



Higher National Unit specification: general information

Unit title: Sports Mechanics

Unit code: FX9L 35

Superclass: MA

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Unit purpose

This Unit introduces the candidate to the specific nature of biomechanics and the mechanical principles, which govern movement. The candidate will also learn that the application of these principles is central to the development of sporting performance.

On completion of this Unit the candidate will be able to:

- 1 Describe mechanical principles.
- 2 Observe and identify biomechanical principles in a sporting performance.
- 3 Analyse sporting performance by use of observational skill and personal research.

Recommended prior knowledge and skills

It would be beneficial for candidates to possess skills or experience relevant to the Unit. This will have been gained through relevant HNC Units. Ultimately entry is at the discretion of the centre.

Credit points and level

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

**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.*

General information (cont)

Core Skills

There may be opportunities to gather evidence towards Core Skills in *Communication*, *Information and Communication Technology (ICT)* and *Problem Solving* during the study of 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 within the subject area of the Group Award to which it contributes. This Unit is included in the framework for the HND *Coaching and Developing Sport*.

Assessment

Outcome 1 will be assessed through restricted response questions.

Outcome 2 will be assessed by an observation schedule.

Outcome 3 will be assessed by a report.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

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

Describe mechanical principles.

Knowledge and/or Skills

Mechanical Principles:

- ◆ force
- ◆ centre of gravity
- ◆ types of motion
- ◆ impulse
- ◆ momentum
- ◆ factors affecting pathways
- ◆ lever systems
- ◆ dynamics
- ◆ axis of rotation
- ◆ spin
- ◆ planes of the body

Evidence Requirements

To achieve this Outcome the candidate will require evidence to demonstrate their understanding of all aspects of the Knowledge and/or Skills section. The instrument of assessment will be restricted response questions. Assessment will be conducted under supervision.

Assessment Guidelines

The candidate will be required to produce satisfactory responses to all questions.

Higher National Unit specification: statement of standards (cont)

Unit title: Sports Mechanics

Outcome 2

Observe and identify biomechanical principles in a sporting performance.

Knowledge and/or Skills

- ◆ Observational skills:
 - what the body is doing?
 - how it is doing it?
 - when is the body doing it?
 - where is the body going?

- ◆ Phases of the performance

Evidence Requirements

To achieve this Outcome the candidate will be required to produce evidence to demonstrate their understanding of all aspects of the Knowledge and/or Skills section. Each candidate will be required to observe a sporting performance on DVD (or equivalent) and/or a live performance and analyse the biomechanical principles shown. Assessment will be done under supervision.

Assessment Guidelines

The candidate will be required to produce accurate analysis of the biomechanical principles, which have been observed on recorded media and/or a live performance.

Higher National Unit specification: statement of standards (cont)

Unit title: Sports Mechanics

Outcome 3

Analyse a sporting performance by use of observational skill and personal research.

Knowledge and/or Skills

- ◆ Observation:
 - preparation
 - action
 - recovery
 - quality of movement
- ◆ Research:
 - model performance
 - application of mechanical principles
- ◆ Development:
 - plan of action
 - performance monitoring

Evidence Requirements

A report based on recorded or live performance. The report will include research into model performance of the skill being analysed including details of the application of mechanical principles. The report will include an account of the performance observed describing the quality of movement and the areas requiring development. This will involve devising a suggested Plan of Action and schedule for performance monitoring. All aspects of the Knowledge and Skills section must be covered satisfactorily. The report will be in the region of 1,000 words plus annotated diagrams and references.

Assessment Guidelines

Candidates will produce a report to cover all above requirements. This report may prepare outwith the centre if wished and submitted for assessment. Centres will ensure the authenticity of work.

Higher National Unit specification: support notes

Unit title: Sports Mechanics

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

The Unit is likely to form part of a Group Award and is primarily designed to provide candidates with knowledge of the mechanical principles involved in sports performance, and subsequent analysis of the principles from Outcome 1 by means of an observation analysis schedule. As such candidates will benefit from studying relevant subject based Units prior to studying this Unit, such as HNC Units in *Anatomy, Physiology and Energy Systems* at SCQF level 7.

Higher National Unit specification: support notes (cont)

Unit title: Sports Mechanics

Outcome 1

Forces — Newton's Laws:

- ◆ inertia
- ◆ steady state and equal and opposite

Internal:

- ◆ muscular contraction
- ◆ summation of joint forces

External:

- ◆ gravity
- ◆ friction
- ◆ air resistance
- ◆ up thrust of ground
- ◆ point of application
- ◆ direction
- ◆ resultant action

Centre of gravity:

- ◆ position
- ◆ balancing point
- ◆ base of support

Types of motion:

- ◆ linear
- ◆ angular
- ◆ curvilinear
- ◆ projectile

Impulse:

- ◆ the time that a force works on an object

Lever system:

- ◆ 1st, 2nd and 3rd class

Momentum:

- ◆ mass v velocity

Factors affecting pathways:

- ◆ angle of release
- ◆ drag force
- ◆ lift force
- ◆ types of spin

Higher National Unit specification: support notes (cont)

Unit title: Sports Mechanics

Dynamics

- ◆ time
- ◆ weight
- ◆ space and flow

Axis of rotation:

- ◆ vertical
- ◆ sagittal
- ◆ linear

Planes of the body:

- ◆ frontal
- ◆ sagittal
- ◆ horizontal

Outcome 2

- ◆ Phases of the skill
 - preparation
 - action
 - recovery.
- ◆ Observational skills
 - what is the body doing
 - how is it doing it
 - when is it doing it and where is it doing it

Outcome 3

Model performance:

- ◆ the theoretically ideal performance, to allow the observer to make comparisons.
- ◆ the research of the Mechanical Principles demonstrated within this model performance
- ◆ recorded feedback on the observed performance including a description of recognised faults
- ◆ plan of action — prioritise skill development
- ◆ monitoring — goal setting — short term, medium term, long term

Note that the model performance need not be at an elite level but should be of an appropriate level and quality.

Guidance on the delivery and assessment of this Unit

Outcome 1

Assessment could be done immediately after delivery of the information, but the use of ongoing practical application will enhance students' understanding, and should, where possible be adopted on an ongoing basis.

Higher National Unit specification: support notes (cont)

Unit title: Sports Mechanics

Outcomes 2 and 3

This Outcome allows the candidate to observe the application of bio-mechanical principles in performance. It is likely that this would follow naturally after an initial study of the Outcome 1.

Candidates will be required to research model performance and produce a report. While candidates may have a shared experience for Outcome 2 and may have watched the same performance for Outcome 3, it is expected that research and submissions will be independent. Candidates may of course source their own material.

Open learning

Some parts of this Unit may be able to be delivered by this route although the need to carry out an analysis of performance may need direct support within the centre. This would not prevent an Open Learning route to be used if appropriate.

Opportunities for the use of 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 e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

Opportunities for developing Core Skills

Candidates are likely to have the opportunity to develop skills in *Communication* (oral, written and reading) during their study of the main principles. At a later stage, candidates are required to observe and analyse and this may well provide opportunities to develop skills in *Problem Solving* and in some cases, *Numeracy*. This may depend on the type of data and the use made of it.

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

History of changes to Unit

Version	Description of change	Date

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General information for candidates

Unit title: Sports Mechanics

This Unit introduces you to Biomechanics — the mechanical principles that govern all human movement. There will be reference to Knowledge and/or Skills gained from other Units in the HNC award.

The Unit will go on to develop your observation and analysis skills, to enable you to give appropriate feedback to enhance sporting performance.

On completion of this Unit you will be able to describe mechanical principles and the affect they have on sporting performance. This will be achieved by observation and analysis from video and live performance.

The Unit will be assessed by restricted response questions for Outcome 1, an observation schedule in Outcome 2, and a comprehensive report for Outcome 3.