Higher National Unit Specification

General information

Unit title: Food Composition (SCQF level 7)

Unit code: F6VD 34

Superclass: NH

Publication date: June 2019

Source: Scottish Qualifications Authority

Version: 03

Unit purpose

This unit is designed to provide learners with relevant underpinning knowledge and understanding of the chemical components of food, and to enable them to apply this to the food industry.

Outcomes

On successful completion of the unit the learner will be able to:

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

Credit points and level

1 Higher National Unit credit at SCQF level 7: (8 SCQF credit points at SCQF level 7)

Recommended entry to the unit

Access to this unit will be at the discretion of the centre however, it would be beneficial if learners have a science subject, such as Chemistry at SCQF level 6. Learners should have completed, or be in the process of completing, F6VB 33 *Science for the Food Industry: An Introduction* before embarking on this unit.

Higher National Unit Specification: General information (cont)

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Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes for this unit specification.

There is no automatic certification of Core Skills or Core Skill components 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.

This unit is a mandatory unit in the HNC in Food Science and Technology and the PDA in Food Science. It can also be delivered as a stand-alone unit.

The Assessment Support Pack (ASP) for this unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website **(http://www.sqa.org.uk/sqa/46233.2769.html**

Equality and inclusion

This unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

Higher 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.

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. Learners 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 main components of food.

Knowledge and/or skills

- Fats and oils
- Carbohydrates
- Proteins

Outcome 2

Explain the implications for the food and drink industry of the chemical properties of food components.

Knowledge and/or skills

- The sources of food components
- Chemical reactions that can occur during handling, processing and storage of foods
- Selection of food components for different food applications
- Functions of nutrients in foods from the food processing perspective

Higher National Unit Specification: Statement of standards (cont)

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Evidence requirements for this unit

Learners will need to provide evidence to demonstrate their knowledge and/or skills across all outcomes by showing that they can provide:

- an explanation of the key aspects of the chemical structure of an example food component and its main properties: explanations should use diagrams where appropriate and include suitable scientific concepts.
- an explanation of how the chemical composition of the example can be applied to the food industry: the evidence should cover three different factors that are significant for the food industry, and can cover any aspect of food manufacturing including handling, processing and storage.

This unit can be assessed holistically. Learners could be given a brief to help them concentrate on the key factors in each case. The choice of brief should reflect a number of different factors to enable learners to recognise the significance of the chemical composition of food components to food processing. Assessment can be undertaken as learners progress through the unit.

Learners 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.

Higher National Unit Support Notes

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Unit support notes are offered as guidance and 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 and PDA in Food Science. It is intended to provide learners 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 and 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 learners are expected to apply their knowledge and understanding of chemistry to food processing and the food industry. It is important that learners appreciate the reason why food chemistry is critical to food manufacturing. This can be achieved by highlighting the implications of chemical structure and properties of food components for the food manufacturing industry (including implications during handling, storage and processing).

Learners undertaking this unit will find it beneficial to have some prior scientific knowledge. This can be achieved through the completion of a suitable unit in chemistry or a related science at SCQF level 6. It is possible, however, that some learners may not have previously studied science at SCQF level 6. Learners in this situation can undertake the HN Unit F6VB 33 *Science for the Food Industry: An Introduction*, which will prepare them for this unit.

Guidance on approaches to delivery of this unit

Outcome 1

This covers fats and oils, carbohydrates and proteins. The following gives guidance on what could be covered.

Fats and oils: 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, antioxidants.

Carbohydrates: 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, retro gradation, hydrolysis of starch, glucose/corn syrup. Non-starch polysaccharides (NSP) thickeners and gelling agents (eg xanthan, pectin, alginates, carrageenans and cellulosic derivatives), dietary fibre and carbohydrate replacements such as artificial sweeteners.

Proteins: 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

Learners should consider the ways in which chemical structures and properties can be applied to the food industry. They can do this by identifying factors that 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 (including handling and storage). In other words, the factors can cover any matter that can affect the operations of firms in the food industry and which food technologists should be aware of and take into account.

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 or emulsions; carbohydrates could be pectin gel formation, and proteins could include denaturation and coagulation.

This unit is an applied unit that also includes significant underpinning theoretical knowledge and understanding of chemistry related to the food industry. The purpose of the unit is to enable learners to become aware of the significance of chemical structure and properties to all aspects of the food industry (including handling, storage, food processing and consumption). The delivery of the unit should keep this purpose firmly in mind and encourage learners to see how the material can be applied to the day-to-day operations and activities of food suppliers and consumers.

Learners are not expected to undertake practical laboratory work.

Field trips to the food manufacturing industry, eg abattoirs, factories, bakeries, etc will enable students to relate chemical properties of food components to food processing. Participation in class group work, engaging students in the deconstruction of complex foods, will enable them to relate chemical structures to chemical properties, and how these relate to food manufacturing and consumption.

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Guidance on approaches to assessment of this unit

Evidence can be generated using different types of assessment. The following are suggestions, as there may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Assessment for this unit focuses on the application of the knowledge and understanding of chemical structures and chemical properties. Learners 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.

Learners have to do this for a number of different components. This means, if desired, learners can carry out assessment work during the delivery of the unit. Alternatively, learners 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 learners.

Learners can be encouraged to do their own research to support their investigation of the application of theoretical concepts and principles from chemistry appropriate referenced sources of information. Learners can present their explanations for assessment in a number of ways. They could provide a report, perhaps structured around some questions that they have been given in advance. They could do a poster presentation or make use of presentation software.

Opportunities for 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 social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the evidence requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

Opportunities for developing Core and other essential skills

Communication: Written Communication (Writing) at SCQF level 5. As part of their assessment work for this unit, learners are expected to explain the chemical functionalities and properties of major components of food and relate these to the food industry.

Higher National Unit Support Notes (cont)

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Learners 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 and reference their sources of information appropriately.

History of changes to unit

Version	Description of change	Date
03	Unit content has been transferred to a new shell and typographical amendments made to wording throughout.	06/06/19
02	Title amended by removal of numeral 1 in line with QDT agreement.	27/04/10

General information for learners

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This section will help you decide whether this is the unit for you by explaining what the unit is about, what you should know or be able to do before you start, what you will need to do during the unit and opportunities for further learning and employment.

This unit is a mandatory unit in the HNC Food Science and Technology and PDA in Food Science. It is designed to give you the underpinning knowledge and understanding of the chemical components of food that 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 a fundamental building block in both the HNC and PDA, and you will make use of this knowledge throughout your whole course.

In addition, this 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.

You will study the chemical structure and properties of different components of food such as fats and oils, carbohydrates and proteins. You will be asked to explain the implications of the composition of foods and the properties of the food components on food manufacturing.

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. 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.