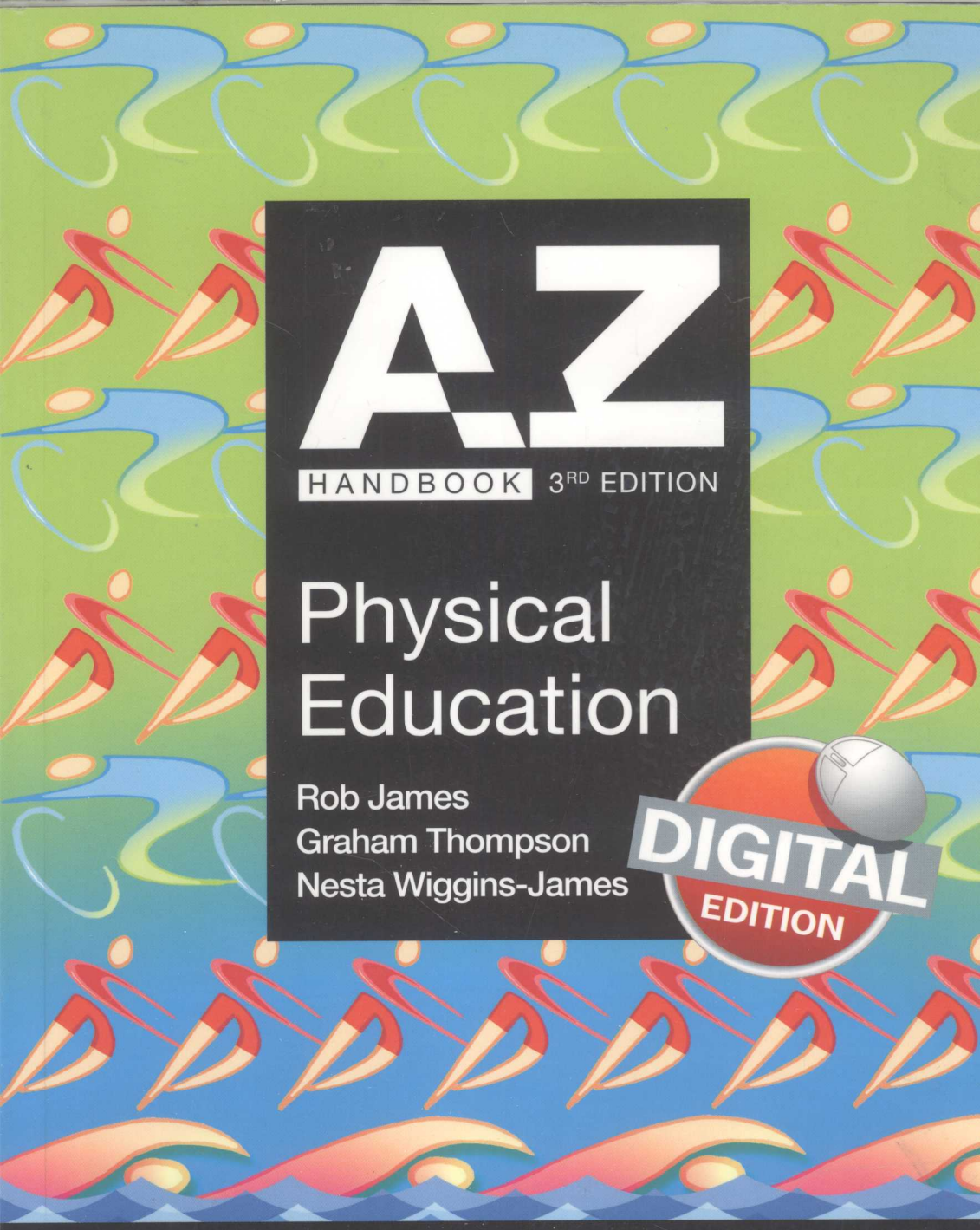

A-Z HANDBOOK 3RD EDITION

Physical Education

Rob James
Graham Thompson
Nesta Wiggins-James

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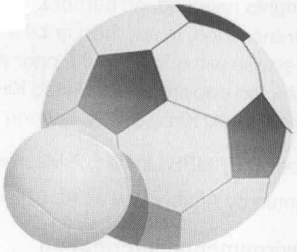

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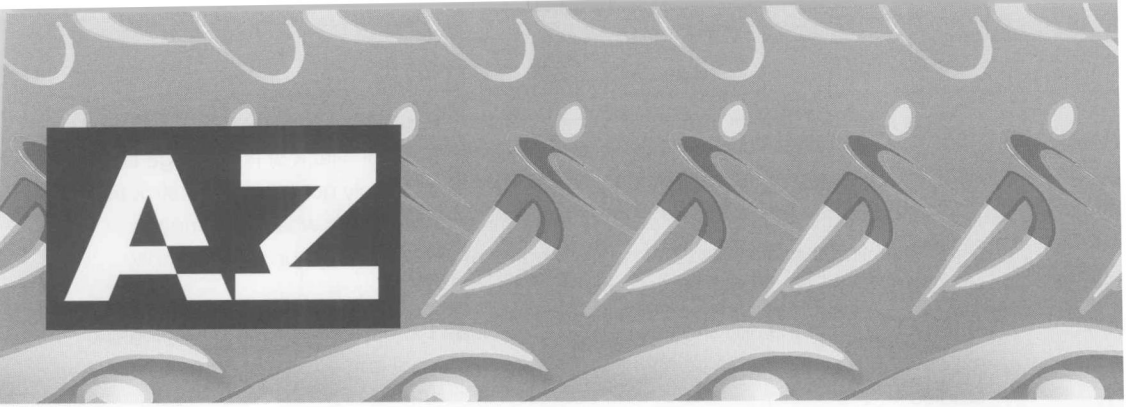

How to use this book

The *A–Z Physical Education Handbook* is an alphabetical glossary of terms covering all theoretical aspects of the specifications and designed for ease of use. It does not attempt to be an exhaustive list of every term within the course, but covers the major terms that should be familiar to students. The terms are drawn from the disciplines of anatomy and physiology, psychology, sociology and history, and comparative studies.

Where possible, each entry starts with a simple one-line definition and progresses to explain the term in more detail, showing how it relates to other associated areas of physical education. This is further reinforced with the use of practical examples where appropriate, as the application of knowledge is crucial to understanding the topics fully. Some entries do not allow for this structure, for example, those entries covering the various sporting organisations, and as a result these have been modified to outline their aims and current initiatives.

Utilising the cross-referencing system can increase your understanding of the subject areas. Within each entry any associated terms that can expand your knowledge appear in bold italics. The entry ***flexibility***, for example, refers the reader to ***cool-down***. By using this system you will gain a more complete understanding of the issues you are studying and start to develop a more synoptic approach to your study.

So while the *A–Z Handbook* is a glossary that will aid your study of physical education, it is important to recognise that it is not a textbook. This means that you will require further reading to complete your understanding of the topic. However, the more substantial entries will give you a sound introduction to the concepts and issues, in addition to providing a handy reference when you encounter concepts of which you are unsure.

During your course of study, the handbook is essentially a book to pick up to browse through and use to complement your basic understanding as well as helping to clarify new ideas. In addition, it should prove useful during revision. To help during this period, carefully selected lists are provided at the back of the handbook for the units produced by the AQA, Edexcel and OCR examination boards, subdivided for each module. Information for examinations produced by CCEA, WJEC, CIE, Scottish Higher and the IB diploma can be found on the website that accompanies this book. These lists could act as a starting point for your revision and should then be expanded using the cross-referencing system. Advice on how to achieve a grade A* can also be found on the website.

There is also a section in the appendices explaining examiners' terms. Many candidates fail to do themselves justice in examinations, not because of a lack of knowledge but through misunderstanding of question requirements or simply not following instructions. This section outlines many key examiners' terms and describes what each means. Understanding these terms can improve your examination technique considerably, allowing you to gain valuable extra marks.

Other sections in the appendices have been included specifically for the physiological aspects of the course to eliminate the need for excessive entries and to complement your studies.

A–Z Online

This new digital edition of the *A–Z Physical Education Handbook* includes free access to a supporting website and a free desktop widget to make searching for terms even quicker. Log on to **www.philipallan.co.uk/a-zonline** and create an account using the unique code provided on the inside front cover of this book.

Once you are logged on, you will be able to:

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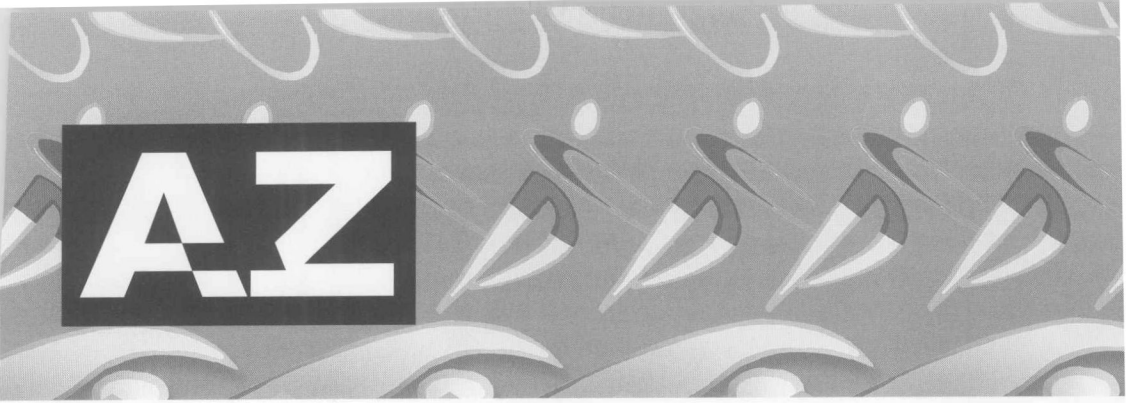
We hope that you find the *A–Z Physical Education Handbook* enjoyable to use, informative and an invaluable resource throughout your studies.

Acknowledgements

Nesta and Rob would like to thank Ffion, Ellie, Rees and Cai for being so patient during the writing of this book.

Rob James, Nesta Wiggins-James and Graham Thompson



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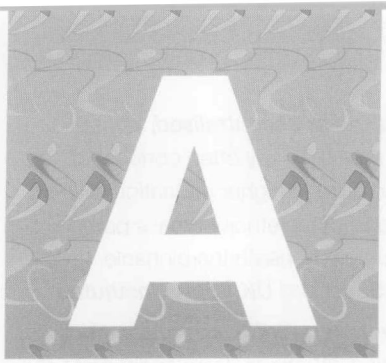


A state: see ***state anxiety***.

A trait: see ***trait anxiety***.

a-vO_2 diff: see ***arterio-venous oxygen difference (a-vO_2 diff).***

abduction: a ***movement pattern*** involving actions away from the midline of the body or one of its body parts. It occurs in the ***frontal plane,*** for example at the hip joint when performing a cartwheel in gymnastics. A muscle that causes this movement is known as an ***abductor***. (See appendix, page 320.)

abductor: a muscle that causes the ***movement pattern*** known as ***abduction*** at a joint. For example, the deltoid raises the arm sideways at the shoulder joint during the preparatory phase of the discus throw. In this instance, the deltoid is an abductor.

abilities are inherited, innate and generally enduring traits that an individual possesses, allowing them to complete various tasks. Certain skills require specific abilities, which can be broadly categorised into ***psychomotor ability*** and ***gross motor ability***. The former involves the processing of information and initiation of the movement, e.g. ***coordination*** and ***reaction time***; the latter involves actual movement, e.g. ***flexibility***, ***strength***, stamina, ***balance*** and ***speed***.

aborigines: the tribe that entered ***Australia*** during the last Great Ice Age. Their ***society*** was organised and semi-nomadic, and the spiritual world was an integral feature of their philosophy. Colonisation led to disease and death through military action, and the loss of land rights only recently being recognised and compensated for in the Native Title Act 1994. This is an example of an ***ethnic group*** who were affected by the ***White Australia policy*** and their fate was similar to that of ***native Americans***. They now form less than 2% of the population.

Traditional physical activities would have a functional base, for example, hunting and games as preparation for battles; they also have a strong religious and ***ritual*** meaning. The National Aboriginal Sport Foundation is part of the ***Australian Sports Commission*** and has founded the Aboriginal Sport and Recreation Programme. Aboriginal ***culture*** has seen a revival within a more liberal society, although aborigines still suffer severe ***discrimination***.

academies of sport: training centres for the development of ***elite*** athletes, usually with the aim of raising the profile of sport within a country, and forming part of a national strategy in sport policy. Consequently, ***national governments*** are usually heavily involved in the philosophy and funding of these centres as they can help create an important ***national identity***. They are based on:

- top-class ***coaching***
- world-class facilities
- scientific support.

Academies and institutes of sport can be either ***centralised*** or ***decentralised,*** targeting specific sports, which may be traditional or new to the country. They often concentrate on national sports or on those with an ***ethnic*** identity, often utilising higher education or ***local authority*** facilities. These centres can either be isolated from the ethos of mass participation or allow mass sport to run parallel to it, forming the structure beneath the pinnacle. (See also ***Australian Institute of Sport***, ***English Institute of Sport*** and ***UK Sports Institute***.)

acceleration: the rate of change of ***velocity***. It is a ***vector quantity*** possessing both magnitude and direction and is integral to many sporting situations, from sprinting to the drive in ***golf***. Acceleration is calculated using the formula:

FORMULA: $\text{Acceleration} = \dfrac{\text{change in velocity}}{\text{time}}$ or $\dfrac{v-u}{t}$

where

v = final velocity

u = initial velocity

t = time.

units of acceleration = $m\ s^{-2}$

Newton's second law of motion is commonly known as the law of acceleration and states:

'The acceleration of a body is proportional to the force causing it, and the acceleration takes place in the direction in which that force acts.'

More simply, the greater the force imparted the greater the resultant acceleration. This is expressed as:

FORMULA: $F = ma$

where

F = force

m = mass

a = acceleration.

(See also ***newton*** and ***Newton's laws of motion***.)

accommodation (society): the process whereby different social groups live together in harmony, accepting each other's distinct identities such as language and ***culture***. In sociological terms it is often used to describe the mutual tolerance of different ***ethnic groups*** living in the same society. This is different from ***assimilation***.

acetylcholine: a transmitter substance released by the ***central nervous system***, allowing muscles to contract. It is released when a nerve impulse reaches the ***motor end plate*** and enables the impulse to cross the synaptic cleft. If sufficient acetylcholine is released, the muscle fibre is said to have ***action potential***, allowing the muscles to contract and movement to occur. In order to prevent continual stimulation, the acetylcholine is blocked by the ***enzyme*** cholinesterase. This allows the motor unit to prepare for new stimuli and contract again when required.

acetylcoenzyme A (acetyl coA): a compound derived from ***pyruvic acid*** when the ***aerobic energy system*** is being utilised. During the process it is oxidised to release ***energy***. Before it can be totally downgraded to release energy, acetylcoenzyme A must

combine with a four-carbon molecule called oxaloacetic acid to form ***citric acid***. This compound can now enter the ***Krebs cycle*** to form carbon dioxide and water, and release energy for muscular contraction.

achievement motivation refers to an individual's interaction with the environment and their desire to succeed. Atkinson suggested an individual's level of ***motivation*** depends on a combination of personality and situational factors. People display either a ***need to achieve*** or ***need to avoid failure*** tendency when placed in certain situations. A situation is evaluated in terms of an individual's probability of success and the incentive value of that success, which can be expressed as:

FORMULA: $TA = (Ms - Maf) \times (Ps \times \{I - Ps\})$

where

TA = achievement motivation

Ms = motive to succeed

Maf = motive to avoid failure

Ps = probability of success

I = incentive value of success.

For example, the motivation level of a novice tennis player when faced with a match against a club player will depend on their perceived chance of success and whether or not they are prepared to face the challenge whatever the outcome, or merely not play in case they are seen to fail.

Critics of the theory argue it is too simplistic and that different performers perceive success in a variety of ways, depending on whether their tasks have an ***outcome goal*** or a ***task-orientated goal***. (See also ***Veroff's stages of achievement motivation***.)

actin: a thin protein filament found in muscle cells. It is found in the ***sarcomere*** and combines with ***myosin*** to produce movement (see ***sliding filament theory***). Each actin ***myofilament*** is composed of two proteins:

- fibrous actin – provides active sites to which the myosin cross-bridge can bind during muscle contraction
- tropomyosin and troponin molecules – aid the attachment of the myosin cross-bridge when calcium ions are released from the sarcoplasmic reticulum during nerve stimulation.

action potential: the electrical activity that is developed in a muscle or nerve cell during activity. Occurs when sufficient ***acetylcholine*** has been released by the ***central nervous system*** and is the ***stimulus*** for muscle contraction.

Active Australia: a national programme run by the ***Australian Sports Commission*** where the focus is on participation and ***Sport for All***, integrating other programmes such as ***Aussie Sport*** and Aussie Able into getting Australians 'up and active' at the foundation level of sport. This requires the adoption of a corporate plan by local state sport ***recreation*** departments. Active Australia identifies three main aims:

- to increase and enhance lifelong participation
- to realise the social, health and economic benefits of participation
- to develop a quality infrastructure with opportunities and services to support participation.

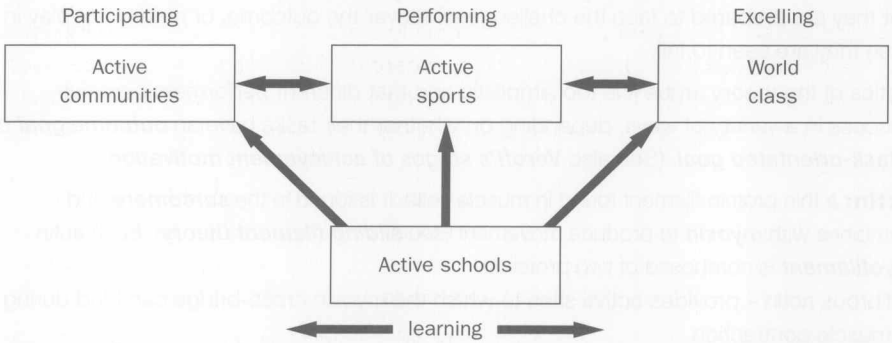
Its focus is entirely on sport for all rather than ***excellence***.

active leisure takes place in ***leisure*** time and involves the individual personally participating in a physical activity. (See also ***physical recreation***.)

Active Sports Programme: a scheme coordinated by ***Sport England*** based on four policy headings:

- Active schools – forms the foundation
- Active communities – looks at breaking down the barriers to participation and considers equity issues
- Active sports – links participation to ***excellence*** such as participation in the Millennium Youth Games
- World class – supporting the current and next generation of most talented individual athletes and teams to achieve greater success in national and international competition.

They are meant to act as building blocks and are not necessarily linear, as shown by the diagram. They also complement the Sports Council's ***participation pyramid*** of foundation, participation, performance and excellence. The majority of the funding will come from the ***National Lottery*** and there will be a strengthening of the regional set up via ***local authorities***. There will be a framework around all experiences available to potential participants such as the ***National Junior Sports Programme, Sportsmark*** and Coaching for Teachers.



active stretching: this form of stretching activity involves the performer undertaking a stretch with no external assistance. Active stretching typically occurs when the athlete performs voluntary muscular contractions and holds the stretch for a period of 30–60 seconds. No external assistance is required. By consciously relaxing the target muscle at the limit of the range of motion, muscle elongation may occur following regular contraction.

Activemark: an award scheme for primary schools that recognises good practice within the ***physical education*** provision. The higher 'gold' level can also be achieved. The Activemark and Activemark Gold awards scheme recognises and rewards primary, middle and special schools that provide young children with the opportunity to receive the benefits of physical activity. It has been developed in partnership with the British Heart Foundation and has the theme 'Get active, stay active'. To achieve an award, a school needs to:

- offer a broad and balanced physical education programme
- provide an environment that encourages physical activities

- teach children the importance of staying active for life
- provide enhanced curricular provision through some additional opportunities for physical activity
- have an effective inclusion policy for disabled pupils.

Activemark Gold recognises all the above, plus:

- realistic, in-depth physical education and physical activity development plans
- a commitment to providing a range of additional, high quality opportunities for physical activity.

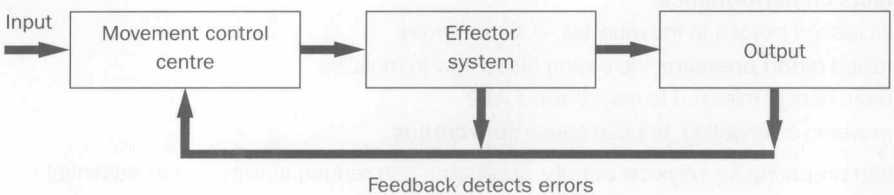
A team of assessors appointed by ***Sport England*** reviews the schools against these rigorous criteria.

actual productivity refers to a group's or team's performance of a task. Steiner (1972) suggested that this was equal to the ***potential productivity*** minus the losses due to ***faulty processes***. A group may contain a large number of highly skilled individuals who would be expected to perform well, but fail to do so due to ***motivation*** problems and poor ***coordination***, the result being a poor performance, possibly displaying the ***Ringelmann effect*** and ***social loafing***. For example, a team contains several 'flair' players who may not necessarily contribute as consistently as they should during play. The coach may decide to omit one for the good of the team, replacing them with a less skilful but harder working player, thus attempting to minimise the faulty processes so that actual productivity may equal potential productivity. (See also ***group productivity***.)

Adam's closed loop theory suggests the performer's movement can be modified with the use of ***feedback*** from the various sensory ***receptors***. This is an extension of the ***open loop control*** theory and a closing of the circuit. The concept is based on two key factors:

- the 'memory trace', allowing selection and initiation of the movement, with no actual control
- the 'perceptual trace', allowing comparison and modification against stored motor programmes. The perceptual trace is developed through practice and any feedback, either during or after the performance, allows errors to be detected, compared to a reference of correctness and adjustments made.

For example, a gymnast completing a routine will constantly evaluate the movements being performed during the sequence and make adjustments as required to maintain ***balance***, speed and control based on their knowledge of how each component should feel. The theory assumes that there is a separate memory trace for each ***movement pattern***, which would not necessarily be accommodated by and recalled from the ***long-term memory store***. It also suggests practice should be accurate and variance would hinder learning, which research has refuted.



adaptive physical education sport: an umbrella term used to encompass such areas as dance, sport, fitness and rehabilitation of individuals with impairment across the lifespan. It evolved during the 1950s, from both the medical and educational perspectives, and is a popular concept in the USA, where federal ***legislation*** in 1975 required that teaching styles, facilities and equipment should be adapted to meet the needs of both regular and special students within the mainstream education system. There is no comparable system in the UK.

adduction: a ***movement pattern*** involving movement towards the midline of the body or one of its body parts. It takes place in the ***frontal plane*** and occurs, for example, at the hip joint, in the crossover step during the run-up phase of the javelin throw. A muscle that causes this movement is known as an ***adductor***. (See appendix, page 320.)

adductor: a muscle that causes the ***movement pattern*** known as ***adduction*** at a joint. For example, the adductor brevis, longus and magnus muscles, together with the gracilis, cause adduction at the hip during the crossover steps in the run-up phase of the javelin throw.

adenosine diphosphate: see *ADP*.

adenosine triphosphate: see *ATP*.

administration: the management of the affairs of an organisation or institution such as sport as a whole or a sports club. It can be seen as developing from the community, for example a local sports club is surmounted by its regional, national and international counterparts. Organisations such as national ***governing bodies*** and ***Sport England*** are all concerned with administrative issues, such as:

- governing sport
- making decisions
- creating and distributing finances and resources.

ADP (adenosine diphosphate): a high-energy phosphate compound consisting of adenosine and two phosphate groups attached to it. During the resynthesis of ***ATP***, adenosine diphosphate combines with another phosphate group to form ATP, which can subsequently be broken down to release energy for muscular contraction.

adrenaline: a hormone released by the adrenal gland at times of stress as well as before and during exercise. It is a pre-requisite for physical activity and forms the body's ***fight or flight response***, which can affect the performer in a number of ways, as outlined below.

Effects on the body:

- increased heart rate
- constriction of blood vessels
- breakdown of glucose and fats
- sweat production.

Effects on performance:

- increased oxygen to the muscles – CO_2 removed
- raised ***blood pressure***, increasing blood flow to muscles
- more energy released to resynthesise ***ATP***
- prevents overheating, but can cause ***dehydration***.

When preparing for physical activity, adrenaline can reduce activity in non-essential organs and increase activity in those organs required for the activity, namely the muscles, making it an essential ingredient during exercise.

Advanced Apprenticeship in Sporting Excellence (AASE) is an addition to the talent pathway and is part of the ***Youth Sports Trust's gifted and talented*** programme. When school finishes, the AASE programme takes over. There are more than 2500 talented young sportsmen and women aged between 16 and 19, in over 12 sports in England that are currently training to become world class performers. Enrolling on the AASE programme allows them to train in their chosen sport and prepare for life after sport by gaining qualifications that will set them up for the workplace or allow them to progress to university. The programme includes qualifications for work within the related fields of coaching, sport development, health and fitness, operational management of sports facilities, sports leadership and the outdoors.

After the AASE programme, there is the ***Talented Athlete Scholarship Scheme***, a programme funded by the ***Department for Culture, Media and Sport***, which represents a unique partnership between sport and universities. Alongside, there is ***Sports Coach UK*** which ensures that talented coaches are matched with talented athletes, in line with the UK Coaching Framework. It is underpinned by ***UK Sport's World Class Performance Pathway.***

adventurous activities: outdoor pursuit activities which take place in the ***natural environment***, often in situations which are dangerous and challenging, and which may involve the ***conquest*** of natural obstacles or terrain, for example rock climbing, skiing and sky diving. New activities continue to be developed, mostly as a result of technological advances, such as jet skiing and windsurfing. Many of these activities developed as a means of exploring terrain and human resources, as well as through the need to ***escape*** from the urban to the natural environment.

Adventurous activities are not governed by rules as such, there are no winners or losers and therefore no officials. There is usually, however, a code of ***etiquette*** concerning safety and ***conservation*** of the natural environment. Recently many adventurous activities have become sports, involving scoring systems and officials, e.g. white water slalom racing and speed climbing.

The main challenge for the participant occurs against the elements, requiring them to differentiate between real and perceived ***risks*** (see also ***danger***). ***Wilderness areas*** and extreme climatic zones in the ***USA*** and ***Australia*** produce opportunities within these sports not available in the more gentle terrain and temperate climate of the UK.

advertising: paid-for communication through ***mass media*** such as television, newspapers or radio. Advertising and marketing have become powerful forces and sport has become a vehicle for the promotion of products and images which enable advertising companies to make profits, providing employment and income for a large number of people.

aerobic: literally meaning 'with oxygen', aerobic metabolism typically occurs during low-intensity exercises that are of long duration, such as long-distance running or ***cycling***.

aerobic capacity: the ability to provide and sustain energy aerobically. It is the component of fitness that underpins all endurance-based activities such as long-distance running, cycling or swimming, as well as being a contributory factor to many other sporting situations. Key factors that determine an individual's level of ***aerobic*** capacity include genetics, physiology, lifestyle, sex, age, ***body composition*** and the quantity of training undertaken by the individual concerned. The VO_2 max of an individual is a strong indicator of aerobic capacity.

aerobic energy system: the ***energy*** pathway that uses oxygen to break down ***glycogen*** and ***fat*** to release energy, which can then be used to resynthesise ***ATP***. Under ***aerobic*** conditions, the glucose molecule can be totally degraded, providing an energy yield 18 times that produced in ***anaerobic*** conditions. The glucose molecule is broken down in special 'powerhouses' or 'factories' known as ***mitochondria***, where the ***Krebs cycle*** and ***electron transport chain*** take place. ***Slow twitch muscle fibres*** possess a greater number of mitochondria then ***fast twitch muscle fibres*** and therefore have a greater capacity to produce energy over an extended period of time. When a molecule of glucose is degraded, energy sufficient to resynthesise 38 moles of ATP is released as follows:

- 2 during anaerobic ***glycolysis***
- 2 during the Krebs cycle
- 34 during the electron transport chain.

Because of the vast energy supply gained through aerobic metabolism, this system is used mainly in endurance-based activities where exercise is less intense and energy is required over a long period of time. This system is also responsible for supplying the energy required by the body at rest. Examples include running a marathon or time-outs during a basketball match.

aerobic fitness, also known as cardiovascular fitness, it is the ability of the body to perform exercise over an extended period of time in the presence of oxygen. It relies on the efficiency of the body to utilise oxygen to release energy that is stored in ***glycogen*** and ***fats***. Sports performers who have high levels of ***aerobic fitness*** include marathon runners, cyclists and triathletes. In order to improve aerobic fitness, athletes should undertake a period of ***continuous training*** or aerobic interval training.

aesthetic: the quality of movement and an appreciation of art forms. Some sports, such as tennis and cricket, are won through technical superiority alone. However, ***gymnastic activities*** such as figure skating also award marks for artistic merit. These decisions are made by judges and will inevitably be determined to some extent by ***subjective*** opinions. The performer:

- experiences the aesthetic moment through his or her ***kinaesthetic*** flow patterns, making it subjective in character
- achieves the performance through knowing what to do and how to do it
- needs to be able to gain pleasure from executing a movement, as skillfulness alone does not ensure an aesthetic experience. This may be more easily achieved in ***closed skill*** situations such as ***gymnastics*** where the performer is able to focus on the inward motions with minimal ***interference*** from the sporting environment.

The spectators' experience, however, comes from outside the event and they need to bring understanding, interpretation and imagination, together with the ability to engage emotionally in the activity, in order to experience the aesthetic moment.

affective attitude: one of the components of the ***triadic model***, this refers to the performer's emotional feelings towards an issue or ***attitude object*** based on past experiences or values. For example, the performer may enjoy taking part in exercise, displaying a positive attitude, but may particularly dislike swimming, showing a negative attitude.

affective learning refers to the positive ***attitudes*** and emotional components that may be required to prepare and compete effectively, e.g. ***etiquette***, ***sportsmanship***, confidence

and focusing techniques. To maximise learning, this component should be combined with ***effective learning*** and ***cognitive theories of learning***.

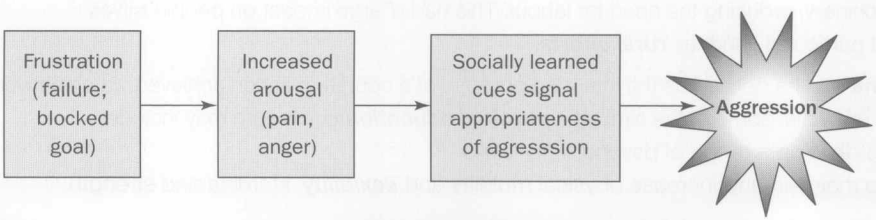
aggression: any form of behaviour intended to injure or harm another person either verbally or physically and, within a sporting context, outside the laws of the game. All acts of aggression are viewed as anti-social, caused by biological, sociological or environmental factors:

- Biological theories suggest individuals are born with aggressive tendencies, e.g. instinct theory argues that we have developed these traits as part of the evolutionary process of survival, and aggression is either an instinctive reaction or displayed to establish control over a particular territory. Aggressive tendencies must be released for the good of the individual (known as ***catharsis***). This can be in an acceptable form, e.g. sport, or as unacceptable behaviour, e.g. violence and crime.
- Sociological theories such as the ***social learning theory*** propose that, through observation of others during the learning process, actions are copied and they are more likely to be repeated if they are reinforced and rewarded. The chance of repetition is increased if the model is of high status to the individual, e.g. if a top-class performer commits a foul but avoids ***punishment*** the observer will attempt to repeat the action given the opportunity.
- Environmental factors can lead to goals being blocked thus leading to the ***frustration–aggression hypothesis***. If the performer's objective is being blocked, they may become frustrated and eventually aggressive if this continues, e.g. a performer is being well marked by the opponent and eventually commits a foul because they cannot perform as desired.

An updated version of this proposal is the ***aggression cue theory***, which suggests that although frustration will cause an increase in ***arousal*** levels, an aggressive act will only occur if a socially learnt cue is present or the environmental situation makes committing the act acceptable (Berkowitz 1993). For example, a player may only commit an aggressive act if they receive encouragement from their coach or think the referee may not see their actions.

Actions considered aggressive in one situation may not be in another, e.g. hitting an opponent during a hockey match compared with a punch in a boxing bout. Acceptable forms of aggression are known as ***assertive behaviour*** or ***channelled aggression***.

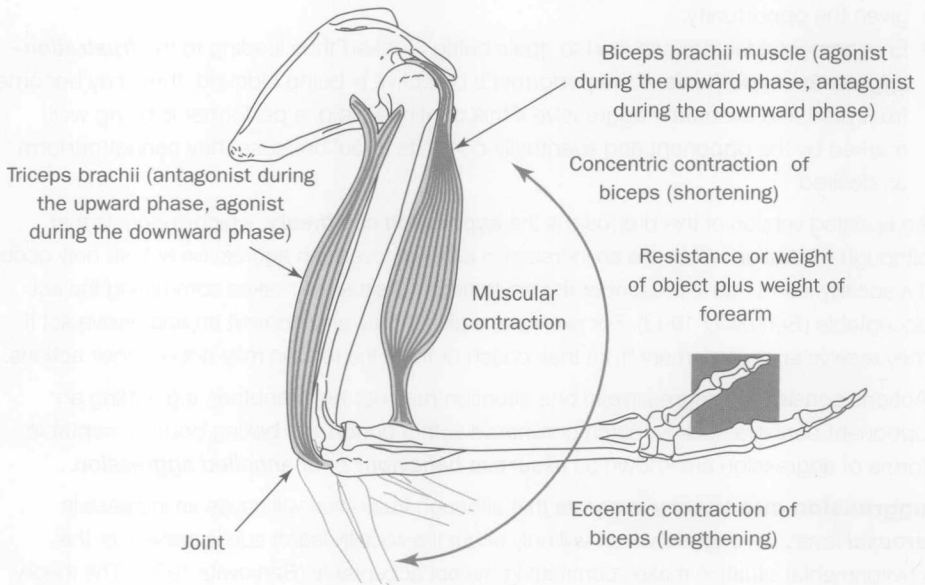
aggression cue theory suggests that although frustration will cause an increase in ***arousal*** levels, an aggressive act will only occur if a socially learnt cue is present or the environmental situation makes committing the act acceptable (Berkowitz 1993). The theory allows for some of the weaknesses of the ***frustration–aggression hypothesis*** as it takes into account the influence of socially learned behaviour and the situation the performer is currently experiencing. For example, a basketball player who drives for a lay-up shot is constantly blocked by an opponent causing frustration, but they may only commit a foul if the coach has encouraged and tolerated this behaviour in the past.



aggressive cue hypothesis: see ***aggression cue theory***.

agility: a motor-based component of ***fitness***, involving the ability of the performer to move and change direction and position of the body quickly and effectively while under control. For example, during a game of basketball the player has to adjust their body position while dribbling or driving for the basket when performing a lay-up shot, depending on the position of defenders. It can be measured using the ***Illinois agility run test***. Unfortunately, training has little effect on an individual's agility as this is an innate characteristic and cannot be significantly improved.

agonist: also known as a prime mover, an agonist is the muscle that is directly responsible for the movement at a joint. Muscles usually work in pairs or groups to facilitate coordinated movement, with each performing a different function. For example, during a biceps curl exercise, when ***flexion*** occurs at the elbow joint the biceps brachii is responsible for the movement and is therefore the agonist. However, as one muscle shortens, another lengthens and is known as the ***antagonist***. In this example, the anatagonists are the triceps brachii. Muscles working together in this way is known as ***reciprocal inhibition***. As the weight is lowered, the role of each muscle is reversed and the triceps brachii become the agonists and the biceps brachii the antagonists.



agrarian revolution: signified a dramatic movement of the population from rural areas to the towns during the ***Industrial Revolution*** in nineteenth-century Britain. Farming had become less important as small farms were taken over by large landowners as a result of the enclosure system and farming practices had changed with the development of machinery, reducing the need for labour. This had a large impact on people's lives and particularly on their ***rural sports***.

aims can be defined as the intended purpose of a course of action achieved via objectives. For example, some of the aims of a ***physical education*** curriculum may include:

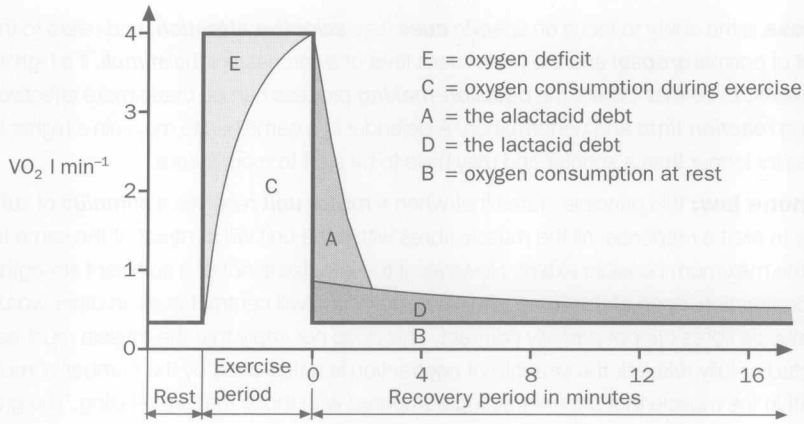
- to develop a range of psychomotor skills
- to maintain and increase physical mobility and ***flexibility***, stamina and strength

- to develop understanding and appreciation of a range of physical activities
- to develop positive values and ***attitudes*** like ***sportsmanship***, competition, necessity of abiding by the rules
- to help children acquire ***self-esteem*** and ***self-confidence*** through the acquisition of skills, knowledge and values
- to develop an understanding of the importance of exercise in maintaining a healthy lifestyle.

air resistance: a force that causes a resistance to the motion of an object or body when moving through the air. The amount of air resistance created depends upon the size, weight, shape and speed of the object. Faster moving objects generate greater air resistance, which can cause deceleration of the moving body.

Performers often attempt to limit the effects of air resistance by using specialist equipment or clothing, which can include altering the shape of cyclists' helmets or wearing tight lycra clothing. (See also ***Bernouilli effect*** and ***Magnus effect***.)

alactacid debt: also known as the fast component of ***excess post-exercise oxygen consumption*** (EPOC), this is the first stage of the ***recovery*** process or replenishment of the oxygen debt. Its function is to resynthesise ***creatine phosphate*** and ***ATP***, and to resaturate ***myoglobin*** with oxygen. This is the fast stage of the ***excess post-exercise oxygen consumption*** and is accomplished by increasing the amount of oxygen entering the body, which explains why a performer experiences heavy breathing following exercise. This process usually takes 2 or 3 minutes and utilises up to four litres of oxygen. Once the alactacid debt has been replenished, the consumed oxygen is used to remove waste products such as ***lactic acid*** that may have accrued and is known as the ***lactacid debt***.



Alactacid debt

alactic energy system: also known as the ATP–PC ***energy system***, this is the first energy pathway to be utilised by the body to resynthesise ***ATP*** without the use of oxygen. This ***anaerobic*** system uses stored ***creatine phosphate*** from the muscle cells, not for muscle contraction but purely to resynthesise ATP and maintain a constant supply of energy. A ***coupled reaction*** occurs very rapidly, but can only last up to 10 seconds and is therefore