



Higher National Unit Specification

General information

Unit title: Sound Production: Synthesis and Sampling (SCQF level 7)

Unit code: J0LB 34

Superclass: XL

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Unit purpose

This unit is designed to give the learner an understanding of the creation and use of sounds using synthesisers and samplers. The unit provides the opportunity for learners to gain the basic skills required to program a range of synthesisers and samplers, either software or hardware based, to emulate the sound of a range of natural instruments and sounds and to create entirely original sounds. The learner will then integrate the developed sounds into a creative work such as a piece of music or sound design. This unit is intended for learners interested in programming synthesisers and samplers to emulate existing sounds or to create entirely new sounds.

Outcomes

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

- 1 Create synthesiser patches incorporating a range of synthesis techniques to a given brief.
- 2 Create a sample-based instrument using recorded material to a given brief.
- 3 Integrate a range of developed sounds into a creative work to a given brief.

Credit points and level

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

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Recommended entry to the unit

Access to this unit is at the discretion of the centre. However, it is recommended that learners have prior knowledge and skills in the use of digital audio workstation (DAW) software or use of hardware synthesisers and samplers. In addition, learners would benefit from basic knowledge of synthesis and sampling techniques. This could be evidenced through NQ units such as *Music: MIDI Sequencing* and *Sound Production: Synthesis and Sampling Techniques* (SCQF level 6) and HN units such as: *Sound Production: Digital Audio Workstations* (SCQF level 7)

Core Skills

Achievement of this Unit gives automatic certification of the following Core Skills component:

Complete Core Skill	None
Core Skill component	Critical Thinking at SCQF level 5

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of this Unit specification.

Context for delivery

This is an optional unit in the framework for HN Sound Production. It is recommended that it should be taught and assessed within the subject area of the group award to which it contributes.

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

Create synthesiser patches incorporating a range of synthesis techniques to a given brief.

Knowledge and/or skills

- ◆ Creation of synthesiser sounds on different types of synthesiser
- ◆ Types of synthesis
- ◆ Application of sound generators and modifiers to shape sounds
- ◆ Storing and recalling sound patches to an appropriate medium

Outcome 2

Create a sample-based instrument using recorded material to a given brief.

Knowledge and/or skills

- ◆ Creating audio samples for a sampler instrument
- ◆ Editing audio samples for playback in a sampler
- ◆ Mapping samples to different keys/triggers within a sampler
- ◆ Mapping samples of different velocities onto areas of the same key/trigger
- ◆ Triggering playback of audio samples
- ◆ Storing and recalling sample patches to an appropriate medium

Outcome 3

Integrate a range of developed sounds into a creative work to a given brief.

Knowledge and/or skills

- ◆ Using synthesiser instruments in a creative work
- ◆ Using sampler instruments in a creative work

Evidence requirements for this unit

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

Higher National Unit Specification: Statement of standards (cont)

Unit title: Sound Production: Synthesis and Sampling (SCQF level 7)

Outcome 1

Create synthesiser patches using a combination of oscillators, envelope generators, filters and amplifiers for four synthesis types from the following list (two patches per synthesis type):

- ◆ Subtractive synthesis
- ◆ Additive synthesis
- ◆ FM synthesis
- ◆ Granular synthesis
- ◆ Physical modelling synthesis
- ◆ Wavetable synthesis
- ◆ LA synthesis

Centres should select four types of synthesis from the list above and these should be taught and assessed.

- ◆ Give a brief description of each type of synthesis used.
- ◆ Save the sound patches to an appropriate medium for recall purposes.

Product and written and/or oral evidence in the form of the synthesiser patches and brief descriptions of synthesis processes will be produced.

Outcome 2

- ◆ Create audio samples for a sampler instrument without unintended clipping or distortion
- ◆ Accurately edit audio samples for playback in a sampler
- ◆ Map samples to different keys/triggers within a sampler
- ◆ Map samples of different velocities onto areas of the same key/trigger
- ◆ Trigger playback of audio samples
- ◆ Save sample patches to an appropriate medium for recall purposes

Learners should generate the samples that they are going to use by recording at least six different impulses at three different velocities and store them in an appropriate file format. These will then be edited and mapped across six keys/triggers on a sampler instrument. Impulses could be taken from instruments such as a drum kit, piano, bass guitar or any suitable instrument and triggered via MIDI.

Product evidence will be submitted as a standalone sampler instrument or as part of a Digital Audio Workstation (DAW) sampler.

Assessors should complete an observational checklist.

Outcome 3

- ◆ Use synthesiser instruments in a creative work
- ◆ Use sampler instruments in a creative work

Higher National Unit Specification: Statement of standards (cont)

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Learners will submit product evidence in the form of a created piece of music or sound design not less than two minutes in duration. This piece will feature two of the synth patches developed in Outcome 1 and sample instruments developed in Outcome 2. Evidence will take the form of a finished DAW project file. If hardware sequencers are used, their data should be retained on a suitable medium such as a USB or SD card or recorded into a DAW as MIDI and audio. If using hardware synthesisers/samplers, the audio output of these must be recorded on at least a stereo format.

Assessors should complete an observational checklist.

Evidence for all outcomes will be generated in controlled classroom conditions.



Higher National Unit Support Notes

Unit title: Sound Production: Synthesis and Sampling (SCQF level 7)

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 an optional unit within the HN Sound Production framework.

This unit is suitable for learners who wish to progress to more advanced courses in music technology and music, such as degree programmes in Sound Production and Sound Design, or for anyone with an interest in musical composition and/or sound design.

This unit has clear links with other units that form part of the HN in Sound Production such as *Sound Production: Digital Audio Workstations* (SCQF level 7), *Sound Production: Digital Audio Workstations* (SCQF level 8), *Sound Production: Acoustics* (SCQF level 8), *Sound Production: Audio for Multimedia* (SCQF level 7), *Sound Production: Audio for Multimedia* (SCQF level 8), and *Sound Production: Recording and Mixing* (SCQF level 7). Although not essential, it is recommended that learners may have had some experience prior to this unit of MIDI sequencing and digital audio editing, or an integrative approach may be taken.

Learners will gain skills in programming synthesisers and samplers. Musicians and sound designers require an understanding of sound waveforms and how to manipulate these within electronic or virtual instruments for creative contexts. Learners will therefore have the opportunity to acquire skills that would lead to a variety of applications; for example, sound design projects, electronic music programming, performing with technology or audio installations.

It should be noted that the types of synthesiser and sampler referred to in the outcomes can be software or hardware types. The unit has been specifically written to allow a range of approaches to suit delivering centres.

Learners should be made aware of the requirement for copyright clearance, particularly when using samples in Outcomes 2 and 3.

This unit offers the potential for aspects of the following National Occupational Standards to be demonstrated:

CCSMT11	Produce audio materials using sampling and synthesis technology for music and sound industries
CCSMT39	Carry out software sound and audio manipulation
CCSMT7	Use basic functions of MIDI sequencing on professional DAWs
CCSMT10	Develop key MIDI and DAW audio techniques

Higher National Unit Support Notes (cont)

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Guidance on approaches to delivery of this unit

For Outcome 1, it is expected that teaching approaches will take into account basic concepts of four different types of sound synthesis and modifiers, prior to embarking on programming skills. This outcome is primarily intended to be a practical exercise in the use of synthesisers and as such brief explanations of process will be sufficient.

Learners should have plenty of opportunities to experiment with the different types of synthesiser. However, it is recommended that they may begin programming by following sets of instructions on programming specified sounds, through which they will gradually begin to see the effect of each of the modifiers. Empty patches for each of the synthesiser types should be generated and made available to the learners.

In Outcome 2, learners may work in groups or pairs to record the material that they are going to use for their sample instruments. Care should be taken to ensure each learner has produced their own samples and sample editing software or hardware should be made available for each learner to carry out their own edits independently.

Outcome 3 could be a creative piece of music or sound design in response to a given brief. It should feature two of the synths developed in Outcome 1 and the sampler instrument developed in Outcome 2. This could integrate with units such as *Sound Production: Digital Audio Workstations* (SCQF level 7), *Sound Production: Digital Audio Workstations* (SCQF level 8) or *Sound Production: Audio for Multimedia* (SCQF level 7).

Outcomes could be taught sequentially or holistically as a single piece of work where synth design, sampling and arrangement occur concurrently. Theory teaching should take place at the beginning of the unit.

Learners must be aware of, and adhere at all times to the requirements of current copyright legislation in relation to the creation, performance and use of music and other forms of intellectual property.

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.

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.

Outcome 1

A practical response to a given brief — written and/or oral evidence

Centres should ensure that the given brief allows scope for all evidence requirements to be met.

Higher National Unit Support Notes (cont)

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The learner is required to use synthesiser programming skills to show competency in creating patches on a variety of synthesisers, programming at least two sounds as specified by the tutor/assessor on four different types of synthesiser. The assessor should select four types of synthesis from, subtractive synthesis, additive synthesis, FM synthesis, granular synthesis, physical modelling synthesis, wavetable synthesis and linear arithmetic synthesis, giving each centre scope to include models that are available locally. The four synthesis types chosen should then be taught and assessed. All parameters for oscillators, amplifiers, filters and envelopes should be noted or saved within the synthesiser patch. This patch should be saved and named for recall.

A mark-up sheet for each synthesiser patch should be created that records all parameters and settings that have been edited, the name given to the patch, a description of the sound that has been created along with typical music uses for the patch.

Evidence should take the form of completed synthesiser patches saved to an appropriate medium and brief written or oral description of each type of synthesis used.

Outcome 2

A practical response to a given brief.

Centres should ensure that the given brief allows scope for all evidence requirements to be met.

Using a studio or hand-held recording system, the learner is to record a collection of sounds from an instrument chosen by them or specified by a lecturer. Suitable instruments would include those whose timbre changes with velocity. A minimum of six pitches or individual drum hits should be recorded at three velocities and stored in a suitable format. These must be clear and undistorted at the point of recording. The learner is then required to use the editing functions of software or a sampler to 'top and tail' the sounds.

The learner should place these samples into a key/trigger, key/trigger group or zone and map velocity ranges on a sampler and trigger the samples from MIDI notes.

Evidence should take the form of the finished sample patch file or hardware sampler patch and an observational checklist.

Outcome 3

A practical response to a given brief.

Learners should prepare a piece of music or sound design in a suitable DAW incorporating at least two of the synths from Outcome 1 and the sampler from Outcome 2. Synthesiser patches and loops from the DAW package could be used to complete the piece as well as effects, however the use of effects are not assessed in this unit.

Higher National Unit Support Notes (cont)

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Evidence should take the form of the completed DAW project folder or hardware sequencer file. If a DAW is being used the folder should contain the application file with synths and sample patches. Samples should be appropriately labelled. If hardware synths and samplers are being used, they should be triggered by recorded MIDI tracks or a hardware sequencer and recorded as audio in at least a stereo format.

An assessor observational checklist should be completed and retained.

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

During this unit there will be opportunities for learners to develop Core Skills such as *Information and Communication Technology (ICT)*, *Problem Solving* and *Working with Others*.

This Unit has the Critical Thinking component of Problem Solving embedded in it. This means that when learners achieve the Unit, their Core Skills profile will also be updated to show they have achieved Critical Thinking at SCQF level 5.

History of changes to unit

Version	Description of change	Date
02	Core Skills Component Critical Thinking at SCQF level 5 embedded.	31/08/18

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General information for learners

Unit title: Sound Production: Synthesis and Sampling (SCQF level 7)

This unit is designed to enable you to develop key skills and knowledge in sound/music synthesis and sampling. It is primarily intended to introduce you to modern synthesis and sampling techniques and to give you the opportunity to create your own synths and samples. It will be of special interest to you if you have an interest in sound design, audio for multimedia or electronic music production.

You will use modern synthesisers and samplers to create a piece of music or sound design. You may use a digital audio workstation, but emphasis is placed on your skills in creating new sounds and sample instruments.

There are three outcomes. In Outcome 1, you will design synthesiser sounds from blank patches and further sculpt them using a range of sound modifiers. You will also have to describe the basic operating methods of the synthesisers you make. In Outcome 2, you will create a sample instrument by recording sounds and mapping them onto sampler keys/triggers. In Outcome 3, you will use these sounds to create a piece of music or sound design.

It is possible that you will use these sounds for assessment in other units, for example, Sound Production: Digital Audio Workstations (SCQF level 7), Sound Production: Digital Audio Workstations (SCQF level 8) and Sound Production: Audio for Multimedia (SCQF levels 6 and 7).

On completion of the unit you should be able to:

- 1 Create synthesiser patches incorporating a range of synthesis techniques to a given brief.
- 2 Create a sample based instrument using recorded material to a given brief.
- 3 Integrate a range of developed sounds into a creative work to a given brief.

You will have the opportunity to develop elements of the following Core Skills: *Communication, Information and Communication Technology (ICT) and Working with Others.*

You will have the opportunity to develop elements of critical listening skills.

This Unit has the Critical Thinking component of Problem Solving embedded in it. This means that when you achieve the Unit, your Core Skills profile will also be updated to show you have achieved Critical Thinking at SCQF level 5.