivery by linking the course as closely as possible to the food and drink industry.

The Assessment Planner at Appendix 5 shows that the assessment for the mandatory Unit *F4TL34: Food Hygiene Intermediate* is an examination. This is to meet the requirements of REHIS and to enable candidates to gain the professional recognition of the REHIS Intermediate Food Hygiene Certificate.

It is also important to note that the assessment planner shows that assessment between different Units is connected, eg the pattern of assessment in the food manufacturing Units is common across all three Units and links closely to that for the introductory food industry Units — which will help to ensure that the assessment is manageable for candidates. The volume of assessment was considered carefully when developing the Units to ensure that assessments would not become a burden for candidates. This is a further advantage of practically-based assessment as it helps to ensure that assessment arises naturally out of the learning and teaching process.

6.3 Open Learning

In principle, it is possible for the HNC in Food Science and Technology to be delivered by Open Learning. However, the amount of practical work in many of the Units within the award means that it may not be straightforward to make suitable arrangements for open learning candidates. It would be necessary, for example, to ensure that candidates have the opportunity to undertake practical work. This could also be complex because of the importance of the stringent safety, health and hygiene requirements for the food and drink industry. It would be necessary also to make appropriate arrangements for assessment particularly since much of the practical work requires observation checklists.

Authentication is not an issue that relates solely to open or distance learning. However, the fewer the opportunities for assessors and candidates to meet face-to-face, then the greater the need to build in authentication strategies.

SQA approved centres are responsible for the authentication of their open, distance or mixed mode programmes through their quality assurance processes. Centres must be confident that:

- candidates entered for a qualification are who they say they are
- evidence submitted for assessment by candidates can be authenticated as their own work

SQA recommend that a mix of authentication tools be used to ensure the above, such as:

- Questioning — personal, telephone or online interview
- Written questioning
- ICT — online conferences, email discussions, password controlled systems, handwriting recognition, computer scanning of facial features, voice prints, finger prints, hand patterns and recognition of key board use
- Personal logs and personal statements
- Witness testimony
- Summative assessment under supervision
- Audio or video taped evidence
- Signing and counter-signing of candidates' work
- Assessment supervisors — authenticators, invigilators and mentors

6.3 Additional Support Needs

Where appropriate and necessary, delivery and assessment learning will be structured to allow for candidates with additional support needs. Any such arrangements will take into account the advice and guidance in the SQA website **www.sqa.org.uk/assessmentarrangements**

6.4   Transitional arrangements

The HNC in Food Science and Technology (G9DD 15) is a national award which replaces an existing locally-devised award which has been discontinued. It is not necessary, therefore, to make transition arrangements for candidates to move from the previous award to the proposed new award. However, there may be a need to make arrangements for credit transfer for candidates who have achieved some Units in the previous HNC Food Technology but have not completed the full award. Such arrangements would allow candidates to gain credit in the new HNC in Food Science and Technology for previous achievement.

The number of candidates to whom this might apply, as outlined earlier, is likely to be small. It is intended, therefore, that any arrangements for credit transfer will be made on a case by case basis. These arrangements will be formally confirmed with a relevant External Verifier before being implemented.

7   General information for centres

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

Internal and external verification

All instruments of assessment used within this/these Group Award(s) should be internally verified, using the appropriate policy within the centre and the guidelines set by SQA.

External verification will be carried out by SQA to ensure that internal assessment is within the national guidelines for these qualifications.

Further information on internal and external verification can be found in *SQA's Guide to Assessment and Quality Assurance for Colleges of Further Education* (**www.sqa.org.uk**).

8　General information for candidates

Welcome to the HNC in Food Science and Technology. This award is designed to give you the skills, knowledge and understanding you will need to gain employment in the food and drink industry.

Food and drink is the largest manufacturing sector in Scotland and in the UK as a whole. It is diverse and includes a wide range of different activities such as bakery, meat and fish processing, drinks and dairy produce. It is a dynamic industry which has to respond to consumer demands that can change on a daily basis. It also has to be able to meet the requirements of food retailers (such as supermarkets) to make quality products and deliver them within agreed time scales which may be very short. The food and drink industry also has a history of being ready to adapt to new technology to meet customer expectations.

In addition, food and drink is a significant industry in other ways too. It has a very high profile because health, diet and nutrition are all important in today's society and are directly linked to the consumption and production of food and drink. As someone working in the food and drink industry, you will have to take factors like these into account in your work. Safety is of paramount importance in the industry too. Food and drink products have to be produced in a hygienic environment to ensure that they are safe for consumers.

The food and drink industry is closely connected with farming as many of its materials come from farmers. It has a key role to play in environmental protection and sustainability. Food and drink is a global industry too. Commodities used by the industry come from all over the world and UK exports of food and drink products are worth about £10 billion a year.

Jobs in the food and drink industry are fast moving and offer a lot of variety. As someone working in the food industry, you will be involved in providing the kind of food products that people want — and to meeting changing consumer tastes and requirements. There are a wide range of employment opportunities for qualified people. The HNC in Food Science and Technology will enable you to work in any part of the industry that you choose. For example, you could work:

♦　as a food scientist and technologist in quality assurance
♦　in food testing and development laboratories

The award will also give you the background that you will need for a career in food hygiene or food inspection.

The HNC in Food Science and Technology has a number of specific aims. It will enable you to:

♦ develop a broad overview and understanding of the way the food industry operates, the processes it uses and the products that it makes
♦ develop practical laboratory skills required in the modern food industry
♦ develop practical skills in the technology of food processing
♦ gain the underpinning scientific knowledge and understanding you will need to function effectively in the modern food industry
♦ gain knowledge and understanding of food processing techniques and their use in the modern food industry
♦ develop a knowledge and understanding of the principles of food safety sufficient to gain the REHIS Intermediate Food Hygiene Certificate
♦ undertake three optional Units which will give you a chance to develop other relevant skills, knowledge and understanding

The HNC in Food Science and Technology will introduce you to the food industry and to the factors which influence it and what it does. This is often described by the phrase *'farm to fork'*. Farmers provide the materials which the food and drink industry uses to make food and drink products. These products are then supplied to retailers where consumers buy them.

Food can be processed in many different ways so this HNC includes a range of methods of food processing and technology. Science is also important in the food and drink industry. Food is made up of chemical compounds and is affected by biological factors such as micro-organisms. In order to fully understand food processing you will therefore study food science including food composition and microbiology. This will help you to understand what happens to food products when they are being made. The HNC, though, is predominantly a practical and applied course. Your work will include practical work in both food processing and in the laboratory.

The award is divided into a number of Units each of which covers a different aspect of food science or technology. Some of these Units are mandatory and these are ones which you must take. There is a range of other Units too, such as ICT and Business Management, which will give you the chance to develop other skills.

There are assessments associated with each Unit which will be fully explained to you. Many of these assessments are based in practical work and you will undertake them as part of your normal study activities. To succeed in a Unit you must complete the assessment for the Unit to the required standard. Each Unit in the HNC has a credit value of 1 and you have to achieve 12 credits in total to gain your HNC.

As part of this award, you will also do what is known as a Graded Unit. This will be a project which will help you bring together the different aspects of food science and technology that you have been studying throughout the award.

One of the Units in this award is *Food Hygiene Intermediate*. This Unit is the equivalent of the Intermediate Certificate of the Royal Environment Health Institute of Scotland (REHIS) and is the only Unit in the HNC which is assessed by a formal exam. Passing this Unit will give you recognition by an important professional body connected to the food industry. This means that the HNC in Food Science and Technology offers you the first step towards professional work within the food industry in food hygiene and inspection if this is something you wish to do in your career.

After you have completed the HNC in Food Science and Technology you may go on to the HND in Food Science and Technology which normally takes a further year of full time study. This HND builds on the work you have done in your HNC and should also give you a chance of a wider range of job opportunities in the food and drink industry.

There are many job opportunities in the food and drink industry for food scientists and technologists. The HNC in Food Science and Technology can be the start of a rewarding career in a dynamic, fast moving industry which makes products that are vital to everyone.

Good luck with your studies!

9   Glossary of terms

SCQF: This stands for the Scottish Credit and Qualification Framework, which is a new way of speaking about qualifications and how they inter-relate. We use SCQF terminology throughout this guide to refer to credits and levels. For further information on the SCQF visit the SCQF website at **www.scqf.org.uk**

SCQF credit points: One HN credit is equivalent to 8 SCQF credit points. This applies to all HN Units, irrespective of their level.

SCQF levels: The SCQF covers 12 levels of learning. HN Units will normally be at levels 6–9. Graded Units will be at level 7 and 8.

Subject Unit: Subject Units contain vocational/subject content and are designed to test a specific set of knowledge and skills.

Graded Unit: Graded Units assess candidates' ability to integrate what they have learned while working towards the Units of the Group Award. Their purpose is to add value to the Group Award, making it more than the sum of its parts, and to encourage candidates to retain and adapt their skills and knowledge.

Dedicated Unit to cover Core Skills: This is a non-subject Unit that is written to cover one or more particular Core Skills.

Embedded Core Skills: This is where the development of a Core Skill is incorporated into the Unit and where the Unit assessment also covers the requirements of Core Skill assessment at a particular level.

Signposted Core Skills: This refers to the opportunities to develop a particular Core Skill at a specified level that lie outwith automatic certification.

Qualification Design Team: The QDT works in conjunction with a Qualification Manager/Development Manager to steer the development of the HNC/HND from its inception/revision through to validation. The group is made up of key stakeholders representing the interests of centres, employers, universities and other relevant organisations.

Consortium-devised HNCs and HNDs are those developments or revisions undertaken by a group of centres in partnership with SQA.

Specialist single centre and specialist collaborative devised HNCs and HNDs are those developments or revisions led by a single centre or small group of centres who provide knowledge and skills in a specialist area. Like consortium-devised HNCs and HNDs, these developments or revisions will also be supported by SQA.

10   Appendices

Appendix 1: Summary of Employer Consultation
Appendix 2: Mapping of NOS to HNC Units using Improve Units
Appendix 3: Possible delivery sequence
Appendix 4: Opportunities to develop Core Skills
Appendix 5: Assessment Planner
Appendix 6: Full specifications of Units in HNC Food Science and Technology

Appendix 1   Summary of Employer Consultation

Representatives from 33 food businesses with operations in Scotland replied to the questionnaire issued in the Autumn of 2008. This is a respectable return for a survey of this nature and respondents included many of the major employers in the industry.

A summary of the responses and comments are issued as a separate document, which can be found on the SQA website.

Appendix 2 Mapping of National Occupational Standards (NOS) to HNC Units using Improve (SSC) Units

HNC Unit code	HNC Unit title	National Occupational Standard																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Mandatory Units																				
F6VF 34	Food Industry Principles: An Introduction		✓						✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F6VE 34	Food Industry Practices: An Introduction		✓		✓		✓	✓		✓				✓				✓		✓	✓
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures		✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures		✓		✓		✓	✓	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures		✓		✓		✓	✓	✓	✓		✓	✓	✓	✓			✓	✓	✓	✓
F6VL 34	Microbiology of Foods 1					✓														✓	
F6VD 34	Food Composition	✓									✓										
F4TL 34	Food Hygiene Intermediate		✓		✓		✓												✓	✓	✓
F7EW 34	Graded Unit 1	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓
	Optional Units																				
F6VB 33	Science for the Food Industry: An Introduction	✓				✓					✓										
F6VM 34	Microbiology of Foods 2					✓														✓	
F6VK 34	Legislation and the Food Industry		✓																	✓	✓
DV9T 34	Fundamentals of Quality													✓	✓						
F1RJ 34	Business Management: An Introduction																				
D85F 34	Using Software Applications Packages			✓																	

Key to Improve Units in the mapping grid

Number in table	Improve Unit Title
1	Food science in manufacture
2	HACCP for food manufacturing
3	ICT and MIS in food manufacture
4	Principles and practices of food safety management in manufacture
5	Principles of biological science essential in food manufacture (L2)
6	Principles of Clean In Place (CIP) and disinfection (L2)
7	Principles of effective food manufacture
8	Principles of food and raw materials in manufacture
9	Principles of food processing practice (L2)
10	Principles of food science in manufacture (L2)
11	Principles of handling in manufacture (L2)
12	Principles of monitoring and assessing risks in food manufacture
13	Principles of product quality and improvements in food manufacture (L2)
14	Principles of quality in food manufacture
15	Principles of sharpening, maintain and selecting cutting tools and equipment in food manufacture (L2)
16	Principles of the food and drink manufacturing sector (L2)
17	Principles of the use and storage of materials in food manufacture L2)
18	Principles of working effectively in food manufacture (L2)
19	Principles of working safely in food manufacture (L2)
20	Principles of workplace food safety in manufacture (L2)

Appendix 3   Possible delivery sequence

Based on a teaching year divided into three blocks, the Units in HNC in Food Science and Technology could be delivered in the following sequence:

Block 1
Food Industry Principles: An Introduction
Food Industry Practices: An Introduction
Science for the Food Industry: An Introduction
Food Hygiene Intermediate
Legislation and the Food Industry

Block 2
Food Manufacturing: Processing Practices at Sub-ambient Temperatures
Food Manufacturing: processing Practices at Ambient Temperature
Microbiology of Foods 1
Food Composition
Using Software Application Packages

Block 3
Food Manufacturing: Processing Practices at Elevated Temperatures
Food Analysis
Microbiology of Foods 2
Fundamentals of Quality
Graded Unit 1

The above sequence meets the following criteria:

♦ Block 1 concentrates on ensuring that candidates build the foundation that they will need for the award. It includes all introductory Units on the food and drink industry and other key Units which enable candidates to become aware of key contextual factors which affect the food and drink industry.

♦ Block 2 develops the subjects introduced in Block 1 through the specialist food science and technology Units. *Using Software Applications Packages* is included in Block 2 to ensure that candidates develop these critical transferable skills as an integral part of their programme of study and will be able to apply them to their work in Block 3, especially the Graded Unit.

♦ Block 3 completes the specialist food technology Units and allows candidates to take forward their study of food science. The nature of the Graded Unit means that it must come towards the end of the delivery sequence.

♦ The delivery sequence spreads optional Units throughout the academic year (there is one in each Block) and enables candidates to complete 15 Units. Those who wish to do so should, therefore, be in a position to progress to an HND in Food Science and Technology.

Appendix 4 Opportunities to develop Core Skills

Core Skills mapping of Mandatory Units   Key: *Relevant SCQF level;*   *S = Signposted; E= Embedded*

Unit Code	Unit title	Communication			Numeracy		ICT		Problem Solving			Working with Others	
		Oral	Reading	Writing	Using Graph Info	Using Number	Acc Info	P/C Info	CT	P&O	R&E	WCO	RCC
F6VF 34	Food Industry Principles: An Introduction			SCQF 5 S									
F6VE 34	Food Industry Practices: An Introduction			SCQF 5 S									
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures			SCQF 5 S								SCQF 5 S	
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures			SCQF 5 S		SCQF 5 S						SCQF 5 S	
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures			SCQF 5 S		SCQF 5 S						SCQF 5 S	
F6VL 34	Microbiology of Foods 1			SCQF 5 S									
F6VD 34	Food Composition			SCQF 5 S									
F4TL 34	Food Hygiene Intermediate	No specific signposted or embedded Core Skills											
F7EW 34	Graded Unit 1	SCQF 5 S	SCQF 5 S	SCQF 6 S	SCQF 4 S	SCQF 5 S	SCQF 5 S	SCQF 5 S	SCQF 6 S	SCQF 6 S	SCQF 6 S		

Core Skills mapping of Optional Units   *Key: Relevant SCQF level;   S = Signposted; E= Embedded*

Unit Code	Unit title	Communication			Numeracy		ICT		Problem Solving			Working with Others	
		Oral	Reading	Writing	Using Graph Info	Using Number	Acc Info	P/C Info	CT	P&O	R&E	WCO	RCC
F6VB 33	Science for the Food Industry: An Introduction			SCQF 4 S									
F6VM 34	Microbiology of Foods 2			SCQF 5 S		SCQF 5 S							
F6VC 34	Food Analysis			SCQF 5 S		SCQF 5 S							
F6VK 33	Legislation and the Food Industry		SCQF 6 S	SCQF 5 S					SCQF 5 S			SCQF 5 S	
DV9T 34	Fundamentals of Quality		SCQF 6 S	SCQF 6 S									
F1RJ 34	Business Management: An Introduction	SCQF 6 S	SCQF 6 S	SCQF 6 S		SCQF 5 S				SCQF 5 S			
D85F 34	Using Software Applications Packages						SCQF 5 E	SCQF 5 E					

Appendix 5   Assessment Planner

NB — This is based on advice in the Unit specifications. Actual assessments may vary.

Unit Code	Unit title	Type of Assessment	Comments
	Mandatory Units		
F6VF 34	Food Industry Principles: An Introduction	Open-book	Based on questions to elicit knowledge and understanding
F6VE 34	Food Industry Practices: An Introduction	Open-book and practical	Practical work supplemented by observation checklists and reports
F6VG 34	Food Manufacturing: Processing Practices at Ambient Temperatures	Open-book and practical	Practical work supplemented by observation checklists and reports
F6VJ 34	Food Manufacturing: Processing Practices at Sub-Ambient Temperatures	Open-book and practical	Practical work supplemented by observation checklists and reports
F6VH 34	Food Manufacturing: Processing Practices at Elevated Temperatures	Open-book and practical	Practical work supplemented by observation checklists and reports
F6VL 34	Microbiology of Foods 1	Open-book and practical	Practical laboratory work supplemented by observation checklists and reports
F6VD 34	Food Composition	Open-book	Based on questions to elicit knowledge and understanding
F4TL 34	Food Hygiene Intermediate	Closed-book examination	To conform with REHIS requirements
F7EW 34	Graded Unit 1	Project	Chosen by candidates (with advice) to involve practical technical and laboratory work plus supporting evidence to demonstrate planning, developing and evaluating
	Optional Units		
F6VB 33	Science for the Food Industry: An Introduction	Open-book	Based on questions to elicit knowledge and understanding
F6VC 34	Microbiology of Foods 2	Open-book and practical	Practical laboratory work supplemented by observation checklists and reports
F6VM 34	Food Analysis	Open-book and practical	Practical laboratory work supplemented by observation checklists and reports

Unit Code	Unit title	Type of Assessment	Comments
F6VK 33	Legislation and the Food Industry	Open-book	Based on questions and possibly case studies to exemplify applications and elicit knowledge and understanding
DV9T 34	Fundamentals of Quality	Closed-book and Open-book	Outcome 1 would be closed-book, whilst Outcomes 2 and 3 are open-book
F1RJ 34	Business Management: An Introduction	Case study	Open-book report using a case study of a relevant organisation
D85F 34	Using Software Applications Packages	Practical	Practical work can be based on specific tasks or a case study supplemented by observation checklists

Appendix 6   Full specifications of Units in HNC Food Science and Technology

Mandatory Units
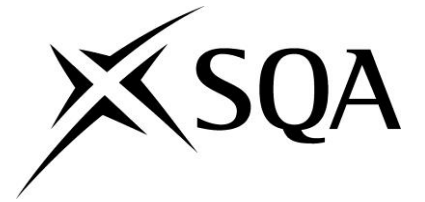
Higher National Unit specification

General information for centres

Unit title: Food Industry Principles: An Introduction

Unit code: F6VF 34

Unit purpose: This Unit is designed to introduce candidates to the structure of the food industry and the fundamental principles which underpin all aspects of food manufacturing. It will enable candidates to explain the structure of the food industry which provides the background context for food manufacturing. The Unit will also introduce candidates to operations associated with food processing.

On completion of the Unit the candidate should be able to:

1   Explain the structure of the food industry.
2   Explain the processes of food manufacture.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. However, it would be helpful if candidates had good written skills, eg English at SCQF level 4 or equivalent.

Core Skills: There are opportunities to develop the Core Skills component of *Communication:* Written Communication (Writing) at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is a mandatory Unit in the HNC in Food Science and Technology. It is recommended that it should be taught and assessed within this Group Award. It is complementary to the Unit F6VE 34 *Food Industry Practices: An Introduction* and it is recommended that both Units are taught during the early stages of the Group Award.

Assessment: This Unit could be assessed in a variety of ways. For example, assessment could consist of two reports, one on the structure of the food industry and the other on the processes of food manufacture. The two could be combined into a single report if desired.

Higher National Unit specification: statement of standards

Unit title: Food Industry Principles: An Introduction

Unit code: F6VF 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Explain the structure of the food industry

Knowledge and/or Skills

♦   Flow of materials
♦   Distribution chain
♦   Retail market structure
♦   Supply chain partnerships
♦   External factors affecting the structure of the food industry

Evidence Requirements

Candidates will need to provide written/oral evidence to meet all the Knowledge and/or Skills by showing that they can:

♦   explain the main components of the food industry (ie flow of materials; distribution chain; retail market structure; supply chain partnerships) and show how they are related to each other
♦   explain the impact of two external factors on the structure of the food industry
♦   illustrate their explanation with examples drawn from the food industry
♦   draw conclusions on the ways in which the structure of the food industry impacts on food manufacturing

Assessment Guidelines

This Outcome could be assessed in a variety of ways. For example, candidates could be asked to research the food industry and provide a report on it. They could be given a brief outlining a template for the evidence. About one third of the evidence can be devoted to conclusions on the way in which the structure impacts on the food industry.

Higher National Unit specification: statement of standards (cont)

Unit title: Food Industry Principles: An Introduction

Outcome 2

Explain the process of food manufacture

Knowledge and/or Skills

♦ Preliminary operations for food processing
♦ Factors affecting choice of techniques
♦ Principles of food preservation and food storage

Evidence Requirements

Candidates will need to provide written/oral evidence to meet all the Knowledge and/or Skills items by showing that they can explain the:

♦ preliminary operations in a particular context
♦ factors which affect choice of techniques in each context
♦ principles of food preservation and food storage which apply in a particular context

The evidence should cover two different contexts which involve two or more food processing techniques

ASSESSMENT GUIDELINES

This Outcome could be assessed in a variety of ways. For example, candidates could be asked to provide a report on food processing operations in different contexts. They could be given contexts and asked to research the preservation techniques/preliminary operations involved. The evidence can refer to the principles of food storage which apply in each context.

It would be possible to ask candidates to complete a single report covering both Outcomes. The report may, however, have two distinct parts.

Administrative Information

Unit code: F6VF 34

Unit title: Food Industry Principles: An Introduction

Superclass category: WM

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Food Industry Principles: An Introduction

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This is an introductory Unit intended to introduce candidates to the main principles of food processing. It should be seen as complementary to the Unit F6VE 34 *Food Industry Practices: An Introduction*. It is designed to prepare candidates for the HNC in Food Science and Technology in general as well as for a more detailed study of the main methods of food processing in particular.

It would be helpful if candidates had good written communications skills, eg achieved English at SCQF level 4 or equivalent.

Outcome 1 covers the structure of the food industry. It should be considered from the point of view of an industrial manufacture. However, candidates should be aware of the influences such as retail organisations, consumer preferences, social attitudes (eg on healthy eating and obesity), cultural factors, government policy on health, ethical and environmental considerations, and allergenic materials. It should look at the size of firms (eg. agribusinesses) and different sectors of the industry so that candidates are aware of the 'farm to fork' approach. The flow of materials should cover primary and secondary sources of material.

Outcome 2 covers food preservation techniques and the prevention of food spoilage. Preliminary operations can include techniques such as grading, sorting, peeling, washing and blanching. This Outcome includes the principles of food preservation and food storage and candidates should be able to relate these to the various techniques.

Guidance on the delivery and assessment of this Unit

The Unit should be delivered in a practical context where candidates are encouraged to apply knowledge and understanding to contexts in the food industry. Throughout, candidates should consider the standpoint of food manufacturers and the factors which influence the decisions they make about food processing.

For Outcome 1, candidates can be encouraged to research organisations (eg food producers, retailers etc) in the food industry and work out how they fit into the structure and the factors which affect the way they operate. For Outcome 2, candidates could visit food manufacturing organisations to see preliminary operations for themselves. There may also be opportunities for candidates to undertake practical work. It may be possible to combine the two approaches — candidates could undertake research on an organisation which they are then able to visit or make contact with.

Assessment, particularly for Outcome 1, can be based on research undertaken by candidates. A considerable amount of information on organisations involved in the food industry and the industry in general is available on the internet and candidates can make use of this.

Higher National Unit specification: support notes (cont)

Unit title: Food Industry Principles: An Introduction

This Unit could be assessed in a variety of ways, eg for both Outcomes candidates could produce a report. Candidates may provide two separate reports or combine their work into a single report. They can be given guidance or a template on the layout and structure of the evidence. The evidence should include referencing where appropriate.

Opportunities for developing Core Skills

*Communication***: Written Communication (Writing) at SCQF level 5**

As part of their assessment work for this Unit, candidates are expected to explain the structure of the food industry and food processing techniques. Candidates could do this by producing a written report although other presentation methods could be adopted. If they do produce a written report then they will use written information to demonstrate their knowledge and understanding of relevant ideas and information. For this, they will be required to organise their material into a logical and effective structure make use of an appropriate format for a report. They could be asked to base their report on research which they have carried out for themselves.

Open learning

This Unit could be delivered by Open Learning although candidates should have the opportunity to undertake practical work. Appropriate arrangements would need to be made for assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

Unit title: Food Industry Principles: An Introduction

General information for candidates

This Unit is a mandatory Unit in the HNC Food Science and Technology. It is designed to introduce you to the fundamental principles which underpin all aspects of food manufacturing and introduce you to operations associated with food processing. It will also give your some background to the structure of the food industry — from farm to fork — which should help to set all your studies in the HNC in a suitable context.

As part of your study of the food industry you will look at the retail market structure and supply chains as well as the flow of materials and the distribution from manufacturer to retailer. You will also look at factors affecting the food industry such as social attitudes (on healthy eating and obesity for example) and ethical and environmental considerations.

You will also be introduced to the basic principles of preliminary operations in food processing relating to food preservation and storage, as well as the factors which affect which techniques are used in which contexts.

This Unit is closely associated with the Unit *Food Industry Practices: An Introduction* and together they provide an introduction, not just to the food industry and all that it involves, but to the specialist Units in food processing which you will do later in your HNC.

The assessment for the Unit will require you to show that you can accurately explain the structure of the food industry and food processing operations. You will have to illustrate your explanations with examples. You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.

Higher National Unit specification

General information for centres

Unit title: Food Industry Practices: An Introduction

Unit code: F6VE 34

Unit purpose: This Unit, which includes practical work, is designed to introduce candidates to the main processing methods used in the food industry. It will enable candidates to become familiar with the key aspects of food manufacturing and provide them with the background context for further study of food manufacturing.

On completion of the Unit the candidate should be able to:

1   Conduct food processing operations used in the food industry.
2   Explain factors which affect the choice of food processing methods.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre.

Core Skills: There are opportunities to develop the Core Skills component of *Communication:* Written Communication (Writing) at SCQF level 5 and *Working with Others* (Working Co-operatively with Others) at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is a mandatory Unit in the HNC in Food Science and Technology. It is recommended that it should be taught and assessed within this Group Award. It is complementary to the Unit F6VF 34 *Food Industry Principles: An Introduction* and it is recommended that both Units are taught during the early stages of the Group Award.

Assessment: This Unit could be assessed in a variety of ways. For example, assessment could consist of a report on the processing methods used for three different types of food. The report could cover the three main methods of food processing and would be supplemented with an observation checklist relating to the practical work undertaken as part of the Unit.

General information for centres (cont)

Higher National Unit specification: statement of standards

Unit title: Food Industry Practices: An Introduction

Unit code: F6VE 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Conduct food processing operations used in the food industry

Knowledge and/or Skills

♦   Ambient temperatures
♦   Sub-ambient temperatures
♦   Elevated temperatures
♦   Advantages and disadvantages of different methods

OUTCOME 2

Explain factors which affect the choice of food processing methods

Knowledge and/or Skills

♦   Consumer preferences
♦   Costs
♦   Preservation
♦   Safety
♦   Quality

General information for centres (cont)

Higher National Unit specification: statement of standards

Evidence Requirements for the Unit

Candidates will need to provide written/oral evidence to meet all the Knowledge and/or Skills items by showing that they can explain the:

♦ choice of processing method used in a particular context
♦ method of processing used in a particular context including relevant examples of techniques and equipment used
♦ advantages and disadvantages of the method of food processing used in a particular context

The evidence should cover three different food processing contexts each of which makes use of a different method.

Candidates must demonstrate that they can carry out three food processing operations in accordance with safety and hygiene requirements. To ensure that candidates meet these requirements, they should be observed on all 3 occasions and a record should be kept of the observation.

Assessment Guidelines for the Unit

This Unit could be assessed in a variety of ways. For example, candidates could be asked to provide a report on processing methods used in different contexts. The evidence would explain the reasons for the choice of processing method, an explanation of what the processing method involves and a discussion of the advantages and disadvantages of the method in the particular case.

The evidence would be accompanied by observation checklists for the practical work. Candidates could refer to lessons from the practical work in their evidence.

Administrative Information

Unit code: F6VE 34

Unit title: Food Industry Practices: An Introduction

Superclass category: WM

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

Higher National Unit specification: support notes

Unit title: Food Industry Practices: An Introduction

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This is an introductory Unit intended to introduce candidates to the main methods of food processing. It should be seen as complementary to the Unit F6VF 34 *Food Industry Principles: An Introduction*. It is designed to prepare candidates for more detailed study of each of the three main methods of food processing.

Candidates are not expected to cover all aspects of the three main methods of food processing. The aim is to ensure that they are fully aware of the three methods, what they consist of and how and why they are used. They should also understand the ethical, cultural, dietary and food safety and organic factors which have an impact on food processing methods.

Particular processing techniques can be used to exemplify each of the three main methods. Suitable examples could be:

♦   ambient temperatures: size reduction (for example, mayo); meat massaging/injection
♦   sub-ambient temperatures: freezing; cook chilling
♦   elevated temperatures: smoking; pasteurisation; canning (for example, pears); pickle production; jam production

Guidance on the delivery and assessment of this Unit

The Unit should be delivered in a practical context. Candidates will be expected to develop knowledge and understanding of the different methods of food processing but they should relate this knowledge and understanding to the day to day activities of the food industry. Throughout candidates should be encouraged to consider the practical implications of the material in the Unit such as the different methods of food processing that are used and the reasons why a method may be used in a particular situation. They should also consider the advantages and disadvantages of the different methods.

Candidates should also get the opportunity to undertake practical work in pilot scale operations. They may be able to work together to undertake the practical work. They can also visit food manufacturing organisations to see for themselves the major methods of food processing and the equipment that is used in them. Candidates should be able to gain practical experience and observe examples of different methods of food processing.

Formative and summative assessment should enable candidates to analyse food processing operations and to assess the circumstances in which particular methods of processing are used.

Higher National Unit specification: support notes (cont)

Unit title: Food Industry Practices: An Introduction

There should also be some practical assessment. At this stage, the emphasis should be on ensuring that candidates undertake some practical work. This should enable candidates to begin the process of developing skills that they will need in later specialist Units on food processing methods. It will also enable them to become familiar with safety, hygiene and other requirements which are essential to the food manufacturing. Candidates should carry out work on three different methods of food processing.

In order to ensure that they meet health, safety and hygiene requirements, they should be observed while carrying out practical work. A checklist can be used to record these observations. Photographic and/or video evidence could be used to supplement the checklist.

Opportunities for developing Core Skills

Communication: Written Communication (Writing) at SCQF level 5

As part of their assessment work for this Unit, candidates are expected to explain different food processing operations and the factors that influence their use in particular contexts. Candidates could do this by producing a written report although other presentation methods could be adopted. If they do produce a written report then they will use written information to demonstrate their knowledge and understanding of relevant ideas and information. For this, they will be required to organise their material into a logical and effective structure make use of an appropriate format for a report.

Working with Others (Working Co-operatively with Others) at SCQF level 5

The opportunities to gather evidence for this Core Skill component depend on the approach used for the practical work required by this Unit. Candidates are expected to carry out food processing operations using pilot plant equipment. They could do this in groups in which case they will have to work with others to identify the requirements of the practical work and to determine what roles and responsibilities each member will task in order for the work to be completed safely and hygienically. They will also need to organise their own contribution, alter it where appropriate and make suggestions to the others for the practical work. They will also have to take actions to encourage co-operative working during the practical activity such as providing support and encouragement for others involved in the task and helping to minimise any disagreements among group members.

Open learning

This Unit could be delivered by Open Learning although candidates should have the opportunity to undertake practical work. Appropriate arrangements would need to be made for assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

Unit title: Food Industry Practices: An Introduction

General information for candidates

This Unit is a mandatory Unit in the HNC in Food Science and Technology. It is designed to introduce you to food processing operations and help you to understand the basic principles which apply to all aspects of food manufacturing. It will give you the background that you need for the three specialist Units in different types of food processing methods which you will take later in your HNC.

They are:

♦ *Food Manufacturing: Food Processing at Ambient Temperatures*
♦ *Food Manufacturing: Food Processing at Sub-Ambient Temperatures*
♦ *Food Manufacturing: Food Processing at Elevated Ambient Temperatures.*

This is a practical Unit and you will be involved in practical work using pilot plant equipment. This will give you an understanding of the main methods of food processing as well as hands-on experience of the kind you will need when you take up employment in the food industry. You will find out about the techniques and equipment that are used in the different methods of food processing. This Unit will also enable you to consider factors which influence which method of food processing is used in a particular situation. These include things such as the preferences of the consumer and the cost of the processing method.

It is extremely important in the food industry that food processing is carried out in hygienic conditions. Health and safety are also extremely important. The practical work will emphasise how vital these factors are and you will be expected to conduct your practical work in a manner which meets all health, safety and hygiene requirements. You will be observed while you are doing it in order to ensure that you do work in accordance with them.

This Unit is closely associated with *Food Industry Principles: An Introduction* and together they provide an introduction to the food industry and all that it involves and provide the background for the remainder of the Units in your HNC.

The assessment for this Unit will require you to carry out three different food processing operations. You will, as it says above, be observed while you are doing this. You will also be required to explain the method of food processing used in a particular context including the equipment used and the advantages and disadvantages of the method in that context. You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.

Higher National Unit specification

General information for centres

Unit title: Food Manufacturing: Processing Practices at Ambient
Temperatures

Unit code: F6VG 34

Unit purpose: This Unit is designed to enable candidates to gain practical experience of the principles and practices of food processing operations carried out at ambient temperatures within the food industry. The Unit will enable them to determine appropriate processing techniques to ensure that food safety and food quality requirements are met.

On completion of the Unit the candidate should be able to:

1   Conduct ambient pre-processing operations.
2   Conduct ambient processing operations.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Candidates should have some knowledge and understanding of the food industry and the processing methods it uses. This could be demonstrated by successful completion of the following Units:

♦   F6VF 34   *Food Industry Principles: An Introduction*
♦   F6VE 34   *Food Industry Practices: An Introduction*

Core Skills: There are opportunities in this Unit to develop the Core Skills components of *Communication:* Written Communication (Writing) at SCQF level 5, *Numeracy* (Using Number) at SCQF level 5 and *Working with Others* (Working Co-operatively with Others) at SCQF level 5 although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is a mandatory Unit in the HNC Food Science and Technology. It is one of three specialist Units in food processing methods and is complementary to F6VJ 34 *Food Manufacturing: Processing Practices at Sub-Ambient Temperatures* and F6VH 34 *Food Manufacturing: Processing Practices at Elevated Temperatures*.

General information for centres (cont)

Assessment: This Unit could be assessed in a variety of ways. For example, assessment can consist of observation checklists of practical work supplemented by reports explaining the equipment used, the results of the practical work and conclusions from it. It would be possible for candidates to keep a laboratory log book of their practical work and use it to present assessment evidence.

Higher National Unit specification: statement of standards

Unit title: Food Manufacturing: Processing Practices at Ambient Temperatures

Unit code: F6VG 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Conduct ambient pre-processing operations

Knowledge and/or Skills

♦ Ambient pre-processing operations
♦ Ambient pre-processing equipment
♦ Factors affecting the selection and conduct of pre-processing operations and equipment

OUTCOME 2

Conduct ambient processing operations

Knowledge and/or Skills

♦ Ambient processing and separation operations
♦ Ambient processing equipment
♦ Factors affecting the selection and conduct of processing operations and equipment

Evidence Requirements for the Unit

Candidates will need to provide evidence to meet all the Knowledge and/or Skills items by showing that they can carry out practical work for four different food processing operations, which must include both pre-processing and processing operations at ambient temperatures. Candidates should carry out the practical work using safe hygienic working practices to ensure food safety. This can be demonstrated by an observation checklist to show:

♦ effective planning and preparation for the practical task
♦ attention to personal hygiene
♦ safe use of equipment in accordance with the specific requirements of the items of equipment used
♦ cleaning and disinfection of equipment and surfaces

Higher National Unit specification: statement of standards (cont)

Unit title: Food Manufacturing: Processing Practices at Ambient

For each piece of practical work, candidates should provide evidence to show that they can:

♦ accurately record and present results using tables and graphs where appropriate and including all necessary calculations
♦ draw conclusions from the results including their applicability to industrial contexts

In addition, candidates must provide evidence to show that they can accurately explain:

♦ the items of industrial processing equipment used in a particular context and the functions that they fulfil: two items of equipment should be covered in each context
♦ factors which affect the selection and conduct of operations and equipment in a particular context: three factors should be given in each case

Assessment Guidelines for the Unit

This Unit could be assessed in a variety ways. For example, candidates can be asked to provide a number of brief reports based on their practical work. They can present these in any suitable format. They could, for example, be encouraged to keep a laboratory log book or diary for their practical work and use this as the means of presenting evidence for assessment. This evidence can be supplemented by observation checklists to ensure that candidates have followed suitable practice when undertaking practical work.

Administrative Information

Unit code: F6VG 34

Unit title: Food Manufacturing: Processing
                                         Practices at Ambient Temperatures

Superclass category: WM

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

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Higher National Unit specification: support notes

Unit title: Food Manufacturing: Processing Practices at Ambient Temperatures

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is a mandatory Unit in the HNC Food Science and Technology. It is a practically based Unit and will allow candidates to appreciate the care taken by industry to ensure the production of foods for consumers which is both safe and of acceptable quality. It is one of three Units covering methods and equipment used in food manufacturing at different temperatures. The others are:

♦   F6VJ 34   *Food Manufacturing: Processing Practices at Sub-Ambient Temperatures*
♦   F6VH 34   *Food Manufacturing: Processing Practices at Elevated Temperatures*

This Unit is designed to enable candidates to build on the introduction to ambient processing methods in F6VE 34 *Food Industry Practices: An Introduction*. Nevertheless, the Unit is suitable for those who have not completed this Unit but have obtained the necessary background in other ways.

The Unit covers pre-processing and processing operations and equipment at ambient temperatures. Candidates are expected to be aware of the factors which influence both sets of activities. These factors include:

♦   Danger of contamination by and subsequent multiplication of micro-organisms — this should enable candidates to appreciate why industry seeks to preserve food by applying specific processing conditions which are the exact opposite of the growth requirements of micro-organisms such as temperature, water activity, acidity and atmospheric conditions
♦   Avoidance of waste (it is well documented that approximately 30% of all food is wasted before it reaches the consumer)
♦   Food quality and consumer requirements
♦   Environmental conditions such as the impact of humidity, temperature and atmospheric conditions on food deterioration
♦   Health and safety requirements
♦   Hazard Analysis Critical Control Points (HACCP)/food safety management systems

For Outcome 1, candidates should understand why certain pre-processing operations are carried out by industry paying particular attention to maintaining the safety and quality of processed foods.

Pre-processing practices can include:

Cleaning	—	wet and dry methods
Sorting/grading	—	by size using fixed and variable aperture; and by colour
Peeling	—	abrasion, steam and chemical (lye)

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Ambient
Temperatures

For Outcome 2, practices can include:

Solid comminution	—	hammer, disc mills
	—	slicing, dicing, chopping, mincing
Liquid homogenisation	—	emulsifying agents
Mixing	—	flow patterns
		Liquid mixers
		Tumble, screw mixers
		Mixers, colloid pressure units
Separation	—	centrifugation
		disc-bowl Unit
		filtration

Candidates can also be introduced to new technologies such as high pressure processing and irradiation.

For practical work, candidates should be able to present their results in a suitable manner. Where appropriate the presentation should include tables and graphs and candidates should carry out all the necessary calculations. Candidates should also interpret the results of their practical work by drawing conclusions from them. These conclusions can be used to supplement and reinforce their explanation of operations and equipment. Candidates should also comment on the differences between practical work on a pilot scale and food production on commercial scale.

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

This Unit is a practically based Unit which also covers important underpinning theoretical knowledge and understanding. Delivery methods should take account of this by ensuring that the material is always closely linked to activities in the food industry and the operations of organisations engaged in food processing.

This is a practical Unit which is built around practical work undertaken by candidates. This involves ensuring that candidates display good practice in terms of health and safety, particularly safe hygienic practices. The practical work selected should ensure that the methods which candidates conduct are ones which will give them a good overall experience of the practical application of suitable methods and equipment. In this way they should be in a position to apply their experience to other techniques — either as part of their subsequent study or in industry. Candidates may work in groups during practical sessions although any summative assessment work should be done individually.

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Ambient Temperatures

There is a variety of ways that this Unit can be assessed. For example, assessment can take the form of observation checklists (photographic and/or video evidence could be used to supplement the checklist) and evidence that candidates can record and present the results of their practical work using tables and graphs where appropriate and including all necessary calculations. Candidates should also draw some conclusions from the practical work, in particular about its applicability to larger scale industrial contexts.

Candidates can present their work in a report format which would enable them also to explain the items of industrial processing equipment used in a particular context and factors which affect the selection and conduct of operations and equipment in a particular context. The evidence should include referencing where appropriate.

However, other methods of presentation would be possible. Candidates could, for example, keep a laboratory logbook or diary during their practical work and use this as a basis for presenting all the evidence for assessment. They could use other presentation methods such as presentation software or make use of web 2.0 techniques. Assessment work can be undertaken as candidates work through the Unit, and gathered together in a portfolio.

Opportunities for developing Core Skills

*Communication***: Written Communication (Writing) at SCQF level 5**

As part of their assessment work for this Unit, candidates are expected to maintain details of practical work. This can be done in a laboratory log book or diary and candidates will be expected to organise the content into a logical and effective structure. Candidates will, therefore, use written information to demonstrate their knowledge and understanding of relevant ideas and information. Candidates can also be asked to write up their practical work in a report style which can replicate that used in industry. In these cases, candidates can be expected to make sure that the report meets its intended purpose by a format and layout appropriate to an industrial readership.

Numeracy **(Using Number) at SCQF level 5**

As part of the practical work for this Unit, candidates are required to carry out practical work. They are expected to undertake calculations using scientific formulae and, using the Outcome of these calculations, draw conclusions about the results of their practical work. This will involve quantitative data over a range and candidates will be required to decide what numerical operations are to be carried out and the order in which to do them.

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Ambient
Temperatures

Working with Others **(Working Co-operatively with Others) at SCQF level 5**

The opportunities to gather evidence for this Core Skill component depend on the approach used for the practical work required by this Unit. Candidates are expected to carry out food processing operations using pilot plant equipment. They could do this in groups in which case they will have to work with others to identify the requirements of the practical work and to determine what roles and responsibilities each member will take in order for the work to be completed safely and hygienically. They will also need to organise their own contribution, alter it where appropriate and make suggestions to the others for the practical work. They will also have to take actions to encourage co-operative working during the practical activity such as providing support and encouragement for others involved in the task and helping to minimise any disagreements among group members.

Open learning

This Unit could be delivered by Open Learning although candidates will have to have the opportunity to undertake practical work. Appropriate arrangements would need to be made for assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Food Manufacturing: Processing Practices at Ambient
Temperatures

This Unit is a mandatory Unit in the HNC Food Science and Technology. It is one of three specialist Units in food manufacturing which you will take as part of your HNC. The others are:

♦   *Food Manufacturing: Food Processing at Sub-Ambient Temperatures*
♦   *Food Manufacturing: Food Processing at Elevated Ambient Temperatures.*

It follows on from the introductory Units in *Food Industry Principles: An Introduction* and *Food Industry Practices: An Introduction*, particularly the second of these. The *Food Industry Practices: An Introduction* Unit introduced you to methods of food processing where you learnt that there are three main types depending on the temperature involved.

This Unit covers food processing at ambient temperatures. You will look at both pre-processing operations and processing operations. Examples of the pre-processing operations could include cleaning, sorting, grading and peeling while ambient processing operations could cover mixing, size reduction and centrifugation.

This is a practical Unit and you will be involved in practical work using pilot plant equipment. This will allow you to develop the skills and understanding you have already gained from *Food Industry Practices: An Introduction*. In this way, you will get more practical, hands-on experience of the kind you will need when you take up employment in the food industry. You will find out about the items of equipment used in different methods of processing at ambient temperatures and the factors which affect the selection of equipment.

You will already know about the importance of health and safety and hygiene in food processing. You will be expected to conduct your practical work in a manner which meets all health, safety and hygiene requirements. You will be observed while you are doing it in order to ensure that you do work in accordance with these.

The assessment for the Unit will require you to carry out four different food processing operations at ambient temperatures, including both pre-processing and processing operations. You will also be required to record the results of your practical work and draw conclusions from them, for example about how they may apply in large-scale industrial contexts. You will also be expected to explain the items of equipment used and factors affecting the selection of equipment and the method of processing.

You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.

After you have completed this Unit, you could consider other areas such as Food Hygiene, HACCP and Health and Safety.

Higher National Unit specification

General information for centres

Unit title: Food Manufacturing: Processing Practices at Sub-Ambient Temperatures

Unit code: F6VJ 34

Unit purpose: This Unit is designed to enable candidates to gain practical experience of processing operations carried out at sub-ambient temperatures within the food industry. The Unit will enable them to determine appropriate processing techniques to ensure that food safety and food quality requirements are met.

On completion of the Unit the candidate should be able to:

1   Conduct commercial chilling of foods.
2   Conduct commercial freezing and thawing techniques.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Candidates should have some knowledge and understanding of the food industry and the processing methods it uses. This could be demonstrated by successful completion of the following Units:

♦   F6VF 34   *Food Industry Principles: An Introduction*
♦   F6VE 34   *Food Industry Practices: An Introduction*

Core Skills: There are opportunities in this Unit to develop the Core Skills components of *Communication*: Written Communication (Writing) at SCQF level 5 and *Numeracy* (Using Number) at SCQF level 5 and the Core Skill of *Working with Others* at SCQF level 5 although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is a mandatory Unit in the HNC Food Science and Technology. It is one of three specialist Units in food processing methods and is complementary to F6VG 34 *Food Manufacturing: Processing Practices at Ambient Temperatures* and F6VH 34 *Food Manufacturing: Processing Practices at Elevated Temperatures*.

General information for centres (cont)

Assessment: This Unit can be assessed in a variety of ways. For example, assessment can consist of observation checklists of practical work supplemented by reports explaining the equipment used, the results of the practical work and conclusions from it. It would be possible for candidates to keep a laboratory log book of their practical work and use it to present assessment evidence.

Higher National Unit specification: statement of standards

Unit title: Food Manufacturing: Processing Practices at Sub-Ambient Temperatures

Unit code: F6VJ 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Conduct commercial chilling of foods

Knowledge and/or Skills

♦ Refrigeration systems and methods
♦ Refrigeration equipment
♦ Effect on micro-flora and enzymes
♦ Factors affecting the selection, conduct and efficiency of methods and equipment

OUTCOME 2

Conduct commercial freezing and thawing techniques

Knowledge and/or Skills

♦ Freezing and thawing techniques
♦ Freezing and thawing equipment
♦ Effect on micro-flora
♦ Factors affecting the selection, conduct and efficiency of techniques and equipment

Higher National Unit specification: statement of standards (cont)

Unit title: Food Manufacturing: Processing Practices at Sub-Ambient
Temperatures

Evidence Requirements for the Unit

Candidates will need to provide evidence to meet all the Knowledge and/or Skills items by
showing that they can carry out practical work for four different food processing operations at
sub-ambient temperatures, one of which must be chilling. Candidates should carry out the
practical work using safe hygienic working practices to ensure food safety. This can be
demonstrated by an observation checklist to show:

♦ effective planning and preparation for the practical task
♦ attention to personal hygiene
♦ safe use of equipment in accordance with the specific requirements of the items of
  equipment used
♦ cleaning and disinfection of equipment and surfaces

For each piece of practical work, candidates should provide evidence to show that they can:

♦ accurately record and present results using tables and graphs where appropriate and
  including all necessary calculations
♦ draw conclusions from the results including their applicability to industrial contexts

In addition, candidates must provide evidence to show that they can accurately explain:

♦ the items of industrial processing equipment used in a particular context and the
  functions that they fulfil: two items of equipment should be covered in each context
♦ the effect on micro-flora and enzymes
♦ factors which affect the selection, conduct and efficiency of operations and equipment in
  a particular context: two factors should be given in each case

Assessment Guidelines for the Unit

This Unit can be assessed in a variety of ways. For example, candidates can be asked to
provide a number of brief reports based on their practical work. They can present these in any
suitable format. They could, for example, be encouraged to keep a laboratory log book or
diary for their practical work and use this as the means of presenting evidence for assessment.
This evidence can be supplemented by observation checklists to ensure that candidates have
followed suitable practice when undertaking practical work.

Administrative Information

Unit code: F6VJ 34

Unit title: Food Manufacturing: Processing
Practices at Sub-Ambient Temperatures

Superclass category: WM

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Higher National Unit specification: support notes

Unit title: Food Manufacturing: Processing Practices at Sub-Ambient Temperatures

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is a mandatory Unit in the HNC Food Science and Technology. It is a practically based Unit and will allow candidates to appreciate the care taken by industry to ensure the production of foods for consumers which is both safe and of acceptable quality. It is one of three Units covering methods and equipment used in food manufacturing at different temperatures. The others are:

♦ F6VG 34 *Food Manufacturing: Processing Practices at Ambient Temperatures*
♦ F6VH 34 *Food Manufacturing: Processing Practices at Elevated Temperatures*

This Unit is designed to enable candidates to build on the introduction to sub-ambient processing methods in F6VE 34 *Food Industry Practices: An Introduction*. Nevertheless, the Unit is suitable for those who have not completed this Unit but have obtained the necessary background in other ways.

The Unit covers chilling and freezing methods and equipment as well as thawing techniques and equipment. Candidates are expected to be aware of the factors which influence both sets of activities.

These factors include:

♦ Reasons for chilling and freezing such as perishability, seasonal availability and ripening
♦ Factors affecting the safety and quality of chilled foods such as microbial activity, parasitic activity, enzymatic activity, organolephtic properties, o_2, air humidity and temperature
♦ Factors affecting the safety and quality of frozen foods such as microbial activity, parasitic activity, enzymatic activity, fast and slow freezing rates, organolephtic properties, ice crystal growth and cell damage, freezer burn, volume change and chill injury and damage
♦ Nutrition
♦ Consumer requirements and cost factors
♦ Health and safety requirements
♦ Hazard Analysis Critical Control Points (HACCP)/food safety management systems

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Sub-Ambient
Temperatures

For Outcome 1, candidates should understand why chilling is carried out by industry paying particular attention to maintaining the safety and quality of processed foods. The Outcome could cover the main component parts of a mechanical refrigeration system such as:

♦   Compressor
♦   Condenser
♦   Evaporator
♦   Expansion valve

and how the system is adapted for usage in direct and indirect refrigeration systems.

Pieces of industrial equipment could cover:

♦   Air blast chillers
♦   Cryogenic units for chilling

For Outcome 2, candidates should recognise why thawing is not simply the reverse of freezing with respect to heat flow, thermal conductivity, tempering and how it is carried out on a small scale to maintain the safety and quality of the foods involved.

Pieces of industrial equipment could cover:

♦   Air blast freezers, tunnel, fluid bed units
♦   Plate freezers vertical/horizontal
♦   Cryogenic units for freezing

Factors influencing thawing could cover:

♦   Packaging
♦   Temperature
♦   Humidity
♦   Freezer burn
♦   Growth of micro-organisms

This Outcome can also cover the design and operation of industrial units using:

♦   Thermal properties — air, water, steam, vacuum, Infra red (IR)
♦   Electrical properties — resistance dielectrics, microwaves

Modified atmosphere packaging

In addition both Outcomes can cover rules for usage of fridges and freezers such as:

♦   Location
♦   Temperature control
♦   Hygiene
♦   Food safety factors

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Sub-Ambient
Temperatures

For practical work, candidates should be able to present their results in a suitable manner. Where appropriate the presentation should include tables and graphs and candidates should carry out all the necessary calculations. Candidates should also interpret the results of their practical work by drawing conclusions from them. These conclusions can be used to supplement and reinforce their analysis of operations and equipment. Candidates should also comment on the differences between practical work on a pilot scale and food production on commercial scale.

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Sub-Ambient
               Temperatures

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

This Unit is a practically based Unit which also covers important underpinning theoretical knowledge and understanding. Delivery methods should take account of this by ensuring that the material is always closely linked to activities in the food industry and the operations of organisations engaged in food processing.

When undertaking practical work, candidates should be made fully aware of good practice in terms of safe working practices, particularly cleanliness and hygiene. The practical work is likely to cover only some of the possible methods and techniques. The methods selected should be ones which will give candidates a good overall experience of the practical application of suitable methods, techniques and equipment. In this way they should be in a position to apply their experience to other techniques — either as part of their subsequent study or in industry. Candidates may work in groups during practical sessions although any summative assessment work should be done individually.

There is a variety of ways that this Unit can be assessed. For example, assessment can take the form of observation checklists (photographic and/or video evidence could be used to supplement the checklist) and evidence that candidates can record and present the results of their practical work using tables and graphs where appropriate and including all necessary calculations. Candidates should also draw some conclusions from the practical work, in particular about its applicability to larger scale industrial contexts.

Candidates can present their work in a report format which would enable them also to explain the items of industrial processing equipment used in a particular context and factors which affect the selection and conduct of operations and equipment in a particular context. The evidence should include referencing where appropriate.

However, other methods of presentation would be possible. Candidates could, for example, keep a laboratory logbook or diary during their practical work and use this as a basis for presenting all the evidence for assessment. They could use other presentation methods such as presentation software or make use of web 2.0 techniques. Assessment work can be undertaken as candidates work through the Unit and gathered together in a portfolio.

Opportunities for developing Core Skills

Communication: **Written Communication (Writing) at SCQF level 5**

As part of their assessment work for this Unit, candidates are expected to maintain details of practical work. This can be done in a laboratory log book or diary and candidates will be expected to organise the content into a logical and effective structure. Candidates will, therefore, use written information to demonstrate their knowledge and understanding of relevant ideas and information. Candidates can also be asked to write up their practical work in a report style which can replicate that used in industry. In these cases, candidates can be expected to make sure that the report meets its intended purpose by a format and layout appropriate to an industrial readership.

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Sub-Ambient Temperatures

Numeracy **(Using Number) at SCQF level 5**

As part of the practical work for this Unit, candidates are required to carry out practical work. They are expected to undertake calculations using scientific formulae and, using the Outcome of these calculations, draw conclusions about the results of their practical work. This will involve quantitative data over a range and candidates will be required to decide what numerical operations are to be carried out and the order in which to do them

Working with Others **(Working Co-operatively with Others) at SCQF Level 5**

The opportunities to gather evidence for this Core Skill component depend on the approach used for the practical work required by this Unit. Candidates are expected to carry out food processing operations using pilot plant equipment. They could do this in groups in which case they will have to work with others to identify the requirements of the practical work and to determine what roles and responsibilities each member will take in order for the work to be completed safely and hygienically. They will also need to organise their own contribution, alter it where appropriate and make suggestions to the others for the practical work. They will also have to take actions to encourage co-operative working during the practical activity such as providing support and encouragement for others involved in the task and helping to minimise any disagreements among group members.

Open learning

This Unit could be delivered by Open Learning although candidates will have to have the opportunity to undertake practical work. Appropriate arrangements would need to be made for assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Food Manufacturing: Processing Practices at Sub-Ambient
             Temperatures

This Unit is a mandatory Unit in the HNC Food Science and Technology. It is one of three specialist Units in food manufacturing which you will take as part of your HNC. The others are:

♦   *Food Manufacturing: Food Processing at Ambient Temperatures*
♦   *Food Manufacturing: Food Processing at Elevated Ambient Temperatures.*

It follows on from the two introductory Units ie, *Food Industry Principles: An Introduction* and *Food Industry Practices: An Introduction —* particularly the second of these. The *Food Industry Practices: An Introduction* Unit introduced you to methods of food processing where you learnt that there are three main types depending on the temperature involved.

This Unit covers food processing at sub-ambient temperatures. You will look at processing operations involving techniques of chilling, freezing and thawing.

This is a practical Unit and you will be involved in practical work using pilot plant equipment. This will allow you to develop the skills and understanding you have already gained from *Food Industry Practices: An Introduction*. In this way, you will get more practical, hands-on experience of the kind you will need when you take up employment in the food industry. You will find out about the items of equipment used in different methods of processing at ambient temperatures and the factors which affect the selection of equipment.

You will already know about the importance of safe working practices and hygiene in food processing. You will be expected to conduct your practical work in a manner which meets all health, safety and hygiene requirements. You will be observed while you are doing it in order to ensure that you do work in accordance with these.

The assessment for this Unit will require you to carry out four different food processing operations at sub-ambient temperatures, one of which will be chilling. You will also be required to record the results of your practical work and draw conclusions from them, for example about how they may apply in large-scale industrial contexts. You will also be expected to explain the items of equipment used and factors affecting the selection of equipment and the method of processing.

You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.

After you have completed this Unit, you could consider other areas such as Food Hygiene, HACCP and Health and Safety.

Higher National Unit specification

General information for centres

Unit title: Food Manufacturing: Processing Practices at Elevated
Temperatures

Unit code: F6VH 34

Unit purpose: This Unit is designed to enable candidates to gain practical experience of food processing operations carried out at elevated temperatures within the food industry. The Unit will enable them to determine appropriate processing techniques to ensure that food safety and food quality requirements are met.

On completion of the Unit the candidate should be able to:

1   Conduct food processing at elevated temperatures.
2   Perform evaporation and dehydration techniques.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Candidates should have some knowledge and understanding of the food industry and the processing methods it uses. This could be demonstrated by successful completion of the following Units:

♦   F6VF 34   *Food Industry Principles: An Introduction*
♦   F6VE 34   *Food Industry Practices: An Introduction*

Core Skills: There are opportunities in this Unit to develop the Core Skills components of *Communication*: Written Communication (Writing) at SCQF level 5 and *Numeracy* (Using Number) at SCQF level 5 and the Core Skill of *Working with Others* at SCQF level 5 although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is a mandatory Unit in the HNC Food Science and Technology. It is one of three specialist Units in food processing methods and is complementary to F6VG 34 *Food Manufacturing: Processing Practices at Ambient Temperatures* and F6VJ 34 *Food Manufacturing: Processing Practices at Sub-Ambient Temperatures*.

General information for centres (cont)

Assessment: This Unit can be assessed in a variety of ways. For example, assessment can consist of observation checklists of practical work supplemented by reports explaining the equipment used, the results of the practical work and conclusions from it. It would be possible for candidates to keep a laboratory log book of their practical work and use it to present assessment evidence.

Higher National Unit specification: statement of standards

Unit title: Food Manufacturing: Processing Practices at Elevated Temperatures

Unit code: F6VH 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Conduct food processing at elevated temperatures

Knowledge and/or Skills

♦ Methods of processing food at elevated temperatures
♦ Equipment used for processing foods at elevated temperatures
♦ Factors affecting the selection, conduct and efficiency of methods and equipment

OUTCOME 2

Perform evaporation and dehydration techniques

Knowledge and/or Skills

♦ Evaporation and dehydration techniques
♦ Evaporation and dehydration equipment
♦ Factors affecting the selection, conduct and efficiency of techniques and equipment

Evidence Requirements for the Unit

Candidates will need to provide evidence to meet all the Knowledge and/or Skills items by showing that they can carry out practical work for four different food processing operations at elevated temperatures, including evaporation and dehydration. Candidates should carry out the practical work using safe hygienic working practices to ensure food safety. This can be demonstrated by an observation checklist to show:

♦ effective planning and preparation for the practical task
♦ attention to personal hygiene
♦ safe use of equipment in accordance with the specific requirements of the items of equipment used
♦ cleaning and disinfection of equipment and surfaces

Higher National Unit specification: statement of standards

Unit title: Food Manufacturing: Processing Practices at Elevated
                  Temperatures

For each piece of practical work, candidates should provide evidence to show that they can:

♦   accurately record and present results using tables and graphs where appropriate and
     including all necessary calculations
♦   draw conclusions from the results including their applicability to industrial contexts

In addition, candidates must provide evidence to show that they can accurately explain:

♦   the items of industrial processing equipment used in a particular context and the
     functions that they fulfil: two items of equipment should be covered in each context
♦   factors which affect the selection and conduct of operations and equipment in a particular
     context: three factors should be given in each case

Assessment Guidelines for the Unit

This Unit can be assessed in a variety of ways. For example, candidates can be asked to
provide a number of brief reports based on their practical work. They can present these in any
suitable format. They could, for example, be encouraged to keep a laboratory log book or
diary for their practical work and use this as the means of presenting evidence for assessment.
This evidence can be supplemented by observation checklists to ensure that candidates have
followed suitable practice when undertaking practical work.

Administrative Information

Unit code: F6VH 34

Unit title: Food Manufacturing: Processing Practices at Elevated Temperatures

Superclass category: WM

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

Higher National Unit specification: support notes

Unit title: Food Manufacturing: Processing Practices at Elevated Temperatures

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is a mandatory Unit in the HNC Food Science and Technology. It is a practically based Unit and will allow candidates to appreciate the care taken by industry to ensure the production of foods for consumers which is both safe and of acceptable quality. It is one of three Units covering methods and equipment used in food manufacturing at different temperatures. The others are:

♦ F6VG 34   *Food Manufacturing: Processing Practices at Ambient Temperatures*
♦ F6VJ 34   *Food Manufacturing: Processing Practices at Sub-Ambient Temperatures*

This Unit is designed to enable candidates to build on the introduction to processing food at elevated temperatures in F6VE 34 *Food Industry Practices: An Introduction*. Nevertheless, the Unit is suitable for those who have not completed this Unit but have obtained the necessary background in other ways.

The Unit covers the main methods of food processing at elevated temperatures — blanching, pasteurisation, sterilisation, baking and frying — as well as evaporation and dehydration techniques and equipment. Candidates are expected to be aware of the factors which influence all these activities. These factors include:

♦ Factors affecting the choice of processing methods such as microbial activity, enzymatic activity, water in foods, water activity, moisture content, available water (Aw) relationships
♦ Factors affecting the safety and quality of foods at elevated temperatures such as microbial and enzymatic activity, influence of pH, organolephtic properties
♦ Nutrition
♦ Advantages and disadvantages of the processes
♦ Consumer requirements and cost factors
♦ Health and safety requirements
♦ Hazard Analysis Critical Control Points (HACCP)/Food Safety Management Systems

For Outcome 1, candidates should understand why processing at elevated temperatures is carried out by industry paying particular attention to maintaining the safety and quality of processed foods. This Outcome deals with blanching, pasteurisation, sterilisation, baking and frying.

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Elevated Temperatures

For blanching, candidates could be introduced to the reasons for blanching such as enzyme activity on storage and pre-processing operation. They can also consider the advantages and disadvantages of blanching such as: destruction of enzymes; displacement of air/gases; cleaning; reduction of micro-organisms; tissue softening; destruction of vitamins; destruction of texture. It may also be helpful to examine the use of a chemical test such as the peroxidase test to determine residual enzyme activity.

Different types of industrial blanchers could include tunnel and rotary.

For pasteurisation, candidates could consider the aims of pasteurisation with respect to: the effect on food; the effect on micro-organisms; the influence of pH.

Different methods of industrial pasteurisation for packaged or unpackaged foods could include:

♦ Steam pans
♦ Plate heat exchanger
♦ Tubular heat exchangers
♦ Tunnel pasteuriser

Candidates could also examine the principles and practices of an enzymatic test to evaluate pasteurisation efficiency relating to phosphatase and alpha amylase.

For sterility, candidates can consider the concept of commercial sterility and the importance of the destruction of pathogenic and spoilage bacteria with reference to the genera *Clostridium* and *Bacillus.*

Sterilisation techniques can include canning, bottling, use of flexible pouches and UHT processing and can be related to the stages of these processes: ingredient preparation; filling; exhausting; processing.

Sterilisation equipment could include the containers used and cover the formation and closures of three piece and two piece steel and aluminium cans with ribbing, expansion rings, laquering, sealing compound.

Sterilisation equipment could also cover:

♦ Static and rotary retorts
♦ Hydrostatic steriliser
♦ Plate heat exchanger
♦ Scraped surface heat exchanger

Candidates could also look at final sterilised packaged product defects attributable to either container or processing faults such as:

♦ Can defects, seaming, storage, Fo, operator control, cooling water
♦ Blown cans, hydrogen swells, overfilling
♦ Flipper, springer, soft swell, hard swell

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Elevated
Temperatures

For Outcome 2 candidates could be introduced to the aims of evaporation and dehydration controlling the state of water in foods, water activity, moisture content and Aw relationships. They could also consider advantages and disadvantages such as weight, bulk, transport, shelf life, packaging, control of Aw, preconcentration, production costs, quality.

Evaporation and dehydration equipment could include:

♦ Pan
♦ Plate
♦ Short and long tube units
♦ Fluid bed
♦ Spray
♦ Conveyor

For freeze drying, the following could be included:

♦ Water phase diagram
♦ Freezing
♦ Sublimation
♦ Desorption
♦ Thermal contact
♦ Food applications

Candidates could also consider water activity and its effects on spoilage mechanisms. In addition, they could look at the effects of time and temperature on the quality of evaporated and dried foods in terms of enzymatic, physical, chemical and microbial problems; shrinkage, case hardening, loss of volatiles, burn on.

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

This Unit is a practically based Unit which also covers important underpinning theoretical knowledge and understanding. Delivery methods should take account of this by ensuring that the material is always closely linked to activities in the food industry and the operations of organisations engaged in food processing.

When undertaking practical work, candidates should display good practice in terms of safe working practices, particularly cleanliness and hygiene. The practical work is likely to cover only some of the possible methods and techniques. The methods selected should be ones which will give candidates a good overall experience of the practical application of suitable methods, techniques and equipment. In this way they should be in a position to apply their experience to other techniques — either as part of their subsequent study or in industry. Candidates may work in groups during practical sessions although any summative assessment work should be done individually.

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Elevated Temperatures

Assessment can take the form of observation checklists (photographic and/or video evidence could be used to supplement the checklist) and evidence that candidates can record and present the results of their practical work using tables and graphs where appropriate and including all necessary calculations. Candidates should also draw some conclusions from the practical work, in particular about its applicability to larger scale industrial contexts.

Candidates can present their work in a report format which would enable them also to explain the items of industrial processing equipment used in a particular context and factors which affect the selection and conduct of operations and equipment in a particular context. The evidence should include referencing where appropriate.

However, other methods of presentation would be possible. Candidates could, for example, keep a laboratory logbook or diary during their practical work and use this as a basis for presenting all the evidence for assessment. They could use other presentation methods such as presentation software or make use of web 2.0 techniques. Assessment work can be undertaken as candidates work through the Unit, and gathered together in a portfolio.

Opportunities for developing Core Skills

Communication: Written Communication (Writing) at SCQF level 5

As part of their assessment work for this Unit, candidates are expected to maintain details of practical work. This can be done in a laboratory log book or diary and candidates will be expected to organise the content into a logical and effective structure. Candidates will, therefore, use written information to demonstrate their knowledge and understanding of relevant ideas and information. Candidates can also be asked to write up their practical work in a report style which can replicate that used in industry. In these cases, candidates can be expected to make sure that the report meets its intended purpose by a format and layout appropriate to an industrial readership.

Numeracy (Using Number) at SCQF level 5

As part of the practical work for this Unit, candidates are required to carry out practical work. They are expected to undertake calculations using scientific formulae and, using the Outcome of these calculations, draw conclusions about the results of their practical work. This will involve quantitative data over a range and candidates will be required to decide what numerical operations are to be carried out and the order in which to do them.

Higher National Unit specification: support notes (cont)

Unit title: Food Manufacturing: Processing Practices at Elevated Temperatures

Working with Others **(Working Co-operatively with Others) at SCQF level 5**

The opportunities to gather evidence for this Core Skill component depend on the approach used for the practical work required by this Unit. Candidates are expected to carry out food processing operations using pilot plant equipment. They could do this in groups in which case they will have to work with others to identify the requirements of the practical work and to determine what roles and responsibilities each member will take in order for the work to be completed safely and hygienically. They will also need to organise their own contribution, alter it where appropriate and make suggestions to the others for the practical work. They will also have to take actions to encourage co-operative working during the practical activity such as providing support and encouragement for others involved in the task and helping to minimise any disagreements among group members.

Open learning

This Unit could be delivered by Open Learning although candidates will have to have the opportunity to undertake practical work. Appropriate arrangements would need to be made for assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Food Manufacturing: Processing Practices at Elevated Temperatures

This Unit is a mandatory Unit in the HNC Food Science and Technology. It is one of three specialist Units in food manufacturing which you will take as part of your HNC. The others are:

♦ *Food Manufacturing: Food Processing at Ambient Temperatures*
♦ *Food Manufacturing: Food Processing at Sub-Ambient Temperatures*

It follows on from the introductory Units in *Food Industry Principles: An Introduction* and *Food Industry Practices: An Introduction*, particularly the second of these. The *Food Industry Practices: An Introduction* Unit introduced you to methods of food processing where you learnt that there are three main types depending on the temperature involved.

This Unit covers food processing at elevated temperatures. The processes you will look at will include blanching, pasteurisation, sterilisation, baking and frying. You will also be asked to perform evaporation and dehydration techniques such as freeze drying.

This is a practical Unit and you will be involved in practical work using pilot plant equipment. This will allow you to develop the skills and understanding you have already gained from *Food Industry Practices: An Introduction*. In this way, you will get more practical, hands-on experience of the kind you will need when you take up employment in the food industry. You will find out about the items of equipment used in different methods of processing at elevated temperatures and the factors which affect the selection of equipment.

You will already know about the importance of health and safety and hygiene in food processing. You will be expected to conduct your practical work in a manner which meets all health, safety and hygiene requirements. You will be observed while you are doing it in order to ensure that you do work in accordance with these.

The assessment for the Unit will require you to carry out four different food processing operations at elevated temperatures, including performing evaporation and dehydration techniques. You will also be required to record the results of your practical work and draw conclusions from them, for example about how they may apply in large-scale industrial contexts. You will also be expected to explain the items of equipment used and factors affecting the selection of equipment and the method of processing.

You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.

After you have completed this Unit, you could consider other areas such as Food Hygiene, HACCP and Health and Safety.

Higher National Unit specification

General information for centres

Unit title: Microbiology of Foods 1

Unit code: F6VL 34

Unit purpose: This Unit is designed to enable candidates to explain the different main groups of micro-organisms and their importance to the food industry. The Unit also introduces candidates to some of the practical skills required in the microbiology laboratory.

On completion of the Unit the candidate should be able to:

1   Explain the main groups of micro-organisms.
2   Perform microbiological techniques on growth of micro-organisms.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. However, it would be beneficial if candidates had completed a science subject. This could be achieved through Units in Biology or Chemistry at SCQF level 6 or through the HN Unit F6VB 33 *Science for the Food Industry: An Introduction.*

Core Skills: There are opportunities to develop the Core Skills component of *Communication:* Written Communication (Writing) at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is a mandatory Unit in the HNC in Food Science and Technology.

Assessment: The assessment for this Unit consists of explanation of the role of micro-organisms in the food industry which could take the form of a report or a presentation. In addition candidates must carry out three practical laboratory exercises each of which should be observed and recorded, perhaps by using an observation checklist. Candidates must provide information on the results of each practical exercise and could use a laboratory logbook to do this. Candidates could gather all their reports into a portfolio which would contain all the assessment evidence for the Unit.

Higher National Unit specification: statement of standards

Unit title: Microbiology of Foods 1

Unit code: F6VL 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Explain the major groups of micro-organisms

Knowledge and/or Skills

- ♦ Cell structure
- ♦ Morphology
- ♦ Reproduction/replication
- ♦ Role of micro-organisms in the food industry

OUTCOME 2

Perform microbiological techniques on growth of micro-organisms

Knowledge and/or Skills

- ♦ Correct use of laboratory equipment
- ♦ Safe performance of laboratory techniques
- ♦ Data analysis and calculation of results

Higher National Unit specification: statement of standards (cont)

Unit title: Microbiology of Foods 1

Evidence Requirements for the Unit

Candidates will need to provide written/oral and practical evidence to meet all the Knowledge and/or Skills items by showing that they can:

♦ explain, using diagrams where appropriate, the cell structure, morphology and reproduction/replication of bacteria, yeasts, moulds, protozoa, algae and viruses
♦ give a valid example to illustrate the role of each of the 6 types of micro-organism in the food industry: in each case, the example should be accompanied by a reason to explain the role in the food industry

Candidates should carry out three practical laboratory exercises on the growth of micro-organisms using different microbiological techniques. The exercises should be carried out aseptically and in accordance with approved standards.

Candidates should prepare and set up equipment in an appropriate manner for each piece of laboratory work. They should deploy suitable practical techniques in accordance with prevailing safety requirements in the laboratory. They should draw conclusions on the effect of the growth of micro-organisms from the results of the practical work. These conclusions should be related to the food industry.

Candidates should be observed while undertaking the three practical laboratory exercises and a record should be kept of this observation. Candidates should also keep records of the results of each practical exercise.

Assessment Guidelines for the Unit

Candidates could present evidence in a number of ways to show that they can explain the different types of micro-organisms. They could be asked to produce a short report or asked to prepare a presentation perhaps using suitable software or posters. The evidence should include referencing where appropriate.

An observation checklist can be used to record the observation of practical work and it can cover items such as practical skills deployed and safe laboratory practice. Photographic and/or video evidence could be used to supplement the checklist. Candidates could provide information of the results of each laboratory exercise by keeping a laboratory logbook. Candidates could be asked questions about the work they have done to supplement the observation checklist and the information on results.

Administrative Information

Unit code: F6VL 34

Unit title: Microbiology of Foods 1

Super class category: NH

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

Higher National Unit specification: support notes

Unit title: Microbiology of Foods 1

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is a mandatory Unit in the HNC in Food Science and Technology. It introduces candidates to basic microbiology theory and practical skills in the context of food manufacture. It will also help prepare candidates for employment in a biological science related post.

This Unit is an applied Unit. Candidates are expected throughout the Unit to apply their knowledge and understanding of microbiology and associated laboratory techniques to food processing and the food industry. It is important that candidates appreciate the reason why the study and practice of microbiology is vitally important in food manufacturing. An important part of the Unit also is to provide candidates with the vocabulary of microbiology. This will enable them to have meaningful discussion with specialists in an industrial context.

Candidates attempting this Unit will find it beneficial to have some prior scientific knowledge. This can be achieved through the completion of suitable Units in biology or a related science at SCQF level 6. It is possible, however, that some candidates embarking on an HNC in Food Science and Technology may not have previously studied science at SCQF level 6. Candidates in this situation can take the HN Unit F6VB 33 *Science for the Food Industry: An Introduction* which will prepare them for this SCQF level 7 Unit. Ideally, candidates should have completed 'Science for the Food Industry: An Introduction' before they begin this Unit. However, candidates who are in the process of completing F6VB 33 *Science for the Food Industry: An Introduction* may well be suitably prepared to embark on this Unit.

The Unit will help candidates to become familiar with some of the microbiological techniques which are used in the food industry and of the importance of following proper procedures in the laboratory. Candidates should be made fully aware of the importance of safe working practices and the precautions that should be taken to ensure that these are achieved. They should recognise the need to obtain accurate results and the consequent requirement to conduct experiments carefully and according to the relevant procedure. They will be expected also to keep a record of their observations and results including calculations where necessary and interpretation of the results. At the completion of the Unit, candidates should feel confident about performing routine experiments.

This Unit is closely linked to FV6M 34 *Microbiology of Foods 2* which covers microbiological agents, radiations, competition and metabiotic effect.

Higher National Unit specification: support notes (cont)

Unit title: Microbiology of Foods 1

For Outcome 1 the following types of micro-organisms can be covered: bacteria, yeasts, moulds, protozoa, algae and viruses. In each case, candidates should be able to explain cell structure, morphology and reproduction/replication of the micro-organism. They should also be able to give an example of each micro-organism which is relevant to the food industry. It is insufficient to provide an example on its own and candidates would be expected to relate the example to a suitable context relevant to the food industry and explain why the example is important to the food industry.

For Outcome 2, the analysis of micro-organisms is undertaken through laboratory based practical exercises. For this Unit, laboratory work should focus on the growth of micro-organisms. Candidates should develop suitable laboratory skills, such as the use of microscope to examine wet preparations; the preparation of simple and differential stained slides; aseptic transfers; use of pipette; inoculation of solid and liquid media.

The techniques required to work in a microbiology laboratory in the food manufacturing industry include:

♦   Safety — use of aseptic technique
♦   Microscopy — morphology of bacteria, yeasts and moulds
♦   Staining techniques — simple staining, Gram staining, endospore staining
♦   Sub culturing techniques — pipetting, inoculations, streaking out
♦   Incubation techniques — temperature, gaseous environment
♦   Disposal — cultures, slides, samples

Candidates should be made thoroughly aware of the critical importance of health and safety, including Personal Protective Equipment (PPE) in a laboratory and be able to take all appropriate precautions to ensure that an appropriate environment is maintained. They should draw conclusions from their practical work which are related to the food industry.

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

Delivery should aim to help candidates apply the material in the Unit to the food industry. It should also build laboratory skills so that candidates can approach laboratory work confidently.

Candidates should be encouraged to take responsibility for their own learning and may be able to research for themselves some of the ways in which microbiology applies in the food industry. This could help to integrate different parts of the HNC in Food Science and Technology as candidates should be able to recognise, for example, the ways in which micro-organisms affect the methods used for processing food.

Assessment for this Unit involves both practical work and explanation. Candidates should be observed during some of their practical work and the observation should be recorded on a checklist (photographic and/or video evidence could be used to supplement the checklist). This will provide evidence that candidates have followed proper laboratory procedures and carried out the work safely and accurately. If necessary, the observation checklists may be supplemented by additional questions. Candidates must provide information on the results of practical work which could be done through a laboratory log book.

Higher National Unit specification: support notes (cont)

Unit title: Microbiology of Foods 1

Explanation can be provided in a number of ways and assessors could choose to vary the methods to suit different groups of candidates. Candidates could provide a report for example which they could prepare in their own time. This report could be based on a series of questions which may help candidates to structure their responses. Another option is to ask candidates to give a presentation.
The evidence should include referencing where appropriate.

Again candidates could be given some questions to help them structure their work. Candidates could make use of software (such as PowerPoint) or they could develop a poster based presentation.

Whatever method is used, assessment judgments should be based on the explanation of microbiological terms and not the facility with which the candidate uses the method of explanation.

For all assessment evidence, candidates could be asked questions to supplement evidence provided in another form.

There may be scope, depending on the way assessment evidence is generated, for candidates to gather all their evidence in a portfolio which they can build as they progress through the Unit.

Opportunities for developing Core Skills

Communication: Written Communication (Writing) at SCQF level 5

As part of their assessment work for this Unit, candidates are expected to maintain details of practical work. This can be done in a laboratory log book or diary and candidates will be expected to organise the content into a logical and effective structure. Candidates will, therefore, use written information to demonstrate their knowledge and understanding of relevant ideas and information. Candidates can also be asked to write up their practical work in a report style which can replicate that used in industry. In these cases, candidates can be expected to make sure that the report meets its intended purpose by a format and layout appropriate to an industrial readership.

Open learning

This Unit could be delivered by Open Learning. However, candidates must be able to undertake practical laboratory work under supervised conditions, something which may be time-consuming and difficult to organise. If suitable arrangements can be made, they would have to cover assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Microbiology of Foods 1

This Unit is a mandatory Unit in the HNC in Food Science and Technology. It is designed to provide you with knowledge and understanding of microbiology. This underpins all aspects of the food industry and is something that you will make use of throughout your whole course. It applies particularly to the food processing Units but you will find applications of micro-biology in many other parts of the course too.

The Unit is important also because it gives you the vocabulary that you will need when you take up employment in the food industry. This will enable you to discuss what happens to food and the effects that this may have on consumers as well as on food manufacturers.

You will study aspects of 6 different kinds of micro-organisms: bacteria, yeasts, moulds, protozoa, algae and viruses. In each case, you will also be expected to give examples to show how they are relevant and important to the food industry.

As well as giving you some background in scientific concepts and understanding, the Unit enables you to develop skills in laboratory work. Again, these are skills which can be critical to the successful operation of organisations in the food industry. In this Unit, you will concentrate particularly on laboratory techniques relating to the growth of micro-organisms.

After completing the Unit, you will have a good basis in microbiology theory and practice and be well aware of its relevance to the food industry. You will be able to further extend and develop your practical and theoretical knowledge of Microbiology in the Unit, *Microbiology of Foods 2*.

The assessment for the Unit will require you to show that you can accurately explain the different types of micro-organisms. You will also have to successfully complete practical laboratory work. You will be observed while you are doing your laboratory work and will have to keep records of work that you have done. You will also have to draw conclusions relating to the food industry from the results.

You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.

Higher National Unit specification

General information for centres

Unit title: Food Composition

Unit code: F6VD 34

Unit purpose: This Unit is designed to provide candidates with relevant underpinning knowledge and understanding of the chemical components of food and to enable them to apply this to food manufacturing and to the food industry.

On completion of the Unit the candidate should be able to:

1   Explain the chemical structure and properties of the major components of food.
2   Explain the implications for the food industry of chemical properties of food components.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. However, it would be beneficial if candidates had completed a science subject, such as Chemistry, at SCQF level 6. Candidates who have not do have previous knowledge of science at SCQF level 6 can prepare for this Unit by taking the HN Unit F6VB 33 *Science for the Food Industry: An Introduction*. They should have completed, or be in the process of completing, F6VB 33 *Science for the Food Industry: An Introduction* before embarking on this Unit.

Core Skills: There are opportunities to develop the Core Skills component of *Communication:* Written Communication (Writing) at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is a mandatory Unit in the HNC Food Science and Technology.

Assessment: This Unit can be assessed in a variety of ways, eg, candidates can be asked to explain the chemical functionalities and properties of different examples of fats and oils, carbohydrates and proteins. For each example, they can also explain its factors about the chemical composition which have important implications for the food industry. These implications could relate to a range of factors such as effects on food processing and diet and nutrition.

Higher National Unit specification: statement of standards

Unit title: Food Composition

Unit code: F6VD 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Explain the chemical structure and properties of the major components of food

Knowledge and/or Skills

♦ Fats and oils
♦ Carbohydrates
♦ Proteins

OUTCOME 2

Explain the implications for the food industry of chemical properties of food components

Knowledge and/or Skills

♦ Sources of food components
♦ Chemical reactions during food processing
♦ Selection of fats for bakery goods, emulsions and frying
♦ Functions of fats and oils, carbohydrates and proteins in food
♦ Diet and nutrition

Evidence Requirements for the Unit

Candidates will need to provide written/oral evidence to meet all the Knowledge and/or Skills items by showing that they can illustrate the chemical functionalities and properties of food components.

They should provide six examples at least one of which should come from each of fats and oils, carbohydrates and proteins. The examples should be chosen to ensure that each of the knowledge and/or skills items in Outcome 2 is covered at least once. For each example candidates should provide the following:

Higher National Unit specification: statement of standards (cont)

Unit title: Food Composition

♦   a precise explanation of the key aspects of the chemical structure of the example and its main properties: explanations should use diagrams where appropriate and include suitable scientific concepts.
♦   a precise explanation of how the chemical composition of the example can be applied to the food industry: the evidence should cover three different factors which are significant for the food industry and can cover any aspect of food manufacturing and consumption including selection of components, health and dietary factors; changes of components during processing; sources of components.

Assessment Guidelines for the Unit

This Unit can be assessed in a variety of ways, eg candidates can be given different examples of fats and oils, carbohydrates and proteins. They could be asked to research each example to find out:

♦   its chemical functionalities and properties
♦   factors about its chemical composition which have important implications for the food industry

Candidates could be given a brief to help them concentrate on the key factors in each case.

The choice of examples should reflect a number of different factors to enable candidates to recognise the significance of the chemical composition of food components to food processing. Assessment can be undertaken as candidates progress through the Unit.

Candidates could present their explanations in a report form (including referencing where appropriate) or by making use of presentation software (such as Powerpoint) or any other suitable methods.

Administrative Information

Unit code: F6VD 34

Unit title: Food Composition

Superclass category: NH

Original date of publication: August 2008

Version: 02

History of changes:

Version	Description of change	Date
02	Title amended by removal of numeral 1 in line with QDT agreement.	27/04/10

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Food Composition

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is a mandatory Unit in the HNC Food Science and Technology. It is intended to provide candidates with essential underpinning knowledge and understanding about the chemical structure and properties of food components. This knowledge and understanding permeates all aspects of food processing and the food industry but provides a particular foundation for the study of different methods of food processing.

The Unit does not contain practical scientific work but it is an applied Unit as candidates are expected to apply their knowledge and understanding of chemistry to food processing and the food industry. It is important that candidates appreciate the reason why food chemistry is critical to food manufacturing. This can be done by highlighting the implications of chemical structure and properties of food components for the food manufacturing industry and for those who consume the industry's products.

Candidates undertaking this Unit will find it beneficial to have some prior scientific knowledge. This can be achieved through the completion of suitable Units in chemistry or related science at SCQF level 6. It is possible, however, that some candidates embarking on an HNC in Food Science and Technology may not have previously studied science at SCQF level 6. Candidates in this situation can take the HN Unit F6VB 33 *Science for the Food Industry: An Introduction* which will prepare them for this SCQF level 7 Unit. Ideally, candidates should have completed F6VB 33 *Science for the Food Industry: An Introduction* before they begin this Unit. However, candidates who are in the process of completing F6VB 33 *Science for the Food Industry: An Introduction* may well be suitably prepared to embark on this Unit.

Outcome 1

This covers fats and oils, carbohydrates and proteins. Candidates should also be made aware of vitamins and minerals. The following gives some guidance on what could be covered.

Lipid chemistry could cover the following:

Fatty acids, glycerol, ester formation, triglyceride structure, effect of chain length and saturation on melting points and keeping qualities, winterisation, smoke point, oxidative rancidity: reactions and control, hydrolytic rancidity, cis-fats and trans-fats.

Higher National Unit specification: support notes (cont)

Unit title: Food Composition

Carbohydrate chemistry could cover the following:

Photosynthesis, common sources of sugars, starch and other polysaccharides, mono and disaccharides, relative sweetness, solubility, invert sugar, caramelisation, preservation by sugar, structure of amylase and amylopectin, gelatinisation, retrogradation, hydrolysis of starch, glucose/corn syrup, cellulose and other constituents of non starch polysaccharides (NSP) and dietary fibre, formation of pectin gels, carbohydrate replacements such as artificial sweetners.

Protein chemistry could cover the following:

Classification of amino acids, essential and non-essential amino acids, plant and animal proteins, zwitterions, iso-electric points, primary, secondary and tertiary structures, effects of heat, acid, mechanical agitation, enzymes etc. on protein structure.

Outcome 2

Candidates should consider the ways in which chemical structures and properties can be applied to the food industry. They can do this by identifying factors which affect the food industry in a significant way. The factors should relate to the chemical structure and chemical properties of food components but can cover any aspect of food processing and food consumption. In other words, the factors can cover any matter which can affect the operations of firms in the food industry and which food technologists should be aware of and alter to.

The factors may vary depending on whether fats and oils, carbohydrates or proteins are being considered. For example factors affecting:

♦   fats and oils could be fats and oils for frying, shortening, creaming, emulsions
♦   carbohydrates could be pectin gel formation
♦   proteins could include denaturation and coagulation

Reference could be made to vitamins and minerals.

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

This Unit is an applied Unit which also includes significant underpinning theoretical knowledge and understanding of chemistry as related to the food industry. The purpose of the Unit is to enable candidates to become aware of the significance of chemical structure and properties to all aspects of the food industry. The delivery of the Unit should keep this purpose firmly in mind and encourage candidates to see how the material can be applied to the day to day operations and activities of food suppliers and consumers.

Candidates are not expected in this Unit, however, to undertake practical laboratory work. There is a complementary Unit in the HNC/HND Food Science and Technology, ie F6VC 34 *Food Analysis*, which does develop laboratory skills. This is an optional Unit in the HNC Food Science and Technology. Where candidates are taking both Units, it may be appropriate to integrate the delivery as far as possible.

Higher National Unit specification: support notes (cont)

Unit title: Food Composition

Assessment for this Unit focuses on the application of the knowledge and understanding of chemical structures and chemical properties. Candidates are given examples of food components and asked not only to explain their structure and properties but also to investigate how the component affects the food industry. Candidates have to do this for a number of different components. This means, if desired, candidates can carry out assessment work during the delivery of the Unit. Alternatively, candidates can be given a research brief towards the end of the delivery period and asked to apply the knowledge that they have gained during their study of the Unit. It would be possible, and may be desirable, to give different examples to different candidates. Candidates can be encouraged to do their own research to support their investigation of the application of theoretical concepts and principles from chemistry.

Candidates can present their explanations for assessment in a number of ways. They could provide a report, perhaps structured around some questions which they have been given in advance. They could do a poster presentation or make use of presentation software.

Opportunities for developing Core Skills

Communication: Written Communication (Writing) at SCQF level 5

As part of their assessment work for this Unit, candidates are expected to explain the chemical functionalities and properties of major components of food and relate these to the food industry. Candidates could do this by producing a written report although other presentation methods could be adopted. If they do produce a written report then they will use written information to demonstrate their knowledge and understanding of scientific concepts. For this, they will be required to organise their material into a logical and effective structure and make use of an appropriate format for a scientific audience. They could be asked to base their report on research which they have carried out for themselves.

Open learning

This Unit could be delivered by Open Learning although candidates will have to have the opportunity to undertake practical work. Appropriate arrangements would need to be made for assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Food Composition

This Unit is a mandatory Unit in the HNC Food Science and Technology. It is designed to give you the underpinning knowledge and understanding of the chemical components of food which you will need in your study of all aspects of food processing and technology. It will also enable you to apply this to food manufacturing and to the food industry. It is, in fact, a fundamental building block in the HNC and you will make use of it throughout your whole course. You will find applications of the chemistry of foods in the food processing Units but these are important in many other parts of the course too.

In addition, the Unit is important because it gives you the vocabulary that you will need when you take up employment in the food industry. This will enable you to discuss what happens to food and the effects that this may have on consumers as well as on food manufacturers. In all these respects it has a similar purpose to the mandatory Unit *Microbiology of Foods 1*.

You will study the chemical structure and properties of different components of food such as fats and oils, carbohydrates and proteins. You also be asked to explain the implications that these chemical properties have for the food industry. These include, among other things, the sources of food components and implications for diet and nutrition.

This is an applied Unit in that you will have to apply your chemical knowledge and understanding to examples from the food industry. There is no laboratory work in this Unit. Another Unit in the HNC Food Science and Technology award, ie *Food Analysis*, is designed to enable you to develop practical laboratory skills and techniques which will enable you to analyse the chemical properties of foodstuffs.

The assessment for this Unit requires you to explain the chemical functionalities and properties of six different examples of food components. The examples will include at least one from each of fats and oils, carbohydrates and proteins. For each example, you will also have to explain how it can be applied to the food industry.

You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.

Higher National Unit specification

General information for centres

Unit title: Food Hygiene Intermediate

Unit code: F4TL 34

Unit purpose: This Unit is designed to develop the candidate's knowledge and understanding of the principles of Food Safety. The Unit is equivalent to the REHIS Intermediate Food Hygiene certificate.

On completion of the Unit, the candidate should be able to:

1   Describe the principles of food safety identifying the role of bacteria and non bacterial agents.
2   Describe the production of safe food in relation to the prevention of food poisoning, food borne illness and contamination by physical and allergenic materials.
3   Explain the rationale behind food safety management systems based on the principles of HACCP and the role of current hygiene legislation.
4   Explain the need for satisfactory design, construction and maintenance of food premises and equipment and the benefits of effective cleaning and disinfection.
5   Explain the principles involved in the preservation and safe storage of food.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Candidates should have good communication competence demonstrated by the achievement of Core Skills *Communication* at SCQF level 5 or above. They should also have achieved an Elementary Food Hygiene Unit/qualification, for example NQ Unit DC0K 10 *Food Hygiene Elementary Intermediate 1* and/or achieved the REHIS Elementary Food Hygiene Certificate (or equivalent) or Standard Grade Home Economics at General level.

Core Skills: There are no opportunities to develop Core Skills in this Unit.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: Each Outcome can be assessed individually by means of closed-book questioning or it may be possible to combine Outcomes. An exemplar instrument of assessment and marking guidelines have been produced to show the national standard of achievement required at HN level.

Higher National Unit specification: statement of standards

Unit title: Food Hygiene Intermediate

Unit code: F4TL 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Describe the principles of food safety identifying the role of bacteria and non bacterial agents

Knowledge and/or Skills

♦   Benefits of high standards of food hygiene
♦   Types of micro-organisms
♦   Types of non-bacterial agents
♦   Factors which affect growth of micro-organisms
♦   The role of spores in the survival of bacteria

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge by showing that they can:

♦   identify the moral, legal and financial benefits of high standards of food hygiene
♦   define: micro-organisms (moulds, yeasts, viruses, and bacteria) and describe their involvement in food spoilage, food poisoning and food borne illness
♦   identify the problems caused by chemicals (including metals) and by the consumption of poisonous plants, fish and viruses, their involvement in food poisoning and contamination and relevant preventative measures
♦   describe binary fission, average generation time and the factors which affect the bacterial survival and multiplication: time, nutrients, pH level, moisture, atmosphere, temperature
♦   describe the function of bacterial spores, their formation and their role in the survival of bacteria

This Outcome will be assessed by means of unseen closed-book short answer questions produced under controlled conditions. Evidence of knowledge for this Outcome will be assessed on a sample basis. The sample must cover all knowledge and skills items listed above. The questions will be allocated marks and candidates must obtain a mark of 60% or more for this Outcome.

Assessment Guidelines

This Outcome will be assessed by means of short answer responses to unseen closed-book questions. The assessment will be carried out in controlled conditions. The questions must cover all knowledge and skills items and it is envisaged the assessment will take approximately 30 minutes.

Higher National Unit specification: statement of standards (cont)

Unit title: Food Hygiene Intermediate

Centres must ensure that there are an appropriate number of questions available for any re-assessment to ensure that candidates are not offered an assessment which has been recently undertaken by other candidates. Questions must be of the same standard and must present the same level of challenge to candidates.

The assessment for this Outcome could be combined with the assessment of the other 4 Outcomes of the Unit. It is envisaged that an assessment covering all 5 Outcomes would last approximately 2.5 hours.

Outcome 2

Describe the production of safe food in relation to the prevention of food poisoning, food borne illness and contamination by physical and allergenic materials

Knowledge and/or Skills

- Food poisoning and food borne disease
- Sources, routes and foods commonly involved in food poisoning/food borne infection
- Physical and allergenic contaminants and their sources
- Control of food poisoning and food borne infection and other food safety hazards

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge by showing that they can:

- describe the main differences between food poisoning and food borne disease in terms of their effects and characteristics
- define and provide examples of high-risk foods
- describe cross contamination, differentiating between direct and indirect
- identify the most common physical and allergenic contaminants and the most likely sources
- identify the sources, food vehicles, and specific control measures of the following food poisoning bacteria:
  — *Salmonella species*
  — *Staphylococcus aureus*
  — *Clostridium perfringens*
  — *Bacillus cereus*
  — *Clostridium botulinum*
- and the following Food Borne Illnesses:
  — *Campylobacter species*
  — *Listeria species*
  — *V TEC (verocytotoxin producing E.coli)*
- identify sources of physical and microbial contamination related to personal hygiene and describe how they can be controlled
- list occasions when a food handler should wash and disinfect their hands and describe a suitable method for washing, disinfecting and drying hands

Higher National Unit specification: statement of standards (cont)

Unit title: Food Hygiene Intermediate

This Outcome will be assessed by means of unseen closed-book short answer questions produced under controlled conditions. Evidence of knowledge for this Outcome will be assessed on a sample basis. The sample must cover all knowledge and skills items listed above. The questions will be allocated marks and candidates must obtain a mark of 60% or more for this Outcome.

Assessment Guidelines

This Outcome will be assessed by means of short answer responses to unseen closed-book questions. The assessment will be carried out in controlled conditions. The questions must cover all knowledge and skills items and it is envisaged the assessment will take approximately 30–45 minutes.

Centres must ensure that there are an appropriate number of questions available for any re-assessment to ensure that candidates are not offered an assessment which has been recently undertaken by other candidates. Questions must be of the same standard and must present the same level of challenge to candidates.

The assessment for this Outcome could be combined with the assessment of the other 4 Outcomes of the Unit. It is envisaged that an assessment covering all 5 Outcomes would last approximately 2.5 hours.

Outcome 3

Explain the rationale behind food safety management systems based on the principles of HACCP and the role of current hygiene legislation

Knowledge and/or Skills

♦   Current Food Hygiene legislation
♦   Principles of HACCP
♦   HACCP based systems
♦   The Role of the supervisor/middle manager in food safety

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge by showing that they can:

♦   describe the main requirements of current Food Hygiene legislation
♦   describe the role of the authorised enforcement officer and their powers
♦   define the terms: hazards, controls, critical control points, monitoring, validation, verification and recording
♦   describe the main benefits/advantages of having a HACCP based system
♦   outline the food hygiene/HACCP training requirements legally required for food handlers and the benefits of structured training
♦   explain the purpose of having establishment specific standards eg house rules and give examples of these
♦   describe responsibilities of supervisors/middle managers with regard to food safety management systems

Higher National Unit specification: statement of standards (cont)

Unit title: Food Hygiene Intermediate

This Outcome will be assessed by means of unseen closed-book short answer questions produced under controlled conditions. Evidence of knowledge for this Outcome will be assessed on a sample basis. The sample must cover all knowledge and skills items listed above. The questions will be allocated marks and candidates must obtain a mark of 60% or more for this Outcome.

Assessment Guidelines

This Outcome will be assessed by means of short answer responses to unseen closed-book questions. The assessment will be carried out in controlled conditions. The questions must cover all knowledge and skills items and it is envisaged the assessment will take approximately 30–45 minutes.

Centres must ensure that there are an appropriate number of questions available for any re-assessment to ensure that candidates are not offered an assessment which has been recently undertaken by other candidates. Questions must be of the same standard and must present the same level of challenge to candidates.

The assessment for this Outcome could be combined with the assessment of the other 4 Outcomes of the Unit. It is envisaged that an assessment covering all 5 Outcomes would last approximately 2.5 hours.

Outcome 4

Explain the need for satisfactory design, construction and maintenance of food premises and equipment and the benefits of effective cleaning and disinfection

Knowledge and/or Skills

♦   Principles of design of the working environment
♦   Uses of materials relevant for premises and equipment
♦   The importance of effective maintenance, cleaning and disinfection
♦   The purpose of provision of effective lighting, ventilation, services
♦   Waste storage and disposal systems
♦   The control of food pests
♦   Cleaning and disinfection of food premises, equipment and utensils

Higher National Unit specification: statement of standards (cont)

Unit title: Food Hygiene Intermediate

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge by showing that they can:

♦   describe the principles involved in the satisfactory design of food premises, equipment and utensils
♦   describe the types of materials used in the construction of food premises and equipment
♦   explain the need for proper maintenance of premises and equipment and how this might be achieved
♦   explain the importance of the necessity for the satisfactory provision of lighting, ventilation, water, power supplies and drainage — highlighting good practice/legal requirements
♦   describe the main types of waste storage and disposal systems available for food premises
♦   identify the main hazards associated with food pests
♦   describe the habitat, characteristics, food requirements, and signs of infestation of food pests
♦   describe a system for the effective cleaning and disinfection of premises, work surfaces and equipment

This Outcome will be assessed by means of unseen closed-book short answer questions produced under controlled conditions. Evidence of knowledge for this Outcome will be assessed on a sample basis. The sample must cover all knowledge and skills items listed above. The questions will be allocated marks and candidates must obtain a mark of 60% or more for this Outcome.

Assessment Guidelines

This Outcome will be assessed by means of short answer responses to unseen closed-book questions. The assessment will be carried out in controlled conditions. The questions must cover all knowledge and skills items and it is envisaged the assessment will take approximately 30–45 minutes.

Centres must ensure that there are an appropriate number of questions available for any re-assessment to ensure that candidates are not offered an assessment which has been recently undertaken by other candidates. Questions must be of the same standard and must present the same level of challenge to candidates.

The assessment for this Outcome could be combined with the assessment of the other 4 Outcomes of the Unit. It is envisaged that an assessment covering all 5 Outcomes would last approximately 2.5 hours.

Higher National Unit specification: statement of standards (cont)

Unit title: Food Hygiene Intermediate

Outcome 5

Explain the principles involved in the preservation and safe storage of food

Knowledge and/or Skills

♦ Importance of satisfactory storage
♦ Storage units
♦ Defrosting and cooling of food
♦ Stock rotation of food
♦ Date marking of food
♦ Principles of food preservation

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge by showing that they can:

♦ explain the importance and practical application of satisfactory storage to minimise the risk of contamination and decomposition of food and the prevention of microbial growth
♦ identify the importance of the following factors in relation to the effectiveness of Unit: siting, maintenance and cleaning, appropriate loading, temperature checks
♦ explain the controls necessary when defrosting food
♦ explain the correct procedures for cooling hot or cooked food to be used at a later stage
♦ describe what is meant by stock rotation and its benefits
♦ explain the use of terms 'Use-by' and 'Best Before' on foods
♦ describe the basic principles involved in the preservation of food by the use of high/low temperature, dehydration, chemicals, modification of atmosphere and smoking

This Outcome will be assessed by means of unseen closed-book short answer questions produced under controlled conditions. Evidence of knowledge for this Outcome will be assessed on a sample basis. The sample must cover all knowledge and skills items listed above. The questions will be allocated marks and candidates must obtain a mark of 60% or more for this Outcome.

Assessment Guidelines

This Outcome will be assessed by means of short answer responses to unseen closed-book questions. The assessment will be carried out in controlled conditions. The questions must cover all knowledge and skills items and it is envisaged the assessment will take approximately 30–45 minutes.

Centres must ensure that there are an appropriate number of questions available for any re-assessment to ensure that candidates are not offered an assessment which has been recently undertaken by other candidates. Questions must be of the same standard and must present the same level of challenge to candidates.

The assessment for this Outcome could be combined with the assessment of the other 4 Outcomes of the Unit. It is envisaged that an assessment covering all 5 Outcomes would last approximately 2.5 hours.

Administrative Information

Unit code: F4TL 34

Unit title: Food Hygiene Intermediate

Super class category: NH

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

Higher National Unit specification: support notes

Unit title: Food Hygiene Intermediate

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is intended to develop the candidate's knowledge of Food Hygiene, building upon knowledge gleaned while undertaking an Elementary Food Hygiene course or National Certificate related Unit. A strong emphasis should be placed on the importance of controls and how as a part of a food safety management system they can be effective as a means of eliminating or reducing the recognised food hazards: Microbiological, Physical, Chemical and Allergenic to a safe level. Candidates should be encouraged to complete Hazard Analysis/HACCP charts in order to ensure a holistic understanding in practice of the practicalities of this concept. Candidates should be encouraged to create a 'Glossary of Terms' for this Unit to aid understanding of food hygiene specific terminology. These terms should include the following: *Food Hygiene, HACCP, hazards, controls, CCPs, validation, verification, monitoring, recording, hazard analysis, micro-organism, pathogen, food poisoning, food spoilage, gastroenteritis, healthy carrier, convalescent carrier, case, binary fission, optimum, toxins, incubation/onset period, contamination, cross contamination, high risk food, food allergen, allergy and intolerance, cleaning, disinfection, disinfectant, sterilisation, bactericide, detergent, bactericidal detergent, sanitizer, food pest.*

Outcome 1

This helps to 'set the scene' in terms of the problems associated with the practice of poor food hygiene practices in the workplace and the benefits of having high standards. It looks at the recent food poisoning figures and any trends there may be in terms of new pathogens or particular problem areas/practices. It then involves the consideration of micro-organisms and non-bacterial agents. Bacteriology is also linked to this Outcome allowing underpinning knowledge to be developed at an early teaching/learning stage, this would include size, shape, structural features and toxin formation.

Candidates should be introduced to the consequences of poor food hygiene.

The causes and trends of food poisoning outbreaks over the past 10-year period in Scotland should also be considered.

Outcome 2

This Outcome allows close examination of both physical and bacterial contamination and focuses on their sources and control mechanisms. A study should take place of the important Food Poisoning Bacterias and those responsible for Food Borne Illness, giving practical examples of outbreaks linked to each, where possible.

Higher National Unit specification: support notes (cont)

Unit title: Food Hygiene Intermediate

In relation to personal hygiene, reference should be made to:

♦ boils
♦ cuts
♦ spots
♦ skin infections
♦ sneezing
♦ coughing
♦ smoking
♦ eating in a food room
♦ wearing jewellery/nail varnish
♦ reporting of illness

There should also be an introduction of hazards associated with the presence of food pests.

Outcome 3

This Outcome provides the opportunity for the candidate to come to terms with the extremely important concept of HACCP with all its theory and practical application within a food business. It also introduces current food hygiene legislation and its relevance to HACCP, temperatures, the role of the Environmental Health Officer (EHO) and their powers especially in terms of notices. The Food Standards Agency should be covered here, looking at their role in terms of food safety. Candidates should be encouraged to complete HACCP charts which may be linked to any practical cookery activities they may be involved in at the time.

The following should be covered:

♦ the main requirements of the Food Safety Act; Food Hygiene (Scotland) Regulations 2006; Regulation EC No 852/2004 and the General Food Regulations 2004
♦ the role and powers of authorised enforcement officers to include the issue of Hygiene Improvement Notice and Hygiene Emergency Prohibition Notice
♦ the seven principles of HACCP as defined by the Codex Alimentarius
♦ the role of the Food Standards Agency and how they relate to the local authority
♦ the background to food hazard analysis systems and the rationale behind them
♦ the main prerequisite requirements for a food business prior to HACCP implementation
♦ Examples of food safety management systems SFBB (Safer Food Better Business) and CookSafe Food Safety Assurance System
♦ the responsibilities of supervisors/middle managers to include: the establishment of food safety policies, quality assurance and control, auditing systems, inspecting premises, staff training, control of allergenic hazards

Outcome 4

This Outcome looks at the practicalities of the design of food premises/equipment and how their effectiveness in terms of food safety can be achieved. Legal aspects as well as Good Practice issues should be investigated with planning exercises, visits to existing food premises encouraged.

Higher National Unit specification: support notes (cont)

Unit title: Food Hygiene Intermediate

Also in this Outcome, there is an opportunity to look at Food Pests and the part they play in food hygiene/spoilage, the legal position in terms of infestation and how they might be controlled by effective design and construction and by various controls.

It should cover:

♦   the need for proper maintenance of premises and equipment and how this might be achieved
♦   the main hazards associated with food pests — rodents, birds and insects
♦   the habitat, characteristics, food requirements, signs of infestation of food pests
♦   what is meant by Environmental Control, Physical Control and Chemical Control methods
♦   energies eg Physical, Chemical, Heat used in the cleaning process with practical application
♦   cleaning terms to be understood with practical application: Bactericide, Cleaning, Detergent, Disinfectant, Disinfection, Bactericidal Detergent, Sanitiser, Sterilisation

Outcome 5

This Outcome examines the importance of the correct storage of food as a means of preventing food poisoning/spoilage. In particular effective storage of high risk/raw foods/ready to eat foods should be emphasised and the role of stock rotation. Procedures for the defrosting of stored food and the cooling down of hot food should be highlighted. Food preservation techniques/methods should be dealt with here emphasising the important part this plays in the food industry and understanding the principles involved in the preservation and subsequent storage of foodstuffs.

It should cover:

♦   foods — fresh fruit and vegetables, raw meat and poultry, fish and shellfish, frozen foods, high risk foods, canned and dried goods, eggs
♦   the importance of the following factors in relation to the effectiveness of the storage Unit: siting, maintenance and cleaning, appropriate loading, temperature checks in order to have an effective refrigerator
♦   examples of food preservation by the use of pasteurisation, ultra heat treatment, sterilisation, canning, chilling, freezing, vacuum packing, dehydration, the use of salt and sugar

Guidance on the delivery and assessment of this Unit

Lecturers responsible for the delivery of this Unit should be suitably qualified, preferably with a Diploma in Advanced Food Hygiene and with knowledge of HACCP. The REHIS approved text book, *Intermediate Food Hygiene* (fifth edition onwards) by Richard A. Sprenger would be a useful reference book as well as using audio visual materials produced by Highfield or other recognised training companies. Guest speakers may be considered, eg an Environmental Health Officer for input into legislation.

Higher National Unit specification: support notes (cont)

Unit title: Food Hygiene Intermediate

This Unit is likely to form part of a Group Award, one in which the candidates are provided with the skills and competences necessary to become Hospitality Supervisors/Managers/ Middle managers. This Unit is vital in order to provide them with the knowledge necessary to be responsible for food hygiene in a practical situation including having an awareness of HACCP as the basis on which food safety management systems need to be based. Candidates should be encouraged to apply their knowledge in other areas of their course (where appropriate) particularly if they are to be assessed in units that involve practical cookery. The achievement of this Unit will allow candidates to apply to REHIS for an Intermediate food hygiene certificate.

Open learning

If this Unit is delivered by open or distance learning methods, additional resources will be required for candidate support, assessment and quality assurance.

Candidates with disabilities and/or additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Food Hygiene Intermediate

This Unit is designed to give you an understanding of the principles of Food Hygiene. The Unit is equivalent to the Royal Environmental Health Institute of Scotland's (REHIS) Intermediate Food Hygiene Certificate. Successful achievement of the Unit will provide you with the level of knowledge expected of someone working in a supervisory role within the food industry.

There are five Outcomes in this Unit.

In the first Outcome you will be introduced to the problems associated with poor food hygiene practices and the benefits of having high standards of hygiene.

The second Outcome examines both physical and bacterial contamination and focuses on their sources and control mechanisms.

The third Outcome focuses on the extremely important concept of HACCP (Hazard Analysis and Critical Control Points). This will include both theory and practical application within a food business.

In the fourth Outcome you will look at the practicalities of designing food premises to ensure they are effective in terms of achieving food safety and the need for proper maintenance of premises and equipment. You will also consider food pests and the part they play in food hygiene/spoilage and how they might be controlled by effective design and construction.

In the final Outcome you will look at the importance of the correct storage of food — particularly high risk food, raw food and ready to eat foods - as a means of preventing food poisoning/spoilage. Food preservation techniques and methods will also be covered in this Outcome.

The assessment of the five Outcomes will be by means of unseen closed-book short answer questions.

On successful achievement of this Unit, you will be eligible to apply to REHIS for the Intermediate Food Hygiene Certificate.

Higher National Graded Unit specification

General information for centres

This Graded Unit has been validated as part of the HNC Food Science and Technology. Centres are required to develop the assessment instrument in accordance with this validated specification. Centres wishing to use another type of Graded Unit or assessment instrument are required to submit proposals detailing the justification for change for validation.

Graded Unit title: Food Science and Technology: Graded Unit 1

Graded Unit code: F7EW 34

Type of Graded Unit: Project

Assessment Instrument: Practical Assignment

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Purpose: This Graded Unit is designed to provide evidence that the candidate has achieved the following principal aims of the HNC Food Science and Technology to enable candidates to:

♦   develop study and research skills which will help them to become independent learners
♦   develop practical scientific and technical skills
♦   develop transferable skills such as problem solving which they will need to function effectively in the food and drinks industry
♦   contribute to the demand for trained personnel by employers

General information for centres (cont)

Recommended prior knowledge and skills: It is recommended that the candidate should have completed or be in the process of completing the following Units relating to the above specific aims prior to undertaking this Graded Unit:

F6VF 34: Food Industry Principles: An Introduction
F6VE 34: Food Industry Practices: An Introduction
F6VG 34: Food Manufacturing: Processing Practices at Ambient Temperatures
F6VJ 34: Food Manufacturing: Processing Practices at Sub-Ambient Temperatures
F6VH 34: Food Manufacturing: Processing Practices at Elevated Temperatures
F6VL 34: Microbiology of Foods 1
F6VD 34: Food Composition
F4TL 34: Food Hygiene Intermediate

Core Skills

There are opportunities to develop the Core Skills components listed below in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Problem Solving — Critical Thinking at SCQF level 6
Problem Solving — Planning and Organising at SCQF level 6
Problem Solving — Reviewing and Evaluating at SCQF level 6

Communication — Oral Communication at SCQF level 5
Communication — Reading at SCQF level 5
Communication — Writing at SCQF level 6

Numeracy — Using Graphical Information at SCQF level 4
Numeracy — Using Number at SCQF level 5

Information and Communication Technology — Accessing Information at SCQF level 5
Information and Communication Technology — Providing/Creating Information at SCQF level 5

Assessment: This Graded Unit will be assessed by the use of a Practical Assignment. The developed **Practical Assignment** should provide the candidate with the opportunity to produce evidence that demonstrates she/he has met the aims of the Graded Unit that it covers.

Administrative Information

Graded Unit code: F7EW 34

Graded Unit title: Food Science and Technology: Graded Unit 1

Original date of publication: August 2008

Version: 02

History of changes:

Version	Description of change	Date
02	Titles of Units F6VD 34 amended by removal of numeral 1 in line with QDT agreement.	26/04/10

Source: SQA

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Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates

Graded Unit title: Food Science and Technology: Graded Unit 1

Conditions of assessment

The candidate should be given a date for completion of the **Practical Assignment.** However, the instructions for the assessment task should be distributed to allow the candidate sufficient time to assimilate the details and carry out the assessment task. During the time between the distribution of the assessment task instructions and the completion date, assessors may answer questions, provide clarification, guidance and reasonable assistance. The assessment task should be marked as soon as possible after the completion date. The final grading given should reflect the quality of the candidate's evidence at the time of the completion date.

The evidence for the project is generated over time and involves three distinct stages, where each stage has to be achieved before the next is undertaken. Thus any re-assessment of stages must be undertaken before proceeding to the next stage.

If a candidate fails the project overall or wishes to upgrade, then this must be done using a *substantially different* project, ie all stages are undertaken using a new project, assignment, case study, etc. In this case, a candidate's grade will be based on the achievement in the re-assessment, if this results in a higher grade.

Instructions for designing the assessment task

The assessment task is a project. The project is an investigation into the processing of a food product or products. The project undertaken by the candidate must be a complex task which involves:

♦   variables which are complex or unfamiliar
♦   relationships which need to be clarified
♦   a context which may be familiar or unfamiliar to the candidate

The assessment task must require the candidate to:

♦   analyse the task and decide on a course of action for undertaking the project
♦   plan and organise work and carry it through to completion
♦   reflect on what has been done and draw conclusions for the future
♦   produce evidence of meeting the aims which this Graded Unit has been designed to cover

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Project brief

The underlying purpose of the practical assignment is to provide candidates with an opportunity to undertake a project to demonstrate that they possess scientific and technological skills relevant to the contemporary food and drink industry.

Candidates will be required to choose a project which enables them to investigate the processing of a food product or products. It should enable them to carry out some practical work and to apply some scientific principles. It must also enable them to draw conclusions. In some cases, depending on the choice of project, candidates may be able to make recommendations but this is not a necessary requirement.

Candidates should select a project which covers material taken from at least four of the mandatory Units for this Group Award. The project may also make use of material from optional Units, provided all the Units involved are part of the programme of study followed by the candidate for this Group Award. When choosing a project, candidates should make sure that it will be sufficient basis to meet all the requirements of this Graded Unit.

Candidates will be required to negotiate and develop a brief for their project. It should enable them to cover the following stages:

Stage 1 — Planning

As part of this stage, candidates will be required to:

1   Set objectives for the project.
2   Give reasons to justify their choice of project.
3   Identify sources of technical and scientific information for the project.
4   Identify the practical activities required to complete the project.
5   Prepare a timetable for the completion of the project.

Stage 2 — Developing

During this stage, candidates will be expected to:

1   Gather relevant technical and scientific information from the sources identified in the Planning stage.
2   Carry out the practical work associated with the project in a safe and hygienic manner (this would involve using processing plant equipment and/or undertaking practical laboratory work).
3   Present the results of the practical work in a suitable format.
4   Draw conclusions about the project, based on the practical work and the technical and scientific information gathered.
5   Monitor the actual progress of the plan against the timetable and take any necessary corrective action.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Stage 3 — Evaluating

For this stage, candidates will be expected to:

1   Comment on the extent to which the objectives of the project have been met.
2   Comment on the strengths and weaknesses of the project.
3   Draw some lessons for future projects that they may undertake.

Guidance on grading candidates

Candidates who meet the minimum Evidence Requirements will have their achievement graded as C — competent, or A — highly competent or B — somewhere between A and C. The grade related criteria to be used to judge candidate performance for this Graded Unit is specified in the following table.

Grade A	Grade C
Is a seamless, coherent piece of work which:	Is a co-ordinated piece of work which:
♦ has sufficient evidence for the three essential phases of the project, is produced to a high standard, and is quite clearly inter-related	♦ has sufficient evidence for the three essential phases of the project and is produced to an adequate standard
♦ is highly focused and relevant to the tasks associated with the project brief	♦ is focused and relevant to the tasks associated with the project brief
♦ demonstrates high levels of relevant skills	♦ demonstrates adequate levels of relevant skills
♦ is clear and well structured throughout and maintains a high level of accuracy and technical content	♦ is satisfactorily structured and adequate in terms of accuracy and technical content
♦ effectively consolidates and integrates knowledge and skills from different Units in HNC Food Science and Technology	♦ consolidates and integrates knowledge and skills from Units in HNC Food Science and Technology but this may lack some continuity and consistency
♦ contains a variety of practical work which is carried out precisely, safely and hygienically and accompanied by detailed and comprehensive presentation of results	♦ contains practical work which is carried out adequately and accompanied by presentation of suitable results
♦ gathers information from a wide range of scientific and technical sources and relates this in a considered and valid way to the practical work of the project	♦ gathers scientific and technical information for the project and makes some connection between it and the practical work of the project
♦ provides logical and coherent reasons to support points made	♦ provides reasons to support points made but this may not be done consistently and some reasons may lack coherence

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

The project will be marked out of 100. Assessors will mark each stage of the project, taking into account the criteria outlined. The marks will then be aggregated to arrive at an overall mark for the project. Assessors will then assign an overall grade to the candidate for this Graded Unit based on the following grade boundaries.

A = 70% — 100%
B = 60% — 69%
C = 50% — 59%

Note: the candidate must achieve all of the minimum evidence specified below for each stage of the project in order to achieve the Graded Unit.

Evidence Requirements

The project consists of three stages: Planning, Developing, and Evaluating. The following table specifies the minimum evidence required to pass each stage.

Note: The candidate must achieve **all of the minimum evidence** specified below for each stage of the project in order to pass the Graded Unit.

Project stage	Minimum Evidence Requirements
Stage 1 — Planning 20% of total marks	Present a plan for the project which includes: ♦ objectives for the project ♦ reasons to justify the choice of project ♦ sources of technical and scientific information for the project ♦ description of the practical activities required to complete the project ♦ a timetable for the completion of the project which identifies the main activities required for the project and contains a timescale for the completion of each stage **Additional guidance on grading** This section of the practical assignment will be assessed by the presentation of evidence for each of the five aspects listed above. Candidates may present this evidence in any manner which they consider appropriate. They may include charts or diagrams if they wish to do so but these are not necessary. Tutors may ask questions of candidates to elucidate further evidence and allow the candidate to provide further explanation (if this is done a record of the questions and responses should be kept). This section is worth 20 marks. Guidance on allocation of the marks is given in the support notes for this Unit.
	The candidate must achieve all of the minimum evidence specified above in order to pass the Planning stage. This can be demonstrated by presenting evidence covering all five aspects of the Planning stage and achieving a mark of at least 10/20.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Project stage	Minimum Evidence Requirements
Stage 2 — Developing 60% of total marks	Present evidence of the Developing stage of the project which will cover: ♦ gathering relevant technical and scientific information from the sources identified in the Planning stage ♦ carrying out the practical work associated with the project in a safe and hygienic manner (this would involve using processing plant equipment and/or undertaking practical laboratory work) ♦ presenting the results of the practical work in a suitable format ♦ drawing conclusions about the project, based on the practical work and the technical and scientific information gathered ♦ monitoring the actual progress of the project against the timetable and take any necessary corrective action **Additional guidance on grading** This section of the practical assignment will be assessed by the presentation of evidence for each of the five aspects listed above. Candidates may present this evidence in any manner which they consider appropriate. They may include charts, tables or diagrams if they wish to do so but these are not necessary. Tutors may ask questions of candidates to elucidate further evidence and allow the candidate to provide further explanation (if this is done a record of the questions and responses should be kept). This section is worth 60 marks. Guidance on allocation of the marks is given in the support notes for this Unit.
	The candidate must achieve all of the minimum evidence specified above in order to pass the Developing stage. This can be demonstrated by presenting evidence covering all five aspects of the Developing stage and achieving a mark of at least 30/60.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Project stage	Minimum Evidence Requirements
Stage 3 — Evaluating 20% of total marks	Present evidence of the Evaluating stage of the project which will cover: ♦ the extent to which the objectives of the project have been met ♦ strengths and weaknesses of the project ♦ lessons for future projects that they may undertake **Additional guidance on grading** This section of the practical assignment will be assessed by the presentation of evidence for each of the three aspects listed above. Candidates may present this evidence in any manner which they consider appropriate. They may include charts or diagrams if they wish to do so but these are not necessary. Tutors may ask questions of candidates to elucidate further evidence and allow the candidate to provide further explanation (if this is done a record of the questions and responses should be kept). This section is worth 20 marks. Guidance on allocation of the marks is given in the support notes for this Unit. *The candidate must achieve all of the minimum evidence specified above in order to pass the Evaluating stage. This can be demonstrated by presenting evidence covering all three aspects of the Evaluating stage and achieving a mark of at least 10/20.*

Support notes

Candidates will negotiate a project with their tutor. For day-release candidates this could be a work-based topic. Examples of the type of project which candidates might select could be:

♦ factors affecting the can vacuum formation when preparing a soft drink from a fruit concentrate
♦ effect of pre-treatments on the Vitamin C concentration of frozen potato chips
♦ effects of differing levels of components of sausages with reference to texture, cost and current legislation
♦ processing of berries using Fluidised Bed Drier optimising conditions with reference to speed and final product quality
♦ comparison of factors affecting the quality of a mayonnaise-based sauce produced by utilising a colloid mill and an homogeniser

This Unit is based on the mandatory Units in the HNC Food Science and Technology. It should be attempted, therefore, when candidates have completed as many of these Units as possible as they provide candidates with the skills, knowledge and understanding required for this Graded Unit.

This Unit is likely to be undertaken during the last 12 weeks of the session. As a guide, candidates would spend two weeks researching and planning for the project so that by week three they are in a position to present evidence on their plan for the project.

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

The next five/six weeks would be devoted to carrying out the practical work. Candidates should be encouraged to keep a logbook of all activities which could be discussed with the tutor during the Planning and Developing stages and would also provide a valuable source of reference for the Evaluating stage. Depending on their choice of project, candidates may have to work with technical and purchasing staff and to work around other projects which might require the use of the same piece of equipment. Tutors should make sure that candidates follow appropriate safety and hygiene procedures when undertaking all types of practical activity, whether they are using processing plant equipment or undertaking laboratory work.

On completion of the practical activity candidates would present evidence of the Developing stage. Thereafter, they should evaluate their work throughout the project as a whole and present evidence to demonstrate that they have done this.

Guidance on Awarding Marks

The following gives guidance on how to apportion marks for each of the stages of the practical assignment. When deciding what marks to award, assessors should take into account the grading criteria and the requirements of the generic level descriptor for SCQF level 7.

Stage 1 Planning

This section is worth 20 marks which should be allocated as set out below.

Up to three marks for the specific objectives for the project — marks should be awarded on the basis of:

♦ the extent to which the objectives are consistent with the material in Units in the HNC Food Science and Technology
♦ the extent to which the objectives are relevant to a situation in the contemporary food and drink industry
♦ the extent to which the objectives are clear, specific and achievable within the expected time frame

Up to three marks for reasons to justify the choice of project — marks should be awarded on the basis of:

♦ the clarity and comprehensibility of the outline of the project (maximum of 1 mark)
♦ the extent to which the reasons are convincing including the clarity with which they are presented
♦ the degree of initiative and/or originality shown by the candidate is selecting the project and making arrangements for it

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Up to four marks for sources of technical and scientific information for the project — marks should be awarded on the basis of:

♦ the range of sources identified
♦ the complexity of the technical and scientific information involved
♦ the degree of initiative and originality shown by the candidate in identifying sources
♦ extent to which non-routine sources are used

Up to five marks for the description of the practical activities required to complete the project — marks should be awarded on the basis of:

♦ the range of scientific and technical practical work to be undertaken
♦ the relevance of the practical work to the project
♦ the extent to which the suggested practical work is feasible and within the capabilities which could be expected of a candidate on HNC Food Science and Technology
♦ the clarity and accuracy of the description
♦ degree of originality shown by the candidate is choosing suitable practical activities

Up to five marks for a timetable for the completion of the activity — marks should be awarded on the basis of:

♦ the inclusion of a final completion date and significant milestones to reaching this date
♦ how realistic the timetable is likely to be with respect to factors such as the availability of resources for practical work, other commitments which the candidate might have, etc
♦ identification of resources (including time) needed to carry out the plan
♦ the extent to which the timetable is consistent with the objectives of the project

Stage 2 Developing

This section is worth 60 marks which should be allocated as set out below.

Up to 12 marks for gathering relevant technical and scientific information about the project from the sources identified in the Planning stage — marks should be awarded on the basis of:

♦ the accuracy and clarity of the information gathered
♦ the relevance of the information to the project
♦ the range of different types of technical and scientific information gathered
♦ the range of sources actually used by the candidate to gather technical and scientific information
♦ the extent to which the candidate was required to use her/his initiative in gathering technical and scientific information

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Up to 20 marks for carrying out the practical work associated with the project — marks should be awarded on the basis of:

♦ extent to which the practical work was conducted in a safe and hygienic manner
♦ extent to which practical work was conducted in a manner which made effective and economical use of resources
♦ number and range of practical activities carried out (this may involve the use of pilot plant equipment, laboratory work or other relevant practical work)
♦ relevance of the practical work actually carried out to the project
♦ clarity and accuracy of the description of the practical work

Up to eight marks for presenting the results of the practical work in a suitable format — marks should be awarded on the basis of:

♦ the choice of format to present the results from the practical work including any calculations where appropriate
♦ precision of results from the practical work
♦ clarity and accuracy of the presentation of the results of the practical work

Up to 10 marks for drawing conclusions about the project based on the practical work and the technical and scientific information gathered — marks should be awarded on the basis of:

♦ the extent to which the conclusions are explicitly based on the technical and scientific information gathered
♦ the extent to which the conclusions are explicitly based on the practical work undertaken
♦ the quality and validity of reasons given to justify the conclusions
♦ the relevance of the conclusions to the objectives of the project

Up to 10 marks for monitoring the actual progress of the project against the timetable and taking any necessary corrective action — marks should be awarded on the basis of:

♦ the effectiveness of the methods used by the candidate to check progress of the plan against the timetable (candidates could use a log book or other method of recording progress)
♦ the extent to which methods of corrective action were suitable in the circumstances (or why corrective action proved to be unnecessary)
♦ the quality and validity of reasons given to support points made about monitoring progress and taking any corrective action
♦ clarity and accuracy of the presentation of the effectiveness of monitoring and any corrective action

Higher National Graded Unit specification: instructions for designing the assessment task and assessing candidates (cont)

Stage 3 Evaluating

This section is worth 20 marks which should be allocated as set out below.

Up to seven marks for an assessment of the extent to which the objectives of the project have been met — marks should be awarded on the basis of:

♦   comprehensive coverage of all objectives
♦   making explicit connections between how well the objectives were met and the Planning and Developing stages of the project
♦   reflection on the suitability of the objectives for the project
♦   the strength and validity of the reasons given to support points made
♦   the use of any feedback from others (eg tutors) on the objectives of the project

Up to seven marks for an explanation strengths and weaknesses — marks should be awarded on the basis of:

♦   making reference to both the Planning and Developing stages when explaining strengths and weaknesses
♦   identification of both strengths and weaknesses (which could, if desired, be expressed in terms of what went well and what did not go as well as expected)
♦   extent to which the candidate adopts a realistic attitude to identifying strengths and weaknesses
♦   the strength and validity of the reasons given to support points made
♦   the use of feedback from others (eg tutors) in identifying strengths and weaknesses

Up to six marks for lessons for future projects that the candidate may undertake (eg for HND Food Science and Technology) — marks should be awarded on the basis of:

♦   making reference to both the Planning and Developing stages when drawing lessons
♦   extent to which the lessons follow from strengths and weaknesses of the project as identified by the candidate
♦   extent to which the lessons are likely to be feasible and practicable as far as the candidate is concerned
♦   the strength and validity of the reasons given to support points made
♦   the use of feedback from others (eg tutors) on this project when drawing lessons for the future

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

General information for candidates

For this Graded Unit you will be expected to carry out a project to investigate the processing of a food product or products. You will be able to discuss possible projects with your tutors but it will be up to you to choose a suitable project.

You will be expected to follow three stages for your project — Planning, Developing and Evaluating.

During the Planning stage (worth 20 marks) you will be expected to do the following:

♦   set objectives for your project
♦   identify reasons to justify your choice of project
♦   identify suitable sources of technical and scientific information for your project
♦   identify suitable practical activities required to complete the project
♦   prepare a timetable for your project

You have to pass the Planning stage by gaining 10 marks out of 20 before you can move on to the other two stages.

In the Developing stage (worth 60 marks), you will:

♦   gather relevant technical and scientific information from the sources you identified in the Planning stage
♦   carry out the practical work associated with the project: you will be expected to do this in a safe and hygienic manner
♦   present the results of your practical work in a suitable format
♦   draw conclusions about the project based on the practical work and the technical and scientific information gathered
♦   monitor the progress of your project against your timetable and take any necessary corrective action to make sure you meet your deadlines

The Evaluating stage (worth 20 marks) requires you to think about how your project has worked out and to:

♦   comment on the extent to which the objectives of your project have been met
♦   comment on the strengths and weaknesses of your project
♦   draw some lessons for future projects that you may undertake

You will present evidence for each of the three stages. There are a number of ways in which you could do this but your tutor will advise you on what is a suitable method in your case. Marks will be awarded for the evidence you present.

The project will be marked out of 100. To pass the Unit you must achieve 50% of the total marks and gain at least 50% of the marks for each of the three stages of the project. You will be awarded a grade for your project.

♦   If you achieve an overall mark of 50–59% you will be awarded a Grade C.
♦   If you achieve an overall mark of 60–69% you will be awarded a Grade B.
♦   If you achieve an overall mark of 70% or higher you will be awarded a Grade A.

Optional Units
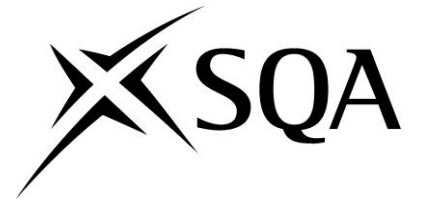
Higher National Unit specification

General information for centres

Unit title: Science for the Food Industry: An Introduction

Unit code: F6VB 33

Unit purpose: This Unit is designed to provide candidates with the theoretical and practical scientific knowledge and understanding which underpins food technology.

On completion of the Unit the candidate should be able to:

1   Explain the cellular nature of food.
2   Explain basic scientific concepts applicable to food technology.
3   Perform basic laboratory techniques.

Credit points and level: 1 HN credit at SCQF level 6: (8 SCQF credit points at SCQF level 6*)

SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. This Unit is suitable for candidates with no prior knowledge of science.

Core Skills: There are opportunities to develop the Core Skills component of *Communication:* Written Communication (Writing) at SCQF level 4 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is part of the HNC in Food Science and Technology. It is intended for candidates who have not previously completed Units in a scientific subject at SCQF level 6. It will prepare candidates for the Units, F6VD 34 *Food Composition* and F6VL 34 *Microbiology of Foods 1*, both of which are mandatory in the HNC in Food Science and Technology.

Assessment: Candidates will be expected to demonstrate their knowledge and understanding by explaining scientific concepts and relate them, where appropriate, to the food industry. They could do this by responding to specific questions. For the practical part of the Unit, they will be expected to carry out experiments and record the results of them in a suitable format, possibly in a laboratory logbook. In addition, observation checklists are used to ensure that experimental work is carried out safely and accurately. Candidates may gather their evidence for all Outcomes together in a portfolio.

Higher National Unit specification: statement of standards

Unit title: Science for the Food Industry: An Introduction

Unit code: F6VB 33

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Explain the cellular nature of food

Knowledge and/or Skills

♦   Plant and animal cells
♦   Cell structure in relation to function
♦   Respiration, photosynthesis and osmosis

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

♦   explain the cell structure of a plant and animal cell: the explanation should cover the function of nucleus, cytoplasm, chloroplast, cell membrane and cell wall and should include a correctly labelled diagram of each cell
♦   explain respiration, photosynthesis and osmosis: the explanation should outline what each involves and should include an illustrative example related to the food industry

Assessment Guidelines

Candidates could be asked to generate evidence by giving responses to specific questions. These could be presented in the form of a short report or in another suitable presentation format. This work could be combined with the evidence for Outcomes 2 and 3 and presented in a portfolio.

Higher National Unit specification: statement of standards (cont)

Unit title: Science for the Food Industry: An Introduction

OUTCOME 2

Explain basic scientific concepts applicable to food technology

Knowledge and/or Skills

- Structure of molecules and compounds
- Properties of compounds
- Carbon compounds
- Functional groups and homologous series
- Solutions and colloidal suspensions
- Acidity and alkalinity
- Heat

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- explain one structure of a molecule and one structure of a compound: the explanation should refer to different types of bonding and to the Periodic Table
- explain one property of a compound: the property should be selected from melting point, boiling point and hardness/softness
- explain two carbon compounds: the compounds should be selected from alkanes, alkenes, alkanols, akanals, alkones, alkanoic acids or esters
- explain one functional group: the functional group should be selected from hydroxyl, carbonyl, carboxyl and amino
- explain one solution and one colloidal suspension: the colloidal suspension should be chosen from sols, gels or emulsions
- explain acidity and alkalinity with reference to the pH scale
- explain heat by giving one example of a change of state and one example of heat transfer: the example of change of state should be taken from latent heat, boiling and melting point or specific heat capacity and the example of heat transfer should be taken from conduction, convection or radiation

In each case, the explanation should refer to a relevant example related to food technology. Explanations should be scientifically accurate and, where appropriate, should make use of relevant formulae.

Assessment Guidelines

Candidates could be asked to generate evidence by giving responses to specific questions. These could be presented in the form of a short report or in another suitable presentation format. This work could be combined with the evidence for Outcomes 1 and 3 and presented in a portfolio.

Higher National Unit specification: statement of standards (cont)

Unit title: Science for the Food Industry: An Introduction

OUTCOME 3

Perform basic laboratory techniques

Knowledge and/or Skills

♦ Follow instructions for an experiment
♦ Safe working practices in a laboratory
♦ Precise results
♦ Reporting of results

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can perform 2 laboratory experiments accurately and record the results in a suitable format. Records should include:

♦ all relevant results, including correct calculations where appropriate
♦ a summary of conclusions drawn from the results, including sources of error

Candidates should prepare and set up equipment in an appropriate manner for each experiment. They should deploy suitable practical techniques in accordance with prevailing safety requirements in the laboratory and ensure that their work produces accurate results. Candidates should be observed on both occasions and a record should be kept of the observation.

Assessment Guidelines

Candidates can present the evidence of their practical work in a laboratory logbook. An observation checklist can be used to record the achievement of practical skills such as safe laboratory practice. Candidates could be asked questions about the work they have done to supplement the observation checklist and the recording of analyses.

The work for this Outcome could be incorporated into a portfolio of work which also includes evidence for Outcomes 1 and 2.

Administrative Information

Unit code: F6VB 33

Unit title: Science for the Food Industry: An Introduction

Superclass category: NH

Original date of publication: August 2008

Version: 02

History of changes:

Version	Description of change	Date
02	Titles of Units F6VD 34 and F6VC 34 amended by removal of numeral 1 in line with QDT agreement.	26/04/10

Source: SQA

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Higher National Unit specification: support notes

Unit title: Science for the Food Industry: An Introduction

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is intended to provide candidates with the scientific background which underpins the HNC in Food Science and Technology. It is intended for candidates who have not previously completed Units in chemistry or a related science at SCQF level 6. It will prepare candidates for Units in the HNC Food Science and Technology, such as F6VC 34 *Food Analysis* and F6VL 34 *Microbiology of Foods 1*.

The Unit is both theoretical and practical. Candidates are introduced to basic scientific concepts from chemistry, biology and physics but they are also required to undertake some laboratory work. This theoretical and practical foundation will help them develop suitable knowledge, understanding, skills and techniques which they can develop in the HNC Food Science and Technology particularly in Units such as F6VL 34 *Microbiology of Foods 1,* F6VM 34 *Microbiology of Foods 2* and F6VC 34 *Food Analysis*.

When carrying out laboratory work candidates should be made fully aware of the importance of safe working practices and the precautions that should be taken to ensure that these are achieved. They should recognise the need to obtain accurate results and the consequent requirement to conduct experiments carefully and according to the relevant procedure. They will be expected also to keep a record of their observations and results. Throughout, however, the intention is that candidates should relate their work in the Unit to the food industry. In this sense, the Unit is also an applied Unit.

Outcome 1 covers the cellular nature of food. Candidates can cover the following:

♦ Function of nucleus, cytoplasm, chloroplast, cell membrane and cell wall
♦ Respiration, photosynthesis and osmosis

Candidates should be able to produce labelled diagrams of plant and animal cells.

Outcome 2 is more substantial than Outcome 1. It covers the principles of matter formation and the different types of matter related to the study of food technology. It can include the following:

♦ Atomic structure, ionic and covalent bonding
♦ Alkanes, alkenes, alkanols, alkanoic acids and esters
♦ Functional groups — hydroxyl, carbonyl, carboxyl and amino
♦ Solutes, solvents and solutions
♦ Sols, gels and emulsions
♦ Differences between physical and chemical changes
♦ Kinetic theory of matter related to changes in state
♦ Acidity, alkalinity and pH
♦ Humidity, relative and absolute
♦ Heat: change of state — latent heat; boiling point, melting point, specific heat capacity; heat transfer — conduction, convection and radiation

Unit title: Science for the Food Industry: An Introduction

Candidates should be able to use chemical formulae, where appropriate when explaining chemical concepts.

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

The delivery of this Unit should take into account that its purpose is to prepare candidates for scientifically based Units in the HNC Food Manufacture such as F6VD 34 *Food Composition* and F6VL 34 *Microbiology of Foods 1*. Candidates will be taking this Unit because they have not achieved Units in scientific subjects at SCQF level 6. It is possible that, in the past, they perhaps have found studying science difficult or uninteresting or both. Given the vital importance of scientific understanding and practical laboratory skills in the HNC in Food Science and Technology, it is important that the delivery methods adopted should engage the attention and interest of candidates.

Wherever possible, delivery should encourage candidates to be as active as possible. A combination of delivery methods may be one way to achieve this. This could range from direct exposition to asking candidates to find out information for themselves. This could be done in groups who could be guided towards different research tasks. Groups could then share information. This can also help candidates take responsibility for their own learning and help them to develop patterns of independent study. Wherever possible the material can be applied to the food industry so that candidates recognise the importance of scientific knowledge and understanding to their study of food manufacturing. If candidates realise this at an early stage, they are likely to approach later Units with a positive attitude.

Outcome 2 covers a greater amount of material than Outcome 1 and it is likely, therefore, that, during the delivery process, candidates will devote more time to the knowledge and/or skills items in Outcome 2 than to the knowledge and/or skills items in Outcome 1.

For the practical laboratory skills, the aim should be to build both skills and confidence so that candidates are in a strong position to undertake the practical parts of Units such as F6VL 34 *Microbiology of Foods 1* and F6VC 34 *Food Analysis*.

Assessment for this Unit tests the understanding of candidates and their practical work. Assessment for this Unit could take a variety of ways. For example, knowledge and understanding can be assessed through questions which ask candidates to explain relevant scientific concepts and, where appropriate, relate them to the food industry. Candidates could be asked to present their responses to these questions in a number of different ways, eg they could group their responses together in the form of a short report or they could prepare a simple poster presentation. Alternatively, they could make use of presentation software (such as Powerpoint) or use tools from a virtual learning environment.

Practical work can be assessed by observation and through reports on experimental work. Candidates should be observed during some of their work and the observation should be recorded on a checklist (photographic and/or video evidence could be used to supplement the checklist). This will provide evidence that candidates have followed proper laboratory procedures and carried out the work safely and accurately. If necessary, the observation checklists may be supplemented by additional questions. Candidates must also provide reports of their experiments as reports also form part of the assessment, with the evidence including referencing where appropriate. They could also use a laboratory log book to do this.

Higher National Unit specification: support notes (cont)

Unit title: Science for the Food Industry: An Introduction

Candidates could submit a portfolio of work covering all the assessment for this Unit. They could build the portfolio during their study of the Unit. In this way, assessment can arise naturally out of the delivery process.

Opportunities for developing Core Skills

Communication: **Written Communication (Writing) at SCQF level 4**

As part of their work for this Unit, candidates are expected to maintain details of experimental work in a laboratory logbook. Depending on the method of presentation used, they may also be expected to use written information to demonstrate/convey their knowledge and understanding of scientific concepts. For this, they will be required to make use of a logical structure and use appropriate vocabulary to accurately convey meaning to first reading.

Open learning

This Unit could be delivered by Open Learning. However, candidates must be able to undertake practical laboratory work under supervised conditions, something which may be time-consuming and difficult to organise. If suitable arrangements can be made, they would have to cover assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Science for the Food Industry: An Introduction

This Unit is an optional Unit in the HNC Food Science and Technology. It is designed to help you gain the underpinning knowledge and understanding that you will need to successfully tackle the scientific Units in the HNC, particularly *Microbiology of Foods 1* and *Food Composition*. It also gives you some of the scientific background that you will need to fully understand methods of food processing. It will be particularly useful if you have not previously studied scientific subjects or have not done so for a long time. Foods are chemical compounds and food processing can involve changing the physical properties of these compounds so scientific knowledge and understanding is crucial to the operation of the food industry.

The Unit is both theoretical and practical. It introduces you to scientific concepts from chemistry in particular, but also from physics, and shows how these can be applied to the food industry. It also gives you an opportunity to do some laboratory work and develop practical scientific skills that you will need for other Units in your HNC. After completing the Unit you will have a good basis in fundamental scientific principles relevant to the food industry and have some valuable practical laboratory skills. You will be able to all of this in later Units in the HNC in Food Science and Technology.

The assessment for this Unit will require you to show that you can accurately explain scientific concepts and principles. You will also have to successfully complete practical laboratory work. You will be observed while you are doing this and will also have to keep records of work that you have done in the laboratory.

You will have succeeded in meeting all the requirements of this Unit if you pass this assessment.

Higher National Unit specification

General information for centres

Unit title: Food Analysis

Unit code: F6VC 34

Unit purpose: This Unit is designed to enable candidates to develop the practical laboratory skills and techniques required to perform analysis of the chemical properties of foodstuffs.

On completion of the Unit the candidate should be able to:

1   Use practical techniques to investigate the properties of foodstuffs.
2   Report the results of investigations.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. However, it would be beneficial if candidates had completed a science subject. This could be achieved through the HN Unit F6VD 34 *Food Composition* or the HN Unit F6VB 33 *Science for the Food Industry: An Introduction* or through Units in Chemistry at SCQF level 6.

Core Skills: There are opportunities to develop the Core Skills component of *Communication:* Written Communication (Writing) at SCQF level 5 and *Numeracy* (Using Number) at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is part of the HNC in Food Science and Technology. It is recommended that it should be taught and assessed within this Group Award. It is closely linked to the Unit F6VD 34 *Food Composition*. Candidates therefore attempting this Unit may find it beneficial to have completed, or be in the process of completing the Unit F6VD 34 *Food Composition*.

Assessment: Candidates will be expected to carry out experiments using a number of different analytical techniques. They will record the results of these experiments and interpret the results. This can be assessed in a variety of ways, eg they could use a laboratory logbook. In addition, observation checklists can be used to ensure that experimental work is carried out safely and accurately.

Higher National Unit specification: statement of standards

Unit title: Food Analysis

Unit code: F6VC 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Use practical techniques to investigate the properties of foodstuffs

Knowledge and/or Skills

♦   Volumetric analysis
♦   Gravimetric analysis
♦   Wet chemical analysis
♦   Preparing equipment for the analyses
♦   Safe performance of laboratory techniques
♦   Precise results

OUTCOME 2

Report the results of investigations

Knowledge and/or Skills

♦   Data analysis and calculation of results
♦   Comparison of results with expected standards

Evidence Requirements for the Unit

Candidates will need to provide written/oral and practical evidence to meet all the Knowledge and/or Skills items by showing that they can carry out eight food analyses. The eight food analyses should include at least two of each of the following:

♦   perform volumetric analyses for at least two foodstuffs
♦   perform gravimetric analyses for at least two foodstuffs
♦   perform wet chemistry analyses for at least two foodstuffs

The remaining two analyses can come from any of the above.

Higher National Unit specification: statement of standards (cont)

Unit title: Food Analysis

These eight analyses should be recorded in a suitable format. The records should contain:

♦ methodology
♦ all relevant results, including correct calculations where appropriate
♦ a comparison of the results with the expected standards
♦ conclusions drawn from the results

Candidates should prepare and set up equipment in an appropriate manner for each experiment. They should deploy suitable practical techniques in accordance with prevailing safety requirements in the laboratory and ensure that their work produces precise results. To ensure that candidates meet these requirements, they should be observed on all eight occasions and a record should be kept of the observation.

Assessment Guidelines for the Unit

Candidates can maintain a laboratory logbook to record the evidence of their practical work. An observation checklist can be used to record the achievement of practical skills such as safe laboratory practice.

Candidates could be asked questions about the work they have done to supplement the observation checklist and the recording of analyses.

Administrative Information

Unit code: F6VC 34

Unit title: Food Analysis

Superclass category: NH

Original date of publication: August 2008

Version: 02

History of changes:

Version	Description of change	Date
02	Title amended by removal of numeral 1 in line with QDT agreement.	27/04/10

Source: SQA

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Food Analysis

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is intended to enable candidates to analyse the chemical properties of foodstuffs. In order to do this, candidates need to develop appropriate laboratory skills and techniques including the reporting of experimental work. The Unit is, therefore, a practically-based Unit involving experimental work in the laboratory.

This Unit forms part of the HNC Food Science and Technology. It is closely linked to the Unit F6VD 34 *Food Composition* in which candidates gain underpinning knowledge and understanding of chemistry which they apply to food processing and the food industry. This Unit also, therefore, helps candidates to appreciate why food chemistry is critical to food manufacturing.

Candidates undertaking this Unit will require some prior scientific knowledge. This could be provided by F6VD 34 *Food Composition*. Alternatively, candidates could have completed Units in chemistry or a related science at SCQF level 6 or F6VB 33 *Science for the Food Industry: An Introduction*.

The Unit should enable candidates to become familiar with laboratory techniques of relevance to the food industry and of the importance of following proper procedures in the laboratory. Candidates should be made fully aware of the importance of safe working practices and the precautions that should be taken to ensure that these are achieved. They should recognise the need to obtain accurate results and the consequent requirement to conduct experiments carefully and according to the relevant procedure. They will be expected also to keep a record of their observations and results including calculations where necessary and interpretation of the results. At the completion of the Unit, candidates should feel confident about performing routine experiments.

The following give some examples of analyses which could be used. They are examples only and any other appropriate analysis could be used. The choice may be influenced by factors such as the availability of equipment; the need to develop particular skills among candidates; and so on.

Volumetric

- ♦   Acetic acid in vinegar
- ♦   Lactic acid in yoghurt
- ♦   Tartaric acid in wine
- ♦   Vitamin c in fruit juice
- ♦   Saponification (sap) value of oil
- ♦   Salt in crisps by chloride meter

Higher National Unit specification: support notes (cont)

Unit title: Food Analysis

Gravimetric

♦ Ash content
♦ Lactose in milk
♦ Fat determination by Soxhlet
♦ Moisture by oven drying or moisture meter

Wet chemistry

♦ Alcohol in wine by distillation
♦ Dean and Stark moisture determination
♦ Iron in cereal by spectrophotometry

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

Delivery should aim to build laboratory skills in candidates so that their confidence in undertaking laboratory work is enhanced. Throughout, candidates can be encouraged to see how their work in this Unit is important to the activities of the food industry.

This Unit is closely associated with the Unit, F6VD 34 *Food Composition*. If candidates are taking both Units, it may be appropriate to integrate the way in which they are delivered. Candidates could for example complete F6VD 34 *Food Composition* and then move directly into this Unit.

Assessment for this Unit is based on the practical work undertaken. Candidates should be observed during their work and observation should be recorded on a checklist (photographic and/or video evidence could be used to supplement the checklist). This will provide evidence that candidates have followed proper laboratory procedures and carried out the work safely and accurately. If necessary, the observation checklists may be supplemented by additional questions.

Candidates must also record and interpret the results of their experiments and they could use a laboratory log book to do this. Reports should include the results of the analyses including any calculations which are necessary. The evidence should include referencing and sources of errors where appropriate. Candidates should interpret the results by comparing them with the expected standard.

Opportunities for developing Core Skills

Communication: **Written Communication (Writing) at SCQF level 5**

As part of their assessment work for this Unit, candidates are expected to maintain details of practical work. This can be done in a laboratory log book or diary and candidates will be expected to organise the content into a logical and effective structure. Candidates will, therefore, use written information to demonstrate their knowledge and understanding of relevant ideas and information. Candidates can also be asked to write up their practical work in a report style which can replicate that used in industry. In these cases, candidates can be expected to make sure that the report meets its intended purpose by a format and layout appropriate to an industrial readership.

Higher National Unit specification: support notes (cont)

Unit title: Food Analysis

Numeracy **(Using Number) at SCQF level 5**

As part of this Unit, candidates are required to carry out practical work. They are expected to undertake calculations using scientific formulae and, using the Outcome of these calculations, draw conclusions about the results of their practical work. This will involve quantitative data over a range and candidates will be required to decide what numerical operations are to be carried out and the order in which to do them

Open learning

This Unit could be delivered by Open Learning. However, candidates must be able to undertake practical laboratory work under supervised conditions, something which may be time-consuming and difficult to organise. If suitable arrangements can be made, they would have to cover assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Food Analysis

This Unit is an optional Unit in the HNC Food Science and Technology. It follows on from *Food Composition* and is designed to enable you to develop practical laboratory skills and techniques which will enable you to analyse the chemical properties of foodstuffs and draw conclusions.

Food Analysis provides you with knowledge and understanding of the chemical properties of foodstuffs. It is a practical Unit in which you will learn some of the practical techniques used in the food industry to investigate the properties of foodstuffs. These practical skills complement the ones you will have developed in the mandatory Unit *Microbiology of Foods 1*.

You will know from your work on *Food Composition* and from the Units in food processing that chemical properties of foodstuffs are a vital part of the day to day operation of food businesses. You will also know the implications that they have for consumers. This Unit, therefore, provides you with practical skills which will be beneficial when you take up employment in the food industry. It will also help you consolidate things that you have learnt in other Units.

During this Unit you will be introduced to a number of different practical techniques such as volumetric analysis, gravimetric analysis and wet chemistry analysis. You will be shown how to do these experiments and how to perform them safely and in accordance with laboratory procedures. You will also draw conclusions from the results of your work by comparing your results with the expected standards for the experiments that you do.

The assessment for the Unit will require you to carry out eight food analyses. You will be observed while you are doing your laboratory work and will have to keep records of work that you have done. These records will include the results of your work and the conclusions you have drawn.

You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.

Higher National Unit specification

General information for centres

Unit title: Microbiology of Foods 2

Unit code: F6VM 34

Unit purpose: This Unit is designed to enable candidates to investigate and explain the effects of different factors on the growth and multiplication of micro-organisms such as antimicrobial agents, radiations, competition and metabiotic effect. The Unit also enables candidates to develop their existing laboratory skills.

On completion of the Unit the candidate should be able to:

1   Analyse the effects of chemical and physical factors on the growth, multiplication and survival of micro-organisms.
2   Perform microbiological techniques including enumeration.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. However, it would be beneficial if candidates had completed F6VL 34 *Microbiology of Foods 1*.

Core Skills: There are opportunities to develop the Core Skills component of *Communication:* Written Communication (Writing) at SCQF level 5 and *Numeracy* (Using Number) at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is part of the HNC/HND Food Science and Technology. It is closely linked to the HN Unit F6VL 34 *Microbiology of Foods 1* and can be taught and assessed in conjunction with this Unit.

Assessment: The assessment for this Unit consists of a number of laboratory reports based on practical exercises and related analysis of the effects of micro-organisms on food manufacture. These reports will enable candidates to demonstrate that they have the necessary practical skills and that they have acquired the underpinning knowledge and understanding needed to analyse and evaluate the behaviour of micro-organisms and the importance of this in food manufacture. An observation checklist can be used to record the achievement of practical skills such as safe laboratory practice. Candidates could gather all their reports into a portfolio which would contain all the assessment evidence for the Unit.

Higher National Unit specification: statement of standards

Unit title: Microbiology of Foods 2

Unit code: F6VM 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Analyse the effects of chemical and physical factors on the growth, multiplication and survival of micro-organisms

Knowledge and/or Skills

♦ Effects of physical and chemical factors on the growth, multiplication and survival of micro-organisms
♦ Effects of micro-organisms on food

OUTCOME 2

Perform microbiological techniques including enumeration

Knowledge and/or Skills

♦ Correct use of laboratory equipment
♦ Safe performance of laboratory techniques
♦ Viable counts and total counts
♦ Data analysis and calculation of results

Higher National Unit specification: statement of standards (cont)

Unit title: Microbiology of Foods 2

Evidence Requirements for the Unit

Candidates will need to provide written/oral and practical evidence to meet all the Knowledge and/or Skills items by showing that they can:

♦ analyse the effect of **three** different factors on microbial growth, multiplication and survival: the factors should be selected from antimicrobial agents, radiations, competition and metabiotic effect
♦ give accurate examples to illustrate the effect of microbial growth, multiplication and survival to the food industry: in each case, the example should be accompanied by a reason to explain the effect within the food industry

Candidates should carry out **three** practical laboratory exercises using different microbiological techniques related to assessing the spoilage potential of foods and promoting beneficial growth in micro-organisms. The exercises should be carried out aseptically and in accordance with approved standards.

In addition, they should also:

♦ perform aseptically one total count technique on a given sample in accordance with an acceptable industry method
♦ perform aseptically two different viable counts on given samples in accordance with an acceptable industry method: each of the two counts must use a different method selected from pour plate, most probable number, membrane filtration
♦ draw valid conclusions from an evaluation of the data obtained from the performance enumeration techniques

Candidates should prepare and set up equipment in an appropriate manner for each piece of laboratory work. They should deploy suitable practical techniques in accordance with prevailing safety requirements in the laboratory and ensure that their work produces accurate results. To ensure that candidates meet these requirements, they should be observed on at least **four** occasions, at least **one** of which should be when undertaking a count technique. A record should be kept of each observation. Candidates should also keep records of the results of each practical exercise.

Candidates should also provide **one** laboratory report on the practical laboratory exercise using a count technique. This report should be presented in a suitable format and include suitable data and evaluation. The evidence should include referencing and sources of errors where appropriate. The evaluation should be based directly on the data and candidates should draw reasoned conclusions from the data they have collected.

Higher National Unit specification: statement of standards (cont)

Unit title: Microbiology of Foods 2

Assessment Guidelines for the Unit

Candidates could present evidence in a number of ways to show that they can explain the effects of physical and chemical factors on micro-organisms. They could be asked to produce a short report, for example, or asked to prepare a presentation perhaps using suitable software or posters.

An observation checklist can be used to record the observation of practical work and it can cover items such as practical skills deployed and safe laboratory practice. Candidates could provide information of the results of each laboratory exercise by keeping a laboratory logbook. Candidates could be asked questions about the work they have done to supplement the observation checklist and the information on results.

The format for the laboratory report could include:

♦ Title and date
♦ Introduction including relevant theory
♦ Materials and method
♦ Results including calculations
♦ Discussion including analysis and conclusions
♦ References
♦ Appendices (where appropriate)

Administrative Information

Unit code: F6VM 34

Unit title: Microbiology of Foods 2

Superclass category: NH

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

Higher National Unit specification: support notes

Unit title: Microbiology of Foods 2

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is part of HNC/HND Food Science and Technology. It is closely linked to the HN Unit F6VL 34 *Microbiology of Foods 1* and develops and extends the microbiology theory and practical skills related to food manufacture which are introduced in that Unit. Both Units will help prepare candidates for employment in a biological science related post. Candidates should have completed, or be in the process of completing, F6VL 34 *Microbiology of Foods 1* before embarking on this Unit.

The two Units are both applied Units. Candidates are expected throughout this Unit to apply their knowledge and understanding of microbiology and associated laboratory techniques to food processing and the food industry. It is important that candidates appreciate the reason why the study and practice of microbiology is vitally important in food manufacturing.

Candidates attempting this Unit should have prior knowledge of Microbiology which they can gain through F6VL 34 *Microbiology of Foods 1*.

The Unit will help candidates to develop their skills and awareness of the microbiological techniques used in the food industry. It will also reinforce for them the importance of following proper procedures in the laboratory. Throughout, candidates should be reminded of the importance of safe working practices and the precautions that should be taken to ensure that these are achieved. They should remember, and put into practice, the need to obtain accurate results and the consequent requirement to conduct experiments carefully and according to the relevant procedure. They will be expected also to keep a record of their observations and results including calculations where necessary and interpretation of the results. At the completion of the Unit, candidates should feel confident about performing a wide range of experimental techniques in microbiology.

In Outcome 1, the physical factors would include environmental factors. The factors which influence the growth, multiplication and survival of micro-organisms with respect to food technology can include:

♦ Antimicrobial agents
♦ Radiations
♦ Competition
♦ Metabiotic effect

Higher National Unit specification: support notes (cont)

Unit title: Microbiology of Foods 2

In Outcome 2, the analysis of micro-organisms is undertaken through laboratory based practical exercises. Candidates should develop the laboratory skills that they used in F6VL 34 *Microbiology of Foods 1* (such as the use of microscope and other equipment) and techniques (such as the preparation of simple and differential stained slides). The techniques required to work in a microbiology laboratory in the food manufacturing industry relevant to this Unit include:

♦ Safety — use of aseptic technique
♦ Microscopy — bacteria, mould and yeast
♦ Morphology of protozoa, algae and viruses
♦ Spoilage potential of foods
♦ Growth of beneficial organisms

Total count techniques can include counting chamber and spectrophotometry; while viable count techniques could be pour plate, most probable number and membrane filtration.

Candidates should be made thoroughly aware of the critical importance of health and safety in a laboratory and be able to take all appropriate precautions to ensure that an appropriate environment is maintained.

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

Delivery should aim to help candidates apply the material in the Unit to the food industry. Learning activities should be able to take advantage of the experience that candidates have gained from F6VL 34 *Microbiology of Foods 1*. The practical laboratory work for this Unit, for example, can build on the laboratory skills that candidates have developed in F6VL 34 *Microbiology of Foods 1*. Delivery for this Unit, therefore, could seek to enhance the capability and confidence which candidates have already gained through F6VL 34 *Microbiology of Foods 1*.

Candidates should be encouraged to take responsibility for their own learning and may be able to research for themselves some of the ways in which microbiology applies in the food industry. This may enable them also to take forward expertise and understanding which they have gained from F6VL 34 *Microbiology of Foods 1*. In this way, delivery can contribute to the integration of the whole HNC/HND in Food Science and Technology. Candidates who take this Unit may well have completed Units in Food Processing and should be in a strong position to appreciate, and find examples of, the ways in which micro-organisms affect the methods used for processing food.

Assessment for this Unit involves both practical work and explanation. Explanation can be provided in a number of ways and assessors could choose to vary the methods to suit different groups of candidates. Candidates could provide a report for example which they could prepare in their own time. This report could be based on a series of questions which may help candidates to structure their responses. Another option is to ask candidates to give a presentation. Again candidates could be given some questions to help them structure their work. Candidates could make use of software (such as PowerPoint) or they could develop a poster based presentation. The evidence should include referencing and sources of errors where appropriate.

Assessment judgments should be based on the explanation of micro-biological terms, and not the facility that the candidate used to outline the explanation.

Higher National Unit specification: support notes (cont)

Unit title: Microbiology of Foods 2

Candidates should be observed during some of their practical work and the observation should be recorded on a checklist (photographic and/or video evidence could be used to supplement the checklist). This will provide evidence that candidates have followed proper laboratory procedures and carried out the work safely and accurately. If necessary, the observation checklists may be supplemented by additional questions. Candidates must provide information on the results of practical work which could be done through a laboratory log book. They must also provide a laboratory report in a suitable format on a laboratory exercise using a count technique. The format should allow candidates to present and evaluate their results but any accepted format would be suitable.

Candidates could gather all their evidence in a portfolio which they can build as they progress through the Unit.

Opportunities for developing Core Skills

Communication: **Written Communication (Writing) at SCQF level 5**

As part of their work for this Unit, candidates are expected to maintain details of experimental work in a laboratory logbook. They are also expected to provide one full laboratory report which will require them to present and analyse information from practical work they have undertaken. This will require them to organise their information into a logical structure, divide it into suitable sections and to make sure that all parts of the report link together. They will be expected to use a format appropriate to a laboratory report and communicate in a manner appropriate to a scientific audience.

Numeracy **(Using Number) at SCQF level 5**

As part of the practical work for this Unit, candidates are required to carry out practical work using enumeration techniques. They are expected to undertake calculations on the data they obtain and to evaluate the results in the light of these calculations. This will involve quantitative data over a range and candidates will be required to decide what numerical operations are to be carried out and the order in which to do them.

Open learning

This Unit could be delivered by Open Learning. However, candidates must be able to undertake practical laboratory work under supervised conditions, something which may be time-consuming and difficult to organise. If suitable arrangements can be made, they would have to cover assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

General information for candidates

Unit title: Microbiology of Foods 2

This Unit is part of the HNC/HND in Food Science and Technology. It follows on from the Unit *Microbiology of Foods 1* and is designed to enable you to further develop your knowledge, understanding and practical skills. You will already be aware from your study of *Microbiology of Foods 1* that micro-organisms are critical to all aspects of the food industry and can impact on consumers and manufacturing. This Unit is important (for the same reasons as *Microbiology of Foods 1*) because it gives you the vocabulary that you will need when you take up employment in the food industry. This will enable you to discuss what happens to food and the effects that this may have on consumers as well as on food manufacturers.

This Unit is about the effects of physical and chemical factors on the growth and survival of the different types of micro-organisms that you studied in *Microbiology of Foods 1*. In the same way as you did in the previous Unit you will also be expected to give examples relevant to the food industry.

This Unit enables you to develop your laboratory skills, including important count techniques. This will give you a wider range of skills and enhance your capabilities in food science. After completing the Unit you will have built up a sound understanding of microbiology theory and practice and will be well aware of how it applies in the food industry.

The assessment for the Unit will require you to show that you can accurately explain the effects of physical and chemical factors on the growth and survival of different types of micro-organisms. You will also have to successfully complete practical laboratory work. You will be observed while you are doing your laboratory work and will have to keep records of work that you have done. For this Unit, you will also have to complete a laboratory report on your work on a count technique. This report will include an evaluation of your results.

You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.

Higher National Unit specification

General information for centres

Unit title: Legislation and the Food Industry

Unit code: F6VK 34

Unit purpose: This Unit is designed to enable candidates to recognise the significant impact that government policy and legislation has for the food industry, both in terms of how food businesses operate and the products they make. It also enables candidates to consider the implications that government policy, for example on health, may have on the food industry. It will help candidates to assess the implications of legislation and other government activities for organisations and how organisations can respond to the demands which legislation imposes upon them.

On completion of the Unit the candidate should be able to:

1   Explain the implications of legislation and food policy for organisations in the food industry.
2   Explain the implications of the enforcement of legislation for organisations in the food industry.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre.

Core Skills: There is no automatic certification of Core Skills or Core Skills components in this Unit. However, there are opportunities to develop the Core Skills components of *Communication*: Written Communication (Reading) at SCQF level 6; Written Communication (Writing) at SCQF level 5; *Problem Solving* (Critical Thinking) at SCQF level 5 and *Working with Others* (Working Co-operatively with Others) at SCQF level 5.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed in the subject area of the Group Award to which it contributes. This Unit is an optional Unit in the HNC Food Science and Technology.

Assessment: This Unit could be assessed in a variety of ways. For example, assessment could consist of a report on the implications for organisations in the food industry of legislation, government policy and enforcement of legislation. Candidates could refer to a particular part of legislation, policy or enforcement or they could consider the implications a broad area such as a specific Act of Parliament.

Higher National Unit specification: statement of standards

Unit title: Legislation and the Food Industry

Unit code: F6VK 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Please refer to *Knowledge and/or Skills for the Unit* and *Evidence Requirements for the Unit* after the Outcomes.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Explain the implications of legislation and government policy for organisations in the food industry

Knowledge and/or Skills

♦   Food safety legislation
♦   Food standards
♦   Weights and measures
♦   Government policy on food and health

OUTCOME 2

Explain the implications of the enforcement of legislation for organisations in the food industry

Knowledge and/or Skills

♦   Food Standards Agency
♦   Enforcement agencies
♦   Enforcement options

Higher National Unit specification: statement of standards (cont)

Unit title: Legislation and the Food Industry

Evidence Requirements for the Unit

Candidates will need to provide written/oral evidence to meet all the Knowledge and/or Skills items by showing that they can assess implications for the food industry of legislation, government policy and enforcement of legislation.

The evidence must meet the following requirements:

♦ Include **one** example of legislation related to each of food safety, food standards and weights and measures; the examples should be taken from current legislation but may relate to one aspect of a particular item of legislation
♦ Cover **one** example of government policy on food and health
♦ Cover **one** example of the work of the food standards agency
♦ Include **two** examples of the work of enforcement agencies and **two** examples of the operation of enforcement options
♦ Make an explicit link between specific aspects of legislation, policy or enforcement and the possible implications for organisations in the food industry
♦ Indicate at least **two** possible implications in each case and illustrate each of them with a current and relevant example of organisations in the food industry
♦ Explain the importance of the implications for the organisation: this explanation should make some reference to action which the organisation may take in response to the legislation, policy or enforcement

Each aspect of legislation, policy or enforcement should be accurately referenced.

Assessment Guidelines for the Unit

This Unit could be assessed in a variety of methods. For example, candidates could be asked to report on the implications for organisations in the food industry of legislation, government policy and enforcement of legislation. Candidates could be given different examples of legislation to encourage them to undertake their own research. Candidates could produce either a separate report for their assessment of each aspect of legislation, policy or enforcement or they could combine their assessments together in a single report. The evidence should include referencing where appropriate.

Administrative Information

Unit code: F6VK 34

Unit title: Legislation and the Food Industry

Superclass category: EC

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

Higher National Unit specification: support notes

Unit title: Legislation and the Food Industry

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is an optional Unit in HNC in Food Science and Technology. Legislation affects the way in which food processing operations are carried out and it also influences the products which the industry produces. The Unit should enable candidates to realise the vital importance of legislation to the food industry and for them to appreciate that it has important implications for organisations in the industry.

Food processing organisations are subject to legislation such as health and safety which affects all organisations. In this regard the implications for them are similar to those for other organisations. However, the general health of the population is one of the major concerns of governments and the relationship between food and health means that legislation is of greater importance for the food industry than for many other industries.

Government policy may also impact on the food industry, particularly the products that it makes and the way in which they are marketed. This policy may not always be backed with legislation but it may still have implications for the food industry. Government policy to encourage people to follow a healthier diet, for example, may have implications for the attitudes of consumers. They may, for example, expect food manufacturers to use ingredients which are compatible with the policy even though there is no legal requirement to do so. Food producing organisations which do not do this could, perhaps, encounter adverse publicity as a result.

The emphasis of this Unit is on the implications of legislation, policy and enforcement for organisations in the food industry. It covers legislation from all sources that might have an impact on the food industry, including that originating through the European Union. It may help candidates if they are given an introduction to the legislative process and to the various sources of legislation such as the Scottish Parliament, UK Parliament and the European Union.

Outcome 1 looks at the ways organisations have to take account of legislation and government policy on health and nutrition. Implications can relate to both their operational activities (eg implementation of Hazard Analysis and Critical Control Point (HACCP) and the products they produce). They can include factors such as the costs of meeting legislative requirements, the organisational arrangements required, the possible impact on stakeholders such as suppliers and consumers. Outcome 2 focuses on the implications of the way legislation is enforced, such as the role of inspection as well as implications which may stem from non-compliance, eg fines or disaffected consumers.

Candidates are not expected to examine all aspects of particular pieces of legislation. However, they should become familiar with the main types of legislation and policy which may affect organisations in the food industry. They should also be able to recognise the specific pieces of current legislation and current policy which are relevant at the time they undertake this Unit. When examining implications they should be able to refer to specific aspects of particular items of legislation or policy and indicate precisely how they may influence how organisations should behave.

Higher National Unit specification: support notes (cont.)

Unit title: Legislation and the Food Industry

Candidates should appreciate that legislation can be complex and detailed and that it can, and does, change. They should, as a result of this Unit, develop skills in accessing relevant legislation and policy and reading through it to determine what consequences it might have for organisations in the food industry. This should help them to recognise the importance for organisations of checking legislative requirements and current government policy before making decisions on what to do.

The following gives some indication of content which could be covered in this Unit. Where legislation and/or policy changes, candidates should be encouraged to refer to the most recent versions of the Acts of Parliament and to the most up to date policy measures.

Outcome 1

♦   Food Safety Act, 1990 and associated Regulations:
  — food and food sources
  — sale
  — rendering food injurious to health
  — food safety requirements
  — selling to the purchasers prejudice
  — misleading descriptions

♦   Food Standards:
  — composition and labelling of food (eg front of pack; traffic lights)
  — chemical safety of food
  — name of food
  — ingredients
  — additives
  — allergies
  — Quantitative Ingredient Description (QUID)
  — Durability
  — Storage conditions
  — Origin/provenance/traceability
  — Manufacturer
  — GM foods

♦   Weights and Measures Act 1985:
  — minimum fill system
  — average fill system

Food Hygiene Regulations and associated Regulations including Hazard Analysis Critical Control Points (HACCP)/Food Safety Management Systems.

EC Directives

Approved premises

Higher National Unit specification: support notes (cont.)

Unit title: Legislation and the Food Industry

Outcome 2

Food Standards Agency: its remit and activities; role of inspection; legislative sanctions such as fines; wider implications such as effects on consumer attitudes.

Environmental Health and consumer protection.

The role of:

♦ Environmental Health Officer
♦ Food Safety Officer
♦ local authorities
♦ national enforcement agencies eg Health and Safety Executive (HSE)
♦ Health Protection Scotland (HPS)

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

The delivery of this Unit should aim to encourage candidates to develop skills in investigating legislation and policy which is relevant to organisations in the food industry. This could involve accessing particular pieces of legislation and/or policy through the internet, for example.

Candidates could be asked, for example, to identify key provisions in the legislation the main aspects of policy or the critical aspects of enforcement. It would be possible for candidates to do this by working in groups with each group looking at different items. They could then share the results of their research. Initially, candidates could be given careful and precise direction on what to look for but as they develop expertise the guidance could become more general.

Once candidates are aware of the provisions of legislation, the nature of policy and have gathered information on enforcement, they could then explore the implications for organisations, covering both the operations of organisations and the products they make. This is the focus of this Unit and delivery should try to help candidates understand the importance of legislation without getting bogged down in its detail and complexity. Again, candidates can be given substantial guidance on what implications to look for in the early stages of the Unit. Once they become accustomed to the likely nature of implications the guidance could be more general.

Candidates should be encouraged to take specific aspects of a piece of legislation, or an aspect of importance and work through the implications for organisations. The Food Safety Act, for example, may affect the way in which manufacturing operations are carried out and candidates should draw precise links between specific parts of the legislation and the way it influences factors such as how food is processed and the costs of doing this, with possible further implications for prices and profits. Other implications may cover inspection since this is the main way in which this legislation is enforced. Candidates should consider the implications for organisations of inspection also. These may extend to arrangements for inspections, responding to inspection reports, possible sanctions for breach of legislation and the potential consequences if sanctions are taken such as court appearances, fines and adverse publicity with possible knock-on effects on sales.

Higher National Unit specification: support notes (cont)

Unit title: Legislation and the Food Industry

The above approaches allow for both formative and summative assessment to arise naturally out of the delivery of the Unit. For summative assessment for the Unit candidates can be asked to provide a report which looks at the implications of particular items of legislation, government policy and enforcement on the operations of organisations in the food industry. The evidence should include referencing where appropriate. Different candidates could be given different items of legislation, policy and enforcement. It is possible for assessment to look at one aspect of legislation, policy or enforcement. It is not necessary for candidates to look at the implications of all aspects of a particular Act of Parliament for example. It would be acceptable also for candidates to examine the implications of something which is covered by more than one piece of legislation or policy.

Opportunities for developing Core Skills

This Unit provides opportunities for candidates to work towards components of three Core Skills: *Communication, Problem Solving* and *Working with Others*. The following gives some examples of some of the opportunities for developing these Core Skills which the Unit makes available to candidates.

Communication: Written Communication (Reading) at SCQF level 6

This Unit deals with complicated matters of legislation and policy relating to the food industry. Candidates will be expected as part of their work for this Unit to read documents containing vocabulary which is abstract and may be unfamiliar to them. Policy documents especially related to food and health have a number of different purposes including inform, evaluate and persuade. Legislative requirements are a vital part of the food industry and it is vital that candidates recognise the importance of carefully reading relevant documents as this is a key aspect of ensuring that legislative requirements are met.

Communication: Written Communication (Writing) at SCQF level 5

As part of their work for this Unit, candidates could be expected to present written information on the implications of legislation for organisations. This will require them to highlight the most significant details both of relevant legislation and policy and on the possible impact on organisations. Their work will have to be organised into a logical structure and use appropriate language and sentence construction. This written work could be the product of investigative work carried out by the candidates into aspects of legislation and how they could affect organisations in the food industry.

Problem Solving (Critical Thinking) at SCQF level 5

Candidates taking this Unit will be expected to identify factors which may be involved in a particular situation. This is because they are required to explain the implications of legislation and policy for organisations in the food industry. To do this, also, they will have to identify the relationship between variables and draw some conclusions from this.

Higher National Unit specification: support notes (cont)

Unit title: Legislation and the Food Industry

Working with Others **(Working Co-operatively with Others) at SCQF level 5**

This will depend on the methods of delivery adopted for this Unit. The Unit lends itself to group working whereby candidates research legislation and policy relating to the food industry. In order to do this, candidates will need to identify the requirements of the activity and take steps to encourage co-operative working such as behaving appropriately towards others and recognising the contribution that others make.

Open learning

This Unit could be delivered by Open Learning although candidates should have the opportunity to undertake practical work. Appropriate arrangements would need to be made for assessment and quality assurance.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

General information for candidates

Unit title: Legislation and the Food Industry

This Unit is an optional Unit in the HNC in Food Science and Technology.

It is designed to enable you to recognise the significant impact that government policy and legislation has for organisations in the food industry. This impact can relate to the products that organisations make, the way the products are sold and can also affect the way organisations operate.

The Unit also enables you to consider the implications that government policy (for example regarding health) may have on the food industry. After completing the Unit you will be able to explain the implications of legislation and other government activities for organisations and how organisations can respond to the demands which legislation imposes upon them.

Legislation is particularly important in the food industry. This is because the general health of the population is one of the major concerns of governments and there is a close relationship between food consumption and health. Government policy to encourage people to follow a healthier diet, for example, may have implications for the attitudes of consumers. This may affect the kind of products which food manufacturers produce and the way in which they are marketed.

During the Unit, you will study different aspects of legislation and policy on health and food. The emphasis is on the impact that this has on the food industry. As a result, you will concentrate on the implications that policy and legislation have for organisations in the food industry. You will also look at the ways in which legislation is enforced and the implications that this has for organisations.

The assessment for the Unit will involve you in explaining the implications for organisations in the food industry of legislation, government policy and enforcement of legislation. You will be expected to give some specific examples of legislation, policy and enforcement in your explanation. You will also be required to consider how organisations in the food industry might respond to legislation.

You will have succeeded in meeting all the requirements of this Unit if you pass this assessment.

Higher National Unit Specification

General information for centres

Unit title: Fundamentals of Quality

Unit code: DV9T 34

Unit purpose: This Unit is intended to enable the candidate to explain the fundamental quality management principles and practices and the role of the quality function within an organisation. The Unit should introduce the candidate to:

♦   definitions of quality and the evolution of quality, present day position and looking forward
♦   the role of the quality function/department, its activities, organisation and responsibilities
♦   inter-relationships with other organisational functions/departments

On completion of the Unit the candidate should be able to:

1   Explain the fundamental principles of quality and quality management, and how they have evolved.
2   Explain the role of quality and quality management within an organisation.
3   Explain the inter-relationships of quality with other organisational functions or departments.

Credit points and level: 1 HN Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*).

SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: It is recommended that candidates undertaking this Unit posses good written and/or verbal communication skills, together with a knowledge of organisation structures and the factors that influence employee behaviour at work.

Core Skills: There are opportunities to develop the Core Skill of Communication at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

General information for centres (cont)

Assessment: The assessments for this Unit could consist of Closed-Book and Open-Book Assignment modes.

The assessment for Outcome 1 could be a closed-book series of structured questions designed to assess the candidates knowledge and understanding of the subject areas identified within the Evidence Requirements.

Assessment for all Outcomes may be integrated or individually assessed, with an appropriate instrument of assessment using a case study based on a real or fictitious organisation. Candidates should be provided with, or directed to, information relating to the organisation and its environment. If the candidate is directed to gather information, the case study should ideally be based on an organisation that the candidate is familiar with, or one about which the candidate can easily gather data. Candidates who have current or past work experience may be able to base their assignment on an organisation in which they have previously worked.

Higher National Unit specification: statement of standards

Unit title: Fundamentals of Quality

Unit code: DV9T 34

The sections of the Unit stating the Outcomes, knowledge and/or skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Explain the fundamental principles of quality and quality management, and how they have evolved

Knowledge and/or skills

- Historical development of quality
- Fundamental principles of quality
- Fundamental principles of quality management

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- explain the historical development of quality
- explain the concept of quality
- explain the fundamental principles of quality, covering the basic principles of quality requirements, grade, capability, customer satisfaction (both internally and externally)
- explain the concept of quality management
- explain the fundamental principles of quality management, covering management, quality management system, quality planning, quality control, quality assurance, quality improvement, effectiveness and efficiency

Assessment guidelines

This Outcome should be assessed by a series of restricted response questions, covering each of the Evidence Requirements, under closed-book conditions, within one to two hours.

Higher National Unit specification: statement of standards (cont)

Unit title: Fundamentals of Quality

OUTCOME 2

Explain the role of quality and quality management within an organisation

Knowledge and/or skills

♦ Concepts relating to an organisation
♦ The role of the Quality Function in relation to the aims and objectives of an organisation
♦ Quality Management activities
♦ The Process Model referred to within current Quality Management System standard

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

♦ explain these concepts of an organisation: organisational structure; infrastructure; work environment; internal and external customers
♦ explain the role of the quality function within an organisation
♦ explain the implementation of the management of quality within an organisation and activities including planning, implementation, control, evaluation, motivation, preventative and corrective action
♦ explain the Process Model

The evidence must demonstrate that the candidate has knowledge of the relevant concepts.

Assessment guidelines

This Outcome can be assessed individually or by an integrated approach with Outcome 3, through an assignment in relation to an organisation that the candidate is familiar with or a fictitious case study. Individual assignment approximately 750 words, while combined assignment 1,500 words.

OUTCOME 3

Explain the inter-relationship of quality with other organisational functions or departments

Knowledge and/or Skills

♦ Role of quality within other organisational functions or departments
♦ Methods used to identify and assess quality within functions or departments
♦ Role of quality and environmental issues
♦ Role of quality and health and safety issues

Higher National Unit specification: statement of standards (cont)

Unit title: Fundamentals of Quality

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

♦ explain the inter-relationships between quality and three other organisational functions or departments
♦ explain the common issues and methods used to identify and assess quality requirements within an organisation's functions or departments
♦ explain the common objectives of Quality, Environmental and Health and Safety issues within an organisation

Assessment guidelines

This Outcome can be assessed individually or by an integrated approach with Outcome 2, through an assignment in relation to an organisation that the candidate is familiar with or a fictitious case study. It is suggested that the individual assignment consists of approximately 750 words, while the combined assignment would consist of 1,500 words.

Administrative Information

Unit code: DV9T 34

Unit title: Fundamentals of Quality

Superclass category: VD

Date of publication: August 2006

Version: 01

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Fundamentals of Quality

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is a mandatory Unit for the Group Award HNC Quality and is designed to provide candidates with fundamental knowledge of Quality and Quality Management principles.

The Unit highlights the concepts of quality and quality management within the context of an organisation, and how these concepts have evolved over the years. It also covers the inter-relationships between quality and the other organisational functions or departments and the common issues with Environment and Health and Safety.

The Unit covers all aspects of quality and quality management within an organisation, and is designed to:

♦   enhance the candidates knowledge of the definitions of quality, quality management, and the evolution of quality, present day position and looking forward
♦   enhance the candidates understanding of the role of the Quality function, its activities, organisation and responsibilities
♦   enhance the candidates understanding of the Inter-relationships between quality and other organisational functions or departments

This is an introductory Unit and should provide an overview of quality, not a detailed knowledge.

There are numerous different theories and models that can be used to demonstrate the content of this Unit, and to explain the role within organisations. The following gives some guidance on the content for each individual Outcome, it is neither exhaustive nor prescriptive:

Outcome 1

The concept of Quality by definition with reference to the current versions of ISO 9000 Fundamentals and Vocabulary and ISO 8402: Glossary of terms used in Quality Assurance.

The concept of quality can be further enhanced by an understanding of related concepts such as requirement, grade, capability, customer satisfaction, based on the thematic groupings of clause 3 of the current version of ISO 9000 standard.

The fundamental principles of quality management are enhanced by the related concepts of management, quality management system, quality planning, quality control, quality assurance, quality improvement, effectiveness and efficiency, based on the thematic groupings of clause 3 of the current version of ISO 9000 standard.

Higher National Unit specification: support notes (cont)

Unit title: Fundamentals of Quality

There are various theories on the evolution of quality and the management of quality within organisations, and this can be explored through any of these theories and philosophies of Deming, Crosby, Feigenbaum, Juran, Ishikawa and Taguchi to the new wave of Quality Gurus, covering Traditional Quality Control methods through to Continuous Improvement.

Outcome 2

The concepts relating to an organisation; organisational structure, infrastructure, work environment, internal and external customers, stakeholders are illustrated in the thematic groupings of clause 3 of the current version of ISO 9000 standard.

An understanding of the Process Model, highlighted in the current version of ISO 9000 standard would be beneficial for the candidate to develop an understanding of the concepts of quality and quality management.

There are numerous models, systems and philosophies on the related concepts of Quality Management activities such as planning, implementation, control, evaluation, motivation, preventative and corrective action. A basic understanding of these management principles would be beneficial to the candidate.

Outcome 3

The role of the Quality function or department in relation to the aims and objectives of an organisation can be demonstrated by actual case study of the candidates own organisation and/or a pre-selected organisation. Detailed knowledge of the role of other functions or departments, outwith the Quality function or department, would be beneficial for the candidate, such as marketing, design and development, purchasing, production planning, production/manufacturing, finance, sales and after-sales servicing.

Detailed knowledge of the methods used to identify and assess quality within these areas, is not necessary, though it would be helpful for candidates to appreciate the complexity of the achievement of quality within these areas.

Detailed knowledge of environmental and health and safety policies and procedures are not necessary, though it would be beneficial for the candidate to develop an understanding of the basic principles and the common elements between these issues and Quality related issues within an organisation. Reference to the current versions of the Management Standards of ISO 14001 and OHSAS 18001 would be helpful.

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

It is envisaged that this Unit will be delivered through lecturer/learner discussion and reference to appropriate text, support material, experience and case study. The appropriate use of examples and case study can help keep the Unit relevant to the candidates own organisation or one which they are familiar with.

Higher National Unit specification: support notes (cont)

Unit title: Fundamentals of Quality

Candidates should be encouraged to relate theory and practice within their discussions and analysis. Candidates should also be encouraged to apply models and philosophies of quality related issues to real and/or fictitious organisations, and draw conclusions that relate to the fundamental principles of quality and quality management.

The Unit aims to integrate both theory and practice but the focus should be on the practical aspects of quality function within an organisation and the inter-relationships with other functions.

Summative assessment should focus on the candidates understanding of the concepts of quality and quality management within the organisation. Candidates should be encouraged to practice applying theoretical models and philosophies to the concept of quality within the organisation. Formative assessment can be an ongoing part of the Unit with candidates being given the assessment s/assignments to work on as each topic is taught.

Assessment for Outcome 1 should be based on a series of closed-book questions covering the subject areas identified in the Unit. Assessments for Outcomes 2 and 3 should be an assignment based on a real or fictitious case study, and the candidate should be given suitable information and guidance to conduct the assignment. The assessment for Outcomes 2 and 3 can be integrated or individually assessed.

Opportunities for developing Core Skills

The delivery and assessment of this Unit may contribute towards the 'Reading' and 'Writing' components of the Core Skill of Communication at SCQF level 6 because of the requirement to read various documents including textbooks, Standards and Glossaries, and to provide written answers to formative and summative assessments.

Open learning

This Unit is suitable for open or distance learning methods, and if it is decided to deliver the Unit through any of these methods, additional resources for candidate support, assessment and quality assurance will be required. For further information and advice please refer to the SQA guide: *Assessment and Quality Assurance for Open and Distance Learning (A1030, February 2001).*

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

General information for candidates

Unit title: Fundamentals of Quality

This Unit is a one credit mandatory Unit at SCQF level 7. It is recommended that you possess good written and/or verbal communication skills, together with a knowledge of organisation structures and the factors that influence employee behaviour at work.

This Unit is recommended as a pre-requisite to all other units within the framework of the HNC Quality (G86N 15).

The Unit covers all aspects of quality and quality management within an organisation, and is designed to:

♦   enhance your knowledge of the definitions of quality, quality management, and the evolution of quality, present day position and looking forward
♦   enhance your understanding of the role of the Quality function, its activities, organisation and responsibilities
♦   enhance your understanding of the Inter-relationships between quality and other organisational functions or departments

There are numerous different theories and models that can be used to demonstrate the content of this Unit, and to explain the role within organisations.

The Unit has three Outcomes. The first Outcome addresses the fundamental principles of quality and quality management, and how they have evolved. The second Outcome addresses the role of the quality function and quality management within an organisation. The third Outcome addresses the inter-relationships of quality with other organisational functions or departments.

The content of the Unit will be kept relevant through the appropriate use of examples and by focusing the areas of study on organisations that are relevant to you. This should provide the flexibility required to study, as appropriate, organisations of different sizes, public and private organisations, and organisations operating in different markets.

For a successful completion of this Unit, you will be required to achieve a satisfactory level of performance on the assessment work. This will require you to assess and discuss the concepts of Quality Function and Quality Management within an organisation.

Higher National Unit specification

General information for centres

Unit title: Business Management: An Introduction

Unit code: F1RJ 34

Unit purpose: This Unit is designed to provide candidates with a basic knowledge and understanding of the meaning of management and management activities. The Unit also introduces the candidate to the concept of business financial management, human resource management and marketing within business organisations. The Unit is intended for candidates who are undertaking courses where an awareness of the way businesses operate and how they are managed is important.

On completion of the Unit the candidate should be able to:

1 Explain the main functions of management and describe the main activities associated with the role.
2 Explain the requirement for business financial management.
3 Explain the human resource management function.
4 Explain the role of marketing within business organisations.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.

Recommended prior knowledge and skills: Access to this Unit is at the discretion of the centre. However, candidates would normally be expected to have competence in communication skills at Intermediate 2 (SCQF level 5).

Core Skills: There are opportunities to develop the following Core Skills Units/components within this Unit although there is no automatic certification of Core Skills Units or Core Skills components:

Communication at SCQF level 6
Planning and organising (a component of the Problem Solving Core Skill) at SCQF level 5
Working with numbers (a component of the Numeracy Core Skill) at SCQF level 5.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Higher National Unit specification

General information for centres (cont)

Assessment: The Unit could be assessed in various ways. Each Outcome could be assessed individually or all four Outcomes could be integrated and assessed by an open-book report of around 2,000 words or equivalent using a case study of a real or hypothetical organisation. Centres should ensure that the organisational detail in the case study will allow candidates to generate the necessary evidence or include supplementary questioning to cover gaps.

Alternatively, Outcomes 1, 3 and 4 could be integrated and again assessed by means of a case study on a real or hypothetical organisation. Outcome 2 could be assessed by a mixture of extended response and restricted response open-book questioning which would include horizontal and vertical analysis and interpretation of a profit and loss and balance sheet.

Higher National Unit specification: statement of standards

Unit title: Business Management: An Introduction

Unit code: F1RJ 34

The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

OUTCOME 1

Explain the main functions of management and describe the main activities associated with the role.

Knowledge and/or Skills

♦   Managerial activities
♦   Managerial roles
♦   Organisational effectiveness
♦   Managerial leadership

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

♦   explain the application of the following managerial activities: planning, leading, organising and controlling
♦   describe the following managerial roles: interpersonal roles, informational roles and decisional roles
♦   explain how four different managerial activities can impact on organisational effectiveness
♦   explain how the application of two theories of leadership can be used to improve the way in which managers lead staff

Assessment Guidelines

The assessment for Outcome 1 could be by means of an open-book extended response questioning on a real or hypothetical organisation presented in a report format.

The assessment for all Outcomes could be combined if an open-book task was set using a real or hypothetical case study of an organisation and supplementary questioning to cover all Evidence Requirements were used throughout the Unit. Centres should ensure that the organisational detail in the case study will allow candidates to generate the necessary evidence. A report of approximately 2,000 words in length or equivalent could act as a guide for the sufficiency of evidence for all Outcomes.

Higher National Unit specification: statement of standards (cont)

Unit title: Business Management: An Introduction

OUTCOME 2

Explain the requirement for business financial management

Knowledge and/or Skills

♦   Financial planning and control
♦   Balance sheet and profit and loss account

Evidence Requirements

Candidates should provide evidence to demonstrate their knowledge and/or skills by showing that they can:

♦   explain the financial planning and control process in relation to a small business or a department within a large organisation
♦   for a given set of data, complete a horizontal and vertical analysis on balance sheet and profit and loss account and interpret the results

Assessment guidelines

This Outcome could be assessed by means of an extended response, open-book assessment that includes analysis and interpretation of given data and a calculation for a balance sheet and profit and loss account.

The assessment for all Outcomes could be combined if an open-book task was set using a real or hypothetical case study of an organisation and supplementary questioning to cover all Evidence Requirements were used throughout the Unit. Centres should ensure that the organisational detail in the case study will allow candidates to generate the necessary evidence. A report of approximately 2,000 words in length or equivalent could act as a guide for the sufficiency of evidence for all Outcomes.

OUTCOME 3

Explain the human resource management function

Knowledge and/or Skills

♦   Human resource management
♦   Human resource management activities
♦   Current employment legislation

Higher National Unit specification: statement of standards (cont)

Unit title: Business Management: An Introduction

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

♦ identify four objectives of human resource management
♦ explain four activities of human resource management
♦ explain one contractual, one discrimination and one other piece of current employment legislation that impacts on the human resource management function

Assessment Guidelines

The assessment for Outcomes 3 could be by means of open-book, extended response questioning on a real or hypothetical organisation presented in a report format.

The assessment for all Outcomes could be combined if an open-book task was set using a real or hypothetical case study of an organisation and supplementary questioning to cover all Evidence Requirements were used throughout the Unit. Centres should ensure that the organisational detail in the case study will allow candidates to generate the necessary evidence. A report of approximately 2,000 words in length or equivalent could act as a guide for the sufficiency of evidence for all Outcomes.

OUTCOME 4

Explain the role of marketing within business organisations

Knowledge and/or Skills

♦ Marketing Orientation
♦ Marketing Mix
♦ Marketing Research

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

♦ define and explain the term marketing
— explain how marketing differs from selling and advertising
— explain the benefits which can be derived from adopting a marketing approach
— distinguish between the marketing approach and other business philosophies
♦ identify and explain the elements of the marketing mix
♦ explain the importance of marketing research
♦ distinguish between different types of marketing research
— describe primary and secondary data

Higher National Unit specification: statement of standards (cont)

Unit title: Business Management: An Introduction

Assessment Guidelines

The assessment for Outcomes 4 could be by means of open-book, extended response questioning on a real or hypothetical organisation presented in a report format.

The assessment for all Outcomes could be combined if an open-book task was set using a real or hypothetical case study of an organisation and supplementary questioning to cover all Evidence Requirements were used throughout the Unit. Centres should ensure that the organisational detail in the case study will allow candidates to generate the necessary evidence. A report of approximately 2,000 words in length or equivalent could act as a guide for the sufficiency of evidence for all Outcomes.

Administrative Information

Unit code: F1RJ 34

Unit title: Business Management: An Introduction

Superclass category: AA

Original date of publication: August 2007

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

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Higher National Unit specification: support notes

Unit title: Business Management: An Introduction

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

OUTCOME 1

Candidates should be able to describe the distinctive features of managerial work and the activities which managers undertake. They should also be able to identify different factors, which impact on managerial effectiveness and appreciate the overlap between, theories of leadership and approaches to management. Candidates should be able to explain how theories of leadership can be used to improve the way in which managers lead staff. Some of the following may be useful for this Outcome:

Roles and activities of managers as described by researchers, Mintzberg and Fayol.

Managerial behaviour and organisational effectiveness: Theory X, Theory Y, Theory Z (Ouchi), Blake and Mouton. Management by objectives. Basic managerial philosophies (Mullins).

Action-centred leadership. Leadership styles, autocratic, democratic, laissez-faire. Contingency theory. Transformational leadership.

OUTCOME 2

Candidates should have a broad understanding of financial accounts and their use in a business. They should also be able to understand the important role financial budgeting plays throughout the business planning process.

OUTCOME 3

This Outcome gives a broad introduction to the human resource function. It is not intended that the subject matter be taught in detail. What is important is that candidates understand the range of activities carried out by Human Resource Management, and how these contribute to organisational success. Some of the following may be useful for this Outcome:

Definition of Human Resource Management and the important role it plays at a strategic level. Long term, proactive, strategic, integrated role.

Objectives: Staffing, performance, change management, administration.

Activities: Employee resourcing — Recruitment, Selection, HR Planning, Personnel record keeping. Employee development — Training and development. Employee relations — Grievance and discipline handling, legal advice, employee welfare. Employee reward — Pay and remuneration

Current legislation: Contract of employment, Equal Opportunities, Health and Safety at Work, Dismissal and Redundancy, Industrial Relations.

Higher National Unit specification: support notes (cont)

Unit title: Business Management: An Introduction

OUTCOME 4

This Outcome introduces the candidate to marketing. Marketing is an integral part of all organisations and as such it should be possible to make the Outcome relevant to any client group. Where possible the theory of marketing should be related to situations that are relevant to the specific group of candidates.

Some of the following may be useful for this Outcome:

Marketing philosophy, customer focus, marketing environment, target market.

Marketing mix: Total product model, product life cycle, pricing policies, promotion mix, just-in-time distribution.

Marketing research: Primary and secondary data collection; qualitative and quantitative research methods.

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

All assessments for all Outcomes could be integrated. Such an approach would be possible if a real or hypothetical case study of an organisation and supplementary questioning to cover all Evidence Requirements were used throughout the Unit. Delivering centres should ensure that the chosen organisation details are suitable to meet all of the assessment tasks and, where possible, provide a business scenario from the candidate's chosen field of study. An open-book report with some supplementary questioning could be produced in the candidates' own time.

It is recommended that the candidate be given at least four weeks for research and preparation and a further week to submit his/her report. The report should be approximately 2,000 words in length.

Opportunities for developing Core Skills

There are opportunities to develop the Core Skill Communication at SCQF level 6 and the Core Skills component 'planning and organising' of the Core Skill Problem Solving and the Core Skills component 'working with numbers' of the Core Skill Numeracy, both at SCQF level 5 in this Unit although there is no automatic certification of Core Skills or Core Skills components.
Communication, both oral and written will be undertaken during lecturer led and class based discussion surrounding Unit topics. The Unit also requires some degree of problem solving and use of number to evaluate and carry out calculations regarding the solvency of a given organisation.

The availability of suitable software packages to support accuracy and professional presentation of written work could be advantageous.

Higher National Unit specification: support notes (cont)

Unit title: Business Management: An Introduction

Open learning

The Unit could be delivered by distance learning. However, it would require planning by the Centre to ensure the sufficiency and authenticity of candidate evidence. For further information and advice please refer to the SQA guide: *Assessment and Quality Assurance for Open and Distance Learning* (A1030, February 2001).

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

General information for candidates

Unit title: Business Management: An Introduction

This Unit enables you to acquire basic business skills and a basic knowledge of the business world. Most college graduates will finish their careers with some measure of business responsibility and an awareness of the various topics covered in this Unit is invaluable.

This Unit introduces you to the study of Business Management. The Unit examines the roles of managers and the differing styles of management and discusses the relationship between managerial behaviour and an effective organisation. You will also look at the importance of leadership as part of the management process.

By the end of the Unit you should also be able to understand the important role financial budgeting plays throughout the business planning process. The Unit also gives a broad introduction to the human resource function. It is not intended that the subject matter be taught in detail but that you will understand the range of activities carried out by Human Resource Management and how these contribute to organisational success.

The Unit will give you a flavour of the challenges of employing people, marketing goods or services and also financial management.

The assessment for this Unit is likely to be through a case study of a real or hypothetical organisation. You will be required to answer questions and produce a report of around 2,000 words. You will also be required to analyse a balance and profit and loss account and interpret the results

There are opportunities to develop the following Core Skills Units/components within this Unit although there is no automatic certification of Core Skills Units or Core Skills components:

Communication at SCQF level 6
Planning and organising (a component of the Problem Solving Core Skill) at SCQF level 5
Working with numbers (a component of the Numeracy Core Skill) at SCQF level 5.

Higher National Unit Specification

General information for centres

Unit title: Using Software Applications Packages

Unit code: D85F 34

Unit purpose: This Unit is designed to enable candidates to use an IT system and software applications packages effectively and responsibly to process a range of types of data. Activities will be centred on applying a range of skills using more than one software applications package. Candidates will learn how to integrate different types of data from more than one application and how to carry out searches in order to extract and present relevant information from electronic data sources.

On successful completion of the Unit candidates will be able to:

1   Operate a range of IT equipment paying due attention to other users
2   Use a range of software application packages effectively and responsibly
3   Find information from suitable computer data sources.

Credit value: 1 HN Credit at SCQF level 7: (8 SCOTCAT credit points at SCQF level 7)

SCQF (the Scottish Credit and Qualifications Framework) brings Scottish qualifications into a single framework of 12 levels ranging from SQA Access 1 to doctorates. The SCQF includes degrees; HNC/Ds; SQA National Qualifications; and SVQs. Each SQA Unit is allocated a number of SCQF credit points at a specific level. 1 SCQF point = 10 hours of learning. HN candidates are normally expected to input a further number of hours, matched to the credit value of the Unit, of non-contact time or candidate-led effort to consolidate and reinforce learning.

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre, however it would be useful if the candidate had good keyboard and mouse skills prior to attempting this Unit. It is recommended that the candidate have some familiarity with computers and software applications packages, although this need not have been gained in a formal environment. This may be evidenced by the possession of appropriate National Units or courses.

Core Skills: This Unit gives automatic certification of the following Core Skill:

Using Information Technology: Intermediate 2

Higher National Unit specification: statement of standards

Unit title: Using Software Applications Packages

Unit code: D85F 34

Context for delivery: This Unit provides a solid basis on which further IT skills can be built if required. It will enable candidates to use IT systems with minimal support. Candidates are expected to achieve effective results when using IT software. Electronic data sources are to be used. Files should be provided for candidates as appropriate, to negate the need for them to enter large amounts of text or data.

Assessment Strategy: This Unit is largely of a practical nature. An observation checklist is required for Outcome 1. The other 2 Outcomes can be assessed by a single assessment containing a number of tasks in the form of a project or case study. Candidates will be required to submit evidence in the form of printouts, listings, screen dumps or disk based evidence to demonstrate that they have carried out the requirements. Files should be provided for candidates as appropriate to negate the need for them to enter large amounts of text or data. Candidates should have access to on-line help.

Since the Core Skill of *Using Information Technology* at Intermediate 2 is embedded in this Unit, it is strongly recommended that assessment centres follow the guidelines given. Centres wishing to use a different assessment model should seek prior moderation of the assessment instrument(s) they intend to use to ensure that the Core Skills are covered.

The sections of the Unit stating the Outcomes, Knowledge and/or skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

This Unit is included in a number of HNC and HND frameworks. It is recommended that it should be taught and assessed within the particular Group Award to which it contributes.

Higher National Unit specification: statement of standards (cont)

Unit title: Using Software Applications Packages

OUTCOME 1

Operate a range of IT equipment paying due attention to other users

Knowledge and/or skills

♦   The different components of a computer system and how to use them, eg mouse or other pointing device, keyboard, monitor, disk drive, processor, printer, scanner, etc.
♦   The functions of operating system tools, eg file managers, print managers, control panels and how to use them.
♦   The ways in which data can be kept secure (eg passwords, back ups, virus protection) and how security procedures can be used to meet the needs of users of a computer system.

Evidence Requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can:

♦   Use 5 hardware devices (eg mouse, keyboard, printer, monitor, disk drive, scanner)
♦   Start up and close down the operating system
♦   Open and close software packages
♦   Locate data and applications
♦   Use a filing system (eg to organise folders and sub-folders, applying naming conventions)
♦   Use tools within the operating system (eg file managers, print managers and control panels)
♦   Use security measures responsibly and with consideration for the needs of other users (eg passwords, backups, virus protection).

The evidence for this Outcome should be by submission of an observation checklist covering all the points above. Candidates must also produce printouts to show changes made to their filing system and to identify backup files.

Assessment guidelines

It is recommended that candidates be given a practical exercise that ensures that all the points in the Evidence Requirements are covered. Assessors would then complete the observation checklist appropriately.

Higher National Unit specification: statement of standards (cont)

Unit title: Using Software Applications Packages

OUTCOME 2

Use a range of software application packages effectively and responsibly

Knowledge and/or skills

♦   Selection of **three** software applications packages
♦   How to use straightforward features of a range of software application packages
♦   How to use complex features of one software application package
♦   How to process and output data

NB: the software applications packages may be any from word/text processing, spreadsheet, database, simulation, graphics, communications (eg Internet, intranet, email, etc), audio/music, animation, video, multimedia, desktop publishing, programming language, data logging and retrieval, control or other suitable packages).

Evidence Requirements

Candidates will need evidence to demonstrate their skills and/or knowledge by showing that they can:

♦   Select software applications packages which are appropriate to meet the identified information requirements
♦   Enter, edit and output data - for **all three** application packages
♦   Use **one** application package in depth, using at least **three** or more complex features, (eg use templates, auto-correction, tables, graphics, merge and indexing in a word processing package)
♦   Integrate at least **two** different data types in one application package (eg text and graphics, text and number, or graphics and sound)
♦   Output information from at least **three** software application packages in one or more appropriate formats to meet a given specification
♦   The evidence for this Outcome must be in the form of a document, design, composition, model or presentation covering all the Evidence Requirements shown above.

Assessment guidelines

The emphasis in this Outcome should be on producing basic and complex information in a context that is unfamiliar to the candidate. Centres may wish to complete an observation checklist to keep track of the candidate's development in the use of the three chosen software applications packages.

A combined assessment could be produced for Outcomes 2 and 3 in the form of a case study or project where information located for Outcome 3 is incorporated into documentation produced in Outcome 2.

Higher National Unit specification: statement of standards (cont)

Unit title: Using Software Application Packages

OUTCOME 3

Find information from suitable computer data sources

Knowledge and/or skills

♦ Computer data sources, including the Internet
♦ Searching for data
♦ Extracting data
♦ Presenting information in appropriate formats

Evidence Requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can carry out 2 searches to extract and present relevant information from local or remote computer data sources. To do this the candidate will be required to:

♦ Select suitable computer data sources for the information search
♦ Plan how to find the information, taking account of efficiency in terms of time, cost, effective filtering and Outcome
♦ Extract information that matches several search criteria. The criteria might be key terms, fields or file names. The information might be text, numbers, graphics, images, video, audio/music, data sets. The searches must be different from each other, eg searching 2 different sources, or searching the same source for two different forms of information
♦ Present the extracted information so that it is clear and helpful to others
♦ The evidence for this Outcome must be in the form of a document, design, composition, model or presentation covering all the Evidence Requirements shown above.

Assessment guidelines

The emphasis in this Outcome should be on searching for relevant information, producing and presenting the found information clearly. Selection/importation may involve tools such as screen grabbers, digital cameras or scanners

Centres may wish to complete an observation checklist to keep track of the candidate's development in the use of searching, selecting, extracting, producing and presenting information.

A combined assessment could be produced for Outcomes 2 and 3 as stated in the Assessment Guidelines for Outcome 2.

Administrative Information

Unit code: D85F 34

Unit title: Using Software Applications Packages

Superclass category: CD

Date of publication: February 2002

Source: SQA

Higher National Unit specification: support notes

Unit title: Using Software Applications Packages

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit is aimed at enabling candidates to use a variety of software applications packages, including the Internet (electronic communications). It is also designed to enable candidates to use IT systems and applications effectively and responsibly to process a range of types of data. Candidates will learn how to integrate different types of data from more than one application in a piece of work and how to carry out searches in order to extract and present relevant information from electronic data sources.

Candidates should achieve the level of competence required of a regular user of information technology systems and software applications packages. Candidates will require individual access to a personal computer/workstation with an Internet connection. It is suggested that, wherever possible, commercially available current versions of industry standard software be used. The component parts of an integrated software package along with its operating environment can be used to achieve all Outcomes. It is generally assumed that the environment for this Unit will be, for example, Microsoft Windows and Microsoft Office or Lotus, or other vendor equivalents, however, this is not specified and the Outcome requirements are deliberately generic in nature.

The use of the Internet should be encouraged throughout the Unit. Candidates should be encouraged to become familiar with the use of email, web browsers, search engines, channels, video conferencing, etc.

Outcome 1 looks at the components of hardware, the functions of operating system tools and how these are used. Responsible use of data security measures (eg passwords, backups, virus protection) and taking care of the requirements of other users are also pre-eminent.

Outcome 2 looks at using a range of software applications packages to process a range of data types. Centres can choose three or more packages (a minimum of three different packages must be used) from the whole range of applications packages available. The emphasis in this Outcome should be on outputting information in appropriate formats to meet user requirements. Candidates should be able to integrate at least two different data types into a single product and to format the product so that the final output is clear and helpful to users.

Higher National Unit specification: support notes (cont)

Unit title: Using Software Applications Packages

An indication of the range of activities that candidates are expected to be able to carry out when using a variety of software application packages during the course of this Unit is given below for some of the 'standard' applications that centres may use. This should not be taken
to be a prescriptive or indeed, an exhaustive list of requirements but should help to serve as a guide to the level of skills required. These include all the 'in-depth' features of software applications packages.

Please remember that candidates only need to demonstrate the use of **one** software application package **in-depth** in order to meet the requirements of the Unit and of IT Core Skills at Intermediate 2. For the other two software applications packages they are only required to demonstrate the use of the basic features.

1   Selection and use of appropriate software applications packages.

2   Selection and use of document layout, page layout and format facilities, eg views, use of toolbars, rulers, guides, zoom, fonts, bullets and numbering, borders and shading, tabs, case, dropped capitals, columns, themes, backgrounds, styles, frames, colours and lines, alignment, templates, auto-format. Here, complex features would be themes, backgrounds, styles, frames, templates, auto-format, etc.

3   Use of on-line help and tutorial support facilities.

4   File handling, eg properties, naming conventions, saving, saving for use with web and other applications, retrieving, retrieving from web and other applications, copying, renaming, importing, exporting, emailing, attachments, routing and faxing.

5   Editing, eg undo, repeat, cut, copy, paste, paste special, select all, fill, clear, find, replace, go to, rename, links and objects.

6   Selection and use of insertions, eg headers and footers, page breaks, comments, footnotes, captions, numbering, symbols, date and time, index and tables, bookmarks, pictures, objects, hyperlinks, graphics, movies, sounds, tables, queries, forms and reports, functions, charts, comments, fields, records and files.

7   Use of 'tools', eg spelling and grammar checker, thesaurus, options, search and replace, auto-correction, sort, merge, customisation, security, protection, macros (simple), on-line facilities, send and receive, address books, synchronisation, message rules, messenger services, newsgroups and accounts.

8   Printing, eg printer selection, printer properties; printer set up, eg paper size, paper type, scaling, orientation, print preview; use of print preview facilities, eg zoom, multiple pages, ruler, scaling etc.

Higher National Unit specification: support notes (cont)

Unit title: Using Software Applications Packages

Outcome 3

Candidates should select suitable computer data sources for information and extract suitable information from these computer data sources to meet relevant information requirements.

GUIDANCE ON THE DELIVERY AND ASSESSMENT OF THIS UNIT

This Unit is designed to enable candidates to use IT systems effectively and responsibly to process a range of types of data. It is a general IT Unit that should be suitable for all vocational areas. Early inclusion of this Unit in an award is preferable as students should then be able to present work for other units using the knowledge and skills learned in this Unit.

During the course of the Unit candidates should have several opportunities to develop their practical skills and should then be assessed appropriately.

Assessment should be by a practical exercise that is observed by the assessor. An observation checklist would be sufficient evidence for Outcome 1 along with appropriate printouts, listings and screen dumps. For Outcomes 2 and 3, it is recommended that candidates be given a project or case study containing the tasks required to meet all the Evidence Requirements.

Candidates should have access to on-line help, tutorial support and/or suppliers' manuals as required.

Individual centres will need to plan Outcomes 2 and 3 to ensure that such resources as the ISP, CDs, telephone lines, modems, software applications packages and operating systems updates are available prior to commencement of the Unit.

Centres may wish to teach this Unit in the context of Microsoft Office User Specialist (MOUS) certification.

Links to Vocational Qualifications

Depending on how this Unit is taught by centres, it is considered possible to cover the knowledge and understanding components for the following VQ units. These units may also help to serve as a guide to centres as to the level of competence required by candidates.

VQ	VQ Unit No.	VQ Element No.	Outcome in this Unit
Using IT Level 3	301	1, 2 and 3	1 & 2
Using IT Level 3	305	1, 2, 3 and 4	2
Using IT Level 3	306	1, 2, 3 and 4	2
Using IT Level 3	311	1, 2 and 3	2
Using IT Level 3	327	1, 2, 3 and 4	2
Managing IT for Teleworking Level 3	336	1, 2, 3 and 4	2

Higher National Unit specification: support notes (cont)

Unit title: Using Software Applications Packages

Open learning

This Unit is well suited for delivery by both open and distance learning where the candidate has appropriate workplace, home based, or other facilities to carry out the practical assignments, and adequate supervision and support is available. This will require careful planning by the centre to ensure the sufficiency and authenticity of candidate evidence. It may be necessary for an "on-line support" tutor to be involved. In situations where the student completes work away from the centre, regular contact with tutors will be necessary. This may take the form of visits by the tutor to the student or vice versa. It is at the discretion of the centre as to whether assessments take place at the centre, workplace, or at home.

For information on normal open learning arrangements, please refer to the SQA guide *Assessment and Quality Assurance of Open and Distance Learning* (SQA, 2000).

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

General information for candidates

Unit title: Using Software Applications Packages

This Unit is designed to enable you to use IT systems and applications effectively and responsibly to process a range of types of data. You should develop a broad knowledge of the theoretical concepts, principles, boundaries and scope of Information Technology Applications. By the end of the Unit you should have learned how to use the basic features of at least two software applications packages and the complex features of one more package.

You will be required to use and develop a broad range of skills in a range of software applications packages (a minimum of 3), for example, word processor, spreadsheet, database, graphics, communications (ie internet, intranet, email, etc), audio/music, animation, video, multimedia, desktop publishing or other packages to meet specified requirements.

On successful completion of the Unit you will be able to:

1   Operate a range of IT equipment paying due attention to other users

2   Use a range of software application packages effectively and responsibly

3   Find information from suitable computer data sources.

In **Outcome 1** you will learn about the components of hardware and how to use them, the functions of operating system tools and how these are used. Outcome 1 will be assessed by means of a practical exercise that will test your ability to carry out the required tasks under observation by your tutor/assessor.

In **Outcome 2** you will learn about how to use a range of software applications packages to process a range of types of data. You will learn about a minimum of 3 different software packages from the whole range of applications packages available. In this Outcome you will learn how to output information in appropriate formats to meet user requirements. You will learn how to integrate data types (eg text, number, graphics, audio, video) into a single product and to format the product so that the final output is clear and helpful to users.

In **Outcome 3** you will learn how to use and access the Internet and use other electronic means of finding information. You will be required to find relevant information and produce it in a format suitable for meeting user requirements.

Outcomes 2 and 3 will be assessed by a project or case study that will test your ability to carry out the required tasks. You will need to produce appropriate printouts, listings, screen dumps or disk based evidence to demonstrate that you have carried out the requirements. Your tutor/assessor may also observe you carrying out some or all of these tasks.

You will be encouraged to access on-line help facilities, tutorial support and/or suppliers' manuals as required. More detailed guidance on the content, amount, style and quality required of your work will be made available to you during your progress through the Unit.