Route map through learning, teaching and assessment

Course: Mathematics of Mechanics Level: Advanced 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 Advanced Higher Mathematics of Mechanics.

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.

These support materials are not intended to constrain staff, hence they are neither prescriptive nor exhaustive. They provide suggestions on approaches to learning and teaching that will provide intellectual challenge to learners either in a formal learning environment or through independent learning. Learners will have the opportunity to develop deep learning and acquire high-level skills such as research and analysis through the medium of Advanced Higher Mathematics of Mechanics. Staff are encouraged to draw on these materials, and existing materials, to develop 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 other subject-specific links you may find helpful as you develop **programmes of learning** for Advanced Higher Mathematics of Mechanics. These links are followed by a sequential list of the key guidelines, advice and support for Advanced Higher Mathematics of Mechanics **qualifications**. 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 Advanced Higher Mathematics of Mechanics

Education Scotland NQ Course Materials on Glow (login and password required). Copy and paste the link into the browser to go straight to this page:
http://www.educationscotland.gov.uk/nqcoursematerials/subjects/m/nqresource_tcm4854172.asp

Education Scotland – Key Curriculum Support
A quick guide to finding vital information about Curriculum for Excellence:
http://www.educationscotland.gov.uk/keycfesupport/index.asp

This appears under three headings

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

SQA Course and Unit Support Notes
These provide advice and guidance on learning and teaching
http://www.sqa.org.uk/files_ccc/AHCUSNMathsofMechanics.pdf

Advanced Higher Mathematics of Mechanics course content

The main SQA Mathematics of Mechanics pages are found at http://www.sqa.org.uk/sqa/48475.html with those specifically related to Advanced Higher at http://www.sqa.org.uk/sqa/48505.html. Staff should also regularly check the updates and announcements section of this page.

The course specification can be found at:
http://www.sqa.org.uk/files/ng/AHCourseSpecMathsofMechanics.pdf

More detail on course coverage can be found in the Course Support notes.
http://www.sqa.org.uk/files_ccc/AHCUSNMathsofMechanics.pdf

Further mandatory information on course coverage is found from page 7 of the Course Assessment Specification.
http://www.sqa.org.uk/files_ccc/AHCASMathsofMechanics.pdf

A course comparison between National 5, Higher and Advanced Higher highlights **points of change and areas of stability** and can be found at:
http://www.sqa.org.uk/sqa/files_ccc/AH_Mathematics_of_Mechanics_Course_comparison.pdf

Course assessment

At Advanced Higher added value will be assessed in a course assessment, which consists of one question paper worth 100 marks. The course will be graded A–D.
http://www.sqa.org.uk/files_ccc/AHCASMathsofMechanics.pdf

Question paper This is a calculator question paper which lasts for three hours and is worth 100 marks. It will be carried out under exam conditions and marked by the SQA.
The paper will comprise of a series of short and extended response questions set in contexts that require the application of skills developed in the course.
In the course assessment, added value focusses on breadth, challenge and application in contexts appropriate to mechanics.

A specimen question paper and detailed marking instructions can be found at:
http://www.sqa.org.uk/files_ccc/MathsMechanicsSQPAH.pdf

Guidance on the use of past paper questions can be found at:
http://www.sqa.org.uk/files_ccc/MathematicsofMechanicsSQPAHPPGuidance.pdf

Unit assessment

Units are mandatory when taken as part of the Advanced Higher Mathematics of Mechanics course but they can be taken independently. Unit support notes follow on from the course support notes.
http://www.sqa.org.uk/files_ccc/AHCUSNMathsofMechanics.pdf

Each individual unit has an Advanced Higher unit specification which gives details of the outcomes and assessment standards. There is:

ONE outcome for Linear and Parabolic Motion – based on operational and reasoning skills
ONE outcome for Force, Energy and Periodic Motion - based on operational and reasoning skills
ONE outcome for Mathematical Techniques for Mechanics - based on operational skills.

Mathematics of Mechanics: Linear and Parabolic Motion
http://www.sqa.org.uk/files/nu/AHUnitLinearParabolicMotion.pdf

Mathematics of Mechanics: Force, Energy and Periodic Motion
http://www.sqa.org.uk/files/nu/AHUnitForceEnergyPeriodicMotion.pdf

Mathematics of Mechanics: Mathematical Techniques for Mechanics
http://www.sqa.org.uk/files/nu/AHUnitMathsTechMechanics.pdf

Learners must meet all the outcomes and assessment standards, and staff should read the documentation carefully. Evidence should be generated through learning and teaching. Assessment evidence can be drawn from a variety of activities and presented in a variety of formats. All of the evidence does not have to be generated from one activity but can be from several tasks and assessments carried out throughout the course. Learners should have access to resources to complete the assessment task and no time restrictions should be imposed. Staff should use their professional judgment when looking at the assessment evidence and ensure that minimum competency is met. They should undertake quality assurance regularly.

Three different ways of gathering evidence have been suggested by SQA. The most traditional approach is unit by unit. A combined approach links knowledge and understanding from two or more units together. Many staff will move towards the portfolio approach as their confidence grows. Here evidence is gathered from everyday learning using key classroom tasks. Unit assessment support is kept on the SQA Secure website.

Verification

http://www.sqa.org.uk/sqa/58448.html

The verification process is meant 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 carried out by SQA.

Prior Verification

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

Staff who devise their own assessments can send them to SQA for prior verification, free of charge. This is only necessary where significant changes have been made to the unit assessment provided by SQA. It gives staff confidence that their proposed assessment is fit for purpose and meets national standards.

Internal Verification

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

As a matter of course, staff should be quality assuring their assessments by carrying out activities that they have used previously, for example double marking and blind marking. Samples of learners' work should be marked by more than one staff member in a department or in single-person departments an arrangement should be made with another school.

External Verification

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

In Mathematics of Mechanics, schools will submit samples of learners' evidence for scrutiny by subject-specialist qualification verifiers. SQA intend that every school will be verified over the first few years. Verification will take place at various points in the year. Twelve samples will be asked for.

Schools must retain the evidence until 31 July of each academic year.
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/65427.html

SQA offers two services:

- 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.

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