



National Unit specification: general information

Unit title: Food Manufacture: Fundamentals of Food Science
(SCQF level 6)

Unit code: H1NE 12

Superclass: WM

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Summary

The purpose of this Unit is to give candidates an overview of the science and legislation underpinning the food and drink manufacturing industry. Candidates will develop a knowledge and understanding of the chemical composition and nutritional properties of various foods. Candidates will investigate the legislation that is associated with the food industry including the relevant microbiology and food safety aspects.

This is a mandatory Unit within the National Progression Award in Food Manufacture at SCQF level 6. It can also be taken as a free standing Unit. This Unit is suitable for candidates who are hoping to gain employment in the food production and processing industry. It is also suitable for those who are employed but wish to broaden their knowledge and skills. It aims to facilitate progression to further study including into Higher National and degree programmes in Food Science and Technology.

Outcomes

- 1 Investigate the chemical composition of foods.
- 2 Investigate the nutritional components, the health implications and dietary effects of these components on different populations.
- 3 Investigate relevant food safety legislation associated with food and drink processing and production.

Recommended entry

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent qualifications or experience:

- ◆ Numeracy and Communication at SCQF level 5
- ◆ Science or Health and Food Technology at SCQF level 5

General information (cont)

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Credit points and level

1 National Unit credit at SCQF level 6: (6 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.*

Core Skills

Achievement of this Unit gives automatic certification of the following Core Skills component:

Complete Core Skill None

Core Skill component Critical Thinking at SCQF level 5

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of this Unit specification.

National Unit specification: statement of standards

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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Investigate the chemical composition of foods.

Performance Criteria

- (a) Identify the chemical elements found in carbohydrates, proteins and fats.
- (b) Describe the synthesis reactions that build complex food groups from their chemical elements.
- (c) Investigate the degradation reactions that break down these complex food groups into simple elements for absorption by the human body.

Outcome 2

Investigate the nutritional components, the health implications and dietary effects of these components on different populations.

Performance Criteria

- (a) Compare the food nutrient groups present in a range of processed or manufactured food products.
- (b) Research effects of dietary nutritional components in different populations.

Outcome 3

Investigate relevant food safety legislation associated with food and drink processing and production.

Performance Criteria

- (a) Investigate the relevant food safety practices associated with a specific food or drink.
- (b) Identify the legislation that underpins these practices.
- (c) Investigate how hazards are managed within the specific food or drink product.

National Unit specification: statement of standards

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Evidence Requirements for this Unit

Evidence can be generated holistically or Outcome by Outcome.

Outcome 1

Written and/or oral recorded evidence is required in a closed-book assessment to demonstrate that the candidate has achieved all of the Outcomes and Performance Criteria.

- ◆ Identify the chemical elements found in the three food groups: carbohydrates, proteins and fats.
- ◆ Describe the synthesis reactions used to build complex molecules of the three food groups from their chemical elements.
- ◆ Investigate how these three complex food groups can be degraded into simple products by the human body.
- ◆ Describe how the human body absorbs the three food groups.

Outcome 2

Written and/or oral recorded evidence is required in an open-book assessment to demonstrate that the candidate has achieved all of the Outcomes and Performance Criteria.

- ◆ Compare the components present in a range of food for example proteins, saturated fats, unsaturated fats, complex carbohydrates, sugars, salts and vitamins and minerals.
- ◆ Research effects of dietary components on different populations for example vegetarians, ethnic minorities, allergy sufferers, and religious cultures, regional and national trends.

Outcome 3

Written and/or oral recorded evidence is required in an open-book assessment.

Candidates must investigate the relevant food safety practices associated with a specific food or drink, identify the legislation that underpins these practices and investigate how hazards are managed within the specific food or drink product.

Responses must make valid reference to at least six aspects of food safety legislation. Candidates need to research Hazards Analysis and Critical Control Points (HACCP) with particular reference to the control of hazards, ie contamination from microbiological, physical, chemical, allergens and the growth and survival of pathogenic organisms.

National Unit specification: support notes

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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.

Outcome 1

Restricted response questions could be used as an assessment tool for Outcome 1. This should be carried out under closed-book conditions with supervision.

Outcome 2

Candidates need to compare the components present in a range of foods. They can look at for example proteins, saturated fats, unsaturated fats, complex carbohydrates, sugars, salts and vitamins and minerals. These components can be evaluated by collecting food labels from various foods. These labels would be relevant for Outcome 3 when candidates evaluate food safety legislation. Investigations into the diet and health of different populations for example vegetarians, ethnic minorities, allergy sufferers, religious cultures, regional and national trends could be evaluated.

Outcome 3

The food labels that were collected for Outcome 2 could be used to evaluate the allergen and safety advice for this Outcome. The opportunity to achieve REHIS elementary Food Hygiene certificate at an additional charge could be made available to candidates.

HACCP underpins food safety in the food and drink food production and processing industry so it needs to be included in the research to investigate underpinning legislation. Candidates need to research more than just the microbiological and spoilage aspects of food safety and reference to physical, chemical and allergens food safety in relation to HACCP.

National Unit specification: support notes (cont)

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Guidance on the content and context for this Unit

This Unit is a mandatory Unit within the National Progression Award in Food Manufacture at SCQF level 6. It can also be delivered as a free-standing Unit. The purpose of this Unit is to give candidates an overview of the science and food safety legislation underpinning the food manufacturing industry. Candidates will develop a knowledge and understanding of the chemical composition and nutritional properties of various foods. Candidates will investigate the legislation associated with the food industry with particular reference to HACCP.

This Unit can be tailored to suit individuals already working within a specific food or drink industry or individuals wishing to specialise in particular areas.

This Unit is aligned to the following National Occupational Standards (NOS) for Food Manufacture: Food Science from Improve:

- ◆ principles of food science in food technology — IMPFT104K
- ◆ principles of food policy and regulation — IMPFT101K
- ◆ principles of human food nutrition — IMPFT102K
- ◆ Develop new markets with different countries or diverse cultures — CFAIWS6

The specific NOS that this Unit will relate to will be dependent on the food or drink manufacturing industry under investigation by the candidate. In Outcome 1 the candidates will learn about the elements present in the food groups and how these groups synthesis to produce the food components and how they are absorbed by the human body.

Outcome 2 demonstrates how the body utilises these food groups in relation to specific populations.

Outcome 3 illustrates the link between production, processing and the underpinning food safety legislation utilising a food safety management system based on the principles of HACCP with particular reference to the control of hazards, ie contamination from microbiological, physical, chemical, allergens and the growth and survival of pathogenic organisms.

Candidates would benefit from having knowledge and/or skills from a specific food production area but this is not essential. A basic knowledge of a science based subject would also be beneficial but not essential. This Unit could be integrated with employers progression schemes to allow employees the opportunity to proceed into supervisory posts or quality control posts. This Unit could also be used to prepare candidates for progression into further education and university degree programmes in various food related subjects including BSc in Food Science and Technology.

National Unit specification: support notes (cont)

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Guidance on learning and teaching approaches for this Unit

Delivery of this Unit should be as practical as possible with the inclusion of laboratory skills sessions and scientific investigations.

For Outcome 1 candidates would benefit from:

- ◆ Working in small groups to research and present information on the synthesis and degradation reactions associated with the three food groups.
- ◆ Making use of the internet to visualise the breakdown of foods and the absorption by the human body.

For Outcome 2 candidates would benefit from:

- ◆ Working as a class to collect the information labels from various foods.
- ◆ Having visits from appropriate professionals to demonstrate how the human body utilises the food groups.
- ◆ Working individually to produce a project looking at the effects of food components on various populations.

For Outcome 3 candidates would benefit from:

- ◆ Having visits from local regulatory bodies to highlight the scope of their role related to food and drink production and processing.
- ◆ Working in small groups to investigate relevant legislation through the production line of a specific food in a local food factory.
- ◆ Working individually to produce a portfolio that look at a specific product and the associated hazards and controls required in its manufacture.

Essential skills development

By adopting the learning and teaching approaches highlighted above and in the Outcomes and corresponding Evidence Requirements, this Unit will provide candidates with the opportunity to develop the following essential skills for life, learning and work:

- ◆ Time management by meeting assignment deadlines and completion of tasks.
- ◆ Analytical and interpretative skills by analysing data and collecting information.
- ◆ Presentation skills by producing information to be shared with other class mates.
- ◆ Independent learning by producing individual reports and portfolios.
- ◆ Responsibility by taking charge of their learning and producing the Outcomes required.
- ◆ Confidence by working and presenting information to classmates as well as meeting individuals from industry.
- ◆ Citizenship by making links with industry.

National Unit specification: support notes (cont)

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Guidance on approaches to assessment for this Unit

The suggested approach to assessment in this Unit is a combination of closed-book restricted response questions as well as produce a project and research portfolio.

The following approaches to assessment are suggested:

- Outcome 1: closed-book in supervised conditions
- Outcome 2: open-book in the form of a project
- Outcome 3: open-book in the form of a portfolio that will include the work produced by Outcomes 1 and 2

Time should be allowed for reassessment. Where the Unit is assessed holistically candidates need only be reassessed on those elements that have not met the Performance Criteria.

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

Opportunities for developing Core Skills

In this Unit candidates will develop knowledge and understanding of the chemical composition and nutritional properties of various foods and aspects of related legislation associated with the food industry.

Candidates will:

- ◆ identify the chemical elements found in major food groups
- ◆ explain and describe a range of chemical processes and reactions relating to food groups
- ◆ carry out research investigations
- ◆ present findings
- ◆ identify relevant legislation
- ◆ research workplace practices relating to the food and drink industry

This means that as candidates are doing this Unit they will be developing aspects of the Core Skills of *Communication, Numeracy, Problem Solving, Information Communication Technology (ICT)* and *Working with Others*.

National Unit specification: support notes (cont)

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This Unit has the Critical Thinking component of Problem Solving embedded in it. This means that when candidates achieve the Unit, their Core Skills profile will also be updated to show they have achieved Critical Thinking at SCQF level 5.

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

History of changes to Unit

Version	Description of change	Date

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