

Chapter 1: Proficiency of movement

Contents

- 1.1 Fundamental movement skills
 - 1.2 Appraisal of movement proficiency
 - 1.3 Skill acquisition — the stages of skill learning and types of skills
 - 1.4 Factors affecting skill acquisition
 - 1.5 Biomechanics and its application to human movement
 - 1.6 Practice and training regimes to improve performance
- Review

Note to students and teachers: This PDF has been provided as an offline solution for times when you do not have internet access or are experiencing connectivity issues. It is not intended to replace your eBook and its suite of resources. While we have tried our best to replicate the online experience offline, this document may not meet Jacaranda's high standards for printed material. Please always refer to your eBook for the full and latest version of this title.

Chapter 1: Proficiency of movement

Introduction

There is a strong link between proficiency of movement and the quality of your performance. The fundamental skills you learn as a child lead to the more complex skills you need to complete specialised activities in a skilful way. Feedback using performance measures, practice and a knowledge of biomechanics can all help you build skills and improve your technique.



eBook plus

Watch this video

Proficiency of movement

Searchlight ID: eles-2332

All sports that we play require us to use our manipulative and movement skills.

ESSENTIAL QUESTION

Why is it important to identify and measure the proficiency of movement in athletic performance?

STARTER QUESTIONS

1. How do you assess your proficiency of movement?
2. What factors influence skill acquisition?
3. How do you move from fundamental to advanced skills?

4. How can ICT help improve your skills?
5. How can biomechanics maximise skill performance?

INQUIRY SEQUENCE

- 1.1 Fundamental movement skills
 - 1.2 Appraisal of movement proficiency
 - 1.3 Skill acquisition — the stages of skill learning and types of skills
 - 1.4 Factors affecting skill acquisition
 - 1.5 Biomechanics and its application to human movement
 - 1.6 Practice and training regimes to improve performance
- Review

1.1 Fundamental movement skills

All advanced skills and techniques in sport evolve from the fundamental skills developed during childhood and adolescence.

ENGAGE

Fundamental movement skills are the building blocks for more complicated or sophisticated movements. Children learn to crawl, walk, run, skip, throw, catch, bounce, hit and jump. These actions are called the 'basic skills'. Basic skills lead to the more specialised skills required in games, dance, gymnastics and other sporting and recreational pursuits.

Use the **Basic skills** worksheet in your Resources section to link basic skills to more complicated ones.

eBook *plus*

Worksheet

Basic skills

Searchlight ID: doc-14827



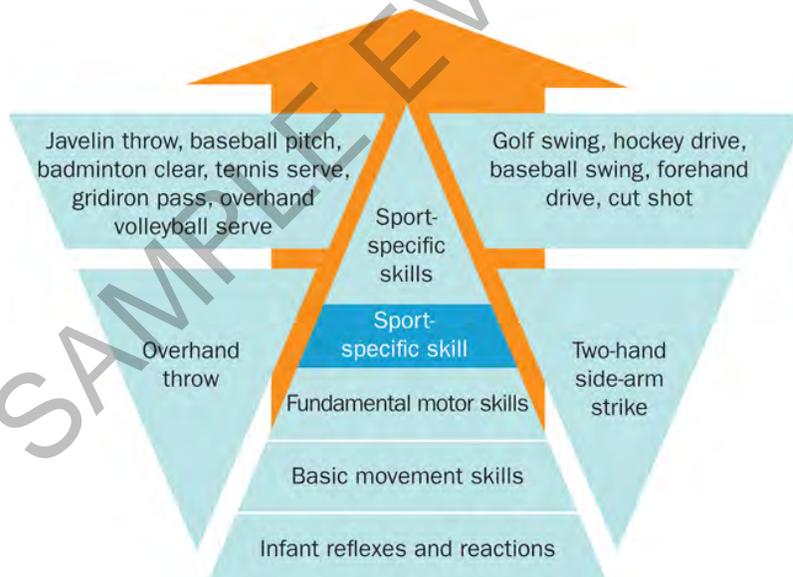
What basic skills form the foundation for rock climbing?

Explore

Proficiency and quality of movement

The link between **proficiency of movement (or skill proficiency)** and the quality of performance is very strong. The characteristics of proficient movement are:

- certainty of achieving the performance goal
- minimising energy expenditure during the performance
- minimising the movement or performance time (in activities where speed is essential).



Fundamental movement skills instruction and its effect on the performance of sport-specific skills

Specialised sporting skills

Specialised sporting skills are found in a wide variety of games and sports played throughout the world. Moving from the fundamental skills to these more specialised skills involves a process similar to assembling building blocks. The fundamental skills constitute the foundations upon which more specialised skills are developed. For example, the catch, strike and overarm throw form the basis of the more specialised sport-specific skills employed in cricket, baseball and softball.



Relationship between fundamental movement skills and specific sport skills (overarm throw)

Judgement of movement

When we view movement performances, we often make judgements about them. When judgements are based on our feelings or impressions, they are **subjective judgements**. Such evaluation is fine when we are spectators; however, subjective judgements can have a low degree of accuracy. To improve the quality of the judgement, a good understanding of what constitutes proficiency in terms of the movement performance is required. This can be done by using consistent methods, techniques or tools for appraising the proficiency of the movement. This makes the judgement more objective in nature which increases the accuracy of the feedback. These are called **objective judgements**.

Maximum certainty of goal achievement

One quality of skill proficiency is movement certainty. To be 'skilled' implies that the individual is able to achieve the movement or performance with a high degree of accuracy. Individuals who can perform the skill or movement consistently can be considered to have attained proficiency.

Minimum energy expenditure

It takes skill to minimise or eliminate unnecessary movements. This is crucial for activities where conservation of energy is critical to success, such as in a triathlon, or a physically demanding routine in gymnastics.

This quality is often observable. Skilled performers often appear to be performing the activity easily. This can be referred to as moving 'efficiently'.



AFL forward Nick Riewoldt has achieved a high level of accuracy when it comes to kicking for goal.

Elite gymnasts perform their routines with a minimum of unwanted or unnecessary energy expenditure.

DID YOU KNOW?

Elite athletes often have set routines leading up to the performance of a skill. The routine is always the same; this leads to consistency in performance, and the performance goal or outcome is usually achieved. This is observable in skills such as the golf swing or tennis serve, although these need to be modified at times due to changes in the external environment. This includes movement patterns of an opponent or changes in the weather (such as hitting into a headwind).

Minimum movement time

Skilled performers in many activities are able to execute their movements more quickly and efficiently. We often hear of skilled performers seeming to have 'more time' in which to perform the skills of their chosen sport. This is often a function of their ability to perform movements in a reduced time frame.



Skilled cricketers such as Michael Clarke often seem to have ‘plenty of time’ in which to play their shots — a sign of a skilled performer.



An instructor may provide specific information, tutoring or training, but regular practice is imperative to improve movement skill.

ACTIVITIES

1 A+ sport

1. Use the **Skilled performance** weblinks in your Resources section to watch several skilled sporting performances. Evaluate them in terms of the characteristics of proficient movement. Describe how each performance appeared to you. In particular, note the rhythm, pace and ease of movement.
2. Did the performers achieve their goals?

eBook *plus*

Weblinks

Skilled performance 1: AFL

Skilled performance 2: Netball

Skilled performance 3:
Gymnastics

Skilled performance 4: Soccer

3. What was the goal in each case?
4. Did the performances minimise energy expenditure?
5. Were the performances 'efficient' in nature?
6. Compare and contrast the performance of a beginner to that of the more experienced athletes.

2 Be proactive

Teachers often complain about a 'crowded curriculum'. Taking this into consideration, argue a case for more sport and physical activity in schools at a primary school level. Your argument may include some of the following points.

- The link between basic skills developed during childhood and sophisticated skills required to participate in sport and other recreational activities during adolescence and adulthood
- The importance of participation in sport at the primary school level for social development
- The importance for children to develop proficiency in the fundamental movement skills

CHECK & CHALLENGE

Explain

1. What is meant by the statement 'skilled performers always seem to have more time to perform the skills'? Why is this statement often true?

Elaborate

2. Refer to the 'fundamental movement skills instruction and its effect on the performance of sport-specific skills' diagram at the beginning of this section and describe in your own words what it illustrates. Provide an example, other than the ones given in the diagram, that illustrates how basic skills can be transferred to more specialised skills.

Evaluate

3. Think of ten sports and evaluate what level of skill you have attained in each of them.

1.2 Appraisal of movement proficiency

Movement skills can be measured for proficiency by assessing the quality, efficiency and outcome of the performance.

ENGAGE

Movement proficiency can be analysed and measured in a number of ways. These include:

- observing the performance live
- judging or scoring the performance
- measuring the outcome of the performance
- comparing the outcome with the percentile charts
- data collection and movement analysis
- criteria checklists
- skill tests.

Not all these methods can be applied to all types of movements or skills. In this section, each method will be described, and an opportunity to use each method for measuring performance will be provided.

Use the weblinks in your Resources section to watch some performances. How would you appraise the performances?



eBook *plus*

Weblinks

- Explaining gymnastics judging
- Kids gymnastics

In gymnastics, would you rather be judged subjectively or objectively?

Explore

Appraising movement proficiency

It is possible to assess movement or skill proficiency in terms of both its process (for example, the quality and efficiency with which the elements of the skill are performed) and its outcome (for example, some kind of result, such as a goal, or some form of measurement, such as a distance achieved).

To appraise movement proficiency, some method, technique or tool for assessing the level of performance is necessary. These are called **performance measures**. However, before applying performance measures, a number of factors need to be considered. These factors can affect our judgement of the movement performance, and include:

- individual characteristics of the performer, such as age, size, body type, fitness level and experience
- level of performance, for example, novice or elite, club, state or national competition
- performance context, for example, practice as opposed to a game situation
- environmental conditions.

We also need to consider who determines the criteria for appraisal and who sets the standards upon which to assess the movement. In many national and international sporting competitions (such as gymnastics and figure skating), movement requirements, categories, deductions and degrees of difficulty are all determined by sporting bodies and federations, who use experts to determine what constitutes a skilled performance.

It is also important to realise that, while most athletes will largely adhere to the principles that underpin proper technique, some will modify their style to suit themselves. This explains why there are many variations of the accepted technique. For this reason, it is important to determine whether any particular variation is basically sound or inherently weak, as distinct from labelling anything as 'right' or 'wrong', or attempting to get every player to adhere to the same 'perfect' technique.

Performance measures

The appraisal of performance can be a very complex task; therefore, a range of performance measures are frequently used.

Observation

Observation of performance can be used to appraise both the level of skill proficiency during the performance and the outcome or result of the performance. Observation can be seen as a continuum from 'highly objective' to 'highly subjective'.

Performance criteria, checklists, rubrics and rating scales

Observations of performance can be made more objective by focusing on the specific criteria, qualities and/or desirable aspects of a performance, and assigning them categories (for example,

excellent, good, average, fair, poor) and/or rating scales (for example, 5, 4, 3, 2, 1). To develop criteria to be used in the appraisal of movement performance, follow the steps below.

1. *Specify the nature of the movement or skill* — ascertain exactly what it is you want to appraise.
2. *Establish the performance criteria you want to use* — determine and list the particular aspects of the movement or skill that you will be appraising and making judgements about.
3. *Practise applying the criteria* — to develop the analytical skill to appraise movement performance, it is necessary to practise.

Checklists and rubrics are usually developed from performance criteria. If a particular part of the movement or skill is performed correctly, a tick or rating is given to it. This information can be used to help the performer rectify faults or errors and thereby improve his or her level of skill proficiency. Checklists, rubrics and rating scales can allow for self-appraisal, peer appraisal, and teacher or coach appraisal of performance.



To be fair to all contestants, judges of dance competition look for established moves performed 'correctly' and evaluate contestants' level of proficiency.

Skill tests and performance achievements

Skill tests provide an indication of the outcome rather than the skill or movement process. There are many tests used to measure skill performance. An example is the wall target throwing test, which can be used to assess the accuracy with which individuals perform the overarm throw. It is possible to utilise a range of performance achievements to measure aspects of a movement performance. These measures can include speed, distance, time, height, weight and accuracy, and are often expressed numerically. For example, 'Lachlan ran 13.5 seconds in the 100-metre sprint'.

Norm- and criterion-referenced standards and percentile ranks

Norm-referenced standards (or normative scales) allow an individual's score or result to be compared with the performance of a representative group (usually a reference group, such as a nationwide sample of students of similar age and gender) in the same task or test.

Criterion-referenced standards interpret an individual's score or result compared to others of similar age or gender etc.

Percentile ranking is common. Percentiles indicate the percentages of a reference group that score above or below a given score on the scale. For example, 'Siobhan achieved a score that put her at the 85th percentile'. This indicates that she has scored higher than 84 per cent of those taking the test, in other words, in the top 15 per cent of the compared population.

Statistical information

Statistical information obtained from an **activity analysis** (or games analysis) can also be used to appraise performance. The most common statistical data obtained from games analysis includes:

- possession skills, for example, marks or passes received in Australian Rules Football
- disposal skills, for example, kicks and handballs, including the effectiveness or otherwise of these in Australian Rules Football
- successful and unsuccessful scoring attempts.

Other data, such as movement patterns and intensities, can also be used when measuring and appraising a player's performance.

Performance appraisal of selected motor skills

In this section, we consider the appraisal of movement proficiency in a number of motor skills, ranging from fundamental movement skills to more specific sporting skills. In each case, use the **eLessons** in your Resources section to access a criteria checklist, rubric or table as the means of appraising the movement proficiency related to the particular skill.

In the mid 1990s, the Victorian Department of Education commissioned the development of a fundamental motor skills program for children in primary school. The *Fundamental Motor Skills Manual* and accompanying instructional video and posters provided assessment checklists for each of the core skills. These provide an excellent template for the development of similar checklists for other, more complex, specific sporting skills.

Performance criteria for the catch, overhand throw, punt kick and two-handed side-arm strike are listed below.

eBook plus

eLessons

- Catching
Searchlight ID: eles-0750
- Golf swing
Searchlight ID: eles-0755
- Javelin throw
Searchlight ID: eles-0754
- Overhand throw
Searchlight ID: eles-0751
- Punt kick

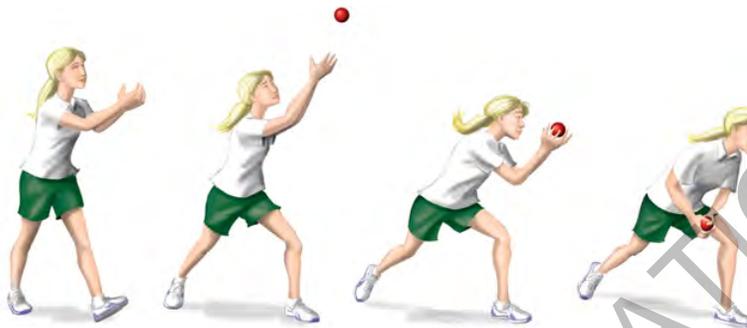
Performance criteria for the catch

1. Eyes are focused on the ball throughout the catch
2. Preparatory position, with elbows bent and hands in front of body
3. Hands move to meet the ball
4. Hands and fingers positioned correctly to catch the ball
5. Catch and control the ball with hands only
6. Elbows bend to absorb the force of the ball

Searchlight ID: eles-0752

- Soccer throw-in

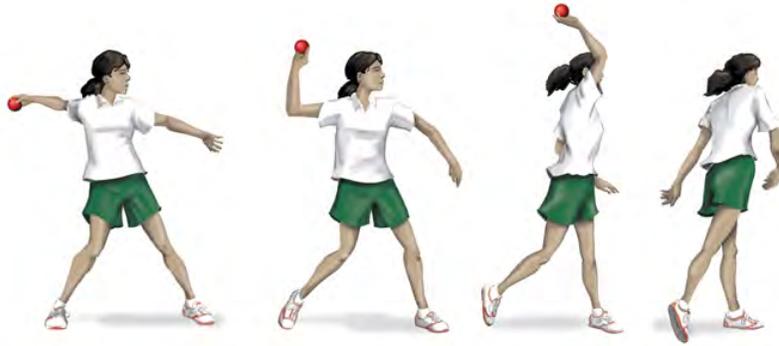
Searchlight ID: eles-0756



Fundamental motor skill of the catch

Performance criteria for the overhand throw

1. Eyes are focused on the target throughout the throw
2. Stand side-on to the target
3. Throwing arm nearly straightened behind the body
4. Step towards the target with foot opposite throwing arm during the throw
5. Marked sequential hip-to-shoulder rotation during the throw
6. Throwing arm follows through, down and across the body



Fundamental motor skill of the overhand throw

Performance criteria for the drop punt kick

1. Eyes are focused on the ball throughout the kick
2. Ball is held at about hip height in front of the kicking leg
3. Step forward onto the non-kicking foot
4. Bend the knee of the kicking leg during the backswing
5. Hip extension and knee flexion of at least 90 degrees during the preliminary kicking movement
6. Guide ball down with one hand so it makes contact with the top of the kicking foot
7. Forward and sideward swing of the arm opposite the kicking leg



Fundamental motor skill of the drop punt kick

Other specific sporting skills

Performance criteria for the golf swing, javelin throw and soccer throw-in can be accessed by using the eLessons in your Resources section.

Qualitative analysis of human movement

Observing, analysing and appraising human movement performance through the use of performance criteria and checklists is a form of **qualitative analysis**. Coaches and teachers need to be skilled in qualitative analysis to be able to provide the most appropriate interventions for improving the performance.

Qualitative analysis usually involves four key tasks:

1. preparation
2. observation
3. evaluation/diagnosis
4. intervention.

The preparation task is concerned with the coach or teacher developing knowledge about the key performance features of a movement or skill, as well as the common errors that performers exhibit. They gather this information from scientific research, expert opinion and personal experience.

Observation involves gathering appropriate information about the movement or skill. The most common strategy involves observation of **movement phases**. This involves dividing the movement or skill into a number of phases, such as the preparation phase, the execution phase and the follow-through phase. Movement phases can be further divided into **key elements**. Key elements are distinct actions that join to make up a phase. For example, in the execution phase of a golf drive, the key elements are the weight shift, hip rotation, head position, and arm and club extension. Phases and elements can be seen in most of the skill criteria and checklists provided previously in this chapter.

The third aspect of qualitative analysis involves the evaluation or diagnosis of the desirable (strengths) and undesirable (weaknesses) aspects of the movement or skill performance.

The final task in qualitative analysis is intervention. This involves providing feedback, usually while practising, that will lead to improved performance via correction of identified errors.

DID YOU KNOW?

Skills can only improve if the athlete is given specific feedback about their performance. Elite athletes and coaches are dependent on teams of people who gather data from the performance of the individual, the team and opponents. This data is used to fine tune and, at times, change an athlete's technique, the team tactics, or the way an opponent is matched up.

Video analysis software

An important tool in qualitative analysis is the use of video analysis software. This allows for the observation of greater movement detail, the unlimited capacity to replay and observe the movement over again, as well as split-screen comparisons and overlays of performance. Some software products allow the placement of graphics and drawings on the video to illustrate key features and aspects of the performance.

Recent advances in integrating video and computer technologies have made many video analysis software programs affordable. Several companies have programs and packages especially designed for use by teachers and students. Two examples are Webbsoft Technologies' 'Swinger'

software and Dartfish's 'DartTrainer' software (see the figure below). There are also a range of applications (apps) that can be used on digital platforms such as iPads and Android devices.



Video analysis software can be an important aid in qualitative analysis and performance appraisal.

ACTIVITIES

1 Appraisal

Suggest which method of appraisal (subjective or objective) is best suited to each of the performances below and explain your reasoning.

1. Tower diving
2. Tennis rally
3. Hockey penalty stroke
4. 100-metre sprint

2 Measuring performance and skill proficiency

Test yourself and a partner on the following skill proficiency tests. Use the **Performance and proficiency** worksheet in your Resources section to record your results and those of your partner. Alternatively, draw up a recording table of your own. Note that the following basketball tests can easily be adapted to other sports, such as netball or soccer.

1. *Basketball goal shooting:*
 - a. Set out eight cone markers around the vicinity of the key, as shown below.
 - b. Begin at cone 1 and have three shots at goal. Count the number of successful shots and then record this score.

- c. Proceed to the rest of the marker cones in sequence and repeat the three shots at goal. Record the number of successful attempts at each cone and the number of successful attempts in total.
- d. Additionally, or alternatively, you can begin at cone 1 and attempt to shoot a goal. Continue taking shots until you are successful and then move on to the next cone and repeat. Count and record the total number of shots it takes you to score a goal successfully at each cone marker and in total.



Basketball goal shooting set-up

eBook plus

Worksheet

Performance and proficiency

Searchlight ID: doc-14830

2. Basketball free throw shooting:

- a. Have 10 shots at goal from the free throw line.
- b. Repeat three times, recording the number of successful shots in each batch of 10 shots, as well as the total number that were successful.

3. Basketball ball handling and dribbling:

- a. While dribbling the ball, run in a figure-eight shape twice around two marker cones placed 10 metres apart. Record the time taken to complete the task.
- b. Repeat, but this time, run and dribble in the opposite direction around the cones. Record the time taken to complete the task.

3 Comparing tests

1. Compile the whole class's results from activity 2 and calculate the group's average scores as a benchmark proficiency in each test.
2.
 - a. Based on the benchmark proficiency score for each test, how did you perform?
 - b. Which skill did you perform best?

- c. Which skill did you perform least well?
- d. Using these results, what goals can you set for yourself?

4 Set the test

Design three other simple skill proficiency tests that could be used in a sport of your choice. Be prepared to explain these tests to the rest of the class.

5 Performance appraisal by activity analysis

1. In groups of three, undertake an activity analysis of a player engaged in a sport of your choice. This can be done by observing your class engaged in playing sport, by observing a match played locally, by attending an elite level match or by viewing a video of a match.
2. Record your data using the sample tables provided in the **Activity analysis** worksheet in your Resources section.

6 Performance appraisal of selected motor skills

Over a period of three to five sessions, teach one of the fundamental motor skills to a small group of younger children, and assess their motor skill proficiency by the end of the instructional period. Use the **Fundamental appraisal** worksheet in your Resources section to help you.

7 Using technology for feedback purposes

Research the use of technology in sport and how it can help an athlete improve performance via feedback. Come up with two types of technological tools that can help provide athletes and their coaches with appropriate feedback to modify and improve performance. This may include video analysis, computer software or use of 'applications' via smartphones. Discuss the advantages and disadvantages of the two tools selected. Finally, decide on the one that would be most appropriate for you. Justify your response.

eBook *plus*

Worksheets

- Activity analysis
Searchlight ID: doc-14828
- Fundamental appraisal
Searchlight ID: doc-14829

CHECK & CHALLENGE

Explain

1. Explain why athletes seek feedback from a teacher or coach who will help them improve their technique and performance.

Elaborate

2. Discuss the merit of using performance criteria to evaluate a skill in comparison to using only the outcome of the performance as a measure of success.

Evaluate

3. How should your movement proficiency be assessed in a school situation? Think about which of the methods of assessing movement proficiency is the most practical in a school situation and why. Which method of assessing movement proficiency is most accurate? Explain your answer.

1.3 Skill acquisition – the stages of skill learning and types of skills

When learning a new skill, there are three distinct stages of progression: the cognitive stage, the associative stage and the autonomous stage. The types of skills you can learn are categorised into distinct types; these are closed skills, open skills, discrete skills, serial skills and continuous skills.

ENGAGE

When learning a new skill, the basic skills developed during childhood are used. Skill acquisition is a staged process and, depending on the type of skill, the process can be achieved rapidly or sometimes more slowly, depending on the complexity of the task, the quality of feedback and ability of the performer. A teacher or coach is vital when learning new skills as they provide the activities, feedback and instructions that enable the skill to be mastered. In this section, all of these areas will be addressed.

Can you remember when you first learned to ride a bike? In pairs, discuss the stages of learning for this skill.



How does a beginner become an athlete?

Explore

Skill acquisition

Skill is the learned ability to bring about predetermined results with maximum certainty, often with minimum outlay of time or energy or both. Skill acquisition is the processes in which individuals learn motor skills.

Stages of skill learning

Whenever an individual is learning a new skill, the teacher or coach should understand the stages of learning and be able to recognise at which level of performance the learner is. The three stages of learning are:

1. cognitive stage (or beginner stage)
2. associative stage (or practice stage)
3. autonomous stage (or automatic stage).

Cognitive stage

Individuals who are at the **cognitive stage** of skill learning need to learn how to execute the skill. You can assist beginners by first demonstrating the skill a number of times so that they can get an idea of the skill, and by identifying two or three key points to focus on. A visual demonstration is a powerful teaching tool.

Demonstrate the skill so the player can visualise the skill and then have the player practise it. After allowing the person to practise the skill for a while, point out their errors, re-emphasise and demonstrate the key points and then have the learner practise the skill again. Be aware that during this first stage of skill learning, the beginner's movements will often appear uncoordinated and a large number of errors are common.

Associative stage

During the **associative stage**, the individual is beginning to get the feel of the movement and fewer errors are made. Demonstrations and feedback in this stage can help individuals to refine their skills. It is important to note that the time spent in this stage will depend on a number of factors, such as the complexity of the skill, the motivation of the individual, the ability of the coach to detect errors and to provide accurate feedback, and the individual's abilities and past experiences. Some people may not ever progress from this stage.

Autonomous stage

In the **autonomous stage**, the individual is able to complete the skill with little conscious effort. The skill could be sped up or slowed down, depending on the requirements of the situation. Other information can now be taken in, such as the opponent's moves, the weather conditions and other external factors that may affect the skill. At this stage an athlete can focus on other factors, such as application of different degrees of force or spin.

DID YOU KNOW?

Most people are able to move to the associative stage of skill learning quite quickly; however, entering the autonomous stage may take months or years of practice, and some people may never be able to progress to the autonomous stage. The younger a person is when developing a skill, the more likely it is they will progress through to the autonomous stage.

Classification of skills

The teacher or coach should be knowledgeable about the different types or classifications of motor skills, as these have implications in terms of skill acquisition and practice. A common classification is to consider skills as either closed or open. Closed and open skills represent the end points of a continuum, as shown below.



Skill classification continuum

Closed skills

Closed skills are performed in an environment that is stable, predictable and allows performers to plan their movements in advance. Performers executing a closed skill are in full control of the timing or speed of the skill. Examples of closed skills are a golf swing, a gymnastics routine, taking

a free throw in basketball and swimming in a pool. Closed skills can usually be mastered more easily because success is a matter of practising the movement and repeating it until the skill is learned.

Open skills

An **open skill** is a skill performed in an environment that is variable and unpredictable. Open skills are usually externally paced and performed in a constantly changing environment. Performers therefore need to be aware of these changes and adjust their movements to suit. Examples of open skills are batting in cricket, softball or baseball, and playing team sports that have opposition, such as football, netball and hockey.

Open skills are often more difficult to learn, as more decisions need to be made before executing the skill. For example, receiving a pass in netball requires you to make decisions on where to move to receive the ball, at what height and speed the ball will come at you, where your opponent will be and what you will do when you receive the ball. When learning skills, it may be possible to 'close' the skill down, then gradually 'open' the skill over time. Using netball as an example, passing and catching the ball can be done in a closed environment by passing it to a stationary player. When that is mastered, you can open the skill by receiving the ball on the move, then adding token opposition, followed by full opposition, a lead-up game and, finally, a full game.



Taking a free throw in basketball is an example of a closed skill. Here, Lauren Jackson shoots from the free throw line.



Taking a contested mark in Australian Rules football is an example of an open skill. Opposition and the weather can affect skill performance.

Discrete, serial and continuous skills

Another method of classifying skills is according to the way in which the timing of the movements are organised. Skills classified in this way are referred to as discrete, serial or continuous skills.

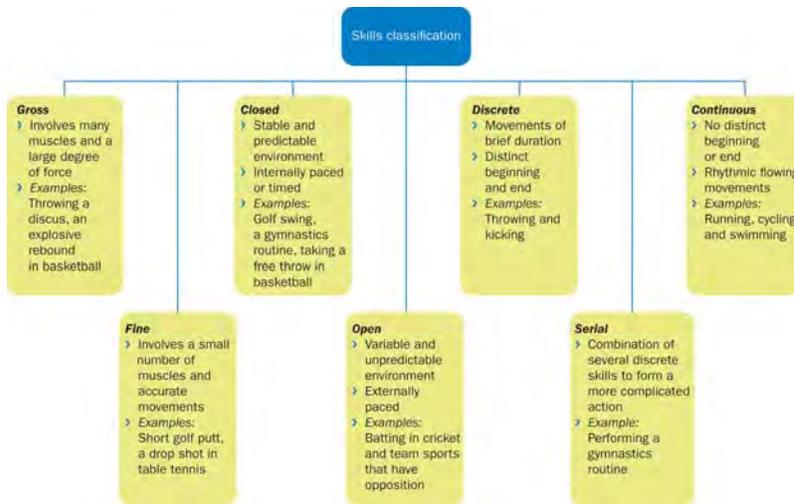
Discrete skills involve movements of brief duration, and they have a distinct beginning and end. Examples include throwing and kicking a ball.

Sometimes, discrete skills are linked to form more complicated actions. These types of skills are classified as **serial skills**. The duration of serial skills is longer, and each individual movement in the series has a definite beginning and end. However, the order of the elements that make up the total skill is often crucial to performance success. Performing a gymnastics routine is an example. Such skills are best acquired by breaking the skill down into its component parts and then linking them back together.

Continuous skills have no distinct beginning or end. These skills or movements are often repetitive or rhythmic in nature and may continue for several minutes. Examples include running, cycling and swimming.

A final way of categorising skills is in relation to the degree of muscle force required for successful outcomes. At one end of the spectrum, some skills require the involvement of all muscles, activated by strong and continuous messages sent via the nervous system. These movements are referred to as **gross motor skills**. Examples include lifting a heavy weight and throwing a javelin.

Conversely, some sports require the use of few muscles, activated by a small number of nervous impulses. These are referred to as **fine motor skills**. Examples in sport of fine motor skills include darts, billiards, shooting and archery.



Summary of skill classifications

ACTIVITIES

1 Summarise

The stages of skill learning are clearly described in this section. Use the table below to summarise the three stages of skill acquisition.

Stage	Characteristics	Examples in sport
Cognitive		
Associative		
Autonomous		

2 Continuum

Create a continuum with closed skills at one end and open skills at the other. In pairs, discuss where each of the following would sit. Give reasons for your answers.

- 100-metre sprint
- Archery
- Marking in football
- Motor car racing
- Receiving a pass in netball
- Serving in tennis

- Vault in gymnastics
- Tenpin bowling

CHECK & CHALLENGE

Evaluate

1. Which of the stages of skill learning do you think requires the most input from a coach? Why?

Elaborate

2. For each of the five categories of skills, list three skills or activities which exhibit the characteristics of that type of skill.

Evaluate

3. Which of the five categories of skills do you believe would be the most difficult to teach or learn? Which would be the easiest? Justify your answers.

1.4 Factors affecting skill acquisition

Skills are learned by practising in a range of ways. Practice is important, but so too is feedback about the performance. This is best provided by a teacher or coach, who should understand that a number of factors can influence skill learning. These factors include practice, feedback and transference.

ENGAGE

Skills can be practised as a whole or broken down into parts. Practice can be spread over a number of sessions or be completed in one intense block. Which of these methods is best for learning a new skill? In this section, each of these methods is investigated and you will be able to make a decision about which is best.



Practising is an important part of skill learning.

Explore

Practice

Practice is essential for the acquisition and development of movement and sport-specific skills. The teacher or coach should be aware of the different types of practice and should select the method that optimises the individual's ability to learn. The main types of practice are:

- massed and distributed practice
- whole or part practice
- mental and physical practice.

Massed and distributed practice

Massed practice involves practice over a long period of time. This type of practice is most suitable for highly skilled and motivated performers. An example would be practising 50 tennis serves in succession.

Distributed practice involves short sessions interspersed with periods of rest, during which either feedback is provided or another skill is practised. Distributed practice is more suitable when the athlete is learning a new skill, when the skill is complex and/or physically demanding or when the learner's motivation is not high.

Whole or part practice

Whole practice involves practising a skill in its entirety, whereas **part practice** involves breaking down the skill to practise it in parts. Some skills are best practised in their entirety; for example, a golf swing. Others, such as a basketball lay-up, might best be broken down into component parts,

with each part practised in isolation, before the parts are combined and practised as a whole. In this example the dribbling and shooting components would be practised in isolation before they are combined for the lay up.

Physical and mental practice

Most of us are familiar with **physical practice**, which involves actually performing a skill. In contrast, **mental practice** involves imagining or visualising the skill in your mind. Elite athletes use such mental imagery to improve their skill levels.

Feedback

Feedback provides us with information about the quality of our performance. This is usually in the form of knowledge of performance or knowledge of results.

Knowledge of performance is information about the actual quality of performance itself; for example, was the skill performed with the correct technique? This feedback may be provided by an external source, such as the coach, or it may come from the individual performing the skill who has a 'feel' for the quality of the performance.

Knowledge of results is feedback about the outcome of the movement or performance; for example, whether a serve in tennis was in or out.



A coach can provide valuable feedback to an athlete about his or her performance.

There are other types or forms of feedback. Internal or **kinaesthetic feedback** is about the 'feel' of the movement. For example, a golfer can often feel whether the shot was a good one by the way the movement felt and the way his or her body flowed during its execution. On the other hand, external or **augmented feedback** can be provided by visual, verbal or aural (hearing) signals. For example, a golfer can tell that he or she hit the ball well by the sound made on contact, by seeing the ball flying down the fairway or by being told that the shot was a good one.

Feedback is very important if players are to improve. For feedback to be effective, it is best given as soon as possible during or after the performance and it should be positive rather than negative. People are much more receptive to feedback that is positive in nature. It is likely to motivate more, increasing the likelihood of the performer practising more, increasing their success that serves as a further motivational tool. The precision of the feedback given is also very important. Feedback

such as 'well done' is good for encouraging beginners. Feedback such as 'you need to follow through more at the end of your throw' followed by 'try putting your throwing hand in your back pocket after you have released the ball' is also specific and valuable for the learner. It is vital that a teacher or coach moves around and provides feedback to as many individuals as possible. It is important to use feedback effectively so that individuals and teams can optimise their performance.

DID YOU KNOW?

People are able to process only two or three pieces of information at once. Feedback regarding performance should be limited and should be given as soon as possible upon completion of the skill.

Transference

Skill transference occurs when the learning or development of one skill can be used in the acquisition and development of another skill. This is possible because we are able to 'withdraw' past experiences from our 'skills bank' and transfer them to similar movements and skills. For example, there are certain similarities and basic principles that apply to all methods of kicking, regardless of whether it is in Australian Rules football, rugby or soccer. Transference can also relate to the way individuals think about rules, space, time, tactics and strategies. Familiarity with the use of space and time in soccer, for example, can be beneficial to hockey and lacrosse.

Transference also enables a player to adopt movement strategies and elements appropriate for a game or performance. This includes athletes being aware of their own body in relation to space, such as in a diving or gymnastics routine. This spatial awareness is vital in team games, as performers need to be aware of other players and their movements. An understanding of the elements of space and time are vital for an athlete to thrive in sport. The use of time and space can be manipulated by skilled performers to improve the chances of a successful outcome. Examples include:

- use of space — space can be used by a team to enable a performer more time while in possession of a ball, increasing the likelihood of an accurate pass. This can be achieved in a sport such as soccer where a ball is passed to a player on the other side of the field. Conversely, defenders attempt to close down space, to apply pressure on the ball carrier and reduce their time in possession.
- use of time — time can be used to advantage. A basketball team playing against another who has poor speed may increase the speed of play to reduce the time available for the opponents to defend the ball, increasing the chance of success. A team leading may also decide to 'waste time' by deliberately holding onto and passing the ball instead of trying to shoot.



Skill transference occurs when the learning or development of one skill can be used in the acquisition and development of another skill.

ACTIVITY

Do it

Complete the laboratory activities in the **Feedback** worksheet in your Resources section and comment on the effect of feedback on performance.

eBook *plus*

Worksheet

Feedback

Searchlight ID: doc-14831

CHECK & CHALLENGE

Explain

1. List three key factors that affect skill learning.
2. Use an example to illustrate the difference between internal and external feedback.

Evaluate

3. Evaluate how open and closed environments affect the learning of skills.
4. What type of feedback is most useful for your learning?

Elaborate

5. Outline the difference between a technique that is incorrect and one that is individualised.
6. How is skill transference important for achieving and promoting an active lifestyle?
7. Describe an open skill from a sport of your choice and explain how you would 'close it down' when teaching it to a beginner, and then gradually 'open' the skill when success has been achieved at the previous stage.

1.5 Biomechanics and its application to human movement

Biomechanics is an area of sports science that applies the laws of physics and mechanics to promote performance in sport. A basic knowledge of biomechanics can assist athletes and coaches to produce better results.

ENGAGE

In this section key biomechanical concepts will be presented to help explain how each can be applied to improved performance. When combined with good technique, the result is maximal performance. The concepts to be presented are:

- application of force
- projectile motion
- balance and stability.

The Fosbury Flop is a high jump technique pioneered by Dick Fosbury at the 1968 Olympic Games. Fosbury was successful in clearing 2.24 m because this technique allowed him to clear the bar in an arched position while his body's centre of mass passed under the bar. This is an excellent example of how biomechanical principles can be applied to improve athletic performance. Fosbury's technique is still the technique used today by all elite high jumpers.

eBook *plus*

Weblink

Fosbury Flop

Use the **Fosbury Flop** weblink in your Resources section to see footage of Dick Fosbury's performance at the 1968 Olympic Games.



Sumo wrestlers try to maximise their stability to ensure success against an opponent who is attempting to knock them off balance.

Explore

Biomechanics

Skills can be very complex to perform, and to understand how such movements are produced, we can turn to the science of biomechanics. Biomechanics studies the forces and their effects on and within the human body.

Understanding biomechanics can produce the following benefits for coaches, teachers and athletes:

- Optimisation of skill performance and proficiency by developing the most efficient and effective technique
- The design and development of improved equipment and materials to maximise sports performance, as well as the development and modification of sports equipment to widen participation; for example, junior-size equipment allows participation at a younger age
- The transference of skills from the practice field to the playing field; for example, batting tees, ball-throwing machines, swimming flumes, and video and computer software allows athletes to enhance technique in practice and apply this in competition
- Prevention and reduction of injuries through an understanding of injury causes and the development and application of proper technique.

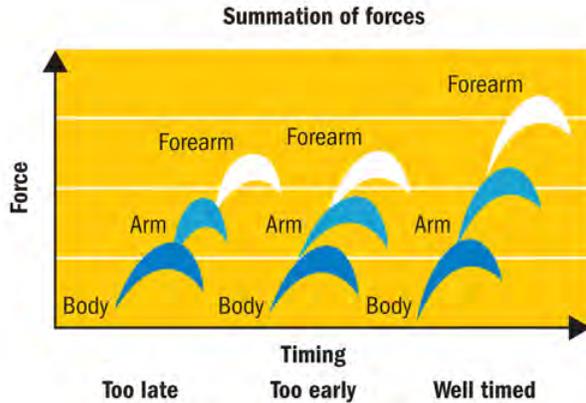
Force production and application

The performance of all movement and motor skills — including running, jumping, throwing, kicking and striking — requires muscular force being produced and applied. How effectively the force can be developed and applied often goes a long way towards determining the proficiency with which the skill is performed. The following biomechanical principles are important factors to consider in force production and application.

Summation of forces

Summation of forces is necessary when a maximal effort is required, such as kicking a football for distance, throwing a javelin, fast bowling a cricket ball, performing the high jump or performing a vault in gymnastics. This summation means the adding of different body parts to accumulate a greater overall force via the contribution of all these parts. To achieve the best results, the individual must combine movements of these different body parts into a coordinated sequence of movements. Summation of force can occur in two ways: the sequential summation of force or simultaneous summation of force.

Sequential summation of force is when a sequence of body movements takes place, starting with the larger, more powerful body parts to produce the initial force, and then transferring this force to the next moving part and eventually finishing with the smaller, lighter body parts. To achieve the greatest possible force, each segment must contribute by developing its greatest force before the next body part comes into action. As well as developing the maximum force of each preceding body part, each subsequent body part needs a stable base to summate the force effectively.

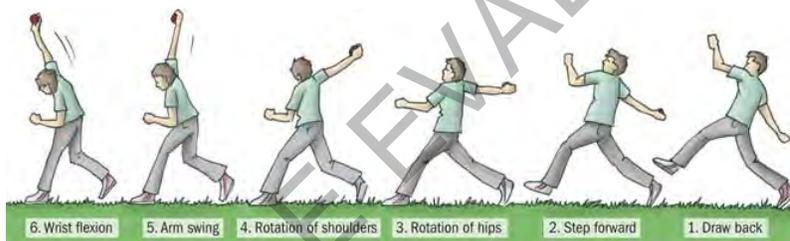


Timing of sequential summation of forces

Fast bowling in cricket is a good example of sequential summation of force. In the delivery action, there is a sequence of body movements beginning with the larger, heavier body parts (legs, trunk) and finishing with the smaller, lighter body parts (wrist, hand):

1. The first part of the delivery action is the step forward onto the front foot.
2. This then provides a stable platform for the rotation of the hips and trunk.
3. Momentum is then transferred to the shoulder and the arm swing, followed by wrist flexion and the release of the ball from the hand and fingers.

The figure below illustrates the concept of sequential summation of force in bowling.



The delivery action in fast bowling in cricket showing the sequential summation of force

Players who cannot throw a ball as far as expected may not be carrying out summation of forces correctly. You may need to ask yourself when analysing the movement or skill:

- Are as many body parts as possible being used to contribute to the desired outcome?
- Are the body parts that are larger and stronger operating before the smaller, faster muscles?
- Are the body parts being used accelerating in the correct order, so that each body part contributes to an optimal level before the next body part comes into operation?

eBook plus

Interactivity

Cricket: fast bowling

Searchlight ID: int-5484

- Is each body part stabilising around a solid base to enable each following action to accelerate optimally?
- Are the body parts that are lighter but move more quickly used at the point of release? You may like to apply this to other skills.

Simultaneous summation of force takes place when an individual performs a skill like the high jump or a gymnastics vault. The performer carries out an explosive action with maximum force over a very short period of time. The aim of this type of force production is to develop vigorous and powerful movements of the arms and legs to produce a powerful take-off.

Impulse

Another means of increasing the amount of force production or momentum imparted during a movement is by applying the force for a longer period of time. This is the principle of **impulse**. Impulse is important in many sports, including the start of the 100-metre sprint in athletics, leaving the blocks in swimming, pitching in softball and baseball, the discus throw, and performing the push pass in hockey. For example, in discus, it is beneficial to perform a circular spin before releasing the discus, rather than throwing from a standing position; this allows the athlete more time to generate muscular force.

In the 100-metre sprint, two techniques are used at the start of the race to generate greater impulse:

1. Pushing from the blocks to maintain a strong forward force for as long as possible
2. Taking short, sharp steps over the first 10–20 metres, which allows the feet to push repeatedly against the track and magnify the force applied.

Absorption of force

Just as a person can generate force by applying it over a period of time, the same principle can be used to absorb force. This is important in instances such as catching a ball. Absorbing the force means that the object that is in motion is being slowed or stopped. The longer the force is absorbed the easier it is to slow down. This absorption of force can be achieved via a number of ways. Examples include altering the technique of a skill or by using equipment that can absorb the impact for a period of time. Some examples are listed in table 1.1.

Table 1.1: Example of absorption of force

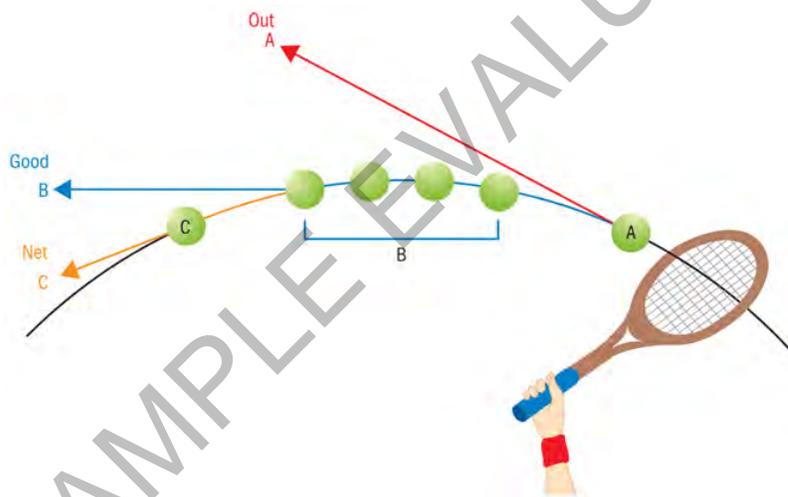
Absorption of force by altering technique	Absorption of force via use of equipment
A cricketer attempting to catch a hard cricket ball will let the ball hit their hands and move their hands in the direction the ball is going, enabling the force to be absorbed over time.	A high jumper performing the Fosbury Flop will have their force absorbed by a thick high jump mat. The thicker the mat, the longer the force can be absorbed and the easier it is for the jumper to slow down safely, with the mat absorbing the force instead of the jumper.

Absorption of force by altering technique	Absorption of force via use of equipment
A netballer who jumps up to receive a pass will land and attempt to absorb the force over a long period of time. This is achieved by bending their knees when landing and continuing to do so until the force is absorbed.	A tennis racquet with loose strings will absorb the force of a tennis ball easier, as the ball is in contact with the strings over a period of time. If the strings were tight, then the ball will not be absorbed by the strings as readily, requiring the player themselves to generate more force to overcome the force of the ball.

Accuracy

In some sports, maximum force is not required; rather, accuracy is more important. Accuracy in throwing and striking can be improved by 'flattening the arc'. This is achieved by moving the axis of rotation (the shoulder joint) forward in the direction of the throw just prior to the time of release of the ball. The arm should straighten as the shoulder moves forward because of the transfer of weight onto the front foot and the rotation of the trunk.

When a player serves in tennis (see the figure below), he or she creates a flattened arc of the racquet head by the shift of body weight forward and the rotation of the body prior to the moment of contact. When a player hits a softball, the arc is flattened due to the rotation of the trunk, which moves the shoulders forward, and the transference of weight onto the front leg just prior to contact.



The correct trajectory is obtained by striking the ball at point B; this is called flattening the arc.

Projectile motion — velocity of release and angle of release

Throwing, striking and kicking skills all involve objects such as balls and implements (for example, discus or javelin) being projected into the air. In biomechanics, this is known as **projectile motion**, where the object moving through the air is referred to as a **projectile**. A projectile's flight path (trajectory) is influenced by a number of factors, of which velocity of release and angle of release are the most important.

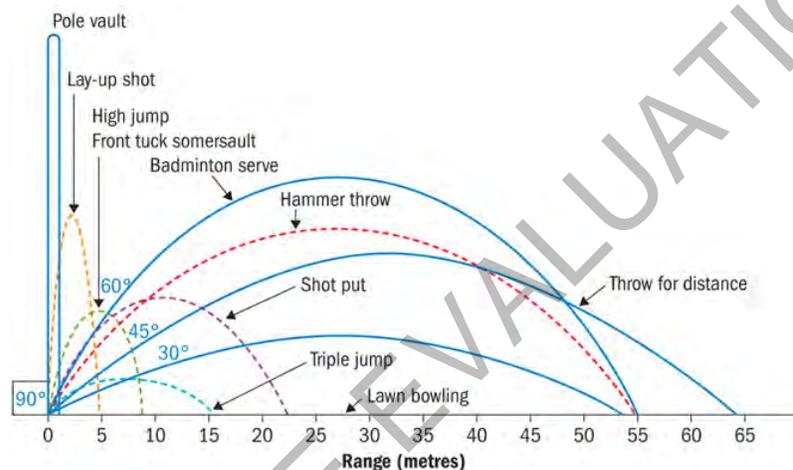
Velocity of release

Velocity of release is the most important factor for achieving maximum distance of a projectile. Basically, the greater the velocity of release, the greater the distance achieved. Velocity of release is largely determined by the principles of force production (summation of force and impulse) discussed previously.

Angle of release

When attempting to achieve maximum distance in throwing and kicking skills, the optimal **angle of release** of a projectile is 45 degrees for any given velocity of release. This angle of release provides equal components of vertical and horizontal force. However, this applies only when the height of release and height of landing are the same, and when spin and air resistance are not present.

Given that this is rarely the case, the optimal angle of release for achieving maximum distance in most sporting activities is usually less than 45 degrees, with an angle of between 35 and 45 degrees being most common. The figure below shows the optimal angles of release for various sporting skills. When height is required, the angle of release increases, such as during a pole vault or high jump.



Optimal angles of release and associated trajectories for various sporting skills

Balance and stability

In sport, balance and stability can make the difference between an effective or ineffective performance. **Stability** is an object's resistance to movement from a balanced position. There are two types of stability:

- *Static stability* – when an object is at rest
- *Dynamic stability* – when an object is in motion.

The stability of an object depends on a number of factors, including:

- the area of the object's base of support
- the height of the centre of gravity of the object above the base of support

- the position of the line of gravity relative to the base of support.

The area of the base of support

The area of the **base of support** of an object refers to the part or parts of the object in contact with the support surface. For example, the hands are in contact with the floor in a handstand, and the head and hands are in contact for a headstand. The area of the supporting base of the object is directly related to its stability; the greater the area of support, the greater the degree of stability. Therefore, stability can be increased by increasing the area of the base of support. This can be achieved by making contact with more body parts or by spreading the body parts so that they cover a greater area, such as when placing the feet further apart prior to receiving a bump in football.

Centre of gravity

The **centre of gravity** of an object refers to the point in the object or body through which the downward force of gravity acts. Generally, the higher the centre of gravity of the object above its base of support, the less stable the object. Lowering the centre of gravity of an object relative to its base of support acts to increase the stability of the object. Individuals can increase their stability by bending their knees and thereby lowering their centre of gravity.



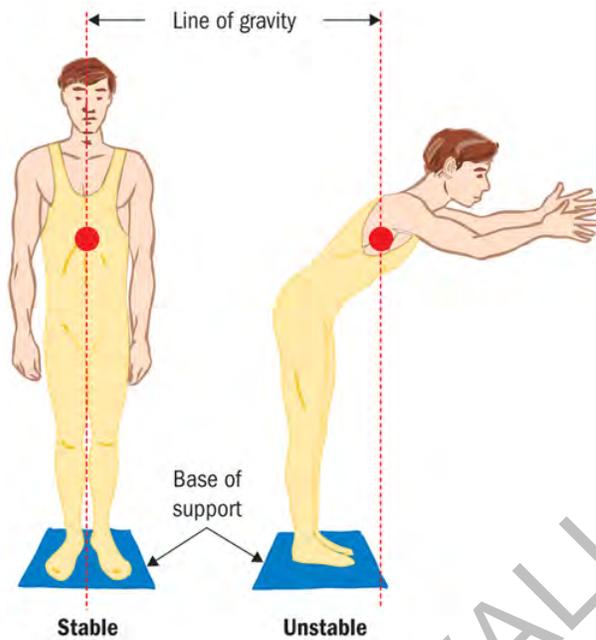
The height of our centre of gravity changes according to the skill we are performing.

Line of gravity

The **line of gravity** is an imaginary vertical line passing downwards through the centre of gravity. The closer the line of gravity is to the limits of the base of support, the less stable the object. In some sports and skills, athletes deliberately position the line of gravity close to the limits of their base of support so that only a small force is required to get them moving in the required direction. Swimmers and runners on the blocks lean forward in the direction of intended movement, so that when the gun goes off, they require only a small amount of force to begin moving in the required direction (see the figure below). In a sprint, as soon as an athlete removes their hands from the

ground (when using starting blocks) their line of gravity is in front of the body, causing quick rotation of the body and an explosive start. The athlete is prepared for this and puts their foot out to stabilise themselves so they don't fall over. This is an example where a lack of stability is actually a good thing, allowing movement to be far quicker than it would otherwise be.

Other athletes who require a position of stability, such as sumo wrestlers (shown at the beginning of this section), attempt to do the opposite by positioning the line of gravity as far inside the base of support as possible.

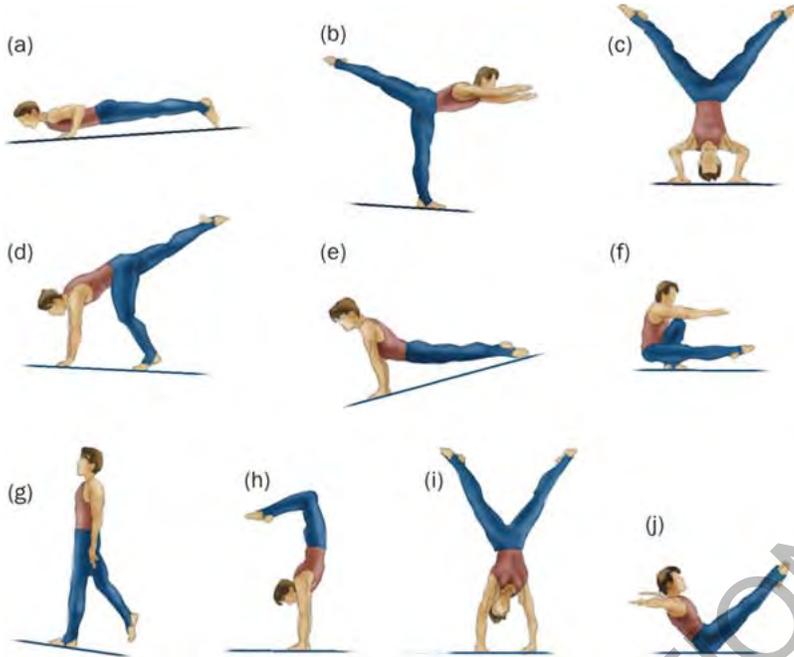


Stability is lost when the line of gravity falls outside the base of support.

ACTIVITIES

1 Stability

Rank the figures below from least stable to most stable. Then use the **Stability** worksheet in your Resources section and complete the activity.



2 Summation of forces

Use the **Summation of forces** worksheet in your Resources section and complete the activity.

3 Projectile motion

Use the **Projectile motion** worksheet in your Resources section and complete the activity.

4 Analysing the use of force using ICT

- In pairs, use the **Video analysis software** weblink in your Resources section or similar software on your laptop, tablet or phone to record a partner perform a bowl in cricket. After recording this action, compare it to the action found in the bowling illustration in this section. Based on these comparisons, make suggestions about how the performer can generate more force. Swap over on completion.
- Describe the benefits of using digital tools in helping to analyse a particular movement such as a bowl in cricket. What feedback can be provided that a coach cannot provide? Describe the link between feedback and improved performance, using this activity as a guide.

eBook *plus*

Worksheets

- Stability
Searchlight ID: doc-14833
- Summation of forces
Searchlight ID: doc-14834
- Projectile motion
Searchlight ID: doc-14832

Weblink

Video analysis software

CHECK & CHALLENGE

Explain

1. Explain the concept of impulse and its relationship to the amount of force or momentum that can be generated during the performance of a skill, such as throwing or kicking for distance.

Elaborate

2. Outline the difference between simultaneous and sequential summation of force.
3. What are three sporting skills that require sequential summation of forces and three that require simultaneous summation of forces?
4. Using a sporting example, explain the difference between static and dynamic stability.

Evaluate

5. What are the benefits that a knowledge of biomechanics can provide for coaches, teachers and athletes?
6. Select one of the following activities and then identify the biomechanical principles which can be applied to it. In each case, describe how the principle operates for the activity you have chosen.
 - a. Javelin throw
 - b. Tennis serve
 - c. Greco-Roman wrestling
 - d. 100-metre sprint

1.6 Practice and training regimes to improve performance

Performance of skills in a game or competitive situation requires practice and training in a less competitive and more controlled situation. Coaches set up practice regimes which allow the athlete to rehearse their skills and movement repeatedly.

ENGAGE

What are the different types of practices and training regimes available to and used by coaches and athletes? What tactics can be practised and rehearsed and how can athletes apply these to a game situation? In this section you will explore and answer these questions.

Use the **Training drills** weblink in your Resources section to view some training and skill drills. Do you think they are basic, intermediate or advanced drills? As a class, discuss what you think characterises an advanced skill drill.

eBook *plus*

Weblink

Training drills



There are many types of practice drills.

Explore

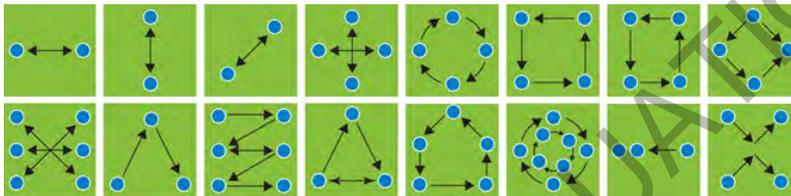
Practice and training regimes

In previous sections, we discussed practice as an essential factor in enabling individuals to acquire and develop proficiency in motor skills. We learned that practice could be massed or distributed, whole or part, and mental or physical. We will now consider some other aspects of practice that can assist us in acquiring and developing motor and sporting skills. An important element in developing skill proficiency is having the ability to perform the skills in game-like situations. Most often, skills are initially taught and practised through the use of basic skill drills. Many of these drills take place in lines, lanes, circles, squares or triangles, which can result in individuals attending to what is happening in only limited situations. If there is an overemphasis on practising the skills in this way, the individual may struggle to apply these skills in game situations, where peripheral vision and an awareness of teammates and opponents are required. Therefore, skills should be developed through basic skill drills to begin with and, once learned, individuals should advance their performance of these skills through intermediate skill drills, advanced drills and, eventually, game-like practice activities. This is to prepare individuals for the type of movements and situations that take place during actual games.

Basic skill drills

Basic skill drills are designed to allow the individual to learn and perform the skills in an environment where they do not have to consider outside elements such as the opposition or movement. In other words, they are performed in a closed environment. These types of drills are often performed with the individual stationary, or moving slowly at a walking or jogging pace. In this early phase of skill learning, if the individual is required to direct his or her attention to anything other than performing the skill itself (such as moving to provide support or taking notice of where an opponent is positioned), his or her focus can be distracted, leading to a lack of concentration on the performance of the skill.

In ball games such as basketball, Australian Rules football, soccer, netball and hockey, basic skill drills are usually set up with the players in formations such as lines, circles, squares or triangles (see the figure below). The ball is generally played in the direction of the arrows, with players performing the skills in a stationary position, or while walking or jogging. It is easy to imagine setting up such drills for any number and range of skills, such as the push pass in hockey or handballing in Australian Rules football. It is important that players are fully capable of performing a skill before advancing from basic to more advanced drills.



In ball games, basic skill drills are usually set up with the players in formations such as lines, circles, squares or triangles.

Intermediate skill drills

Once players have acquired the basics of the skill, the skill may then be practised using an intermediate skill drill. In intermediate drills, movement is the only other factor that the player must consider. The player must learn to perform the skill with movement involved, and with the pace of the movement slowly progressing, all the while attempting to perform the skill correctly. The types of movement involved should include:

- *stationary to moving* — performing the skill from a stationary position, or playing the ball to a moving partner or into a moving zone
- *moving to stationary* — performing the skill while moving, or playing the ball to a stationary partner or into a fixed zone
- *moving to moving* — performing the skill while moving, or playing the ball to a moving partner or into a moving zone.

Intermediate skill drills can also be set up with the players forming lines, circles, squares or triangles. In a moving to moving skill drill, the ball may move in one direction and the player in another.

Advanced skill drills

As the difficulty of the drill is increased, the aim is to make the activity more like a real game situation. With advanced drills, the challenge to the player is heightened by progressively increasing the speed with which the drill is performed, so that it eventually reaches match tempo. In addition, reducing the space and time the players have to perform the skill, introducing opponents and asking players to modify their skills (such as application of spin in a tennis serve) are ways to increase the degree of difficulty.

Use the acronym SSTEP to change any one or more of the parameters in table 1.2 to advance a skill drill.

Table 1.2: SSTEP parameters

Speed	<ul style="list-style-type: none">• The speed at which the drill is being performed• Having the player perform a number of repetitions within a set time limit or time frame
Space	<ul style="list-style-type: none">• Changing the amount of space available to the player performing the skill
Time	<ul style="list-style-type: none">• Changing the period of time in which the drill is being performed• Increasing the time period in which the skill has to be practised; this increases the physical demands on the performer• Decreasing the time period in which the skill has to be practised; this increases the speed of the performance
Equipment	<ul style="list-style-type: none">• Introducing different equipment, or setting up a drill with different equipment <p>By altering the equipment, the performer can be challenged to complete a skill using a more advanced technique. An example is a junior tennis player who learns to play using a short racquet that is easy to swing and hit a ball accurately. When the player is using this technique correctly, they can be challenged by introducing a longer racquet that will be harder to control but produce more force. The technique used for this longer racquet may be altered. For example, the player may hold the racquet closer to the head to maintain control and gradually lengthen this as they improve their skills.</p>
Pressure	<ul style="list-style-type: none">• Introducing opposition to the person performing the skill• This can be done progressively — first with token opposition, where the performer is not challenged for possession; second, allowing the performer to get possession and then providing opposition in the form of attempted blocking; and, finally, by providing full opposition where the possession is contested in a game-like manner.

Opposed drills

Introducing opposition into any skill drill will provide the stepping stone to performing the skill in a game-like situation. Opposed drills entail the player and opponent weighing up the available options and choosing the best way to perform the task. Other skills, such as tackling and evasion, are also developed alongside the focus skill in some sports.

Grid games

Grid games are an extension of intermediate and advanced skill drills. They take place, as their name suggests, within a grid or defined area and usually involve a relatively small number of players, such as three to five players per side. An example of a grid game would include a keeping-off type passing game, which requires players from each side to make a certain number of passes while moving continuously within the defined grid or area. As the players' movements are not as defined as in a skill drill, players must make decisions on where and when to move, as in a real game situation. Such games not only encourage awareness of time and space but also help develop characteristics of teamwork, such as running to support and communication. In grid games, it is also possible to limit the movement of players to certain zones within the grid or area (non-invasive practices). This allows players to develop positional sense, and limits the type and amount of opposition that they encounter. Grid games provide an opportunity for players to begin developing what is referred to as **tactical proficiency**.

Tactical proficiency

Tactical proficiency or **decision making** is the ability to weigh up game situations and decide which option to take and when to take it; for example, whether to carry the ball or pass it to a teammate, or whether to shoot for a score or pass to a player who is in a better position. Tactical proficiency can be developed through activities that closely mirror game situations.

Game sense

Game sense can also be considered as an approach to coaching that uses the game as the focus of the practice session. By focusing on the game (not necessarily a full game but, often, a modified version of the game), players are encouraged to:

- start thinking strategically about game concepts
- become more tactically aware and able to make better decisions during the game
- develop skills within a realistic context rather than practising them in isolation
- develop a greater understanding of the game being played.

By using a game sense approach, players are challenged to think about what they are actually doing and why. Game sense activities require players to perform skills while in situations that simulate those they may be exposed to in a real game. Players are forced to weigh up the choice of which skill to perform, and how to perform the skill in order to complete the drill. These sessions help players quickly choose the appropriate technique at the right time during the heat of a game.



Game sense activities are an essential link between the development of skill or technical proficiency and being prepared to play in full-game situations. A game sense approach to developing tactical awareness and proficiency is addressed in more detail in chapter 3.

Learning about rules, strategies and tactics educates players to make good decisions during a game.

Synchronicity

An even more advanced skill is the creation of movement sequences aligned to the movement of others. Sometimes these are **synchronous** movements that require two or more athletes to move in unison for optimal performance to occur. Synchronous movements mean to move at the same time. Synchronised diving is an example of such an activity where two divers perform the same dive simultaneously. In a game of volleyball, a skill that requires synchronous movements is that of two athletes jumping up at the net together to block an incoming spike.

Individual movements are done by a performer in isolation. Using the above examples, a diver performing by themselves or a volleyballer independently performing a serve, dig or set are examples of these types of movements. In team sports the individual movements performed by different players are combined to create a set play. This can occur at the same time, such as in a game of soccer where two athletes may perform a run into the penalty area to enable the player with the ball to keep dribbling and provide options for a pass to these players. Others are done in sequence, such as in volleyball where one player receives and passes a serve via a dig, then a different player sets the ball up for a third player who attempts to spike the ball down for a winner.

ACTIVITIES

1 Drill down

1. Work with a partner and select a skill from a sport of your choice.
2. Describe a basic, intermediate and advanced skill drill that you could use when teaching the skill to a group of secondary school students. Make sure that your three skill drills show progressions.
3. Demonstrate any one of your skill drills to the class during a practical session.

2 Game, set, match

List as many examples in sport as you can where set plays and routines can be applied to the advantage of the team.

3 SSTEP parameters

Refer to table 1.1 and create a skill drill for each of the five steps by using one of the following skill drill levels.

- Basic
- Intermediate
- Advanced
- Opposed

4 Creating a synchronous routine

In a group size of your choice, complete the following tasks in relation to *either* a dance routine or gymnastics routine.

1. Choreograph (plan) together a routine of your choice.
2. Practise the routine, aiming to incorporate synchronous movements between participants.
3. Video the performance using a tool of choice, such as Dartfish or Coach's Eye (many free options out there for you to use!).
4. Using this footage, critique the performance, highlighting areas of individual and group strengths and weaknesses.
5. Use this feedback in your next stage of practice with an emphasis on improving the quality of individual and group performance.
6. Video the 'final' performance and again critique the quality of the performance.
7. Discuss the benefits of using ICT as a mechanism to improve performance, particularly in regards to synchronicity and timing of movements.

CHECK & CHALLENGE

Explain

1. Outline the key differences between a basic, intermediate and advanced skill drill.

2. Which level of skill drills are grid games best suited for?

Evaluate

3. How can training and skill drills be used to build and improve the game sense of an athlete?
4. What does 'game sense' mean to you?
5. Explain why a long distance runner will prefer to use a shoe with thick padding on the sole as opposed to a sprinter who wants a thin padding.

Review

What have I learned?

- Fundamental motor skills are common movement activities such as running, jumping, catching, throwing, kicking and striking. They are the precursor movements to the more specialised, complex skills used in games, sports and physical activities.
- Measures used to assess movement proficiency include observation; checklists; rubrics and rating scales; measurements; norm- and criterion-referenced standards and percentile ranks; and statistical information.
- Teachers and coaches often possess movement and sport-specific knowledge and experience, as well as an understanding of the principles of skill acquisition and biomechanics.
- Skill acquisition is the movement science concerned with the processes and ways in which individuals acquire and learn motor skills.
- Feedback and practice are two other important factors affecting skill learning and acquisition.
- Biomechanics is the science that applies the laws of mechanics and physics to human movement.
- Summation of forces can involve either sequential summation of forces or simultaneous summation of forces.
- Impulse refers to the amount of force applied to an object and the period of time over which this force is applied. It is important in many sports, including the sprint start technique in athletics, pitching in baseball and performing the push pass in hockey.
- Accuracy in throwing and striking skills is often obtained through the application of the concept of 'flattening the arc'.
- The stability of an object depends on a number of factors, including the area of the object's base of support; the height of the centre of gravity of the object above the base of support and the position of the line of gravity relative to the base of support.

- Skills should be practised through basic skill drills to begin with, progressing through more complex intermediate and advanced drills, and, eventually, game-like practices such as grid games and game sense drills.

CHECK

1. Link a fundamental movement skill to a manipulative skill by describing an example of how this works in a sport of your choice.
2. Explain how you would ensure consistency in assessing a gymnastics or dance routine. List the criteria you would expect judges to follow.
3. For a specific sporting skill, outline a plan of action to take a beginner from the cognitive stage through to the associative stage of skill learning.
4. For a specific sporting skill, explain how you would close this skill down so that a beginner could learn it, and then how you would gradually open it up as the learner became more proficient.
5. Select a sport and describe a typical training session that improves performance in a game situation.
6. Define the key words and terms of the topic using the **In my words** worksheet in your Resources section.

eBook plus

Worksheet

In my words

Searchlight ID: doc-14835

eBook plus

Interactivity

Multiple choice quiz

Searchlight ID: int-5383

eBook plus

Interactivity

True/false quiz

Searchlight ID: int-5384

eBook plus

Interactivity

Crossword

Searchlight ID: int-5385

ESSENTIAL QUESTION REVIEWED

Why is it important to identify and measure the proficiency of movement in athletic performance?

Evaluate your initial response to the essential question now that you have studied the topic.

SAMPLE EVALUATION ONLY