Higher National Unit Specification

General information

Unit title: Food Analysis (SCQF level 7)

Unit code: F6VC 34

Superclass: NH

Publication date: June 2019

Source: Scottish Qualifications Authority

Version: 03

Unit purpose

The purpose of this unit is to provide learners with the practical scientific skills and techniques that will enable learners to investigate the properties of foodstuffs and report on any investigations.

The unit is suitable for learners studying at HNC or PDA level 7 and will provide the necessary underpinning knowledge and skills to enable progression to further study, or seek employment within the food science or technology sectors.

Outcomes

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

1 Use practical techniques to investigate the properties of foodstuffs.
2 Report the results of investigations.

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

Learners should possess an understanding of chemistry. In particular chemical formulae, bonding, physical properties and the ability to balance chemical equations. Access to this unit will be at the discretion of the centre. However, it would be beneficial if learners had completed a chemical related qualification. This could be achieved through the HN Unit xxxx 34 *Food Composition*, the HN Unit XXXX 33 *Science for the Food Industry: An Introduction* or through units in Chemistry at SCQF level 5 and 6.

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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 in the subject area of the group award to which it contributes.

It is closely linked to the unit F6VD 34 *Food Composition*, and learners attempting this unit may find it beneficial to have completed, or be in the process of completing the *Food Composition 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

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 this unit

Learners 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.

Outcome 1

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)

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Outcome 2

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

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 intended to enable learners to analyse the chemical properties of foodstuffs. In order to do this, learners 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 learners gain underpinning knowledge and an understanding of chemistry, which they can apply to food processing and the food industry. This unit also, therefore, helps learners to appreciate why food chemistry is critical to food manufacturing.

Learners undertaking this unit will require some prior scientific knowledge. This could be provided by F6VD 34 *Food Composition*. Alternatively, learners 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 learners to become familiar with laboratory techniques of relevance to the food industry and of the importance of following proper procedures in the laboratory. Learners 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 and precise 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, learners 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 learners; and so on.

Higher National Unit Support Notes (cont)

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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

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 approaches to delivery of this unit

Delivery should aim to build laboratory skills in learners so that their confidence in undertaking laboratory work is enhanced. Throughout, learners 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 learners are taking both units, it may be appropriate to integrate the way in which they are delivered. Learners could for example complete F6VD 34 *Food Composition* and then move directly into this unit.

Ideally the theory of each technique will be discussed before any practical work is performed. Where time allows, learners could be given the opportunity to practice techniques before any formal assessed practical. The techniques used within the laboratory are transferrable and skills developed are ones used in many chemical and biological fields.

It is important to introduce learners to the idea of experimental errors and the calculation of numerical errors that impact the accuracy of analysis. Also, with some analysis in food science, the values being analysed are small so discussion around limits of detection are important, in particular where spectrophotometry is utilised.

Higher National Unit Support Notes (cont)

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Assessment for this unit is based on the practical work undertaken. Learners 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 learners have followed proper laboratory procedures and carried out the work safely and accurately. If necessary, the observation checklists may be supplemented by additional questions.

Learners must also record and interpret the results of their experiments and they could use a laboratory notebook 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. Learners should interpret the results by comparing them with the expected standard.

Guidance on approaches to assessment of this unit

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

Learners can maintain a laboratory notebook 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.

Learners could be asked questions about the work they have done to supplement the observation checklist and the recording of analyses. Product evidence such as photographic or video could also be gathered.

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 guidelines

The outcomes may be assessed separately.

Outcome 1

Learners 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 learners meet these requirements, they should be observed on all eight occasions and a record should be kept of the observation, an observation checklist could be used to record achievement of practical skills such as safe laboratory practice.

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Outcome 2

Learners can maintain a laboratory notebook to record the evidence from their practical work and officially record results, calculations, comparison of results and conclusions.

Learners could be asked questions about the work they have done to supplement the observation checklist and the recording of analyses.

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 maintain details of practical work. This can be done in a laboratory log book or diary and learners will be expected to organise the content into a logical and effective structure. Learners will, therefore, use written information to demonstrate their knowledge and understanding of relevant ideas and information. Learners can also be asked to write up their practical work in a report style which can replicate that used in industry. In these cases, learners 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 this unit, learners 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 learners will be required to decide what numerical operations are to be carried out and the order in which to do them.

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.	10/06/19
02	Title amended by removal of numeral 1 in line with QDT agreement.	27/04/10

General information for learners

Unit title: Food Analysis (SCQF level 7)

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 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.

Chemical properties of foodstuffs are a vital part of the day to day operation of food businesses. This unit provides you with practical skills that will be beneficial when you take up employment in the food industry.

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 carry out these experiments 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.

Observation and calculation of errors is an important consideration and you will be taught what to look for and how to handle any numerical error values, therefore noting any impact that experimental error might have on the precision and accuracy of results.

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 all the evidence requirements for both outcomes:

- Use practical techniques to investigate the properties of foodstuffs.
- Report the results of investigations.