CAMBRIDGE NATIONAL

LEVEL 1/LEVEL 2

SPORT SCIENCE

SECOND EDITION

J828

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Contents

How to use this book

This textbook contains all four units for Cambridge National Level 1/2 in Sport Science.

These are:

- Unit R180 Reducing the risk of sports injuries and dealing with common medical conditions
- Unit R181 Applying the principles of training: fitness and how it affects skill performance
- Unit R182 The body's response to physical activity and how technology informs this
- Unit R183 Nutrition and sports performance

Each unit is then divided into topic areas from the specification. Each unit opener will help you to understand what is covered in the unit, the list of topic areas covered, and what you will be assessed on, fully matched to the requirements of the specification. All of the learning content for each learning outcome is covered in the book.

Key features of the book

Topic areas
The topic areas are clearly stated so you know exactly what is covered.

How will I be assessed?
Assessment methods are clearly listed and fully mapped to the specification.

Getting started
Short activities to introduce you to the topic.

Key terms
Definitions to help you understand important terms.

Case study
See how concepts can be applied to real-life scenarios.

Activities
Short tasks to help you understand an idea or assessment criteria. These include group and research tasks.

Test your knowledge
Questions and quick tasks to test your knowledge and understanding of each learning outcome. Answers are provided online at: **hoddereducation.co.uk/cambridge-nationals-2022/answers**

Research
Links and suggestions for further research into the subject.

Synoptic links
Links to relevant details in other parts of the book so you can see how topics link together.

Read about it
Includes references to websites and other sources for further reading and research.

Practice questions
This feature appears in Unit R180 where you will be assessed by an exam. Mark schemes and example answers are provided online at: **hoddereducation.co.uk/cambridge-nationals-2022/answers**

Assignment practice
This feature appears in units R181, R182 and R183 and will help you prepare for non-examined assessment with model assignments.

How will I be assessed?

Unit R180 is a mandatory examined unit. Your teacher may enter you for the exam in January and/or June. This unit must be taken as the terminal assessment at the end of your course of study. There will be 48 guided-learning hours and you will be assessed through a one-hour and 15-minute written exam, which is set and marked by OCR. It has two sections:

- Section A has 25 marks and is made up of multiple-choice questions and a number of short- to medium-response questions.
- Section B has 45 marks made up of context-based questions, short- to medium-response questions, extended-response analysis and evaluation questions.

The exam is out of 70 marks in total and is worth 40 per cent of your overall mark. During the external assessment, you will be expected to demonstrate your knowledge and understanding of this unit through questions that require the skills of analysis and evaluation in particular contexts. As you study this unit, you will need to make comprehensive notes and use the internet as a resource. Copies of past paper exams and mark schemes will be beneficial to your studying.

For **Topic Area 1**, you need to:

- know and understand the extrinsic factors that can influence the risk and severity of injury
- know and understand the intrinsic factors that can influence the risk and severity of injury
- compare and contrast the risk and severity of injuries from different extrinsic and intrinsic factors.

For **Topic Area 2**, you need to:

- know and understand the key components of a warm up
- know and understand the physiological and psychological benefits of a warm up
- be able to compare and contrast warm up components and their benefits to the cardio-respiratory and musculo-skeletal systems, including the possible negative effects if no warm up is performed
- know and understand the key components of a cool down
- know and understand the physiological benefits of a cool down
- be able to compare and contrast cool down components and their benefits to the cardio-respiratory and musculo-skeletal systems, including the possible negative effects if no cool down is performed.

For **Topic Area 3**, you need to:

- know and understand the difference between acute and chronic injuries
- know and understand the common types of acute sports injuries
- know and understand the causes, symptoms and treatments of each acute injury and ways of reducing risk of acute injuries, including examples of different body parts that are susceptible to acute injuries
- be able to compare and contrast causes, symptoms and treatments of each acute injury
- know and understand the common types of chronic sports injuries
- know and understand the causes, symptoms and treatments of each chronic injury and ways of reducing risk of chronic injuries
- be able to compare and contrast causes, symptoms and treatment of each named chronic injury.

For **Topic Area 4**, you need to:

- know and understand the measures and responses that can be taken before and during participation in sport or physical activity to reduce the risk and severity of injury/medical conditions
- know and understand appropriate responses and treatment to injuries and medical conditions in a sporting context
- know the advantages and disadvantages of using different types of responses and treatment for different injuries/medical conditions
- know the different times when such responses and treatments can be used.

For **Topic Area 5**, you need to:

- know and understand the causes, common symptoms and treatments of asthma, diabetes and epilepsy
- know and understand the causes, common symptoms and treatments of sudden cardiac arrest (SCA)
- know and understand the causes, common symptoms and treatments of medical conditions such as hypothermia, heat exhaustion and dehydration
- be able to compare and contrast causes, common symptoms (as listed in the relevant NHS guidance) and treatments of different medical conditions.

Topic Area 1 Different factors which influence the risk and severity of injury

Getting started

Many factors can cause injury in sport. Working with a partner, one of you should choose a sport and both of you discuss and list some of the factors that could cause injury in that sport. When you have completed that task, the second learner should choose a completely different sport and repeat the discussion by listing some of the factors that could cause injury in that sport.

While serious injuries are, thankfully, rare in physical activities, minor injuries are relatively common. Different injuries may be caused by **extrinsic factors**, which are from outside of the body, or **intrinsic factors**, which come from within the body.

1.1 Extrinsic factors

Extrinsic factors are those where the factor or risk of injury come from outside the body. They include the type of sporting activity undertaken, the type of coaching/supervision provided, the environment in which the activity takes place, and the equipment involved.

1.1.1 Types of sports activity

Some sports and activities are more dangerous than others and, therefore, more likely to involve injuries. The type and severity of injuries that occur also differs depending on the type of activity. For example, rugby is more dangerous than swimming; you are more likely to get injured playing rugby than you are going for a swim, and you will probably suffer different types of injuries from playing rugby than you might get from swimming.

Some sports emphasise or actually require physical contact with other performers. These are known as **contact sports**.

Key terms

Extrinsic factors Where the factor or risk of injury comes from outside the body.

Intrinsic factors Where the factor or risk of injury comes from within the body.

Contact sports Sports where physical contact between performers is an accepted part of play.

Synoptic links

Further information on different types and causes of sports injuries can be found in this unit in Topic Area 3 Different types and causes of sports injuries, sections 3.1 Acute injuries and 3.2 Chronic injuries.

Sports such as amateur boxing are won or lost according to the level of physical contact the performer has with an opponent. Other sports, such as rugby, hockey and football, require tackling of opposition players. These sports are often known as full-contact sports, as the sport cannot be undertaken without contact. Other sports, such as basketball and netball, have contact but such contacts are against the rules of the game or are accidental and do not form part of the sport.

Contact in a contact sport can also include impact with a piece of sporting equipment. In sports such as hockey or cricket, injuries can be caused by being struck by a hockey stick or a cricket ball.

Non-contact sports are those where performers should have no possible means of coming into contact with other performers, for example swimming and gymnastics, where performers use separate lanes or take turns to perform. Some sports, such as cycling, may involve racing in a group with other competitors. This can often result in brushing against and bumping into other competitors; cyclists try to avoid contact, however, as it leads to crashes and injuries.

Involvement in contact sports, such as football, makes it more likely that an injury will occur than taking part in non-contact sports, such as swimming.

Some sports involve repeating the same movement over and over again. This can also lead to injury because the same part of the body is being used again and again. For example, the repetitive actions of throwing a javelin and bowling in cricket place severe strains on the performer's arm and shoulder, which can lead to injuries.

Figure 1.1 Rugby is a contact sport

Figure 1.2 Swimming is a non-contact sport

Figure 1.3 Repetitive movements may lead to injuries

Research

Read more about the causes of sports injuries at:

www.health24.com/Medical/Sports-injuries/Overview/causes-of-sports-injuries-20160329

https://medbroadcast.com/condition/getcondition/sports-injuries

1.1.2 Coaching/Instructing/Leading

Coaching is an extrinsic factor that can affect the types of injuries that occur to those involved in sport and physical activity.

Coaches must have the ability to pass on the correct information to those they are instructing. If a coach has poor coaching techniques, or a lack of knowledge of the correct techniques, they may teach those incorrect techniques to a performer, increasing their risk of injury. For example, a performer could easily suffer an injury to their head or neck if they were shown the wrong technique for a back drop on the trampoline.

Key term

Non-contact sports
Sports where participants compete alternately, or are physically separated, or the rules detail no contact.

Knowledge of techniques/rules/regulations

Similarly, if a performer is using the wrong technique for landing at each stage of a triple jump and the coach is unable to recognise the use of incorrect technique, this could lead to an ankle injury due to the uneven landing.

In much the same way, a coach may allow performers to practise activities without detailed knowledge of the techniques, rules and regulations of the sport, which may lead to injuries. For example, canoeists should wear helmets, but if the coach allows practices to take place without the performers wearing helmets, the possibility of injury is increased.

The coach may not know the rules of the sport or be unable to explain the rules and regulations of a sport properly, which may lead to injury. For example, they may be unable to explain the rules about tackling from behind in football, which may lead to bad tackles and possible injury.

The rules and regulations of sports are designed to help prevent injuries. For example, there are rules about:

- the number of players allowed on a pitch or court to stop overcrowding and injuries occurring due to people bumping into each other
- foul and dangerous play, such as a late tackle in rugby
- the misuse of equipment, such as lifting the stick high in hockey
- protective equipment that must be worn in some sports, for example wearing gum shields to protect teeth in boxing, or wearing shin pads to prevent bruising and fractures to the lower leg in football
- age groups, for example in rugby to ensure that children play against other children of a similar age group and, therefore, physique
- safe use of equipment and apparatus, for example the correct way to remove or add weight discs to a barbell when lifting weights.

Experience

The more experience a coach has, the more likely they are to have the necessary knowledge of appropriate coaching techniques and be able to describe those techniques to the performer.

Communication skills

Poor or ineffective communication skills may lead to injury. A coach who cannot explain accurately what is required, may allow dangerous situations to develop. For example, a performer could easily suffer a head or neck injury if the coach's explanation of how to tackle properly in rugby was not clear.

Group activity

In small groups, choose one contact sport and one non-contact sport and compare the types of injuries that may occur in each sport.

Figure 1.4 Inappropriate coaching can be a cause of extrinsic injuries

Synoptic links

Further information on warm up/cool down routines can be found in this unit in Topic Area 2 Warm up and cool down routines.

Supervision

There are also rules and regulations related to the supervision of certain sports. An example is lifeguards at swimming events; similarly, there must be **spotters** present around a trampoline while it is in use.

Proper supervision allows coaches to better understand the individual needs and abilities of their performers, which will ensure safe, age-appropriate activities for the participants. As levels of sports participation increase, it becomes even more important for coaches to adopt strict supervision of their performers in every situation.

Supervision of participants includes:

- 'keeping an eye' on performers before and after practice sessions while everyone is waiting to arrive or leave
- observing the development of their performers as they progress from a beginner to a more expert level
- supervising the performance of the various sport-related activities during training, practices and competitions.

Regardless of the reason for supervision, at any given time, the safety of the performers must be the constant priority of the coach in charge. If performers are left unattended, for example, before or after a practice or game, when the participants are not restricted to a pitch or court with walls and fences, the possible danger to the safety of the performers is increased because there are so many possible causes of harm, from general playing around to the misuse of equipment. It is the coach's responsibility to supervise participants properly and keep them safe. There needs to be an adequate number of coaches and staff members present and alert at all times.

Key term

Spotters Suitably sized and trained non-performers who are positioned around equipment, such as a trampoline or weights, to assist performers who may fall or be hurt by the equipment.

Ethical standards/behaviour

Sports coaches are expected to conform to ethical standards/behaviour in several areas, even though coaching is not a regulated, licensed profession.

Coaches must treat everyone fairly and sensitively within the context of their activity and ability, regardless of their gender, ethnic origin, cultural background, sexual orientation, religion or political affiliation.

Coaches will form relationships with the participants, but the coach is responsible for setting and monitoring the boundaries between a working relationship and friendship with their performers. This is most important when a performer is a young person.

Where physical contact between coach and performer is a necessary part of the coaching process, for example providing support during a gymnastics move, coaches must ensure that no action on their part could be misinterpreted and that National Governing Body (NGB) guidelines are followed.

Figure 1.5 Coach supporting a gymnast

Coaches should make clear to performers the degree of commitment expected of the performer and from the coach. For example, a swimming coach should make it clear how often and for how long the performer is expected to attend training sessions.

Coaches must not encourage performers to break the rules of their sport. They should actively discourage such actions and encourage performers to obey the spirit of the rules. For example, coaches should encourage their players to indicate to the officials if an opposition player gets injured, rather than play on. Coaches must never encourage the use of banned performance enhancing substances.

Coaches must display high personal standards and project a favourable image of themselves and their sport to everybody they come into contact with.

As far as possible, coaches have a responsibility to ensure the performers' safety by taking all reasonable steps to establish a safe working environment. This will involve making sure that the activity undertaken is suitable for the age, physical and emotional maturity, experience and ability of the performers.

Coaches must encourage their performers to treat opponents with the respect they deserve, both in victory and defeat. A key role of the coach is to prepare performers to respond to success and failure in a dignified manner.

Coaches must accept responsibility for their performers' conduct and discourage inappropriate behaviour in training, competition and away from the sporting arena.

How each sporting activity is done should be in keeping with the approved practice as determined by the NGB and be within the competency of the coach. For example, a swimming coach should not think that because they are in a swimming pool they can start coaching life-saving without specific training.

1.1.3 Environment

The environment can increase the likelihood of injuries occurring. Playing surfaces can become dangerous due to the weather and temperature conditions, as well as a number of other reasons.

The presence of various objects on the playing surface, such as litter, glass, debris, animal faeces or wet leaves, can result in cuts, injuries or illness. The environment surrounding the playing area should also be checked, because objects such as trees, fences and advertising banners could potentially cause injury if performers collide with them. Similarly, items such as goal posts, corner posts and other equipment integral to the activity need to be checked to make sure they are secure, in good working order and, if necessary, covered to ensure safety. For example, if rugby posts are not

Synoptic links

Further information on psychological factors can be found in this unit in Topic Area 1 Different factors which influence the risk and severity of injury, sections 1.2.2 Psychological factors and 1.2.3 Reasons for aggression.

Figure 1.6 Poor weather can increase the risk of injury

padded, a player could easily run into a post and suffer a serious head injury. Similarly, the possibility of a discus leaving the hand of a thrower and causing injury will be reduced if there is netting to stop that happening.

Weather/temperature conditions

The weather and temperature can have a major impact on playing conditions, especially in outdoor sports. Poor playing conditions can increase the potential for injuries. For example, rain can make playing surfaces slippery in games such as hockey and football, leading to less control of players' movements and more likelihood of collisions and injuries.

In cold weather playing surfaces become harder or frozen, increasing the risk of injuries from falling. Very cold weather also increases the risk of **hypothermia**.

If it is hot, the playing surface may again become hard, but there is the added problem of sun burn, **dehydration**, and **heat exhaustion**.

Figure 1.7 Weather conditions can affect playing surfaces

Key terms

Hypothermia A dangerous drop in body temperature below 35°C.

Dehydration Harmful reduction in the amount of water in the body.

Heat exhaustion Fatigue and collapse resulting from prolonged exposure to excessive or unaccustomed heat.

Synoptic links

Further information on hypothermia can be found in this unit in Topic Area 5 Causes, symptoms and treatment of medical conditions, section 5.5.1 Overview of hypothermia.

If the weather is windy, or if there are gales, sports such as sailing, windsurfing and rock climbing become more dangerous. The occurrence of lightning endangers the personal safety of all performers.

The weather may make it necessary for performers to change their style of play, which may lead them to make unusual movements and create further risk of injury.

Playing surfaces (natural and artificial) and surrounding area

Sometimes because of the weather, but also due to other reasons, playing surfaces and/or the surrounding areas may become slippery and performers may slip or fall. For example, water or a damp patch in or around a badminton court can cause injury as the performers may slip on it and hurt their ankles.

Synoptic links

Information on the importance of wearing the right footwear can be found in this unit in Topic Area 1 Different factors which influence the risk and severity of injury, section 1.1.4 Equipment.

Synoptic links

Further information on heat exhaustion, heat stroke and dehydration can be found in this unit in Topic Area 5 Causes, symptoms and treatment of medical conditions, sections 5.5.5 Overview of heat exhaustion and 5.5.9 Overview of dehydration.

Many playing surfaces, courts or pitches are surrounded by fences, barriers and advertising boards, which can cause injury if performers collide with them. In sports such as basketball or volleyball, it is quite common for the substitutes to be sat on benches close to the playing area, offering another potential cause of injury through collisions.

Similarly, the presence of foreign objects on the playing surface or the surrounding area, such as litter, glass, wet leaves, stones or other sharp objects, can cause injuries, either through slipping on them or colliding with them.

Human interaction

Sports are competitive – performers play against the opposition – and many sports involve the presence of teammates. In other words, there is human interaction, which increases the risk of injury.

Other performers/participants

Other performers are potentially injury-causing. For example, in netball participants may accidentally run into each other, commit a contact foul against another player, may not be fully aware of the rules regarding contact, or the players may be of different abilities, ages or gender so there is an imbalance and the prospect of collisions.

Performers should be checked to make sure they are wearing suitable clothing and/or footwear. Jewellery should be removed and/or covered up and protected. Long hair may need to be tied back for some activities to prevent the hair being pulled, while fingernail length needs to be checked in sports such as netball to prevent scratches.

In activities such as fitness sessions, the performers should be checked to make sure that those taking part are fit enough to perform at the required level, and that the instructor is made aware of any previous injuries or health issues.

Officials

One of the most important interactions that sports participants have are with the officials. The referees, umpires and judges not only control the match/game, but they must also ensure the safety of participants throughout the activity.

Before the activity begins, the officials should inspect the playing area for any potential problems, such as foreign objects and pitch-side obstructions, as described above.

During the activity, officials need to be vigilant that nothing has occurred that may lead to an injury. For example, during a time out in basketball or volleyball, drinks may be spilled, which could leave the court slippery and potentially dangerous for the performers. In rugby, the post protectors could be loosened through contact and become inefficient at protecting players.

Test your knowledge

1 Describe **three** ways that coaching can influence the risk of injury to a sports performer.
2 Explain how different playing surfaces may affect the type of footwear being worn by performers.

Synoptic links

Further information on different types and causes of sports injuries can be found in this unit in Topic Area 3 Different types and causes of sports injuries, sections 3.1 Acute injuries and 3.2 Chronic injuries.

The officials are responsible for ensuring that the activity proceeds within the rules and regulations of the activity in order to minimise the risk of injury. Should an injury occur, it is the official's responsibility to stop play and ensure the safety of the injured performer. For example, in rugby, head injuries such as concussion are possible from tackles and the referee needs to make sure that performers who have suffered a potential concussion do not continue to play.

Spectators

In many activities, the number of spectators is relatively few, but these few spectators are often able to interact with the performers. In many sports, the close proximity of spectators can be a potential safety risk to performers. For example, in basketball and netball, players who are sprinting after a ball travelling out of play can easily become involved in collisions with seated or standing spectators.

The presence of spectators can sometimes affect the levels of arousal of performers and increase their aggression, which makes them more likely to commit fouls and increases the risk of injury.

In football, spectator hooliganism can occasionally lead to players having objects thrown at them, pitch invasions by spectators and potential physical assaults.

1.1.4 Equipment

Many sports involve the use of equipment that is designed to improve performance but can also lead to injury if not used appropriately or looked after properly.

Protective equipment

Performers often use specially designed protective equipment to help prevent injuries. For example, in sports like hockey and football performers are required by the rules of the game to wear shin pads to prevent injuries to the lower leg. In cricket, when batting and keeping wicket, players wear a much larger form of pad to protect their legs from injury.

Other examples of protective equipment include helmets in skiing and cycling, gum shields in boxing and rugby, shoulder pads in rugby and lacrosse and knee pads in volleyball and mountain biking. Not wearing the appropriate protective equipment or wearing worn-out or ill-fitting protective equipment is another potential cause of injury.

The protective equipment is often a form of padding around potentially dangerous objects that are part of the sport. For example, in rugby and volleyball the posts are heavily padded to prevent collision injuries. In indoor athletics, the ends of the 60 m sprint lanes have protective barriers. In sports such as gymnastics, participants perform on mats to protect them from injuries.

Synoptic links

Further information on safety checks can be found in this unit in Topic Area 4 Reducing risk, treatment and rehabilitation of sports injuries and medical conditions, section 4.1.1 Safety checks.

Figure 1.8 Spectators are close to the action during basketball matches

Synoptic links

Further information on psychology and aggression can be found in this unit in Topic Area 1 Different factors which influence the risk and severity of injury, sections 1.2.2 Psychological factors and 1.2.3 Reasons for aggression.

Figure 1.9 Gymnastics uses protective equipment

Performance equipment

In many sports, performers make use of equipment that is designed to improve performance, but also has the potential to cause injury. For example, lacrosse and hockey players use sticks, cricketers and lacrosse players throw a hard ball, and rock climbers and trampolinists may make use of a harness.

Clothing

Wearing inappropriate clothing could cause injury through catching or snagging on the equipment of other performers, or because movements become restricted. Some activities require specialist clothing that reduces the risk of injury. In triathlon, performers usually wear wetsuits during the swim to protect against the cold water, then remove them to cycle and run in a triathlon suit.

Figure 1.10 Triathletes wear different clothing for the different stages of the event

Footwear

Performers need to wear suitable footwear for the sport they are playing and the surface they are playing on. Some sports are played on several different surfaces; grass, artificial grass and indoor carpet tennis courts and football pitches may require the use of different indoor and outdoor footwear, for example. Changes in weather conditions will often mean a change in the type of footwear worn to prevent injury.

In many sports it is important to wear footwear that is suitable for that particular sport and the circumstances in which the sport is played. For example, football and rugby players wear different types of boots or studs depending on the state of the surface on which they are playing, in order to have control of their movements to prevent injury. Athletes wear spikes when sprinting; basketball players wear high-ankle boots for protection. Inappropriate footwear could result in injury through slipping, through not fitting properly or through contact with other people's studs or spikes.

Group activity

In small groups, choose **three** diverse sports and research the equipment required for each of them to help prevent injury.

Activity

For each piece of equipment identified in the group activity, explain what type of injury the equipment might prevent and why you think this.

Activity

As a class, use the list identified in the Getting started activity and add any extrinsic factors that may need to be considered to help prevent injury.

Group activities

1 Working in small groups, select a sport and create a poster that identifies the different types of extrinsic factors that can cause injury in that sport.
2 Add information to the poster that offers advice on how to reduce these extrinsic risks.

Test your knowledge

1 Explain how officials may affect behaviour of performers.
2 Describe **three** ways that the environment can influence the risk of injury to a sports performer.
3 Describe **two** ways, other than the environment and officials, that extrinsic factors can influence the risk of injury to sports performers.

1.2 Intrinsic factors

Intrinsic factors are those where the factor or risk of injury comes from within your own body. They include any individual variables between performers in terms of gender, age or experience; the physical preparation for the activity in terms of fitness, technique and nutrition; and mental preparation in terms of sleep, medical conditions and recurring injuries. Psychological factors should also be considered, such as motivation, arousal, confidence and aggression.

1.2.1 Individual variables

All people are different and have individual variables, which means that what suits one performer may not suit another.

Gender

One obvious individual variable is gender. Approaches that may be suitable for male performers may not be suitable for female performers, and vice versa. Trying to perform skills and techniques that are best suited to a different gender may lead to injury. For example, men tend to be physically stronger than women, so women should not be expected to lift the same amount of weight as men. Similarly, women tend to be more flexible than men, therefore men should be wary of attempting to produce the same range of movements as women.

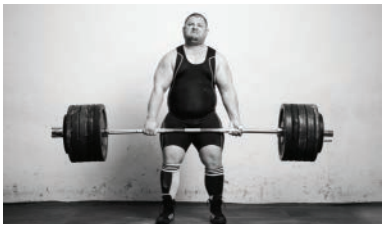

Figure 1.11 Men tend to be able to lift heavier weights than women

Figure 1.12 Women tend to be more flexible than men

Age

Another individual variable is age. In general, older adults are not as strong as younger adults. Similarly, children are not as strong as adults. There is a risk of injury if older adults and children attempt the same strength exercises as young adults. In team games, for example, children should practise and play with performers in the same age category. Young adults should play with other young adults, and older performers, often called **veterans** or **vets**, should play with players of a similar age.

Figure 1.13 Vets rugby

Experience

The more experienced participants are, the more likely they are to be able to perform the activity without injury. Inexperienced performers of whatever age are more likely to perform skills incorrectly and suffer injuries. For example, an inexperienced gymnast can injure themselves by overstretching when performing the splits, whereas an experienced performer is more aware of the limits to their range of movement and will avoid overstretching.

While participants in sport and physical activity come in all shapes and sizes, certain shapes and sizes are an advantage in some activities. For example, being tall can be of benefit in sports such as basketball, being compact can be beneficial in activities such as gymnastics, and being muscular can be helpful in sports such as rugby. Participants do not have to be tall, compact or muscular to participate and succeed in these sports but, at the highest performance levels, an appropriate shape may help.

Weight

One aspect of size and shape is weight. Participants need to be a reasonable weight for their chosen activity. Being underweight is just as unhealthy as being overweight, and is just as likely to be a potential cause of injury. For example, an underweight rugby player may be unable to break through attempted tackles and may get injured in the process, while an overweight badminton player may find it difficult to reach drop shots and may put excessive strain on their joints when moving around the court.

In general, more people are overweight than underweight. Sport and physical activity can help as part of a weight-loss programme, and sporting performance often benefits from being at an appropriate weight for that activity. Several activities, such as amateur boxing, organise competitions in weight categories.

Fitness levels

One of the main causes of injury to participants in sporting activities is a lack of **fitness**. In order to undertake sporting activities, performers should have prepared by making sure their body is fit enough to withstand the rigours of physical activity. This involves preparation and **training**. A lack of suitable fitness from a lack of training will expose

Key terms

Veterans (vets) Performers above a certain age that is specific to the sport.

Fitness Set of qualities relating to a person's ability to perform physical activity.

Training The process of bringing a person to a suitable level of proficiency.

CAMBRIDGE NATIONAL

LEVEL 1/LEVEL 2

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Ross Howitt is a leading PE specialist, educational consultant, author and teacher trainer. He has been involved with major examination bodies and has written hundreds of magazine articles, textbooks and resources. Ross has worked with Premier League teams and varying sport stars, as well as in the corporate world to facilitate effective leadership and institutional improvement.

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