Higher National Unit specification

General information for centres

Unit title: Food Analysis and Nutritional Labelling

Unit code: F8L4 35

Unit purpose: This Unit is designed to enable candidates to develop skills in carrying out experimental techniques used to gather information about food products required for food labelling. It enables them to use this and other information to prepare and evaluate nutritional labels for food and determine the extent to which they are accurate and fit for purpose.

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

1 Analyse foods for nutritional information.
2 Evaluate food nutrition labels.

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

**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, candidates should have some prior knowledge of the chemical components of food which could be demonstrated by relevant practical experience or achievement of appropriate Units at SCQF level 7, such as F6VC 34 Food Analysis and F6VD 34 Food Composition.

Core Skills: There are opportunities to develop the following Core Skills components in this Unit: *Written Communication* (Writing) at SCQF level 6; *Numeracy* (Using Number) at SCQF level 6; *Problem Solving* (Critical Thinking) at SCQF level 6; *Problem Solving* (Reviewing and Evaluating) at SCQF level 6. There is no automatic certification of these 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.

Assessment: The assessment for this Unit consists of observation and records of laboratory work on the analysis of foods for labelling purposes supplemented by reports on two analyses. An observation checklist can be used to record the achievement of practical skills such as safe laboratory practice. Candidates must also evaluate food labels which they have prepared. This work could be combined with the reports on analyses, especially where information from the analyses is used for the label. However, candidates could present their work in other ways, eg by making use of presentation software.

Higher National Unit specification: statement of standards

Unit title: Food Analysis and Nutritional Labelling

Unit code: F8L4 35

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.

Outcome 1

Analyse foods for nutritional information

Knowledge and/or Skills

- Experimental techniques
- Data collection and analysis

Outcome 2

Evaluate food nutrition labels

Knowledge and/or Skills

- Format
- Declaration
- Claims
- Sources of information
- Labelling legislation
- Factors affecting food nutrition labelling

Evidence Requirements for the Unit

Candidates will need to provide written/oral and practical evidence to meet all the Knowledge and/or Skills items from Outcome 1 by showing that they can carry out a total of 5 different food analyses. These analyses should include at least one analysis related to Group 1 labelling and at least one analysis related to Group 2 labelling.

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 5 occasions and a record should be kept of the observation.

Candidates should maintain a record of experimental work and produce two formal reports:

- an analysis of a food product related to Group 1 labelling
- an analysis of a food product related to Group 2 labelling

These reports should be presented in a suitable format and should contain:

- materials and methodology
- all relevant results, including correct calculations where appropriate
- conclusions drawn from the results including sources of error

Candidates will need to provide written/oral evidence to meet all the Knowledge and/or Skills items from Outcome 2 by showing that they can evaluate nutritional labels. They should comment on nutritional labels for four different food products, at least two of which are labels that they have prepared for themselves. These labels should include at least one related to Group 1 labelling and one related to Group 2 labelling. The information used for the four labels taken as a whole should make use of a range of sources of information including information from experiments and from manufacturers' databases.

Each label prepared by candidates must:

- be presented in a correct format which shows ingredients in the correct order and the levels of nutrients per portion
- for Group 1 labelling, contain accurate declarations of the percentage protein, fat, carbohydrate and energy values
- for Group 2, labelling, contain accurate claims for the percentage ingredients

In addition, for each label, candidates must come to a conclusion on how suitable the label is for its purpose. This conclusion should be based on an assessment of the strengths and weaknesses which should include:

- reasons to prove that the label is consistent with current legislation
- comments on the reliability and validity of the sources of information used to prepare the label
- discussion of any errors and their consequences
- reference to other factors which affect food labelling

Assessment Guidelines

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. Reports should be presented in a suitable format which could be along the following lines:

- Title and Date
- Aim/Introduction, including relevant theory
- Materials and Methods
- Results including tables, calculations and graphs
- Evaluation
- Conclusions
- References

Higher National Unit specification: statement of standards (cont)

Unit title: Food Analysis and Nutritional Labelling

Candidates could present their work on evaluating labels in a variety of ways, eg report format or through a poster presentation or by using presentation software. Candidates could be given questions and could present their work as responses to these questions. It may be possible to combine the experimental work and the labelling into one report.

Assessment can be undertaken as candidates progress through the Unit. 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: F8L4 35

Unit title: Food Analysis and Nutritional Labelling

Superclass category: NH

Original date of publication: August 2009

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

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 Analysis and Nutritional Labelling

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 an opportunity to develop practical skills required to gather information which is needed to prepare nutritional labels for food products. The Unit also enables candidates to evaluate nutritional labels to determine the extent to which they are fit for purpose. Candidates will be expected to prepare labels for themselves and use these labels as the basis for their evaluation. When preparing labels, candidates will also make use of information from other sources such as manufacturers' databases.

This is both a practical and an applied Unit. As it includes practical laboratory work in food chemistry, candidates will be expected to learn a variety of experimental techniques and perform the calculations associated with them. The Unit will, therefore, enable candidates to further develop their laboratory skills. In addition, it will reinforce the importance of following proper laboratory procedures. Throughout their practical laboratory work, 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 conduct experiments carefully and according to the relevant procedure. They will be expected to maintain records of their laboratory work and to write some reports of this work which should include their results, calculations and conclusions. At the completion of the Unit, candidates should feel that they have developed additional skills in food chemistry which will be of value to them as prospective employees in the food industry.

The Unit also has an applied element. Candidates are required to prepare and evaluate nutritional labels for food. Their practical laboratory work provides one source of information on the nutritional content of food stuffs and can, therefore, be of use when preparing and evaluating nutritional labels. Candidates are also expected to refer to nutritional labels used by food manufacturers. In this way, the practical and applied elements of the Unit are closely related to each other. However, information from other sources is also used for food labelling and candidates will be expected to make use of these sources.

From their relevant practical experience or previous study (eg achievement of Units F6VD 34 Food Composition and F6VC 34 Food Analysis), candidates should already have a good appreciation of the importance of food chemistry to food manufacturing. This Unit should therefore deepen and extend this awareness. The Unit is about applying food chemistry to the food industry. The emphasis on nutritional labelling should help to highlight the way this Unit is applied in a commercial context. It should also help candidates to recognise the range of factors, such as legislation and consumer attitudes, which can affect the operation of firms in the food industry.

The following give some further details on each of the 2 Outcomes.

Higher National Unit specification: support notes (cont)

Unit title: Food Analysis and Nutritional Labelling

Outcome 1

This deals with practical laboratory work. Candidates should cover a number of different experimental techniques available for both Group 1 and Group 2 labelling.

For Group 1, labelling techniques could include determination of:

- percentage protein using Kjeldahl and instrumental methods
- percentage fat using Soxhlet, Mojonnier and Gerber methods
- percentage carbohydrates by moisture (eg oven drying and Dean and Stark) and ash (eg furnace combustion)
- energy values in food by finding kilojoules and kilocalories/100g food

For Group 2, labelling techniques could include determination of:

- percentage of free sugar using Fehling's reduction and HPLC
- percentage fibre using Englyst, AOAC fibre determinations
- percentage of saturated fat by GLC, selecting saturated fats
- percentage of sodium by flame photometry, emission spectroscopy
- percentage of chloride by ion selective electrode

The foods investigated could include liquid, dried and solid examples such as milk, soya flour, and jam.

Candidates can be shown how to make relevant calculations from both experimental and published data.

Outcome 2

This is about the construction of nutrition labels. Candidates are also expected to undertake an evaluation of the labels they produce by commenting on the extent to which the label is fit for purpose. This will involve them in commenting on factors such as:

- accuracy of information conveyed on the label
- reliability and validity of the sources of information on the label
- extent to which the information covers all the information which consumers are likely to require
- errors and their consequences (eg product recall; harm to consumers)

The evaluation could also include discussion on reference nutrient intake (RNI), why the label is consistent with current legislation, how far the label takes into account current dietary advice etc.

Higher National Unit specification: support notes (cont)

Unit title: Food Analysis and Nutritional Labelling

Candidates will require underpinning knowledge of food labelling. Candidates will need to become familiar with factors such as:

- nutrition panels on different kinds of foods
- sources of information for food labels eg from the Food Standards Agency; manufacturer's analysis or calculations from known or actual values of the ingredients used; calculations from generally established and accepted data; other databases
- the need to comply with food legislation especially when claims — such as high or low in a particular nutrient — are made
- the use of front of pack labelling systems (eg traffic lights) and other ways of displaying nutrient intake
- relevance of significant amounts of vitamins and minerals
- the use of allergen information and logos depicting suitability for particular groups such as vegans or coeliacs.

Candidates should also be aware of current legislation on food labelling and of factors which could affect food labelling. These could include reference nutrient intake (RNI), attitudes of consumers, pressure groups, current events such as an outbreak of illness, current advice on diets such as recommended daily intake.

Guidance on the delivery and assessment of this Unit

Guidance on Delivery

This Unit is both a practical and an applied Unit, and in addition is intended to develop underpinning theoretical knowledge and understanding of chemistry as related to the food industry. However, the emphasis of the Unit is nutritional labelling. This is something of which candidates are likely to be well aware and delivery should be able to make use of this — thus enabling candidates to see how the Unit and the food chemistry within it can be applied to the day to day operations/activities of food manufacturers and consumers.

There is a complementary Unit ie (F8L5 35) Food Composition: Raw Materials, which does not involve laboratory work but looks at raw materials used in food products and at food additives. Where both Units are being delivered as part of a Group Award, eg in the HND Food Science and Technology and it may be appropriate to integrate the delivery of the Units.

Outcome 1 involves practical laboratory work. Delivery can make use of the laboratory skills that candidates have developed through relevant practical experience or achievement of other Units (such as F6VC 34 Food Analysis and in Units in Microbiology). Delivery for this Unit, therefore, should aim to enhance the capabilities which candidates have already gained. By this stage candidates should be confident of what they can do and be able to recognise the ways in which they could apply the skills they are developing in their future employment in the food industry.

Candidates can be introduced to food labelling itself in a number of ways. They could, for example, be asked to research labels used on food which they consume. This research could also include investigations into current legislation and guidelines as well as consumer attitudes and sources of nutritional information. Candidates could do this in small groups and each group could also be asked to research a different aspect and present their findings to their colleagues. Subsequently, the groups could (on the basis of the information obtained by the cohort as a whole) prepare and present some exemplar labels. This would help candidates to prepare labels individually which they are expected to do as part of the assessment. This research based approach could also help candidates to see the relevance of the Unit — as well as increasing their awareness of industry practice.

Guidance on Assessment

Assessment for this Unit covers both practical laboratory work and evaluating food labels. Candidates should be observed on five occasions during some of their practical work and the observation should be recorded on a 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 should also keep a record of their laboratory work and prepare two formal reports, one on Group 1 labelling analysis and one on Group 2 labelling analysis.

These reports must make use of a suitable format for a laboratory report (see page 3). The format should allow candidates to present and evaluate their results.

In addition, candidates are required to evaluate four food labels, at least two of which they have prepared for themselves. The evaluation should be based around an assessment of the strengths and weaknesses of the labels and determine the extent to which they are fit for purpose. Candidates must refer in their evaluation to current legislation and to the reliability and validity of the sources of information used to prepare the label. They must also make reference to other factors which affect food labelling but it is up to them to decide which factors are most important in any particular case. They could include guidelines as well as current trends in diet and may make use of news stories where appropriate. Candidates are not expected to have a detailed knowledge of the specific requirements of all aspects of current legislation but should be able to point to particular examples of where and how it applies.

Candidates can present their evaluation in a number of different 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 suitable software or they could develop a poster based presentation. Assessment judgments should be based on the evaluation of nutritional labels and not the candidate’s ability to conduct a presentation. Oral evidence should be recorded (eg by video) and retained.

Higher National Unit specification: support notes (cont)

Unit title: Food Analysis and Nutritional Labelling

Opportunities for developing Core Skills

Communication: Written Communication (Writing) at SCQF level 6
As part of their assessment work for this Unit, candidates will be required to produce reports on Group 1 labelling and Group 2 labelling. This report will require them to present and analyse essential information in a logical and effective order. The report will have a structure and will make use of conventions appropriate for a scientific audience. They will be required to link their various points together and organise the content in a manner which enables them to draw conclusions from their results.

Numeracy (Using Number) at SCQF level 6
As part of the practical work for this Unit, candidates are required to carry out complex calculations. These will involve them in deciding what steps are to be carried out and the order in which they are to be done. They must decide which calculations to do and ensure that they are completed accurately. The calculations can involve unfamiliar contexts where the relevant information has to be clarified before any numerical work is attempted. Food labelling is also a general context in that this is a matter which applies across all food products.

Problem Solving: Critical Thinking at SCQF level 6
Outcome 2 of this Unit requires candidates to evaluate food labels some of which they will have prepared for themselves. They are expected to base their evaluation on an assessment of the strengths and weaknesses of the labels. This will require them to identify relevant factors which affect these such as legislation and government guidelines, dietary advice, reliability and validity of data used for the label and so on. Candidates will be expected to identify the various relationships between these factors and decide which of them are relevant to the particular situation. The overall requirement, therefore, is that candidates have to justify their approach to dealing with an issue, in this case, food labelling.

Problem Solving: Reviewing and Evaluating at SCQF level 6
Candidates are also expected in Outcome 2 to evaluate the effectiveness of nutritional labels in terms of their suitability for purpose. To do this they are expected to identify what information is required for the label and to gather this from experimental and other sources. They will be expected to draw conclusions from, and about, this information which they will apply to the evaluation of the food label. Evaluation of labels prepared by candidates themselves will involve a review of their own work.

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.

Higher National Unit specification: support notes (cont)

Unit title: Food Analysis and Nutritional Labelling

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 and Labelling

This Unit is both a practical and an applied Unit. From a practical point of view, you will further develop the laboratory skills in food chemistry which you have already gained either through relevant practical experience or in other Units such as Food Analysis 1. Between them, these will give you a good grasp of food chemistry and enable you to obtain underpinning knowledge and develop practical skills that you will need to take up employment in the food industry.

For this Unit, you will learn experimental techniques which can be used to determine the amount percentage content in foods of proteins, fats and other compounds. Information of this kind forms the basis for labels used on food to let consumers know what the food consists of.

Food labelling also makes use of information from other sources such as databases maintained by food manufacturers. You will find out about these other sources and use them, together with the results of your experimental work, to prepare food labels. You will be required to evaluate the nutritional labels by identifying their strengths and weaknesses. From this you will be able to decide on the extent to which the labels are accurate and fit for purpose. This evaluation will involve you looking at labels used by food manufacturers, as well as labels that you will prepare yourself. Therefore, this Unit will help you to develop the skills and knowledge that you need to prepare labels for food.

Nutritional labelling is vital to the food industry. It is not just about finding out the constituents of food but is affected by other important factors such as legislation and consumer attitudes. This Unit should help you to become more aware of the wide range of factors which can affect what firms in the food industry do. It will help you see also why food chemistry has commercial relevance to the day to day activities of firms in the food industry.

The assessment for the Unit requires you to show that you can successfully complete practical laboratory work which will enable you gather information on the constituents of food products. You will be observed while you are doing your laboratory work and will have to keep records of the work that you do. You will also have to write two reports on experiments you have done. You will also have to evaluate food labels, including some you have prepared yourself. In doing this evaluation you will have to consider strengths and weaknesses of the labels and take into account factors such as legislation, the accuracy of information, consumer attitudes and so on. Your tutor will advise on how this assessment is to be presented as it can be done in a variety of ways eg as a report or a presentation, using relevant software or poster presentation etc. You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.