Higher National Unit specification

General information for centres

Unit title: Microbiology of Foods 1

Unit code: F6VL 34

Unit purpose: This Unit is designed to enable candidates to explain the different main groups of micro-organisms and their importance to the food industry. The Unit also introduces candidates to some of the practical skills required in the microbiology laboratory.

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

1 Explain the main groups of micro-organisms.
2 Perform microbiological techniques on growth of micro-organisms.

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. This could be achieved through Units in Biology or Chemistry at SCQF level 6 or through the HN Unit F6VB 33 *Science for the Food Industry: An Introduction.*

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 in Food Science and Technology.

Assessment: The assessment for this Unit consists of explanation of the role of micro-organisms in the food industry which could take the form of a report or a presentation. In addition candidates must carry out three practical laboratory exercises each of which should be observed and recorded, perhaps by using an observation checklist. Candidates must provide information on the results of each practical exercise and could use a laboratory logbook to do this. Candidates could gather all their reports into a portfolio which would contain all the assessment evidence for the Unit.

Higher National Unit specification: statement of standards

Unit title: Microbiology of Foods 1

Unit code: F6VL 34

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 major groups of micro-organisms

Knowledge and/or Skills

- Cell structure
- Morphology
- Reproduction/replication
- Role of micro-organisms in the food industry

Outcome 2

Perform microbiological techniques on growth of micro-organisms

Knowledge and/or Skills

- Correct use of laboratory equipment
- Safe performance of laboratory techniques
- Data analysis and calculation of results

Higher National Unit specification: statement of standards (cont)

Unit title: Microbiology of Foods 1

Evidence Requirements for the Unit

Candidates will need to provide written/oral and practical evidence to meet all the Knowledge and/or Skills items by showing that they can:

- explain, using diagrams where appropriate, the cell structure, morphology and reproduction/replication of bacteria, yeasts, moulds, protozoa, algae and viruses
- give a valid example to illustrate the role of each of the 6 types of micro-organism in the food industry: in each case, the example should be accompanied by a reason to explain the role in the food industry

Candidates should carry out three practical laboratory exercises on the growth of micro-organisms using different microbiological techniques. The exercises should be carried out aseptically and in accordance with approved standards.

Candidates should prepare and set up equipment in an appropriate manner for each piece of laboratory work. They should deploy suitable practical techniques in accordance with prevailing safety requirements in the laboratory. They should draw conclusions on the effect of the growth of micro-organisms from the results of the practical work. These conclusions should be related to the food industry.

Candidates should be observed while undertaking the three practical laboratory exercises and a record should be kept of this observation. Candidates should also keep records of the results of each practical exercise.

Assessment Guidelines for the Unit

Candidates could present evidence in a number of ways to show that they can explain the different types of micro-organisms. They could be asked to produce a short report or asked to prepare a presentation perhaps using suitable software or posters. The evidence should include referencing where appropriate.

An observation checklist can be used to record the observation of practical work and it can cover items such as practical skills deployed and safe laboratory practice. Photographic and/or video evidence could be used to supplement the checklist. Candidates could provide information of the results of each laboratory exercise by keeping a laboratory logbook. Candidates could be asked questions about the work they have done to supplement the observation checklist and the information on results.

Administrative Information

Unit code: F6VL 34

Unit title: Microbiology of Foods 1

Super class category: NH

Original date of publication: August 2008

Version: 01

History of changes:

Version	Description of change	Date

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: Microbiology of Foods 1

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 in Food Science and Technology. It introduces candidates to basic microbiology theory and practical skills in the context of food manufacture. It will also help prepare candidates for employment in a biological science related post.

This Unit is an applied Unit. Candidates are expected throughout the Unit to apply their knowledge and understanding of microbiology and associated laboratory techniques to food processing and the food industry. It is important that candidates appreciate the reason why the study and practice of microbiology is vitally important in food manufacturing. An important part of the Unit also is to provide candidates with the vocabulary of microbiology. This will enable them to have meaningful discussion with specialists in an industrial context.

Candidates attempting this Unit will find it beneficial to have some prior scientific knowledge. This can be achieved through the completion of suitable Units in biology or a 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 '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.

The Unit will help candidates to become familiar with some of the microbiological techniques which are used in the food industry and of the importance of following proper procedures in the laboratory. Candidates 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 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, candidates should feel confident about performing routine experiments.

This Unit is closely linked to FV6M 34 *Microbiology of Foods 2* which covers microbiological agents, radiations, competition and metabiotic effect.

For Outcome 1 the following types of micro-organisms can be covered: bacteria, yeasts, moulds, protozoa, algae and viruses. In each case, candidates should be able to explain cell structure, morphology and reproduction/replication of the micro-organism. They should also be able to give an example of each micro-organism which is relevant to the food industry. It is insufficient to provide an example on its own and candidates would be expected to relate the example to a suitable context relevant to the food industry and explain why the example is important to the food industry.

Higher National Unit specification: support notes (cont)

Unit title: Microbiology of Foods 1

For Outcome 2, the analysis of micro-organisms is undertaken through laboratory based practical exercises. For this Unit, laboratory work should focus on the growth of micro-organisms. Candidates should develop suitable laboratory skills, such as the use of microscope to examine wet preparations; the preparation of simple and differential stained slides; aseptic transfers; use of pipette; inoculation of solid and liquid media.

The techniques required to work in a microbiology laboratory in the food manufacturing industry include:

- Safety — use of aseptic technique
- Microscopy — morphology of bacteria, yeasts and moulds
- Staining techniques — simple staining, Gram staining, endospore staining
- Sub culturing techniques — pipetting, inoculations, streaking out
- Incubation techniques — temperature, gaseous environment
- Disposal — cultures, slides, samples

Candidates should be made thoroughly aware of the critical importance of health and safety, including Personal Protective Equipment (PPE) in a laboratory and be able to take all appropriate precautions to ensure that an appropriate environment is maintained. They should draw conclusions from their practical work which are related to the food industry.

Guidance on the delivery and assessment of this Unit

Delivery should aim to help candidates apply the material in the Unit to the food industry. It should also build laboratory skills so that candidates can approach laboratory work confidently.

Candidates should be encouraged to take responsibility for their own learning and may be able to research for themselves some of the ways in which microbiology applies in the food industry. This could help to integrate different parts of the HNC in Food Science and Technology as candidates should be able to recognise, for example, the ways in which micro-organisms affect the methods used for processing food.

Assessment for this Unit involves both practical work and explanation. Candidates should be observed during some of their practical work and the observation should be recorded on a checklist (photographic and/or video evidence could be used to supplement the 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 must provide information on the results of practical work which could be done through a laboratory log book.

Explanation can be provided in a number of 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. The evidence should include referencing where appropriate.

Again candidates could be given some questions to help them structure their work. Candidates could make use of software (such as PowerPoint) or they could develop a poster based presentation.

Whatever method is used, assessment judgments should be based on the explanation of microbiological terms and not the facility with which the candidate uses the method of explanation.

For all assessment evidence, candidates could be asked questions to supplement evidence provided in another form.

There may be scope, depending on the way assessment evidence is generated, for candidates to gather all their evidence in a portfolio which they can build as they progress through the Unit.

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 maintain details of practical work. This can be done in a laboratory log book or diary and candidates will be expected to organise the content into a logical and effective structure. Candidates will, therefore, use written information to demonstrate their knowledge and understanding of relevant ideas and information. Candidates can also be asked to write up their practical work in a report style which can replicate that used in industry. In these cases, candidates can be expected to make sure that the report meets its intended purpose by a format and layout appropriate to an industrial readership.

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.

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: Microbiology of Foods 1

This Unit is a mandatory Unit in the HNC in Food Science and Technology. It is designed to provide you with knowledge and understanding of microbiology. This underpins all aspects of the food industry and is something that you will make use of throughout your whole course. It applies particularly to the food processing Units but you will find applications of micro-biology in many other parts of the course too.

The Unit is important also 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 aspects of 6 different kinds of micro-organisms: bacteria, yeasts, moulds, protozoa, algae and viruses. In each case, you will also be expected to give examples to show how they are relevant and important to the food industry.

As well as giving you some background in scientific concepts and understanding, the Unit enables you to develop skills in laboratory work. Again, these are skills which can be critical to the successful operation of organisations in the food industry. In this Unit, you will concentrate particularly on laboratory techniques relating to the growth of micro-organisms.

After completing the Unit, you will have a good basis in microbiology theory and practice and be well aware of its relevance to the food industry. You will be able to further extend and develop your practical and theoretical knowledge of Microbiology in the Unit, *Microbiology of Foods 2*.

The assessment for the Unit will require you to show that you can accurately explain the different types of micro-organisms. You will also have to successfully complete practical laboratory work. You will be observed while you are doing your laboratory work and will have to keep records of work that you have done. You will also have to draw conclusions relating to the food industry from the results.

You will have succeeded in meeting all the requirements of this Unit if you pass the assessments.