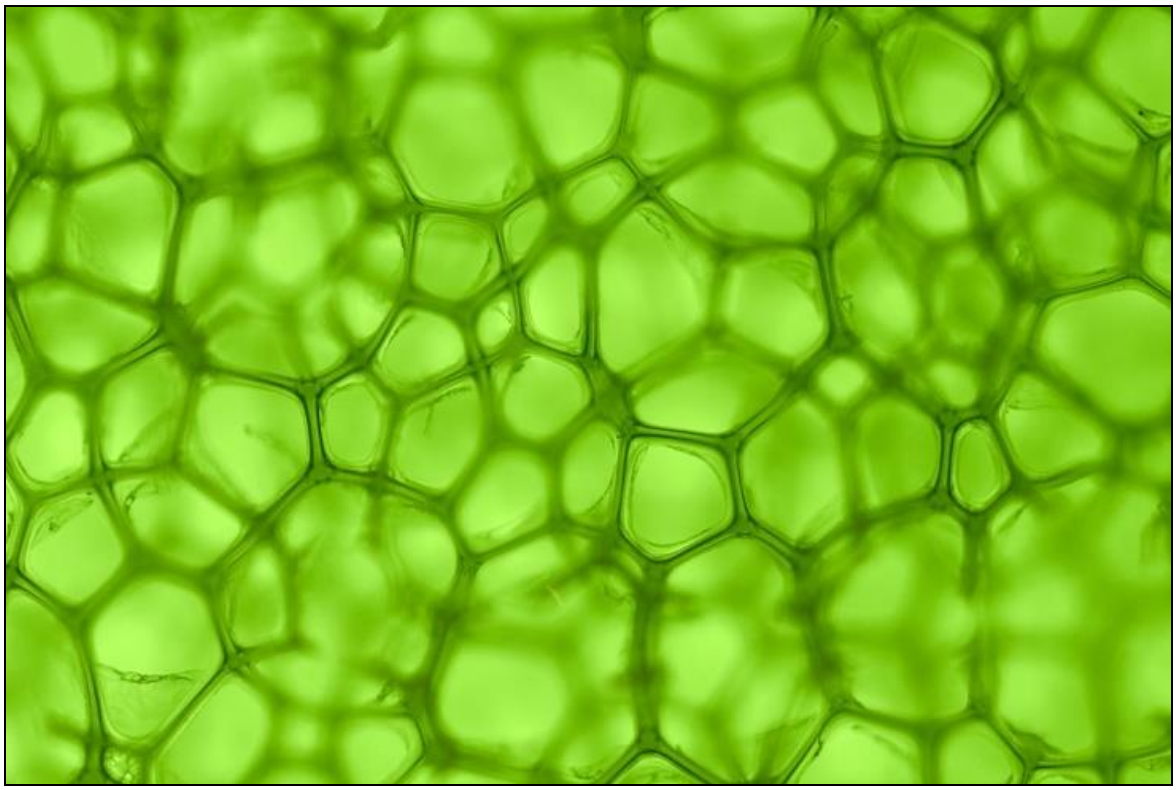
Course Support Notes

National 3 Biology Course Support Notes



Please refer to the note of changes at the end of this document for details of changes from previous version (where applicable).

Contents

Introduction

These support notes are not mandatory. They provide advice and guidance on approaches to delivering and assessing the National 3 Biology Course. They are intended for teachers and lecturers who are delivering the Course and its Units. They should be read in conjunction with the *Course Specification*, and the *Unit Specifications* for the Units in the Course.

General guidance on the Course

Aims

As stated in the *Course Specification*, the aims of the Course are to enable learners to:

- develop basic knowledge and understanding of biology
- develop an understanding of biology's role in scientific issues and relevant applications of biology in society and the environment
- develop scientific inquiry and investigative skills
- develop scientific analytical thinking skills in a biology context
- develop the use of technology, equipment and materials, safely, in practical scientific activities
- develop problem solving skills in a biology context
- use scientific literacy in everyday contexts
- establish the foundation for more advanced learning in biology

Progression into this Course

Entry to this Course is at the discretion of the centre. However, learners would normally be expected to have attained the skills and knowledge required by one or more of the following or by equivalent qualifications and/or experience:

- National 2 Science in the Environment Course or relevant component Units

Experiences and Outcomes
National Courses have been designed to draw on and build on the curriculum experiences and outcomes as appropriate. Qualifications developed for the senior phase of secondary education are benchmarked against SCQF levels. SCQF level 4 and the curriculum level 4 are broadly equivalent in terms of level of demand although qualifications at SCQF level 4 will be more specific to allow for more specialist study of subjects.

Learners who have completed Curriculum for Excellence experiences and outcomes will find these an appropriate basis for doing the Course.

In this Course, learners would benefit from having experience of the following:

Organisers	**Lines of development**	
Planet Earth	Biodiversity and Interdependence	SCN 01, 02, 03
Biological Systems	Body Systems	SCN 12, 13
	Inheritance	SCN 14

More detail is contained in the Biology Progression framework. The Biology Progression framework shows the development of the key areas throughout the suite of Courses.

Progression from this Course

This Course or its components may provide progression for the learner to:

- National 4 in Biology
- National 3 or 4 in another science subject
- Skills for Work Courses (SCQF levels 3 or 4)
- National Certificate Group Awards
- National Progression Awards (SCQF levels 3 or 4)
- Employment and/or training

Hierarchies

Hierarchy is the term used to describe Courses and Units which form a structured sequence involving two or more SCQF levels.

It is important that any content in a Course and/or Unit at one particular SCQF level is not repeated if a learner progresses to the next level of the hierarchy. The skills and knowledge should be able to be applied to new content and contexts to enrich the learning experience. This is for centres to manage.

- Biology Courses from National 3 to Advanced Higher are hierarchical.
- Courses from National 3 to National 5 have Units with the same structure and titles.
- National 5 gives equal progression to both Higher Biology and Higher Human Biology. Higher Biology and Higher Human Biology give equal progression to Advanced Higher Biology.

Approaches to learning and teaching

The purpose of this section is to provide you with advice and guidance on learning and teaching for National 3 Biology.

Teaching should involve an appropriate range of approaches to develop knowledge and understanding and skills for learning, life and work. This can be integrated into a related sequence of activities, centred on an idea, theme or application of biology, based on appropriate contexts, and need not be restricted to the Unit structure. Learning should be experiential, active, challenging and enjoyable, and include appropriate practical experiments/activities and could be learner-led. The use of a variety of active learning approaches is encouraged, including peer teaching and assessment, individual and group presentations, role-playing and game-based learning, with learner-generated questions.

When developing your Biology Course there should be opportunities for learners to take responsibility for their learning. Learning and teaching should build on learners' prior knowledge, skills and experiences. The Units and the key areas identified within them may be approached in any appropriate sequence, at the centre's discretion. The distribution of time between the various Units is a matter for professional judgement and is entirely at the discretion the centre. Each Unit is likely to require an approximately equal time allocation, although this may depend on the learners' prior learning in the different key areas.

Learning and teaching, within a class, can be organised, in a flexible way, to allow a range of learners' needs to be met, including learners achieving at different levels. The hierarchical nature of the new Biology qualifications provides improved continuity between the levels. Centres can, therefore, organise learning and teaching strategies in ways appropriate for their learners.

Within a class, there may be learners capable of achieving at a higher level in some aspects of the Course. Where possible, they should be given the opportunity to do so. There may also be learners who are struggling to achieve in all aspects of the Course, and may only achieve at the lower level in some areas.

Teachers/lecturers need to consider the Course and Unit Specifications to identify the differences between Course levels. It may also be useful to refer to the Biology Progression Framework .

When delivering this Course to a group of learners, with some working towards different levels, it may be useful for teachers to identify activities covering common key areas and skills for all learners, and additional activities required for some learners. In some aspects of the Course, the difference between levels is defined in terms of a higher level of skill.

An investigatory approach is encouraged in Biology, with learners actively involved in developing their skills, knowledge and understanding by investigating a range of relevant Biology applications and issues. A holistic approach should be adopted to encourage simultaneous development of learners' conceptual understanding and skills.

Where appropriate, investigative work/experiments, in Biology, should allow learners the opportunity to select activities and/or carry out extended study. Investigative and experimental work is part of the scientific method of working and can fulfil a number of educational purposes.

All learning and teaching should offer opportunities for learners to work collaboratively. Practical activities and investigative work can offer opportunities for group work, which should be encouraged.

Group work approaches can be used within Units and across Courses, where it is helpful to simulate real-life situations, share tasks and promote team working skills. However, there must be clear evidence for each learner to show that the learner has met the required assessment standards for the Unit or Course. Laboratory work should include the use of technology and equipment that reflects current scientific use in Biology. Fieldwork provides an opportunity for practical work, using first-hand experience of an ecosystem to develop knowledge, understanding and problem solving. Appropriate risk assessment must be undertaken.

Learners would be expected to contribute their own time in addition to programmed learning time.

Effective partnership working can enhance the science experience. Where possible, locally relevant contexts should be studied, with visits where this is possible. Guest speakers from industry, further and higher education could be used to bring the world of biology into the classroom.

Information and Communications Technology (ICT) can make a significant contribution to practical work in National 3 Biology, in addition to the use of computers as a learning tool. Computer interfacing equipment can detect and record small changes in variables allowing experimental results to be recorded over short periods of time completing experiments in class time. Results can also be displayed in real time helping to improve understanding. Data logging equipment and video cameras can be set up to record data and make observations over periods of time longer than a class lesson which can then be subsequently downloaded and viewed for analysis.

Learning about Scotland and Scottish culture will enrich the learners' learning experience and help them to develop the skills for learning, life and work they will need to prepare them for taking their place in a diverse, inclusive and participative Scotland and beyond. Where there are opportunities to contextualise approaches to learning and teaching to Scottish contexts, teachers and lecturers should consider this.

Assessment should be integral to and improve learning and teaching. The approach should involve learners and provide supportive feedback. Self- and peer-assessment techniques should be encouraged, wherever appropriate. Assessment information should be used to set learning targets and next steps.

Suggestions for possible contexts and learning activities to support and enrich learning and teaching are detailed in the table below. The **key areas** are from the Unit Specifications. **Suggested learning activities** are not mandatory. This offers examples of suggested activities from which you could select a range. It is not expected that all will be covered. The contexts for key areas are open to personalisation and choice, so centres are likely to devise their own learning activities. **Exemplification of key areas** is not mandatory. It provides an outline of the level of demand and detail of the key areas.

Cell Biology		
Key areas	**Suggested learning activities**	**Exemplification of key areas**
1 Structure and variety of cells and their functions.	Microscopy/bioviewer to look at a variety of cell types eg plant, animal, microorganisms (yeast and bacteria). Investigate the functions of different cells used by humans eg potato cells (for food), nerve cells, yeast cells (for bread/alcohol production), bacterial cells (for treating sewage/making yoghurt).	Basic structure of animal and plant cells. Variety of cells to include animal, plant, yeast and bacteria. The function of cells to include their different functions within an organism, eg nerve cells, blood cells and their functions as used by humans, eg for food, alcohol production.
2 Function of DNA.	Investigate the role of proteins in biological systems and industry eg antibodies, washing powders.	
3 Risks and benefits of DNA profiling.	Investigate the use of DNA in profiling in forensics, paternity, archaeology, or to assess future health risks.	DNA carries instructions to make proteins.
4 The process of photosynthesis.	Investigate the production of starch in leaves under different conditions or the effect of different light conditions on leaves and roots using bicarbonate indicator.	Photosynthesis is the process in which green plants use carbon dioxide from the air and water from the soil to produce sugar and oxygen.

Cell Biology		
Key areas	**Suggested learning activities**	**Exemplification of key areas**
5 Different types of microorganisms.	Research common bacteria and fungi (ebug website). Investigate the growth of microorganisms from appropriate surfaces, eg finger dabs and surface swabs.	Microorganisms can include bacteria and fungi.
6 Growth of microorganisms and how their growth can be controlled.	Investigations using fermenters with yeast to compare results such as cloudiness when conditions are changed. Investigate common antifungal creams, antibacterial cleaners or antibiotics. Look at the effect of temperature on the growth of microorganisms.	Growth is an increase in cell number and can be influenced by changing conditions.

Multicellular Organisms		
Key areas	**Suggested learning activities**	**Exemplification of key areas**
1 Structure and function of organs and organ systems and their role in sustaining life.	Use of models, multimedia, dissection to investigate structure and function of organ systems. Glow science film clips.	The basic structure and functions of main organs and systems of the body, such as the role of the heart, lungs or digestive system and their role in sustaining life.
2 Role of technology in monitoring health and improving quality of life.	Investigate the use of respirometers, peak flow meters, blood pressure monitors and medical thermometers. Research BMI. Investigate blood glucose monitors for diabetics and artificial valves for heart disease treatment. Research ways to maintain a healthy lifestyle through positive lifestyle choices.	Different aspects of health can be monitored using a wide variety of technological equipment. The information from this monitoring can be used to improve the quality of life of an individual.
3 Body defences against disease and role of vaccines.	Investigate hand washing activities. Research current government/health board campaigns. Research methods by which diseases are spread and how these can be prevented Investigate vaccines received in infancy and childhood. Investigate travel vaccines and why some diseases might be more common in other parts of the world.	The body's first line of defence is barriers to infection such as skin, tears and mucus. When this is breached, an infection can occur. Some white blood cells produce antibodies in response to an infection. Vaccines can provide immunity to disease.

Multicellular Organisms		
Key areas	**Suggested learning activities**	**Exemplification of key areas**
4 Fertilisation and embryonic development and risks to embryo.	Use of models, reference materials and multimedia to explore fertilisation and embryonic development. Collaborate with health professionals. Create a display to inform others.	Fertilisation is the fusion of sex cells. The fertilised egg develops into an embryo then a foetus. Drugs such as alcohol and tobacco can harm human foetal development.

Life on Earth		
Key areas	**Suggested learning activities**	**Exemplification of key areas**
1 Sampling and identifying living things from different habitats to compare their biodiversity and suggest reasons for their distribution.	Investigate the local environment to identify habitats. Investigate biodiversity in a local environment. Use different methods of sampling such as quadrats to estimate abundance of various plants, pitfall traps, Tullgren funnel using leaf litter, sweep nets, pooters or tree beating. Use branching keys to identify organisms. Investigate factors such as light intensity and soil moisture with meters. Compare two contrasting habitats, eg arctic tundra and desert. Use data to predict distribution of organisms. Predict the effects of changing one factor on the distribution of organisms found in an area.	Habitat is the place where an organism lives The range of types of organisms, ie the biodiversity, varies greatly between habitats. Different sampling techniques are used depending upon the organisms being sampled, eg quadrats — plants, pitfall traps — ground dwelling invertebrates. Branching keys are used to identify organisms. Different habitats support different organisms because the organisms are adapted to exist in the particular sets of conditions. The conditions in a habitat, eg light intensity, moisture content of the soil and temperature have an effect on distribution of the organisms living there.
2 Different types of chemicals in agriculture, the alternatives and their impact on global food production.	Investigate growth of seedlings with or without different types of chemicals. Research costs and benefits of modern and traditional methods of crop production. Research/visit conventional/organic food producers.	Different types of chemicals include fertilisers and pesticides. Alternative methods include manure and biological control. Fertilisers can improve crop yield to ensure that enough food is produced to feed the increasing population of the world. Pesticides prevent crop damage. Feeding the increasing human population requires increasing use of fertilisers and pesticides.

Developing skills for learning, skills for life and skills for work

Learners are expected to develop broad generic skills as an integral part of their learning experience. The *Course Specification* lists the skills for learning, skills for life and skills for work that learners should develop through this Course. These are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and must be built into the Course where there are appropriate opportunities. The level of these skills will be appropriate to the level of the Course.

For this course, it is expected that the following skills for learning, skills for life and skills for work will be significantly developed:

Numeracy
This is the ability to use numbers in order to solve problems by counting, doing calculations, measuring, and understanding graphs and charts. This is also the ability to understand the results. Learners will have opportunities to extract, process and interpret information presented in numerous formats including tabular and graphical. Practical work will provide opportunities to develop time and measurement skills.

2.1 Number processes
Number processes means solving problems arising in everyday life through carrying out calculations, when dealing with data and results from experiments/investigations and everyday class work, making informed decisions based on the results of these calculations and understanding these results

2.2 Money, time and measurement
This means using and understanding time and measurement to solve problems and handle data in a variety of biology contexts, including practical and investigative

2**.3 Information handling**
Information handling means being able to interpret biological data in tables, charts and other graphical displays to draw sensible conclusions throughout the Course. It involves interpreting the data and considering its reliability in making reasoned deductions and informed decisions. It also involves an awareness and understanding of the chance of events happening.

Thinking skills
This is the ability to develop the cognitive skills of remembering and identifying, understanding and applying. The Course will allow learners to develop skills of applying, analysing and evaluating. Learners can analyse and evaluate practical work and data by reviewing the process, identifying issues and forming valid conclusions. They can demonstrate understanding and application of key areas and explain and interpret information and data.

5.2 Understanding
This is the ability to demonstrate the meaning of items of Biological information, to explain the order of events in a sequence, and to interpret in a different biology setting or context.

5.3 Applying
This is the ability to use existing information to solve biological problems in different contexts, and to plan, organise and complete a task such as an investigation.

In addition, learners will also have opportunities to develop literacy skills, working with others, creating and citizenship.

Literacy
Learners develop the literacy skills to effectively communicate biological key areas and describe, clearly, biological issues in various media forms. Learners will have opportunities to communicate knowledge and understanding of biology, with an emphasis on applications and environmental, ethical and/or social impacts. Learners will have opportunities to develop listening and reading skills when gathering and processing information.

Working with others
Learning activities provide many opportunities, in all areas of the Course, for learners to work with others. Practical activities and investigations, in particular, offer opportunities for group work, which is an important aspect of science and should be encouraged.

Creating
Through learning in biology, learners can demonstrate their creativity. In particular, when planning and designing experiments/investigations, learners have the opportunity to be innovative in their approach. Learners also have opportunities to make, write, say or do something new.

Citizenship
Learners will develop citizenship skills, when considering the applications of biology on our lives, as well as environmental and ethical implications.

Approaches to assessment

Assessment should cover the mandatory skills, knowledge and understanding of the Course. Assessment should be integral to and improve learning and teaching. The approach should involve learners and provide supportive feedback. Self and peer assessment techniques should be used, where appropriate.

See the *Unit Support Notes* for guidance on approaches to assessment of the Units of the Course.

Combining assessment across Units

If an integrated approach to Course delivery is chosen then there may be opportunities for combining assessment across Units. If this approach is used, then it is necessary to be able to track evidence for individual Outcomes and Assessment Standards.

Transfer of evidence
Evidence for the achievement of Outcome 1 and Assessment Standards 2.2, 2.3 and 2.4 for one Unit can be used as evidence of the achievement of Outcome 1 and Assessment Standards 2.2, 2.3 and 2.4 in the other Units of this Course.

Exemplification of standards

Assessment Standards can be achieved via a number of pieces of evidence covering work done on different occasions.

Assessors should record evidence of achievement of Outcomes and Assessment Standards. The table on the next page shows how the evidence for a candidate can be recorded, with comments, where appropriate. Tables like this are not mandatory.

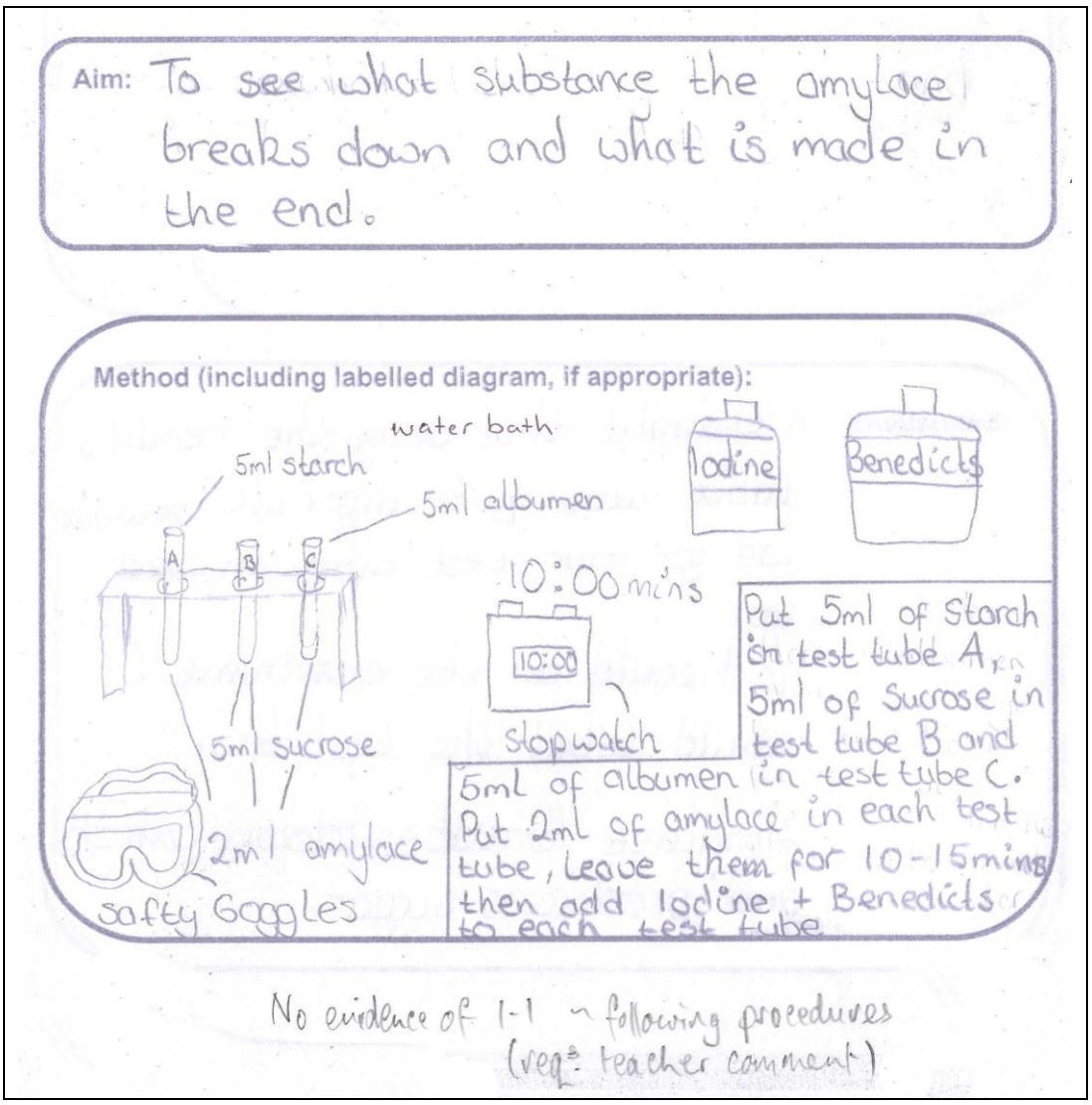
Candidate 1's report shows the successful achievement of Assessment Standards 1.2 to 1.5, using the template supplied in UAS Package 1. Use of the template is not mandatory.

Although the template provides sections for aim and method, these do not need to be assessed at National 3. They offer assistance to the candidate to develop the skills to produce a scientific report.

Assessment Standard	Evidence required	Evidence produced
1.1 Following procedures safely	Procedures have been followed safely and correctly	The candidate was observed carrying out the procedures safely and correctly.
1.2 Making and recording observations/measurements accurately	Observations/ measurements taken are correct	Observations are presented and these are correct.
1.3 Presenting results in an appropriate format	Results have been presented in an appropriate format	Results are presented in an appropriate format, ie table.
1.4 Drawing valid conclusions	What the experiment shows, with reference to the aim	A correct conclusion is stated.
1.5 Evaluating experimental procedures	The suggestion given will improve the experiment	Comment on using more woodlice is an appropriate suggestion for improvement.

Candidate 1

Candidate 1's report shows the successful achievement of Assessment Standards 1.2 to 1.5, using the template supplied in UAS Package 1. Use of the template is not mandatory.



Candidate 1 (contd)

Results:

Test Tube	Iodine	Benidicts
A	Red / Brownk	Orange
B	Red / Brown	Blue
C	Red / Brown	Blue

Conclusions: The amylace brakes down the starch in the starch and makes sugar.

Evaluations: I thought that doing the results table was quite diffficult because we got our test tubes mixed up.
If I could do the experiment I would label the testubes.
Amylace breakes down sarch and produces sugar.

Candidate 2

The report from Candidate 2 provides evidence for Assessment Standard 2.2.

Assessment Standard	Evidence required	Evidence produced
2.2 Describing a given application	Appropriate biology used to describe application	The biology knowledge and the word count are appropriate for National 3.

I have investigated the application of environmental management. This is managing the environment. Environmental managers play a vital role in the protection and sustainable use of resources. They look after animals and plants species.

2.2

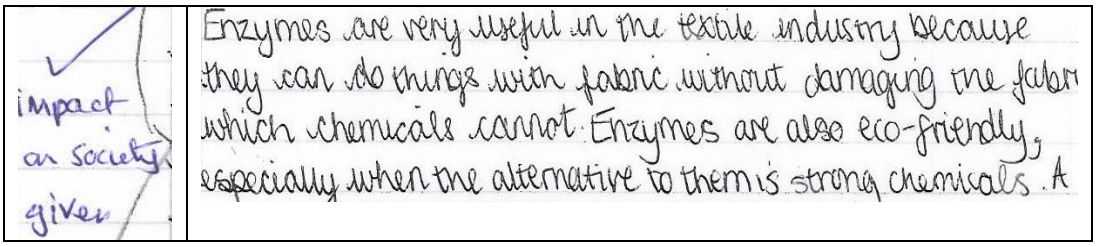
The Royal Society for the Prevention of Cruelty to Animals (RSPCA) is a charity operating in England and Wales that promotes animal welfare. In 2011, the RSPCA investigated 159,759 cruelty complaints and collected and rescued 119,126 animals. It is the oldest and largest animal welfare organisation in the world and is one of the largest charities in the UK, with 1,505 employees.

2.2

Candidate 3

The report from Candidate 3 provides evidence for Assessment Standard 2.3.

Assessment Standard	Evidence required	Evidence produced
2.3 Describing a given biological issue in terms of its effect on the environment/ society	Appropriate biology knowledge is used to describe its effect	Effect on the environment is stated. The biology knowledge and the word count are appropriate for National 3.



Equality and inclusion

The following should be taken into consideration:

Situation	Reasonable Adjustment
Carrying out practical activities	Use could be made of practical helpers for learners with: ♦ physical disabilities, especially manual dexterity, when carrying out practical activities ♦ visual impairment who have difficulty distinguishing colour changes or other visual information
Reading, writing and presenting text, symbolic representation, tables, graphs and diagrams	Use could be made of ICT, enlarged text, alternative paper and/or print colour and/or practical helpers for learners with visual impairment, specific learning difficulties and physical disabilities
Process information using calculations	Use could be made of practical helpers for learners with specific cognitive difficulties (eg dyscalculia)
Draw a valid conclusion, giving explanations and making generalisation/predictions	Use could be made of practical helpers for learners with specific cognitive difficulties or autism

As far as possible, reasonable adjustments should be made for the Assignment, where necessary. This includes the use of 'practical helpers', readers, scribes, adapted equipment or assistive technologies.

It is recognised that centres have their own duties under equality and other legislation and policy initiatives. The guidance given in these *Course Support Notes* is designed to sit alongside these duties but is specific to the delivery and assessment of the Course.

It is important that centres are aware of and understand SQA's assessment arrangements for disabled learners, and those with additional support needs, when making requests for adjustments to published assessment arrangements. Centres will find more guidance on this in the series of publications on Assessment Arrangements on SQA's website: www.sqa.org.uk/sqa//14977.html.

Appendix 1: Reference documents

The following reference documents will provide useful information and background.

- Assessment Arrangements (for disabled learners and/or those with additional support needs) — various publications are available on SQA's website at: www.sqa.org.uk/sqa//14977.html.
- Building the Curriculum 3: A framework for Learning and Teaching
- *Building the Curriculum 4: Skills for learning, skills for life and skills for work*
- *Building the Curriculum 5: A framework for assessment*
- Course Specifications
- Design Principles for National Courses
- *Guide to Assessment* (June 2008)
- Overview of Qualification Reports
- Principles and practice papers for Sciences curriculum area
- Science: A Portrait of current practice in Scottish schools (Nov 2008)
- *SCQF Handbook: User Guide* (published 2009) and SCQF level descriptors (to be reviewed during 2011 to 2012): www.sqa.org.uk/sqa/4595.html
- *SQA Skills Framework: Skills for Learning, Skills for Life and Skills for Work*
- *Skills for Learning, Skills for Life and Skills for Work: Using the Curriculum Tool*

Administrative information

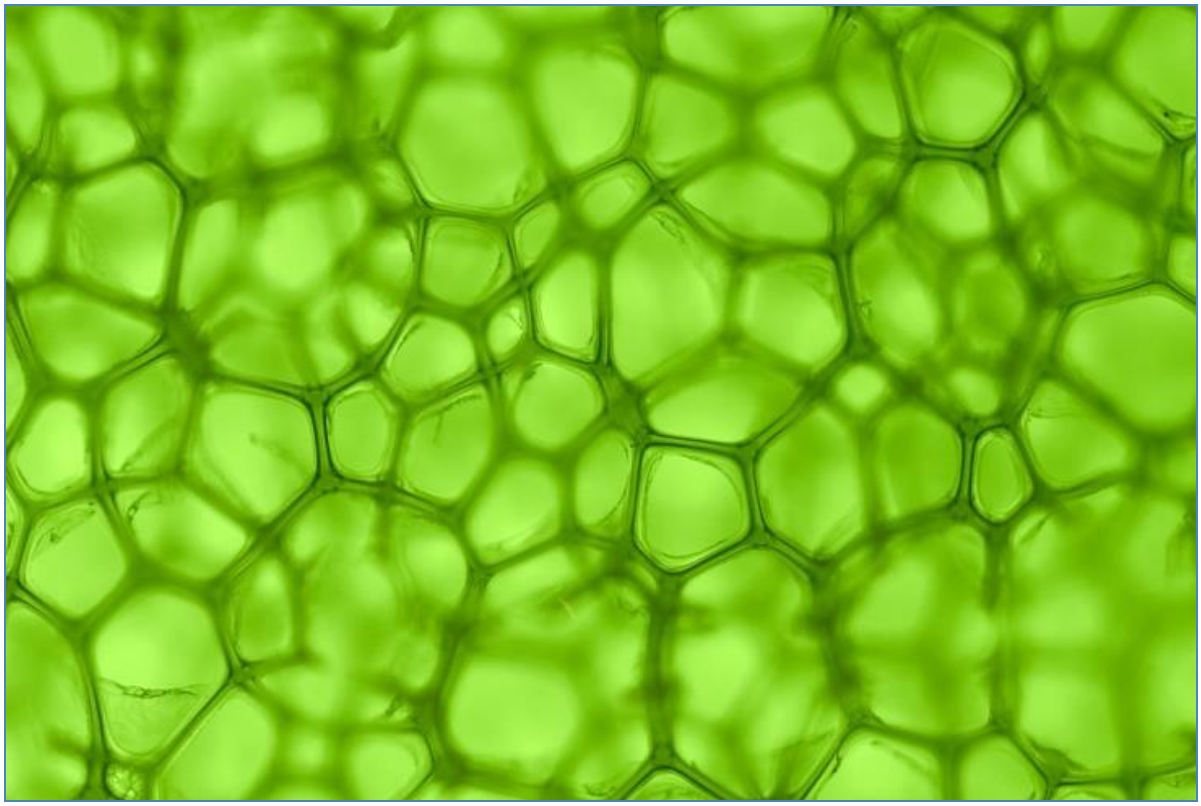
Published: May 2014 (version 1.2)

History of changes to Course Support Notes

Unit details	Version	Description of change	Authorised by	Date
	1.1	Exemplar materials added.	Qualifications Development Manager	June 2013
	1.2	Updates to Mandatory Course Key Areas, Suggested Learning Activities and Exemplification of Key Areas. Amendment to assessor's recording evidence table for Experimental Investigation.	Qualifications Manager	May 2014

Unit Support Notes

Unit Support Notes — Cell Biology (National 3)



Please refer to the note of changes at the end of this document for details of changes from previous version (where applicable).

Introduction

These support notes are not mandatory. They provide advice and guidance on approaches to delivering and assessing the Cell Biology (National 3) Unit. They are intended for teachers and lecturers who are delivering this Unit. They should be read in conjunction with:

- the Unit Specification
- the Course Specification
- the Course Support Notes
- appropriate assessment support materials

General guidance on the Unit

Aims

The general aim of this Unit is to develop skills of scientific inquiry, investigation and analytical thinking, along with knowledge and understanding of cell biology.

Learners will apply these skills when considering the applications of cell biology on our lives, as well as the implications on society/the environment. This can be done by using a variety of approaches, including investigation and problem solving.

The Unit covers the key areas of:

- Structure and variety of cells and their functions
- Function of DNA
- Risks and benefits of DNA profiling
- Photosynthesis
- Different types of microorganisms
- How growth of microorganisms can be controlled

Learners will research issues, apply scientific skills and communicate information related to their findings, which will develop skills of scientific literacy.

Progression into this Unit

Entry to this Unit is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by the following or equivalent qualifications and/or experience:

- National 2 Science in the Environment Course or relevant component Units

Skills, knowledge and understanding covered in this Unit

Information about skills, knowledge and understanding is given in the National 3 Biology *Course Support Notes*.

If this Unit is being delivered on a free-standing basis, teachers and lecturers are free to select the skills, knowledge, understanding and contexts which are most appropriate for delivery in their centres.

Progression from this Unit

This Unit may provide progression to:

- Other qualifications in Biology or related areas
- Further study, employment and/or training

Approaches to learning and teaching

Approaches to learning and teaching and suggested learning activities are covered in the *Course Support Notes*.

Developing skills for learning, skills for life and skills for work

Information about developing skills for learning, skills for life and skills for work in this Unit, is given in the relevant *Course Support Notes*.

Approaches to assessment and gathering evidence

The purpose of this section is to give advice on approaches to assessment for the Unit. There will be other documents produced for centres to provide exemplification of assessments and guidance on how to write them.

Approaches to the assessment of a Unit when it forms part of a Course may differ from approaches to assessing the same Unit when it is not being delivered as part of a Course. If an integrated approach to Course delivery is chosen, then there may be opportunities for combining assessment across Units. Assessments must be valid, reliable and fit for purpose for the subject and level, and should fit in with learning and teaching approaches.

Unit assessment should support learning and teaching and, where possible, enable personalisation and choice for learners in assessment methods and processes. Teachers and lecturers should select the assessment methods they believe are most appropriate, taking into account the needs of their learners and the requirements of the Unit.

There is no mandatory order for delivery of the Outcomes. These should be overtaken throughout the Unit and are an integral part of learning and teaching. The table below gives guidance and advice on possible approaches to assessment and gathering evidence:

Strategies for gathering evidence
There may be opportunities in the day-to-day delivery of the Units in a Course to observe learners providing evidence, which satisfies completely, or partially, a Unit or Units. This is naturally occurring evidence and can be recorded as evidence for an Outcome or parts of an Outcome. In some cases, additional evidence may also be required to supplement and confirm the naturally occurring evidence. Approaches to assessment might cover the whole Unit or be combined across Outcomes. A holistic approach can enrich the assessment process for the learner by bringing together different Outcomes and/or Assessment Standards. If a holistic approach is used, then it is necessary to be able to track individual Assessment Standard evidence. Strategies for gathering evidence and ensuring that the learners' work is their own could include: ♦ personal interviews during which the teacher or lecturer can ask additional questions about completed work ♦ an oral presentation on their work ♦ writing reports in supervised conditions ♦ checklists to record the authenticity ♦ supplementary sources of evidence, such as witness testimony, film or audio clips Evidence can be gathered from classwork, experiments, investigations and/or research carried out in this Unit. It can be obtained using one or more of the strategies outlined above or by alternative methods, which could include a test of knowledge, understanding and skills.

Equality and inclusion

The *Course Support Notes* provide full information on equality and inclusion for this Unit.

It is recognised that centres have their own duties under equality and other legislation and policy initiatives. The guidance given in these *Unit Support Notes* is designed to sit alongside these duties but is specific to the delivery and assessment of the Unit.

Alternative approaches to Unit assessment to take account of the specific needs of learners can be used. However, the centre must be satisfied that the integrity of the assessment is maintained and where the alternative approach to assessment will, in fact, generate the necessary evidence of achievement.

Appendix 1: Reference documents

The following reference documents will provide useful information and background.

- Assessment Arrangements (for disabled learners and/or those with additional support needs) — various publications are available on SQA's website at: www.sqa.org.uk/sqa//14977.html.
- *Building the Curriculum 3: A framework for Learning and Teaching*
- *Building the Curriculum 4: Skills for learning, skills for life and skills for work*
- *Building the Curriculum 5: A framework for assessment*
- Course Specifications
- Design Principles for National Courses
- *Guide to Assessment (June 2008)*
- Research Report 4 — Less is More: Good Practice in Reducing Assessment Time
- Coursework Authenticity — a Guide for Teachers and Lecturers
- *SCQF Handbook: User Guide* (published 2009) and SCQF level descriptors (to be reviewed during 2011 to 2012): www.sqa.org.uk/sqa/4595.html
- *SQA Skills Framework: Skills for Learning, Skills for Life and Skills for Work*
- SQA Guidelines on e-assessment for Schools
- SQA Guidelines on Online Assessment for Further Education
- SQA e-assessment web page: www.sqa.org.uk/sqa/5606.html

Administrative information

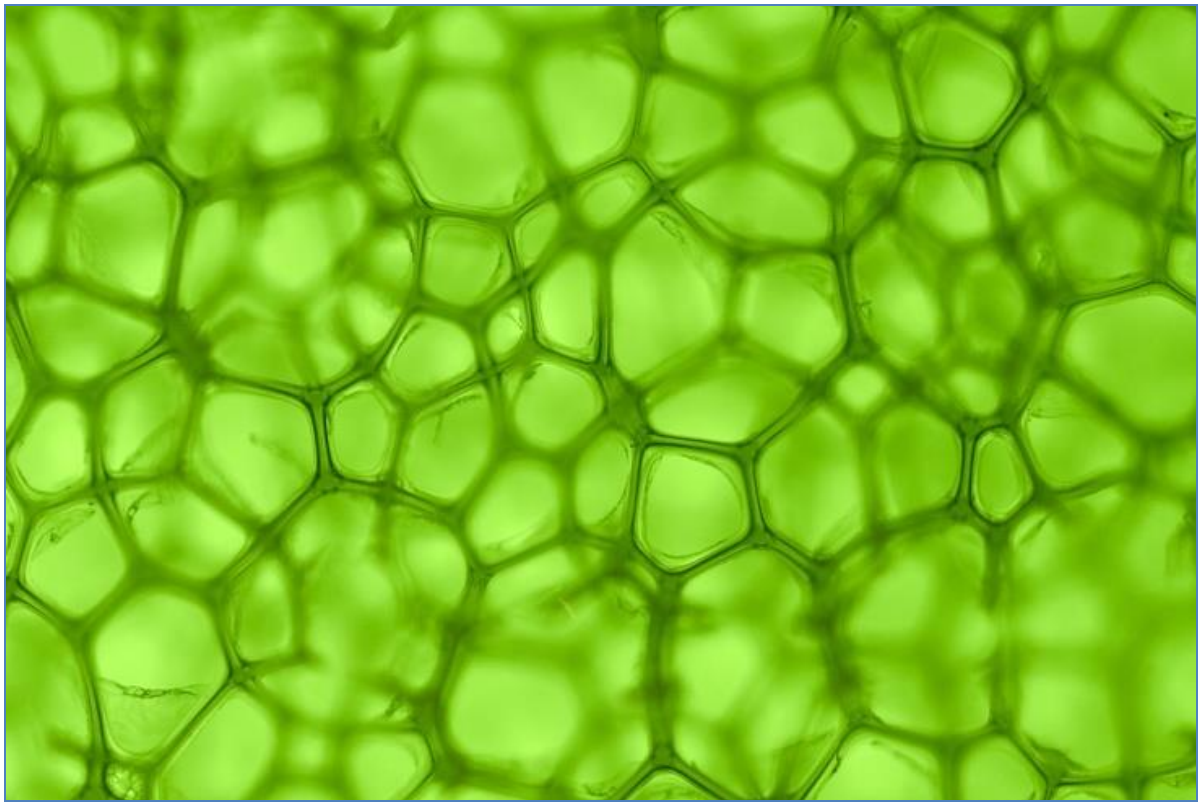
Published: May 2014 (version 1.1)

History of changes to Unit Support Notes

Unit details	Version	Description of change	Authorised by	Date
	1.1	Exemplar materials added.	Qualifications Development Manager	June 2013

Unit Support Notes

Unit Support Notes — Biology: Multicellular Organisms (National 3)



Please refer to the note of changes at the end of this document for details of changes from previous version (where applicable).

Introduction

These support notes are not mandatory. They provide advice and guidance on approaches to delivering and assessing the Biology: Multicellular Organisms (National 3) Unit. They are intended for teachers and lecturers who are delivering this Unit. They should be read in conjunction with:

- the Unit Specification
- the Course Specification
- the Course Support Notes
- appropriate assessment support materials

General guidance on the Unit

Aims

The general aim of this Unit is to develop skills of scientific inquiry, investigation and analytical thinking, along with knowledge and understanding of multicellular organisms.

Learners will apply these skills when considering the applications of multicellular organisms on our lives, as well as the implications on society/the environment. This can be done by using a variety of approaches, including investigation and problem solving.

The Unit covers the key areas of:

- Structure and function of organs and organ systems and their role in sustaining life
- Role of technology in monitoring health and improving quality of life
- Body defences against disease and role of vaccines
- Fertilisation and embryonic development and risks to the embryo

Learners will research issues, apply scientific skills and communicate information related to their findings, which will develop skills of scientific literacy.

Progression into this Unit

Entry to this Unit is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by the following or equivalent qualifications and/or experience:

- National 2 Science in the Environment Course or relevant component Units

Skills, knowledge and understanding covered in this Unit

Information about skills, knowledge and understanding is given in the National 3 Biology *Course Support Notes*.

If this Unit is being delivered on a free-standing basis, teachers and lecturers are free to select the skills, knowledge, understanding and contexts which are most appropriate for delivery in their centres.

Progression from this Unit

This Unit may provide progression to:

- Other qualifications in Biology or related areas
- Further study, employment and/or training

Approaches to learning and teaching

Approaches to learning and teaching and suggested learning activities are covered in the *Course Support Notes*.

Developing skills for learning, skills for life and skills for work

Information about developing skills for learning, skills for life and skills for work in this Unit, is given in the relevant *Course Support Notes*.

Approaches to assessment and gathering evidence

The purpose of this section is to give advice on approaches to assessment for the Unit. There will be other documents produced for centres to provide exemplification of assessments and guidance on how to write them.

Approaches to the assessment of a Unit when it forms part of a Course may differ from approaches to assessing the same Unit when it is not being delivered as part of a Course. If an integrated approach to Course delivery is chosen, then there may be opportunities for combining assessment across Units.

Assessments must be valid, reliable and fit for purpose for the subject and level, and should fit in with learning and teaching approaches.

Unit assessment should support learning and teaching and, where possible, enable personalisation and choice for learners in assessment methods and processes. Teachers and lecturers should select the assessment methods they believe are most appropriate, taking into account the needs of their learners and the requirements of the Unit.

There is no mandatory order for delivery of the Outcomes. These should be overtaken throughout the Unit and are an integral part of learning and teaching. The table below gives guidance and advice on possible approaches to assessment and gathering evidence:

Strategies for gathering evidence
There may be opportunities in the day-to-day delivery of the Units in a Course to observe learners providing evidence, which satisfies completely, or partially, a Unit or Units. This is naturally occurring evidence and can be recorded as evidence for an Outcome or parts of an Outcome. In some cases, additional evidence may also be required to supplement and confirm the naturally occurring evidence. Approaches to assessment might cover the whole Unit or be combined across Outcomes. A holistic approach can enrich the assessment process for the learner by bringing together different Outcomes and/or Assessment Standards. If a holistic approach is used, then it is necessary to be able to track individual Assessment Standard evidence.

Strategies for gathering evidence and ensuring that the learners' work is their own could include:

- personal interviews during which the teacher or lecturer can ask additional questions about completed work
- an oral presentation on their work
- writing reports in supervised conditions
- checklists to record the authenticity
- supplementary sources of evidence, such as witness testimony, film or audio clips

Evidence can be gathered from classwork, experiments, investigations and/or research carried out in this Unit. It can be obtained using one or more of the strategies outlined above or by alternative methods, which could include a test of knowledge, understanding and skills.

Equality and inclusion

The *Course Support Notes* provide full information on equality and inclusion for this Unit.

It is recognised that centres have their own duties under equality and other legislation and policy initiatives. The guidance given in these *Unit Support Notes* is designed to sit alongside these duties but is specific to the delivery and assessment of the Unit.

Alternative approaches to Unit assessment to take account of the specific needs of learners can be used. However, the centre must be satisfied that the integrity of the assessment is maintained and where the alternative approach to assessment will, in fact, generate the necessary evidence of achievement.

Appendix 1: Reference documents

The following reference documents will provide useful information and background.

- Assessment Arrangements (for disabled learners and/or those with additional support needs) — various publications are available on SQA's website at: www.sqa.org.uk/sqa//14977.html.
- *Building the Curriculum 3: A framework for Learning and Teaching*
- *Building the Curriculum 4: Skills for learning, skills for life and skills for work*
- *Building the Curriculum 5: A framework for assessment*
- Course Specifications
- Design Principles for National Courses
- *Guide to Assessment (June 2008)*
- Research Report 4 — Less is More: Good Practice in Reducing Assessment Time
- Coursework Authenticity — a Guide for Teachers and Lecturers
- *SCQF Handbook: User Guide* (published 2009) and SCQF level descriptors (to be reviewed during 2011 to 2012): www.sqa.org.uk/sqa/4595.html
- *SQA Skills Framework: Skills for Learning, Skills for Life and Skills for Work*
- SQA Guidelines on e-assessment for Schools
- SQA Guidelines on Online Assessment for Further Education
- SQA e-assessment web page: www.sqa.org.uk/sqa/5606.html

Administrative information

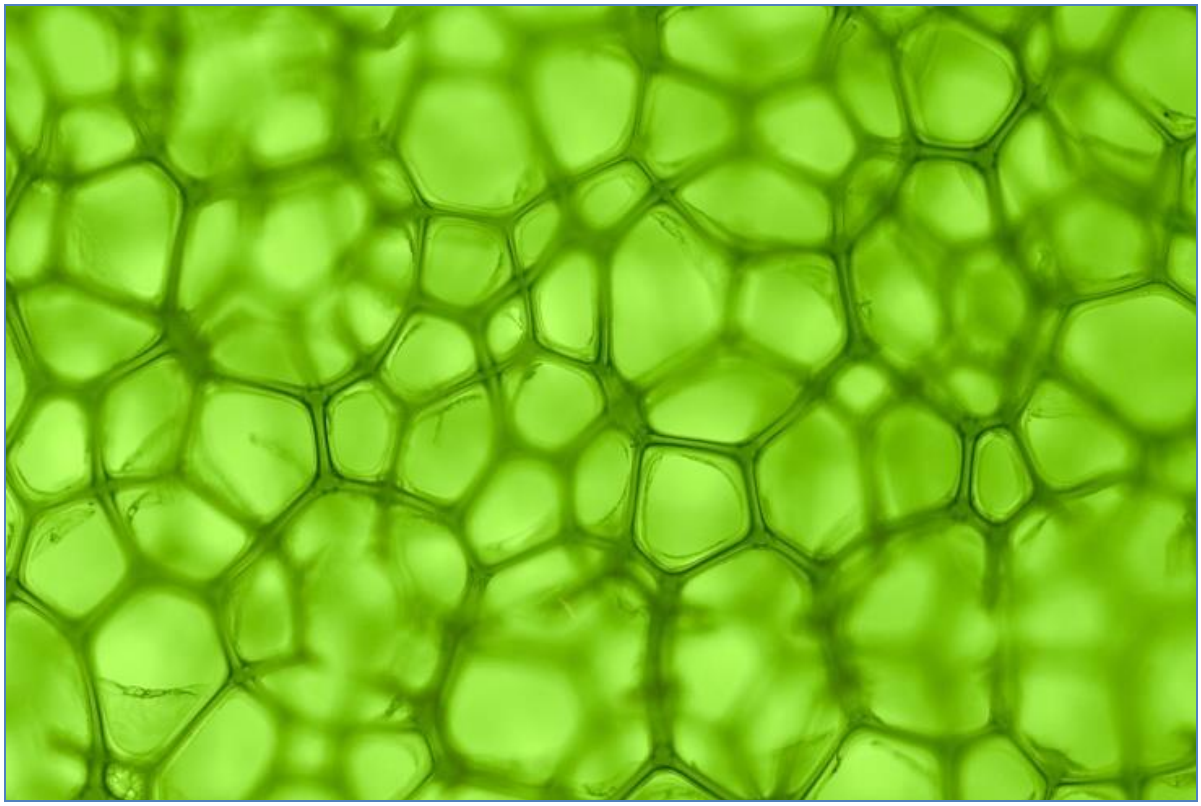
Published: May 2014 (version 1.1)

History of changes to Unit Support Notes

Unit details	Version	Description of change	Authorised by	Date
	1.1	Exemplar materials added.	Qualifications Development Manager	June 2013

Unit Support Notes

Unit Support Notes — Biology: Life on Earth (National 3)



Please refer to the note of changes at the end of this document for details of changes from previous version (where applicable).

Introduction

These support notes are not mandatory. They provide advice and guidance on approaches to delivering and assessing the Biology: Life on Earth (National 3) Unit. They are intended for teachers and lecturers who are delivering this Unit. They should be read in conjunction with:

- the Unit Specification
- the Course Specification
- the Course Support Notes
- appropriate assessment support materials

General guidance on the Unit

Aims

The general aim of this Unit is to develop skills of scientific inquiry, investigation and analytical thinking, along with knowledge and understanding of life on Earth.

Learners will apply these skills when considering the applications of life on Earth on our lives, as well as the implications on society/the environment. This can be done by using a variety of approaches, including investigation and problem solving.

The Unit covers the key areas of:

- Sampling and identifying living things from different habitats to compare their biodiversity and suggest reasons for their distribution
- Different types of chemicals in agriculture, the alternatives and their impact on global food production

Learners will research issues, apply scientific skills and communicate information related to their findings, which will develop skills of scientific literacy.

Progression into this Unit

Entry to this Unit is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by the following or equivalent qualifications and/or experience:

- National 2 Science in the Environment Course or relevant component Units

Skills, knowledge and understanding covered in this Unit

Information about skills, knowledge and understanding is given in the National 3 Biology *Course Support Notes*.

If this Unit is being delivered on a free-standing basis, teachers and lecturers should cover the mandatory skills and key areas in ways which are most appropriate for delivery in their centres.

Progression from this Unit

This Unit may provide progression to:

- Other qualifications in Biology or related areas
- Further study, employment and/or training

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