

BWF

BADMINTON COACH EDUCATION
COACHES' MANUAL



LEVEL 2

ACKNOWLEDGEMENTS

The BWF would like to acknowledge and thank the following individuals and organisations who have made a significant contribution to the development of this resource and the other components of the BWF Level 2 Coach Education Course.

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CONTINENTAL CONFEDERATIONS

- Badminton Africa www.badmintonafrica.org
- Badminton Asia www.badmintonasia.org
- Badminton Europe www.badmintoneurope.com
- Badminton Pan Am www.badmintonpanam.org
- Badminton Oceania www.oceaniabadminton.org



MORE INFORMATION

The resources for BWF Coach Level 2 are available in different languages. The materials can be downloaded from the BWF website.

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MODULE 1
OVERVIEW

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01. BWF COACHING FRAMEWORK

Welcome to the BWF Level 2 Coach Handbook, which is designed to support candidates studying for the BWF Level 2 Coach Award. This award sits within a framework that is outlined in the table below.

The BWF Coaching Framework has the following course types and target groups.

COURSE / AWARD	TARGET GROUP	FORMAT	CONTENT	OUTCOMES / ASSESSMENT
BADMINTON TEACHING CERTIFICATE	Current or training teachers/PE teachers	8 hour course - 1 day format or 8 x 1 hour modules	Basic badminton skills and knowledge - technical, physical and tactical elements – and how to deliver safe and fun badminton sessions for children	Teachers are able to plan and deliver safe, structured and fun badminton activities and sessions Assessed by course tutors
COACH LEVEL 1	Motivated candidates with basic badminton experience / knowledge; PE teachers with badminton teaching certificate	9 day course or 2 x 2 day course with guided coaching practice in between	Basic coaching principles What to coach - Level 1 - technical, tactical, physical and physical elements How to coach - Level 1 – basic coaching methodology Planning and delivery of progressive coaching sessions	Demonstrates basic coaching competencies through effective planning, delivery, review and evaluation of linked coaching sessions Safe management of group activities Assessed by course tutor
COACH LEVEL 2	Level 1 coaches or equivalent. Players with national / international badminton experience	Minimum 6 days tutored activities. Plus tasked and guided coaching practice and planning	Coaching principles How to coach - Level 2 coaching techniques What to coach - Level 2 - technical, tactical and physical and elements with underpinning scientific principles and knowledge Planning and delivery of annual training and competition programmes for individual badminton players	Able to construct and deliver annual training and competition plans. Individual training plans and programmes underpinned by sports science principles. Effective management of groups of players up to elite performance level Assessed by course tutor
COACH LEVEL 3	Level 2 coaches or equivalent with minimum of 3 years coaching experience	Tutored generic and specialist modules Long study of an agreed area of research to demonstrate competence	Advanced planning and delivery for a specialized audience: <ul style="list-style-type: none"> • Children • Elite Performance • Coach Education 	Demonstrate an in-depth knowledge of selected specialist area Ability to manage and integrate other coaches and experts into on-court /off court training plans Long study of an agreed area of research to demonstrate competence Assessed by a panel of relevant coaching experts
COACH LEVEL 4	Highly experience coaches with experience of managing programmes	Graduate/post-graduate level study of approved specialist subject (minimum 12 months)	Advanced level long term planning, delivery and management in chosen area of expertise The application of sports science research, innovative and best practice	Demonstrate long term developmental programmes and planning in specialist area, which includes research and innovative practice Thesis produced on specialist area Assessed by external panel of relevant coaches / sports scientists with badminton experience
COACH EDUCATORS - TUTOR / TRAINERS	Coaches with existing experience in coach development or very experienced coaches with relevant competences	Course length appropriate to the level of award	Relevant to the level of award – such as: <ul style="list-style-type: none"> • Schools Badminton Tutors • Schools Badminton Trainers • Level 1 Coach Educators 	Able to deliver to adult coaches and PE teachers catering to various learning styles and incorporating various teaching / learning techniques. High level of communication skills Assessed by external assessor

02. COURSE CONTENT

The content is outlined in the table of contents for this Coaches Manual – however the table below provides a brief summary of the content for each module.

MODULE	TITLE	BRIEF DESCRIPTION
MODULE 1	Overview	Background to: the BWF coach education framework, the manual structure and badminton as a global sport.
MODULE 2	How to Coach	The coaching process, planning, delivery and review; together with an introduction of the pedagogical aspects of coaching.
MODULE 3	When to Coach	Maturation factors – from childhood to adults.
MODULE 4	Performance Factors	Overview of factors affecting performance in badminton and an introduction to the key principles of adaptation and recovery.
MODULE 5	Performance Factor 1 - Technical – (Hitting Skills)	Builds on the basic technical skills introduced in Level 1 and incorporates additional techniques and the contexts of when these are most used.
MODULE 6	Performance Factor 2 - Technical – (Movement Skills)	Builds on the basic technical skills introduced in Level 1 and introduces specialist movements used in singles and doubles.
MODULE 7	Performance Factor 3 - Tactics	Concentrates on competition coaching and the introduction of performance analysis.
MODULE 8	Performance Factor 4 - Physical	Introduces the key underpinning scientific principles and applies them to coaching situations.
MODULE 9	Physical – Fitness Testing	An introduction of testing protocols relevant to badminton.
MODULE 10	Performance Factor 5 – Sports Psychology	An introduction to the key sports psychology principles which can be applied to coaching situations.
MODULE 11	Performance Factor 6 – Lifestyle	An introduction to sports nutrition and parental influence.

Video material is available to support the content of Modules 5, 6, 8 and 9.

Please refer to the next page for video clips.

03. VIDEO CLIPS

Video clips are available and these support the content of Modules 5, 6, 8 and 9.

The clips demonstrate Movement Skills, Hitting Skills and Physical elements of badminton, including physical testing protocols. These clips compliment, and build on, the resources which were produced for Level 1.

The table below is a summary of the titles of the 106 video clips and the module and content area they link to.

These clips can be viewed and downloaded online – www.bwfbadminton.org

MODULE / CONTENT	VIDEO CLIP TITLE
MODULE 5 PERFORMANCE FACTOR 1 – TECHNICAL (HITTING SKILLS)	<ul style="list-style-type: none"> • Introduction • Backhand Spin Net Shot (In to Out) • Backhand Spin Net Shot (Out to In) • Backhand Cross-Court Net Shot • Forehand Spin Net Shot (In to Out) • Forehand Spin Net Shot (Out to In) • Forehand Cross-Court Net Shot • Backhand Drive Defence • Backhand Long Defence • Backhand Singles Cross-Court Block • Backhand Singles Straight Block • Backhand Block (Doubles) • Forehand Drive (Doubles) • Forehand Block (Doubles) • Forehand Singles Cross-Court Block • Forehand Singles Straight Block • Forehand Cross-Court Reverse Slice • Forehand Cross-Court Slice from Forehand Corner • Forehand Stik Smash • Forehand Straight Reverse Slice • Forehand Straight Slice from Backhand Rearcourt
MODULE 6 PERFORMANCE FACTOR 2 – TECHNICAL (MOVEMENT SKILLS)	<ul style="list-style-type: none"> • Introduction • Return of Service in Doubles • Forecourt Variations • Mid-Court Variations • Rear-Court Variations
MODULE 8 PERFORMANCE FACTOR 4 – PHYSICAL	<p><u>Balance</u></p> <ul style="list-style-type: none"> • Introduction • Static Balance • Inline Lunge • Trampoline Hops • Lunge • Clock Jumps (2 Feet) • Clock Jumps (1 Foot) <p><u>Speed and Agility</u></p> <ul style="list-style-type: none"> • Introduction • Fast Feet – Split-Steps • Fast Feet – Step in and Out • Ladder Work (Side Shuffle) • Ladder Work (Variations) • Cone Shadows (Lateral Shadows) • Court Shadows • Court Shadows – Partner Directed <p><u>Reaction Work</u></p> <ul style="list-style-type: none"> • Basic Split-Step • Split-Step to Lateral Movement • Split-Step to Diagonal Movement • Fast Feet and Hit <p><u>Stability and Strength – Body Weight</u></p> <ul style="list-style-type: none"> • Introduction • Calf Raise • Squat • Inline Lunge • Lunge

	<ul style="list-style-type: none"> · Adductor Leg Raise · Abductor Leg Raise · Trunk Curl · Twisting Trunk Curl · Back Raise · Press Up · Tricep Dip <p><u>Stability and Strength – Free Weights</u></p> <ul style="list-style-type: none"> · Introduction · Calf Raise · Squats · Lunges · Side Bends · Bench Press · Pectoral Fly · Bicep Curl · Tricep Curl · Shoulder Press · Forearm Rotation · Single Arm Row · Upright Row · Wrist Extensor and Flexor <p><u>Stability and Strength – Swiss Ball</u></p> <ul style="list-style-type: none"> · Introduction · Hamstring Curl · Reverse Bridge · Trunk Curl · Twisting Trunk Curl · Roll Away · Side Curl · Plank · Reverse Plank · Rotation · Wood Chop · Back Extension · Press Up <p><u>Stability and Strength – Theraband Exercises</u></p> <ul style="list-style-type: none"> · Introduction · Setting the Scapula · Internal Rotation · External Rotation · Trunk Rotation · Low to High Chops · Abductors (On Back) · Abductors (On Side) · Abductors (Sideway Walks) · Adductors (Standing)
<p>MODULE 9 PHYSICAL – FITNESS TESTING</p>	<p><u>Fitness Testing</u></p> <ul style="list-style-type: none"> · Introduction · Vertical Jump · Broad Jump · Fast Feet · Lateral Speed · Front to Back Speed · Squat · Straight Leg Raise · Seated Trunk Rotation · Inline Lunge · Hurdle Step <p><u>Flexibility</u></p> <ul style="list-style-type: none"> · Static Stretches · Cool Down

04. RULES OF THE GAME

The complete set of rules – Laws of Badminton and Regulations governing the sport, can be downloaded from the BWF website – www.bwfbadminton.org

05. WHY BADMINTON APPEALS

Badminton can be played by all ages and at all levels. At beginner level it offers early satisfaction, with rallies being easily achievable without a great deal of technical expertise.

At the highest level however it is a highly dynamic sport, with shuttles being struck at over 300 km/h and players displaying the highest levels of athleticism.



Badminton is:

- Equally accessible to both boys and girls, men and women.
- A safe, low impact sport for children and adults.
- Builds fundamental physical skills in children, gives an excellent aerobic workout and is highly physically demanding at the elite level.
- Accessible to people of all abilities who can develop a skill which will allow them to play badminton for life.
- Accessible for people with a disability. There are rules to govern that groups people according to their class of disability. This ensures fair and safe competitions.



06. ELITE LEVEL BADMINTON

At the highest levels of badminton, the sport requires extraordinary fitness, technical ability, perception and predictive skills as well as extremely fast reaction times.

Players at the top level require extraordinary physical ability including:

- aerobic stamina
- agility
- strength
- explosive power
- speed



At the top levels, badminton is very technical sport, requiring high levels of motor coordination, sophisticated racquet movements and precision when under pressure. Badminton is also a game where tactics and deception are very important.



07. OLYMPIC GAMES SPORT

Since 1992, badminton has been a Summer Olympic Games sport. Altogether 15 medals are available in Olympic badminton – gold, silver and bronze for each of the five disciplines:

- Men's singles
- Women's singles
- Men's doubles
- Women's doubles
- Mixed doubles



Badminton players from each region – Asia, Africa, Europe, Oceania and Pan America compete at the Olympic Games.

Since 1992, players from China, Korea, Indonesia, Malaysia, Denmark, Great Britain, the Netherlands, Japan and Russia have won badminton medals at the Olympic Games.

08. REGULATING BADMINTON WORLDWIDE

The International Badminton Federation (IBF) was established in 1934 and consisted of nine founding members – badminton associations from Canada, Denmark, England, France, Ireland, Netherlands, New Zealand, Scotland and Wales.



In 2006 the IBF changed its name to the Badminton World Federation (BWF).

The BWF is the world governing body for the sport of badminton, recognised by the International Olympic Committee (IOC).

BWF's members are, with a few exceptions, the national governing bodies for badminton. These are organised into five confederations under the IOC system, with each Continental Confederation representing one of the five Olympic rings – Africa, Asia, Europe, Oceania and Pan America.

CONTINENTAL CONFEDERATIONS



**Badminton
Confederation
of Africa**



TECHNICAL OFFICIALS & EVENTS



The BWF is responsible for the Laws of Badminton and the various regulations that govern the badminton worldwide. Technical Officials (Referees, Umpires, Line Judges) are trained and accredited by the BWF at a number of levels. Technical Officials are also trained at a national level and Continental Confederation level.

BWF is the world sanctioning body for international events. The main categories of events are:

- BWF Events
 - World Championships
 - Thomas Cup and Uber Cup (World Men's Team / World Women's Team Championships)
 - Sudirman Cup (World Team Championships)
 - World Junior Championships
 - World Senior Championships
- BWF World Superseries (Premier and Superseries)
- Grand Prix (Gold Grand Prix and Grand Prix)
- International Series (International Challenge and Future Series)

BWF also regulates Para-Badminton worldwide and sanctions and controls the technical side of international para-badminton competitions, including the Para-Badminton World Championships.

09. BWF VISION, MISSION, GOALS

The BWF works closely with National Badminton Associations and the five Continental Confederations for badminton and *promotes, presents, develops, and regulates* the sport worldwide.

VISION

- Badminton is a global sport *accessible to all* - a leading sport in *participation, fan experience and media coverage*.

MISSION

- To *lead and inspire* all stakeholders and *deliver world class events* and innovative *development initiatives* to ensure badminton becomes a *leading global sport*.

GOALS

The BWF goals are:

- To publish and promote the BWF Statutes and its Principles.
- To encourage the formation of new Members, strengthen the bonds between Members and assist in resolving disputes between Members.
- To control and regulate the game, from an international perspective, in all countries and continents.
- To promote and popularise badminton worldwide.
- To support and encourage the development of badminton as a *sport for all*.
- To organise, conduct and present world class badminton events.
- To maintain an Anti-Doping Programme and ensure compliance with the World Anti-doping Agency (WADA) *Code*



BADMINTON COACH EDUCATION
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LEVEL 2

MODULE 2
HOW TO COACH

MODULE 2

HOW TO COACH

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04. Ability, Skill and Potential	23
05. Motor Skills	24
06. Motor Performance and Motor Learning	27
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LEARNING OUTCOMES

By the end of this module, coaches will be able to:

- Describe the components of the coaching process;
- List the stages of the planning process;
- Identify tools that can be used to complete the planning process;
- Compare and contrast the concepts of ability, skill and potential;
- Define motor skills and classify them in different ways;
- Compare and contrast motor learning and motor performance;
- Define practices using the terms blocked, random and varied;
- Describe different learning styles;
- List different questioning types that can be used to support coaching;
- Compare and contrast different coaching techniques;
- List different methods of group management;
- Describe the characteristics of an effective review;
- Describe the characteristics of an effective evaluation.

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01. INCLUSIVITY

The BWF Coach Education programme is designed to be inclusive to allow the content to be adapted for use with all ages, abilities and disabilities.

Whatever level the coach is working at they must remember that they are coaching the sport of badminton and this applies especially when coaching players with a disability.

Every technical practice and routine in the manual can be used / adapted for use with players with a disability when coupled with the "How to Coach" and "What to Coach" principles and practices.

Coaches, through effective questioning, analysis and using the tools provided in this manual should be able to deliver appropriate sessions for people with physical disabilities. The Classification Regulations provide for Sport Classes – two wheelchair classes, three standing classes and one short stature Sport Class.

For coaches working with wheelchair players, even though the manual does not cover specific wheelchair movement techniques, the routines and practices in the manual can be adapted for use in training and movement development for these players.

Coaches should also note that there will be tactical differences when working with players with a disability. However, once a coach has an understanding of the court changes / dimensions for the particular Sport Class and the disability involved, the coach will be able to adapt their tactical knowledge accordingly.

ADVICE FOR COACHES

Emphasis should be placed on the fact that coaches are delivering the sport of badminton. The focus is on understanding each player's strengths and weakness as badminton players through observations and questioning and being able to adapt the practices appropriately for the ability or disability of the player.

When working with players with a disability, the following advice is useful

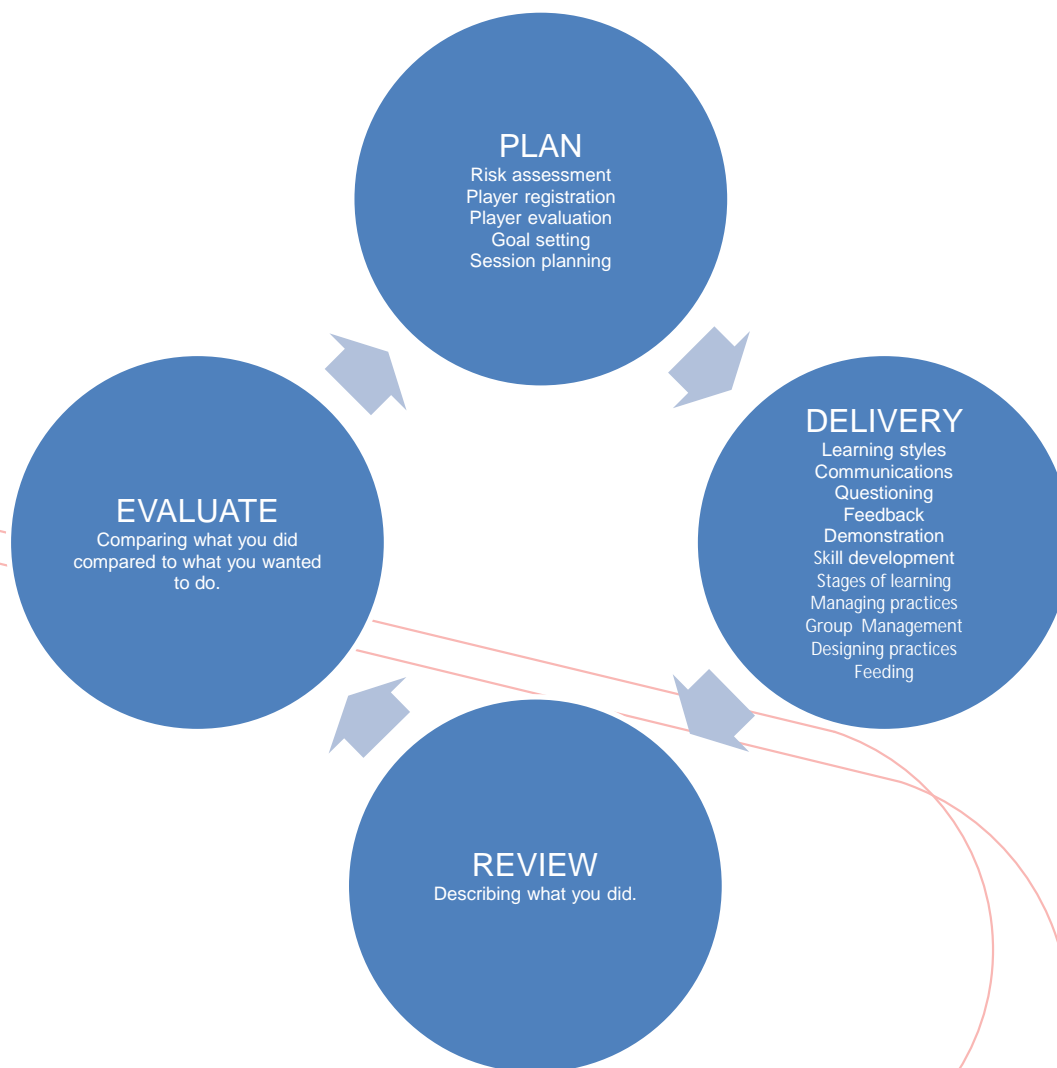
- Ask questions, either directly to the player or to their helper, parent coach.
- Understand what they can and can't do and why.
- Ask them to show you what they can already do – observe their ability on court.
- Don't be afraid to try out practices, routines that you think they could cope with.
- Adjust the level of difficulty of the activity based on their performance in the routine.
- Always keep speaking to the player to obtain feedback.
- Adapt typical badminton movements / techniques to ensure success:
 - An amputee may not be able to lunge on the 'correct' leg. Can the use of alternative footwork patterns enable the player to move effectively and achieve success?
 - A player with short stature may not be able to perform a 'stik' smash. Are there other alternatives for this player in the same situation?
 - Wheelchair players, due to the changes in court dimensions do not need to use net shots. What strokes would they use as an alternative?

More information on coaching badminton players with a disability can be found on the BWF website: www.bwfbadminton.org

02. COACHING PROCESS

HOW TO COACH

The coaching process can be described as a four stage model, with the content covered in the BWF Level 1 course listed in the diagram below.

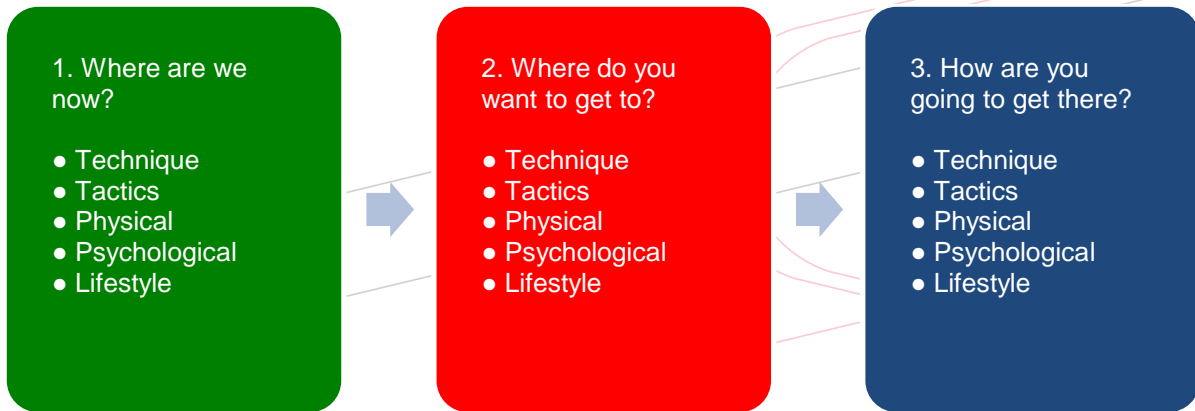


This Level 2 “how to coach” section uses the same coaching process model, with the following differences.

1. In Level 1, the coaching process model was applied in the context of session planning and delivery. In this Level 2 manual, there is more of an emphasis on the model being applied to an annual / 12 month plan.
2. Certain subjects introduced in Level 1 are covered again in Level 2. However the subjects are covered in more depth and/or include alternative concepts with the aim of broadening the knowledge and skills of Level 2 coaches.

03. PLANNING

Planning involves a three stage process.



Note that the three stages involve asking a question and looking for answers under the heading of the five key Performance Factors of **technique**, **tactics**, **physical**, **psychological** and **lifestyle**. Involving the players (and for young players, their parents) in the process is highly beneficial.

1. WHERE ARE WE NOW?

The first stage of the planning process involves collecting information about the current situation. Potential sources of information for each of the performance factors are listed in the table below.

Technical	Tactical	Physical	Psychological	Lifestyle
<ul style="list-style-type: none"> Coach observation of player Other coaches' observations of player The player's own opinions <p>The observations may be on the basis of live performance, or from a video.</p>	<ul style="list-style-type: none"> Coach observation of player Other coaches' observations of player The player's own opinions <p>The observations may be on the basis of live performance, or from a video.</p>	<ul style="list-style-type: none"> Fitness testing Functional Movement screening <p>Most fitness tests can be administered by trained coaches, but movement screening is usually performed by trained physiotherapists or strength/conditioning experts.</p>	<ul style="list-style-type: none"> The player's own opinions Coach opinions Other coaches' opinions Parents' opinions (of younger players) <p>Objective measures of psychology involving for example, questionnaires, should only be used by qualified/trained psychologists.</p>	<ul style="list-style-type: none"> The player's own opinions Coach opinions Other coaches' opinions Parents' opinions (of younger players)

An example of a form that could be used to collect the "where are we now" information is included on the next two pages.

Note: you should try to write down simply what you observe or what you are told and avoid making judgments such as "good", "bad" or "excellent" which generally adds very little useful information.

SAMPLE TEMPLATE: WHERE ARE WE NOW?

Performance Factor	Where are they now?			
Technical / Technique	Hitting: Serving	Hitting: Forecourt	Hitting: Midcourt	Hitting: Rearcourt
	Movement Components	Movement Patterns		Movement Flow (linking of patterns)
Tactical	Singles		Doubles	Mixed

SAMPLE TEMPLATE: WHERE ARE WE NOW?

Performance Factor	Where are they now?							
Physical	Leg Power	Flexibility	Speed	Quickness	Agility	Endurance	Core Strength	Functional Movement Screening
Psychological	Cohesion		Commitment		Control		Concentration	
Lifestyle								

2. WHERE DO WE WANT TO GET TO?

This section of the planning process involves reviewing “where you are now”, deciding on priorities and setting appropriate goals. The Level 1 course introduced the concept of goal setting and a revision of this is included below.

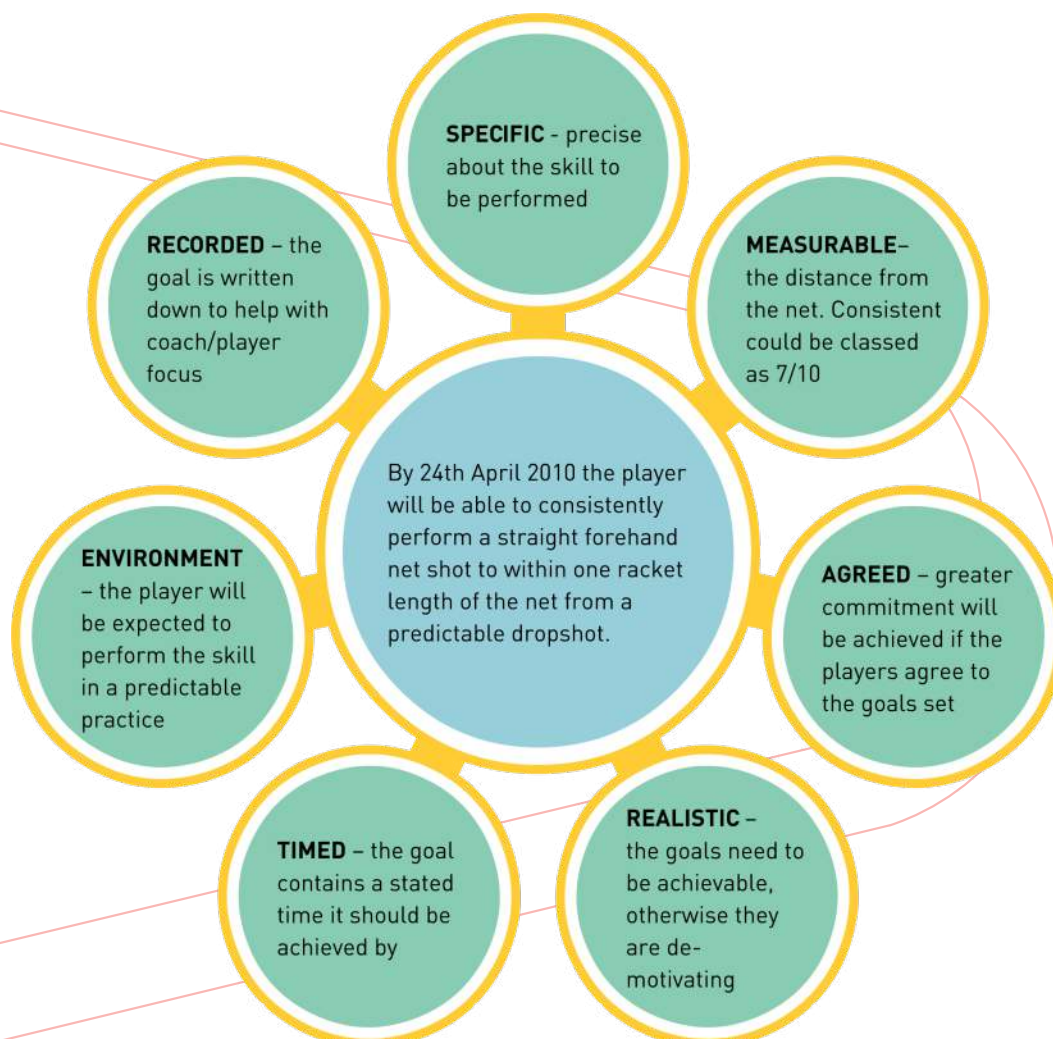
Goals help to:

- Focus Training
- Motivate
- Monitor Player Progress
- Monitor Coaching Effectiveness

Two useful guidelines for writing effective goals are:

- Start each goal by writing “By the end of [*stated date/time*] the player will be able to
- Make sure your goal uses a “doing” word, such as demonstrate, perform, explain, compare, select, construct etc.

Useful goals tend to have the characteristics described in the diagram below.



Goals can be split into process or outcome goals. The differences between these types of goals are explained in the table below.

<p style="text-align: center;">PROCESS GOALS</p> <p>These are goals that deal with personal improvement of technical, physical, tactical, psychological or lifestyle factors. They are often short-term and support the development of intrinsic motivation.</p>	<p style="text-align: center;">OUTCOME GOALS</p> <p>These are goals that are concerned with winning or doing better than someone else. They are often long-term goals and support the development of extrinsic motivation.</p>
<p style="text-align: center;">CONTROLLABLE</p> <p>Process goals are highly controllable and can be used to set targets to support a player's improvement.</p>	<p style="text-align: center;">NOT CONTROLLABLE</p> <p>Outcome goals are not controllable as they are dependent upon other people. They are usually concerned with selection, winning, achieving a ranking etc.</p>
<p style="text-align: center;">EXAMPLE</p> <p>By the end of the session, I will be able to play a straight backhand overhead dropshot consistently off a predictable feed.</p> <p>During this tournament I will use deep breathing between points.</p>	<p style="text-align: center;">EXAMPLE</p> <p>By the end of September 2012 I will be the National singles champion.</p>

3. HOW ARE WE GOING TO GET THERE?

Once the goals have been set then the coach and player need to decide what type of training is going to occur and how this type of training is organised over one year. A sample template that can be used is shown overleaf.



PHOTO CREDIT: BWF/BADMINTONPHOTO

KEY TO THE ANNUAL PLAN

Section of Annual Plan	Explanation
1. Month 2. Week Commencing 3. Week Number	These sections are simply there to help with the organisation of the plan and can be completed at the start of the year.
4. Competition	<p>This section allows competitions to be identified at the start of the year in which the players plan to compete. It may be useful, particularly for junior players, to categorize tournaments as follows:</p> <ul style="list-style-type: none"> • "A" tournaments are the targeted tournaments, where the player is aiming to play at their optimal level and if they do so they could win that event. • "B" tournaments are where the player would hope to compete well, but would not be expected to be still competing in the later stages of that event. • "C" tournaments are where the player would hope to compete well, but would struggle in the early stages. These events would be largely to gain experience, for example a junior player starting their first adult tournament.
5. Training Camps	This would allow for placing training camps strategically through the year so they help the player's overall development across the annual plan.
6. Testing/Review	This section helps identify the timing of tests (e.g. fitness tests) and formal reviews (to evaluate progress).
7. Long Term Training Cycle	A long term training cycle is a period of training which ends with a peak performance. Sometimes this may simply be winning a particular tournament (an outcome goal) or achieving a particular level of performance (a more process-driven approach). Long term cycles can typically be anywhere from three months to four years in length.
8. Medium Term Cycle	<p>Each long term cycle is split into medium term cycles of:</p> <ul style="list-style-type: none"> • transition, which is effectively a break from the sport (whilst still remaining active) • preparation • competition
9. Short Term Cycle	<p>Short term cycles are basically sub-divisions of the medium term cycles.</p> <ul style="list-style-type: none"> • The transition cycle is often short in duration so this is not usually broken down into short term blocks. • The preparation cycle is usually split into short term cycles called "general preparation" and "specific preparation". General preparation tends to involve an emphasis on: <ul style="list-style-type: none"> ○ basic fitness (strength, flexibility, endurance and speed); ○ technical development (in a tactical context). Specific preparation involves a shift towards: <ul style="list-style-type: none"> ○ sports-specific fitness (elastic strength, speed-endurance, agility etc.); ○ tactics (employing new/refined technical skills). • The competition cycle is usually split into short term cycles called "competition development" and "priority competition". <p>Short term cycles can typically be from one week (a short transition cycle) to 12 weeks (a general preparation phase). In the latter case, where a short term cycle consists of a number of weeks, it may be necessary to split that down into shorter blocks (e.g. 3 to 6 weeks). This can be useful to "refresh" the training, giving a different emphasis and hence potentially supporting greater training adaptation.</p>
10. Weekly Cycles	Weekly cycles can be used to help plan training on a seven day basis.

Section of Annual Plan	Explanation																								
11. Activity Volume	Activity volume can be measured as the total time spent each week in training and competition.																								
12. Activity Intensity	<p>Activity intensity is a measure of how hard the activity (training and competition) is. Whilst some activity intensity can be very objectively measured (e.g. running times as a percentage of maximum, heart rates during training etc.) the complexity of badminton training and competition makes this very difficult to measure.</p> <p>Borg's RPE scale of 1 – 10, with the coach and player evaluating each session on this scale, is more practical.</p> <table border="1"> <tbody> <tr> <td>0</td> <td>Nothing at all</td> <td>5</td> <td>Hard</td> </tr> <tr> <td>0.5</td> <td>Very, very light</td> <td>6</td> <td></td> </tr> <tr> <td>1</td> <td>Very light</td> <td>7</td> <td>Very Hard</td> </tr> <tr> <td>2</td> <td>Fairly light</td> <td>8</td> <td></td> </tr> <tr> <td>3</td> <td>Moderate</td> <td>9</td> <td></td> </tr> <tr> <td>4</td> <td>Somewhat hard</td> <td>10</td> <td>Very, very hard (maximal)</td> </tr> </tbody> </table> <p>Reference: Borg, G. (1998). <i>Borg's Rating of Perceived Exertion and Pain Scales</i>. Champaign, IL: Human Kinetics.</p>	0	Nothing at all	5	Hard	0.5	Very, very light	6		1	Very light	7	Very Hard	2	Fairly light	8		3	Moderate	9		4	Somewhat hard	10	Very, very hard (maximal)
0	Nothing at all	5	Hard																						
0.5	Very, very light	6																							
1	Very light	7	Very Hard																						
2	Fairly light	8																							
3	Moderate	9																							
4	Somewhat hard	10	Very, very hard (maximal)																						
13. Activity Load	Activity load is effectively activity volume x activity intensity. In theory then, an adult international player should in theory have a training load maximum of 300 (i.e. 30 hours per week x 10 on the intensity scale). Of course the reality is much lower, as maximal intensity could not be reached for all the 30 hours.																								

An example of a long term plan, with one long term cycle of planning completed, is shown overleaf.



PHOTO CREDIT: BWF/BADMINTONPHOTO

LONG TERM TRAINING CYCLE PLANNING SHEET

The form below provides a structure for recording the goals that are set for a particular long term cycle. An example of a completed form is shown overleaf.

Long Term Planning Sheet		
Player's Name:	Year:	Long term Training Cycle No.
Medium Term Cycle - Preparation		
By the end of the general preparation cycle, the player will be able to:	By the end of the specific preparation cycle, the player will be able to:	
Medium Term - Competition		
By the end of the competition development cycle the player will be able to:	By the end of the priority competition cycle the player will be able to:	

EXAMPLE: LONG TERM TRAINING CYCLE PLANNING SHEET

Long Term Planning Sheet		
Player's Name: Sid Stingray	Year: 2012	Long term Training Cycle No. 1
Medium Term Cycle - Preparation		
<p>By the end of the general preparation cycle the player will be able to:</p> <ul style="list-style-type: none"> consistently demonstrate a broad range of strokes from the forehand rearcourt during predictable practices. consistently demonstrate lower body positions when defending in singles during predictable practices. describe tactical plans that could be implemented against the 5 players immediately above them in the national rankings (based on an analysis of their strengths and weaknesses). provide evidence via a training diary of 8 hours physical training per week. improve 3 mile run time by 1 minute. improve 6 repetition maximum squatting weight by 20kg. improve 300m run time by 2 seconds. 	<p>By the end of the specific preparation cycle the player will be able to:</p> <ul style="list-style-type: none"> consistently demonstrate a broad range of strokes from the forehand rearcourt during unpredictable practices. consistently demonstrate lower body positions when defending at singles during predictable practices. successfully implement a variety of tactical plans which could be used against 5 players immediately above them in the national rankings against sparring partners. provide evidence via a training diary of 7 hours physical training per week. improve vertical jump height by 8cm. improve average speed endurance shuttle run time by 0.4 sec. 	
Medium Term - Competition		
<p>By the end of the competition development cycle the player will be able to:</p> <ul style="list-style-type: none"> provide evidence of competitive victories against 3 players ranked higher in the national rankings. reduce unforced error rate out the side of the court to 3 per set. 	<p>By the end of the priority competition cycle the player will be able to:</p> <ul style="list-style-type: none"> reach the semi-finals of the national singles championships. improve their world singles ranking by 20 places. 	

ANNUAL PLANNING FOR CLUB/SQUAD TRAINING

The previous annual planning models are most relevant to:

- older junior or senior elite players;
- small coach-player ratios

In many cases coaches are faced with larger groups. In this case, coaches should aim to apply differentiation, where the needs of individuals within that group are catered for, both in the type of skill being practiced and the level of difficulty of those practices.

However, it is clearly not manageable for one coach to have 30 players all working on a different skill, so having a coaching tool that at least points to some themes that should be emphasised in the sessions is beneficial. An example of this type of planning tool is shown overleaf.

SAMPLE: COACHING TOOL

By the end of the training period players should be able to consistently:			Week Numbers (x = planned content, ù = actually done)																				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Movement Skills (in practice conditions with a degree of unpredictability)	1	Perform a dynamic split step that links movements in various directions.																					
	2	Use a variety of methods to link split-steps to lunges and jumps.																					
	3	Lunge/recover with good range of movement + knee/foot alignment when striking a shuttle.																					
	4	Jump diagonally backwards – strike the shuttle – land + move off under control.																					
	5	Move back 2 steps - leap/rotate - land/move off with control.																					
Hitting Skills (in practice conditions with a degree of unpredictability)	6	Adjust grips appropriately in response to an unpredictable hand or racket fed shuttle.																					
	7	Perform bh and fh low serves within 1 racket length of the low service lines.																					
	8	Perform fh + bh flick serves within 1 racket length of doubles service line.																					
	9	Perform fh flick and high serves into the back tramlines.																					
	10	Perform bh + fh net shots that land within 1 racket length of the net.																					
	11	Perform straight + cross-court fh + bh lifts that land in the back tramlines.																					
	12	Perform fh ohs with 1) basic grip 2) sideways stance 3) forearm rotation 4) kick-through.																					
Tactical Skills	13	Using space in games	Demonstrate how to use height to help you/make it hard for your opponent.																				
	14		Demonstrate how to use and cover the depth of the court.																				
	15		Demonstrate how to use and cover the width of the court.																				
	16	Personal strengths + development areas	Demonstrate 2 ways in which they can use skills to trick their opponent.																				
	17		Identify 2 things they do well in badminton.																				
	18		List 2 things they can improve and demonstrate how to work on these areas.																				
	19	Opponent	Describe and use a game plan against an opponent.																				
On Court Conduct	20	Partner	Describe 2 doubles formations + use them in set plays when starting rallies.																				
	21	Respect opponents, officials and coaches.																					
	22	Play the game according to the rules.																					
	23	Try their best in both training and competition.																					
	24	Work well with others when training and competing																					
	25	Keep the playing surface clear of obstructions: e.g. stray shuttles.																					
	26	Keep off other players' courts when not involved in that match or practice.																					
Commit to the Sport	27	Score a game accurately when competing.																					
	28	Umpires a singles game to 21 points.																					
	29	Plays the sport in their own time to improve their skills.																					
	30	Helps others by coaching them.																					
	31	Helps in the organisation and running of competitions.																					

DELIVERY COACHING SESSIONS

Having developed a plan, coaches then need to be able to deliver sessions effectively to help the player's progress effectively towards their goals.

The following information is designed to reinforce some of the concepts introduced in the Level 1 course and also expand the coach's base knowledge.

04. ABILITY, SKILL AND POTENTIAL

Ability and **skill** are two terms that are often used to mean the same thing. However in motor learning terms they are actually different concepts.

ABILITY

Ability can be defined as:

“Consistent, long lasting attribute that is largely genetically determined and underpins a player's sporting performance”.

The key points to highlight from this definition are that abilities are inherited and remain relatively the same, despite the life experiences that a player goes through or the type/duration and quality of practice undertaken. Different research projects have attempted to identify all the abilities that exist, but there is still much work to be done in this area.

Fleishman (1964) split abilities into:

- Perceptual motor abilities, where the nervous system has a major influence over the quality of movement produced. Example are co-ordination of limbs, reaction time (the speed of a single response to a single stimulus), response orientation (making quick movement choices in response to different stimuli), aiming etc.
- Physical abilities, such as strength, flexibility, stamina, speed etc.

SKILL

Skill has already been defined as

“a learned movement, or sequence of movements, that allow for the completion of a particular task”.

Skilled performers are those who are able to perform tasks with great certainty, efficiency and at great speed.

The key difference between abilities and skills therefore is that **abilities** are genetically determined whereas **skills** are learnt. However skills will be built on the foundation of a player's ability. Skills are often more sports specific, whereas abilities are more generic.

POTENTIAL

Potential can be defined as the

“the degree of possibility of becoming something”.

So a player may be described as having a high possibility of becoming a club, international or world-class player. The problem with this is that whilst **potential** is relatively easy to define, it is almost impossible to measure.

ABILITY, SKILL AND POTENTIAL: COACHING IMPLICATIONS

1. Coaches should appreciate that all players are different and bring with them a different “toolkit” of abilities – meaning they might appear to learn certain aspects of the badminton quicker than others. Coaches should seek to help this situation by differentiating in their delivery, offering different types and difficulties of practices within a session.

This approach can be used to:

- build very high level skills with players who demonstrate high ability levels in a particular part of the game;
 - support development of players who appear weak in a particular ability so the level of skill developed is of a sufficient standard not to be eventually targeted as a weakness.
2. Early assessments of players as “**talented**” on the basis of appearing to display high **ability** levels should be avoided, because the type of **abilities** required to perform well early in development are not necessarily those required to perform well later in their development.

In particular, early learning requires more reliance on thinking skills whereas many skills then require better physical abilities to develop further. So a player may be selected as **talented** very early, although they may not be so strong in the **abilities** required to then develop those **skills** to a higher level.

3. Although generally accepted that people do exhibit what appear to be largely genetically determined **abilities** and these **abilities** are stronger in some than in others, there is still much research required to gain a better understanding of the number and type of **abilities** and the extent to which these abilities underpin **skill development**.
4. The rate of **skill** development is not only due to the underpinning **abilities** of a player. Factors such as motivation, nerves, the environment (physical/social) and coaching quality can all play a major part in the progress of a player.

05. MOTOR SKILLS

Motor skill can be defined as

“a learned movement or sequence of movements that allow for the completion of a particular task”.

In badminton, a lunge would be an example of a **motor skill**.

Clearly some people are able to demonstrate a higher level of **motor skill** than others. Guthrie (1952) identified three features demonstrated by a skilled performer compared to an unskilled performer:

1. **Maximum certainty of achieving your goal.** A skilled performer will execute a particular skill with a far greater degree of certainty about the outcome than an unskilled performer. So a competent badminton player may perform a particular movement pattern into and out of the forehand rearcourt consistently well.
2. **Minimum movement time.** A skilled performer will execute a particular skill much more quickly than an unskilled performer. So a proficient player may be able to drive a shuttle off the body

when returning a fast smash, whereas an unskilled player may only be able to do this off a slower moving shuttle.

3. **Minimum energy expenditure.** A skilled performer will be able to perform skills more efficiently than an unskilled performer. So a proficient player will be able to jump and land more efficiently, saving energy and therefore help to maintain performance level over a longer period of time compared to an unskilled performer

MOTOR SKILL CLASSIFICATIONS

Skills can be classified according to the:

- nature of the task;
- relative importance of the movement itself or the thinking behind that movement;
- the amount of unpredictability within the environment where the skill is being performed.

NATURE OF THE TASK

Skill can be classified according to the nature of the task, these being **discrete**, **serial** and **continuous**.

- **Discrete** tasks have a definite start and finish and very often take place within short time-span. An example would be throwing a ball.
- **Serial** skills involve putting together different **discrete** skills to create more complex actions.
- **Continuous** skills often involve repeated movements, performed over a longer period of time. Examples would be running, cycling and swimming.

To play badminton successfully requires mastery of a whole host of **serial** skills. The player must read their opponent's stroke, respond to their opponent's stroke with appropriate footwork, position their body, execute a return stroke then recover to the most appropriate court position.

THE MOVEMENT ITSELF, OR THE THINKING / DECISION-MAKING BEHIND THE MOVEMENT

This method of analysing skill involves organising skills according to the importance of simply performing the movement itself or the thinking/decision-making behind the movement.

Often these are organised on a continuum for motor skills (where performing the movement correctly is most important and the thinking behind that movement is less important) to cognitive skills (where the thinking behind a movement is most important whilst the movement itself is not).

Motor Skills		Cognitive Skills
<ul style="list-style-type: none"> • Performing the movement correctly is most important. • Thinking/decision-making is less important. 	<ul style="list-style-type: none"> • Performing the movement "correctly" is of some importance. • Some decision making is important 	<ul style="list-style-type: none"> • Need to perform the movement "correctly" is less importance • Thinking/decision-making is most important.
<ul style="list-style-type: none"> • 60m sprint 		<ul style="list-style-type: none"> • Making a move in a chess game.

It can be argued that badminton does not fit so well into this classification, as success at the very top level requires both a high level of motor skills (performing movement and hitting effectively) and high standard decision-making.

THE UNPREDICTABILITY OF THE ENVIRONMENT IN WHICH SKILLS ARE BEING PERFORMED

Some skills are performed in a very predictable environment – these are known as closed skills. In badminton terms the main example of a closed skill would be when serving. Open skills are necessary when the environment in which the skill is being performed is constantly changing and requires the performer (player) to continually adjust to these variations. Once in the rally, open skills are required for the badminton player to perform effectively.

SUMMARY

In order to be successful at badminton, players are required to show high levels of:

- **Serial skills**, with different smaller skills being put together, resulting in linked patterns of movement and hitting skills.
- A combination of **motor** (the movement and hitting skills) and **cognitive skills** (thinking/decision-making skills).
- **Open skills**, being able to adapt to the different challenges presented by their opponent's strokes.

Reference:

Guthrie, E.R. (1952). *The Psychology of Learning*. New York: Harper and Row.



PHOTO CREDIT: BWF/BADMINTONPHOTO

06. MOTOR PERFORMANCE AND MOTOR LEARNING

Motor Learning can be defined as

“the internal process that governs a player’s capacity to demonstrate a motor task”.

In contrast, **motor performance** can be defined as

“the observable demonstration of a motor task”.

In most cases, if a player is able to display a consistent high level of **motor performance**, then it is reasonable to assume they are demonstrating a high level of **motor learning**. However, **motor performance** can be affected by a number of factors such as tiredness, nerves and physical fatigue which could cause the level of **motor learning** to be underestimated when observing **motor performance**.

STAGES OF LEARNING

The Level 1 course introduced Fitts and Posner’s (1967) model to describe three broad stages of motor learning. These stages are named the 1) cognitive, 2) associative and 3) autonomous stages. The table overleaf expands on this model and includes:

- the length of the stage;
- the observed behaviour of the player at this stage of learning;
- what the player is trying to achieve at this stage;
- coaching advice

Note that this model is referring to the level of that player in relation to the skill being performed, rather than referring to the specific level of player.

For example, an elite level player may be introduced to a new movement pattern. In relation to learning that new skill they are a beginner and are liable to exhibit some if not all of the characteristics described in the table overleaf in the beginner’s column.

CHARACTERISTICS: STAGES OF LEARNING

	COGNITIVE	ASSOCIATIVE	AUTONOMOUS
Length of Phase	Short	Long	On-Going
What this Looks Like	<ul style="list-style-type: none"> · Very frequent mistakes · Lacks accuracy · Hesitant · Slow · Inefficient · Lacking in confidence · Lacks flexibility (adaptability) 	<ul style="list-style-type: none"> · Mistakes less frequent · Improving accuracy · More decisive · Quicker · Improved efficiency · Gaining in confidence · Becoming adaptable 	<ul style="list-style-type: none"> · Few mistakes · Highly accurate · Decisive · Produced at high speed · Efficient · Confident · Can adapt instinctively
What the Player is Trying to Achieve	<ul style="list-style-type: none"> · A visual picture in their mind of the skill · An appreciation of the co-ordination required to perform the skill · An appreciation of why they are performing a skill (tactical context) · The capacity to demonstrate the basic shape or pattern of the skill 	<ul style="list-style-type: none"> · Players trying to refine the basic shape or pattern, working towards greater speed, efficiency and consistency · Improve their decision-making (when to use the skill) in increasingly unpredictable practices 	<ul style="list-style-type: none"> · Able to perform skills consistently, at high speed and with efficiency in match play against their peers · Develop high-level decision making skills with minimal coach support · Development of player's capacity to self-evaluate and self-correct
How the Coach Can Help	<ul style="list-style-type: none"> · Keep things simple · Provide accurate demonstrations · Give the players opportunity to problem solve by practicing · Use questioning to encourage problem solving · Give short, precise explanations · Give positive feedback 	<ul style="list-style-type: none"> · Encourage practices that gradually increase in complexity, speed and unpredictability · Only increase the difficulty of practice if the standard of skill is being maintained · Encourage more self-evaluation of the players' own performance 	<ul style="list-style-type: none"> · Provide more challenging practices, with skills produced; <ul style="list-style-type: none"> ○ In game-like practices. ○ At full match speed. · Maintain player's capacity to self-evaluate and self-correct

07. PRACTICE STRUCTURE

It is generally accepted that in order to improve and achieve a high level of competence in a skill, practice is required. However practice can be structured in very different ways. Two important things to consider when selecting the type of practice are:

- The actual nature of badminton
- The stage of learning of the player (related to the skill being performed)

THE NATURE OF BADMINTON

Referring back to the section on **motor skill**, it is clear that badminton requires:

- **Serial skills**, with different smaller skills being put together, resulting in linked patterns of movement and hitting skills;
- A combination of **motor** (the movement and hitting skills) and **cognitive skills** (thinking/decision-making skills);
- **Open skills**, being able to adapt to the different challenges presented by their opponent's strokes.

THE STAGE OF LEARNING OF THE PLAYER (RELATED TO THE SKILL BEING PERFORMED)

Using the learning model proposed by Fitts and Posner (1967), when learning a skill we go through the stages of 1) cognitive (beginner), 2) associative (intermediate) and 3) autonomous (expert).

TYPES OF PRACTICE

Practices can be broadly divided into three types, these being:

1. Blocked Practice
2. Random Practice
3. Varied Practice

Blocked practice involves spending a distinct period of time (e.g. 15-30 minutes) on a specific skill. Hand feeding over the net for a player to perform a backhand net shot is an example of blocked practice. Often a session is organised in a series of blocked practices, for example:

- | | |
|---------------------|------------|
| • Backhand net shot | 15 minutes |
| • Forehand lift | 15 minutes |
| • Forehand smash | 15 minutes |

The advantage of **blocked practice** is it usually involves very simple practices and allows the coach and learner to focus on a very narrow skill area. Aside from the potential for boredom, studies into blocked practices have indicated that:

- **Blocked practices** can be useful in the cognitive stages so players can develop a basic understanding and what they are trying to achieve – the shape of the skill, what it feeling like etc;
- Whilst **blocked practices** can result in short term success (i.e. the player is able demonstrate improvement in the skill within the session), long-term learning is not as effective as when other practice designs are used;

- **Blocked practice** tends to be closed in nature, so ultimately isn't allowing the player to practice in a way that meets the demands of badminton (an open-skilled sport).

RANDOM PRACTICE

Random practice involves mixing up the practice of very different skills. At its most extreme, one particular skill is never practiced twice in a row. A simple practice of clear, dropshot, net shot and lift between two players on half a court is an example of this, with one player using clears and net shots and the other using dropshots and lifts.

This can be made even more random by swapping over the strokes being played after a short time interval. The variety of random practice generally allows for players to have more fun. Aside from this, studies into the effectiveness of random practice have indicated that:

- **Random practice**, whilst not producing the same quality of skill production in the short term (i.e. within the session) does result in improved long-term skill development;
- **Random practice** is closer to replicating the demands of badminton, where the skills being performed are constantly changing depending on the opponent's replies. This is particularly true if the practices involve a degree of decision-making;
- **Random practices** may best be employed in the associative and autonomous learning stages.

Researchers have sought to investigate why **random practice** appears to have a greater effect on long-term learning than **blocked practice**. Two basic explanations for this are:

1. When performing a random task, learning has more meaning because it allows the player to compare/contrast the production of different skills. Long-term memory benefits from this process, meaning learning becomes engrained. An example would be:
 - Player A performs a backhand serve going just over the net onto the forehand of player B.
 - Player B can play either a straight net shot or straight lift.
 - The rally is then played to a conclusion.

Provided player B has had previous blocked opportunities to practice a forehand lift and net shot (to gain an appreciation of a "correct" model) then the random nature of the practice described above will result in better long-term learning, as it creates opportunities to appreciate the:

- need to make shots look the same;
 - different levels of force required to produce each stroke;
 - different feel of each stroke (push, flick etc.);
 - importance of a short action for deception;
 - position of the opponent and how this influences the shot.
2. Because the task is constantly changing, players are constantly forgetting what they had to do to perform a skill successful whilst they focus on the next skill. However, they are quickly asked again to remember how to perform the original skill when the time comes to perform it again. The sheer repetition of being asked to retrieve the correct method of skill production from their long-term memory enhances learning and helps that player to reproduce those skills successfully when faced by the random nature of badminton.

VARIED PRACTICE

Several skilled sporting movements are so similar that they are often placed together in a particular group, or class, of actions. For example, overhead throwing would be regarded as a single class action.

When different players perform this action well, it is easy to see the same features (e.g. sideways stance, weight transfer, sequential recruitment of body parts etc.) even though the action is being used in slightly different ways (e.g. to throw a ball, “throw” a racket at a shuttle etc.).

Skills within a single class retain the same features but can be used in more varied ways, for example by throwing with different forces, to produce different flight paths.

There is much support to indicate that varying practice is very helpful to skill learning as it helps to establish a core movement skill (sometimes known as a “schema”) which the player can adapt depending on the requirements of a particular sporting skill.

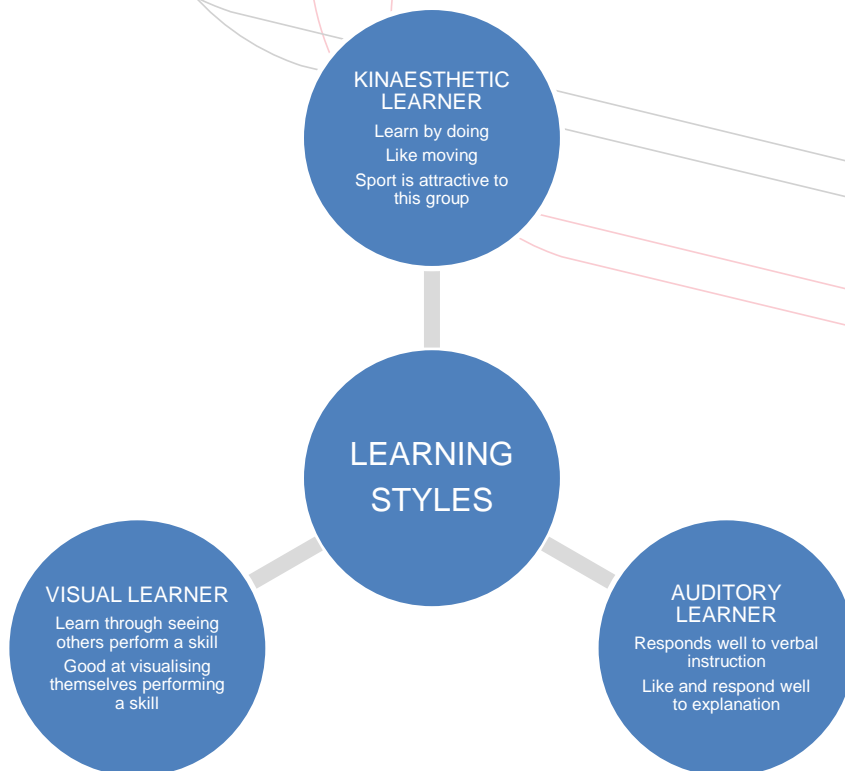
In badminton **varied practice** might involve clear, dropshots and smashes being practiced together to help develop the general overhead throwing action, whilst also allowing the player to vary that action in terms of force, speed, impact point, flight path and distance produced etc.

Varied practice is different to **random practice** in that **varied practice** involves performing variations of the same skills. **Random practice** involves combining practices of many different skills.

08. LEARNING PREFERENCES

People tend to have a preferred learning style and it is important that coaches adapt their approach to meet these different learning needs. The Level 1 course introduced a simple model, which categorised learners in three broad groups of **visual**, **auditory** and **kinaesthetic**.

This model is summarised below.

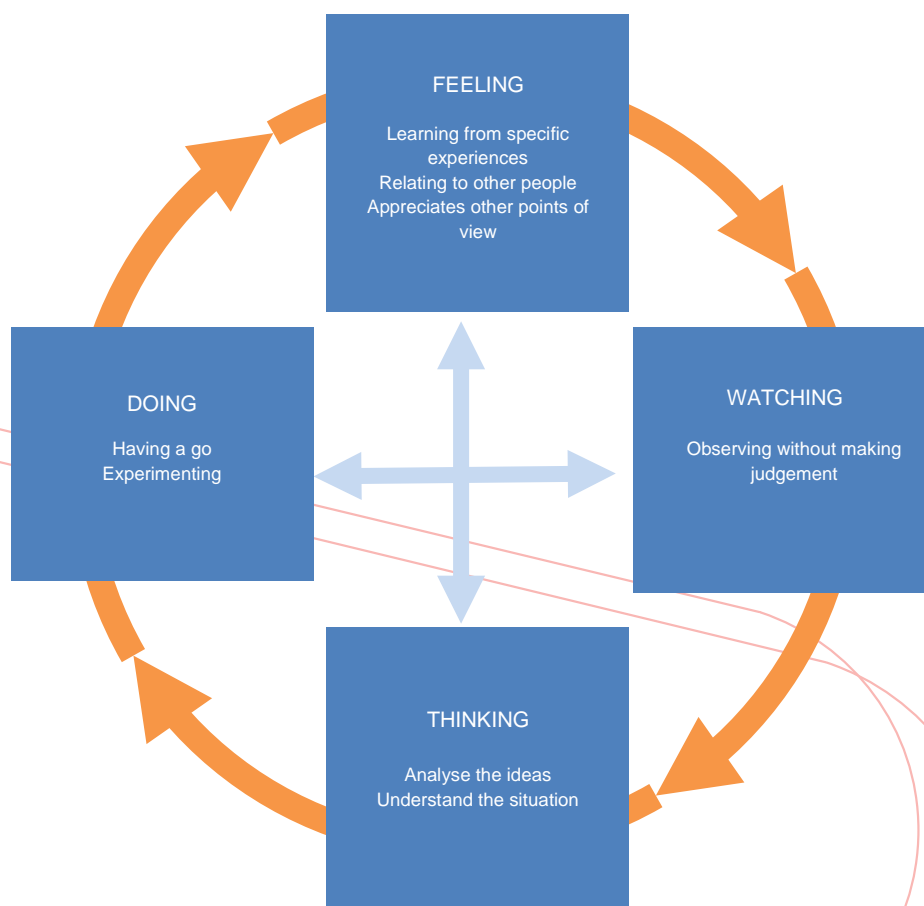


Note that all people will learn with a mixture of these styles and may use different learning styles for different tasks and situations. However they are likely to have an overall preference for one style.

The Visual-Auditory-Kinaesthetic model of learning styles, although useful, is relatively simplistic and not the only model. Other models will be explored in this section.

KOLB'S EXPERIENTIAL LEARNING CYCLE

David Kolb was at the forefront of developing learning cycle models in the 1970's and much work that has followed has been based on this groundwork. The initial basis of Kolb's Learning Cycle is that learning is based on perceptions (thinking and feeling) and processing (doing and watching). The diagram below represents these two concepts.



Note how at this stage rather than considering **learning styles**, the model is more concerned with the process of how we learn through experience. Applied to the learning of a backhand flick serve, this model might involve:

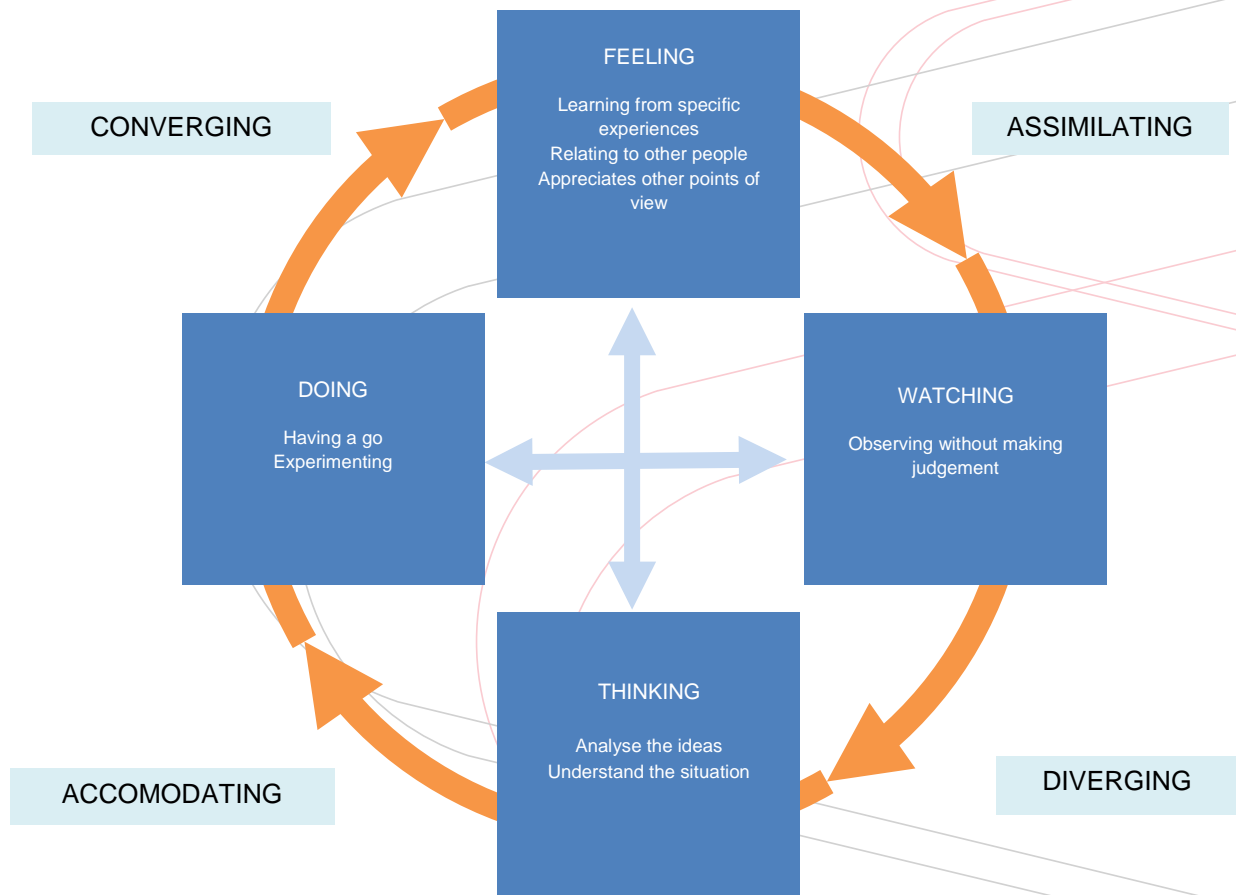
- Watching a demonstration of the backhand flick serve;
- Thinking about the situation, for example the backhand flick serve being used successfully in doubles and how technically this can be achieved (e.g. the logic of hitting from the hand);
- Doing the serve and experimenting with different grips, backswings etc;
- Feelings, in particular appreciating the input from coaches or other players to help refine the serve.

It is generally acknowledged however that as individuals, people learn in slightly different ways, with a preference towards a particular style of learning.

These learning styles have been identified as:

- Diverging
- Assimilating
- Converging
- Accommodating

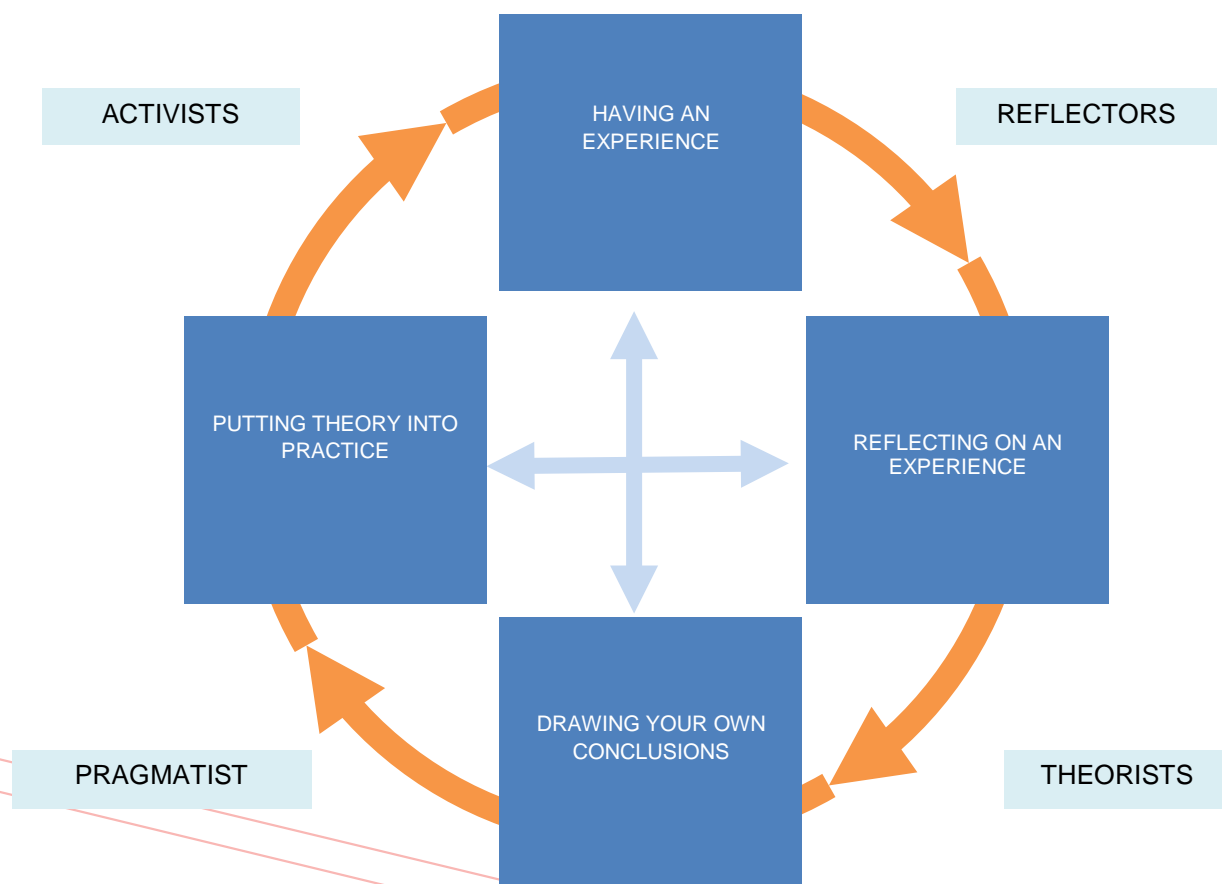
The diagram below illustrates how these four learning styles fit within Kolb's Learning Cycle model



Honey and Mumford (2000) have built on Kolb's original work, making the following adjustments and observations:

- They stress that whilst people may have a preferred method of learning, this method may change depending upon the situation they are in.
- The concept of **divergers**, **assimilators**, **convergers** and **accommodators** are refined and renamed as **reflector**, **theorist**, **pragmatist** and **activist**.

Honey and Mumford's learning cycle can be represented as shown below:



Reflector	Likes to learn from activities that allow them to observe, consider and review.	A player may play a lot of cross court lifts at singles when under pressure, which tend to put him under more pressure. Watching other players to see the direction of their lifts in different situations may help this player make better shot selections.
Theorist	Like to learn by thinking through a problem step by step. Responds well to systems and models.	May respond better to reading and lectures. Interested in the biomechanics behind shots and movement. Will like tactical models.
Pragmatist	Likes to learn new things and apply them to deal with a particular problem.	Will respond well if being shown and told how to perform a specific skill that they can clearly see will help solve a particular problem with their game, with the opportunity to implement as soon as possible.
Activist	Likes new challenges, especially if they are problem-solving in nature.	Activists would respond well to a problem solving situation, such as playing a game of doubles where you are not allowed lift of a smash.

References:

Honey and Mumford (2000). *The Learner Styles Helper's Guide*. Maidenhead: Peter Honey Publications Ltd.

Kolb, David A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Prentice-Hall, Inc., Englewood Cliffs, N.J.

09. QUESTIONING SKILLS

Well-constructed, questioning is a vital part of effective coaching. Questioning can be used to:

- improve learning by making the player take an active part in the learning process (as opposed to just being told);
- build relationships, for example by asking players their opinions;
- managing players, especially by helping them to reflect and commit to a desirable course of action;
- avoid misunderstandings by establishing clarity;
- managing arguments by helping to calm down emotions and identify practical solutions;
- persuading people

The Level 1 course introduced questioning and split the types of questions into open and closed questions. This section will build on this and introduce many other types of questions.



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QUESTIONING SKILLS

Type of Question	Definition	Characteristics	Where It Is Useful	Example
Closed	<ul style="list-style-type: none"> Answered with a single word or short phrase Invite answers that come from a restricted number of possible responses 	<ul style="list-style-type: none"> Easy to answer Quick to answer Provide facts Questioner keeps control 	As opening questions	Are you ready to start the session?
			Gaining clarification	So you want to focus on learning to smash the shuttle?
			For establishing a positive frame of mind	Will you concentrate fully?
			For finishing	So you're ready to focus on this practice now?
Open	<ul style="list-style-type: none"> Invites longer answers Invites a wide variety of possible responses 	<ul style="list-style-type: none"> Makes the player think more deeply about their response Results in the expression of opinions and feelings Control handed over to the player 	To support thinking and learning	What strokes could you play from that position?
			To invite opinions	How would you deal with this situation?
			To encourage problem solving	What practices could we use to improve this stroke?
			To encourage discussion	What other methods could we use to practice that stroke?

QUESTIONING SKILLS

Type of Question	Definition	Characteristic	Where It Is Useful	Example
Funnel Questions	A series of questions which move gradually build towards arriving at a particular point.	<ul style="list-style-type: none"> Go from general to specific questions Can go from closed to open questions 	Finding out more detail about a specific point	What stroke have you just practiced? Which aspects of that technique were you working on?
			Gaining the interest of the player	Which element of the technique did you focus on most?
Probing Questions	Single questions aimed at establishing more detail about a topic.	<ul style="list-style-type: none"> Can often be “why” questions The use of the word “exactly” within the question can help obtain the detail required within an answer 	Gaining clarity/full understanding of an issue	When you say hit at the inside hip, what exactly do you mean by that?
			Obtaining information from players who are trying to avoid giving that information	What exactly are your objections in playing mixed with that player?
Leading Questions	Questions which aim to draw the player towards the questioner’s way of thinking.	<ul style="list-style-type: none"> Useful if the answers the player is being draw towards are clearly in their best interests Should be used carefully as could be perceived as manipulative 	When you want a player to move towards your way of thinking, but make them feel they have arrived at that conclusion themselves	Your partner is very good at that shot, don’t you think?
				So in that situation which would you choose – smash to the centre or to the body of the straight player?
				Shall we practice that movement this way?
Rhetorical Questions	These are not really a question, but a statement that doesn’t necessarily expect an answer.	<ul style="list-style-type: none"> Used to engage the listener Rhetorical questions are often most effective when delivered in a series 	To draw the listener into agreement	Isn’t it great how Jon plays that reverse slice drop shot?
				Wouldn’t it be great to be able to jump like that?

10. COACHING METHODS

Different people learn in different ways. In the Level 1 course, the main learning styles discussed were **visual**, **auditory** and **kinaesthetic**.

In Level 2, different theories of learning styles are introduced (e.g. pragmatist, theorist, reflector, activist). The most effective coaches have a range of coaching methods at their disposal, so they can adapt to meet the learning needs of the players they work with. These coaching methods, with examples and potential advantages/disadvantages, are included in the table below.

Coaching Method	Example(s)	Potential Advantages	Potential Disadvantages
Live Demonstration (whole skill)	A coach or member of the group demonstrating the whole skill, for example the start, approach, hit and recovery for a forehand lift.	<ul style="list-style-type: none"> · Provided the demonstration is accurate, it gives the players an opportunity to form a visual picture in their minds of the correct technique. · When practicing, the players can use this visual picture to work towards. · Can help to build confidence, particularly if the skill is performed by a member of the group, as it can create a - "if they can do it, so can I" – mentality. · Provided the demonstration involves hitting, it allows the players to see not only the shape of the movements and stroke, but also the resulting flight path of the shuttle. · Players can move around the demonstration in order to see key points from different angles. 	<ul style="list-style-type: none"> · The demonstration needs to be of a good enough quality, close enough to the agreed technical model for the sport; otherwise players will copy a technique that is potentially detrimental to their performance.
Live Demonstration (shadowed)	A coach or member of the group shadows the demonstration, without hitting the shuttle.	<ul style="list-style-type: none"> · Tends to focus attention of the group on the shape of the stroke, since there is no shuttle flight path to watch. · May be easier for the coach to give the correct shape of stroke. 	<ul style="list-style-type: none"> · Doesn't give players the opportunity to see the resultant flight of the stroke.

COACHING METHODS

Coaching Method	Example(s)	Potential Advantages	Potential Disadvantages
Video Demonstration	A coach uses video to demonstrate a technique or tactics.	<ul style="list-style-type: none"> Can be inspirational when skills performed by stars of the sport. 	<ul style="list-style-type: none"> Depends on the availability of equipment, such as a laptop, to play the video. Playing back on a small screen may not be effect with dealing with large groups.
Still Pictures	Still pictures can be used to demonstrate technique or tactics used in the sport.	<ul style="list-style-type: none"> Can be inspirational when skills performed by stars of the sport If taken at the right time (e.g. showing point of impact of the shuttle) it can be useful to highlight a specific aspect of a particular skill 	<ul style="list-style-type: none"> Still pictures can lose the essential flow of a stroke, leading to the player producing the stroke in disjointed “stages”.
Manual Guidance	A coach physically guides a player so they use the correct technique. A typical example would be adjusting the grip.	<ul style="list-style-type: none"> The coach has a great deal of control over the grip position, the path the racket head follows, foot position etc. 	<ul style="list-style-type: none"> The player is not physically in control of making these adjustments, so learning may well be compromised.
“Mechanical” Guidance	<p>Various pieces of equipment can be used to guide a player / child towards improving their technique. Examples include:</p> <ul style="list-style-type: none"> Suspended shuttles and balloons to practice overheads (can help with reach) Standing with your back to the net and defending off the body (encourages hitting with shorter swings and out in front of the body) Reaching over a lowered net and then hitting a hand-fed shuttle can encourage reaching out and flicking lifts, rather than taking a long swing Using a weighted racket can improve arm power 	<ul style="list-style-type: none"> Skillfully done, using mechanical guidance can “force” the player to adopt a more appropriate technique. 	<ul style="list-style-type: none"> Care needs to be taken that the habit formed whilst the mechanical guidance is in place is retained when that guidance is removed.

COACHING METHODS

Coaching Method	Example(s)	Potential Advantages	Potential Disadvantages
Points of Reference	<p>This can be as simple as setting targets on the court for players / children to aim at, but it can also be used in other ways. Examples would be:</p> <ul style="list-style-type: none"> Attaching a marker high up on the net and encouraging players to practice striking the shuttle above this marker – encourages taking the shuttle early. Hand feeding a shuttle along a side-line and encouraging players to strike a net lift back along the same line (this can help players who tend to lift with a technique that encourages cross-court hitting). 	<ul style="list-style-type: none"> Points of reference can be used to improve both technique and tactics. 	<ul style="list-style-type: none"> Care needs to be taken that the habit formed whilst the points of reference are in place is retained when that guidance is removed.
Explanation	<p>Taking the shuttle early gives your opponent less time to deal with your reply.</p>	<ul style="list-style-type: none"> Will appeal to auditory learners 	<ul style="list-style-type: none"> Can be confusing if the explanations are too long and/or complicated.
Analogies	<p>Analogies use descriptions to help make more sense of something very similar. So a “bow and arrow” shape may be used to describe how a player stands in preparation for a forehand overhead, or the “what time is it” position might be used to describe the hand and arm position in preparation for a backhand drive.</p>	<ul style="list-style-type: none"> Can be effective provided the players are very familiar with the description being used. 	<ul style="list-style-type: none"> Care should be taken if the comparison is taken too far and includes movements that are unnecessary (e.g. drawing back the string on the bow and arrow analogy).
Acronyms	<p>Acronyms use the initial letters of words to form another word. For example, the word B.A.T.S. can be formed from the first letter of the words back, arm, touch, serve. Young players, when learning a backhand serve, might be encouraged to put the shuttle on their back, reach out in front with their arm, touch the shuttle on the racket and then serve. B.A.T.S. helps them remember what to do.</p>	<ul style="list-style-type: none"> Will help the auditory learners Can help players remember a particular sequence for a skill 	<ul style="list-style-type: none"> Needs to be simple

COACHING METHODS

Coaching Method	Example(s)	Potential Advantages	Potential Disadvantages
Feedback	<p>Give the feedback in a positive manner, for example by:</p> <ul style="list-style-type: none"> • Making a positive statement (e.g. "you are reaching up really well") • Giving the constructive feedback (e.g. "if you use more forearm rotation you will be able to hit harder") • Make a positive statement ("keep reaching up as well because you've made great progress in that area") 	<ul style="list-style-type: none"> • Can be encouraging and helps the player to focus on the critical aspect of a skill that needs attention. 	<ul style="list-style-type: none"> • Too much feedback can overload the player with information and interfere with them focusing on the most crucial aspect of the skill. • Can be easy to give feedback in a negative way ("you are doing it like this, and you need to do it like this") which can be demotivating.
Questioning	<p>Questioning can be used:</p> <ul style="list-style-type: none"> • When introducing a practice, for example "what grip would you recommend for a backhand net kill?" • During a practice, for example "what tactic are you using in this match?" • At the end of a session, for example "what parts of the session did you enjoy the most?" 	<ul style="list-style-type: none"> • Used skillfully, questioning can improve learning by encouraging players to take part in the learning process. 	<ul style="list-style-type: none"> • Even when they know the answer, may be nervous about answering • Language will need to be adapted for different age groups • If used too much, it can be intimidating
Discovery Learning	<p>Players are presented with a problem e.g. play a mixed game but the woman is only allowed to play one shot in the rearcourt. Players are asked to identify the types of shot choices that help this problem to be overcome.</p>	<ul style="list-style-type: none"> • Gives players ownership of the problem and the solutions, so can be a very powerful learning tool, with the learning being more permanent than which information is constantly "told". 	<ul style="list-style-type: none"> • Hands control to the players, who may come up with solutions that don't work!

COACHING METHODS

Coaching Method	Example(s)	Potential Advantages	Potential Disadvantages
Visualisation	<p>Players are encouraged to visualise themselves performing a particular skill or situation. For example:</p> <ul style="list-style-type: none"> • players may be able to visualise themselves performing an accurate serve • players may see a set of imaginary sidelines inside the existing sidelines, and play to these lines as a method of reducing errors out the side 	<ul style="list-style-type: none"> • Can enhance confidence (players making a positive image of themselves succeeding) and performance (players replicating the success they visualise in practice) 	<ul style="list-style-type: none"> • Some players may not be so effective at using their imagination in this way.
Bonus points	<p>Players or coaches can change the scoring system so it encourages a particular skill or tactic. For example, players could play singles but earn 3 points if they win a rally with a dropshot, or with the next stroke they play after a dropshot. In all other ways the game is played in the same way.</p>	<ul style="list-style-type: none"> • Motivates players to use strokes within a game-like context and learn about when how and when to use certain skills effectively. 	
Kinaesthetic	<p>Focussing on the feel of a stroke or movement, for example performing an overhead action with eyes closed to “feel” the throwing action</p>	<ul style="list-style-type: none"> • Will appeal a great deal to the kinaesthetic learners 	<ul style="list-style-type: none"> • When movements or stokes are being performed with eyes closed, players should be well spaced out avoid collisions.

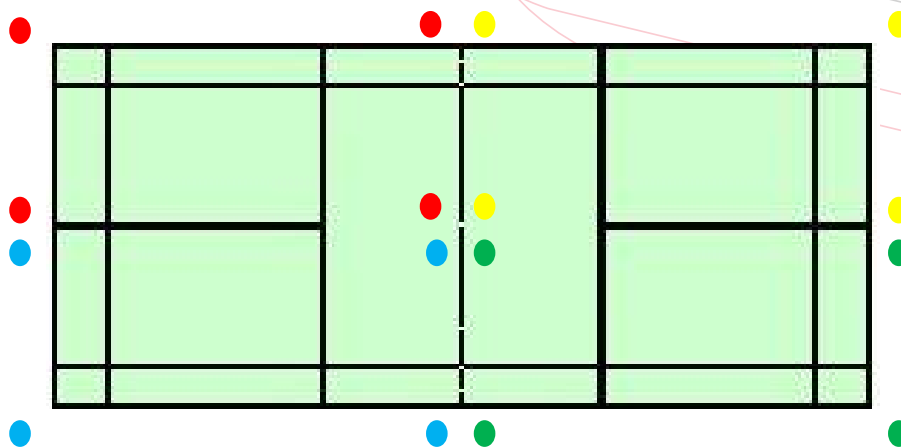
11. GROUP MANAGEMENT

The Level 1 course introduced a number of guidelines to help with effective group management. These are summarised in the table below. The rest of the section will expand on this, giving practical examples for coaches.

Preparation	A well-prepared session can help maintain focus within the group.
Group Rules	Establish a series of rules so that the players know the boundaries for acceptable and non-acceptable behaviour. Make sure that they know the consequences of breaking the code of conduct (e.g. taking 'time out' at the side of the court) are clearly understood.
Bringing the Group Together	Establish a consistent area where you bring the group together.
Demonstrations	Place the group so they are not distracted while watching demonstrations.
Be Sensitive to Learning Styles within the Group	Be aware that the group will contain players who have a preference for visual, auditory and kinaesthetic learning.
Group Dynamics	<ul style="list-style-type: none"> • Rotate practice partners regularly so the group becomes used to helping each other. • If a player is good at a skill, use them to demonstrate. This can be a confidence boost for the player and motivating for the group. • Consider giving more responsibility to potentially disruptive children. • Be inclusive – integrate players with disabilities into the sessions.
Balancing Group/ Individual Needs	<ul style="list-style-type: none"> • Give equal attention to all individuals within the group. • Help players to work at different levels.

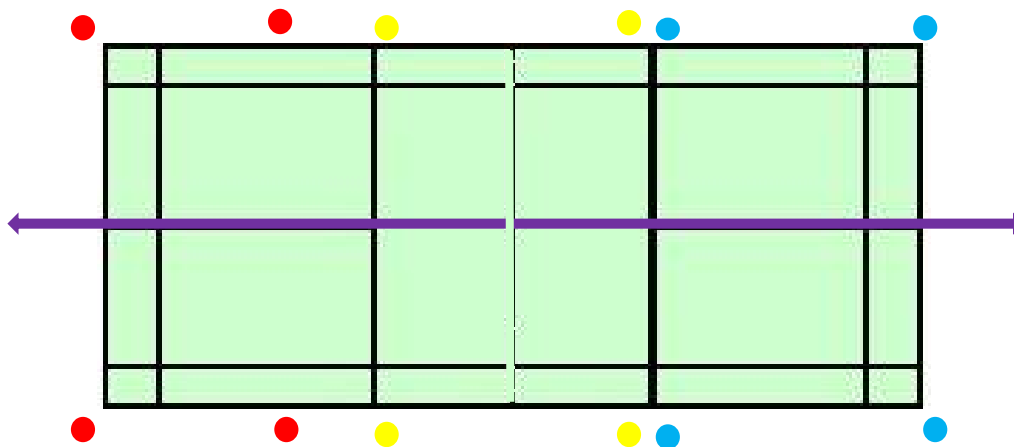
COLOUR CODING

When dealing with very large groups and restricted space, using colours to identify training areas and marking equipment with the same colours can be useful to maintain control of the group and improve safety.



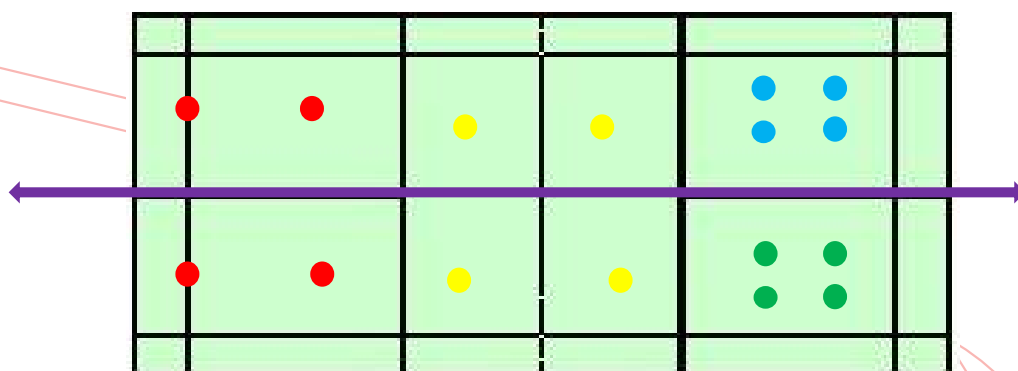
In the above example, players can be organised into yellow, red, blue and green groups, with rackets being marked accordingly (with tape). Various activities can be organised within each colour area.

THE "LONG NET"



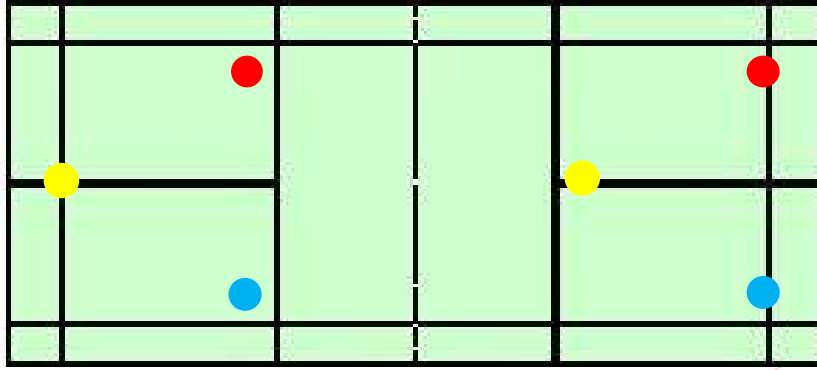
Three nets tied together, or a piece of elastic, can be extended along the length of a court, the court then being divided into three areas as indicated in the above diagrams. Rallying across the net can then occur within the groups. This can work very well with younger groups, playing with shuttles that have been slowed down.

GAMES AND PRACTICES COMBINED



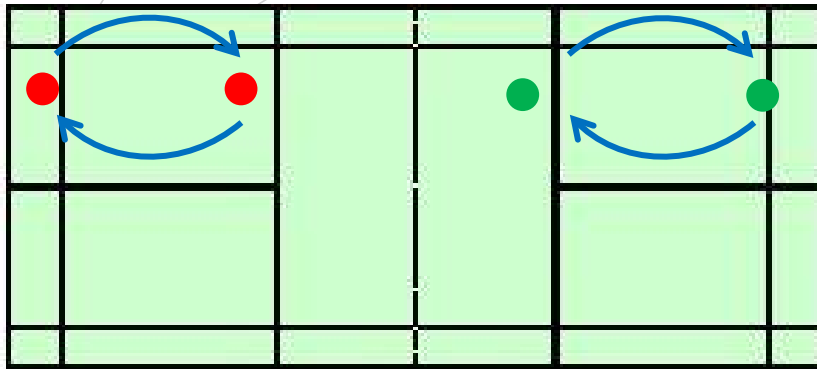
This is a variation on using the long net. Two groups (red and yellow) could play across the net to each other; whilst the blue and the green groups perform skills practices (e.g. blue group footwork, green group rallying by hitting under control off the body).

SPACING (ALTERNATE POSITIONS)



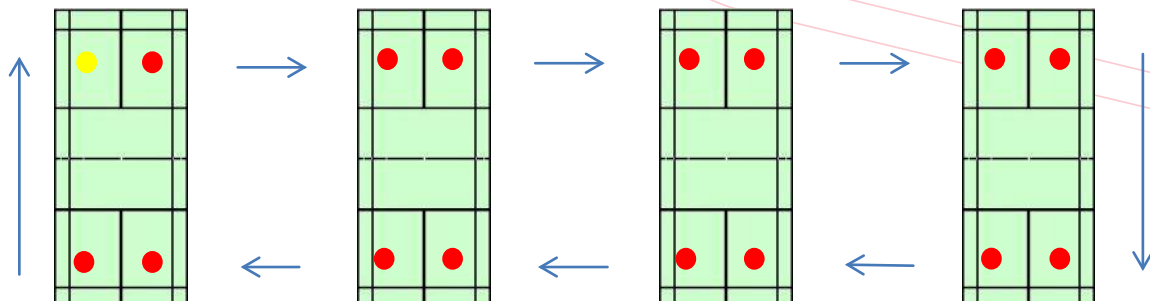
With certain practices it may be possible to have more than four players on court and still operate safely, provided their positions are organised in an alternating way. The above diagram illustrates how this could be achieved with players hitting dropshots and lifts.

INVOLVING THE WHOLE GROUP IN ACTIVITY



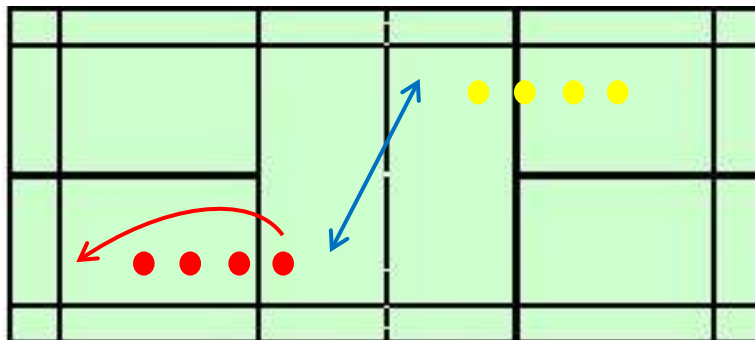
Hitting players (in red) alternate net lifts from a hand feed provided by two alternating hand feeders (in green). The feeder would need to move back from the net to collect the lift, being replaced at the net by another feeder who moves forwards. This makes the practice more dynamic for the feeders.

ROTATING PRACTICE PARTNERS



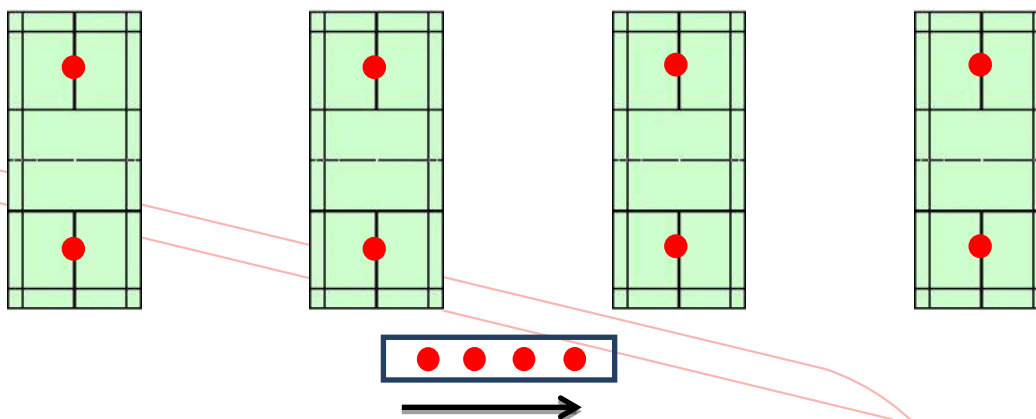
A group of players may be competing or practicing against each other on half a court. At the end of a particular time period (e.g. 5 minutes) all the players rotate one place clockwise, apart from one player (marked in yellow) who remains in the same place. If this process is repeated then eventually each player will play against each other.

CAROUSELLING



Players work in group, playing a particular shot (a cross court net shot in this case), moving away to the back of the group having played the shot. Movement patterns can be practiced here.

THE SUBSTITUTE'S BENCH



Players compete against each other, for example playing short sets to seven points. Losers move onto the back of the substitute's bench and are replaced by the player at the front of the substitute's bench. This can be adapted so that players can also win a match by winning a rally with an agreed stroke, or the shot after that agreed stroke.

So a player may be losing 1 – 6 but they win the next rally with the agreed stroke (a smash) so win the match 7 – 6. This last method is highly motivating, helps players learn when to use certain strokes to their advantage and means players have less waiting time on the substitute's bench.

12. REVIEW OF COACHING



The **review** stage of the coaching process can take place at the end of each:

- Training session;
- Short term cycle;
- Mid-term cycle;
- Long term cycle

The purpose of the **review** is to record evidence upon which and **evaluation** can then be made. The more thorough the **review**, the more likely the **evaluation** is to be accurate.

The content of the **review** should consist solely of describing what you observed has happened. The comments should be balanced between observations about what the players did and observations about what the coach did.

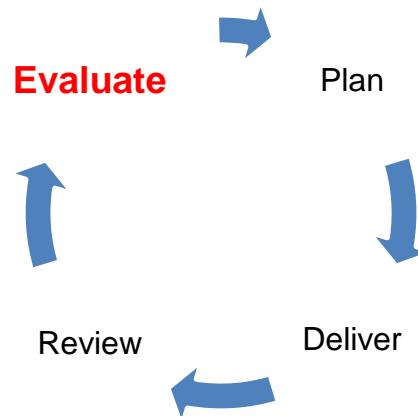
Two key aspects to avoid when recording the **review** information are:

- Recording what you didn't see (e.g. many players did not use a basic grip)
- **Evaluating** the standard of what is produced, especially using words like "good", "excellent", "poor", "bad", "average" etc.

Examples of good **review** information would be:

- "we warmed up for 20 minutes";
- "4 out of 5 players used a basic grip during the forehand dropshot practice";
- "Players' body language during the doubles tactical practices was positive";
- "I spent more time coaching court 1 than court 2";
- "I used questioning at the start and end of the session"

EVALUATION OF COACHING



Having completed a review, **evaluation** is concerned with:

- Did the players achieve the goals set?
- What strengths did the players exhibit?
- What player development areas were identified?
- What strengths as a coach were apparent?
- What coach development areas were identified?

Examples of typical **evaluation** comments might include:

- “We need to warm up for 5 minutes less but include something specific that will help players develop a skill later in the session”.
- “I need to help one player a little more with their basic grip”.
- “We need to keep using problem-solving tactical activities which appear to be very motivating for the players”.
- “I need to balance my attention more evenly across the whole group”.
- “Next time I will try to use more questioning throughout the whole of the session”.

13. SELF-ASSESSMENT QUESTIONS

	Questions	Answers			Marks
1	The 3 stages of the planning process are:	1.	2.	3.	
2	Well written goals have 7 key characteristics, the first of which is "specific". List the 6 remaining characteristics of well written goals	1.	2.	3.	
		4.	5.	6.	
3	"To win the next Olympic singles gold medal" is an example of what type of goal? (Tick against your chosen answer)	1. Process			
		2. Performance			
		3. Outcome			
4	Name the two factors which, when multiplied, result in a calculation of training load	1.	x	2.	
5	Which is genetically determined: ability or skill?				
6	List the 3 characteristics demonstrated by a skilled performer compared to an unskilled performer	1.			
		2.			
		3.			
7	Successful badminton requires excellence in: (Tick one answer)	1. Closed skills			
		2. Open skills			
8	Describe the difference between random and varied practice				
9	List the 4 types of learner included in Honey and Mumford's model of learning styles	1.			
		2.			
		3.			
		4.			
10	Explain the difference between manual and mechanical guidance				
11	Use an example to describe how visualisation might be used to help badminton performance				
12	Explain the difference between review and evaluate				

14. SUMMARY

HOW TO COACH SKILLS

The coaching process has 4 stages: **plan**, **deliver**, **review** and **evaluation**

PLANNING

The **planning** process itself has 3 stages, consisting of:

- Where we are now (a description of the current situation)
- Where we want to get to (using goal setting)
- How we are going to get there (forward planning tools)

DELIVERY

Effective coaching **delivery** relies on coaches having sound underpinning knowledge and appropriate **delivery** skills. Examples include being able to:

- Compare and contrast the concepts of **ability** (genetically endowed) , **skills** (which are developed) and **potential**
- Define **motor skills** and classify them according to:
 - the nature of the task (discrete, serial or continuous)
 - the relative importance of the movement or the thinking behind it
 - the unpredictability of the environment in which the skills are being performed
- Compare and contrast the concepts of **motor performance** and **motor learning**, the latter concept being split into cognitive, associative and autonomous stages
- Structure skill practices effectively using and appropriate mix of **blocked**, **random** and **varied** practice
- Describe different **learning styles** and their importance as an influence on **coaching delivery**
- List different **questioning methods** (open, closed, funnel, probing, leading and rhetorical) and suggest examples where they could be used effectively to support coaching
- Describe different coaching techniques, including:
 - demonstration
 - use of video and still images
 - manual and mechanical guidance
 - points of reference
 - explanation, analogies and acronyms
 - feedback
 - questioning
 - discovery learning
 - visualization
 - game manipulation (e.g. bonus points)
 - kinaesthetic
- List different methods of group management

REVIEW

- Describe the characteristics of an effective **review**, with a commitment to describing only what happened

EVALUATION

- Describe the characteristics of effective **evaluation**
-

BADMINTON COACH EDUCATION
COACHES' MANUAL
LEVEL 2

MODULE 3
WHEN TO COACH

MODULE 3

WHEN TO COACH

01. Introduction

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LEARNING OUTCOMES

By the end of this module, coaches will be able to:

- Identify 'when to coach' specific skills under the headings of Technical, Tactical, Physical, Psychological and Lifestyle.



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01. INTRODUCTION

In order to develop players effectively, it is important to have a long term player development framework in place, otherwise the wrong skills may be introduced and taught at the wrong time.

The difficulty with such models is to produce a framework which gives a useful guideline, but retains enough flexibility to account for cultural differences and for individual differences between:

- Male and females
- Early and late physical maturers
- Early and late emotional maturers
- Early and late cognitive maturers

Many sports have based their “when to coach” models on Long Term Athlete Development (LTAD) models developed by Istvan Bayli.

The LTAD model has undoubtedly been of benefit in raising awareness of the need to plan long term in order to develop a player effectively. However the validity of some of the concepts within the LTAD framework, most notably those concerned with “windows of trainability” (where children are regarded as being more receptive physiologically to certain types of physical training) have been challenged.

The badminton “when to coach” model provided in this section is highly flexible and avoids being too prescriptive.



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WHEN TO COACH MODEL

Stage of Development	Technical	Tactical	Physical	Psychology	Lifestyle
Mid-childhood (6 – 9 years old) Establish Generic Movement Skills	<ul style="list-style-type: none"> • Movements (split-step, travelling, lunge, jumping). • Striking skills (forearm rotation focus) – underarm and overarm. 	<ul style="list-style-type: none"> • Introduction to modified games (small court, no net – low net, modified shuttles). • Singles. • Personal spatial awareness (reach). 	<ul style="list-style-type: none"> • Focus on ABC'S (agility, balance, co-ordination and speed). • Warm-ups and calm downs as means to control group. 	Introduction to: <ul style="list-style-type: none"> • Basic laws of the game. • Ethics of the game. 	<ul style="list-style-type: none"> • Parental focus – introduction to simple rules and ethics of the sport.
Late childhood (8 - 13 years old) Develop Sports Specific Skills	<ul style="list-style-type: none"> • Linking of movements into distinct sport-specific patterns. • Form hitting techniques into wide ranging, deceptive strokes. 	<ul style="list-style-type: none"> • Transition from modified games to full court. • Singles bias with gradual. Introduction to level doubles. • Gradual introduction to competition. • Spatial awareness (height, width & depth) to support decision making. • Problem solving approach with conditioned games. 	<ul style="list-style-type: none"> • Basic introduction to physical conditioning (but not formalised programmes). • Gradual introduction of formalised warm-up and cool down in later stages of period. 	Develop a positive attitude to: <ul style="list-style-type: none"> • Yourself. • Others in the sport. • The sport itself. 	<ul style="list-style-type: none"> • Parent education programme (e.g. long term plan, parent-coach-player roles, communication etc.).
Puberty (11 – 16 years old) Establish Sound Training Habits	<ul style="list-style-type: none"> • Consistent production of movement patterns and strokes sustained under increasingly unpredictable training environments and when competing with peers. • Address personal development areas. 	<ul style="list-style-type: none"> • Spatial, self, opponent and partner awareness supporting decision-making. • Problem-solving approach with conditioned games. • Singles bias with development of specific doubles tactics (mixed in latter stages of period). 	<ul style="list-style-type: none"> • Introduction to development of 4 S's (stamina, speed, suppleness and strength). • Gradual move to formalised physical training programmes once emotionally mature. 	<ul style="list-style-type: none"> • Implicit mental training embedded in practice. • Develop self-resilience. • Support under 5 C's: <ul style="list-style-type: none"> ○ Control ○ Confidence ○ Concentration ○ Commitment ○ Cohesion. 	<ul style="list-style-type: none"> • Increased expectation of players to take responsibility for own lifestyle choices and control (parent to player transition).
Young adult (15 – 19) Training for Competition	<ul style="list-style-type: none"> • Consistent production of movement patterns and stroke shapes in competition against peers (at higher speeds). • Address personal development areas. • Introduce periodised technical training. 	<ul style="list-style-type: none"> • Pre-match planning. • Post-match analysis. • Video analysis. • Implementing match plans against specific opponents. • Introduce periodised approach to tactical training. • Working with coaches at events. 	<ul style="list-style-type: none"> • Increased move to periodised physical training. • Individualized training programme. • Likely involvement of strength/conditioning experts. 	<ul style="list-style-type: none"> • Gradual exposure to more explicit psychological training, possibly led by specialists. 	<ul style="list-style-type: none"> • Player takes major role in lifestyle choices + management (diet, time-management, education/ training balance, training diary, tournament plan, equipment etc).
Adult (17 + years old) Training for Peak performance.	<ul style="list-style-type: none"> • Periodised and individual training programmes. 				

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Balyi, I., & Hamilton, A. (2004). *Long-Term Athlete Development: Trainability in children and adolescents. Windows of opportunity. Optimal trainability*. Victoria, BC: National Coaching Institute British Columbia & Advanced Training and Performance Ltd.

Ford, Paul , De Ste Croix, Mark , Lloyd, Rhodri , Meyers, Rob , Moosavi, Marjan , Oliver, Jon , Till, Kevin and Williams, Craig (2011) '*The Long-Term Athlete Development model: Physiological evidence and application*', *Journal of Sports Sciences*, 29: 4, 389 — 402, First published on: 04 January 2011 (iFirst)



BADMINTON COACH EDUCATION
COACHES' MANUAL
LEVEL 2

MODULE 4
PERFORMANCE FACTORS

MODULE 4

PERFORMANCE FACTORS

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LEARNING OUTCOMES

By the end of this module, coaches will be able to:

- Name the Factors Affecting Badminton Performance
- Describe the Principles of Training – Adaptation, Overload and Recovery



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01. INTRODUCTION

Within badminton, performance factors can be defined as:

“the elements of training that influence a player’s capacity to perform effectively”.

In order to develop optimally, a player needs to address 5 key performance factors. These are listed below:

Performance Factor	Elements
Technique	How to move and hit the shuttle
Tactics	A player’s decision making, depending upon awareness and situation during play
Physical	Strength, speed, endurance, flexibility, co-ordination, agility, balance, quickness
Psychological	Cohesion, confidence, control, concentration, commitment
Lifestyle	Balance of activities, time management, parents, nutrition, injury management/prevention

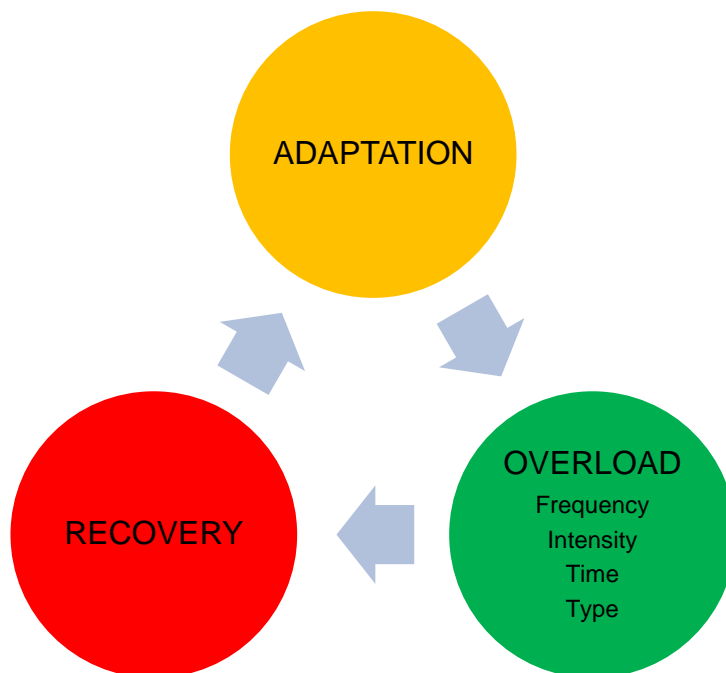
Whilst it helps to organise coaching information under these five separate headings, they are very much interlinked.

For example:

- to have the endurance to last a long match (physical factor) requires correct nutrition (lifestyle factor).
- improved movement and hitting (technique) improves a players options to attack (tactics).
- adapting to the opponent’s strokes (tactics) requires concentration (psychology).

PRINCIPLES OF TRAINING

In order to make training effective, various principles of training need to be applied. These principles are represented in the diagram below:



02. PRINCIPLE OF ADAPTATION

Adaptation:

- is the term used to describe how the body changes in response to training;
- can occur in any of the 5 Performance Factors (technical, tactical, physical, psychological and lifestyle);
- occurs after training

Adaptation is the key principle of training – other principles are applied and manipulated to bring about the best adaptation possible.

03. PRINCIPLE OF OVERLOAD

In order to make improvements due to training it is important that the body and mind experiences 'loads' that become progressively harder. The coach and player work together to provide and complete training that overloads the body. In order to do this, it is necessary to manipulate certain training variables, including:

- Frequency (how often you train)
- Intensity (how hard you train)
- Time (how long you train)
- Type (what type of activity you use)

04. PRINCIPLE OF RECOVERY

Since adaptation only occurs after training, it is important to note the following:

- To give sufficient rest time to allow this adaptation to take place.
- Too much rest means that the benefits of the training are lost before the next training session occurs.
- Insufficient rest does not allow the systems of the body to recover.



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BADMINTON COACH EDUCATION
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LEVEL 2

MODULE 5
PERFORMANCE FACTOR 1 –
TECHNICAL (HITTING SKILLS)

MODULE 5

PERFORMANCE FACTOR 1 – TECHNICAL (HITTING SKILLS)

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LEARNING OUTCOMES

By the end of this module, coaches will be able to:

- Describe the key technical points and tactical context for a range of strokes, including:
 - spin and cross-court net shots;
 - singles and doubles mid-court defence;
 - overhead slices and stik smash
- Identify links between specific movements and tactical situations;
- Apply different coaching methods to movement development

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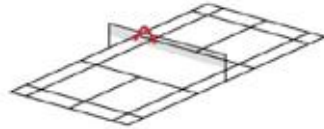




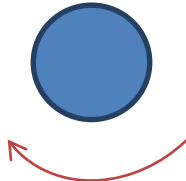
01. INTRODUCTION

This section will build on the technical knowledge established in the Level 1 Coach Education course. As with Level 1, this section will be divided into two areas: hitting and movement. Though, in reality, the technique of hitting is completely linked to movement before, during and after the hitting phase, by dividing the two, it helps to simplify and present the content.

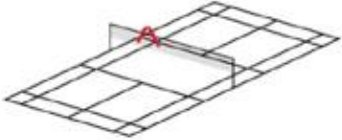







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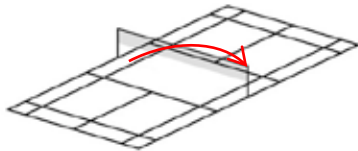




02. BACKHAND SPIN NET SHOT (IN TO OUT)

WHERE THE SHUTTLE GOES	Forecourt to forecourt	
WHEN WE USE IT	<ul style="list-style-type: none"> • You are attacking, taking the shuttle early and close to the net • Often used when you are approaching the shuttle diagonally • Often used when the shuttle is received from cross-court • Played in reply to an opponent spinning the shuttle in to out 	
WHY WE USE IT	<ul style="list-style-type: none"> • Use spin to force an error or an uncontrolled reply • Use to force a short, defensive lift 	
PREPARE <ul style="list-style-type: none"> • Use a relaxed, basic grip • Use a relaxed reach, racket head slightly above the hand 		
BACKSWING <ul style="list-style-type: none"> • Establish a relaxed thumb grip • Rotate arm inwards (pronation) • Racket head is slightly to the inside of the intended impact point 		
FORWARD SWING <ul style="list-style-type: none"> • Use slight outward rotation (supination) • The racket moves from in to out, creating an arc underneath the shuttle • Impact just prior to or at the bottom of the arc 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Continue to supinate in a relaxed manner • Maintain a high racket position to look for an opportunity to net kill 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • When facing a shuttle as it travels to you, the shuttle is designed so that it rotates in a clockwise direction. A right handed player, playing this stroke, will therefore be hitting with the natural spin of the shuttle. • Land the front lunging foot on or just after impact 		

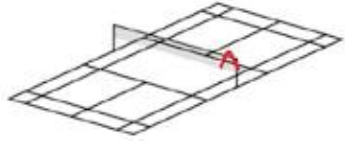




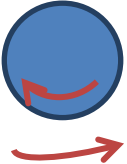
03. BACKHAND SPIN NET SHOT (OUT TO IN)

WHERE THE SHUTTLE GOES	Forecourt to forecourt	
WHEN WE USE IT	<ul style="list-style-type: none"> • Mostly used when you are in an attacking situation, taking the shuttle early and close to the net • Often played when you are approaching the shuttle straight on • Often played in reply to an opponent spinning the shuttle out to in 	
WHY WE USE IT	<ul style="list-style-type: none"> • Making the shuttle spin makes it difficult for the opponent to control their return • The stroke can be used to: <ul style="list-style-type: none"> ○ hit a winner; ○ force a weak return from your opponent, such as a short lift or loose net shot 	
PREPARE <ul style="list-style-type: none"> • Approach with a relaxed, basic grip • Use a relaxed reach, racket head slightly above hand 		
BACKSWING <ul style="list-style-type: none"> • Establish a relaxed thumb grip • Reach forwards • Raise racket slightly outside the intended shuttle impact point 		
FORWARD SWING <ul style="list-style-type: none"> • The racket moves from out to in, creating a shallow arc underneath the shuttle by pronating the forearm slightly 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Short follow through • Maintain a high racket position to look for an opportunity for a net kill 		
HINTS TIPS AND VARIATIONS <ul style="list-style-type: none"> • When facing a shuttle as it travels to you, the shuttle is designed so it will rotate in a clockwise direction. A right handed player, playing this stroke will, therefore be hitting against the natural spin of the shuttle. 		

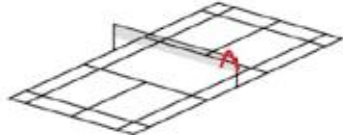




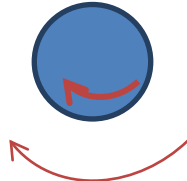
04. BACKHAND CROSS-COURT NET SHOT

WHERE THE SHUTTLE GOES	Forecourt to forecourt	
WHERE IT DOES	<ul style="list-style-type: none"> • Generally the striking player is on balance and taking the shuttle early • The receiving player is out of position and/or off-balance 	
WHY WE USE IT	<ul style="list-style-type: none"> • Force an opponent to change direction and take the shuttle late • Force an error or an uncontrolled reply 	
PREPARE <ul style="list-style-type: none"> • Approach with a relaxed, basic grip • Use a relaxed reach, racket head slightly above hand 		
BACKSWING <ul style="list-style-type: none"> • Maintain a relaxed basic grip or put thumb along corner of the racket handle • Extend arm • Pronate forearm (rotate forearm inwards) • Racket head slightly outside the line of flight of the shuttle 		
FORWARD SWING <ul style="list-style-type: none"> • Rotate arm outwards (supination) • Maintain slight angle between forearm and racket • Short contact time with shuttle 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Minimal follow through • Anticipate opponent's next reply 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • As with all strokes, it is important to take the shuttle early to put your opponent under pressure • Be careful playing this off-balance and under pressure because it can help your opponent to exploit the space on the forehand side with their next shot. 		

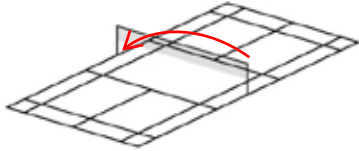




05. FOREHAND SPIN NET SHOT (IN TO OUT)

WHERE THE SHUTTLE GOES	Forecourt to forecourt	
WHEN WE USE IT	<ul style="list-style-type: none"> Intercepting the shuttle close to the net The striking player is approaching from a cross-court position The shuttle has been played cross-court to you 	
WHY WE USE IT	<ul style="list-style-type: none"> To force an inaccurate net reply To force a short defensive lift 	
PREPARE <ul style="list-style-type: none"> Use a relaxed, basic grip Carry racket in front of body 		
BACKSWING <ul style="list-style-type: none"> Extend racket arm Supinate forearm Present racket strings to the shuttle 		
FORWARD SWING <ul style="list-style-type: none"> Move the racket across the shuttle – in to out Racket creates a shallow arc shape 		
FOLLOW THROUGH <ul style="list-style-type: none"> Complete the shallow arc shape Maintain a high racket position in anticipation of a weak net return 		
HINTS TIPS AND VARIATIONS <ul style="list-style-type: none"> When facing a shuttle as it travels to you, the shuttle is designed so it will rotate in a clockwise direction. When a right handed person plays this stroke, they are therefore hitting against the spin. 		

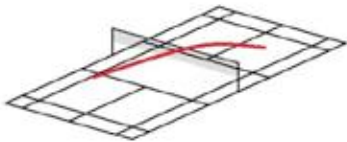




06. FOREHAND SPIN NET SHOT (OUT TO IN)

WHERE THE SHUTTLE GOES	Forecourt to forecourt	
WHEN WE USE IT	<ul style="list-style-type: none"> Intercepting the shuttle close to the net Approaching the shuttle straight on (approaching straight to a straight reply) 	
WHY WE USE IT	<ul style="list-style-type: none"> To force an inaccurate net reply To force a short/defensive lift 	
PREPARE <ul style="list-style-type: none"> Use a relaxed, basic grip Carry racket out in front of the body 		
BACKSWING <ul style="list-style-type: none"> Extend racket arm Supinate forearm Take racket head slightly outside the line of flight of the shuttle 		
FORWARD SWING <ul style="list-style-type: none"> Continue to supinate forearm Strike across the shuttle – out to in Create a shallow arc 		
FOLLOW THROUGH <ul style="list-style-type: none"> Uses very little follow through Maintain a high racket position to look for an opportunity to net kill 		
HINTS TIPS AND VARIATIONS <ul style="list-style-type: none"> When facing a shuttle as it travels to you, the shuttle is designed so it rotates in a clockwise direction. A right handed person playing this stroke is therefore hitting with the spin of the shuttle. 		

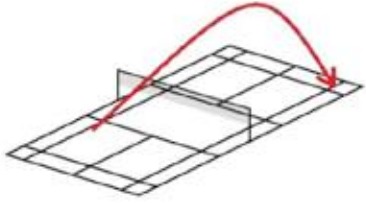




07. FOREHAND CROSS-COURT NET SHOT

WHERE THE SHUTTLE GOES	Forecourt to forecourt	
WHEN WE USE IT	<ul style="list-style-type: none"> • The player is on balance and taking the shuttle early • The receiving player is out of position and/or off-balance 	
WHY WE USE IT	<ul style="list-style-type: none"> • To force an error or a weak reply 	
PREPARE <ul style="list-style-type: none"> • Approach with a basic grip • Use a relaxed reach, racket head slightly above hand 		
BACKSWING <ul style="list-style-type: none"> • Extend the arm • Supinate forearm so racket head goes slightly outside of the shuttle flight 		
FORWARD SWING <ul style="list-style-type: none"> • Rotate arm inwards (pronation) • Maintain angle between forearm and racket • Short contact time with shuttle 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Minimal follow through • Anticipate opponent's next reply 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • As with all strokes, it is important to take the shuttle early to put your opponent under pressure • Be careful playing this off-balance and under pressure because it can help your opponent to exploit the space on the backhand side with their next shot. 		

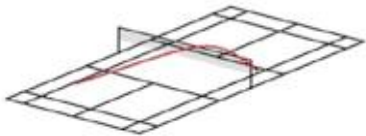




08. BACKHAND DRIVE DEFENCE (OFF THE BODY)

WHERE THE SHUTTLE GOES	Midcourt to midcourt	
WHEN WE USE IT	Off a smash or drive	
WHY WE USE IT	<ul style="list-style-type: none"> • An attempt to turn defence into attack • To force opponent's away from the forecourt • Deny an attacking opportunity 	
PREPARE <ul style="list-style-type: none"> • Carry racket out in front of the body • Begin to move into position to perform a split-step 		
BACKSWING <ul style="list-style-type: none"> • Establish a relaxed thumb grip • Land the split step, bending knees slightly • Move elbow upwards and forwards (elbow is bent) • Rotate lower arm inwards (pronation) • Create angle between racket and forearm 		
FORWARD SWING <ul style="list-style-type: none"> • Rotate lower arm outwards (supination) • Straighten elbow 		
FOLLOW THROUGH <ul style="list-style-type: none"> • As arm relaxes momentum of racket produces further forearm rotation • Recover the racket quickly in preparation for the next stroke 		
HINTS AND VARIATIONS <ul style="list-style-type: none"> • If you have less time, the action may need to be shortened – meaning it may not be possible to create so much of an angle between the racket and forearm. • Strike the left or right of the shuttle to hit the stroke cross-court 		

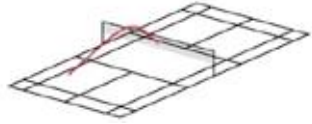




09. BACKHAND LONG DEFENCE (OFF THE BODY)

WHERE THE SHUTTLE GOES	Midcourt to rearcourt	
WHEN WE USE IT	Returning a smash or drive	
WHY WE USE IT	<ul style="list-style-type: none"> • Allowing time to regain balance and position on the court • Move your opponent(s) around the court • In women's doubles it can be used as a tactic to tire your opponents 	
PREPARE <ul style="list-style-type: none"> • Begin to establish a relaxed thumb grip • Carry racket out in front of the body (relaxed reach) • Start the split-step in anticipation of your opponent's stroke 		
BACKSWING <ul style="list-style-type: none"> • Land the split step, bending knees slightly • Move elbow upwards and forwards (elbow is bent) • Rotate upper and lower arm inwards (pronation) • Create angle between racket and forearm 		
FORWARD SWING <ul style="list-style-type: none"> • Begin to straighten legs slightly • Rotate upper and lower arm outwards (supination) and extend elbow • Strike the shuttle out in front of the body, with racket head below the hand • Strike through and under the shuttle 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Relax and allow momentum of racket to continue outward rotation of upper and lower arm • Recover racket ready for next stroke 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • If you have less time the action may need to be shortened • Strike the left or right of the shuttle to hit the stroke cross-court 		

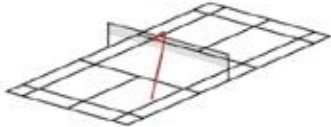




10. BACKHAND SINGLES CROSS-COURT BLOCK

WHERE THE SHUTTLE GOES	Midcourt to mid/forecourt	
WHEN WE USE IT	In reply to a smash	
WHY WE USE IT	<ul style="list-style-type: none"> • An attempt to change defence into attack • Increasing the distance an attacker has to cover in order to follow up a straight smash 	
PREPARE <ul style="list-style-type: none"> • Use a relaxed basic grip • Carry racket out in front of the body • Start your split-step, with a wide stance and parallel to the net 		
BACKSWING <ul style="list-style-type: none"> • Maintain a relaxed basic grip or move thumb along corner of handle • Lunge to side (non-racket leg lunge shown) • Rotate upper and lower arm inwards (pronation of forearm) • Establish angle between forearm and racket 		
FORWARD SWING <ul style="list-style-type: none"> • Supinate upper and lower arm outwards (supination of forearm) • Hyperextend wrist • Guide shuttle cross-court 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Turn and recover racket quickly 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • To prevent the smashing player being able to follow up with a spin net shot, block so the shuttle travels slightly further into court • The stroke can be performed on the racket leg 		

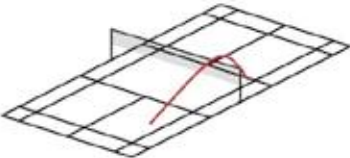




11. BACKHAND SINGLES STRAIGHT BLOCK

WHERE THE SHUTTLE GOES	Midcourt to mid/forecourt	
WHEN WE USE IT	Returning a wide smash	
WHY WE USE IT	<ul style="list-style-type: none"> • An attempt to turn attack into defence • Increasing the distance an attacker has to cover after hitting a cross-court smash • To deny an attacking opportunity 	
PREPARE <ul style="list-style-type: none"> • Use a relaxed basic grip • Carry racket out in front of the body • Start your split-step, with a wide stance and parallel to the net 		
BACKSWING <ul style="list-style-type: none"> • Maintain a relaxed basic grip or move thumb along corner of racket handle • Lunge to side (non-racket leg lunge shown) • Rotate upper and lower arm inwards (pronation of forearm) • Create an angle between forearm and racket 		
FORWARD SWING <ul style="list-style-type: none"> • Pronate forearm slightly • Push through shuttle 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Complete pushing through shuttle • Turn and recover racket quickly to anticipate possible returns 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • To prevent the smashing player being able to follow up with a spin net shot, block so the shuttle travels slightly further into court 		

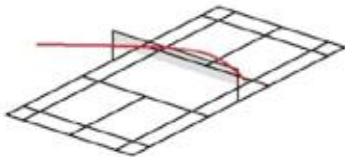




12. FOREHAND SINGLES CROSS-COURT BLOCK

WHERE THE SHUTTLE GOES	Midcourt to mid/forecourt	
WHEN WE USE IT	When returning a wide smash	
WHY WE USE IT	<ul style="list-style-type: none"> • An attempt to change attack into defence • Increasing the distance an attacker has to cover in order to follow up a straight smash • Deny an attacking opportunity 	
PREPARE <ul style="list-style-type: none"> • Use a relaxed basic grip • Carry racket out in front of the body • Split-step timed with opponent's stroke 		
BACKSWING <ul style="list-style-type: none"> • Lunge out to the side • Reach out • Take racket back by supinating forearm and hyperextending wrist 		
FORWARD SWING <ul style="list-style-type: none"> • Pronate forearm and straighten wrist • Tighten grip • Guide shuttle in a cross-court direction 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Recover racket quickly to anticipate possible returns 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • To prevent the smashing player being able to follow up with a spin net shot, block so the shuttle travels slightly further into the court • An overhead hand feed may be used to simulate a straight smash and let the player practice this skill. However, the throw will have limited pace, so move to racket feeding as soon as possible 		

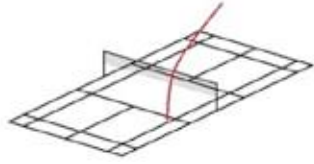




13. FOREHAND SINGLES STRAIGHT BLOCK

WHERE THE SHUTTLE GOES	Midcourt to mid/forecourt	
WHEN WE USE IT	When returning a wide smash	
WHY WE USE IT	<ul style="list-style-type: none"> • An attempt to change defence into attack • Increasing the distance an attacker has to cover after hitting a cross-court smash • To deny an attacking opportunity 	
PREPARE <ul style="list-style-type: none"> • Use a relaxed basic grip • Carry racket out in front of the body • Start your split-step timed with your opponent's stroke 		
BACKSWING <ul style="list-style-type: none"> • Lunge out to side • Reach out • Take racket back by supinating forearm and hyper-extending wrist 		
FORWARD SWING <ul style="list-style-type: none"> • Pronate forearm slightly and straighten wrist • Push through shuttle 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Recover racket quickly to anticipate possible returns 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • To prevent the smashing player being able to follow up with a spin net shot, block so the shuttle travels slightly further into court 		

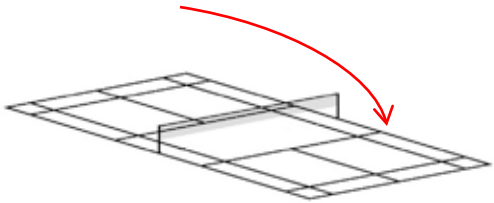




14. FOREHAND CROSS-COURT REVERSE SLICE

WHERE THE SHUTTLE GOES	Backhand rearcourt, cross-court to mid/forecourt	
WHEN WE USE IT	In response to an opponent's lift or clear	
WHY WE USE IT	<ul style="list-style-type: none"> • To force opponent to take shuttle low and late • To try and hit a winner • To maintain the attack 	
PRPARE <ul style="list-style-type: none"> • Use a relaxed basic grip or adjust to a panhandle • Racket in overhead ready position 		
BACKSWING <ul style="list-style-type: none"> • Bring elbow up and forwards • Rotate upper and lower arm outwards (supination of forearm) 		
FORWARD SWING <ul style="list-style-type: none"> • Reach for shuttle • Rotate upper and lower arm inwards (pronate forearm) • Bring racket head across the shuttle to send it in a cross-court direction 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Inward rotation of forearm continues due to racket momentum • Bring racket in front of the body in preparation for the next stroke 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • Some players may adjust their grip towards a slight panhandle, but be aware some opponents may see this change when you are about to play this stroke 		

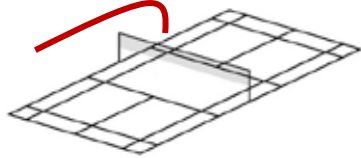




15. FOREHAND CROSS-COURT SLICE

WHERE THE SHUTTLE GOES	Forehand rearcourt, cross-court to the mid/forecourt	
WHEN WE USE IT	In response to an opponent's lift or clear	
WHY WE USE IT	<ul style="list-style-type: none"> • To try and hit a winner • To force an opponent to take the shuttle low and late • To maintain the attack 	
PREPARE <ul style="list-style-type: none"> • Use a relaxed basic grip • Racket in overhead ready position 		
BACKSWING <ul style="list-style-type: none"> • Rotate upper and lower arm outwards (supination of forearm) • Bring elbow up and forwards 		
FORWARD SWING <ul style="list-style-type: none"> • Throw the racket head towards the shuttle (relaxed reach) • Slice along the outside of the shuttle with a fast racket head speed 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Recover racket quickly in preparation for the next stroke 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • Some players may adjust their grip slightly towards a thumb grip, but beware that some opponents may be able to spot the grip change and therefore anticipate the sliced shot 		

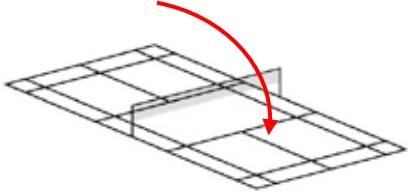




16. FOREHAND OVERHEAD STIK SMASH

WHERE THE SHUTTLE GOES	Rearcourt to midcourt	
WHEN WE USE IT	In response to a lift or clear	
WHY WE USE IT	<ul style="list-style-type: none"> • To win the point • To force an error • To maintain the attack 	
PREPARE <ul style="list-style-type: none"> • Use a relaxed basic grip • Racket in overhead ready position • Jump sideways (and sometimes slightly backwards) to the shuttle 		
BACKSWING <ul style="list-style-type: none"> • Bring elbow up and forwards • Rotate upper and lower arm outwards (supination of forearm) 		
FORWARD SWING <ul style="list-style-type: none"> • Continue to reach up • Rotate upper and lower arm inwards (pronate forearm) • Strike the shuttle powerfully in a downwards direction 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Racket rebounds • Recover racket quickly in preparation for the next stroke 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • Use your no-racket arm to assist you in the jump • The shot can be performed jumping out to the forehand and backhand sides 		

17. FOREHAND STRAIGHT REVERSE SLICE

WHERE THE SHUTTLE GOES	Forehand rearcourt to mid/forecourt	
WHEN WE USE IT	In response to an opponent's lift or clear	
WHY WE USE IT	<ul style="list-style-type: none"> • To try and hit a winner • To force your opponent to take the shuttle low and late • To maintain the attack 	
PREPARE <ul style="list-style-type: none"> • Use a relaxed basic grip or turn grip slightly to panhandle • Racket in overhead ready position 		
BACKSWING <ul style="list-style-type: none"> • Rotate upper and lower arm outwards (supination of forearm) • Bring elbow up and forwards 		
FORWARD SWING <ul style="list-style-type: none"> • Reach for the shuttle • Rotate upper and lower arm inwards (pronate forearm) • Bring the racket head across the shuttle from out to in 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Inward rotation of arm will continue due to relaxation/racket momentum • Bring racket back in front of body in preparation for next stroke 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • Some players may adjust their grip towards a slight panhandle, but be aware some opponents may see this change when you are about to play this stroke 		

18. FOREHAND STRAIGHT SLICE FROM BACKHAND REARCOURT

WHERE THE SHUTTLE GOES	Rearcourt to mid/forecourt	
WHEN WE USE IT	In response to a lift or clear	
WHY WE USE IT	<ul style="list-style-type: none"> • To force an opponent to take the shuttle low and late • To maintain the attack 	
PREPARE <ul style="list-style-type: none"> • Establish a relaxed basic grip • Racket in overhead ready position 		
BACKSWING <ul style="list-style-type: none"> • Bring elbow up and forwards • Rotate upper and lower arm outwards (supination of forearm) 		
FORWARD SWING <ul style="list-style-type: none"> • Throw the racket head towards the shuttle (relaxed reach) • Slice along the side of the shuttle with a fast racket head speed 		
FOLLOW THROUGH <ul style="list-style-type: none"> • Recover racket quickly in preparation for next stroke 		
HINTS, TIPS AND VARIATIONS <ul style="list-style-type: none"> • Some players may adjust their grip slightly towards a thumb grip, but beware that some opponents may be able to spot the grip change and therefore anticipate the sliced shot • Usually you can play this shot most effectively when performing a scissor kick/kick through • Consider moving positively forwards after this attacking stroke, anticipating returns to straight returns to the forecourt 		

BADMINTON COACH EDUCATION
COACHES' MANUAL
LEVEL 2

MODULE 6
PERFORMANCE FACTOR 2
TECHNICAL (MOVEMENT SKILLS)

MODULE 6

PERFORMANCE FACTOR 2 - TECHNICAL (MOVEMENT SKILLS)

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LEARNING OUTCOMES

By the end of this section coaches will be able to:

- List the 4 stages of the movement cycle;
- List the components of movement used in badminton;
- Organise the movement components into typical movement patterns;
- Describe differences in footwork for service returns in doubles;
- Describe differences in footwork patterns linked to tactical situations;
- Identify the advantages and disadvantages of different coaching methods used in movement development



01. INTRODUCTION

This section will recap briefly on the concepts and movement patterns introduced in Level 1. It will then explore some differences between singles and doubles movement, with particular attention to returning serve in doubles.

Developing movement patterns that are appropriate for different strokes and tactical situations will also be covered.

Finally, the effectiveness of different coaching methods (e.g. shaping, chaining and whole-part-whole) to movement training will be explored.

02. MOVEMENT PATTERNS

THE TYPICAL MOVEMENT PATTERNS INTRODUCED AT LEVEL 1

If you watch a high level badminton game and focus on the movements performed by the player, you will see the same movements being repeated many times over. These movement components are listed below:

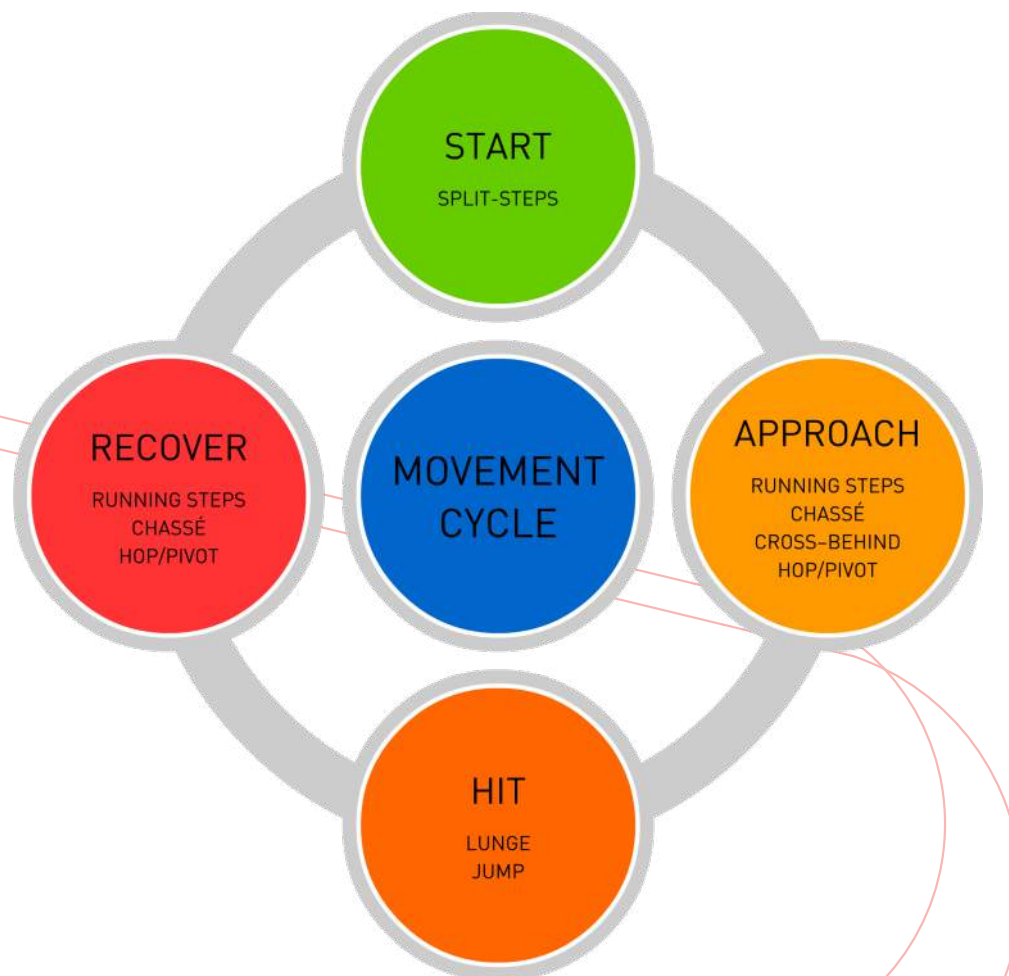
- Split-step
- Running steps
- Chassé
- Cross behind
- Hop
- Lunge
- Jump



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Training these movement components in isolation is useful, but eventually they need to be integrated so that the player can “flow” around the court effectively. A useful way to put these components together is in a model known as the “movement cycle” (shown below). The movement cycle has four sections:

- **Start** – which happens in response to your opponent’s hit and allows you to move off towards the shuttle.
- **Approach** – which includes the methods you would then use to travel across the court towards the shuttle.
- **Hit** – or more precisely the movements your body performs as you hit.
- **Recovery** – involving methods you would use to travel in a direction that anticipates your opponent’s reply.



TYPICAL MOVEMENT PATTERNS

Corner of the Court	Typical Movement Patterns (described for a right handed player)			
	Start	Approach	Hit	Recover
Forehand Forecourt	Split-step (parallel to the net)	Run step (left foot)	Lunge (right leg)	Run or chassé back.
	Split-step (racket foot forwards)	Chassé		
	Split-step (racket foot forwards)	Cross-behind		
Backhand Forecourt	Split-step (parallel to the net)	Run step (left foot)	Lunge	Pivot/hop, chassé, run step.
	Split-step (non-racket foot forwards)	Pivot-hop (left foot)		
	Split-step (racket leg committed forwards)	Chassé		
Forehand Rearcourt	Split-step (racket leg back)	Cross-behind (left foot).	Jump and kick through	Running step or chasse.
		Chassé (arc to create sideways stance).	Jump out	Pivot/hop, chassé, run step.
		Chassé		
Backhand Rearcourt	Split-step (non-racket leg back)	Pivot/hop around left foot.	Jump and kick through.	Run step or chasse.
		Chassé, then pivot on left foot.	Step out (lunge if under pressure).	Spin/pivot on left foot then chassé/run
		Running steps back (arc into side-on stance).	Jump and kick through.	Run step or chasse.

03. MOVEMENT TYPES IN SINGLES AND DOUBLES

DESCRIBE DIFFERENCES IN MOVEMENT FOR SINGLES AND DOUBLES PLAYERS





There are a few major differences between singles and doubles movements. Differences are not so much about movement components or patterns, but the nature of how these movements are performed. As a whole, Singles players tend to be more balletic with a wide range of movements. On the other hand, Doubles movements are more staccato and punchy in nature.

RETURN OF LOW SERVE: SINGLES

When returning a low serve in singles, players stand with their non-racket leg forwards then step through on their racket leg to receive the serve.

RETURN OF LOW SERVE: DOUBLES

In doubles, players also stand with their non-racket leg forwards and then either:

<p>1. Step through on their racket leg to receive serve.</p> <p>OR</p>		
<p>2. Step forwards on their non-racket leg to receive serve</p>		

Stepping forwards on the non-racket leg has advantages because:

- It is quicker, so allows you to take the shuttle earlier.
- The front foot becomes active first and this is an advantage if you then have to push off backwards to receive a flick serve.

Younger juniors, some female players and lower level players generally find that, because they receive from a deeper position in the service box, stepping forwards on the racket leg is necessary to cover the distance required to reach the shuttle.

IDENTIFY LINKS BETWEEN SPECIFIC MOVEMENTS AND TACTICAL SITUATIONS

Whilst there are several movement patterns that are easily recognisable, those patterns can be adapted depending upon personal preference and the particular tactical situation. The next section highlights some key areas for consideration where movement patterns can be depending on different situations.

RECOVERY FROM THE REARCOURT

Situation	Movement	Advantage	Disadvantage
Clear	Kick through and running step	<ul style="list-style-type: none"> • Natural • Can cover a large distance so brings you back a long way into court • Useful if your clear has put the opponent under pressure 	May interfere with timing of split-step if clear is intercepted early
Dropshot/Smash	Kick through and split-step	<p>The shuttle is in the air a short period of time before the opponent's reply, so an immediate split-step allows you to:</p> <ul style="list-style-type: none"> - time the split-step with your opponent's hit and use this positively to follow up your attack; - change direction more effectively 	
Smash – Forehand Rearcourt	Jump-out then pivot/ split-step	<ul style="list-style-type: none"> • Pivoting immediately so the racket leg leads indicates the intent to attack to follow in behind the dropshot/smash • The shuttle is in the air a short period of time before being returned, so an immediate split-step allows you to: <ul style="list-style-type: none"> - time the split-step with your opponent's hit; - change direction more effectively. 	Can make it more difficult to return back to the forehand rearcourt
Smash/ Dropshot	Kick-through, then running step and hop	<ul style="list-style-type: none"> • Having kicked-through, the non-racket leg performs a running step - so that when the foot lands it performs a hop to give extra forwards movement power • Very effective to follow up quickly when the opponent is under pressure and likely to play a weak return to the net 	This is a very committed, forwards attacking movement so it could be difficult to reverse direction if shuttle lifted back over the player's head.

MID-COURT RECOVERY

Situation	Movement	Advantage	Disadvantage
Backhand Singles Defence: non-racket leg	Wide lunge on non-racket leg	<ul style="list-style-type: none"> Allows racket to reach the shuttle as soon as possible Keeps player facing the net 	Restricts reach
Backhand Singles Defence: racket leg	Wide lunge on racket leg	Helps reach the shuttle	Turns back completely to the net, so awareness of situation is not so good. It requires quick turn/spin to recover

FORECOURT RECOVERY

Situation	Movement	Advantages
Defensive Lift	Lunge – short adjustment step then chassé/run back to defensive split-step in mid-court	<ul style="list-style-type: none"> Adjustment step allows balance to be re-established and a more powerful push off backwards Finishing with a split-step more parallel to net, prepares player to deal with opponent's likely attack
Early Net Shot	Lunge, short adjustment step back, keep racket leg committed forwards	<ul style="list-style-type: none"> Provided net shot is taken early then the player can remain relatively committed to net, looking for the opportunity to kill a net reply

04. COACHING METHODS

APPLY DIFFERENT COACHING METHODS TO MOVEMENT DEVELOPMENT

This section will look in more detail at methods by which you can develop movement. The coaching methods discussed will be:

- Shaping
- Whole-part-whole
- Chaining

Travelling into and out of the forehand rearcourt with the following movement patterns will be used to demonstrate the application of these coaching methods:

- Split-step
- Chassé
- Jump-out
- Chassé

SHAPING

When using shaping, the whole of the skill is performed throughout the practice, with different aspects being refined as required. The advantage of this method generally given is that the flow of the skill is maintained (i.e. it is not broken up into fragments which can disjoint the movement). The potential disadvantage is that the complexity of the combined elements may make it difficult for the player to learn effectively.

Using our example, the coach may wish to increase the distance covered on the chassé step. The player performs the whole movement into the forehand rearcourt, with the coach giving the necessary feedback on performance.

WHOLE-PART-WHOLE

Using this method, the player performs the whole skill and then a specific part of the skill is separated, worked on independently and then put back into the whole skill. The advantage of this approach is simplicity as it allows the player and coach to focus on one element. The potential disadvantage is that flow can be lost.

Using our example, the player may perform the whole movement, then they decide to work on the jump phase in isolation, making more use of the non-racket arm in the jump phase. Having practised the jump section, this part is then put back into the whole movement to assess the potential improvement.

CHAINING

Chaining involves working on the first part of a skill, then adding the remaining parts in sequence as the player improves, eventually resulting in the whole skill being performed. The advantage of this approach is simplicity and it also gives a lot of control, so that the player only seeks to add the next part in a movement sequence when the previous parts have been performed to an acceptable level.

In our example, the coach may perform the whole movement (or show a video) so the player knows what they are working towards. The player then practices in the following sequence:

- a split-step, with the non-racket leg committed slightly further forwards;
- a split-step and then a chassé;
- a split-step, chassé and then a jump;
- a split-step, chassé, jump out and then a chassé recovery

05. SELF-ASSESSMENT QUESTIONS

	Questions	Answers
1	Describe one simple technical difference between a forehand and backhand spin net shot (played with a right to left movement).	
2	Explain how forearm rotation is used during backswing and forward swing of doubles long defence.	
3	Describe key difference between backhand singles defence when blocking straight and cross-court.	
4	Which side of the shuttle should a right-handed player strike when playing a reverse slice from round-the head?	
5	Describe the differences between a “normal” smash and a “stik” smash.	
6	Describe the advantages and disadvantages of returning serve in doubles when stepping forwards on the racket and non-racket leg.	
7	Describe one possible recovery method after playing an early, tight net shot. Explain the advantages and disadvantages of this method.	
8	Describe how you would apply shaping, chaining and whole-part-whole to the coaching of movement pattern into and out of the forehand rearcourt.	

06. SUMMARY

The BWF Level 2 Technical section has been divided into hitting and movement sections which build on the information presented in Level 1 coaching course material. Key areas covered include:

- The key technical points and tactical context for a range of strokes, including:
 - spin and cross-court net shots;
 - singles and doubles mid-court defence;
 - overhead slices and stik smash.
- The differences in movement for singles and doubles players.
- Links between specific movements and tactical situations.
- Different coaching methods to movement development.



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BADMINTON COACH EDUCATION
COACHES' MANUAL
LEVEL 2

MODULE 7
PERFORMANCE FACTOR 3
TACTICS

MODULE 7

PERFORMANCE FACTOR 3 - TACTICS

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LEARNING OUTCOMES

By the end of this module, coaches will be able to:

- Define tactics;
- Describe a variety of approaches and techniques that can be used to support players tactically during tournaments;
- Use a variety of notational systems to analyse matches

01. INTRODUCTION

In the Level 1 coach education course, tactics was defined as:

“The capacity to make effective decisions based on the awareness of the situation”.

Tactics therefore are about 1) reading situations (awareness) and 2) responding to those situations (making decisions).

Players need to be aware of space, self, their opponent, pace (of stroke) and in doubles, their partner. The decisions they have to make can occur prior to matches, between rallies and between the strokes of a rally.

Coaches can help develop tactical skills in players by improving their awareness of situations and developing their decision-making skills. This can be achieved through using problem-solving activities on court and questioning skills to develop the players' capacity to come up with solutions.

The topics included in this section will focus on supporting players tactically in competition.

02. TOURNAMENT COACHING

GENERAL ADVICE FOR SUPPORTING PLAYERS AT TOURNAMENTS

The most important consideration for a coach when supporting a player at a tournament is that the approach should be individualised.

THE TYPE OF SUPPORT

- Be positive
- Be flexible. Some players may prefer a relatively autocratic or directive approach, with the coach telling them what to do. While, other players may preferred a democratic approach, with the player being encouraged by the coach to decide upon their own approach to a match. The democratic approach has more long term benefits as it helps the players to solve problems for themselves so in the future they can operate effectively without coach support.
- In order to develop players' own thinking skills, the coach should use effective questioning. Examples could include “how do you intend to approach this match?”, “what tactics are you going to use in this match?” etc.
- Support should be simple, focusing on 2-3 points which have been identified as crucial to the outcome of a match.
- Some players who tend to be over-anxious may require the coach to help them reduce their nerves. The tone of voice and body language of the coach in this case should be refined to help that player achieve a state more suitable for effective performance. A more laid-back performer may require a more animated approach from the coach in order to activate them to a state more suitable for competing optimally.
- The support should balance what the player needs to do themselves to help their own performance (e.g. slow down between rallies) and what they need to do to against a particular opponent (e.g. pressurise the deep forehand rearcourt, look for opportunities to hit into the body etc.). For younger players however, focus the advice on what they are doing rather than focusing too much on the opponent.
- Consider creating both a plan A and a plan B for the match

- Only give tactical advice which the player is capable of implementing. For example, expecting a player to use deception in rearcourt (held clears and dropshots) when they have not practiced this.

TIMING OF SUPPORT

1. Prior to the game, establish with the player when they would like to speak about the match to come. Some players may like to talk about their next match many hours before it takes place, whereas others may prefer to talk closer to the match start time.
2. During the game, coaches can communicate with players between rallies provided this does not delay the game. Coaches need to think carefully about doing this however as:
 - the players may become overloaded with information;
 - the information may be overheard by the opponents;
 - long term it does not encourage players to think for themselves.
3. Coaches have the opportunity to communicate with players at the 11 point interval (for 60sec) and between games (120sec). During these periods:
 - keep advice short and simple;
 - be positive;
 - use questioning at the end to check for player understanding (e.g. so what are the things you are going to focus on in the remainder of the set?);
 - adjust tone and body language appropriately. In most cases being calm and controlled is most helpful.
4. After the game, be aware when the players you work with are most receptive to feedback. Immediately after a game is not always the best time as players are often in a state of high emotion, so leaving the feedback session for a suitable time period after the match is usually advisable.

03. MATCH OBSERVATION

OBSERVING MATCHES

When observing matches, coaches have the opportunity to collect information which can be used to:

- help the player to adjust their tactics and improve their performance within a match;
- help the player to develop long-term

Learning a list of abbreviations of technical areas which you use a lot can help when taking notes as it reduces the writing time and allows the coach to observe more. A typical list of abbreviations used is shown below.

Term	Abbreviation	Term	Abbreviation
FORECOURT	FC	FLICK SERVE	FS
MIDCOURT	MC	HIGH SERVE	HS
REARCOURT	RC	LOW SERVE	LS

STRAIGHT	S	NET KILL	NK
CROSS-COURT	CC	NET LIFT	NL
BASE	B	NET SHOT	NS
ERRORS	E	BLOCK	BL
WINNERS	W	DRIVE	DR
DOING WELL	ü	CLEAR	CL
DOING VERY WELL	üü	DROPSHOT	DS
AREA OF CONCERN	X	SMASH	SM
VERY CONCERNING	XX	ROUND THE HEAD	RTH

A summary of typical observation methods is included in the table below.

Method	Advantage	Disadvantage
Observing the whole match with no note taking	The advantage of this approach is that the coach doesn't take their eyes off the court, so doesn't miss anything important.	A lot of things will be observed and the coach will not have notes to refer to. The coach needs to be sure they can select the 2-3 things that are most important to the match outcome and communicate these to the players.
Identifying winners and errors	Very measureable and relatively easy to complete Could provide useful records for future training (e.g. where was I making errors)	Only measures winners and errors without getting an indication of the pattern of shots leading up to those winners and errors – i.e. what caused them? Harder to collect in doubles events
Note taking under strategic headings	Gives a structure to notes and helps to identify 2-3 critical areas	Requires coach to look down to write, so may miss some aspects of the game

A selection of templates that can be used for match analysis are included below.

TEMPLATE: MATCH ANALYSIS							
Tournament		Date		Round		Event	
Player Name				Opponent Name			
How well is the player using and covering space? (width, depth and height)				How well is the opponent using and covering space? (width, depth and height)			
What is the player doing well?				What is the opponent doing well?			
What weaknesses are being exploited by the opponent?				What weaknesses does this opponent have that can be exploited?			
How is the player reacting psychologically in the match?				How is the opponent reacting psychologically in the match?			
Game 1 score		Game 2 score		Game 3 score			

TEMPLATE: MATCH ANALYSIS

Tournament	Date		Event	Round	Player Name		Opponent name	
Game 1 (Score)			Game 2 (Score)		Game 3 (Score)			
	Player	Opponent		Player	Opponent		Player	Opponent
Use/Cover Space (width/Depth/Height)			Use/Cover Space (width/Depth/Height)			Use/Cover Space (width/Depth/Height)		
Doing Well			Doing Well			Doing Well		
Weaknesses being Exploited			Weaknesses being Exploited			Weaknesses being Exploited		
Psychology			Psychology			Psychology		

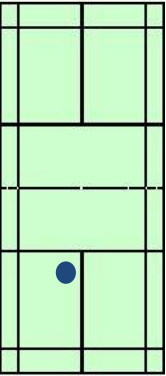
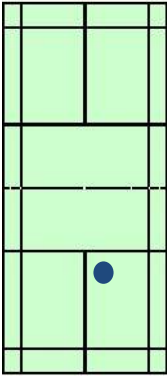
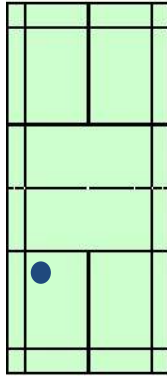
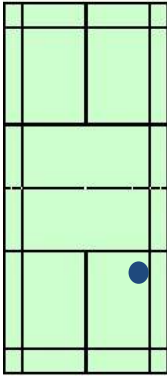
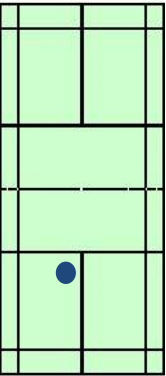
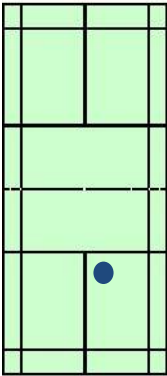
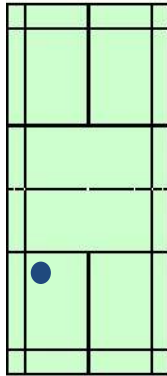
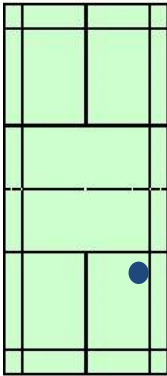
TEMPLATE: MATCH ANALYSIS

PLAYER/PAIR																													
FOREHAND										BACKHAND																			
Serve					Straight					Cross-court					Serve					Straight					Cross-court				
Dropshot	Smash	Clear	Drive	Lift	Block	Net Kill	Net Lift	Net shot	Net Lift	Net Kill	Net Lift	Net shot	RTH Dropshot	RTH Smash	RTH Clear	Dropshot	Smash	Clear	Drive	Lift	Block	Net Kill	Net Lift	Net shot	RTH Dropshot	RTH Smash	RTH Clear		
PLAYER/PAIR																													
FOREHAND										BACKHAND																			
Serve					Straight					Cross-court					Serve					Straight					Cross-court				
Dropshot	Smash	Clear	Drive	Lift	Block	Net Kill	Net Lift	Net shot	Net Lift	Net Kill	Net Lift	Net shot	RTH Dropshot	RTH Smash	RTH Clear	Dropshot	Smash	Clear	Drive	Lift	Block	Net Kill	Net Lift	Net shot	RTH Dropshot	RTH Smash	RTH Clear		

The table below allows a coach to record how scores develop as a match progresses. There is space below to make notes. Often this model will allow the coach to identify key “momentum” points where, depending on whether they are won or lost, players go on to win or lose a number of points.

TEMPLATE: RECORDING PROCESS OF A PLAYER'S PROGRESS IN A MATCH	
1	
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30	
Player/Pair 1 (●)	Player/Pair 2 (x)

In doubles, serving and returning serve plays a large part in deciding the outcome of the match. The template below allows the coach to analyse the serving and return of the pair they are working with, or the serving and return serve of the opposition. Dots can be entered on the court where it is estimated that the shuttle would land after the serve or return of serve.

	SERVING		RETURNING		
	LEFT COURT	RIGHT COURT	LEFT COURT	RIGHT COURT	
PLAYER 1					PLAYER 1
PLAYER 2					PLAYER 2
NOTES					NOTES

04. SELF-ASSESSMENT QUESTIONS

	Questions	Answers
1	List three (3) guidelines you would give to coaches giving tactical advice to players in a tournament.	
2	Describe one advantage and one disadvantage of identifying winners and errors in a match.	
3	Suggest one way in which questioning can be used when talking to players between sets.	
4	List five (5) abbreviations that could be used to record information when analysing a match (e.g. fh ds = forehand dropshot).	
5	Describe a method you could use to improve awareness of the use of height of clears in singles play.	
6	True or false – in mixed doubles, the man is more likely to lift straight – the women is more likely to lift cross-court.	
7	Describe a problem-solving approach that could be used to encourage the effective use of the dropshot in singles.	
8	A female player you coach is often beaten at mixed because she comes under pressure in the rearcourt. Describe how you can use a problem-solving approach to help this player and their partner overcome this weakness.	

05. SUMMARY

Tactics can be defined as:

“The capacity to make effective decisions based on the awareness of the situation”.

When supporting players tactically during tournaments, coaches should adopt a flexible approach that adjusts to meet the needs of individual players. This may involve the coach using a variety of techniques, including:

- keeping positive by using appropriate words, tone of voice and body language;
- keeping things simple;
- using a democratic or autocratic approach (depending on individual player needs);
- having more than one plan;
- notational analysis

Whatever approach is used, it is important that any advice given involves tactical approaches that the player is capable of implementing. Timing of the support given is also crucial, with coaches being clear about how they can most effectively meet the needs of the player they work with prior to, during and after matches.



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BADMINTON COACH EDUCATION
COACHES' MANUAL
LEVEL 2

MODULE 8
PERFORMANCE FACTOR 4
PHYSICAL

MODULE 8

PERFORMANCE FACTOR 4 - PHYSICAL

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LEARNING OUTCOMES

By the end of this module, coaches will be able to:

- Describe the structure and function of the body systems most relevant to sporting performance
- Select appropriate methods of training the systems of the body
- List the principles of training
- Apply the principles of training to an annual plan
- Adapt training methods to players of different ages
- Administer a number of different fitness testing protocols

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01. INTRODUCTION

Badminton is a highly complex sport which makes many physical demands on the human body. This section will introduce coaches to the structure and function of the human body and then cover how the body can be trained to improve physical performance in badminton. Reference will also be made to physical growth and how this influences physical training of children of different ages.

02. THE HUMAN BODY

SYSTEMS OF HUMAN BODY

There are many physical systems that contribute to the running of the human body.

<ul style="list-style-type: none"> · Skeletal · Muscular · Nervous · Respiratory · Cardiovascular · Digestive 	<ul style="list-style-type: none"> · Urinary · Endocrine · Integumentary · Reproductive · Lymphatic
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For the purposes of the Coach Level 2 course, this section will focus on the six systems listed in the first column of the above table.

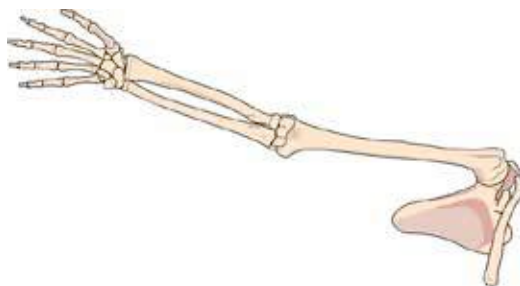
SKELETAL SYSTEM

The skeletal system performs the following functions:

- **Blood Cell Formation**
Certain bones within the body (e.g. upper arm and upper leg) contain red bone marrow which produces blood cells that are used within the cardiovascular system.
- **Store of Mineral**
Bones store large amounts of minerals such as calcium, phosphorus, sodium, potassium and magnesium. These minerals can be used by the body as and when required.
- **Support**
The skeleton gives the body its framework, providing support for the tissues of the body and points of attachment for muscles.
- **Protection**
The central areas of the skeleton provide protection for vital organs of the body. Examples include the skull protecting the brain, the ribcage protecting the heart/lungs and the spine protecting the spinal cord.

STRUCTURE OF BONES

The bones of the body can be long, short, flat or irregular in shape. A typical long bone is shown below:



Bone tissue is made up of fibres and salts, which when combined make the bones strong, with good resistance to bending, stretching, twisting and compression. The central shaft of a long bone is filled with yellow bone marrow.

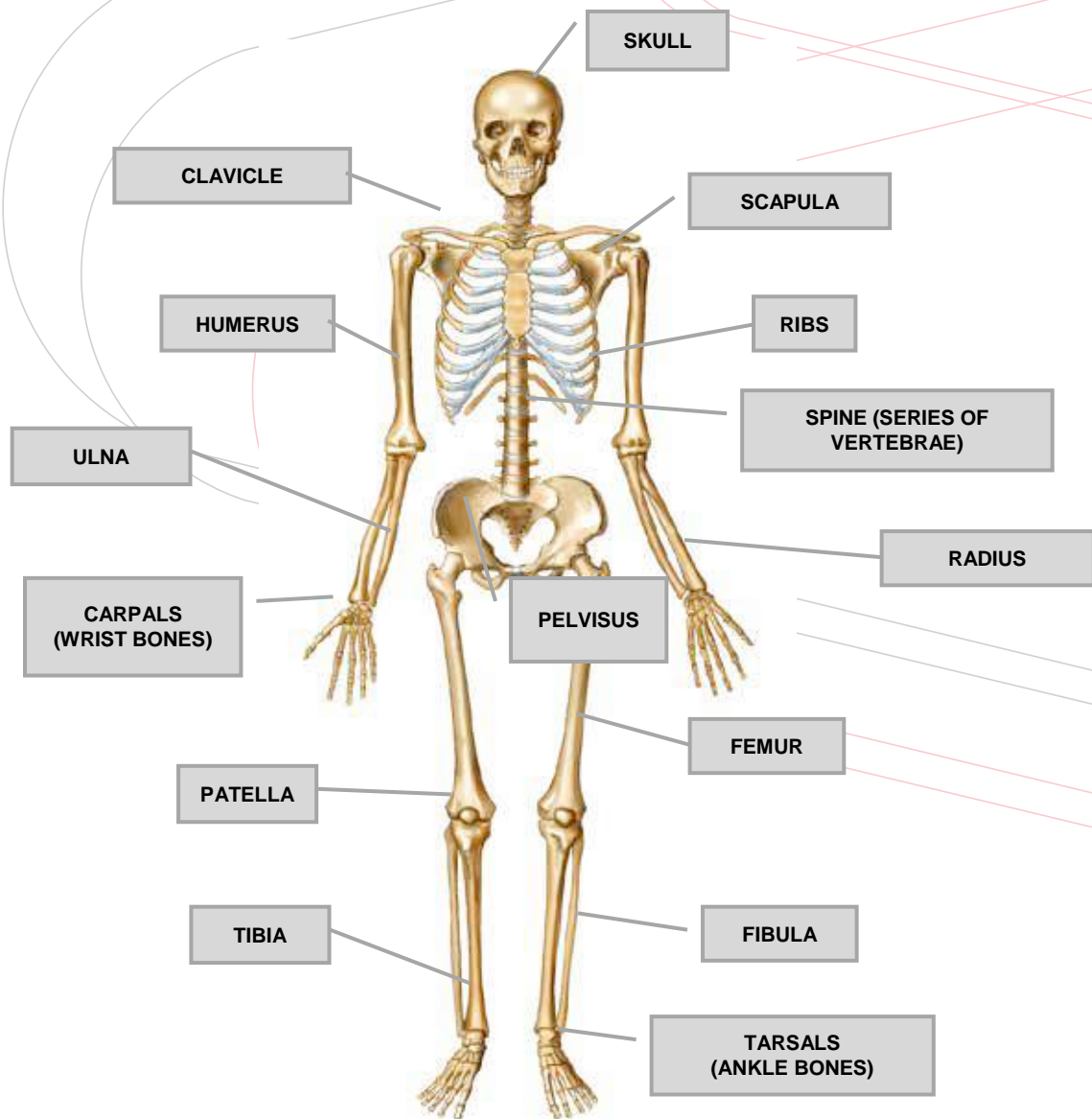


03. THE SKELETON

The mature human skeleton is made up of 206 bones. The skeleton is split into two sections:

- The axial skeleton, consisting of the skull, ribcage and spine. The main function of the axial skeleton is to protect vital internal organs.
- The appendicular skeleton includes the bones of the arms and legs, plus those bones that help to attach the limbs to the axial skeleton (shoulder blades and pelvis).

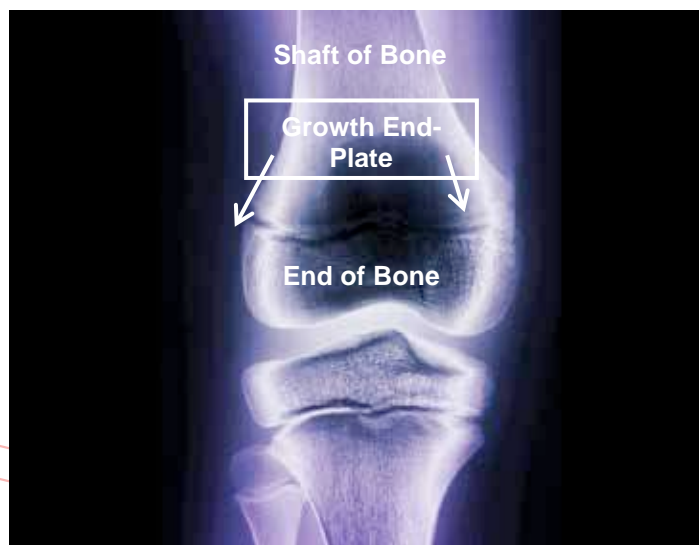
The main bones of the body are illustrated using the diagram below.



DEVELOPMENTAL ASPECTS OF THE SKELETAL SYSTEM

THE DEVELOPMENT OF BONE TISSUE

In the early stages of development, the framework of the body that will eventually evolve into the skeleton is made up of cartilage, which is a relatively soft and pliable material. Whilst in the womb and during childhood, the cartilage gradually evolves into bone, which is a harder material. Crucial to bone growth are “growth end-plates” which are located between the shaft and ends of bones (see the illustration below). These growth end-plates are made up of cartilage, which means they are areas of material that are relatively soft compared to the harder bone tissue on either side of it. The growth end plates finally convert to bone in early adulthood.



To avoid potential damage to the growth end-plates, coaches should:

- avoid excessive repetition of the same movement (e.g. lunges and jumps);
- train and compete wherever possible on sprung/cushioned flooring;
- make sure increases in training loads are progressive and well planned.

RATE OF GROWTH

The timing and rate of growth during childhood is highly individual. The guidelines given in this section are therefore based on average values.

- During the first two years after birth, growth rate is very rapid
- Steady growth is experienced:
 - by girls from the ages of 2 – 9 years old;
 - by boys from the ages of 2 – 11 years old.
- An increase in the rate of growth begins aged 9 in girls and aged 11 in boys.
- The most rapid period of growth occurs:
 - around the age of 11 ½ for girls;
 - around the age of 13 ½ for boys.
- The most rapid rates of growth last for around 24-36 months.

During period of rapid growth coaches should:

- be aware that children who previously were well-balanced and co-ordinated may appear to have lost these movement skills. Coaches should be highly supportive during this phase,

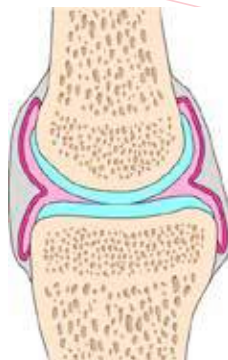
reassuring them of the temporary nature of this period and helping them to recover these movement skills;

- focus on flexibility as many children become inflexible during the growth spurt.

04. JOINTS OF THE BODY

The bones of the body are connected by three different types of joints:

- **Fibrous Joints**, occur when there is little distance between the bones. These bones are then joined by connective tissue (usually ligament). Examples of **fibrous joints** occur between the bones of the skull, between the tibia and fibula (near the ankle) and between the teeth and jaw bones. **Fibrous joints** allow very little movement and are therefore not of great importance to sporting performance, other than when injuries occur.
- **Cartilaginous Joints** consist of bones which are joined together by cartilage, which helps give support whilst providing a greater degree of flexibility than bone. **Cartilaginous joints** allow either no or little movement. Examples of **cartilaginous joints** that do allow some movement can be found between the ribs and the sternum, and between the vertebrae of the spine.
- **Synovial Joints** are the most common type of joint in the body. This type of joint:
 - has a capsule which encloses the whole joint.
 - the capsule creates a cavity between the bones.
 - the joint capsule is filled with synovial fluid which helps lubricate the joint.
 - has layers of cartilage at the end of each of the bones.
 - is strengthened by ligaments that can be found:
 - § outside the joint capsule.
 - § within the walls of the joint capsule.
 - § inside the joint capsule.

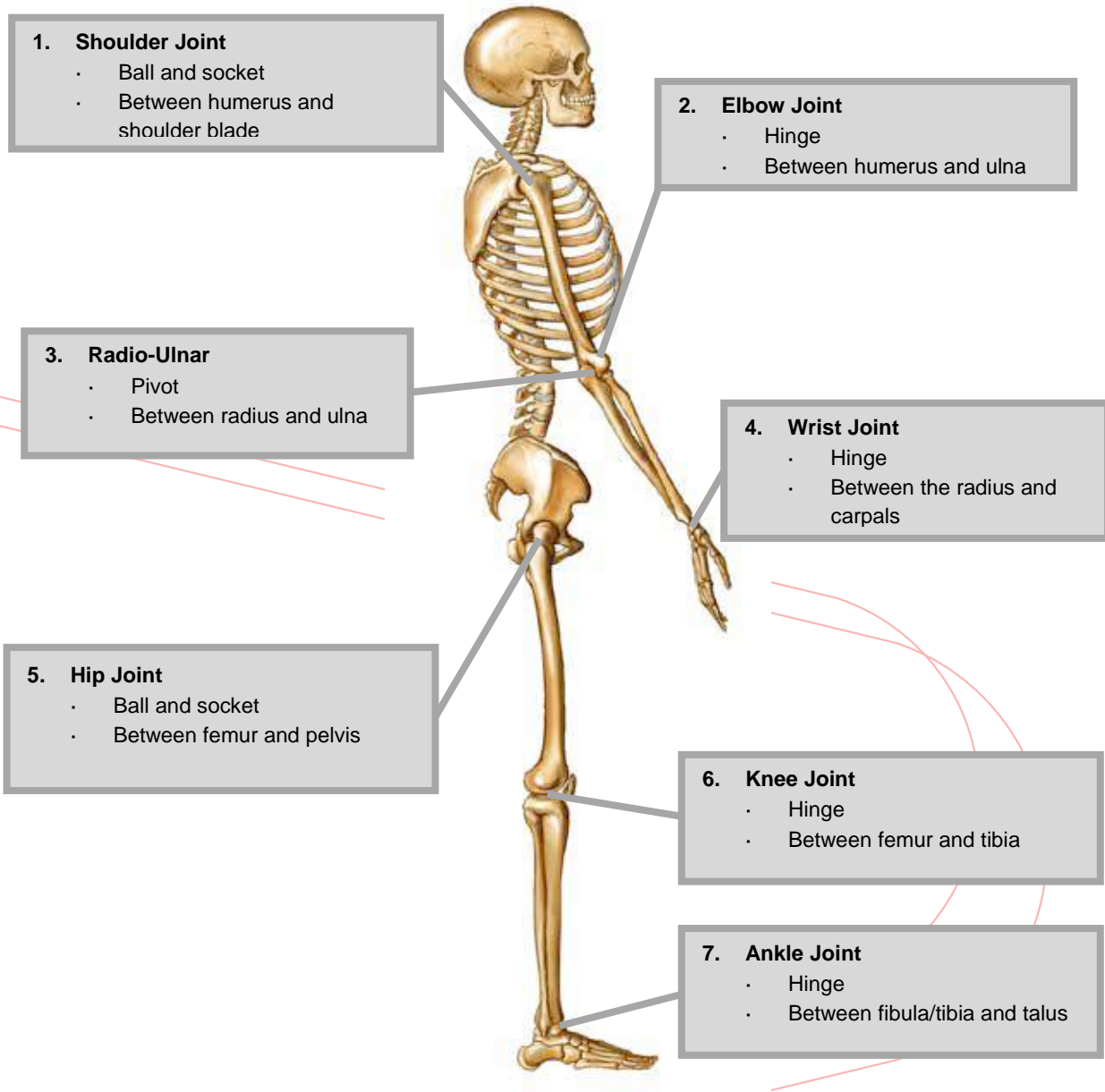


Some **synovial joints** contain additional cartilage, which helps provide further shock absorption qualities for those particular joints.

TYPES OF SYNOVIAL JOINT

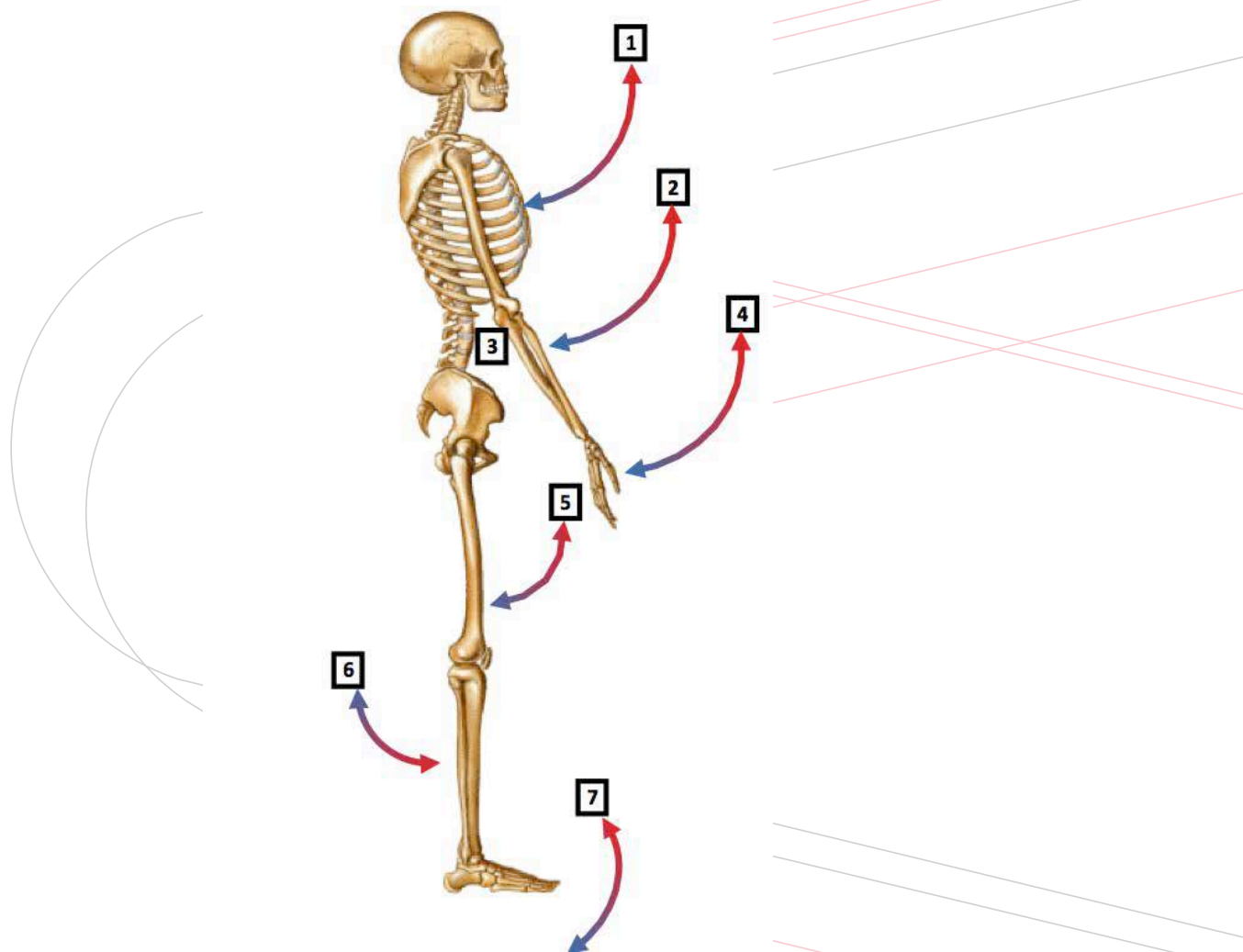
There are many different types of synovial joint, but the main types which are relevant to sporting performance are:

- **Hinge Joints**
- **Ball and Socket Joints**
- **Pivot Joints**



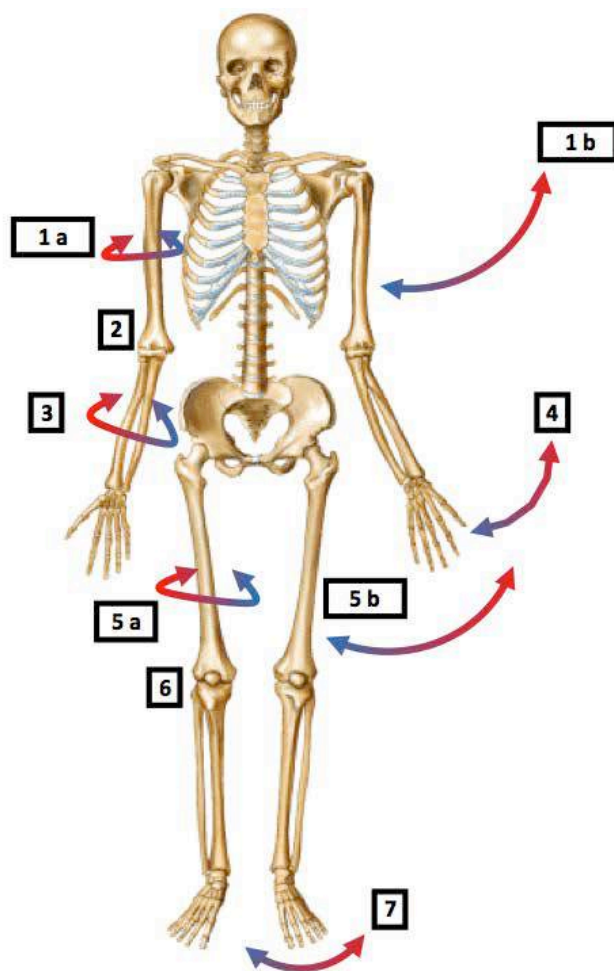
TERMS TO DESCRIBE JOINT ACTIONS

Different terms are used to describe how joints move. The illustration below demonstrates how the main joints of the body can move when viewed from the side.



Joint	Joint Action
1. Shoulder	All the listed joints, apart from the radio-ulnar (3), are able to: <ul style="list-style-type: none"> • Flex (bend) • Extend (straighten)
2. Elbow	
3. Radio-ulnar	
4. Wrist	
5. Hip	
6. Knee	
7. Ankle	

The diagram below demonstrates how the main joints of the body can move when viewed from the front.





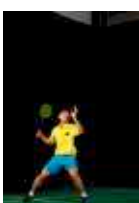


Joint	Joint Actions
1. Shoulder	The shoulder joint can: 1a. rotate externally (front of the arm turns away from the midline) and internally (front of arm turns towards the midline). 1b. abduct (move the arm sideways away from the midline) and adduct (move the arm sideways towards the midline).
2. Elbow	The elbow joint cannot rotate or abduct/adduct
3. Radio-ulnar	The radio-ulnar joint can: <ul style="list-style-type: none"> • supinate (rotate externally so the front of the arm turns away from the midline). • pronate (rotate internally so the front of the arm turns in towards the midline).
4. Wrist	The wrist joint can abduct (move the hand sideways away from the midline) and adduct (move the hand sideways towards the midline).
5. Hip	The hip joint can: 5a. rotate externally (front of the leg turns away from the midline) and internally (front of leg turns towards the midline). 5b. abduct (move the leg sideways away from the midline) and adduct (move the leg sideways towards the midline).

6. Knee	The elbow joint cannot abduct/adduct and can only rotate a little when bent
7. Ankle	The ankle joint can perform: <ul style="list-style-type: none"> · eversion, resulting in the bottom of the foot pointing away from the midline of the body. · inversion, resulting in the bottom of the foot pointing in towards the midline of the body.

APPLICATIONS OF JOINT ACTIONS

An understanding of joint actions improves a coach's ability to observe and analyse technique. The table below gives several examples of this.

Joint Action	Illustration
Flexion (bending) of the ankles, knees and hips.	
Extension (straightening) of the ankles, knees and hips.	
Pronation (internal rotation) of radio-ulnar joint.	
Supination (external rotation) of radio-ulnar joint.	
Abduction of the hip joints.	

05. THE MUSCULAR SYSTEM

Muscle cells are specialised cells that can generate force by contracting. As a result of this characteristic they are able to perform the following functions:

- changing tube diameters within the body.
- moving materials around the body.
- removing materials from the body.
- movement of the body.
- stabilising joints of the body.
- heat production.

There are three types of muscle tissue within the body:

- **Smooth muscle** - which is found in the walls of hollow organs (e.g. the stomach) and tubes (e.g. blood vessels).
- **Cardiac muscle** - which is found in the walls of the heart.
- **Skeletal muscle** - which attaches to the skeleton.

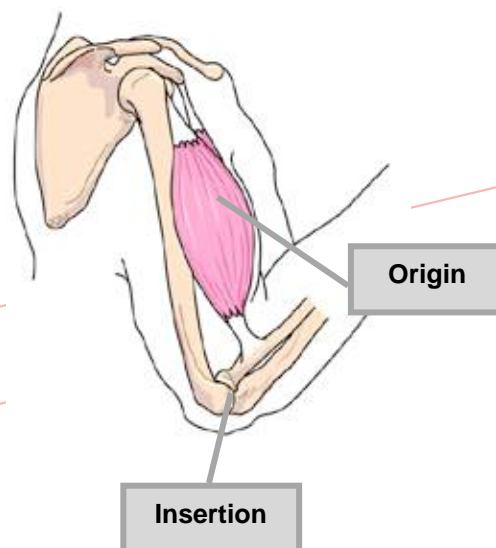
This section will focus on **skeletal muscle**. **Smooth muscle** and **cardiac muscle** will be dealt with in other areas of this manual.

SKELETAL MUSCLE

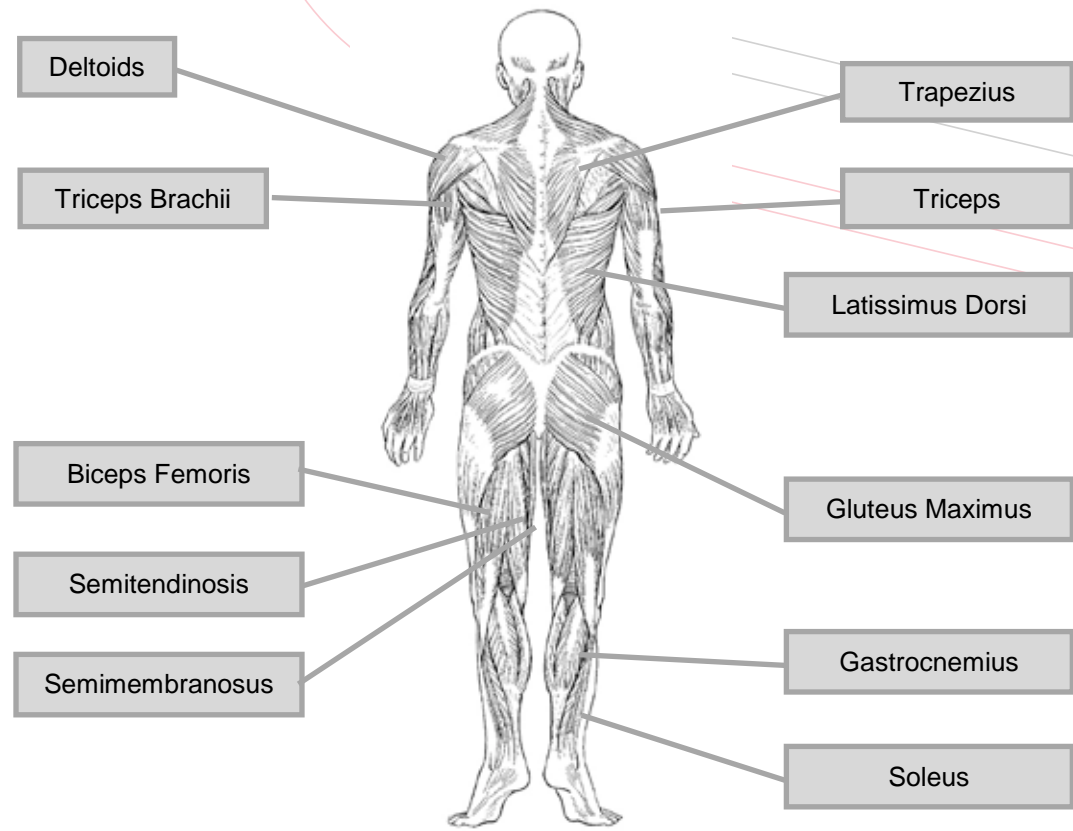
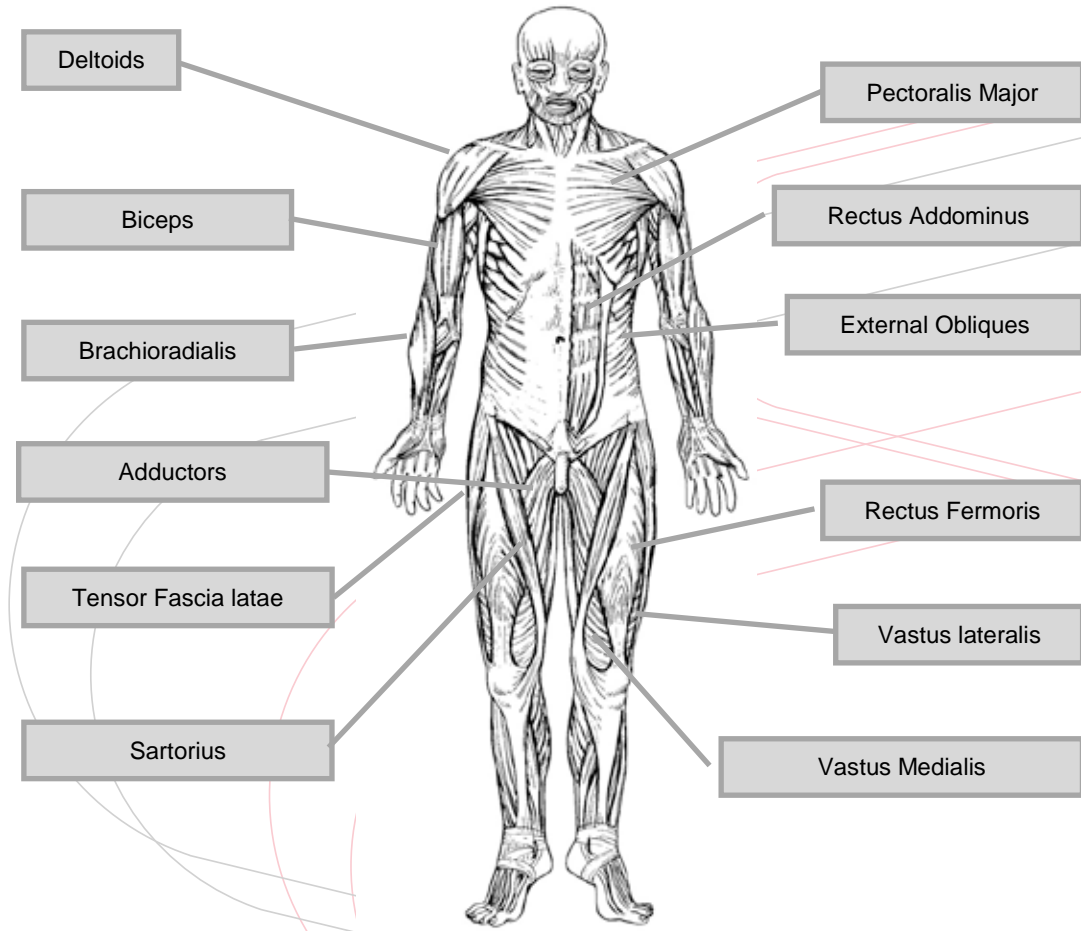
The specific functions of **skeletal muscle** are:

- Movement of the body.
- Stabilising joints of the body.
- Heat production.

Muscles are attached to bones at each end by a strong connective tissue known as tendon. The point of attachment of a muscle closest to the centre of the body is known as the origin. The point of attachment furthest away from the midline of the body is known as the insertion. The origin of a muscle tends to move less than the insertion.

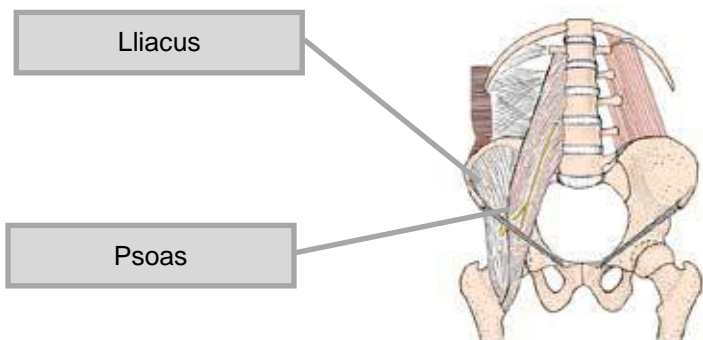


The major muscles of the body are shown in the illustrations below

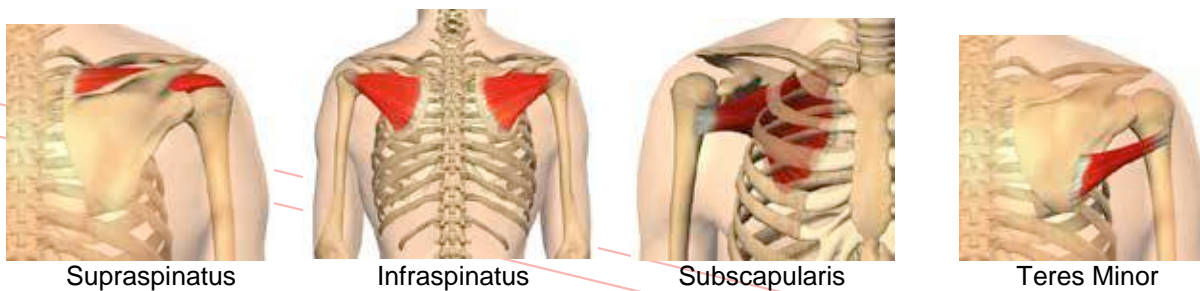


Additional muscles that of importance to badminton performance are:

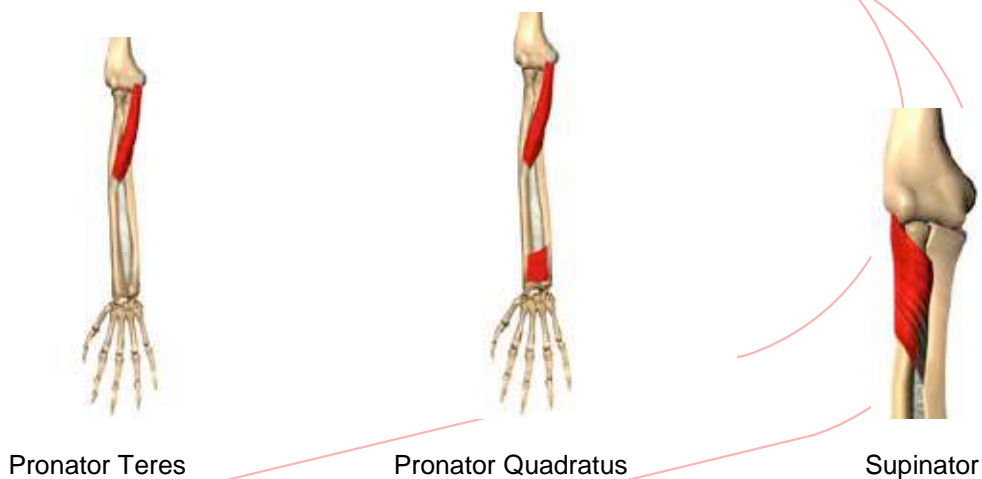
1. Iliopsoas Muscle



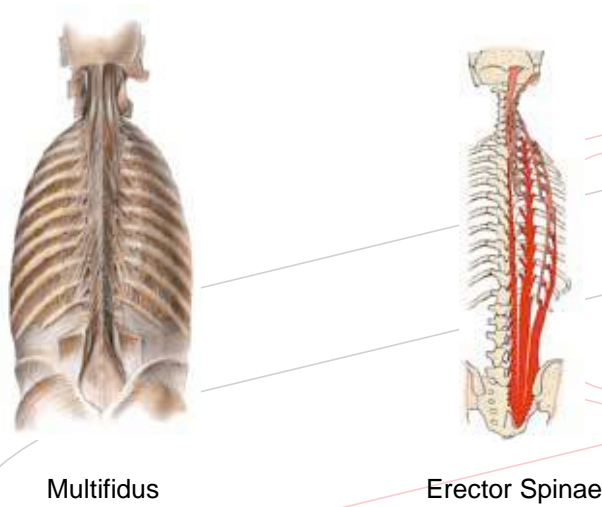
2. Rotator Cuff



3. Pronators and Supinator (internal and external rotators of the forearm)



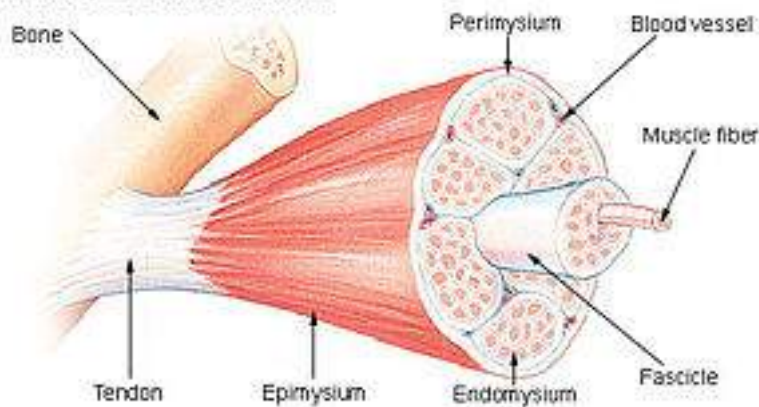
4. Trunk Stabilisers



INTERNAL STRUCTURE OF MUSCLES

The outer covering of a muscle is a connective tissue called epimysium. Within the outer covering of epimysium, there are bundles of muscle fibres surrounded by a further layer of connective tissue known as perimysium. Each individual muscle cell is then surrounded by a final layer of connective tissue known as endomysium. Muscle cells are long and thin, so are often described as muscle fibres. Within muscle fibres there are further filaments.

Structure of a Skeletal Muscle

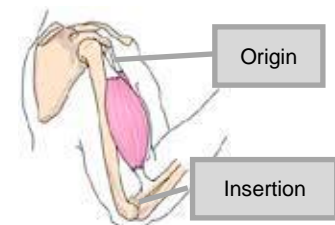
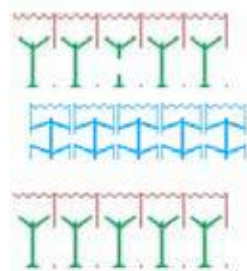

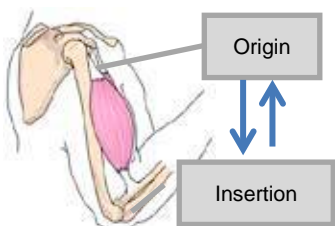
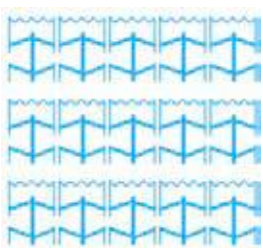

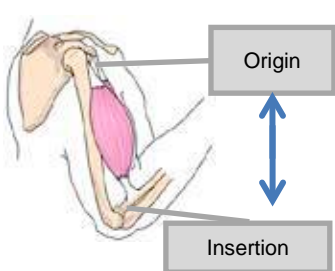
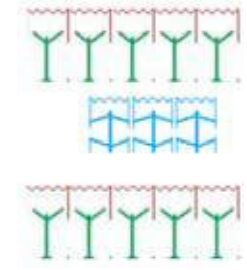



Muscle fibres are able to contract because of the arrangement of filaments within each muscle fibre. The filaments are arranged as in diagram A below. Note how there are **central thicker filaments with extendable arms (myosin)** that “reach out” to **thinner filaments (actin)**. In a relaxed state the two types of filament are not connected (see diagram A below). When a nerve impulse is received, the cross-bridges of the **thick filaments** attach to the **thin filaments** and pulls them together (see diagram B).



TYPES OF MUSCLE CONTRACTION

There are 3 types of muscle contraction: **Isometric**, **Concentric** and **Eccentric**. These are explained in the table below. To illustrate these contractions, the rectus femoris (one of the thigh muscles) will be used as an example

Type of Contraction	Origin and Insertion	Muscle Filaments	Examples
Isometric	 <p>The origin and insertion are staying the same distance apart, meaning the overall muscle length is staying the same.</p>	 <p>Some of the muscle filaments are contracting to "hold" the muscle in a stable position.</p>	 <p>When receiving serve, the rectus femoris of the receiving player will be performing an isometric contraction.</p>
Concentric	 <p>The origin and insertion are moving closer together, meaning the overall muscle length will shorten. As the muscle does this it pulls on the bones and brings about movement.</p>	 <p>Many of the filaments within the muscle cells will be contracting, bringing about a force that shortens the overall muscle length.</p>	 <p>During the upward phase of a jump, the rectus femoris will be shortening, helping to straighten the legs and propel the body upwards.</p>
Eccentric	 <p>The origin and insertion are moving further apart, meaning the overall muscle length is increasing.</p>	 <p>Some of the filaments within the muscle cells will be contracting, providing a "braking" effect so the lengthening of the muscle is done under control.</p>	 <p>When landing from a jump, the origin and insertion of the rectus femoris muscle will move further apart (as it has to travel around a bent knee). Some filaments will still be contracting to provide a controlled landing.</p>

06. LEVER SYSTEMS

The skeleton and muscular systems work together to create three different types of lever in the body. Each lever system has three components:

- a load (e.g. a racket, dumbbell or bodyweight)
- a pivot point (the joint of the body)
- an effort (e.g. a muscular force)

1st Class Lever	2 nd Class Lever	3 rd Class Lever
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p>3rd Class Lever System. The elbow joint provides the pivot, with the effort being exerted by the biceps muscle, pulling up against the load which is the weight of the forearm. The 3rd class lever system is the main lever system of the body and is good for producing speed and range of movement.</p> </div> <div style="width: 35%; border: 1px solid black; padding: 5px;"> <p>1st Class Lever system. The head pivots around the vertebrae of the neck, with the load of the head on one side balanced by the muscles of the neck at the back. There are few examples of this lever system in the body.</p> </div> <div style="width: 30%; border: 1px solid black; padding: 5px;"> <p>2nd Class Lever System. The ball of the foot provides the pivot, with the effort being exerted by the calf muscle, pulling up against the load which is the weight of the body. There are few examples of 2nd class levers in the body.</p> </div> </div>		

07. MUSCLE FIBRE TYPES

Not all muscle fibre types are the same. The characteristics of each different fibre type; **slow, fast (2a)** and **fast (2b)** are described below.

Characteristics	Slow Twitch Fibres (type 1)	Fast Twitch Fibres (type 2a)	Fast Twitch Fibres (type 2b)
Speed of contraction	Slow	Fast	Fast
Resistance to fatigue	High	Average	Low
Fibre Diameter	Small	Average	Large
Ability to work aerobically (i.e. with oxygen)	High	High	Low
Ability to work anaerobically (i.e. without oxygen)	Low	Intermediate	High




All muscles will contain a combination of these fibres, although different muscles will have greater amounts of certain types depending on their function. The relative percentage of fast and slow twitch fibres is largely genetically determined, meaning we are born with a certain percentage of each that remains relatively unaffected by training.



08. THE STRETCH-SHORTENING CYCLE

The **stretch-shortening cycle** is the term used to describe the combination of an eccentric muscle contraction (where the muscle is lengthening) followed immediately by a reversal to a concentric contraction. This combination results in a generation of greater power by using:

- the elastic qualities of muscles and tendons.
- the stretch reflex. During the eccentric contraction, structures within the muscle known as muscle spindles detect the rapid change in length and send messages to the spinal cord via sensory nerves. The spinal cord then returns a message to the muscle instructing it to contract concentrically.

Examples in badminton where the **stretch-shortening cycle** are used in badminton are:

DURING THE SPLIT STEP	
	In preparation for the split step, there will be a short phase where the player is in the air. Gravity will accelerate the player towards the ground.
	Immediately on landing, the muscles of the calf and thigh will be lengthening. Internally, however some filaments will be contracting to control the landing (eccentric contraction). The elastic qualities of the muscles and tendons will also be used to store potential energy. The muscle spindles will sense the rapid lengthening of the muscles and send sensory messages to the spinal cord.
	As the player pushes off: <ul style="list-style-type: none"> • the muscles that were lengthening are now shortening, with filaments with the muscle fibres contracting (a concentric contraction). • the “rebound” effect gained from the elasticity of the muscles and tendons adds to this force. • the spinal cord sends messages back to the muscle, increasing the strength of contraction in order to reverse the rapid lengthening (thereby protecting the muscle).

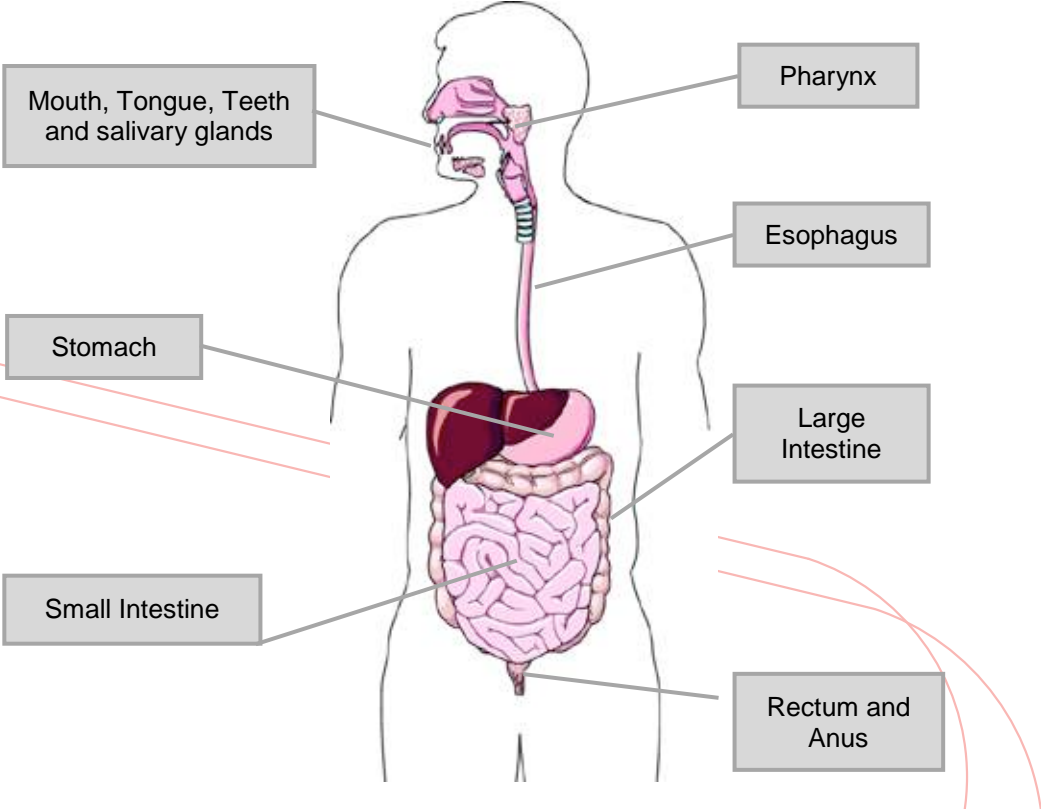
IN THE BACKSWING AND FORWARD SWING OF STROKES	
	On the backswing of a stroke, some muscles will be lengthening. Internally however some filaments will be contracting to control the backswing (eccentric contraction). The elastic qualities of the muscles and tendons will also be used to store potential energy. The muscle spindles will sense the rapid lengthening of the muscles and send sensory messages to the spinal cord, warning of the potential for muscle damage.
	As the player reverses and begins the forward swing: <ul style="list-style-type: none"> • the muscles that were lengthening are now shortening, with filaments with the muscle fibres contracting (a concentric contraction) • the “rebound” effect gained from the elasticity of the muscles and tendons adds to this force. • the spinal cord sends messages back to the muscle, increasing the strength of contraction in order to reverse the rapid lengthening (thereby protecting the muscle).

09. THE DIGESTIVE SYSTEM

The digestive system is responsible for the following:

- introduction of food into the body (via the mouth)
- movement of food along the digestive tract
- mechanical and chemical breakdown of food (known as “digestion”)
- absorption of digested food into the body (via the blood and lymphatic system)
- removal of waste products

The main components of the digestive system are highlighted in the illustration below.



Section of Digestive System	Main Functions
Mouth, Tongue, Teeth and Salivary Glands	Mechanical manipulation of foodstuffs and chewing to break down food. Chemical digestion of carbohydrates begins.
Pharynx and Oesophagus	Involve in swallowing to transport food from the mouth to the stomach.
Stomach	Waves of contraction to mix food. Protein digestion begins and carbohydrate digestion continues.
Small Intestine	Carbohydrate, fat and protein digestion completed. All nutrients (carbohydrates, fats, proteins, vitamins, water) and most minerals absorbed here.
Large Intestine	Mass movement of waste products in preparation for excretion via the rectum/anus. Absorption of salt and water.

In addition to the above:

- the liver produces bile which helps support the digestion and absorption of fat in the small intestine.
- the pancreas produces many enzymes which accelerate digestion of most foodstuff in the small intestine.

10. THE CARDIOVASCULAR SYSTEM

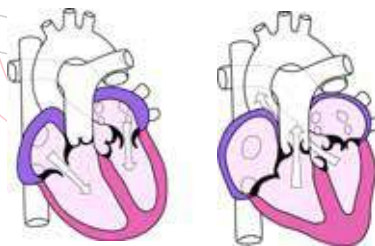
The functions of the cardiovascular system are to:

- transport oxygen and food to the cells of the body.
- transport carbon dioxide and waste products away from the cells of the body.
- transport hormones (chemical messengers) around the body.
- help regulate body temperature.
- help regulate pH (acid/alkali balance).

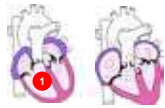



The Cardiovascular System consists of the heart, blood vessels (e.g. arteries, veins and capillaries) and blood.

THE HEART

The heart is a 4 chambered pump located in the chest area between the lungs. The walls of the heart consist of cardiac muscle, which contracts and relaxes to pump blood around the body.



The **two upper chambers** of the heart are known as “atria”. The **two lower chambers** of the heart are known as ventricles. Blood follows the following pathway through the heart and body:

<p>1. Deoxygenated blood from the lower and upper body enters the right atrium. This blood then moves down into the right ventricle through a combination of gravity and the contraction of the walls of the right atrium.</p>	
<p>2. The right ventricle contracts and the deoxygenated blood is pumped to the right and left lungs.</p>	
<p>3. The newly oxygenated blood returns from the lungs and enters the left atrium. This blood then moves down into the left ventricle through a combination of gravity and the contraction of the walls of the left atrium.</p>	
<p>4. The left ventricle contracts and the blood is pumped through the aorta the upper and lower body.</p>	

ASSOCIATED MEASURES:

Stroke Volume = the amount of blood pumped by one side of the heart per beat. A typical stroke volume is 75 millilitres.


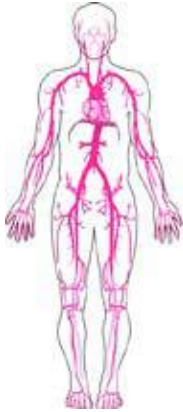
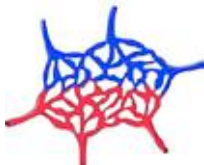
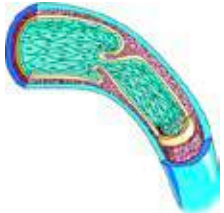
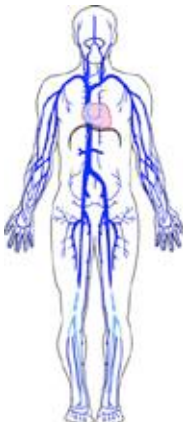
Heart Rate = the number of beats the heart performs per minute. The average resting heart rate is 70 to 75 beats per minute.

Cardiac Output is defined as the amount of blood pumped out from the heart in one minute. In mathematical terms:

$$\text{Cardiac Output (litres/minute)} = \text{stroke volume (millilitres/beat)} \times \text{heart rate (beats/minute)}$$

$$5.25 \text{ litres/minute} = 75 \text{ millilitres/beat} \times 70 \text{ beats/minute}$$

BLOOD VESSELS: STRUCTURE

<p>Arteries carry blood away from the heart. The walls of arteries are relatively thick and consist of layers of different tissues. One of the layers is made up of smooth muscle, which can contract automatically to change the diameter of the internal tube. Changing this diameter helps to control the amounts of blood reaching different areas of the body. The thick walls of arteries helps them to withstand the blood pressure created by the pumping of the heart.</p>  <p>As the arteries travel further from the heart the walls become thinner and the inner diameter becomes smaller. These smaller arteries are known as arterioles.</p>	
<p>The smallest blood vessels are capillaries. Oxygen and nutrients can travel from the blood, through the thin walls of the capillaries and into the body tissues (e.g. muscle). In the opposite direction, tissues of the body give up carbon dioxide and waste products which travel through the capillary walls and into the bloodstream.</p>	
<p>Venules (small veins) transport blood away from the capillaries and back towards the heart. As these venules get closer to the heart they change into veins. Veins have thinner walls than arteries. Some veins, especially those in the limbs, have valves which helps prevent backflow of blood.</p> 	

BLOOD

Adult females have on average a blood volume of 4-5 litres, whereas adult males have an average blood volume of 5-6 litres. Blood itself consists of 55 % plasma (the fluid portion of blood) and 45% blood cells. Plasma is mainly water, although it does contain many other substances including proteins, carbohydrates, fats, minerals and vitamins. Oxygen, carbon dioxide and nitrogen are also found in blood plasma.

Blood cells can be split into:

- **White blood cells**, which fight infection and remove debris from dead or injured cells
- **Red blood cells**, which transport oxygen and carbon dioxide around the body
- **Platelets** (cell fragments – not shown) which help blood to clot

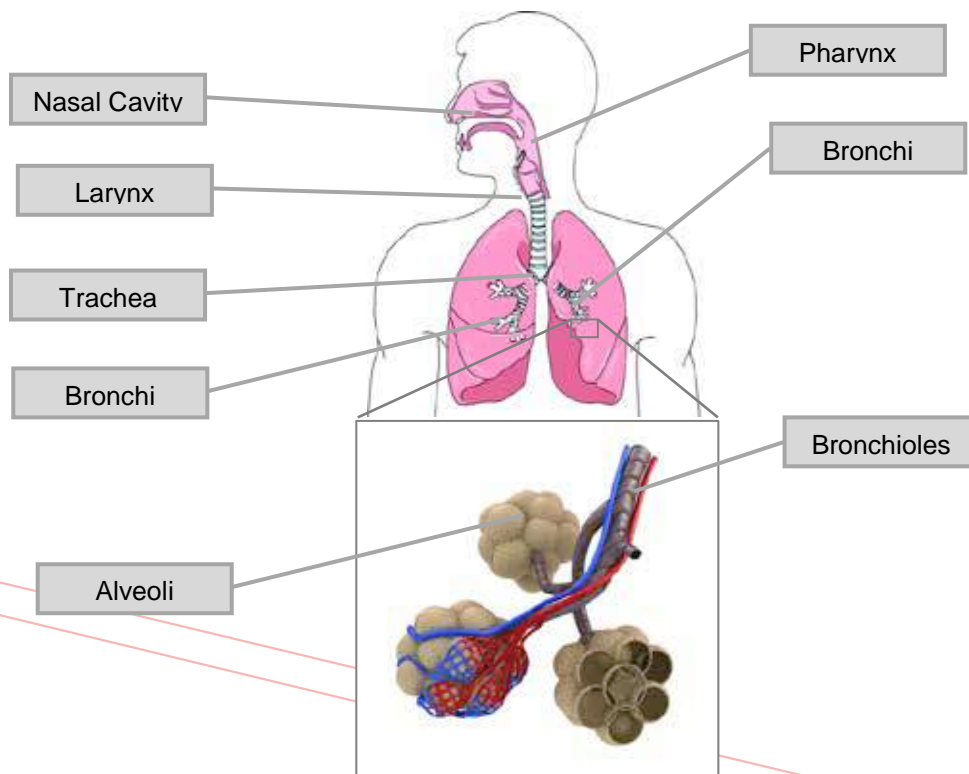


White blood cells

Red blood cells

11. THE RESPIRATORY SYSTEM

The Respiratory System is responsible for providing the cells of the body with oxygen and removing carbon dioxide from the body. It works alongside the cardiovascular system to achieve this. The main components of the respiratory system are highlighted in the diagram below.





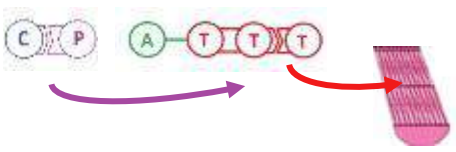
The Nasal Cavity, Pharynx, Larynx, Trachea, Bronchi and Bronchioles are tubes which direct air into and out of the lungs. The Alveoli are thin walled and allow gases to be transferred via capillaries into and out of the bloodstream.

Typical lung volumes in young adults are 5900 millilitres (males) and 4400 millilitres (females). Typical breathing volumes and rates of breathing are included in the table below.



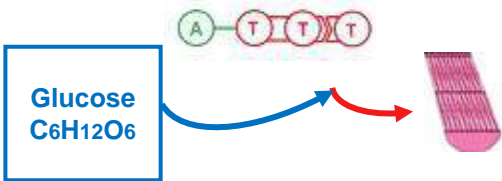
Type of Breathing	Rate of Breathing (breaths per minute)	Volume per Breath	Volume per Minute
Normal breathing at rest	12	500 ml	6000ml/min
Rapid breathing	24	500ml	12000ml/min
Deeper breathing	12	1000ml	12000ml/min

12. ENERGY SYSTEMS



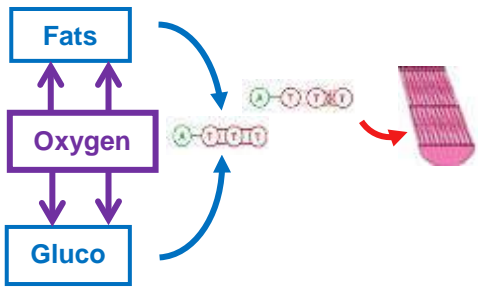
THE ATP-CP SYSTEM

ATP-CP System	1. Adenosine Triphosphate (ATP) is a molecule which is found in small amounts in muscle cells.	
	2. When the ATP molecule splits, it releases energy which is used to help the muscle contract.	
	3. An additional molecule known as Creatine Phosphate (CP) is also found within the muscle cell. This molecule helps ATP keep going for slightly longer.	
4. The advantages of the ATP-CP system is that: <ul style="list-style-type: none"> the molecules required to provide the energy for muscle contraction are within the muscle. the molecules are simple and break down easily and quickly, so energy for muscle contraction is quickly available. 		
5. The disadvantage of the ATP-CP system is that it can only provide energy for a short period of time (around 10 seconds).		
6. Training the ATP-CP system <ul style="list-style-type: none"> Frequency: only 2 – 3 training sessions targeted at this energy system should be completed per week in order to allow sufficient recovery of body tissues. Intensity: repetitions should be at 95-100% effort, with sufficient recovery. Time: <ul style="list-style-type: none"> duration of single repetition of exercise is 2 -10 seconds. recovery from each repetition of exercise is around 6 times the exercise period (i.e. a 10 second period of exercise should be followed by 60 seconds of recovery). 3 – 4 sets of 3 – 4 repetitions, with up to 10 minutes recovery between sets. whatever the sets and reps chosen, it is important that the high quality/intensity of work is maintained. Type: weight training with relatively heavy loads, sprint training (running and/or exercise bike), on-court shadowing, ladder work, clock-work etc. <p>Note: Check the speed and strength sections for further details of training types.</p>		
7. Adaptations to training the ATP-PC system <ul style="list-style-type: none"> ATP levels increase. CP levels increase. Creatine levels increase. Fast twitch fibres increase in size. 		
8. Relevance to badminton <ul style="list-style-type: none"> A well-developed ATP-CP system is necessary for a badminton player as it supports explosive movement in short rallies of up to 10 seconds duration. 		

THE LACTIC SYSTEM




Lactic System	1. Adenosine Triphosphate (ATP) is a molecule which is found in small amounts in muscle cells	
	2. When the ATP molecule splits, it releases energy which is used to help the muscle contract.	
	3. Glycogen is a storage form of carbohydrate found in muscle cells. When required, glycogen is converted to glucose (C ₆ H ₁₂ O ₆), which can then be broken down. The energy from glucose breakdown is used to keep reforming ATP, allowing muscle contraction to keep going for longer. However, if oxygen is not available, lactic acid (partially broken down glucose) is produced.	
	4. The advantages of the lactic system is that: <ul style="list-style-type: none"> • the molecules required to provide the energy for muscle contraction are within the muscle • the molecules are simple and break down easily and quickly, so energy for muscle contraction is quickly available. 	
	5. The disadvantage of the lactic system is that it can only provide energy for a moderate period of time (around 60 seconds). Towards the end of this period, the glucose is partly broken down into lactic acid, creating an acid environment which interferes with the chemical reactions that allow ATP to reform. This reduces the ability of the muscle to contract.	
	6. Training the Lactic Acid system <ul style="list-style-type: none"> • Frequency: only 2 – 3 training sessions targeted at this energy system should be completed per week in order to allow sufficient recovery of body tissues • Intensity: repetitions should be at 85-95% effort, with active recovery • Time: <ul style="list-style-type: none"> ○ duration of single repetition of exercise is 30 - 90 seconds ○ recovery from each repetition of exercise is around 1- 3 times the exercise period (i.e. a 60 second period of exercise should be followed by 60 - 180 seconds of recovery) ○ 1 - 3 sets of up to 5 repetitions, with up to 10 minutes recovery between sets. ○ whatever the sets and reps chosen, it is important that the high quality/intensity of work is maintained. • Type: weight training with relatively moderate loads, sprint training (running and/or exercise bike), on-court shadowing, continuous rallying, multifeeding. <p>Note: Check the speed and strength sections for further details of training types.</p>	
	7. Adaptations to training the Lactic Acid system <ul style="list-style-type: none"> • increased glycogen levels in muscle. • increased enzymes that support chemical reactions involved in breaking down glucose. • improves ability of athlete to tolerate high levels of lactic acid. 	
	8. Relevance to badminton <ul style="list-style-type: none"> • A well-developed Lactic Acid system is necessary for a badminton player as they will be able to sustain performance during extended rallies. 	

THE AEROBIC SYSTEM

Aerobic System	1. Adenosine Triphosphate (ATP) is a molecule which is found in small amounts in muscle cells.	
	2. When the ATP molecule splits, it releases energy which is used to help the muscle contract.	
	3. Both fats and carbohydrates (glycogen) are stored within muscles and these stores can be maintained by the cardiovascular system, with fats / carbohydrates leaving the blood and entering muscles via capillaries. The fats and carbohydrates can provide large amounts of energy when broken down in the presence of oxygen. This energy can be used to keep reforming ATP, which can then be used to drive further muscle contractions.	
	4. The advantages of the Aerobic system is that: <ul style="list-style-type: none"> • fats and carbohydrates can supply a great deal of energy for a long period of time • the chemical reactions involved produce: <ul style="list-style-type: none"> ○ manageable quantities of carbon dioxide which can be breathed out. ○ water. 	
	5. The disadvantages of the aerobic system are: <ul style="list-style-type: none"> • due to the complexity of the chemical reactions energy production is relatively slow • the aerobic system relies not only the efficiency of chemical reactions in the muscle, but also on the cardiovascular system's ability to: <ul style="list-style-type: none"> ○ provide the muscle cells with fats, carbohydrates and oxygen. ○ remove carbon dioxide. 	
	6. Training the Aerobic system <ul style="list-style-type: none"> • Frequency: aerobic training can be undertaken daily as the intensity of such exercise is relatively low. • Intensity: 60 – 85% of maximum. • Time: <ul style="list-style-type: none"> ○ Overall training duration of 20 to 60 min. This can be one single training repetition (e.g. a single run of 30 min at 65% of maximum) or long intervals (e.g. 3 minutes at 85%). ○ If intervals are used, active rest periods of similar time to the work intervals should be used (3 minutes on, 3 minutes off). • Type: running, cycling and swimming may be used. 	
	7. Adaptations to training the Aerobic Energy System <ul style="list-style-type: none"> • more/larger mitochondria (which support aerobic energy production) in muscle cells. • increased amounts of enzymes that support aerobic chemical reactions. • levels of myoglobin (which holds and transports oxygen in the muscle) increases • improved ability of muscle cells to use fat and carbohydrate. • the cardiovascular adapts in many ways to endurance training – these adaptations are covered in the section on endurance training. 	
	8. Relevance to badminton <ul style="list-style-type: none"> • A good basis of endurance is necessary to help badminton players recover between rallies, between matches and between training sessions. 	

13. BALANCE

To describe balance effectively requires use and understanding of the following terms:

	Definition	
Centre of Gravity (cofg)	This is an imaginary point in the body through which the mass of the body is concentrated. For our purposes the centre of gravity of an adult standing normally would be around the navel.	
Base of Support (bofs)	This is area between points of contact on the ground.	
Equilibrium	This is the term used to describe the even distribution of forces around a base of support.	

Static balance can be defined as:



“A state of bodily equilibrium, with forces distributed equally around a static base of support”.

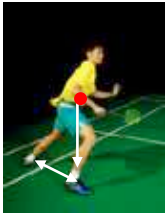

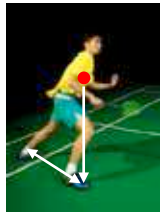


Dynamic balance can be defined as the:

“The capacity of a player to maintain their centre of gravity over a constantly changing base of support”.

The relationship between static and dynamic balance is not clear i.e. there is no clear evidence that training one helps the other. However, in the interests of holistic development, suggestions for training both types of balance are included in this section.

The following principles are important when considering issues of balance:

The lower the CofG, the greater the stability of the player.	
The player is in balance if the CofG is over the base.	

<p>The further the CofG from the centre of the base the less stable the body becomes.</p>	
<p>A larger BofS allows the CofG to move further in a given direction without the player losing stability.</p>	
<p>Moving the CofG towards the edge of the BofS can be used to move off more quickly.</p>	
<p>When a part of the body moves away from the centre of the BofS, the CofG of the player also moves in the direction. Other body parts may need to be moved in the opposite direction to bring the CofG back towards the centre of the BofS.</p>	
<p>When moving, the BofS should be increased in the direction of the force in order to keep the CofG inside the base and therefore assist the stability of the player.</p>	

BALANCE OF THE BODY IS CONTROLLED BY:

- The vestibular system, located in the inner ear
- The eyes
- Proprioception, with sensors in the muscles and tendons of the body

The eyes, inner ears and the proprioceptors send information to the central nervous system (brain and spinal cord) via sensory nerves. The response from the central nervous system (CNS) sends messages to the muscles of the body. They contract to move the limbs in such a way that balance can be maintained.






WHY TRAIN BALANCE?

Balance is necessary for badminton players in order to:




- reduce the risk of injury;
- move more efficiently:
 - with greater speed
 - using less energy

TYPES OF BALANCE TRAINING CAN BE PERFORMED?








STATIC BALANCE – STATIC BODY PARTS

Balance on one foot, then the other foot	Hands outstretched (side to side)	
	Hands by the sides	
	Hands over head	
	Hands outstretched (forwards and back)	
	Aeroplane (arms outstretched and leaning forwards)	

STATIC BALANCE – MOVING BODY PARTS

Balance on one foot, then the other foot	Swing arms in full circles. Gradually increase range and speed of movement of arms. Maintain a still head position.		
	Throw shuttle to each other balancing on one foot. Experiment with catching: <ul style="list-style-type: none"> • one- and two-handed • low and high • to the left and right of the body 		
	Eyes closed and arms extended, partner pushes gently the body or arms of the balancing player		
	Working with partner, both players balancing on one foot, one player mirrors the other who performs various arm and body movements		
Sinking into a lunge position – in line	The player stand in a position with feet wide apart (one foot forwards, one foot back). Feet should be pointing forwards. Player sinks down so both knees bend, and then the player returns to the starting position.		
Sinking into a lunge position – side on	The player stand in a position with feet wide apart (one foot forwards, one foot back). Front foot points forwards, rear foot points to the side. Arms are extended one in front of the other (i.e. if lunging on the right leg, the right arm is pointing forwards). Player sinks down so both knees bend and then the player returns to the starting position. During bending phase the rear heel should lift from ground.		

DYNAMIC BALANCE

Follow the Leader	One player leads, walking or jogging along an agreed route. When the leader adopts a balance position, the rest of the group copies. The leader then moves off again. The leader and group can move forwards or backwards			
Tramline Hops	Working along the tramlines, hop to the left and then to the right of the tramlines, moving along the tramline as you do so.			
Hopscotch	Working along the side tramlines, player alternate: <ul style="list-style-type: none"> · two footed landings outside the tramlines · one footed landings inside the tramlines Encourage a slight pause on each landing to illustrate that a balanced position has been established.			
Backwards Hopscotch	Repeat the previous hopscotch exercise, but perform it backwards.			
Hopscotch Variations	<ul style="list-style-type: none"> · Repeat hopscotch but perform along back tramlines, so two footed landings have to be wider. · One player performs the hopscotch. As that player moves from a two-footed position, partner calls out "left" or "right" to indicate which foot they would like the player to land on. · Repeat normal hopscotch (one foot, then two foot, then one foot etc.) but perform two footed landings with one foot further forwards than the other. 			
Full Lunges	Starting from a standing position, feet together and facing forwards. Use a large step forwards and with hands on hips, move into a lunge position, then return to the starting position. Keep both feet pointing forwards during this movement.			
	Starting from a standing position, feet together and facing forwards. Use a large step forwards, turning the body at the same time, with one arm extended forwards and one back. As the lunge is performed the rear foot will be turned out so it points out to the side, with the rear heel off the ground. Then return to the starting position.			
	Repeat the above but lunge in different directions using an imaginary clock face.			
Clock Face Jumps	Starting from the centre of an imaginary clock face, players jump out to a particular number of the clock face. Exercises could involve and combination of one/two foot take offs and landings. Focus on landing under control and on-balance. After landing return under control to the centre.			

WHEN SHOULD BALANCE BE TRAINED?

Balance work can be undertaken at any time in a player's badminton development; however the following guidelines may be of use:

- since good balance underpins effective movement, it makes sense to place an emphasis on balance work early in a child's development, for example between the ages of 5 and 9.
- balance work within warm-up if considered to help in injury prevention by activating the proprioceptive system.
- in recovery from injury, particularly ankle injuries, an emphasis on balance work can be invaluable to improve the proprioceptive system.

BALANCE AND THE F.I.T.T. PRINCIPLES

	Notes
Frequency	Balance training can be performed daily.
Intensity	Balance training can vary greatly in intensity. Static balances can be very low intensity, whereas dynamic balances (especially those involving jumping) can be of high intensity.
Time	<ul style="list-style-type: none"> · Balance exercises can form part of the warm-up, being easily incorporated in other aspects of the warm-up such as mobilising (e.g. leg swing balancing on one foot; lunges etc.) and shadowing. · The time spent on balance work when recovering from injury should be decided by physiotherapists.
Type	Both static and dynamic balance can be trained. Logically static training (less intense) should be undertaken before dynamic balance (more intense).

14. COORDINATION

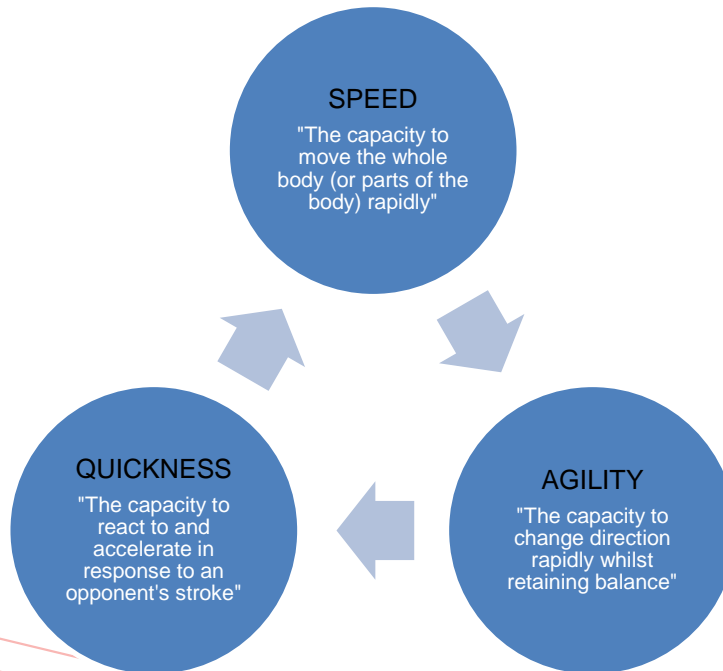
Co-ordination is the capacity to time movements of the body effectively. Badminton requires high levels of co-ordination, responding to visual information (i.e. the shuttle, your opponent, your partner etc.) by manipulating your body to return the shuttle effectively.

Essentially co-ordination training is the same as technical training, because it involves teaching the player to move and strike the shuttle in the most effective manner.

- In the 6-9 age groups, focussing on generic co-ordination skills such as throwing, catching, striking, jumping and methods of travelling is desirable.
- Sport-specific co-ordination should be focussed upon during the 9 – 13 year phase in order to establish appropriate hitting and movement patterns.

15. SPEED, AGILITY AND QUICKNESS

The fitness components of **speed**, **agility** and **quickness** are closely inter-related. The diagram below reflects this relationship and defines each of the components in turn.



WHY TRAIN SPEED, AGILITY AND QUICKNESS?

Speed is necessary for players to:

- take the shuttle early and therefore give the opponent less time.
- take the shuttle early and in doing so create more opportunities to hit down.
- retrieve your opponent's strokes when under pressure.

Agility is required so players can change direction quickly in rallies whilst maintaining balance. Changes in direction can involve a combination of the following:

- movement from high (with jumps) to low (e.g. for singles defence).
- movement from left to right.
- movement forwards and backwards.
- rotating in clockwise and anti-clockwise directions.

Agility is necessary for all the same reasons as speed (giving opponent less time, taking the shuttle early, retrieving your opponent's strokes) but is also necessary to save energy and avoid injury.

Quickness is required to:

- move the feet quickly in response to an opponent's strokes.
- move the racket in response to an opponent's strokes.





HOW THE BODY RESPONDS TO SPEED, AGILITY AND QUICKNESS TRAINING

The muscular and nervous systems adapt to **speed**, **agility** and **quickness** training. Information from the vestibular (inner ear), eyes and proprioceptors (sensors in the muscles) is sent to the central nervous system (brain and spinal cord) by sensory nerves. The CNS responds and sends messages back to the muscles via motor nerves, allowing them to contract or relax appropriately in order to change the position of the body accordingly. This is a very rapid and continually occurring process.

SAQ TRAINING AND THE FITT PRINCIPLES

	Notes
Frequency	SAQ training should be performed 1 – 4 times per week. For mature athletes, speed training is likely to be less frequent in the off-season, gradually increasing during the pre-season and form a major part in the pre-competition phase.
Intensity	SAQ training should be of very high intensity, always aiming to increase the rate at which players can perform the training.
Time	Due to the high intensity, SAQ training should occur in bursts of 15 seconds or less, with the rest interval being at least 5 times the work interval (i.e. work for 10 seconds, rest for 50 sec). The overall time spent will depend on the player – if there is a drop in quality, then the coach should stop the session.
Type	<p>There are numerous different types of SAQ training, including:</p> <ul style="list-style-type: none"> • Fast feet • Ladder work • Hurdle work • Shadowing partner • Reaction work • Bungee cord work • Clock drills <p>Due to the extensive range of exercises available these are dealt with in more detail overleaf.</p>

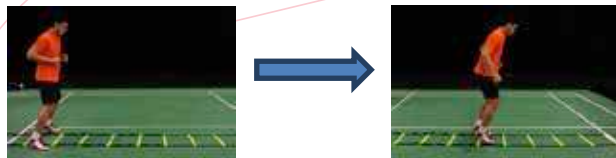
FAST FEET

Name of Exercise	Pictures		Teaching Points ***	Progressions/Notes
Fast Feet: Two Footed Split-Steps			<ul style="list-style-type: none"> Stand facing a partner, with feet outside the tramlines. Jump slightly off ground and bring feet together to land inside the tramlines. Jump slightly off the ground and return so feet are back outside the tramlines. Complete 5 – 10 times. Try to beat your partner to the finish. 	<ul style="list-style-type: none"> Adding an element of competition increases the speed element of the exercise. Repeat but only one foot is allowed to land in the tramlines. Focus on short ground contact time.
Fast Feet: Step In and Out (Box Steps)			<ul style="list-style-type: none"> Stand at the side of the court, facing the centre line of the court. Step with one foot into the tramlines, followed by the second foot Step backwards out of the tramlines, one foot at a time. Repeat 5 -10 times. Try to beat the person opposite to you. 	<ul style="list-style-type: none"> Adding an element of competition increases the speed element of the exercise. Focus on short ground contact time.

LADDER WORK

Ladder work can be performed using a drop-down ladder, but a useful alternative is to create a ladder by using removable tape along the tramlines. There are numerous ladder drills that can be performed, but consider the following guidelines:

- If using tape to create a ladder down the tramlines, then consider making the boxes of the ladder different sizes. This creates an additional movement challenge and is more realistic for badminton, which involves taking strides of different lengths.
- Do not always perform the exercises in one direction. Wherever possible both backwards and forwards movements should be used and when moving sideways there should be movements to both the left and the right.
- The coach can also progress the activities with a series of commands that require the player to change direction on that command (e.g. forwards, backwards, left, right etc.). This can increase the unpredictability of the movements, which helps speed by challenging both the muscular and nervous systems.
- Challenge the players to make up their own ladder footwork routines.



HURDLE WORK


Name of Exercise	Why this Helps	Teaching Points ***	Progressions/Notes
Arm Actions	This helps develop an explosive arm movement that assists in speed development.	<ul style="list-style-type: none"> • Stand upright/relaxed. • Both arms are bent to 90°, one hand at eye level and one hand at the side of buttock. • Keep hands/shoulders relaxed • Alternate arm positions, wrists brushing the hips. 	<ul style="list-style-type: none"> • Light weights can be used during this exercise. • Maintain correct arm mechanics throughout all exercises.
Dead Leg Run	This helps develop a quick knee lift which contribute to fast movement.	<ul style="list-style-type: none"> • Stand facing a row of hurdles. • Place the left foot to the side of the first hurdle. • Right foot lifts over the top of the first hurdle – put down between the hurdles. • Left foot moves to the side of the next hurdle. • Straight left leg, right leg uses “cycling” motion. • Maintain upright posture and correct arm mechanics. 	<ul style="list-style-type: none"> • Place 8 – 10 hurdles about 60cm apart. • Repeat so left leg passes over the hurdle.
Leading Leg Run	This helps develop a quick knee lift which contribute to	<ul style="list-style-type: none"> • Stand facing a row of hurdles. • Lift right leg over first hurdle, followed rapidly by left leg over same hurdle. 	<ul style="list-style-type: none"> • Place 8 – 10 hurdles about 60cm apart. • Repeat so left leg passes over the hurdle

	fast movement.	<ul style="list-style-type: none"> Repeat over the rest of the hurdles. Maintain upright posture and correct arm mechanics. 	first.
Dead Leg Lateral Run	This helps develop a quick knee lift whilst moving sideways.	<ul style="list-style-type: none"> Stand behind a row of hurdles so when you move sideways you travel along the hurdles. The left foot is placed between the hurdles without travelling over the top of the hurdles. The right foot then follows, but this foot is lifted over the top of the hurdle. This is then repeated. Maintain upright posture and correct arm mechanics. 	<ul style="list-style-type: none"> Place 8 – 10 hurdles about 60cm apart. Repeat so left leg passes over the hurdle.
Sideways Run	This helps develop a quick knee lift whilst moving sideways.	<ul style="list-style-type: none"> Stand at the side of a row of hurdles so that when you move sideways you travel over the hurdles. The left foot travels over the hurdle, followed quickly by the right foot. Repeat rapidly down the row. Maintain upright posture and correct arm mechanics. 	<ul style="list-style-type: none"> Place 8 – 10 hurdles about 60cm apart. Repeat so right leg passes over the hurdle first.



SHADOWING PARTNER


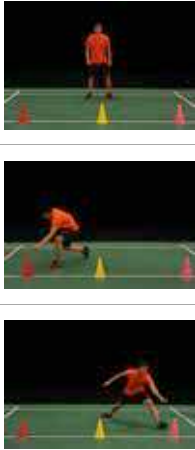
Name of Exercise	Why this Helps	Teaching Points ***	Progressions/Notes
Lateral Shadows – two cones (Cone Shadow)	This helps players to link lateral movements with a split-step.	<ul style="list-style-type: none"> Two players stand opposite each other. Each player stands between two cones, but one player's cones are further apart than the others. The player between the furthest apart cones leads, performing a split-step + moving off to touch a cone. The shadowing partner copies the leader - tries to reach cone first. Leader returns and starts again. 	<ul style="list-style-type: none"> Concentrate on keeping weight central when performing a split-step. Aim to beat player by speed and balance, not by "feinting" on the spot. Consider only using racket hand to touch the cones.

SHADOWING ALONE

Name of Exercise	Pictures	Why this Helps	Teaching Points ***	Progressions/ Notes
6 point shadow – unpredictable		<p>This helps players to link movements with a split-step and improves use of movement patterns in an unpredictable environment.</p>	<ul style="list-style-type: none"> • One player stands in the centre of the court, with a partner facing them with their back against the net. • Partner points racket to area of court they wish the player to move to, then returns their racket to point to the centre of the court. • Player moves to different areas of the court under direction from their partner. 	<p>Directing partner should time the pointing of the racket so it encourages use of the split-step to move off.</p>

REACTION WORK

Name of Exercise	Pictures	Why this Helps	Teaching Points***	Progressions/Notes
Basic Split-Step		<p>Split-steps are used to push off quickly and on-balance.</p>	<ul style="list-style-type: none"> • Player carries 1 shuttlecock, standing opposite their practice partner. • Player performs a controlled underarm throw towards the body of their partner. • Partner reacts to throw with a split-step, catching the shuttle two-handed in front of their body. 	<p>This exercise is essential to developing a split-step, because the trigger for a split-step being started is the shuttle.</p>
Split-Step Lateral Movement		<p>Split-steps are used to push off quickly and on-balance</p>	<ul style="list-style-type: none"> • Player carries 1 shuttlecock, standing opposite their practice partner. • Player performs a controlled underarm throw slightly to side of the player. • Partner reacts to the throw with a split-step, then chassé, catching the shuttle two-handed in front of their body. • The exercise is repeated with the shuttle being thrown in the opposite direction. 	<p>Encouraging a two-handed catch at this stage encourages the player to keep their weight over their base of support, rather than leaning out (off balance) to catch the shuttle.</p>

<p>Split-Step –Diagonal Movement</p>		<p>Split-steps are used to push off quickly and on-balance.</p>	<ul style="list-style-type: none"> • Player carries 1 shuttlecock, standing opposite their practice partner. • Player performs a controlled underarm throw slightly to the backhand side and in front of their partner. • Partner performs split-step, moves off and reaches to catch the shuttle one-hand . • The exercise is repeated with the shuttle being thrown in the opposite direction. 	<ul style="list-style-type: none"> • If moving to forehand, use split-step, chassé and lunge. • If moving to backhand, use split-step, pivot and lunge. • With an accurate throw this can also be used to train diagonal movement backwards.
<p>Cone Work</p>		<p>Split-steps are used to push off quickly and on-balance.</p>	<ul style="list-style-type: none"> • Player stands facing 3 cones, each cone being of a different colour (e.g. green, red, blue). • The coach calls out a colour and the player split-steps, then moves forwards to touch the cone of that colour, then immediately returning to base. • Exercise is repeated. 	<p>Coach can introduce element of doubt by mixing up colour (e.g. when they say red they mean blue, when they say blue they mean red).</p>

16. ENDURANCE

Endurance can be defined as “*the capacity of the body to withstand fatigue*”. When dealing with endurance the most important body systems are the cardiovascular, respiratory and muscular systems.

WHY TRAIN ENDURANCE?

Badminton players need good endurance to:

- maintain work rate during very long rallies
- recover between rallies
- maintain work rate during very long matches
- recover between matches
- recover between training sessions

Endurance training can also be used to reduce body fat.

HOW THE BODY ADAPTS TO ENDURANCE TRAINING

The 3 main systems that adapt as a result of endurance training are the **muscular**, **cardiovascular** and **respiratory** systems.

MUSCULAR ADAPTATIONS TO ENDURANCE TRAINING

- Mitochondria (the energy factories within muscles).
- improve at be able to generate ATP using oxygen.
- increase in both size and number.
- The capacity of muscles to use fat and carbohydrate as an energy source increases.
- Slow twitch fibres increase in size.

CARDIOVASCULAR ADAPTATIONS TO ENDURANCE TRAINING

- The weight and volume of the heart increases with long-term training. Changes are most noticeable in the left ventricle.
- Resting heart rate decreases.
- Heart rate at a given intensity of exercise will drop. For example, a player who has undertaken endurance training will have a lower heart rate when running at a certain speed than a player who has not trained for endurance.
- The heart's stroke volume (i.e. the amount of blood pumped out of one side the heart per beat) increases at rest and during exercise.
- The maximum cardiac output (the maximum amount of blood that can be pumped out per minute) increases.
- The volume of blood increases in a trained player.
- Regular endurance training tends to reduce blood pressure.
- Muscles become more effective at extracting oxygen from the blood.
- The body becomes more efficient at distributing blood to where it is needed.

RESPIRATORY SYSTEM

- The maximum amount of air that can be breathed in per minute increases. This is caused by an increase per breath and an increase in the rate of breathing.
- For a given exercise level, a trained person will breath in less than an untrained person. This means the respiratory muscles are not working so hard in a trained person so require less blood flow. This blood can then be used to help other areas of the body.

ENDURANCE AND THE F.I.T.T. PRINCIPLES

	Notes
Frequency	In the off- and pre-season, endurance training sessions can occur 3 – 4 times per week, depending on individual need. This would tend to drop to 2 sessions during the in-season.
Intensity	<p>Using heart rates can help players to evaluate their ideal training heart rate. One method of calculating training heart rates is by:</p> <ol style="list-style-type: none"> 1. Estimating maximum heart rate (MHR) by subtracting your age from 220. 2. Measure your resting heart rate (RHR). 3. Subtracting your Maximum Heart Rate (MHR) from Resting Heart Rate (RHR) to arrive at a Working Heart Rate (WHR) figure. 4. Calculate 60, 70 and 80% of your WHR figure. 5. Add these calculated heart rates (60, 70 and 80%) to your Resting Heart Rate. 6. Training between 60-80% depending on your fitness level and training goals. <p>As an example:</p> <ol style="list-style-type: none"> 1. A 20 year old has an estimate Maximum Heart Rate (MHR) of 200 bts/min (220 – Age). 2. That 20 year old has a Resting Heart Rate (RHR) of 60 bts/min. 3. This player has a WHR of 140 beats/min. 4. 60% of 140 = 84, 70% of 140 = 98, 80% of 140 = 112 bts/min. 5. Lowest training level (60%) :60 + 84 = 144 bts/min. <p>Moderate training level (70%) :60 + 98 = 158 bts/min.</p> <p>High training level (80%) :60 + 112 = 172 bts/min.</p> <ul style="list-style-type: none"> • Training at 60-70% would be good for burning fat, or the most appropriate intensity for a less fit person. • Training at 70-80% would be a better training intensity for a fitter person.
Time	<ul style="list-style-type: none"> • A minimum duration of 20 minutes is recommended to start to achieve cardiovascular benefits. A maximum length of around 60 minutes (probably in the off-season) is sensible. Runs of 30-45 minutes are most common. • Interval training involving 3-5 minutes of work, followed by 3-5 minutes of active recovery can be used as an alternative to steady continuous work.
Type	<ul style="list-style-type: none"> • Running on soft, even surfaces. • Cycling if the player would benefit from a session involving reduced impact.

17. FLEXIBILITY

FLEXIBILITY DEFINED

Flexibility can be defined as:

“The range and ease of movement about a joint”

Factors that can influence flexibility can be split into internal and external factors and these are listed in the table below.

Internal Factors	External Factors
<ul style="list-style-type: none"> • the type of joint. For example, a ball and socket joint such as the hip offers greater range of movement than a hinge joint such as the elbow. • bony structures. For example, both the shoulder and hip joint are ball and socket joints, but the shoulder joint has a shallower bony socket, meaning it potentially is a more flexible joint. • the internal structures of a joint (e.g. ligaments and cartilage) limit movement. • muscle, tendon, ligament and skin elasticity. • the ability of a muscle to relax. • the temperature of the joint. • the lubrication of the joint (via synovial fluid). • Injury. 	<ul style="list-style-type: none"> • the outside temperature (as warmer body tissues are more flexible than colder tissues). • the time of day (most people are more flexible later rather than earlier in the day). • age (pre-pubescent children are generally more flexible than adults). • gender (females are generally more flexible than males). • the restrictions of any clothing or equipment.

WHY TRAIN FLEXIBILITY?

Flexibility is necessary for badminton players in order to:

- allow them to reach for the shuttle.
- maintain good technique;
- generate force effectively;
- reduce the risk of injury;
- maintain even flexibility on both sides of the body.

	Notes
Frequency	Flexibility can be trained every day.
Intensity	<ul style="list-style-type: none"> • The positions adopted for effective flexibility training by definition put the targeted muscles in a stretched position. The extent of the stretch is dependent on the internal feedback from the player – they should be feeling the stretch, but not pain. • Relaxation is important to stretch effectively, so deep breathing, a quiet atmosphere and even switching off lights can help • As the muscles relax during stretching it is often possible to move to a new position of stretch.
Time	<ul style="list-style-type: none"> • Dedicated flexibility sessions can last for anything from 15 to 45 minutes. • Flexibility training should be included as part of a cool-down after intense training or matchplay, but dedicated flexibility sessions preceded by a period of aerobic exercise to warm muscles first should be undertaken. • Stretches should be held for a minimum of 15-20 seconds but longer (30sec to 1 minute) is better.
Type	<p><u>Static Active Stretching</u> This requires the strength of OPPOSING MUSCLE GROUPS to hold the limb in position for the stretch. For example, contracting the muscles of the upper back to bring the shoulder blades closer together naturally stretches the pectorals of the chest.</p> <p><u>Static Passive Stretch</u> Static PASSIVE stretching uses an external force to hold the stretch in position. Sitting on the floor with both legs extended and then leaning forwards is a passive stretch as it relies on the force of gravity acting on the upper body to stretch the hamstrings and muscles of the lower back.</p>

18. STRENGTH

Strength can be split into 4 types. Definitions of each, plus their relevance to badminton, are included in the table below.

Type of Strength	Definition	Why Train Strength?
Core Strength	The capacity of specific muscles to stabilise joints of the body.	Having good core strength is important for badminton players because: <ul style="list-style-type: none"> • stable joints are less vulnerable to injury • strength and power can only be built effectively on top of a stable base • assist in preventing injury.
Maximum Strength	The greatest force that a player can generate in a single effort.	Overall badminton players do not need to demonstrate extremely high maximal strength (as might be demonstrated by a weight lifter). However a good level of maximal strength in

		the legs is desirable to recover from deep lunges and as a basis for building power.
Strength Endurance	The capacity of muscles to maintain repeated contractions without experiencing fatigue.	Badminton players have to repeat movements many times during a match (e.g. lunging, jumping, pushing of the floor, striking the shuttle) so strength endurance is important.
Elastic Strength	The capacity of muscles to generate force at high speed after rapid pre-stretching.	Elastic strength is vitally important to a badminton player. Examples include: <ul style="list-style-type: none"> · backswings, rapidly stretch the muscles which then recoil to create a powerful forward swing. · the split step, which rapidly stretches the calf muscles and produces a recoil effect that allows the player to move of more quickly.

ADAPTATIONS TO STRENGTH TRAINING

Strength training basically involves overloading the muscles by use of:

- bodyweight exercises.
- free or machine weight exercises.











Adaptations to this include:











- increase in muscle fibre size.
- increase in enzymes (biological catalysts) which accelerate chemical reactions that support anaerobic energy production.
- increased ability to use carbohydrate as a fuel source.
- increase in muscle stores of Adenosine Triphosphate (ATP), Phosphocreatine (PC) and glycogen (carbohydrate) within the muscle.
- increase ligament and tendon strength.
- increase in bone mineral content.

STRENGTH AND THE F.I.T.T. PRINCIPLES



	Notes
Frequency	Strength training performed between 2 – 3 times per week will bring about adaptations whilst still allowing for sufficient recovery times. More sessions may be completed if different areas of the body are targeted in different sessions.
Intensity	<ul style="list-style-type: none"> • Training for strength endurance requires the player to perform exercises where failure to complete the next repetition is not experienced until 15 or more repetitions • Maximum strength training requires the player to perform exercises where failure to complete the next repetition is not experienced until 1 - 5 repetitions have been completed. • Elastic strength (power) requires the player to perform quicker exercises where failure to complete the next repetition is not experienced until 6 – 10 repetitions have been completed. • Plyometric training, involving rapid movements where muscles are rapidly stretch, then immediately contracted can be performed in sets of 6 – 8, with 2-3 sets of exercises per training session. • Typically 2 -3 sets of each exercise would be completed in a strength training session (e.g. 2-3 sets of 15 repetitions for strength endurance).
Time	Recovery between sets is quite individual, but a period of 3 - 5 minutes should be sufficient.
Type	<p>There are numerous different types of strength training, including:</p> <ul style="list-style-type: none"> • Bodyweight exercises. • Machine weight exercise. • Free weight exercises (dumbbells and barbells). • Medicine Ball exercises. • Theraband (elastic bands). • Plyometric. <p>Due to the extensive range of exercises available these are dealt with in more detail below.</p>

BODYWEIGHT EXERCISES (1)

Name of Exercise and Muscle Group	Pictures		Teaching Points***	Progressions/Notes
Calf Raise: <ul style="list-style-type: none"> • Gastrocnemius • Soleus 			<ul style="list-style-type: none"> • Point both feet forwards, feet shoulder width apart. • Stand upright. • Raise up onto balls of feet. • Lower under control. 	<ul style="list-style-type: none"> • Hands on wall • Away from wall • Balls of feet on stable raised edge • Advanced - one foot only
Squat <ul style="list-style-type: none"> • Quads • Gluteals • Hamstrings 			<ul style="list-style-type: none"> • Point both feet forwards, feet shoulder width apart • Stand upright, hands on hips • Bend knees and hips to create a "sitting back" position • Back/shins parallel • Thighs parallel to floor 	<ul style="list-style-type: none"> • Focus on preventing sideways movement of knees • Main work is done by quads/gluteals, but hamstrings do work (in a stabilising role)
Side Leg Raise (1) <ul style="list-style-type: none"> • Adductors 			<ul style="list-style-type: none"> • Lie on side in position shown • Raise lower leg from hip 	<ul style="list-style-type: none"> • Small ankle weights can be used to increase load
Inline Lunge (basic shape) <ul style="list-style-type: none"> • Quads • Gluteals • Hamstrings 			<ul style="list-style-type: none"> • Stand in wide stance, with feet parallel and pointing forwards • Hands on hips • Sink down by bending knees, with back finishing close to front heel • Keep body upright 	<ul style="list-style-type: none"> • Focus on keeping the hips, knees and ankles in line
Lunge <ul style="list-style-type: none"> • Quads • Gluteals • Hamstrings 			<ul style="list-style-type: none"> • Stand upright, feet together and hands on hips • Step forwards with a large stride 	<ul style="list-style-type: none"> • As above

			<ul style="list-style-type: none"> • Bend both knees to finish in a lunge position • Keep trunk upright • Return back to start 	
<p>Side Leg Raise (2)</p> <ul style="list-style-type: none"> • Abductors 			<ul style="list-style-type: none"> • Lie on side • Raise upper leg from hip • Lower slowly 	<ul style="list-style-type: none"> • Small ankle weights can be used to increase load
<p>Trunk Curl</p> <ul style="list-style-type: none"> • Rectus Abdominus 			<ul style="list-style-type: none"> • Lie on back, knees bent to 90° • Cradle head lightly • Curl trunk upwards - shoulder blades leave the ground • Lower slowly 	<ul style="list-style-type: none"> • Support the head • Keep chin away from chest to protect neck
<p>Twisting Trunk Curl</p> <ul style="list-style-type: none"> • Obliques (internal + external) 			<ul style="list-style-type: none"> • Lie on back, knees bent to 90° • Cradle head lightly. • Curl trunk upwards and twist • Lower slowly 	<ul style="list-style-type: none"> • Guide one elbow towards the diagonally opposite knee
<p>Back Raise</p> <ul style="list-style-type: none"> • Erectae Spinae 			<ul style="list-style-type: none"> • Lie face down. • Fingers on sides of head • Keep looking at ground • Raise chest off ground 	<ul style="list-style-type: none"> • Arms extended above the head
<p>Press-Ups</p> <ul style="list-style-type: none"> • Triceps • Deltoids • Pectorals 			<ul style="list-style-type: none"> • Lie face down with palms on ground close to shoulders • Maintaining a straight body, raise body up by straightening the arms • Lower the body under control and repeat 	<ul style="list-style-type: none"> • Perform from the knees for a lighter load







BODYWEIGHT EXERCISES (2)







Name of Exercise and Muscle Group	Pictures		Teaching Points***	Progressions/ Notes
Tricep Dip • Triceps			<ul style="list-style-type: none"> • Support bodyweight with hands on a bench, feet on the floor • Lower body by bending the elbows • Reverse the movement 	<ul style="list-style-type: none"> • Bring the feet closer to the bench makes the exercise easier • Take the feet further from the bench to make the exercise harder

Bodyweight exercises are suitable for all ages and have the advantage of requiring minimal equipment. Additional advice is given below.







- Bodyweight exercises are good for children, however bear in mind that:
 - training time for pre-pubescent children, whilst possibly including elements of bodyweight exercises to develop strength, is probably better spent developing generic fitness components (balance, co-ordination, speed and agility) and badminton specific elements such as technique and tactics.
- Certain body weight exercises (e.g. squats) will not overload a well-conditioned adult player sufficiently to result in strength gains. In this case, free-weight and/or machine weights may be more appropriate.
- Care should be taken if bodyweight exercises are delivered in a circuit format, with the exercises being placed in an order so that different muscles groups are rested sufficiently between stations. An order of **B**ack, **A**rms, **L**egs and **S**tomach (B.A.L.S.) can help make sure exercises are delivered in an effective sequence.
- Thought should be given as to whether the bodyweight exercises are being used to develop maximal strength, strength endurance or elastic strength. Some exercises clearly are biased towards strength endurance (e.g. trunk curls) whereas other (e.g. pull-ups) may for many promote the development of maximal strength.







FREE WEIGHTS

Name of Exercise and Muscle Group	Pictures		Teaching Points***	Progressions/ Notes
Calf Raise (dumbbells) <ul style="list-style-type: none"> • Gastrocnemius • Soleus 			<ul style="list-style-type: none"> • Stand upright with feet shoulder width apart, feet pointing forwards. • Hold dumbbells securely in the hands. • Raise up steadily onto the balls of the feet. • Lower under control 	<p>This exercise can be made harder by:</p> <ul style="list-style-type: none"> • using a heavier weight • starting with the balls of the feet on a secure, slightly raised platform to increase the range of movement.
Squats <ul style="list-style-type: none"> • Gluteals • Quadriceps • Hamstrings 			<ul style="list-style-type: none"> • Stand upright, feet pointing forwards/shoulder width apart • Support a weighted barbell on the upper back/shoulders • Sit backwards, putting weight through the heels • Aim to lower so: <ul style="list-style-type: none"> ○ upper legs parallel to the floor ○ back/ shins parallel to each other ○ head/chest stays up • Return under control to upright stance 	<ul style="list-style-type: none"> • Work to maintain neutral/natural back position. • Use of a weights rack can help put weight into position.
Lunges (dumbbells) <ul style="list-style-type: none"> • Gluteals • Quadriceps • Hamstrings 			<ul style="list-style-type: none"> • Stand with feet side by side, holding dumbbells • Take a long step forwards with one foot (short phase where leg will be straight). • Land front foot – both knees bend with both feet 	<ul style="list-style-type: none"> • Can be performed with barbell across shoulders, or dumbbells held at shoulder height. • Can be performed by









			<ul style="list-style-type: none"> pointing forwards. Return under control. 	<ul style="list-style-type: none"> rotating the turn and turning rear foot out 90° (to mimic more badminton specific lunge).
<p>Side Bends</p> <ul style="list-style-type: none"> Obliques Quadratus lumborum 			<ul style="list-style-type: none"> Stand with feet shoulder-width apart, dumbbells by the side Bend side-ways under control Return to starting position Return to the other side 	<ul style="list-style-type: none"> Avoid twisting of the trunk
<p>Bench Press</p> <ul style="list-style-type: none"> Pectorals Triceps Deltoids (front) 			<ul style="list-style-type: none"> Lie face up on a bench With assistance, take the weight from a helper, hands just over shoulder width apart. Lower weight to chest, then raise so arms are fully extended. Lower under control and repeat. Helper takes weight at the end and replaces on stand 	<ul style="list-style-type: none"> Exercise can be performed with dumbbells. Feet up on bench with knees bent helps to protect the back.
<p>Pectoral Flyes</p> <ul style="list-style-type: none"> Pectorals 			<ul style="list-style-type: none"> Lie face up on a bench. Lift dumbbells above chest and place them together. Lower dumbbells out to the sides of the body Return to start. 	<ul style="list-style-type: none"> Feet up on bench with knees bent helps to protect the back. Maintain slight elbow bend to protect elbow joint.

FREE WEIGHTS

Name of Exercise and Muscle Group	Pictures		Teaching Points***	Progressions/ Notes
Bicep Curl <ul style="list-style-type: none"> · Biceps Brachii · Brachioradialis · Brachialis 			<ul style="list-style-type: none"> · Stand with feet about shoulder width apart · Hold the barbell with hands shoulder width apart · Lift weight by bending elbows · Return to start 	
Tricep Curl <ul style="list-style-type: none"> · Triceps 			<ul style="list-style-type: none"> · Kneel with knee and hand on a bench · Hold dumbbell with your free hand in such a way that the elbow is bent and stays at the side of the body · Lift the weight by straightening the elbow · Lower the weight under control 	<ul style="list-style-type: none"> · Avoid upward and downward movement of the elbow joint
Lateral Raise <ul style="list-style-type: none"> · Deltoids 			<ul style="list-style-type: none"> · Stand upright with feet shoulder width apart. · Hold dumbbells by the sides, palms inwards. · Raise arms out to sides up to shoulder height. · Lower dumbbells back to the sides. 	<ul style="list-style-type: none"> · Maintain a slight bend at the elbow joint to relieve pressure on that joint.

<p>Shoulder Press</p> <ul style="list-style-type: none"> • Deltoids • Triceps 			<ul style="list-style-type: none"> • Stand upright with feet shoulder width apart. • Hold dumbbells close to the shoulders, elbows bent. • Lift the dumbbells above the head by straightening the arms. • Lower the dumbbells back to shoulders. 	
<p>Internal Rotation (pronation of forearm)</p> <ul style="list-style-type: none"> • Pronator quadratus • Pronator teres • Flexor carpi radialis • Anconeus 			<ul style="list-style-type: none"> • Hold a bar with weight securely attached to one end, palm up and elbow bent. • Weight should be pointing away from the body. • Rotate forearm so weight moves from the side of the hand to above the hand • Return to the start. 	<p>If an adapted dumbbell is not available then a hammer is a good substitute.</p>
<p>External Rotation (supination of forearm)</p> <ul style="list-style-type: none"> • Supinator • Biceps Brachii 			<ul style="list-style-type: none"> • Hold a bar with weight securely attached to one end, palm down and elbow bent. • Weight should be pointing in towards the body. • Rotate forearm so weight moves from the side of the hand to above the hand • Return to the start. 	

FREE WEIGHTS

Name of Exercise and Muscle Group	Pictures		Teaching Points***	Progressions/ Notes
Single Arm Row <ul style="list-style-type: none"> • Latissimus dorsi 			<ul style="list-style-type: none"> • Kneel with knee and hand on a bench. • Hold dumbbell off the ground with your free hand. • Lift the weight up towards the body by bending the elbow. • Lower the weight under control and repeat. 	<ul style="list-style-type: none"> • Avoid twisting the trunk when lifting and lowering the weight.
Upright Row <ul style="list-style-type: none"> • Trapezius • Deltoids • Biceps 			<ul style="list-style-type: none"> • Stand with feet shoulder width apart, holding a barbell with hands slightly apart. • Raise bar up to collar bone, with elbows bent and in a high position. • Lower the bar slowly. 	
Wrist Extensor <ul style="list-style-type: none"> • Extensor Carpi Radialis Longior • Extensor Carpi Radialis Brevior • Extensor Carpi Ulnaris 			<ul style="list-style-type: none"> • Stand with feet shoulder width apart with elbows bent. • Hold a dumbbell in each hand, palms down. • Raise and lower the dumbbells under control using wrist movement only. 	
Wrist Flexors <ul style="list-style-type: none"> • Flexor Carpi Radialis • Flexor Carpi Ulnaris 			<ul style="list-style-type: none"> • Stand with feet shoulder width apart with elbows bent. • Hold a dumbbell in each hand, palms up. • Raise and lower the dumbbells under control using wrist movement only. 	

MACHINE WEIGHT EXERCISES








Virtually all muscle groups trained using free weights can also be trained during machine weights. Machine weight exercises are not included in this resource, mainly because the design of such machines can vary considerably. For those wishing to use machine weight exercises as part of their programme, the following information may be useful.

- Bodyweight exercises are normally sufficient for young children to develop strength. Young adults who have completed their growth spurt can benefit from machine strength training, but the focus should be on learning correct technique, starting with light loads and gradually increasing those loads in a monitored, progressive fashion.
- The techniques involved in using machine weights are relatively easy to learn and are safe, provided excessive loads are not used. Inexperienced adults may therefore find that this is the preferred option rather than using free weights.
- In many cases machine weights provide most of the stabilising work when exercising. Although making the exercises safer, the disadvantage is that key muscles used to stabilise joints are not utilised, which can compromise both injury prevention and power generation. Elite players, or recreational players who are willing to spend more time learning free weight techniques, would be better progressing to free weight exercises.















PHOTO CREDIT: BWF/BADMINTONPHOTO

SWISS BALL EXERCISES (1)





Name of Exercise and Muscle Group	Pictures		Teaching Points ***	Progressions/Notes
Hamstring Curl • Hamstrings			<ul style="list-style-type: none"> • Lay on your back arms on the floor, with calves supported on the ball. • Raise the buttocks - create a straight line: ankles to shoulder. • Keeping the hips still, bend the knees to bring the ball in towards the buttocks. • Return to the starting position with buttocks off the ground. 	<ul style="list-style-type: none"> • To make things harder: <ul style="list-style-type: none"> ○ put arms across chest ○ performed one-legged
Reverse Bridge • Gluteals • Hamstrings			<ul style="list-style-type: none"> • Lay on your back - arms on the floor, with calves supported on the ball. • Raise the buttocks to create a straight line between the ankles and shoulder. • Hold until hips begin to drop, then return to start. 	<ul style="list-style-type: none"> • To make things harder: <ul style="list-style-type: none"> ○ put arms across chest
Trunk Curl (straight) • Rectus Abdominus			<ul style="list-style-type: none"> • Lie backwards, with feet on ground and low back on the ball. • Cradle the head. • Move back so back is slightly arched across ball. • Raise up (curling trunk) around 30°, then lower under control. 	<ul style="list-style-type: none"> • Extend arms above the head
Trunk Curl (with twist) • Obliques • Rectus Abdominus			<ul style="list-style-type: none"> • Lie backwards, with feet on ground and low back on the ball • Cradle the head • Move back so back is slightly arched across ball. • Raise up (curling trunk) around 30°, rotating to left. • Lower slowly, then repeat upward movement twisting to right. 	<ul style="list-style-type: none"> • Support/cradle the head, rather than pull • Keep chin off chest to protect neck.

SWISS BALL EXERCISES (1)

Name of Exercise and Muscle Group	Pictures		Teaching Points ***	Progressions/Notes
Roll Away <ul style="list-style-type: none"> • Rectus Abdominus • Transverse Abdominals 			<ul style="list-style-type: none"> • Kneel in front of the ball, with arms straight - hands on the ball. • Roll forwards to create a position where a straight line can be draw through shoulders, hips + knees. • Return to the start. 	<ul style="list-style-type: none"> • Maintain a natural spine position (avoid letting the back arch as you extend through the movement).
Side Curl <ul style="list-style-type: none"> • Obliques • Quadratus Lumborum 			<ul style="list-style-type: none"> • Kneel on the right knee, with left leg extended out to the side. • Lie sideways over the ball. • Lift the trunk up to the side, then lower under control. 	<ul style="list-style-type: none"> • Repeat on other side.
Plank <ul style="list-style-type: none"> • Erectae Spinae • Multifidus 			<ul style="list-style-type: none"> • Kneel in front of ball, with elbows on top of the ball • Extend both legs to create a straight line from feet-hips-shoulders. • Maintain position as long as possible. 	<ul style="list-style-type: none"> • Avoid letting the hips drop.
Reverse Plank <ul style="list-style-type: none"> • Rectus Abdominus • Transverse Abdominals. • Erectae Spinae 			<ul style="list-style-type: none"> • Kneel on your hands and knees, with shins/ankles on the ball. • Push the ball back to lift and straighten the knees and hips. • Create a straight line from feet, knees, hips and shoulders. 	<ul style="list-style-type: none"> • Drawing the legs in (by bending the knees) then extend again – this is more advanced.

			<ul style="list-style-type: none"> Maintain position as long as possible. 	
<p>Swiss Ball Rotation</p> <ul style="list-style-type: none"> Obliques Quadratus Lumborum 	 		<ul style="list-style-type: none"> Lie on your back, holding the swiss ball between the lower legs. Let ball move out to the left, then to the right. 	<ul style="list-style-type: none"> Make sure middle of back remains on the ground
<p>Wood Chop</p> <ul style="list-style-type: none"> Obliques Quadratus Lumborum 	 		<ul style="list-style-type: none"> Create a wide stance, holding the ball out at arm's length. Rotate at the waist/bend knees and hips, swinging the ball close to the ground near to one foot. Reverse this movement and continue until the ball is above the opposite shoulder. 	
<p>Back Extension</p> <ul style="list-style-type: none"> Erectae Spinae 	 		<ul style="list-style-type: none"> Lie face down, with stomach/ chest on the ball and feet on the floor. Place hands at side of head. Raise chest off ball. Lower under control. 	<ul style="list-style-type: none"> Extending arms above the head makes the exercise harder.



SWISS BALL EXERCISES (1)







Name of Exercise and Muscle Group	Pictures		Teaching Points ***	Progressions/ Notes
<p>Press up</p> <ul style="list-style-type: none"> • Pectorals • Triceps • Deltoids • Serratus Anterior 			<ul style="list-style-type: none"> • Position yourself on your knees with the ball in front of you. • Place your hands on the ball slightly more than shoulder width apart, with the elbows straight. • Roll the ball away slightly until your knees, hips and shoulders are in a straight line. • Bend the elbows out to the sides, lowering the chest towards the ball. • Push back up by straightening the elbows, then repeat. 	<ul style="list-style-type: none"> • Perform the exercise from the feet rather than the knees
<p>Tricep Dip</p> <ul style="list-style-type: none"> • Triceps 			<ul style="list-style-type: none"> • Squat near the floor with the ball behind you. • Place your hands on the ball so your fingers are pointing at your back. • Slowly bend the elbows until the upper arm is horizontal to the floor. • Reverse the movement until the arms are straight, then repeat. 	

The guidelines will help players and coaches get the most out of Swiss Ball exercises.







- Swiss Ball exercises are effectively bodyweight exercises. However, because the swiss ball often means the exercise is being performed on an unstable platform, then the exercises are often:
 - harder than normal bodyweight exercises.
 - better at helping to strengthen stabilising muscles as well as the muscles creating each movement
- Swiss Ball exercises can be fun to learn and are therefore appealing to children.
- The correct size of ball is one where, when sitting, the upper leg is parallel to the floor when the knee is bent at 90°.





THERABAND EXERCISES

Name of Exercise and Muscle Group	Pictures		Teaching Points***	Progressions/Notes
<p>Internal Rotation (arm by side)</p> <ul style="list-style-type: none"> • Teres Minor • Subscapularis 			<ul style="list-style-type: none"> • Secure a theraband at one end (e.g. to a badminton post) at elbow height. • Hold the other end at one end, with the theraband under tension. • Keep elbow at the side of the body • Rotate the upper arm so the lower arm moves across the body. • Return to the start position under control. 	<ul style="list-style-type: none"> • Put the scapula in position before starting, back and held down low. • To increase difficulty: <ul style="list-style-type: none"> ○ stand further way to begin with to put band under more tension. ○ increase strength of theraband used.
<p>Internal Rotation (arm at shoulder height).</p> <ul style="list-style-type: none"> • Teres Minor • Subscapularis 			<ul style="list-style-type: none"> • Secure a theraband at one end (e.g. to a badminton post) at just over shoulder height. • Hold the other end at one end, with the theraband under tension, elbow at shoulder height and bent. • Rotate the upper arm - hand moves forwards and downwards to shoulder height • Return to the start position under control. 	<ul style="list-style-type: none"> • Put the scapula in position before starting, back and held down low. • Keep elbow positioned at shoulder height and avoid forwards/backwards movement of the elbow. • To increase difficulty: <ul style="list-style-type: none"> ○ stand further way to begin with to put band under more tension. ○ increase strength of theraband used.

<p>External Rotation (arm by side)</p> <ul style="list-style-type: none"> Infraspinatus 			<ul style="list-style-type: none"> Secure a theraband at one end (e.g. to a badminton post) at elbow height. Hold the other end with the lower arm across the body and the theraband under tension. Keep elbow at the side of the body Rotate the upper arm so the lower arm moves away from the body. Return to the start position under control. 	<ul style="list-style-type: none"> Put the scapula in position before starting, back and held down low To increase difficulty: <ul style="list-style-type: none"> stand further away to begin with to put the band under more tension increase the strength of theraband used Keep upper arm touching the side of the body
<p>External Rotation (arm at shoulder height).</p> <ul style="list-style-type: none"> Infraspinatus 			<ul style="list-style-type: none"> Secure a theraband at one end (e.g. to a badminton post) at just over shoulder height. Hold the other end at one end, with the theraband under tension. Bent elbow should be at shoulder height. Rotate the upper arm - hand moves backwards and upwards Return to the start position under control 	<ul style="list-style-type: none"> Put the scapula in position before starting, back and held down low. Keep elbow positioned at shoulder height and avoid forwards/backwards movement of the elbow. To increase difficulty: <ul style="list-style-type: none"> stand further way to begin with to put band under more tension. increase strength of theraband used
				

THERABAND EXERCISES

Name of Exercise and Muscle Group	Pictures		Teaching Points***	Progressions/Notes
Trunk Rotation • Obliques			<ul style="list-style-type: none"> • Secure theraband at elbow height. • Hold the other end of the theraband in both hands, with the theraband under tension. • Keeping elbows in the sides, rotate trunk through 180°. • Return to the start under control, then repeat. 	<ul style="list-style-type: none"> • To increase difficulty: <ul style="list-style-type: none"> ○ stand further away to begin with to put band under more tension. ○ increase strength of theraband used.
Low to High chops • Obliques			<ul style="list-style-type: none"> • Secure theraband at ground level or trap under one foot • Use a wide stance, hold the other end of the theraband in two hands • Reach down across the body towards the secured end of the theraband • With straight arms, stand up and extend arms so the theraband is stretched diagonally across the body 	<ul style="list-style-type: none"> • To increase difficulty increase strength of theraband used
Abductors (on back) • Gluteals • Tensor Facia Lata			<ul style="list-style-type: none"> • Lie on your back with knees bent to 90° • Place a theraband loop around the knees so there is some tension in the band when the feet are slightly apart on the 	<ul style="list-style-type: none"> • This can be made harder by lifting the feet off the ground so the knees are above the hips.

			<ul style="list-style-type: none"> ground. Force the knees apart, maintaining a neutral back position. Return to the start under control. 	
<p>Abductors (on side)</p> <ul style="list-style-type: none"> Gluteals Tensor Facia Lata 			<ul style="list-style-type: none"> Lie on your side with knees bent to 90° Place a theraband loop around the knees so there is some tension in the band. Force the knees apart by raising the top knee. Return to the start under control 	<ul style="list-style-type: none"> To increase difficulty increase strength of theraband used. Avoid letting the whole body tip backwards.
<p>Sideways Walks</p> <ul style="list-style-type: none"> Gluteals Tensor Facia Lata 			<ul style="list-style-type: none"> Stand with feet slightly apart Place a theraband loop over the knees. Step out sideways Bring feet back towards each other, but not together. 	<ul style="list-style-type: none"> Maintain good upper body posture.

Therabands can be used in a number of ways as a replacement weight exercises. They are particularly useful for training the rotator cuff muscles of the shoulder, core muscles of the trunk and the gluteals.

Theraband exercise can be used by children, although it is recommended that this is done under supervision.

19. SELF-ASSESSMENT QUESTIONS

	Questions	Answers
1	Pick an example of a hinge joint and describe a badminton movement where this is performed.	
2	Focussing on the radio-ulnar joint, describe: <ul style="list-style-type: none"> · where this joint is located · what movements it performs · an example of use in badminton. 	
3	Explain the terms "abduction" and "adduction" and provide an example of their use in badminton.	
4	List 3 functions of the skeletal muscles of the body.	
5	List the four muscles that make up the quadriceps at front of the upper leg.	
6	What happens to the origin and insertion of the triceps muscle when the arm straightens to reach for a forehand overhead?	
7	Describe a second class level system and provide an example of a badminton movement that uses this lever.	
8	A player who naturally appears to withstand fatigue very well could have a high percentage of which type of muscle fibre?	
9	Describe with two badminton examples, the use of the stretch shortening cycle and what advantages using this gives.	
10	Which part of the digestive system is most responsible for absorption of foodstuffs into the body?	
11	Describe the differences in function of arteries, veins and capillaries.	
12	Describe typical rest/recovery intervals that may be used to train the lactic acid system.	

SELF-ASSESSMENT QUESTIONS

	Questions	Answers
13	Typical lung volumes for young males and females are?	
14	A player performs a split-step with feet close together and a very upright, "tall" body position. Describe the changes you would want to make using the terms "centre of gravity" and "base of support". Explain why you want to make these changes.	
15	Using badminton examples, explain the difference between speed, agility and quickness.	
16	List 3 adaptations to the cardiovascular system brought about by aerobic training.	
17	What can be measured to assess the intensity of aerobic training?	
18	List 2 internal and 3 external factors that can affect flexibility.	
19	Select two exercises that could be used to improve the strength of: <ul style="list-style-type: none"> · Quads, gluteals and hamstrings · Pectorals, triceps and deltoids 	

20. SUMMARY

There are 11 systems of the body, but six in particular play a highly significant part in badminton performance. These are:

- Skeletal
- Muscular
- Nervous
- Respiratory
- Cardiovascular
- Digestive

These systems have fairly large physical structures that are easily identifiable, such as the cardiovascular system which consists of the heart, blood vessels and blood itself. In addition to these structural systems, the body also has 3 energy systems, which use various chemical reactions to create energy for the body. These 3 systems are:

- The ATP-PC, which has few chemical reactions so can supply energy rapidly but only for a short duration. This system provides the bulk of the energy for maximal activity of up to 10 seconds duration
- The Lactic Acid system, which has more chemical reactions, can still supply a lot of energy relatively rapidly for up to 60 seconds
- The Aerobic system, which requires many chemical reactions and can supply vast quantities of energy but at a relatively slow rate.

All 3 energy systems are used in badminton.

Badminton requires players to have high fitness levels across a number of components. The components of fitness relevant to badminton include:

- Balance
- Co-ordination
- Quickness
- Speed
- Agility
- Endurance
- Flexibility
- Strength

These can all be trained by overloading the body so it adapts and becomes used to higher and higher levels of physical stress. Overload can be achieved by manipulating the frequency, intensity, time or type of activity. The developmental stage of the player and for mature players the phase within an annual training programme has a great influence on the frequency, intensity, time or type of activity being undertaken.

BADMINTON COACH EDUCATION
COACHES' MANUAL
LEVEL 2

MODULE 9
PHYSICAL - FITNESS TESTING

MODULE 9

PHYSICAL - FITNESS TESTING

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LEARNING OUTCOMES

By the end of this section coaches will be able to:

- Describe the benefits of using fitness testing for player development;
- Explain the concepts of validity and reliability and their significance for accurate fitness testing;
- Differentiate between qualitative and quantitative testing;
- Describe the test protocols for a variety of tests relevant to the sport of badminton.



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01. INTRODUCTION

FITNESS TESTING

Physical fitness testing can be used to:

- motivate players;
- assess players' commitment to a physical training programme;
- evaluate the effectiveness of a physical training programme;
- support selection decisions

For testing to be credible it must be both **valid** and **reliable**.

VALIDITY

For a test to be valid it must measure what it intends to measure. For example, Body Mass Index involves a measuring height and weight and is often classed as a body composition measure. In reality however the test does not measure what the body is composed of (e.g. bone, fat, muscle etc.) so it therefore is not valid. In contrast, vertical jump is a valid measure of leg power as a combination of strength and speed (strength x speed = power) is required to jump up.

RELIABILITY

Tests are reliable when the conditions in which the tests are conducted are consistent. Clear protocols which describe exactly how tests should be conducted, improve the reliability of test results provided those protocols are followed as closely as possible.

QUANTITATIVE AND QUALITATIVE RESULTS OF TESTS

Tests can also be quantitative or qualitative in nature.

QUANTITATIVE TESTING




Quantitative testing involves measuring precise quantities. For example, a player whose 6RM (repetition maximum) for squatting is 90kg is an example of testing quantitatively – there is a clear and precise measure of both the maximum number of lifts (6) and the weight (90kg) used when achieving those 6 lifts.

QUALITATIVE TESTING

Qualitative testing involves looking at the quality of a movement or skill. For example, a player may have a good shape/pattern when performing a broad jump (appropriate knee bend, dynamic arm swing etc.) but their broad jump score is low. A qualitative assessment may help us to understand that whilst the low broad jump score may be due to lack of explosiveness, it may also be because the jump is too shallow.

02. TESTING PROTOCOLS

VERTICAL JUMP HEIGHT

<p>Name of Test Vertical Jump Height</p>	
<p>What it Measures Leg power</p>	
<p>Equipment Needed</p> <ul style="list-style-type: none"> • A wall that is free of marks and obstructions • Ground chalk • Measuring tape or long ruler (1m) • Sticky tape 	
<p>Set Up for the Test</p> <ul style="list-style-type: none"> • Place a piece of sticky tape 30cm from the wall 	
<p>Warming Up</p> <ul style="list-style-type: none"> • A gentle 3 -5 minute aerobic warm-up and dynamic stretches involving progressive squats and arm swings is recommended. • Three practice attempts without chalk should be allowed 	
<p>The Test Protocol</p> <ul style="list-style-type: none"> • Chalk the fingertips of the hand you intend to reach up with when jumping. • Stand sideways on to the wall, as close to the wall as possible (with one shoulder against the wall. Both feet should be between the wall and the sticky tape that was placed on the floor. • Reach up the wall as high as possible, keeping both feet flat on the ground and make a chalk mark on the wall at the highest point you can reach (this is "mark 1"). • Re-chalk the fingertips if necessary. • Stand sideways to the wall, with the foot nearest the wall just outside the 30cm mark on the floor. • Using a knee bend and backward arm swing, bend down then immediately jump in the air, reaching up and tapping the wall with the chalked hand at the peak of the jump (this is "mark 2"). • Measure the vertical distance between marks 1 and 2. • Repeat 3 times, with at least 1 minute between attempts. • Record the highest jump. 	  
<p>Alternatives</p> <ul style="list-style-type: none"> • A measuring scale could be placed on the wall and the difference between the starting point reached (mark 1) and the total jump height achieved (mark 2). • A plyometric version, where the same protocol is followed but the player jumps down off a 30cm bench then jumps in the air. This should be only used with physically fit / well-conditioned adult players. 	

STANDING BROAD JUMP

Name of Test
Standing Broad Jump

What it Measures
Leg Power

Equipment Needed

- Sticky tape
- Extendable measuring tape

Set Up for the Test

- Place a 50cm strip of sticky tape securely on the floor.
- Starting from the 50cm strip of tape, extend the measuring tape to a distance of 5m. The start of the tape should be level with the back edge of the sticky tape.
- Secure the extendable measuring tape at the 1m and the 5m marks using additional small stripes of sticky tape.

**Warming Up**

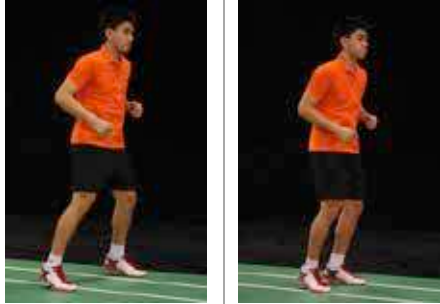
- A gentle 3 -5 minute aerobic warm-up and dynamic stretches involving progressive squats and arm swings is recommended.
- Three practice attempts at the jump should be allowed.

The Test Protocol

- The player stands with both feet behind the 50cm starting strip of tape.
- Bending the knees and swinging the arms backwards, the player swings the arms forwards and extends the knees, jumping forwards as far as possible as they do so.
- The tester watches carefully the landing, marking with a small piece of tape, the point where the heel of the rearmost foot lands.
- Players are allowed one further step forwards to regain their balance on landing.
- Players are allowed three attempts, with at least one minute between attempts
- The best attempt is recorded



FAST FEET

Name of Test Fast Feet	
What it Measures Foot quickness	
Equipment Needed <ul style="list-style-type: none"> • Stopwatch • Badminton court 	
Set Up for the Test None	
Warming Up <ul style="list-style-type: none"> • A gentle 3 -5 minute aerobic warm-up and dynamic stretches including side-to-side leg swings should be completed. • Three practice attempts at the foot work should be allowed 	
The Test Protocol <ul style="list-style-type: none"> • Player stands with feet either side of the side badminton court tramlines. • On the shout of “go” the stopwatch is started. • The player moves their feet rapidly together so they land inside the tramlines, then their feet move rapidly back to their starting position outside the tramlines. This is repeated as quickly as possible five times, finishing with the player’s feet outside the tramlines, when the stopwatch is stopped. • Players are allowed three attempts, with at least one minute between attempts. • The best attempt is recorded. 	

COOPER TEST

<p>Name of Test The Cooper Test</p>
<p>What it Measures Aerobic endurance</p>
<p>Equipment Needed</p> <ul style="list-style-type: none"> · 400 metre track · Stopwatch · Measuring tape · Whistle
<p>Set Up for the Test None</p>
<p>Warming Up 5-10 minute light jog and dynamic stretches</p>
<p>The Test Protocol</p> <ul style="list-style-type: none"> · A player stand at the start line and on command begins to run. The stopwatch is started at the same time. · The player runs as far as possible in 12 minutes. · After 12 minutes the whistle is blown and the player stops immediately, jogging on the spot to cool down. · Distance run is measured (to nearest 10m). · Distance is compared to norm tables (below).

COOPER TEST





Male					
Age	Excellent	Above Average	Average	Below Average	Poor
13-14	>2700m	2400-2700m	2200-2399m	2100-2199m	<2100m
15-16	>2800m	2500-2800m	2300-2499m	2200-2299m	<2200m
17-19	>3000m	2700-3000m	2500-2699m	2300-2499m	<2300m
20-29	>2800m	2400-2800m	2200-2399m	1600-2199m	<1600m
30-39	>2700m	2300-2700m	1900-2299m	1500-1999m	<1500m
40-49	>2500m	2100-2500m	1700-2099m	1400-1699m	<1400m
>50	>2400m	2000-2400m	1600-1999m	1300-1599m	<1300m

Female					
Age	Excellent	Above Average	Average	Below Average	Poor
13-14	>2000m	1900-2000m	1600-1899m	1500-1599m	<1500m
15-16	>2100m	2000-2100m	1700-1999m	1600-1699m	<1600m
17-20	>2300m	2100-2300m	1800-2099m	1700-1799m	<1700m
20-29	>2700m	2200-2700m	1800-2199m	1500-1799m	<1500m
30-39	>2500m	2000-2500m	1700-1999m	1400-1699m	<1400m
40-49	>2300m	1900-2300m	1500-1899m	1200-1499m	<1200m
>50	>2200m	1700-2200m	1400-1699m	1100-1399m	<1100m

MULTI-STAGE FITNESS TEST

<p>Name of Test The Multi-Stage Fitness Test</p>
<p>What it Measures Aerobic endurance</p>
<p>Equipment Needed</p> <ul style="list-style-type: none"> • Long tape measure • 20 metre flat running area • Cones • Multi-stage Fitness Test CD and CD player or Multi-Stage Fitness Test software and means to play this: e.g. laptop.
<p>Set Up for the Test</p> <ul style="list-style-type: none"> • Measure out a 20 metre “track” using cones • Set up Multi-Stage Test so it is ready to play
<p>Warming Up</p> <ul style="list-style-type: none"> • Due to the progressive nature of the test, only a short aerobic warm-up is required.
<p>The Test Protocol</p> <ul style="list-style-type: none"> • The player or players stand at one end of the 20m track. • When instructed by the soundtrack, the players run backwards and forwards between the cones, pacing themselves so they turn in time with the beep. • Players keep running in time with the bleeps until they can no longer keep up. • The last recorded bleep where the player kept up is recorded as that player’s score. The Level (e.g. level 11) and the number of runs completed at that level (e.g. 4) should be recorded. • Test result (level and number of runs at that level) should be converted to an estimated VO₂ max score.
<p>Notes Test results can be compared using norm tables which are downloadable from various internet sites.</p>

LATERAL SPEED TEST

<p>Name of Test Lateral Speed Test</p>	
<p>What it Measures Lateral speed</p>	
<p>Equipment Needed</p> <ul style="list-style-type: none"> • Stopwatch • Badminton court • Six shuttles • Racket 	
<p>Set Up for the Test Six shuttles are placed about 20cm apart on the outside tramlines (three on one side, three on the other).</p>	
<p>Warming Up</p> <ul style="list-style-type: none"> • A gentle 5-10 minute aerobic warm-up and dynamic stretches should be performed. • A lower speed rehearsal of the test should also be performed. 	
<p>The Test Protocol</p> <ul style="list-style-type: none"> • A player stands facing the net, with feet either side of the centre line. • On the shout of "Go" the stopwatch is started and the player moves from side to side, touching each shuttle in turn with their racket. • The player must stay facing the net throughout the test, other than when turning to reach on the backhand side. • The test is completed when each shuttle has been touched by the player's racket and the player has crossed the centre line, when the timer is stopped. • Three attempts per player are allowed, with at least 90 seconds between attempts. • The lowest time is recorded. 	   

FRONT TO BACK SPEED TEST

Name of Test

Front to Back Speed Test

What it Measures

Forwards and backwards speed

Equipment Needed

- Stopwatch
- Badminton court
- Racket

Warming Up

- A gentle 5-10 minute aerobic warm-up and dynamic stretches should be performed.
- A lower speed rehearsal of the test should also be performed.

The Test Protocol

- Carrying rackets, players stand with two feet in the rearcourt tramlines.
- On the command of "go" the stopwatch is started and the players run forwards and backwards three times, placing one foot in the forecourt and two feet in the rear court.
- Three attempts of the test are allowed, with at least three minutes between each attempt.
- The fastest time is recorded for each player.

SQUAT TEST

Name of Test

6RM Squat

Note: This test should only be used with adults who have been trained with free weights and have a sound squatting technique.

What it Measures

Leg strength

Equipment Needed

- Barbell and weights
- Squatting rack or Smith Machine
- Spotters (assistants to control weights)

Set Up for the Test

Weights are placed evenly on a barbell which is balanced on a squatting rack or enclosed within a Smith Machine. The weights are secured in place using securing collars.

Warming Up

A gentle 3 -5 minute aerobic warm-up and dynamic stretches should be performed, including squatting motions using a light weight or just the barbell.

The Test Protocol

- The players bends underneath the bar and grasps the bar:
 - with an underhand grip
 - with hands wide apart
 - bar behind the head, resting on the shoulders
- Spotter move in place at either end of the bar, ready to take the bar if necessary.
- Player says “my bar” and lifts the bar – spotters say “your bar” to acknowledge the lifter has control.
- Player moves backwards from the rack with the barbell, with the spotters moving back at the same time.
- Player squats down until the upper legs are parallel to the floor, then returns to a fully upright position.
- Spotters move up and down with hands close to but not touching the bar
- Movement is repeated as many times as possible, until the player reaches a point where they:
 - fail to complete a lift (where the weight is taken by the spotters).
 - acknowledge that completing the next lift is unlikely, when they return the bar to the squatting rack.
- The test is repeated with five minute rest intervals between attempts, until the player reaches a point where they are unable to complete more than six repetitions.
- Spotters should be prepared at all times to take the barbell if required.
- Note that:
 - a Smith Machine is safer, but the weights lifted are likely to be heavier as there is less stabilising work for the player. A note should be made whether a squatting rack or a Smith Machine was used in order to help consistency across tests
 - initially there will be some experimentation to find weights that are approaching the players 6RM. To begin with, be cautious and build slowly to find the correct weight.



03. FUNCTIONAL MOVEMENT SCREENING

Traditionally range of movement would be assessed by flexibility tests, but there have been several reasons to question this approach, most notably:


- Sport is largely about movement, rather than the ability to hold static positions.
- Flexibility test results do not give a good indication of the interaction of different muscle groups which have to work together in order to perform sporting movements efficiently and safely.

An alternative approach is to use functional movement screening, which involves assessing the quality of simple underpinning movements to give an indication of:




- the mobility (range of movement around a joint or series of joints);
- the efficiency of muscles responsible for stabilising a particular movement;
- strength imbalances in different muscle groups;
- strength imbalances from the left and right of the body.

The intention of this section is to introduce functional movement screening, raising the coach's awareness of this type of training and how it might benefit the players those coaches work with. However it is recommended that, unless the coach is trained in physiotherapy, strength and conditioning etc. then that coach works with a specialist to administer the test; evaluate the movements produced and recommend the appropriate exercises resulting from the test results.


STRAIGHT LEG RAISE

<p>Name of Test Straight Leg Raise</p>	
<p>What it Measures: Stride flexibility, performed with a stable pelvis</p>	
<p>Equipment Needed: One net post</p>	
<p>Set Up for the Test None</p>	
<p>Warming Up: A 3 -5 minutes aerobic warm-up is recommended.</p>	
<p>The Test Protocol</p> <ul style="list-style-type: none"> • The player lies on their back with the front of the net post touching the player's thigh at a point midway between the hip joint and the centre of the knee joint. • The player's arms should be out to the sides at shoulder height, with palms up. • The player raises the leg closest to the post, keeping the leg straight as it does so. The foot of the raised leg should remain neutral (i.e. foot at 90 degrees to the lower leg). • Other leg should remain straight, still and on the ground. • Pelvis remains still. • Repeat the test 3 times slowly and under control. 	
<p>Assessment</p> <ul style="list-style-type: none"> • The test is deemed to be successful if: <ul style="list-style-type: none"> ○ the raised leg is kept straight; ○ the raised leg is kept still; ○ the ankle bone of raised foot passes beyond the net post; ○ foot of raised leg remains neutral; ○ the pelvis remains still (doesn't tilt or twist) • If unsuccessful, exercises to improve this could include: <ul style="list-style-type: none"> ○ calf stretches; ○ hamstring stretches; ○ gluteal stretches; ○ core stability work (to stabilise the pelvis); ○ keep redoing the test 	

SEATED TRUNK ROTATION

Name of Test Seated Rotation			
What it Measures: Trunk rotation range of movement			
Equipment Needed: <ul style="list-style-type: none"> • One net post • One lightweight pole (1.5m) 			
Set Up for the Test None			
Warming Up: A 3 - 5 aerobic warm-up is recommended			
The Test Protocol <ul style="list-style-type: none"> • Sit upright; legs crossed with one foot each side of the post. • Hold pole level across the chest with arms crossed. Pole rests on shoulders and collar bone. • Keeping the back straight, rotate under control left then right. 			
Assessment <ul style="list-style-type: none"> • The test is deemed to be successful if: <ul style="list-style-type: none"> ○ the pole touches the badminton post when rotating to both the left and right. ○ pole is in contact with chest and remains level. ○ trunk maintained in an upright position. • If unsuccessful, exercises to improve this could include: <ul style="list-style-type: none"> ○ keep redoing the test with good form. 			

INLINE LUNGE

<p>Name of Test Inline Lunge</p>	
<p>What it Measures</p> <ul style="list-style-type: none"> • Hip mobility and stability • Quadriceps flexibility • Ankle and knee stability 	
<p>Equipment Needed</p> <ul style="list-style-type: none"> • Masking tape <p>One lightweight pole (1.5m)</p>	
<p>Set Up for the Test</p> <ul style="list-style-type: none"> • Measure a piece of masking tape, starting from the floor and finishing at the point of insertion of the patella tendon (just below the knee cap). <p>Place the tape across a court line (e.g. the centre line of the court) so the centre of the tape is in the middle of the line it crosses.</p>	
<p>Warming Up</p> <p>A 3-5 aerobic warm-up is recommended.</p>	
<p>The Test Protocol</p> <ul style="list-style-type: none"> • Place lightweight rod behind the head and across the shoulders, palm forwards with a wide grip. • Place the toes of the rear foot at one end of the masking tape, with the heel of the front foot placed at the other end of the tape. • Lower the back knee towards the ground, keeping the front heel flat. <p>Keep both feet pointing forwards and repeat movement under control, three times each side.</p>	
<p>Assessment</p> <ul style="list-style-type: none"> • The test is deemed to be successful if: <ul style="list-style-type: none"> ○ minor upper body movement; ○ feet remain in line with the tape; ○ the back knee is touching the heel of the back foot. ○ rod not crossing the centre line, tipping or rotating. • If unsuccessful, exercises to improve this could include: <ul style="list-style-type: none"> ○ balance work for ankle stability; ○ strength and flexibility of: <ul style="list-style-type: none"> § quadriceps; § hamstrings; § gluteals. ○ flexibility of hip flexors; ○ keep redoing the test with good form. • Focus on helping both sides of the body to be able to perform the exercise efficiently. 	

HURDLE STEP

Name of Test

Hurdle step

What it Measures:

Stability of hips, knees and ankles

Equipment Needed:

- Masking tape
- One lightweight pole (1.5m)
- Two net posts

Set Up for the Test

Place a piece of masking tape (1m) between two net posts at the same height of the patella tendon point of insertion (just below knee-cap) of the player.

Warming Up:

A 3 -5 aerobic warm-up is recommended.


The Test Protocol

- Stand with feet together, with a lightweight rod behind the head and across the shoulders, palm forwards with a wide grip. Toes should be just below the tape.
- Step slowly over the tape with one foot, touching the heel on that foot lightly on the ground on the other side of the tape, before slowly returning to the start.
- Repeat the exercise on both sides three times.

**Assessment**

- The test is deemed to be successful if:
 - hips, knees and ankles stay in line, pointing forwards;
 - lightweight rod remains level;
 - minimal spinal movement (e.g. no tilting forwards and backwards or twisting).
- If unsuccessful, exercises to improve this could include:
 - Ankle balancing (e.g. wobble board, balance on one foot etc.);
 - Gluteal, quadriceps and hamstring strength and flexibility;
 - Hip flexor flexibility;
 - Core stability (stabilise pelvis).

SQUAT TEST

Name of Test Squat	
What it Measures: Stability of hips, knees and ankles	
Equipment Needed: <ul style="list-style-type: none"> · Masking tape · One lightweight pole (1.5m) · Wall 	
Set Up for the Test Place a one metre piece of masking tape one foot length from the wall.	
Warming Up: A 3 -5 aerobic warm-up is recommended.	
The Test Protocol <ul style="list-style-type: none"> · Facing the wall, stand with feet shoulder width apart, feet pointing forwards. · Lightweight rod held behind the head and across the shoulders, palm forwards with a wide grip. · Lower into squat, going as far down as possible. 	
Assessment <ul style="list-style-type: none"> · The test is deemed to be successful if: <ul style="list-style-type: none"> ○ heels remain flat. ○ feet parallel and remain stationary on the flight (no sliding/rotating); ○ hips should go below knees; ○ no part of body or rod should touch either the net post or wall; ○ the rod is kept level and not twisting. · If unsuccessful, exercises to improve this could include: <ul style="list-style-type: none"> ○ balance work for ankle stability; ○ strength and flexibility of: <ul style="list-style-type: none"> § quadriceps; § hamstrings; § gluteals; § calves ○ latissimus dorsi and hip flexor flexibility; ○ keep redoing the test with good form. 	

04. SELF-ASSESSMENT QUESTIONS

	Questions	Answers
1	In terms of fitness testing explain the difference between validity and reliability.	
2	With examples, explain the difference between quantitative and qualitative results of testing.	
3	Briefly describe a test you would use to measure leg strength.	
4	Briefly describe a test you would use to measure aerobic endurance.	
5	List three things you would see in a successful in-line lunge.	
6	You are training senior international player. In relation to different phases of an annual training cycle, explain when you would physically test that player. Justify your answer.	

BADMINTON COACH EDUCATION
COACHES' MANUAL
LEVEL 2

MODULE 10
PERFORMANCE FACTOR 5
SPORT PSYCHOLOGY

MODULE 10

PERFORMANCE FACTOR 5 - SPORT PSYCHOLOGY

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LEARNING OUTCOMES

By the end of this module, coaches will be able to:

- Define Sports Psychology;
- Appreciate the boundaries for different applications of sports psychology;
- Describe psychological methods that can be applied coaching under the headings of:
 1. cohesion
 2. control
 3. concentration
 4. confidence
 5. commitment

01. INTRODUCTION

Sports psychology can be defined as:

"the mental processes and behaviours of individuals and groups within sport".

Sports psychology has a huge influence over sporting performance, affecting technique, tactics, physical conditioning and training. Coaches should use sports psychology to:

- help people enjoy the sporting experience and use it to enhance their quality of life;
- improve performance.

Practitioners within sports psychology can be divided into the three areas of clinical, coaching and research. These areas are represented in the diagram below.



- **Clinical Sports Psychology** is practiced by highly trained people with high levels of academic qualifications and experience in sports psychology. Skills they will possess include counseling skills and they are usually licensed by recognised controlling professional bodies. They are usually involved in work where players need support to resolve disorders (e.g. emotional, personality etc.) that inhibit progress within their sport. Such work is not within the job scope of the sports coach.
- **Research Sports Psychology** involves the use research tools such as observation, questionnaires, interviews, experiments etc. to increase the understanding of sports psychology concepts. Often these researchers work with academic establishments such as universities. Coaches sometimes become involved in this type of work, but often to work with researchers rather than to lead the process.
- **Coaching Sports Psychology** involves coaches applying basic psychological principles though their normal coaching practice. Their knowledge of sports psychology may have been gained from part of an educational course, within a coaching award or by their own private study.

Coaches are often hesitant about sports psychology, being much more comfortable in the areas of technical, tactical and physical development. However, all coaches use psychology to differing degrees within their coaching practice. The following guidelines might prove useful:

- Only use sports psychological approaches that are relatively straightforward and which you feel comfortable with. For example, most coaches feel comfortable with the use of goal setting in their coaching.
- Integrate the use of sports psychology within your normal coaching practice wherever possible.
- Avoid going into the area of clinical sports psychology. If you work with players that require help of this nature, seek qualified assistance.
- Avoid going into the world of research sport psychology unless you have the required qualifications and/or experience or you are working alongside qualified / experienced researchers.

KEY AREAS THAT MAKE UP SPORTS PSYCHOLOGY

The diagram below lists different psychological concepts under the headings of **control**, **confidence**, **commitment** and **cohesion**. Note that many of the concepts overlap and interact with each other.



02. COMMITMENT

Commitment can be defined as:

“the duration and intensity of engagement in a particular activity”.

So a player who trains for and plays badminton 25 hours a week with great intensity could be described as displaying a high level of commitment to the sport. Closely linked to commitment is the concept of motivation.

Motivation can be defined as:

“the process that elicits, controls, and sustains certain behaviors”.

In many cases the concepts of commitment and motivation can be used interchangeably i.e. a committed player is a motivated player.

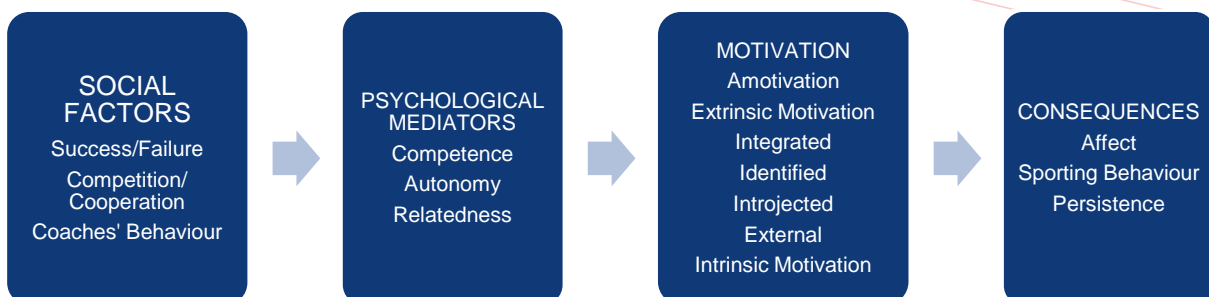
Before looking specifically at practical ways to improve commitment/motivation, it is useful to consider some theories that underpin work in this area.

SELF-DETERMINATION THEORY

Edward Deci and Richard Ryan have been at the forefront of developing self-determination theory (<http://selfdeterminationtheory.org>), which is an overall theory that has been used to study personality, human needs and motivation. Self-determination can be defined as:

“the freedom to make decision and perform actions based on your internal free-will, rather than as a result of external influences”.

Based on the work of Deci and Ryan, Vallerand and Losier (1999) have devised a useful model that applies self-determination theory to the sporting arena. This model is shown below.



This model can be used to:

- analyse players' motivations to participate;
- help coaches understand how they can best motivate their players.

SOCIAL FACTORS

The first stage of the model looks at the social factors, specifically those experienced in the sporting environment, which strongly influence motivation.

SUCCESS

If the sporting experience helps the participant to experience success, then motivation to participate is likely to be stronger. Note that success need not simply be about winning, but could also involve improving.



COMPETITION/COOPERATION

Sport usually involves elements of competition or co-operation. In badminton you need co-operative practice partners; opponents to compete against and doubles partners to play with.



COACH'S BEHAVIOUR

A coach's behaviour can also have a strong influence over a person's motivation. Broadly speaking, coaches tend to operate somewhere between being autocratic (controlling the player) and democratic (where control is given predominantly to the player).



PSYCHOLOGICAL MEDIATORS

The social factors listed above have a strong influence on the beliefs that players have about themselves (the psychological mediators). Players generally have basic needs that involve appearing as:

- **Competent** (e.g. that they can perform a task to a level they are confident about)



- **Autonomous** (i.e. that they have control over what they are participating in)

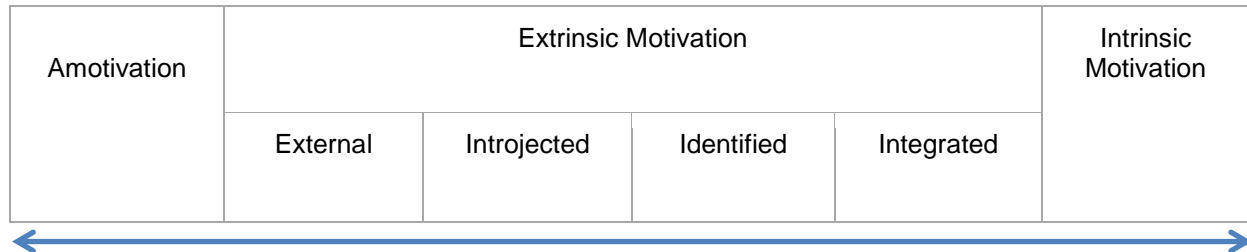


- **Related** (i.e. to be looked after by others and have others look after them)



03. MOTIVATION

Social factors (success/failure, competition/cooperation and coaches behaviour) and their influence upon the beliefs that players hold about themselves (competence, autonomy and relatedness) determine the type of motivation that occurs. Motivation can be split into three types, which can be organised on a continuum as shown below



- **Amotivation** is in actual fact, no motivation. A child who is forced to play badminton when they have no interest in sport is amotivated.
- **Extrinsic Motivation** falls between amotivation and intrinsic motivation. It is different to intrinsic motivation in that the drivers for extrinsic motivation tend to come from external sources. There are however different types of extrinsic motivation, which gradually involve a shift towards a more intrinsic approach.
 - **Externally Controlled Motivation** is where sports participation is driven in order to obtain an external prize, such as a medal or ranking points. Alternatively, external control can involve trying to avoid a penalty or punishment, for example completing 50 dropshots without making an error in order to avoid a penalty of 10 laps of the sports hall.
 - **Introjected Control** is a type of external motivation that has become partly internalized, such as competing or training in order to please parents or coaches. Introjected control often involves a feeling of obligation – participation is expected.
 - **Identified Control** is a form of external motivation where the player recognises that participating in a particular activity, although not of interest in itself, is necessary in order to achieve another goal that is intrinsically motivating to them. An example would be a player who performs shoulder rotation exercises in order to reduce the risk of injury and improve overhead power. The shoulder rotation exercises are not intrinsically motivating in themselves, but the reduced injury risk and overhead hitting power are intrinsically motivating.
 - **Integrated Control** is a form of external motivation where the drivers have become so internalized by the player that often there appears to be little difference between this and intrinsic motivation. For example, a player may be forced to stretch for 30 minutes each day by a controlling coach. The player accepts the control, acknowledging internally the value of the activity and engaging in that activity freely without reminders from the coach. Their intrinsic enjoyment of the activity may however, remain questionable.

Intrinsic Motivation means that the drive to participate comes from within the player themselves. Typical types of intrinsic motivation would include:

- the process of acquiring new knowledge, for example about shot placement when attacking in doubles.
- the outcome of mastering new skills, for example the technique of a backhand clear.
- experiencing the physical excitement of the sporting experience, for example during an extended rally.

CONSEQUENCES

The consequences of different types of motivation include:

- affect, meaning experiencing feelings and emotions. Note these feelings and emotions could be positive or negative.
- persistence, which effectively is the same as displaying commitment to an activity.
- sporting behavior

PRACTICAL APPLICATIONS OF THE MODEL

It is a generally held view that long-term participation in sport is more likely to occur when participants are intrinsically motivated. This means they play the sport because it is an enjoyable experience in itself and helps fulfil their internal needs. Coaches can help encourage intrinsic motivation by:

- adopting a more democratic rather than autocratic approach, which gives participants a choice in the content of training sessions. Problem-solving approaches to activities can also help. Apply the model; such an approach enhances the player's feeling of autonomy.
- advising players on appropriate practices which help them to experience success. If players experience success, for example learning grip changes by hitting a balloon which travels more slowly, then feelings of competence are improved.
- including activities which promote co-operation (supporting each other during training and competition) as this helps develop a feeling of relatedness to others in the group. Whilst competition is an important part of sport and should be included, an over-emphasis on winning and superiority over others can result in a shift from intrinsic to extrinsic motivation. In this instance you are no longer in control (you cannot control winning and losing) and feelings of autonomy and intrinsic motivation can be undermined.
- using positive feedback to enhance feelings of competence. Care should be taken however that positive feedback:
 - is not so incessant that its value is diminished ("death by encouragement")
 - becomes the sole reason for participation (i.e. "I play and train to please my coach")
- encouraging players to work on goals that involve mastering new skills, rather than on outcomes such as winning, ranking points, selection etc.
- encouraging parents to support their children in a manner consistent with that of the coach, focusing on enjoyment, learning new skills and working with others.

THE INTERACTION OF EXTRINSIC AND INTRINSIC MOTIVATION

It is likely that most people are motivated to participate by a combination of both **extrinsic** and **intrinsic** factors, rather than exclusively one or the other. It is interesting therefore to look at the possible interaction between **intrinsic** and **extrinsic** factors.

An over-emphasis on **extrinsic** motivators (e.g. cash payments, ranking points, medals, selection, pleasing parents/coaches etc.) could result in a decrease in **intrinsic** motivation if the player starts to see these external rewards as the prime motivators for their participation. This occurs because the external rewards are largely beyond the control of the player, so feelings of autonomy (being in control of your own destiny) are diminished. Ultimately if the player is unable to keep achieving the external rewards, their reason for participation will be lost and drop-out may occur

It is possible however for **extrinsic** factors to actually enhance **intrinsic** motivation. For example, a child may receive a certificate listing the skills they have performed successfully. The external reward of a certificate effectively gives positive feedback which enhances the child's feelings of competence. This in turn reinforces the child's **intrinsic** motivation for the sport.

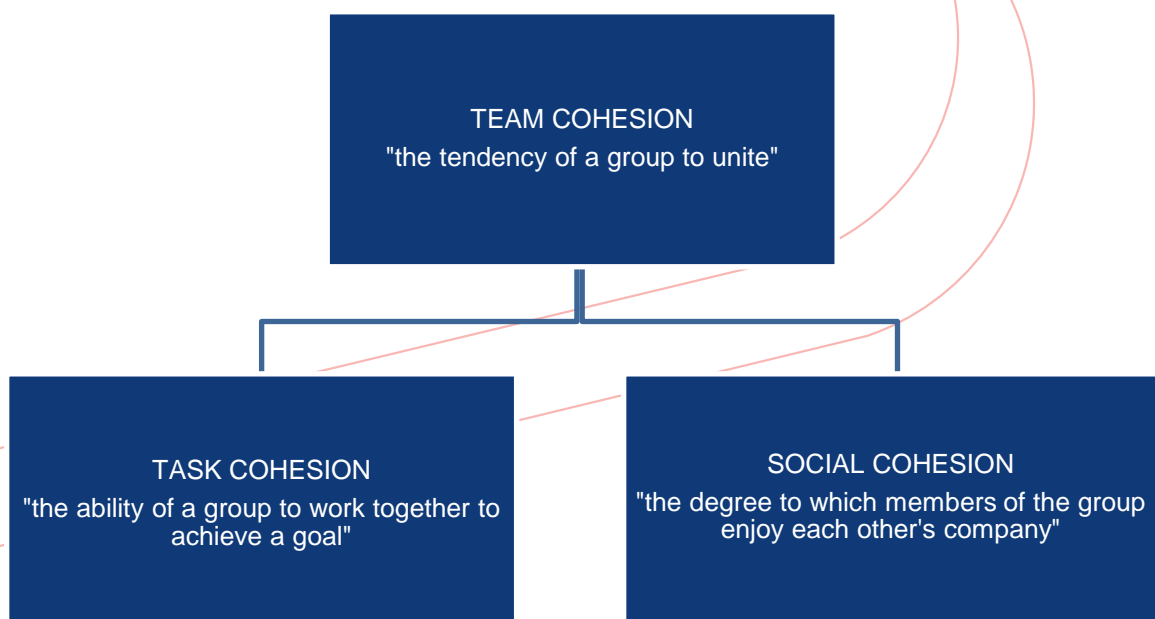
04. COHESION

Cohesion can be defined as *"the tendency to unite"*. Team cohesion therefore is *"the tendency of a group to unite"*, usually in pursuit of a common goal.



In the sporting context, it is useful to split team **cohesion** down into two distinct concepts:

- **Task Cohesion**, which is concerned with the ability of a group to work together to achieve a goal.
- **Social Cohesion**, which is concerned with the degree to which members of the group enjoy each other's company.



When considering team cohesion, it is also important to consider the nature the sport being considered.

INTERACTIVE SPORTS

Interactive Sports are team sports that require members of the team to interact with each other on the field of play or court at the same time. Doubles is therefore clearly an interactive sport.

COACTIVE SPORTS

Coactive Sports are often individual sports that have team formats "imposed" on them. For example, a badminton team competition involving five singles players in one team playing against five singles players in another team would be a clear example of badminton as a coactive sport, with the team outcome not being dependent on the team members interacting on court.

Badminton is therefore a relatively complex mix. It can be:

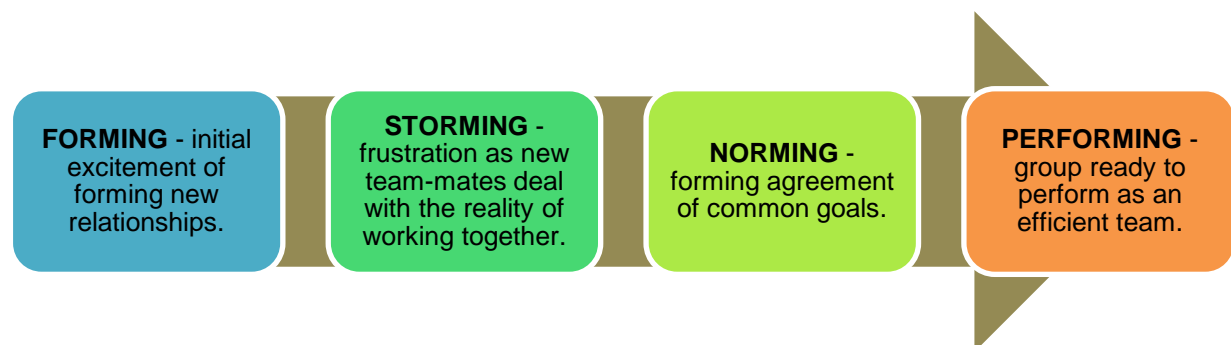
- an individual sport.
- an interactive team sport (in doubles events).
- a coactive team sport (in a singles team event).
- a combination of interactive and coactive team sports (with singles, doubles and mixed results deciding the outcome).

Taken as a whole, much research and anecdotal evidence has supported the idea that the stronger the level of team cohesion, the greater the level of performance. However:

- the link between task cohesion and overall performance is stronger than between social cohesion and overall performance. This means that whilst liking your team-mates can be useful for team cohesion, more important is that the team has shared goals that it is working towards.
- the link between team cohesion and overall performance is stronger in interactive sports than coactive sports.

THE STAGES OF TEAM DEVELOPMENT

Tuckman (1965) provides an early but enduring model which describes the four stages that a group of people must travel through in order to evolve into an effective team. These stages are represented diagrammatically below:



Reference:

Tuckman, B.W. (1965). *Developmental sequences in small groups*. Psychological Bulletin, 63, 384-399.

DEVELOPING TEAM COHESION

In order to help develop team cohesion, direct or indirect approaches can be used. Direct approaches involve sports psychologists working with groups to develop team cohesion, whereas indirect approaches involve sports psychologists training coaches, who then work with the groups to develop team cohesion.

A suggested sequence of stages that might be undertaken to create and maintain team cohesion might include:

1. Establishing the benefits of working cohesively as a team.
2. Identifying the components of good teamwork (e.g. open communication, trust, common identity, common goals, clarification of roles, shared practices, shared sacrifices etc.).
3. Agreeing the team's approach in the areas identified in stage 2 (i.e. in stage 2 common goals are identified as a necessary component of effective teams, in stage 3 the specific goals for the team are created).
4. Managing the team according to the agreed approach.
5. Reviewing the approach (for example at the end of a team event) – what actually happened.
6. Evaluating what happened against goals set.



PHOTO CREDIT: BWF/BADMINTONPHOTO

05. CONCENTRATION



Concentration can be defined as:

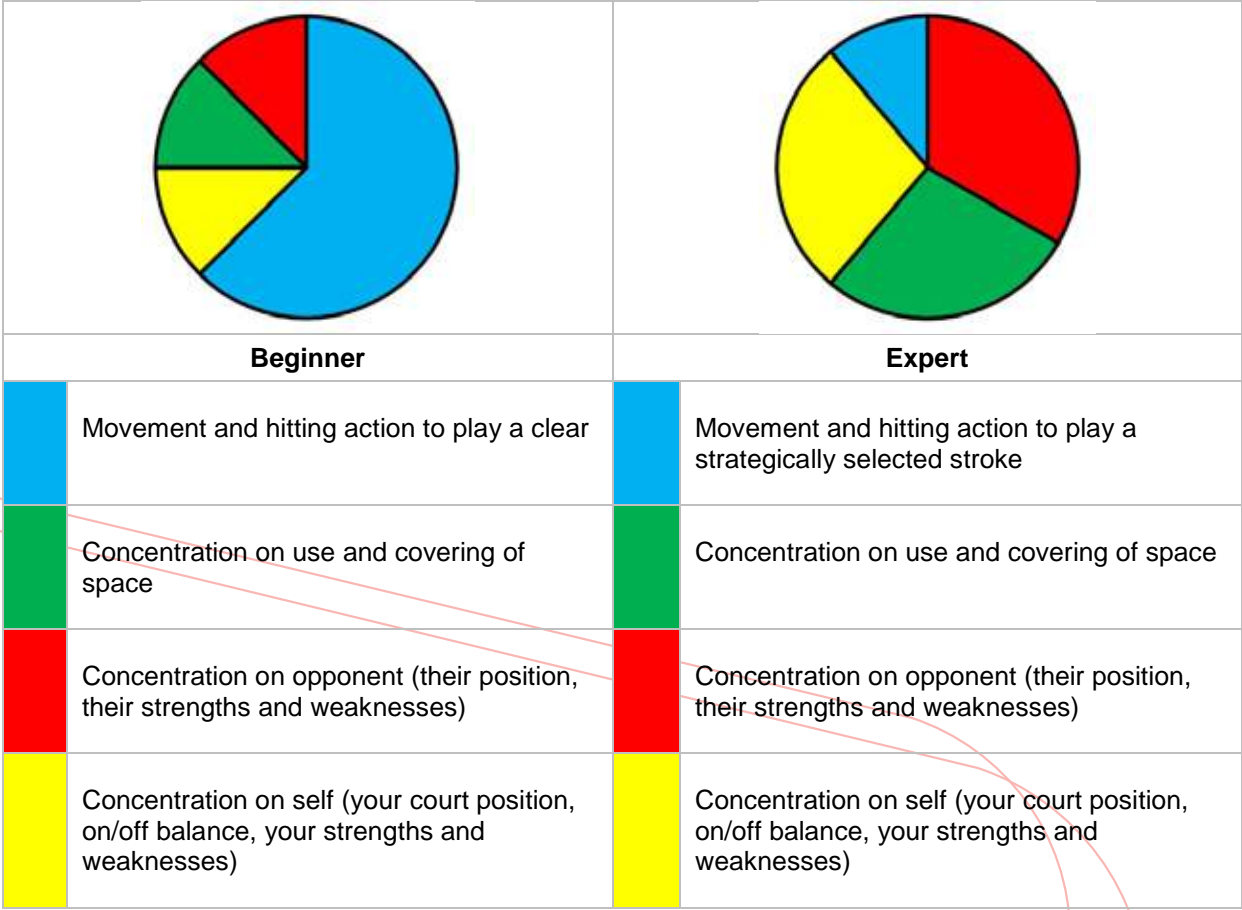
“the process of applying attention”.

So effective **concentration** would involve players directing attention in areas that will enhance performance, whereas **ineffective concentration** will mean attention is given to areas that reduce performance levels. This is demonstrated visually using the diagrams below, which illustrates graphically the difference between two players concentrating equally during a match.

Player 1		Player 2	
Relevant Factors	<ul style="list-style-type: none"> Slows down between rallies Plays on narrow court (i.e. not too close to side lines) Where possible use net more to gain lift 	Relevant Factors	<ul style="list-style-type: none"> Serve low Move base forwards slightly
Possible Relevant Factors	<ul style="list-style-type: none"> Opponent's coach giving a lot of information to opponent 	Possible Relevant Factors	<ul style="list-style-type: none"> Opponent's coach giving a lot of information to opponent
Irrelevant Factors	<ul style="list-style-type: none"> Noise from crowd 	Irrelevant Factors	<ul style="list-style-type: none"> Noise from crowd Fist clenching of opponent Umpiring error earlier in match “Lucky net-cords” from opponent

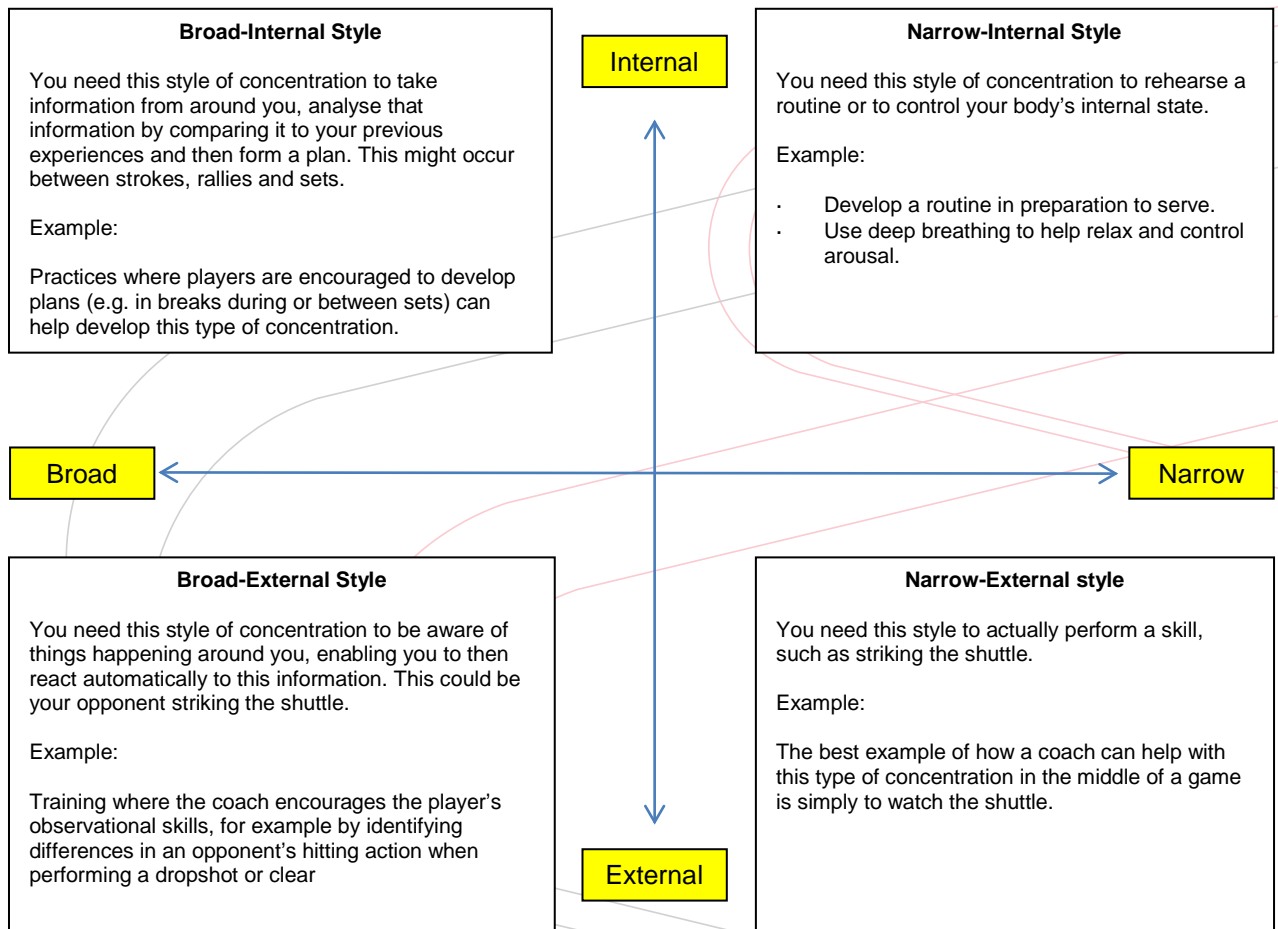
The above diagram illustrates that what you concentrate on (i.e. where you put your attention) is equally, if not more important than how much you concentrate.

Where **concentration** is being directed also depends on the level of skill of the players involved. This is demonstrated graphically with the diagram below. The beginner player has to give far more attention to the technicalities of moving and striking the shuttle, whereas the expert can focus on this and give more **concentration** to tactical aspects such as spatial, self and opponent awareness



Nideffer (1976) devised a theoretical framework which is frequently applied to the study of concentration and where to put attention. This theoretical framework is shown below and supports the concept that there are four types of concentration, varying from Broad to Narrow and External to Internal.

DIFFERENT CONCENTRATION STYLES



From the above model we can see that badminton requires a player to adopt different styles of **concentration** in order to support successful performance.

FACTORS THAT AFFECT CONCENTRATION AND HOW TO AVOID THEM

Concentration can be affected by both internal and external factors. The factors and methods that can be used to control them are provided in the table below.

	Factors that Affect Concentration	Methods to Manage This
Internal factors	Fatigue can affect your concentration as you begin to worry about your physical state.	Make sure you are fit to compete!
	Lack of energy caused by poor nutrition and/or dehydration can both affect concentration.	Make sure you are well prepared nutritionally (see the nutrition section for help with this).
	Over arousal can narrow your attention and cause you to miss information that would help performance.	Work to achieve a level of arousal that works for you, allowing you to focus on relevant information but block out irrelevant information.
	Under-arousal can allow your attention to be too broad, causing distractions from irrelevant queues.	A “do your best” mentality, relaxation techniques (e.g. deep breathing), positive self-talk and the use of familiar routines can all help to control arousal levels and improve concentration. See the section on “control” for more detail of these methods.
	Negative self-talk (e.g. “you’re making too many mistakes!!!) will affect concentration by increasing arousal and narrowing attention, causing you to miss information that could help performance.	Develop positive self-talk methods. See the section on “control” for more detail of these methods.
	Think about past events (e.g. mistakes, umpiring decisions).	Develop a “here and now” mentality which acknowledges that all you can really control is the present.
	Thinking about possible future consequences (e.g. I’m going to lose).	
External Factors	Auditory factors that affect concentration include talking, shouting, mobile phones, public address announcements etc.	<ul style="list-style-type: none"> • The first way to deal with external factors is to learn to accept what you can’t control and leave it behind, because nothing you can do will change it. • The second way is to acknowledge that it is your choice if you are being affected by these influences, then be disciplined enough to choose not to be affected. • Simulation training, where the external distractors are produced in training, can be used to help players learn to manage these distractions.
	Visual factors that can influence concentration includes movement at the back of the court, differences in court backgrounds etc.	
	Gamesmanship that can influence concentrate include bad line calls, scoring disputes etc.	

06. CONFIDENCE



Confidence can be defined as

“belief that you have skills to perform tasks which lead to the achievement of a desired level of performance”.

Some people appear **self-confident** in many different situations and may be described as having a confident personality. Other people may not appear confident generally, but show greater confidence in specific situations, such as in sport.

A concept highly related to that of confidence is self-efficacy. Self-efficacy is defined by Bandura (1997) as:

“beliefs in one’s capabilities to organise and execute the courses of action required to produce given attainments”.

The similarity between this definition and that of self-efficacy can be seen by comparing the two definitions. Building on this definition, Bandura (1997) has identified 4 different methods by which self-efficacy (and hence self-confidence) can be built. Each of these methods can be applied effectively in the sporting environment.

BUILDING CONFIDENCE THROUGH SUCCESSFUL PERFORMANCE

Possibly the greatest way that players can develop their **self-confidence** is through experiencing success. This success is far wider than simply winning matches however and can include experiencing success when learning new skills. Because this is so important, coaches should:

- find ways to simplify complex tasks so inexperienced players can succeed
- slowing down tasks so players can succeed
- differentiate in the group so players of different skill levels can work on a different levels of a task

Examples might include using striking a balloon in the air to introduce grip changes. Because the balloon is much larger, is colourful and travels more slowly than a shuttle, then players should succeed more easily to change grips effectively. Other players of differing standards may be able to achieve this with a shuttle that have been slowed down, when rallying across a line with a partner, or across the net.

BUILDING CONFIDENCE THROUGH VICARIOUS EXPERIENCE/MODELING



Self-confidence can also be developed when players see other people of a similar level performing a skill successfully. This helps reinforce the idea that, with enough effort, it is possible for them to

reproduce that skill to an equivalent standard. This can be achieved by a coach demonstrating a skill so the players can copy. More powerful however is when players see one of their peers, who they regard as being of similar ability, performing that skill. This can create a "if they can do it, then so can I" mentality. The coaching implications of this are that skills should be demonstrated for the players by the coach, but where possible, peers should be used to provide the demonstrations, provided that demonstration is of sufficient quality.

BUILDING CONFIDENCE THROUGH VERBAL ENCOURAGEMENT

Encouragement from coaches, parents, teachers and peers can be an important factor in developing self-confidence. Being positive is very important and because of this coaches should be careful to word their feedback appropriately.

Consider the two examples below:

<p>You have really improved your grip when hitting a forehand overhead. If you reach up a bit more, you'll hit the shuttle even harder – but make sure you use the same grip, because you've made great progress with that.</p>		<p>You have really improved your grip when hitting a forehand overhead – well done, but you really need to reach up much more if you want to hit the shuttle hard.</p>	
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Note how the first example gives:

- praise about the grip.
- advice on reaching up more, worded in a positive way.
- reinforces the praise about the grip.

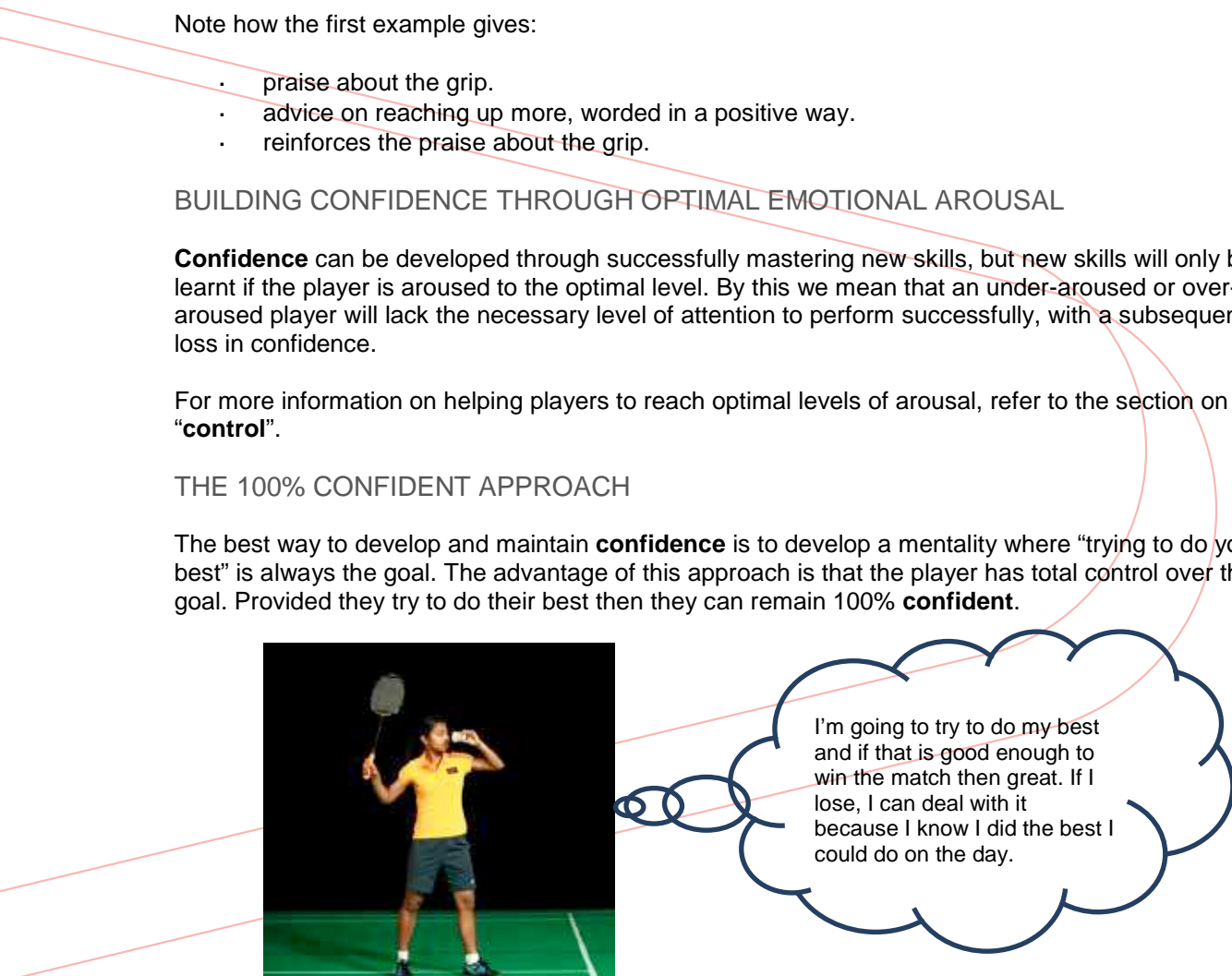
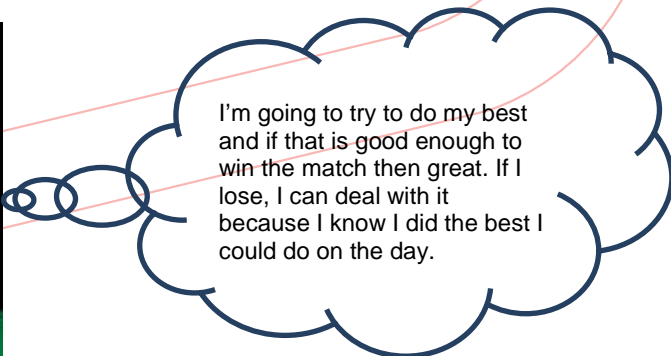
BUILDING CONFIDENCE THROUGH OPTIMAL EMOTIONAL AROUSAL

Confidence can be developed through successfully mastering new skills, but new skills will only be learnt if the player is aroused to the optimal level. By this we mean that an under-aroused or over-aroused player will lack the necessary level of attention to perform successfully, with a subsequent loss in confidence.

For more information on helping players to reach optimal levels of arousal, refer to the section on "control".

THE 100% CONFIDENT APPROACH

The best way to develop and maintain **confidence** is to develop a mentality where "trying to do your best" is always the goal. The advantage of this approach is that the player has total control over the goal. Provided they try to do their best then they can remain 100% **confident**.



HOW TO UNDERMINE CONFIDENCE!

Many players typically do not apply this approach. Their level of confidence is usually based on:

- the goal they want to achieve (more often than not this is “winning”)
- their ability to achieve that goal

This approach is flawed as being confident depends on goals that you cannot control.

- You can't control the level you play to on the day
- You can't control your opponent having a good day

PARENTS AND COACHES

Parents and coaches have a potentially huge influence over the confidence of players. They can do this by reinforcing the “trying to do your best” message. An over-emphasis on uncontrollable goals of winning, selection, medals, scores etc. undermines confidence.

07. CONTROL

Players that exhibit good **control** are able to regulate their mental state in a way that helps them to train and compete effectively. There are several underpinning concepts that support our understanding of **control** in sport and these will be introduced in this section.

AROUSAL DEFINED

Arousal can be defined as

“the condition or state of the body or bodily functions”

Reference:

Collins Thesaurus of the English Language – Complete and Unabridged. 2nd Edition. 2002 © HarperCollins Publishers 1995, 2002

AROUSAL AND THE NERVOUS SYSTEM

Arousal is closely linked to the nervous system and how it affects the workings of the body, such as changes in blood pressure, breathing rate and depth, blood pressure etc. The nervous system can be divided into three components, these being:

- **The Central Nervous System (CNS)** – consisting of the brain, brain stem and spinal cord.
- **The autonomic nervous system (ANS)** – which stimulates glands of the body and organs found in the trunk of the body.
- **The peripheral nervous system** – which transports messages to and from the skeletal muscles of the body.

This section will focus on the role of the **CNS** and **ANS** in controlling arousal as it is those systems that start the arousal response within players.

CENTRAL NERVOUS SYSTEM

Many parts of the **CNS** will play some part in arousal, but the main 3 parts of the **CNS** responsible for regulating arousal are the cerebral cortex, hypothalamus and ascending reticular activating system.

AUTONOMIC NERVOUS SYSTEM

The **ANS** provides largely automatic (involuntary) messages which:

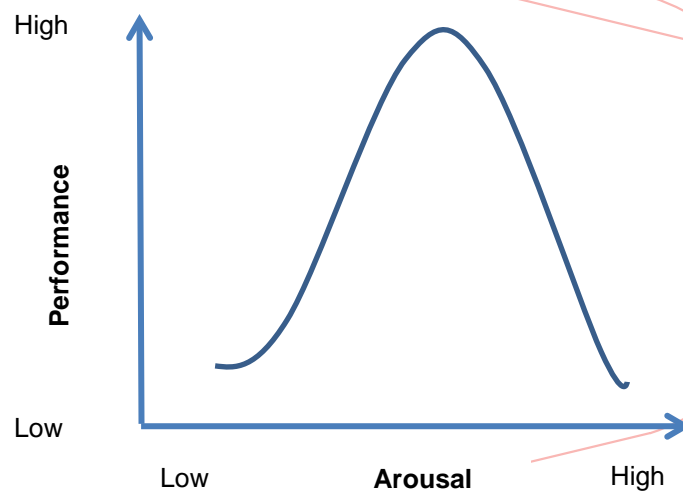
- stimulate the glands of the body (e.g. adrenal glands, sweat glands) which emit hormones.
- stimulate organs found with the trunk of the body (e.g. heart, lungs etc.).

It is important to note that the **CNS** and **ANS** work together to regulate arousal levels, varying from fast asleep to the extremes of anger, aggression, excitement etc. **Arousal** itself is not good or bad – it depends on the activity being undertaken and the individual themselves as to what is the “ideal” level of arousal to complete a task successfully.

AROUSAL, STRESS AND ANXIETY

The terms **arousal**, **stress** and **anxiety** are often used to mean the same thing when discussing a player’s ability to remain in **control**, so it is useful to compare these terms.

- **Arousal** has already been defined as “the condition or state of the body or bodily functions”. There are many theories regarding ideal levels of **arousal** for sporting performance, but a widely accepted model is the Inverted U theory, based on the work of Yerkes and Dodson (1908). The Inverted U theory basically supports the idea that performance is low at low levels of arousal, high in moderate levels of **arousal**, then declines if the **arousal** level is too high.



This is a simple model, with various adaptations of this being proposed depending on the nature of the task and the level of the performer. Basically:

- the more the task involves large muscle groups, the more the U-shape moves to the right
- the greater the competence level of the player, the more the U shape moves to the right
- **Anxiety** is a type of emotion that can be defined as “the body’s response to a perceived threat or danger”. Some players’ personality may mean they are typically more anxious in their everyday

life. This is known as **trait anxiety**. Another term, **state anxiety**, is used to refer to the level of anxiousness in particular situations.

Anxiety has a mental component (concerned with fear of failure, loss of self-esteem etc.) and a physical component (concerned with responses such as tight muscles, sweaty palms, increased heart rate, increased breathing rate etc.).

Mental anxiety tends to be relatively high in the days leading up to a competitive event and then may move up or down depending upon how well the event is going.

Physical signs of anxiety are low in the days leading up to an event, increase significantly in the hours and minutes prior to an event, then disappear quickly as the event begins



- **Stress** can be defined as

“a type of response of the body to a particular demand put upon it”.

Some level of **stress** is often required to perform optimally and this is known as “**eustress**”. Excessive stress, that tends to have negative effects upon performance, is called **distress**.

Levels of **arousal** and **state anxiety** which are not helpful to effective performance are therefore the same as **distress**, with the player losing control psychologically.

TYPICAL CAUSES OF AROUSAL BECOMING OUT OF CONTROL

Situational Factors

- Fear of failure, where a player is concerned about being beaten by an opponent that they think is weaker.
- Fear of negative evaluation from friends, other players, coaches, parents etc. resulting in loss of self-esteem.
- The timing of selections, for example if players do not know if they are to going to compete until the last minute.
- Changes to established routines, for example warm-ups, timing of meals etc.
- The player's assessment of the importance of the competition.

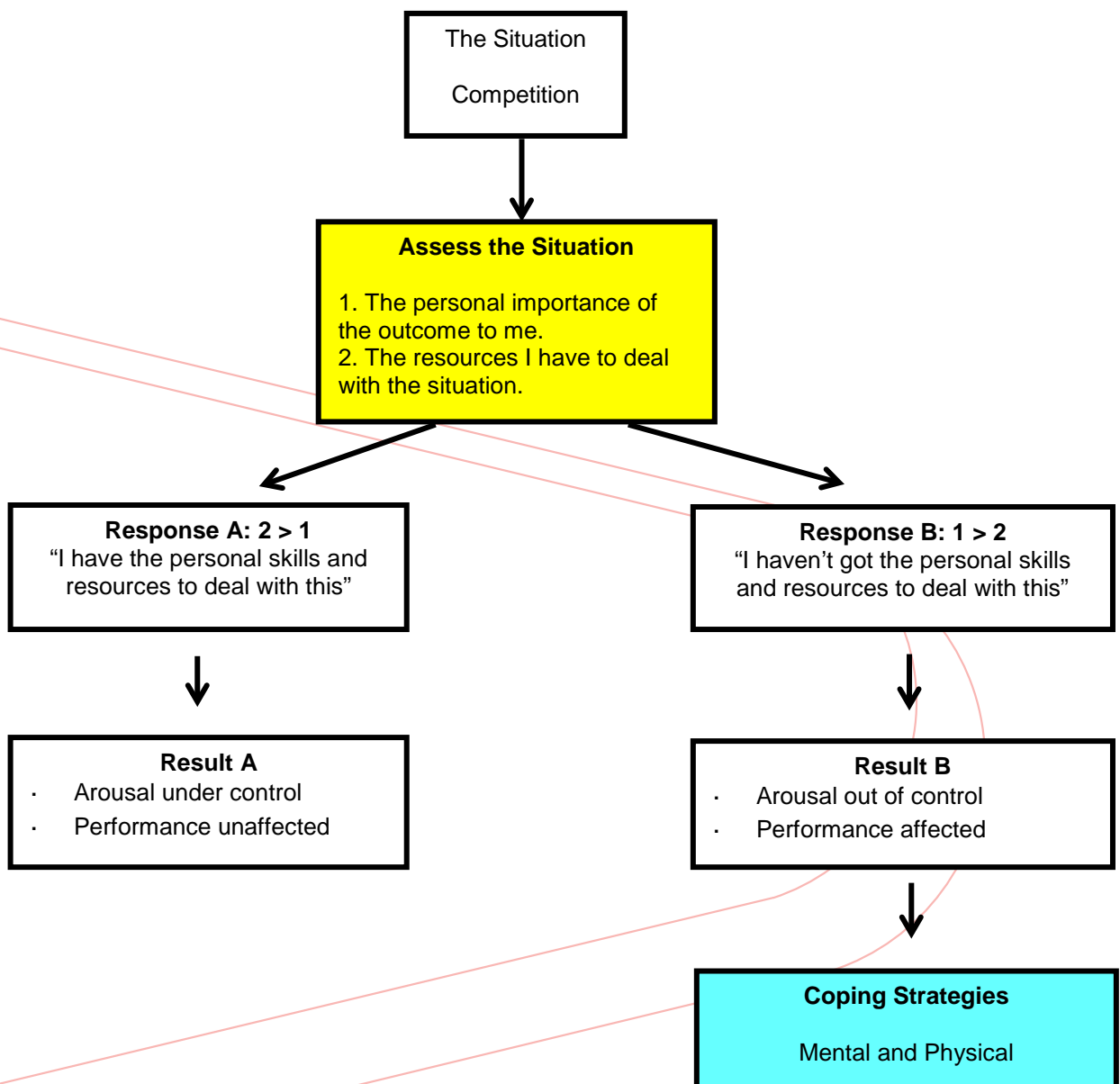
Personality Factors

- Players who naturally tend to have higher arousal levels in everyday life (i.e. high trait anxiety) are likely to have high arousal levels in competitive sporting situations (i.e. higher state anxiety).

- Players who are driven by outcomes, particularly the need to demonstrate dominance over an opponent and the winning of trophies, will tend to be more anxious in competition than those that focus on performing their skills as well as they can.
- Perfectionism. Note that in some cases perfectionism is a “normal characteristic” for well-motivated and high-achieving athletes. However perfectionism can develop to a more negative level where, because perfection cannot be achieved, damaging outcomes such as loss of self-esteem and shame can result.

MANAGING AROUSAL

The model below indicates the process a player goes through when faced with a competitive situation.



ASSESSING THE SITUATION

The first and arguably the best approach to managing arousal is at the “assessing the situation” stage. The player effectively has a choice at this stage as to whether they are going to put pressure on themselves. Positive suggestions include:

- Accepting that your worth as a person is not decided by the outcome of any competition.
- Making sure that significant influences around the person (coaches, parents, friends, teachers etc.) reinforces the message that their worth as a person is not defined by the outcome of the competition.
- Learn to accept that trying your best in both the lead up to the competition and during the competition itself is all that anyone can ask for.
- If the person does their best, but doesn't win, then they can deal with it because their worth as a person is not decided by the outcome of the competition.
- Developing a “do your best” mentality from an early age is a key way to avoid over-arousal (distress) in competitive situations.

COPING STRATEGIES TO CONTROL OVER-AROUSAL

Should over-arousal occur, the coach can help the player to develop coping strategies that can help the player deal with distress/over-anxiety. The aim however is for these strategies to be developed by the player so they can be used without the coaches' encouragement/guidance.

Typical strategies include managing:

- emotions (e.g. relaxation).
- thoughts (e.g. self-talk).
- behaviours (e.g. familiar routines).

COPING WITH OVER AROUSAL USING RELAXATION TECHNIQUES

In the case of over-arousal, relaxation techniques can be used to reduce heart rate, oxygen consumption, breathing rate and muscle tension. Key points to consider here are:

- Relaxation techniques, like any other technique, takes time to develop and it needs to be practiced.
- Not everyone might require this approach and the coach should work closely with the player in deciding if this approach is required. The coach's perception that a player is over-anxious may not be the reality.
- Both **under-arousal** and **over-arousal** might affect performance, so make sure relaxation techniques do not result in an over-relaxation, particularly just prior to starting a match.

Deep abdominal breathing can be used to help relaxation. Ideally the player should lie on their back in a quiet environment, placing one hand on their chest and one hand on their stomach. The player takes slow, deep breaths in and out, feeling only small amounts of movement at the chest but large amounts of movement in the stomach.

Progressive relaxation techniques build on the use of abdominal breathing by adding in a system of tensing, then relaxing, muscle groups in a systematic fashion. Tensing the muscles should be timed with breathing in, relaxing the muscles should be timed with breathing out.

The aim of this is to help the muscles learn to relax by allow them to feel the contrast of tension first. The aim of this procedure eventually is that the player is able to place the muscles immediately in a relaxed state without the need for pre-tensing. Progressive relaxation techniques take time to master (months) but can ultimately result in players being about to achieve a relaxed state in a few seconds, which is useful between points and sets.



COPING WITH OVER-AROUSAL USING SELF-TALK

Self-talk has already been dealt with in some depth within the **confidence** and **concentration** sections, but as a psychological technique it can also be used successfully to help control **arousal**. Short phrases can be used such as:

- “relax”
- “breathe deeply”
- “chill out”
- “keep trying”

COPING WITH OVER-AROUSAL USING FAMILIAR ROUTINES

Players can help to **control arousal** levels by using routines with which they are familiar and which have previously been associated with success. The use of a brief training diary is helpful here to identify routines that have resulted in performances where optimum arousal levels were observed. Note that these routines may not be the same for everyone, but could include:

- warm-ups - duration, intensity, timing, content etc.
- strategy meetings with the coach prior to matches - duration, timing, level of complexity, focus on self or opponent etc.
- preparation in a relatively solitary way, or with people around you
- stay in the competition environment between matches, or relax away from it
- prepare in a calm, controlled way or with lots of noise and activity
- listen to music

08. SELF- ASSESSMENT QUESTIONS

	Questions	Answers
1	Describe a coaching technique which assists in developing intrinsic motivation.	
2	Describe how the concentration of beginners and experts differs.	
3	Describe the potential effect of over-arousal on concentration and suggest methods to adjust this.	
4	Describe the 100% confident approach.	
5	Suggest three familiar routines that could be used to help maintain control.	
6	Define the term "eustress".	
7	List the four components of Nideffer's model of attentional styles. Choosing one of the four, provide a badminton example of one attentional style in action.	
8	To help concentration, suggest two methods of dealing with unwanted external factors.	
9	Suggest four methods by which confidence can be built.	
10	Suggest three methods by which over-arousal can be controlled.	

09. SUMMARY

Sports Psychology can be defined as

“the mental processes and behaviours of individuals and groups within sport”.

Sports psychology can be split into three areas of:

- clinical sports psychology.
- research sports psychology.
- coaching sports psychology.

Coaches will work mainly in the last area and should give careful consideration to involving themselves in clinical and research sports psychology without the necessary training or professional assistance. However, coaches can use sports psychology techniques successfully, particularly if embedded within their natural coaching practice.

Sports psychology is a broad subject that contains many different theories, concepts and techniques which in many cases are inter-related.

One framework that can be used to organise these theories, concepts and techniques is to list them under the headings of:

- Cohesion
- Commitment
- Concentration
- Confidence
- Control

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BADMINTON COACH EDUCATION
COACHES' MANUAL
LEVEL 2

MODULE 11
PERFORMANCE FACTOR 6
LIFESTYLE

MODULE 11

PERFORMANCE FACTOR 6 – LIFESTYLE

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LEARNING OUTCOMES

By the end of this module, coaches will be able to:

- Identify the components of diet;
- Select appropriate foodstuffs that provide a source for each of the components of diet;
- Provide basic nutritional advice for pre, during and post-competition and training;
- Describe the importance of the player-coach-parent relationship;
- Suggest methods by which the coach can help parents to support their child to make sport a positive experience;
- Provide a method to improve time management for players

01. DIET

COMPONENTS OF DIET

FATS

Saturated Fats are found mostly in foods from animals and some plants. Foods from animals include beef, veal, lamb, pork, lard, poultry fat, butter, cream, milk, cheeses etc. Foods from plants that contain saturated fat include coconut, coconut oil, palm oil and cocoa butter. Saturated fats raise cholesterol levels, which may lead to increased risk of heart disease.

Unsaturated Fats include polyunsaturated and monounsaturated fats. They are usually found in many fish, nuts, seeds and oils from plants. Some examples of foods that contain these fats include salmon, trout, herring, avocados, olives, walnuts and liquid vegetable oils (e.g. olives, sunflower, corn). Unsaturated fats lower cholesterol and may lead to a reduced risk of heart disease.

Fats are essential for the body because they:

- help form cell walls;
- assist in nerve conduction;
- support a healthy immune system;
- are essential for hormone production;
- provide a lot of energy, with even slim athletes having substantial fat reserves;
- are a carrier of the fat-soluble vitamin A, D, E, K.

Fats do however have several disadvantages, including:

- an excess of **saturated fats** may lead to an increased risk of heart disease;
- dietary fat is easily converted to storage fat when digested, which can lead to obesity;
- energy production from fat is slow and requires the presence of oxygen.

PROTEINS

Proteins can be found in a variety of foodstuffs. The most complete sources of protein come from animal sources, including eggs, milk, cheese, red meat, fish, and poultry. Other sources of **protein** include cereals, beans, lentils, peas, potatoes, fruits and leafy green vegetables.

The main function of the body is to act as building blocks, creating all the cellular structures of the body. They do provide some energy for exercise but this is not their primary function.

CARBOHYDRATES

Complex Carbohydrates come from foods such as potatoes, rice, corn, pasta, beans and fruit. These foodstuffs also include fibre which is an indigestible form of **carbohydrate**. Digestion and absorption of **complex carbohydrates** is relatively slow but steady.

Simple Carbohydrates tend to be sweeter and include foods such as sugar, low-fat ice-cream, soft drinks, honey, jam and jelly.

The main stores of **carbohydrate** are found in muscles and the liver in the form of glycogen.

Carbohydrates are useful to the body because they:

- provide the body with a source of energy;
- can provide energy more quickly than fats;
- provide fuel for the central nervous system (brain and spinal cord);
- can provide fibres (from complex carbohydrate foods) which help maintain a healthy digestive system;
- help fats to burn efficiently (“fat burns in the flame of carbohydrate”);
- can provide a steady stream of energy (from complex carbohydrate food);
- are a source of Vitamin B

The disadvantages of **carbohydrates** include:

- stores of **carbohydrate** in the liver and muscles are relatively small, so need regular replacement during intense exercise of long duration;
- **sugary carbohydrates** can cause surges and troughs of energy.

MINERALS

Minerals are mostly metallic elements, found in generally small amounts in the body. **Minerals** are part of enzymes (which speed up chemical reactions), hormones (which regulate the functions of certain organs and body parts) and vitamins (which help regulate energy production and creation of body tissues). Functions of **minerals** include:

- helping to provide body structure by the formation of bones and teeth;
- support body functions, such as heart rate, muscle contraction, nerve conduction and maintaining pH (acid/alkaline) balance in the body;
- help to regulate cell activity (as part of enzymes and hormones).

Minerals occur freely in nature and are passed into humans via food (animal and plant) and water. Typical minerals include calcium, phosphorus, sodium, magnesium, iron, fluorine, zinc, copper, selenium, iodine, molybdenum and chromium.

A varied diet normally contains sufficient **minerals** to maintain health and **mineral supplements** are not generally required. Two areas worth noting are:

- iron deficiency may be an issue for women which could ultimately affect the oxygen carrying capacity of blood;
- calcium deficiency can lead to osteoporosis, a condition that weakens bone structure.

VITAMINS

Vitamins are essential chemicals which help regulate energy production and creation by body tissues. Vitamins are used repeatedly to support these reactions.

Vitamins can be split into two categories:

- **Fat soluble vitamins** (A, D, E and K), which are stored in large quantities in the body and are usually easily maintained by following a diet that includes some combination of green leafy vegetables, dairy products, margarine and seeds. Cereals, fruit and meats also contain small amounts of vitamin K. Excessive intake of fat soluble vitamins can be damaging to health and is rarely necessary.
- **Water soluble vitamins** (B complex and C) are not stored in large quantities in the body so should be consumed as part of a daily diet on a daily basis. Excess intake of these vitamins is usually excreted from the body in the form of urine. A combination of meat, peas, beans, lentils, grain, dairy products, fruit and salad should provide the necessary water soluble vitamins to maintain body functions.

WATER

Water makes up between 40 to 60% of total body mass (e.g. 30 – 45kg of a 75kg person). A body using an amount of 2.5 litres /day will typically acquire this water by:

- drinking (1.2 litres);
- food (1.0 litre);
- chemical reactions involved in energy production (0.3 litre).

Water is lost from the body through:

- urine (1 to 1.5 litres);
- perspiration (0.5 to 0.7 litres);
- water vapour in air breathed out (0.25 to 0.30 litres);
- solid waste (0.10 litre).

Water is essential to life and performs many functions in the body, including:

- assisting in the transport of substances around the body;
- providing an environment where many chemical reactions can occur;
- helping to expel waste products from the body in both urine and solid waste;

- regulating temperature;
- lubricating joints.

In order to perform optimally, drink water or isotonic drinks prior to, during and after competition. Isotonic sports drinks are useful as they contain sugars (carbohydrate) and salts in similar concentrations to the body itself. This aids rapid absorption into the body.

Dehydration is a major contributor to loss in performance and in extreme circumstances can be damaging to your health. Helpful tips include:

- training players to drink before, during and after matches/ training;
- drinking more in hot/humid conditions;
- monitoring your urine – small amounts of darker coloured urine indicates dehydration;
- weighing yourself before and after training gives an indication of how much to drink. You should drink 1.5 x litres what you have lost in bodyweight/kg. For example, if you lose 1 kg, you should drink 1.5 litres to replace this.

Sports Medicine Australia (1997) offers the following broad guidelines for fluid intake in children:

Fluid Intake Guide		
Age	Time	Volume
10 years old	45 min before sport	150-200ml
	Every 20 minutes during sport	75-100ml
	After sport	500+ ml
15 years old	45 min before sport	300-400ml
	Every 20 minutes during sport	150-200ml
	After sport	1000+ ml

FOOD LABELLING

Food labelling can help you to make informed choices about what you eat. Labels generally include information about how much of each component of diet is in 100g of this foodstuff.

Aim to select foods that are:

- high in **carbohydrate** (preferable nutritious carbohydrate rather than sugary);
- lower in **fat** and **protein**;
- higher in **vitamins** and **minerals**.

Examples are:

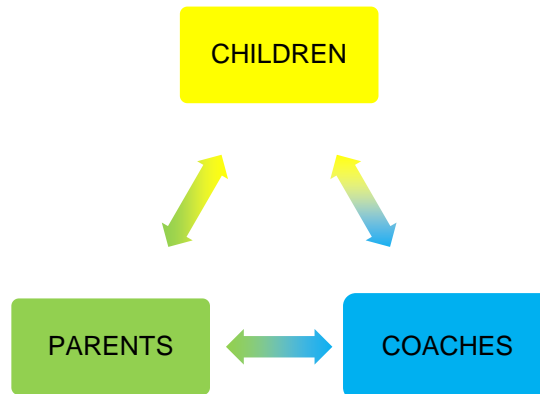
Chipsticks (maize and potato snack) per 100g		Baked beans in tomato sauce per 100g	
Carbohydrate (of which sugars)	61.0 g 0.6g	Carbohydrate (of which sugars)	11.4g 2.4g
Protein	6.0g	Protein	5.3g
Fat (of which saturates)	23.0g 1.9g	Fat (of which saturates)	0.4g trace
Fibre	3.0g	Fibre	5.6g
Sodium	1.45g	Sodium	0.2g

PRE-, DURING AND POST COMPETITION

Pre Competition	During Competition/Training	Post Competition Training
<ul style="list-style-type: none"> • Eat extra carbohydrate and drink plenty of fluid in the 24 hours before competition. • If possible, aim to have last meal 3-4 hours before competing, with a snack 1-2 hours before. • Avoid high protein, fat or high fibre foods that will take longer to be digested in the stomach. 	<p>Little and often:</p> <ul style="list-style-type: none"> • Fruit • Fruit juice/sports drinks • Cereal bars • Honey/jam sandwich <p>If a longer wait between matches:</p> <ul style="list-style-type: none"> • Yoghurt or milk • Lean meat/cheese sandwich <p>Don't try new things during competition – get used to them over a period of time in training.</p> <p>Maintain regularly fluid intake (water/isotonic drinks).</p>	<p>Snacking in the first hour after finishing exercise will help in recovery by:</p> <ul style="list-style-type: none"> • repairing damages tissues (protein); • replacing fluid lose (hydration); • replacing energy stores (carbohydrate); • protecting the immune system (carbohydrate). <p>Examples of good recovery snacks would be:</p> <ul style="list-style-type: none"> • Bowl of cereal or cereal bars with drink of milk. • Milkshakes. • Banana. • Yoghurt. • Lean meat sandwich. • Dried fruit and nuts. • Water or isotonic drinks - make sure you drink.

02. PARENT EDUCATION

When coaching badminton, it is important to take a holistic approach. This means the coach needs to appreciate that they are not coaching *players*, but *people*, who have many strong influences out of the sport. With children and young people, parents are by far the strongest influence. If the coaches, parents and their children work together, then this can help avoid misunderstandings and improve effectiveness. This relationship is often described as the coaching triangle.



There are a number of topics that should be addressed in order to help parents. A list of these is provided below

COACHING PHILOSOPHY

It is important that coaches clearly explain their own philosophy to both children and their parents in order to avoid misunderstandings. A coach may for example, build their philosophy on:

- Honesty.
- Openness.
- Good sporting behaviour.
- Respect for opponents.
- Trying your best in training.
- Trying your best in competition.
- Focus on the process (trying to be the best you can be/self-development).

ROLES AND RESPONSIBILITIES

Roles in this case are fairly easy to identify. They are children, parents and coaches. Much more important are the responsibilities that each of these groups has to fulfil. A club can for example simply list what they see as the core responsibilities for all parties, and then add any specific responsibilities for the individual groups below. This could be communicated via meetings, leaflets, club website etc. The table below shows how this could be presented.

Parents, children and coaches responsible for:		
In addition parents are responsible for:	In addition children are responsible for:	In addition coaches are responsible for:
.

A good way to involve parents, children and coaches in the content of this document is to run a workshop where children, parents and coaches work in groups and are asked to produce three lists, using the headings given below:

The children's group will produce three lists, each list beginning as listed below	The parent's group will produce three lists, each list beginning as listed below	The coach's group will produce three lists, each list beginning as listed below
I am responsible for:	I am responsible for:	I am responsible for:
My parents are responsible for:	My children are responsible for:	The parents are responsible for:
The coaches are responsible for:	The coaches are responsible for:	The children are responsible for:

These lists can then be organised according to the colours and the information used to complete the roles and responsibilities information in the table shown on the previous page.

GOAL-SETTING

Presentations and tasks that help parents understand the process of effective goal-setting are useful. Helping them to understand the difference between setting process and outcome goals is important as this concept links to other areas such as maintaining control, improving confidence, motivation etc.

TIME MANAGEMENT

For parents of elite performers, time management is a key skill for development. The information outlined in this manual under the heading of "Time Management" will be of particular use, most notably the exercise to evaluate how 168 hours is used and the production of a simple weekly planner. These

exercises can be completed in a workshop and are probably most effective when the coach, parent and child work together.

CODE OF CONDUCT

A code of conduct is really an extension of the roles and responsibilities work. The main difference is that a code of conduct must include the sanctions for breaches of that code. Again, involving parents in the process of designing the sanctions is an important part of this process.

NUTRITION

Providing nutritional guidance should be included in any parent education package. If this is presented in a workshop, then it is likely that a specialised, trained person should be used. Guidance can also be given via leaflets, websites etc.

FACE TO FACE COMMUNICATION SKILLS

Heightening parents' awareness of communication skills can be useful to help them support their children successfully.

Workshops of this nature could include:

- Identifying the key aspects of communication as:
 - verbal (the words themselves).
 - paraverbal (the tone or speed of delivery).
 - non-verbal (body language, facial expressions).
 - listening.
 - observing.
- Highlighting the relative power of non-verbal compared to verbal communication. Workshop participants can act out body language they have observed in parents at tournaments, then guess the message being given and discuss the possible implications for their children who might observe this body language
- Highlighting the relative power of para-verbal compared to verbal communication. Workshop participants can read out a simple phrase but asked change the tone to communicate different emotions (e.g. encouraging, anger, abruptness, panic etc.).
- Formulating guidelines for verbal communication could also be part of the workshop. This should be placed in the context of the periods before, during and after competition. Areas of discussion could be:
 - timing of verbal communications;
 - type of verbal communication (i.e. need for simplicity of message, simplicity of language, positive etc.);
 - content of communication (coach coaching the sport, parent being a supportive parent).
- Listening and observing can be delivered via a role-play, where the facilitator "interviews" a volunteer and the rest of the group observes the interview.

"Describe to me your best ever sporting experience" is a good question to start.

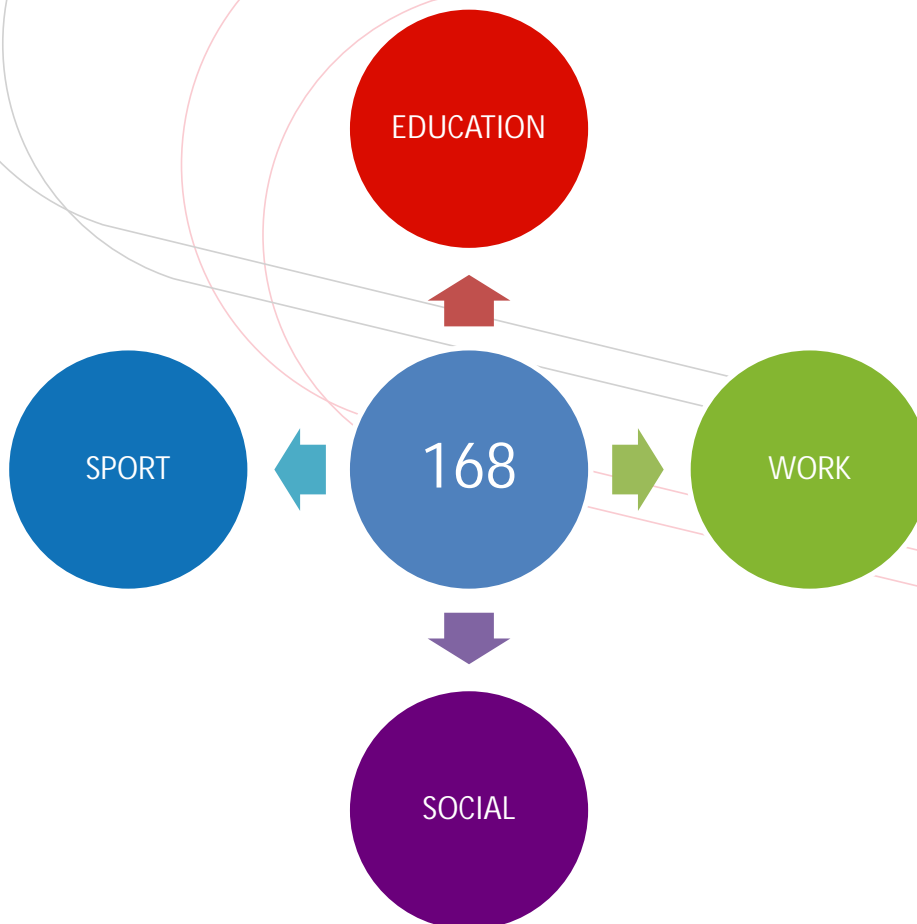
The interviewer should display excellent listening skills for the first 2-3 minutes (eye contact, positive body language, asking questions, smiling and encouraging etc.), then after this time switch their behaviour (beginning to fidget, repeating things back incorrectly, interrupting/finishing off sentences, being distracted by other in the room, looking at mobile phone etc.). Links should be made with using effective listening and observing skills and how this can benefit children

03. WEEKLY PLANNING

Being able to plan so you make maximum use of the time available is a characteristic of successful people, not just within sport. A useful exercise therefore is to write down where you use your time, bearing in mind there are 168 hours in the week. This then helps you identify where you can:

- save time;
- prioritise different activities.

Having completed this exercise, it is quite easy to identify that there are four broad areas that take up most of the time in the week



A weekly planner can help you organise your time more effectively. An example of a simple planner you might use is shown overleaf. Note that amongst other things it contains:

- a reminder of the goals you are working towards;
- colour coding to differentiate between school, work, sport and social commitments;
- a "notes" area to reflect on how well each day went.

WEEKLY PLANNER

Goals:							
Date							
Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6:00 - 7:00							
7:00 - 8:00							
8:00 - 9:00							
9:00 - 10:00							
10:00 - 11:00							
11:00 - 12:00							
12:00 - 13:00							
13:00 - 14:00							
14:00 - 15:00							
15:00 - 16:00							
16:00 - 17:00							
17:00 - 18:00							
18:00 - 19:00							
19:00 - 20:00							
20:00 - 21:00							
21:00 - 22:00							
22:00 - 23:00							
Notes							

AN EXAMPLE OF A WEEKLY PLANNER

Name _____				Goals: By 31 st December I will be able to:			
Education		Work		<ul style="list-style-type: none"> play forehand straight and cross-court net shots; improve my 3 mile run time by 20 seconds; high serve to the back of the court, with the shuttle dropping vertically; monitor progress by consistently using this planning tool; reach a tournament singles semi-final. 			
Social		Sport					
Date	13/11	14/11	15/11	16/11	17/11	18/11	19/11
Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6:00-7:00							
7:00-8:00	Stability/strength	20 min jog		Stability/strength	20 min jog		
8:00-9:00							
9:00-10:00		Football (P.E.)	Swim (P.E.)	Rutland Bronze Tournament	Rutland Bronze Tournament	Rutland Bronze Tournament	Rutland Bronze Tournament
10:00-11:00							
11:00-12:00							
12:00-13:00							
13:00-14:00							
14:00-15:00							
15:00-16:00							
16:00-17:00	Stretch		Homework		Stretch		
17:00-18:00	Homework	Warm-up Speed work On court practices Cool-down	Singles games	Warm-up Speed work On court practices Cool-down	Sleep-over round at John's		Homework
18:00-19:00							
19:00-20:00	Cinema with friends						
20:00-21:00							
21:00-22:00							
22:00-23:00							
Notes	Film was great – very funny. Training hard as P.E. was tougher than usual.	Making my net shots look the same. Cross courts better than straight.	Beat Tommy – yippee but lost to Samantha. She's really got a good smash.	Felt really good today – got a good mark in a maths test. Really enjoyed the new speed exercises.	Lots of sport on the telly – John's new Play Station game is awesome.	Got through to final in doubles but lost in quarter in singles. Did better against an opponent who normally beats me easily.	Won the doubles and the winning shot was a forehand net shot! Found it hard doing my homework because I was "on a high". Maybe do homework on Friday and go round to John's on Sunday

04. SELF- ASSESSMENT QUESTIONS

	Questions	Answers
1	There are two main components of diet that normally provide most energy for the body. Name them.	
2	When involving yourself in lifestyle training with young players (e.g. a workshop on nutrition) which other group has to be involved for this training to be more effective?	
3	Describe a method by which coaches can help players with their time management.	
4	Explain how measuring bodyweight before and after training helps players to judge how much fluid to drink during and after training.	
5	List four ways in which eating and drinking within one hour of finishing training/competing can be good for your body?	
6	Suggest three possible subject areas that would be useful to deliver to parents in order to support their child's development in the sport of badminton.	
7	Describe the importance of body language when parents are watching their children train or compete.	

05. SUMMARY

The main components of diet are carbohydrates, fats, proteins, minerals, vitamins and water. Examples of good sources of nutrition for these components of diet include:

Component of Diet	Example of Good Source
Fat	Red Meat, cheese, milk
Carbohydrates	Potatoes, rice, pasta
Protein	Meat, fish, leafy green vegetables
Vitamins	Fruit and vegetables
Minerals	Milk, Salt, meat

Coaches can and should provide basic nutritional advice for players and also their parents, but support from a suitably qualified nutritionist is desirable to address more complex issues that mainly affect health. Advice surrounding hydration and pre, during and post competition nutrition is particularly important.

Involving parents to help them support their child effectively when training and competing in badminton is essential.

Communicating a coaching philosophy and establishing roles and responsibilities can help avoid misunderstandings and support a consistent approach.

Workshops can be a useful method of working with parents and methods to manage time effectively can be useful for players that aspire to the higher levels of the sport.

BWF

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