# Unit 11: Sports Nutrition

**Unit code:** H/502/5640

**QCF Level 3:** BTEC National

**Credit value:** 10

**Guided learning hours:** 60

## Aim and purpose

The aim of this unit is to provide a broad understanding of the importance of nutrition and hydration to a variety of sports participants.

## Unit introduction

The importance of good nutrition and hydration in sports has grown in popularity in recent years. The significance of a healthy balanced diet and its links to good health and improved sports performance is now a key aspect of the sportsperson's lifestyle; whether they are an elite athlete preparing for World championships or Olympic events, a semi-professional competitor aiming to continue performing or amateur participants who just want to improve their chances of winning.

The demands of rigorous training and competition schedules can have negative effects on the health of every sports participant, but the individual's diet, linked to the recovery process, can have a considerable effect on performance.

Involving the sports performer in the planning of their diet can result in improved health benefits, as well as promoting adequate refuelling and hydration, leading to improved sporting performance. Any adjustment to the nutrition plan can also be linked to energy requirements and expenditure for a variety of different sports and events. The importance of this information should also be extended to other members of the sports team such as coaches, personal trainers and strength and conditioning personnel.

This unit is particularly relevant to those who aspire to work in coaching, fitness instruction, sports nutrition or elite sport.

The first part of the unit focuses on the concepts of nutrition and digestion, with learners exploring the physiology of the digestive system and how food is broken down and subsequently utilised by the body. Learners will then be introduced to the components of a balanced diet and common terms linked to nutritional requirements.

Learners will also explore energy intake and expenditure and how this can be measured in different ways for individual sports performers. Learners will also consider the availability, costs and accuracy of these measures and how relevant they are to the performer. Learners will identify the influencing factors directly linked to energy input and output, including gender, age, climate and physical activity.

The second part of the unit looks at hydration and diet for different sporting activities. Learners will investigate the sporting demands of performers and how nutritional requirements will vary for each individual. The inclusion of sports drinks, gels and traditional methods of hydration will be considered, alongside the activity levels and fitness levels of the individual. Finally, learners will be able to apply knowledge and understanding by producing a realistic diet and hydration plan for selected athletes or sports performers.

## Learning outcomes

**On completion of this unit a learner should:**

1 Know the concepts of nutrition and digestion

2 Know energy intake and expenditure in sports performance

3 Know the relationship between hydration and sports performance

4 Be able to plan a diet appropriate for a selected sports activity.

# Unit content

## 1 Know the concepts of nutrition and digestion

*Nutrition*: macronutrients (carbohydrates, proteins, fats); micronutrients (vitamins, minerals); fibre; nutritional requirements (essential and non-essential); common terminology (Recommended Daily Allowance, Optimum Level, Safe Intake, Estimated Average Requirements, standard abbreviations – RDA, SI, EAR)

*Digestion*: structure of digestive system (buccal cavity, oesophagus, stomach, duodenum, pancreas, liver, gall bladder, small intestine, large intestine, kidneys, digestive juices and enzymes); function of digestive system (digestion, absorption, excretion)

## 2 Know energy intake and expenditure in sports performance

*Energy*: measures (calories, joules, kilocalories, kilojoules); sources, eg fats, carbohydrates, proteins; measuring requirements, eg body composition, lean body mass, percentage body fat (skinfold analyses, bioelectrical impedance analysis, hydrodensitometry); body weight; calorimetry (direct, indirect)

*Energy balance*: basal metabolism; age; gender; climate; physical activity

## 3 Know the relationship between hydration and sports performance

*Hydration*: signs and symptoms (dehydration, hyperhydration, hypohydration, superhydration); fluid intake (pre-event, inter-event, post-event); sources, eg water, sports drinks (hypertonic, hypotonic, isotonic)

*Effects on sports performance*: eg frequency, intensity, duration, specificity, progression, recovery

## 4 Be able to plan a diet appropriate for a selected sports activity

*Diet*: balanced diet (carbohydrates, fats, proteins, water, fibre, vitamins, minerals)

*Activities*: eg aerobic, anaerobic, muscular strength and endurance, flexibility; timing, eg pre-season, mid-season, post-season, pre-event, inter-event, post-event

*Planning diets*: appropriate for selected activity; appropriate for selected sports performer; assessment of needs, eg weight gain, weight loss, muscle gain, fat gain, fat loss; nutrition (macronutrients, micronutrients, fibre); food groups (grains, vegetables, fruits, oils, dairy, meat); sources; availability

# Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | | |
|---|---|---|
| **To achieve a pass grade the evidence must show that the learner is able to:** | **To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:** | **To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:** |
| **P1** describe nutrition, including nutritional requirements using recommended guidelines from public health sources associated with nutrition | | |
| **P2** describe the structure and function of the digestive system in terms of digestion, absorption and excretion | | |
| **P3** describe energy intake and expenditure in sports performance | **M1** explain energy intake and expenditure in sports performance | |
| **P4** describe energy balance and its importance in relation to sports performance | **M2** explain the importance of energy balance in relation to sports performance | **D1** analyse the effects of energy balance on sports performance |
| **P5** describe hydration and its effects on sports performance | | |
| **P6** describe the components of a balanced diet | **M3** explain the components of a balanced diet | |
| **P7** plan an appropriate two-week diet plan for a selected sports performer for a selected sports activity. [SM2, SM3, CT2, CT5, CT6, RL4, RL6] | **M4** explain the two-week diet plan for a selected sports performer for a selected sports activity. | **D2** justify the two-week diet plan for a selected sports performer for a selected sports activity. |

**PLTS**: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

| Key | | | |
|---|---|---|---|
| | IE – independent enquirers | RL – reflective learners | SM – self-managers |
| | CT – creative thinkers | TW – team workers | EP – effective participators |

# Essential guidance for tutors

## Delivery

Tutors have the opportunity to use a wide range of techniques, including lectures, seminars, presentations, practical workshops, practical laboratory sessions, external trips, and guest speakers. Additional learning resources can include journals, nutritional software packages, videos, DVDs, case studies, learner presentations and group work.

Learners need to understand the complexity of dietary influences, not only in relation to different exercise conditions but also how the different nutritional needs and energy requirements of the sports performer can affect performance.

Tutors should emphasise that learners will not be qualified sports nutritionists after completing this unit, and should not give any sports performer dietary advice or make recommendations for supplements. However, learners will have some scope to evaluate dietary plans for sporting activities and recognise where they could be improved in general terms. In addition, they will be able to recognise and identify nutritional terminology.

This unit could include researching the diets of peers, designing a food plan pyramid, keeping a food diary log, and establishing how the diet may be better balanced, meeting nutritional, hydration and energy requirements.

The emphasis in this unit is on encouraging learners to utilise the theoretical aspects of energy requirements, meal planning and hydration and then to contextualise these points for a named sports performer. This will include considering factors such as age, gender, training schedules, competition requirements and specific body measurements, in order to devise a realistic plan. It may be appropriate that this dietary plan is delivered at a certain time and linked to a specific individual. Alternatively, it could be delivered in the format of a selection of case studies, from which only one is selected by each learner. This delivery could include devising dietary plans and information leaflets to give to performers on replenishing fluids and food; presentation in a logbook format could be considered.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

| Topic and suggested assignments/activities and/assessment |
|---|
| Introduction and overview of the unit. |
| **Assignment 1: Digestion and Absorption (P1, P2)**. Tutor introduces the assignment brief. |
| The digestive system – structure and functions: digestion, absorption and excretion. Tutor-led delivery and small group research. |
| Nutritional terminology and food sources: learner research in pairs and group feedback. |
| Balanced diet – how diets may differ. Tutor-led session designing a food plan pyramid. Small group research: balance of good health and group feedback. |
| **Assignment 2: Balancing Energy – Intake and Expenditure (P3, M1, P4, M2, D1)**. Tutor introduces the assignment brief. |
| Investigating different sources of energy for fuel and how this can be measured. Tutor-led session. Research in pairs and presentation of findings to the group. |
| Laboratory testing of practical measures (anthropometric) of energy intake and expenditure – work in pairs. Feedback to the group comparing different methods and accuracy of results. |
| **Assignment 3: Hydration and the Sports Performer (P5)**. Tutor introduces the assignment brief. |
| The effects of hydration on the body – signs and symptoms. Tutor-led discussion and individual learner research activity. |
| Exercise types and fluid balance: tutor-led discussion and learner research in pairs. Group discussion of findings. |
| Sports drinks research: small group research – presentation to group of different drinks. Production of a poster on hydration and sports activities. |
| **Assignment 4: A Balanced Diet (P6, M3)**. Tutor introduces the assignment brief. |
| Balanced diets for athletes and sports performers. Small group research – devising a food diary log. Individual completion of a food log, analysis of completed food logs. |
| **Assignment 5: The Diet Plan (P7, M4, D2)**. Tutor introduces the assignment brief. |
| Nutrition for different sporting activities – small group work researching energy intake and expenditure, comparing two different performers. Feedback and presentation to the group. |
| Planning diets – small-group work devising breakfast, lunches, dinners, refuelling snacks and hydration requirements. Producing a sample two-week diet plan and menu linked to a selected sports performer. |
| Review of unit and assessment. |

## Assessment

Assessment strategies should focus on linking theoretical understanding to practical application.

For P1, learners must be able to describe nutrition and nutritional requirements using common terminology associated with nutrition and guidelines available from recommended public health sources. Learners must be familiar with the guidelines available from recommended public health sources. For P2, learners must be able to describe the structure and function of the digestive system and be familiar with the enzymes that break down specific food sources. There should be a clear link to the process of absorption and excretion of digested foodstuffs.

Criteria P3 and P4 focus on the energy balance required from different body measurements and sporting activities. Although not all the practical resources may be available, external visits to Universities or local health clubs could be incorporated as part of the assignment where more specialised equipment is required. Alternatively, simple methods of measuring energy output could be utilised such as the use of pedometers, skinfold calipers, protocol charts or pre-published questionnaires, the results of which can be linked to learners' laboratory reports.

For P5, the emphasis is placed on knowing the relevance of hydration and how it may impact on sports performance. Assessment could be in the form of a poster linked to sports performance. The digestion of fluids could be linked back to P2 (the digestive process), and also to P3 and P4 in relation to energy balance and performance within the principles of training. For P6, learners need to describe the components of a healthy balanced diet. For P7, learners need to produce an appropriate two-week diet plan for a selected sports performer for a specific sports activity. This should also include relevant hydration. Examples could be provided by a selection of pre-determined case studies at given timescales of the training programme, or a sports performer or athlete known to the learner. Learners must be able to focus on the description of a balanced diet, giving specific examples of food sources of both macro and micronutrients whilst utilising information from food labels.

For M1 and M2, learners should provide an explanation of energy intake and expenditure and explain the importance of energy balance in relation to sports performance. Grading criterion M3 links to P6, and to meet this learners should explain the components of a healthy balanced diet.

The status of the performer (amateur, semi-professional, professional or elite) should have significant bearing on the dietary plan, and this needs to be carefully considered, in particular for M4, which requires an explanation of the plan.

Criterion D1 builds on P4 and M2 and requires learners to analyse the effects and importance of energy balance for sports performance. In their analysis, learners will need to identify the factors which contribute to energy balance and assess their effects on sports performance. Practical examples should be provided where appropriate to support the analysis.

Grading criterion D2 builds on P7 and M4, and learners need to justify the two-week diet plan they have prepared. This means learners will need to provide reasons and/or evidence to support why they designed the plan in the way they did. The two-week dietary plan can be presented in any format, as an ongoing logbook or a portfolio of evidence.

## Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

| Criteria covered | Assignment title | Scenario | Assessment method |
|---|---|---|---|
| P1, P2 | Digestion and Absorption | You take sports training very seriously and your coach has asked you to improve your knowledge of nutrition. You start by researching the digestive system and terminology. | Presentation.<br>Witness statement. |
| P3, P4, M1, M2, D1 | Balancing Energy – Intake and Expenditure | Next, you decide to practically explore different methods of energy intake and expenditure, including anthropometric measures. | Laboratory report. |
| P5 | Hydration and the Sports Performer | Hydration will be extremely important to your sports performance. Research different commercial sports drinks. | Poster. |
| P6, M3 | A Balanced Diet | You decide to look carefully at the diet of a selected sports performer. Research, design, and administer a food log. | Food log. |
| P7, M4, D2 | The Diet Plan | Having improved your subject knowledge you use this, together with information from the food log, to devise a two-week diet for a selected sports performer. | Written diet plan and logbook. |

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Sport sector suite and the BTEC Sport and Exercise Sciences sector suite. This unit has particular links with the following unit titles in the BTEC Sport suite and the BTEC Sport and Exercise Sciences suite:

| Level 2 Sport | Level 3 Sport | Level 3 Sport and Exercise Sciences |
|---|---|---|
| Anatomy and Physiology for Sport | Principles of Anatomy and Physiology in Sport | Anatomy for Sport and Exercise |
| Fitness Testing and Training | Fitness Training and Programming | Fitness Testing for Sport and Exercise |
| Development of Personal Fitness | Fitness Testing for Sport and Exercise | Practical Individual Sports |
| Lifestyle and the Sports Performer | Practical Individual Sports | Exercise, Health and Lifestyle |
| Exercise and Fitness Instruction | Exercise, Health and Lifestyle | Applied Sport and Exercise Physiology |
| Effects of Exercise on the Body Systems | Psychology for Sports Performance | Research Investigation in Sport and Exercise Sciences |
| | The Physiology of Fitness | Laboratory and Experimental Methods in Sport and Exercise Sciences |
| | Research Investigation in Sport and Exercise Sciences | Sport and Exercise Physiology |
| | Laboratory and Experimental Methods in Sport and Exercise Sciences | |

This unit links with the National Occupational Standards (NOS) for:

- Achieving Excellence in Sports Performance at Level 3
- Coaching, Teaching and Instructing at Level 3
- Instructing Physical Activity and Exercise at Level 3.

## Essential resources

Learners need to have access to a wide variety of research materials including texts, journals, and the internet. Additional resources can include access to laboratories and nutrition-based IT software.

## Employer engagement and vocational contexts

This unit focuses on the theory and practical aspects of nutrition linked directly to sports performance. The unit will provide learners with the background knowledge and skills needed to work in a fitness suite, leisure centre or sports club. Centres are encouraged to develop links with local health education professionals, local sports clubs and local shops. This could be via inviting guest speakers to the centre, or by conducting visits to supermarkets, or health centres.

## Indicative reading for learners

### Textbooks


Adams M et al – *BTEC Level 3 National Sport (Performance and Excellence) Student Book* (Pearson, 2010) ISBN 9781846906510

Adams M et al – *BTEC Level 3 National Sport Teaching Resource Pack* (Pearson, 2010) ISBN 9781846906541

Bean A – *Sports Supplements* (A&C Black, 2007) ISBN 9780713682595

Burke L – *Practical Sports Nutrition* (Human Kinetics, 2007) ISBN 9780736046954

Food Standards Committee – *Manual of Nutrition* (Stationery Office Books, 2008) ISBN 9780112431169

Griffin J – *Food for Sport: Eat Well, Perform Better* (Crowood, 2001) ISBN 9781861262165

Karinch M – *Diets Designed for Athletes* (Human Kinetics, 2001) ISBN 9780736038348

Larson-Meyer D E – *Vegetarian Sports Nutrition* (Human Kinetics, 2006) ISBN 9780736063616

Manore M et al – *Sport Nutrition for Health and Performance* (Human Kinetics, 2000) ISBN 9780873229395

McArdle W et al – *Sports and Exercise Nutrition* (Lippincott, Williams and Wilkins, 2005) ISBN 9780781749930

Rinzler C A – *Nutrition for Dummies, 4th Edition* (Wiley, 2006) ISBN 9780471798682


### Journals


*British Journal of Nutrition*

*British Medical Journal*

*International Journal of Sports Nutrition*

*Journal of Nutrition*

*Journal of Sports nutrition*


### Websites

| | |
|---|---|
| British Association of Sport and Exercise Sciences | www.bases.org.uk |
| British Nutrition Foundation | www.nutrition-org.uk |
| Food Standards Agency | www.foodstandards.gov.uk |
| Institute of Food Research | www.ifrn.bbsrc.ac.uk |

## Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

| Skill | When learners are ... |
|---|---|
| **Creative thinkers** | planning an appropriate two-week diet plan for a selected sports performer for a selected sports activity |
| **Reflective learners** | planning an appropriate two-week diet plan for a selected sports performer for a selected sports activity |
| **Self-managers** | planning an appropriate two-week diet plan for a selected sports performer for a selected sports activity. |

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

| Skill | When learners are ... |
|---|---|
| **Independent enquirers** | researching the process of digestion and absorption and how energy is utilised and distributed from different food sources. |

## Functional Skills – Level 2

| Skill | When learners are ... |
|---|---|
| **ICT – Use ICT systems** | |
| Select, interact with and use ICT systems independently for a complex task to meet a variety of needs | researching the components of a balanced diet<br>researching hydration and its effects on sports performance<br>researching energy balance and its importance in relation to sports performance |
| Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used | planning a two-week diet plan for a selected sports performer for a selected sports activity |
| Manage information storage to enable efficient retrieval | recording personal details and anthropometric data<br>recording details of the food log |
| Follow and understand the need for safety and security practices | recording personal details and anthropometric data |
| **ICT – Find and select information** | |
| Select and use a variety of sources of information independently for a complex task | researching the components of a balanced diet |
| Access, search for, select and use ICT-based information and evaluate its fitness for purpose | preparing a laboratory report<br>preparing a food log |
| **ICT – Develop, present and communicate information** | |
| Enter, develop and format information independently to suit its meaning and purpose including:<br>• text and tables<br>• images<br>• numbers<br>• records | researching the components of a balanced diet<br>researching hydration and its effects on sports performance<br>researching energy balance and its importance in relation to sports performance |
| Bring together information to suit content and purpose | interpreting the completed food log |
| Present information in ways that are fit for purpose and audience | designing a food log<br>designing a hydration poster<br>producing a laboratory report for anthropometric measures and energy expenditure |
| Evaluate the selection and use of ICT tools and facilities used to present information | interpreting the data from anthropometric measures<br>interpreting the food log |

| Skill | When learners are ... |
|---|---|
| **Mathematics** | |
| Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations | accurately recording details of anthropometric measures<br>accurately recording details of the food log |
| Select and apply a range of skills to find solutions | interpreting the food log |
| Interpret and communicate solutions to practical problems in familiar and unfamiliar routine contexts and situations | devising and using food logs |
| Draw conclusions and provide mathematical justifications | interpreting the data from anthropometric measures<br>interpreting the food log<br>interpreting energy balance and its importance in relation to sports performance |
| **English** | |
| Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts | discussing the different methods of hydration<br>discussing food terminology and food sources |
| Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions | interpreting the data from anthropometric measures<br>interpreting the food log<br>interpreting energy balance and its importance in relation to sports performance |
| Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively | accurately recording the details of the anthropometric measures<br>accurately recording the details of the food log. |