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

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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:

- 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

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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.

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.

Higher National Unit specification: support notes (cont)

Unit title: Food Composition

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 1

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.