# Route map through learning, teaching and assessment

## Course: Computing Science                    Level: Higher

This route map is intended to assist staff in planning and delivering the overall vision for Curriculum for Excellence. It has been developed to signpost the relevant support materials available to assist staff in the planning of learning, teaching and assessment of Higher Computing Science.

The vision for the new qualifications is to create assessment opportunities that follow and support learning and teaching. This follows the principles laid out in *Building the Curriculum 5* and makes assessment a natural part of learning and teaching.

Education Scotland has published support materials to help staff develop programmes of learning drawn from three sources: course materials commissioned by Education Scotland, other support materials produced by staff seconded to Education Scotland and course materials provided by staff through their education authorities. Further materials will be added as they become available.

These support materials, which are neither prescriptive nor exhaustive, provide suggestions on approaches to learning and teaching that will promote development of the necessary knowledge, understanding and skills for Higher Computing Science. Staff are encouraged to draw on these materials, and existing materials, to develop their own programmes of learning which are appropriate to the needs of learners within their own context.

The link to Education Scotland's support materials can be found below together with a number of other subject-specific links staff may find helpful as they develop **programmes of learning** for Higher Computing Science. These links are followed by a sequential list of the key guidelines, advice and support for the Higher Computing Science **qualification**. This information is intended to support staff in deciding the most appropriate ways to generate evidence and assess learners.

## Useful links for learning and teaching Higher Computing Science

**Education Scotland NQ course materials on Glow** (login and password required)
A wide range of learning and teaching resources to help staff develop programmes of learning.
http://www.educationscotland.gov.uk/nqcoursematerials/subjects/computingscience/index.asp (copy and paste this link into your browser)

**Education Scotland NQs support**
http://www.educationscotland.gov.uk/learningteachingandassessment/curriculumareas/technologies/nqs/index.asp

**Education Scotland Generic Approaches to Learning and Teaching advice for skills in Computing Science**
http://www.educationscotland.gov.uk/nationalqualifications/subjects/computing.asp
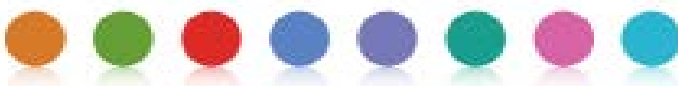
**Scottish Computing Science Teachers' Forum**

Find and connect with other computing science staff, create and/or join groups and share resources.

www.compednet.com

**Computing at School Scotland**

A professional learning and networking community for computing science staff.

www.casscotland.org.uk

**Plan C**

The Professional Learning and Networking for Computing (PLAN C) project provides support for National 3, 4, 5, Higher and Advanced Higher Computing Science as well as Computational Thinking as part of the broad general education.

www.planforcomputing.org.uk

**SQA course and unit support notes providing advice and guidance on learning and teaching**

http://www.sqa.org.uk/files_ccc/CfE_CourseUnitSupportNotes_Higher_Technologies_ComputingScience.pdf

**Key Curriculum for Excellence support**

A quick guide to finding vital information about Curriculum for Excellence under the following headings:

- the latest guidance, updates and plans for embedding Curriculum for Excellence
- information on assessment
- information on the new qualifications.

http://www.educationscotland.gov.uk/keycfesupport/index.asp

**National Assessment Resource** (login and password required)

Materials that inform planning for learning, teaching, moderation and assessment.

https://www.narscotland.org.uk/

## Higher Computing Science course content

Higher Computing Science consists of two units and a coursework assignment:

- **Software Design and Development**
  http://www.sqa.org.uk/files_ccc/CfE_Unit_H_ComputingScience_SoftwareDesignandDevelopment.pdf
  There is a full package of unit assessment support available on the SQA Secure website for this unit. The package includes unit assessments for both combined and unit-by-unit approaches.

- **Information Systems Design and Development**
  http://www.sqa.org.uk/files_ccc/CfE_Unit_H_ComputingScience_InformationSystemsDesignandDevelopment.pdf
  There is a full package of unit assessment support available on the SQA Secure website for this unit. The package includes unit assessments for both combined and unit-by-unit approaches.

- **Coursework assessment**
  Page 8 of this document gives more details of the assessment:
  http://www.sqa.org.uk/files_ccc/CfE_CourseAssessSpec_Higher_Technologies_ComputingScience.pdf

Three assessments have been developed and are available on the SQA Secure website. Staff must use one of the SQA developed assessments. General advice about the assessments is available here: http://www.sqa.org.uk/files_ccc/GAInfoHigherComputingScience.pdf

## Unit assessment *(internal)*

Units are mandatory when taken as part of the Higher Computing Science course but they can also be standalone. Unit support notes follow on from the course support notes. http://www.sqa.org.uk/files_ccc/CfE_CourseUnitSupportNotes_Higher_Technologies_ComputingScience.pdf

### Requirements for the coursework assignment

The coursework assessment is worth 60 marks in total. Since the full award is graded out of 150 marks, this assessment counts for 40% of the overall marks for the full course award.

Learners are expected to demonstrate skills in three broad areas: analysing a problem, building a solution and reporting on the solution.

For all areas, marks are awarded in line with the general principles and marking instructions that accompany each assignment. Each section of 10 marks is broken down by an exemplar description of learner performance in bands. Professional judgement should be used to identify the most appropriate band – and subsequent mark within that band – that matches the learner response. Staff are advised to make comments in the marking to explain their judgement of learner evidence.

### Analysing a problem (10 marks)

Learners will be expected to use the description included in the assessment to create a detailed specification of both a data structure (such as a database or website) and a program. The exact type of data structure will vary depending on the assessment chosen. Learners will also be expected to identify any further information required at this stage.

### Building a solution (40 marks)

This section is split into four areas: data structure design, data structure development, program design and program development. 10 marks are awarded for each stage. Learners are expected to design and develop their data structure and program incrementally, keeping a log of evidence of their development along with their final solution and the testing that has been carried out.

### Reporting on a solution (10 marks)

The final section includes the documentation that has been kept by learners to explain their development of the solution, generated as part of the building a solution section. It should also include notes on any help required. Learners will also write a short report evaluating their solution and commenting on the social, economic, security or legal implications of the solution as appropriate.

### Evidence retention for the performance

The following learner evidence is required for this assessment:

- the completed digital solution, including hardcopy printouts
- a record of progress containing all evidence required by the assessment task
- a report on the learner's solution.

All evidence should be retained for possible external verification by SQA.

### External assessment

The external course assessment comprises a two-section question paper totalling 90 marks. This represents 60% of the overall marks for the full course award.

### Section 1 (short answer questions)

This section carries **20 marks**.

This section is designed to give learners the opportunity to demonstrate a breadth of knowledge across the two core units of the course. Some calculations will be included.

### Section 2 (structured answer questions)

This section carries **70 marks**.

Learners will be presented with a series of structured questions focused on the application of knowledge to solve a computing problem. There will be little focus on the direct recall of knowledge, with an emphasis placed on the application of a learner's understanding. Again, content will be sampled from across the two core units and some questions will require the integration of knowledge from both.

A specimen question paper with marking instructions is available here:

http://www.sqa.org.uk/files_ccc/ComputingScienceSQPH.pdf.

Questions pertaining to the analysis and understanding of a program will be written in SQA standard pseudocode. More details on the structure and syntax of this are available here:

http://www.sqa.org.uk/files_ccc/ComputingSciencePseudocodeSpecificationSQPH.pdf

*Note*: There is no requirement for learners to be able to write solutions in this specific pseudocode.

### Points of change and areas of stability across National 5 and Higher

http://www.sqa.org.uk/sqa/files_ccc/H_Computing_Science_Course_comparison.pdf

### Verification

The verification process is intended to be supportive and not onerous. Internal verification is the process of ensuring standards are applied uniformly and consistently within a school in line with national standards. External verification is the process of ensuring that national standards are maintained consistently across all schools and is carried out by SQA. Information on quality assurance can be found at http://www.sqa.org.uk/sqa/58448.html.

The following links will also support staff preparing evidence for verification purposes including prior verification, as well as internal and external verification:

http://www.sqa.org.uk/files_ccc/Prior%20Verification%20Centre%20Guidance%20FINAL.pdf
http://www.sqa.org.uk/sqa/files_ccc/InternalVerificationGuideforSQAcentres.pdf
http://www.sqa.org.uk/sqa/files_ccc/Evidence_required_for_verificationevents.pdf
http://www.sqa.org.uk/sqa/files_ccc/SQA_Evidence_retention_requirements_A3_table.pdf

Key messages from verification will be put up on the SQA website.

**Results services**

http://www.sqa.org.uk/sqa/files_ccc/FA6669_SQA_Results_Services_A5_8pp_brochure_web.pdf

http://www.sqa.org.uk/sqa/65427.html

SQA offer two services to replace the appeals service:

- Exceptional Circumstances Consideration Service (details to be provided to SQA within ten days of the learner sitting the external assessment)
- Post-results Service – this consists of a clerical check and/or a marking review if the centre has concerns about the results of an individual or group.