**Applied anatomy and physiology (Paper 1)**

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| **Learning objective** | **Learning activity** | **Application**  |  |
| Bones. | Knowledge of the bones at the following locations:* head/neck – cranium, vertebrae
* shoulder – scapula and humerus
* chest – ribs and sternum
* elbow – humerus, radius and ulna
* hip – pelvis and femur
* knee – femur and tibia (students should also know that the patella sits in front of the knee joint)
* ankle – tibia, fibula and talus.

Focus on identifying where these bones are located.  | Name the bones.Correlate knowledge with location (joint).Correlate to muscles that move the bones.Apply the knowledge and understanding to prescribed movements/skills. |  |
| Structure of the skeleton. | How the skeletal system provides a framework for movement (in conjunction with the muscular system):* the skeletal system allows movement at a joint
* the shape and type of the bones determine the amount of movement (short bones enable finer controlled movements, long bones enable gross movement
* flat bones for protection of vital organs
* the different joint types allow different types of movement
* the skeleton provides a point of attachment for muscles – when muscles (contract) they pull the bone.

Focus on applying this knowledge. For example, how flat bones protect the vital body during specific skills, how the muscles and bones work together to perform specific movements, etc. | Know the main points.Apply these points to basic movements.Apply this knowledge to sports specific skills in a variety of sports.  |  |
| Functions of the skeleton. | The main functions should be taught:* support
* protection of vital organs by flat bones
* movement
* structural shape and points for attachment
* mineral storage
* blood cell production.

Functions should be applied to performance in physical activity. | Know the functions.Be able to explain the functions.Be able to give applied examples, eg protection of the heart and lungs by the ribs when ‘chesting’ a ball. |  |
| Muscles of the body. | Identification of the following muscles within the body:* latissimus dorsi
* deltoid
* rotator cuffs
* pectorals
* biceps
* triceps
* abdominals
* hip flexors
* gluteals
* hamstring group (not individual names)
* quadriceps group (not individual names)
* gastrocnemius
* tibialis anterior.

Students should know the role of tendons (attaching muscle to bone). Ensure you can identify the location of the muscles and apply that knowledge to specific movements/ skills. | Know the names of the muscles.Locate the anatomical position of each muscle.Apply this knowledge to basic movements. Apply this knowledge to sports specific skills. |  |
| Structure of a synovial joint. | Knowledge of the following structures of a synovial joint:* synovial membrane
* synovial fluid
* joint capsule
* bursae
* cartilage
* ligaments.

Focus on explaining how these structures fulfill their function to increase stability and prevent injury. Each should be applied to practical examples of movement at the main joints. Students should know the basic role of tendons. | Know the names.Explain what they do.Identify where they are in a joint.Apply their function to practical examples, eg kick a ball. |  |
| Types of freely movable joints that allow different movements. | Identification of the types of joints with reference to the following:* elbow, knee and ankle – hinge joint
* Hip and shoulder – ball and socket.

Focus on these joints only. Focus should be on the type of movement possible at the hinge/ball and socket with application to sporting actions. | Know the names of the joint types.Locate examples of these joints.Apply this knowledge to the movements during basic skills.Apply this knowledge to varying sporting skills. |  |
| How joints differ in design to allow certain types of movement at a joint. | Understand that the following types of movement are linked to the appropriate joint type, which enables that movement to take place:* flexion/extension at the shoulder, elbow, hip and knee
* abduction/adduction at the shoulder
* rotation of the shoulder
* plantar flexion/ dorsiflexion at the ankle.

Focus in this section on what movement is possible at the joints and their names. Applied knowledge, ie to sporting skills is part of movement analysis. This area and ‘movement analysis’ may be taught together. | Know the names of the movements.Understand what movements take place at specific joints.Apply this knowledge to sporting skills (as part of movement analysis). |  |
| How the major muscles and muscle groups of the body work antagonistically on the major joints of the skeleton to affect movement in physical activity at the major movable joints. | With reference to the shoulder, elbow, hip, knee and ankle joints:* major muscle groups operating at these joints (see above)
* the action of prime movers (agonists)/ antagonists
* bones located at the joint (see above)
* how these muscle groups work isometrically and isotonically (concentric/ eccentric).

Focus on the difference between concentric and eccentric (isotonic) contractions. Classroom delivery should be applied, ie to sporting skills and movements.  | Know the terms. Understand how these terms work in conjunction with each other eg an agonist will act as the prime mover to cause concentric contraction.Applied knowledge to basic movements.Applied knowledge to specific sporting skills. |  |
| Pathway of air. | Identification of the pathway of air (limited to):* mouth/nose
* trachea
* bronchi
* bronchioles
* lungs
* alveoli.

Focus on the location of each of these although the characteristics and function of the alveoli must be covered within gaseous exchange.  | Names of pathways.Order of pathways.Identification of pathways on diagrams.Characteristics and functions of the alveoli. |  |
| Gaseous exchange. | Gas exchange at the alveoli – features that assist in gaseous exchange:* large surface area of alveoli
* moist thin walls (one cell thick)
* short distance for diffusion (short diffusion pathway)
* lots of capillaries
* large blood supply
* movement of gas from high concentration to low concentration.

Oxygen combines with haemoglobin in the red blood cells to form oxyhaemoglobin. Students should also know that haemoglobin can carry carbon dioxide.Teaching should focus on the characteristics and how these characteristics assist with gaseous exchange.  | Identify features/ characteristics.Identify features/ characteristics on a diagram.Understand the role of haemoglobin in the transport of oxygen and carbon dioxide.Explain how the features/ characteristics assist with gaseous exchange. |  |
| Blood vessels. | Structure of arteries, capillaries and veins:* size/diameter
* wall thickness
* valves in veins.

Focus on differentiating between the vessel types so that students can explain the vessels and/or identify each vessel from illustrations. How the structure of each blood vessel relates to the function:* carrying oxygenated/ deoxygenated blood to/ from the heart
* gas exchange
* blood pressure
* Redistribution of blood during exercise (vasoconstriction and vasodilation).

Students should know the names of the arteries and veins associated with blood entering and leaving the heart. You must be able to explain the function of each vessel and their relative importance. The vessels entering/leaving the heart should be identified from a diagram. | Name the vessels.Describe the vessels (diameter etc). Identify the vessels from an illustration.Apply the structure to the function of each vessel.Assess each vessels relative importance.Further apply the learning to the vessels entering/ exiting the heart. |  |
| Structure of the heart. | Structure of the heart:* atria (left and right atria)
* ventricles (left and right ventricles).

Focus on the positioning of the left and right atria/ventricles, linking them to the vessels above. Teaching should include illustrations of the heart. | Names of the chambers.Position within the heart.Basic role of each chamber.Correlate the chamber to the adjoining vessels. |  |
| The cardiac cycle and the pathway of the blood. | The order of the cardiac cycle, including diastole (filling) and systole (ejection) of the chambers. This starts from a specified chamber of the heart, eg the cardiac cycle starting at the right ventricle.Pathway of the blood:* deoxygenated blood into right atrium
* then into the right ventricle
* the pulmonary artery then transports deoxygenated blood to the lungs
* gas exchange occurs (blood is oxygenated)
* pulmonary vein transports oxygenated blood back to the left atrium
* then into the left ventricle
* before oxygenated blood is ejected and transported to the body via the aorta.

Valve names are not required but students should be taught that valves open due to pressure and close to prevent backflow.Focus on the cardiac cycle but students should be encouraged to identify the cycle from different starting points and via diagrams of the heart.  | Re-cap of heart chambers/ vessels.Order of the cardiac cycle.Understanding of the cardiac cycle from different starting points.Identification of the cardiac cycle in relation to illustrated diagrams.Full knowledge and understanding linked to blood vessels/systole/ diastole. |  |
| Cardiac output and stroke volume. | Cardiac output, stroke volume and heart rate, and the relationship between them.Cardiac output (Q) = stroke volume x heart rate.Students should be able to interpret heart rate graphs, including an ‘anticipatory rise’, and changes in intensity. Teaching should allow students to analyse graphs, draw their own and make use of varying data to illustrate heart rate changes.  | Know the terms.Understand the relationship to calculate cardiac output.Be able to analyze data and spot changes in heart rate.Plot graphs to demonstrate heart rate data that can be explained/ analyzed.  |  |
| Mechanics of breathing – the interaction of the intercostal muscles, ribs and diaphragm in breathing. | Inhaling (at rest) with reference to the roles of the:* intercostals
* rib cage
* diaphragm.

Exhaling (at rest) with reference to the roles of the:* intercostals
* rib cage
* diaphragm.

You must know that the lungs can expand more during exercise (inspiration) due to the use of pectorals and sternocleidomastoid. During exercise (expiration), the rib cage is pulled down quicker to force air out quicker due to use of the abdominal muscles. No other muscles are needed. Changes in air pressure cause the inhalation and exhalation. | Name the anatomical parts involved.Explain how these work together during inhalation.Explain how these work together during exhaling (including the role of other muscles).Evaluate their role, eg evaluate the role of the diaphragm. |  |
| Interpretation of a spirometer trace. | Identification of the following volumes on a spirometer trace and an understanding of how these may change from rest to exercise:* tidal volume
* expiratory reserve volume
* inspiratory reserve volume
* Residual volume.

Teaching should enable students to Interpret and explain a spirometer trace (and continue a trace on paper) to reflect the difference in a trace between rest and the onset of exercise. Students should be able to analyse and draw traces. | Names of the lung volumes.Explain what each volume is.Be able to identify each on a spirometer trace.Be able to interpret/analyze each on a spirometer trace.Be able to predict what each will do based on information/ draw continuation of the trace. |  |
| Understanding the terms aerobic exercise (in the presence of oxygen) and anaerobic exercise (in the absence of enough oxygen). | Definition of the terms:* aerobic exercise
* anaerobic exercise.

You must have understanding of following: * Summary of aerobic exercise (glucose + oxygen → energy + carbon dioxide + water).
* Summary of anaerobic exercise (glucose → energy + lactic acid).

Teaching will focus on the understanding of the formulae. | Understand the terms aerobic and anaerobic.Recite the equations.Link knowledge to the box below. |  |
| The use of aerobic and anaerobic exercise in practical examples of differing intensities. | Link practical examples of sporting situations to aerobic or anaerobic exercise.Identification of the duration and/or intensity of a physical activity in order to identify and justify why it would be aerobic or anaerobic, eg marathon (aerobic), sprint (anaerobic). Several sporting examples should be used. | Link knowledge from above to sporting examples.Vary the examples.Provide justified answers with reasoned conclusion as to why an activity is likely to be aerobic or anaerobic. |  |
| The use of aerobic and anaerobic exercise in practical examples of differing intensities. | Link practical examples of sporting situations to aerobic or anaerobic exercise.Identification of the duration and/or intensity of a physical activity in order to identify and justify why it would be aerobic or anaerobic, eg marathon (aerobic), sprint (anaerobic). Several sporting examples should be used. | Link knowledge from above to sporting examples.Vary the examples.Provide justified answers with reasoned conclusion as to why an activity is likely to be aerobic or anaerobic. |  |
| Excess post-exercise oxygen consumption (EPOC)/oxygen debt as the result of muscles respiring anaerobically during vigorous exercise and producing lactic acid. | Definition of the term EPOC (oxygen debt).An understanding that EPOC (oxygen debt) is caused by anaerobic exercise (producing lactic acid) and requires the performer to maintain increased breathing rate after exercise to repay the debt.Make use of EPOC diagrams!  | Reasons why recovery is needed.Understanding of the process of recovery.Ability to identify the process of recovery on diagrams. |  |
| The recovery process from vigorous exercise. | The following methods to recover from exercise, including the reasons for their use:* cool down – maintain elevated breathing rate/heart rate (blood flow), stretching, removal of lactic acid
* manipulation of diet – rehydration, carbohydrates for energy
* ice baths/massage – prevention of delayed onset of muscle soreness (DOMS).

You must be able to identify, explain and justify methods of recovery.  | Know the name of each method.Explain how each method is carried out.Justify why these methods are used.  |  |
| Immediate effects of exercise (during exercise). | Focus on these effects:* hot/sweaty/red skin
* increase in depth and frequency of breathing, increased heart rate.
 | Name the effects.Explain the effects. |  |
| Short-term effects of exercise (24 to 36 hours after exercise). | Focus on these effects:* tiredness/fatigue
* light headedness
* nausea
* aching/delayed onset of muscle soreness
* (DOMS)/cramp.
 | Name the effects.Explain the effects. |  |
| Long-term effects of exercise (months and years of exercising). | Focus on these effects:* body shape may change
* improvements in specific components of fitness
* build muscle strength
* improve muscular endurance
* improve speed
* improve suppleness
* build cardio-vascular endurance
* improve stamina
* increase in the size of the heart (hypertrophy)
* lower resting heart rate (bradycardia).
* Students should be taught the components of fitness to understand the long term effects of exercise.
 | Name the effects.Explain the effects. |  |

**Movement analysis (Paper 1)**

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| **Learning objective** | **Learning activity** | **Application** |  |
| First, second and third class lever systems within sporting examples. | Identification of first, second and third class lever systems.Basic drawings of the three classes of lever to illustrate the positioning of:* fulcrum
* load (resistance)
* Effort.

Draw linear versions of a lever, showing the positioning of the fulcrum, load/resistance and effort.Students do not need to draw anatomical body parts but must be able to link the correct lever to a sporting movement or action. Interpretation of sporting movements or actions which involve flexion or extension of the elbow, hip and/or knee, and plantar or dorsi-flexion at the ankle. | Know the names of the three components of a lever.Identify the points on a lever diagram.Link the levers to anatomical body parts (joints). |  |
| Mechanical advantage – an understanding of mechanical advantage in relation to the three lever systems. | Label the effort arm and load/resistance arm on the three classes of lever.Mechanical advantage = effort arm ÷ weight (resistance) arm.Labeling of the effort arm and resistance arm on lever drawings, and interpretation of the mechanical advantage of that lever. | Label the effort and weight/ resistance arm on a lever.Know the equation.Justify why one lever has a bigger mechanical advantage than another. |  |
| Analysis of basic movements in sporting examples. | Types of movement:* flexion/extension at the shoulder, elbow, hip and knee
* abduction/adduction at the shoulder
* rotation of the shoulder
* plantar flexion/dorsiflexion at the ankle.

This section links specific sporting actions to the types of movement. Teaching of this section should include but not be limited to the following sporting actions:* elbow action in push-ups/football throw in
* knee, hip and ankle action in running, kicking, standing vertical jump, basic squats
* shoulder action during cricket bowling (overarm rotation).

Include other sporting examples within teaching. | Know the names of the movements and what they mean.Identify these movements when in action.Interpret movements from one position to another.Interpret sporting movements at the shoulder, elbow, hip, knee and ankle. |  |
| Identification of the relevant planes (frontal, transverse, sagittal) and axes (longitudinal, transverse, sagittal) of movement used whilst performing sporting actions. | Planes (frontal, transverse, sagittal) and axes (longitudinal, transverse, sagittal) should be related to sporting actions. Teaching of these planes/axes should include but not be limited to the following sporting actions:* front somersault/forward roll/running action
* 360° twist (ice skating spin)/discus thrower rotating in circle effort cartwheel.

Focus on the specified planes/axes names. Make use of varying sporting examples. | Identify the planes of the body.Identify the axes of the body.Link the two together and make links to basic movements.Identify the relevant plane/ axes used within specified sporting movements. |  |

**Physical training (Paper 1)**

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| **Learning objective** | **Learning activity** | **Application** |  |
| Health and fitness. | Definitions of health and fitness.World Health Organization (WHO). | Simple recall of the definitions. |  |
| The relationship between health and fitness. | The relationship between health and fitness. Teaching should look at the potential relationship and should include concepts like:* decreased fitness because of ill health, ie poor
* health can result in an inability to train which lowers fitness
* Increased fitness despite ill health, ie unhealthy but able to train, increases fitness.
 | Use of the definitions.Basic links of the relationship.How one can affect the other and vice versa. |  |
| The components of fitness. | Definitions of the following components of fitness:* agility
* balance
* cardiovascular endurance (aerobic power)
* coordination
* flexibility
* muscular endurance
* power/explosive strength (anaerobic power)
* reaction time
* strength (maximal, static, dynamic and explosive)
* speed.

Only these components need to be taught. | Simple recall of definitions of each. |  |
| Linking sports and physical activity to the required components of fitness. | Understand and justify why the components of fitness (as stated above) may or may not be needed when performing certain physical activities and sports.Variety of sporting examples. | Recap the definitions above.Apply each to extreme examples, eg speed for sprinting.Apply to mixed use, eg in games. Evaluate and justify the importance of the components to varying sporting examples. Use of reasoned conclusions. |  |
| Reasons for and limitations of fitness testing. | Reasons for fitness testing should include:* to identify strengths and/or weaknesses in a performance/the success of a training program
* to monitor improvement
* to show a starting level of fitness
* to inform training requirements
* to compare against norms of the group/national averages
* to motivate/sets goals
* to provide variety to a training program.

Limitations of fitness testing should include:* tests are often not sport specific/too general
* they do not replicate movements of activity
* they do not replicate competitive conditions required in sports
* many do not use direct measuring/sub-maximal, therefore inaccurate/some need motivation/some have questionable reliability

they must be carried out with the correct procedures to increase validity. | Recall reasons for fitness testing.Recall limitations of fitness testing.Build on the repertoire of knowledge.Link to the box below, eg reasons for carrying out an agility test. |  |
| Measuring the components of fitness. | Students must gain knowledge of the main procedures of the tests used to measure the following components of fitness:* agility – Illinois Agility Test
* balance – Stork Balance
* cardiovascular endurance (aerobic power) – Multi Stage Fitness Test
* coordination – Wall Toss Test
* flexibility – Sit and Reach Test
* muscular endurance – Sit-Up Bleep Test
* power/explosive strength (anaerobic power) – Vertical Jump Test
* reaction time – Ruler Drop Test
* maximal strength – One Rep Max Test
* speed – 30 meter sprint test
* Strength – Handgrip Dynamometer Test.

Testing procedures refers to ‘how each test is carried out’ and includes reference to how the test is organized (when applicable) in relation to the following:* the facilities and the equipment needed to set it up
* the procedures that have to be followed – the tasks and the rules
* the measurements that are used to score the performance
* the way conclusions are drawn from the scores/results.

Evaluate whether or not these tests are relevant to performers in different sporting activities. Teaching should only cover the stated tests. Practical experience of completing some of/all of the tests.  | The basic protocol of each test.Full explanation of how to administer/ carry out each test.Include how data is collected – see box below.Evaluate the suitability of using each test for differing sports people. |  |
| Demonstration of how data are collected for fitness testing. | Understanding of how test scores are measured/recorded (eg in seconds, levels, centimeters, numbers). Definitions of the terms qualitative and quantitative, in relation to the collection of fitness testing data. Understanding that the quantitative data collected during fitness testing can be compared to national averages. |  |  |
| The principles of training and overload. | Focus on the key principles of training.SPORT to include:* specificity
* progressive overload
* reversibility
* Tedium.

Key principles of overload.FITT to include:* frequency
* intensity
* time
* type.

Students should be taught the terms and what they mean. | This is simply what the terms mean.The application to sporting activities is included below. |  |
| Application of the principles of training. | How the principles of training can be applied to bring about improvements in fitness.Application of the principles to sporting examples. | Re-cap of the terms above.How the principles can be applied to a sport.How the principles can be applied to varying sports.Evaluate how certain principles hold particular importance when training for certain sports.Make links to the training types below. |  |
| Types of training. | Understand the distinctions between different types of training.* **Circuit training** – consider space available, equipment available, number of circuit stations, work: rest ratio, the content/demand of the circuit can be altered in order to improve different components of fitness.
* **Continuous training** – sustained exercise at a constant rate (steady state) without rests, involving aerobic demand for a min of 20 minutes, eg running, swimming, rowing, cycling.
* **Fartlek training** – varying speed, terrain and work: rest ratios.
* **Interval training/high intensity interval training** – periods of exercising hard, interspersed with periods of rest or low intensity exercise.
* **Static stretching** – a way to stretch to increase flexibility, held (isometric) for up to 30 seconds, using correct technique, advisable to avoid over stretching.
* **Weight training** – choice of weight/exercise depends on fitness aim, eg strength/power training or muscular endurance, the importance of safe practice/lifting technique, the need for spotters.
* **Plyometrics** – to increase power. Use of plyometric exercises (eg bounding, depth jumping). Basic physiological understanding – eccentric contraction followed by larger concentric contraction.

Any training (and practice) method must take account of: * the training purpose(s), training thresholds/training targets/training zones (see calculating intensities below)

rest/recovery. | Name of each training type and basic understanding.Make links to the box above.Evaluate as per the box below. |  |
| Identification of the advantages and dis-advantages (the effects on the body) of training types linked to specific aims. | The advantages and disadvantages (the effects on the body) of each type of training method stated above.Students should be taught to select and evaluate appropriate training methods for various (aerobic and anaerobic) fitness needs and make links to sporting activity, eg continuous training is fully appropriate to marathon runners. | Recap of the training types.Basic evaluation of the importance of a training type to an activity.Evaluation and justification (with reasoned conclusions) as to why some training types are particularly useful for specified sports. |  |
| Calculating intensities to optimize training effectiveness. | Definition of training threshold.Calculate the aerobic/anaerobic training zone:* calculate maximum heart rate (220 minus age)
* calculate aerobic training zone (60–80% of maximal heart rate)
* calculate anaerobic training zone (80- 90% of maximal heart rate).

For circuit training, altering the time/rest/content of the circuit will determine the fitness aim.How to calculate one repetition maximum (one rep max) as part of weight training and how to make use of one rep max, with reference to:* strength/power training (high weight/low reps – above 70% of one rep max, approximately three sets of 4–8 reps)
* Muscular endurance (low weight/high reps – below 70% of one rep max, approximately three sets of 12–15 reps).

Students should be encouraged to calculate intensities for varying examples. | Basic recall of the specified intensities.Applications of each to specific training types.Linking the principles of training to sporting activities and training types, justifying the choice and the calculated intensity to be used.  |  |
| Considerations to prevent injury. | The training type/intensity should match the training purpose (eg aerobic or anaerobic).Where applicable, the following factors should be taken into account in order to prevent injury:* a warm up should be completed
* over training should be avoided, eg appropriate weight
* appropriate clothing and footwear should be worn
* taping/bracing should be used as necessary
* hydration should be maintained
* stretches should not be overstretched or bounce
* technique used should be correct, eg lifting technique
* appropriate rest in between sessions to allow for recovery.

Apply these to specified training types. | Basic recall of the potential ways to prevent injury.Evaluation of which ways are appropriate to which training types and sporting activities. |  |
| Specific training techniques – high altitude training as a form of aerobic training. | Learning should focus on how high altitude training is carried out:* train at high altitude
* there is less oxygen in the air and oxygen carrying capacity is reduced
* the body compensates by making more red blood cells to carry oxygen.
* Who it benefits:
* endurance athletes
* athletes that work aerobically.

Limitations:* can be difficult to complete training
* fitness can be lost
* can suffer from altitude sickness
* benefits are lost quite quickly.

Students do not need to know how to calculate intensities for altitude training.  | What is meant by altitude training.Knowledge of the physiology whilst at altitude.Knowledge of the benefits when returning to sea level.Evaluation of who would use altitude training with reasoned conclusions.  |  |
| Seasonal aspects. | Names of the three training seasons:* pre-season/preparation
* competition/peak/playing season
* post-season/transition.

An understanding of what each of the seasons entails (aims):* pre-season/preparation – general/aerobic fitness, specific fitness needs, being ready for competitive season
* competition/peak/playing season – maintain fitness levels, work on specific skills
* post-season/transition – rest and light aerobic training to maintain a level of general fitness.
 | The names of the three seasons.Explanation of what each season entails.Application to varying sporting examples.Evaluation of the importance of each season. |  |
| Warming up and cooling down. | The constituent parts of warming up and cooling down.Warming up should include:* gradual pulse raising activity
* stretching
* skill based practices/ familiarisation
* mental preparation
* increase amount of oxygen to the working muscles.

Cooling down should include:* maintain elevated breathing and heart rate, eg walk, jog
* gradual reduction in intensity
* stretching.
* The benefits of warming up:
* effect on body temperature
* range of movement increased
* gradual increase of effort to full pace
* psychological preparation
* practice of movement skills through the whole range of movement
* injury prevention.

The benefits of cooling down:* allowing the body to recover
* the removal of lactic acid/CO2/
* waste products
* prevent (delayed onset of) muscle soreness/ DOMS.
 | What ‘parts’ a warm up and cool down should entail.How these ‘parts’ can be done.Applied examples to sporting activities.Evaluation of the benefits to be achieved. |  |

**Use of data (Paper 1 and Paper 2)**

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| **Learning objective** | **Learning activity** |  **Application** |  |
| Quantitative data. | Quantitative data deals with numbers.  |  |  |
| Methods for collecting quantitative data. | Students should know that these data can be gained via:* questionnaires
* Surveys.
 |  |  |
| Qualitative data. | Qualitative data deals with descriptions.  |  |  |
| Methods for collecting qualitative data. | Students should know that these data can be gained via:* interviews
* observations.
 |  |  |
| Presenting data. | How to present data in tables.How to plot basic:* bar charts
* line graphs.

How to label x and y axes on bar charts and line graphs.This should include the ability to interpret data given to students within the examinations. | As part of the other topics, above and below. |  |

**Sports psychology (Paper 2)**

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| **Learning objective** | **Learning activity** | **Application** |  |
| Skill and ability. | Definitions of skill and ability. | Basic recall of the definitions of each.  |  |
| Skill classifications. | Basic definition of the following skill classifications:* basic/complex
* open/closed
* self-paced/externally paced
* gross/fine.

Students should know how to choose and justify the appropriate classifications in relation to sporting examples. The justifications must include reasoned judgments.  | Understand how a continuum line works.Knowledge of each continuum extreme eg closed.Application of each point of the continua lines to sporting examples.Full justifications for the choices of where skills fall. |  |
| Definitions of types of goals. | Basic definitions of the following types of goals:* performance goals (personal performance/no social comparison)
* Outcome goals (winning/ result).

Appropriate performance and/or outcome targets for sporting examples. Include application to varying examples. | The names of the goal types.Explanation of these goal types.Application of the goal types to sporting examples.Evaluation of these goal types to various level of performers as shown below. |  |
| The use and evaluation of setting performance and outcome goals in sporting examples. | Cover the main points that:* Performance and outcome goals can be combined. However, it is generally accepted to avoid outcome goals as they rely on factors that cannot be controlled, eg other performers.
* beginners prefer to avoid outcome goals because failure can demotivate/winning may be an unrealistic goal. Students should be encouraged to provide reasoned conclusions to justify their explanations.
 | See above. |  |
| The use of SMART targets to improve and/or optimise performance. | Teaching should focus on SMART targets of goal setting, which are:* specific
* measureable
* accepted
* realistic
* time bound.
 | Know the names. Explain what they mean.Apply them to varying examples, ie what could a SMART target be for? |  |
| Basic information processing model. | The role of each stage (input, decision making, output and feedback) of the model.Input – information from the display (senses), selective attention.Decision making – selection of appropriate response from memory.Output – information sent to muscles to carry out the response.Feedback – received via self (intrinsic) and/or others (extrinsic).Draw (in a box format) and/or explain the stages of a basic model of information processing.Students should be able to apply the basic information processing model to skills from sporting examples.Students do need to know how to differentiate between the use of short term memory and long term memory. This should be in a box and a written format.  | Know the names of the stages.Be able to identify the stages on a diagram (including memory).Be able to explain the stages for basic skills.Be able to explain the stages for a variety of skills.Be able to evaluate the importance of each stage. |  |
| Identify examples of, and evaluate, the effectiveness of the use of types of guidance, with reference to beginners and elite level performers. | Evaluation of the use of the following types of guidance with specific links to:* visual (seeing)
* verbal (hearing)
* manual (assist movement – physical)
* mechanical (use of objects/ aids).

Students need to be able to choose and justify which types of guidance are appropriate for beginners and/or elite level performers. This should include examples of how the guidance can be given, eg visual via demonstration. Students should provide reasoned conclusions for their evaluations.  | Know the types of guidance.Explain the types of guidance.Link the types of guidance to the stages of learning, providing reasoned conclusions.  |  |
| Identify examples of, and evaluate, the effectiveness of the use of types of feedback, with reference to beginners and elite level performers. | Evaluation of the use of the following types of feedback with specific links to beginners and to elite level performers:* positive/negative
* knowledge of results/knowledge of performance
* extrinsic/intrinsic.

Students need to know what each type of feedback entails and be able to choose and justify which types of feedback are appropriate for beginners and/or elite level performers. Students have to provide reasoned conclusions for their evaluations. | Know the types of feedback.Explain the types of feedback.Link the types of guidance to the stages of learning, providing reasoned conclusions. |  |
| Arousal  | Definition of arousal. | Simple recall definition. |  |
| Inverted-U theory | The shape of the ‘inverted-U’ placed appropriately in a graph depicting y axis (performance level – low to high) and x axis (arousal level – low to high).Students must be able to draw an inverted- U graph with both x and y axis appropriately labeled.Describe the inverted-U graph.The relationship between arousal level and performance level, eg when under aroused, performance level is low/under or over arousal causing low performance levels. | Draw an inverted U on graph paper including the axes labeled.Explain the stages of the inverted U (before optimum point, optimum point and after optimum point). |  |
| How optimal arousal levels vary according to the skill being performed in a physical activity or sport. | Link appropriate arousal level (high/low) to gross/fine skills in sporting actions.Link skills (not sports) to an appropriate arousal level, eg a tackle in rugby will need a high arousal level. | Using knowledge from above.Apply the inverted U to varying practical skills – does it need high, medium, low?Encourage students to justify their answers. |  |
| How arousal can be controlled using stress management techniques before or during a sporting performance | Knowledge of the following stress management techniques:* deep breathing
* mental rehearsal/visualization/ imagery
* positive self-talk.

Students should be able to explain how these techniques are carried out.  | Name the techniques.Explain the techniques.Apply the techniques to when/how they could be used in sporting examples. |  |
| Understand the difference between direct and indirect aggression with application to specific sporting examples. | Definition of direct and indirect aggression. Students should be taught to know the meaning of the terms direct and indirect aggression, and be able to suggest examples of direct/ indirect aggression in sport. | Understand and explain the terms direct and indirect aggression.Provide sporting examples of when these occur.Justify the choices. |  |
| Understand the characteristics of introvert and extrovert personality types, including examples of sports which suit these particular personality types. | Focus on the characteristics of personality types and the link to sporting choice. Characteristics of an introvert:* shy/quiet
* thoughtful
* enjoy being on their own/ loner.

Tend to play individual sports when:* concentration/precision (fine skill) is required
* low arousal is required.

Characteristics of an extrovert:* enjoy interaction with others/sociable/aroused by others
* enthusiastic/talkative
* prone to boredom when isolated/by themselves.

Tend to play team sports when:* there is a fast pace
* concentration may need to be low
* gross skills are used.
 | Knowledge of the terms introvert and extrovert.Explain the characteristics of an introvert/ extrovert.Apply the sporting choices of a typical introvert/ extrovert.Justify the choices. |  |
| Definition of intrinsic and extrinsic motivation, as used in sporting examples. | Focus on intrinsic/extrinsic motivation. Intrinsic is from within – for pride/self-satisfaction/personal achievement.Extrinsic is:* from another source/person
* tangible – certificates/ trophies, medals
* Intangible – praise/ feedback/applause.

Students should be able to explain appropriate examples of intrinsic and extrinsic motivation linked to sporting examples. | Knowledge of the terms.Explanation of the types of motivation.Evaluate the worth or significance of both types, using practical examples (see the box below). |  |
| Evaluation of the merits of intrinsic and extrinsic motivation in sport. | Link to the box above: * Intrinsic is generally deemed more effective. Overuse of extrinsic can undermine the strength of intrinsic.
* Performer can become reliant on extrinsic. Intrinsic is more likely to lead to continued effort and participation.
* Extrinsic rewards may result in feelings of pride/self-satisfaction.
 | See above. |  |

**Socio-cultural influences (Paper 2)**

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| **Learning objective** | **Learning activity** | **Application** |  |
| Engagement patterns of different social groups and the factors affecting participation. | Focus on the engagement patterns in physical activity and sport can differ between different social groups.Understand factors that contribute to engagement patterns in the following social groups:* gender
* race/religion/culture
* age
* family/friends/peers
* disability.

Students should be able to make links between the following factors and their relevance to engagement patterns of the groups above:* attitudes
* role models
* accessibility (to facilities/clubs/ activities)
* media coverage
* sexism/stereotyping
* culture/religion/ religious festivals
* family commitments
* available leisure time
* familiarity
* education
* socio-economic factors/ disposable income
* adaptability/ inclusiveness.

Teaching should facilitate student thinking. The list above is not always appropriate to the circumstances and students should be encouraged to analyse the barriers and make reasoned conclusions as to which barriers are appropriate.  | Understand the social groups.Develop a basic understanding of relevant factors.Develop analytical skills to ascertain what factors are relevant to differing circumstances. |  |
| Commercialization. | Define commercialization.Links should be made to the relationship between sport, sponsorship and the media. | Define commercialization.Explain commercialization.Analyze/ evaluate links between sport, sponsorship and the media. |  |
| Types of sponsorship and the media. | Definitions of sponsorship and the media. Types of sponsorship:* financial
* clothing and equipment, including footwear
* facilities.
* Types of media:
* television
* radio
* the press
* the internet
* social media.
 | Understand the types of sponsorship/ media.Apply examples of the above to different scenarios, eg types of media in mainstream sport. |  |
| Positive and negative impacts of sponsorship and the media. | The positive and the negative impacts of commercialized activity (sponsorship and the media) on the following:* performer
* sport
* official
* audience/spectator
* sponsor/company.

Students should be able to justify why the impact is positive and/or negative. Provide reasoned conclusions to your justifications. | Provide basic advantages and disadvantages of commercialized activity to the varying groups.Develop a breadth of understanding, ie several advantages and disadvantages.Evaluate the advantages and disadvantages.  |  |
| Positive and negative impacts of technology. | The positive and the negative impacts of technology on the following:* performer
* sport
* official
* audience/spectator
* sponsor/company.

Students should be able to justify why the impact is positive and/or negative.Examples of technology used in sport (eg Hawkeye, Television Match Official). However, the focus should be on technology generically, not on specific types of technology (eg Hawkeye, Television Match Official). Use examples but the mechanics of the examples will not be required in the examination(s).  | Provide basic advantages and disadvantages of technology in sport to the varying groups.Develop a breadth of understanding, ie several advantages and disadvantages.Evaluate the advantages and disadvantages, with applied examples to varying sports. |  |
| Conduct of performers. | Definitions of the following terms:* etiquette
* sportsmanship
* gamesmanship
* Contract to compete.
* Students should be able to give sporting examples of these terms.
 | Know the terms.Explain the terms.Applied examples of these terms to varying sporting activities. |  |
| Prohibited substances. | Categories of prohibited substances, including the basic positive effects and negative side effects:* stimulants
* narcotic analgesics
* anabolic agents
* peptide hormones (EPO)
* diuretics.
 | Know the terms.Explain the terms – what are they?\*Full application comes below. |  |
| Prohibited substances (blood doping).  | Focus on how blood doping occurs and the effects/side effects of doing it.Blood doping involves the removal of blood a few weeks prior to competition. The blood is frozen and re-injected just before competition.Blood doping leads to increased red blood cell count, which benefits endurance athletes.Side effects can be:* thickening of blood (viscosity)
* potential infection
* potential for heart attack
* embolism (blockage of vessel).

Teaching should focus on these side effects. | How blood doping is carried out.Side effects of blood doping.Evaluation of the advantages of blood doping, with reasoned conclusions.  |  |
| Drugs subject to certain restrictions (beta blockers). | Beta blockers are taken to:* reduce heart rate, muscle tension and blood pressure
* reduce the effects of adrenaline
* improve fine control/ preciseness.
* Side effects can lead to:
* nausea
* weakness
* heart problems.

Beta blockers should be prescribed by a medical professional. | Know the term beta blockers.Explain what they are.Understand the advantages/ disadvantages.Evaluate which type of sports person may take them. |  |
| Which type of performers may use different types of performance enhancing drugs (PEDs) with sporting examples. | * **Stimulants** – alertness.
* **Narcotic analgesics** – pain killers from over training.
* **Anabolic agents** – muscle mass.
* **Diuretics** – lose weight.
* **Peptide hormones** – oxygen carrying capacity.
* **Blood doping** – oxygen carrying capacity.
* **Beta blockers** – for fine motor control Students should be taught to understand in which sports performers may decide to use PEDs, with varying examples.
 | \*Evaluate the use of PEDs, which athletes would they benefit, with reasoned conclusions. |  |
| The advantages and disadvantages of taking PEDs for the performer. | Advantages include:* increased chances of success
* fame
* wealth
* level playing field.

Disadvantages include:* cheating/immoral
* associated health risks
* fines
* bans
* reputational damage.

Focus on the performer only and deal with generic advantages/ disadvantages for sports performers. | A basic understanding of the advantages and disadvantages. Develop a wider repertoire of understanding. |  |
| The disadvantages to the sport/event of performers taking PEDs. | Disadvantages include:* reputation
* credibility.

Focus solely on the disadvantages to sport generically.  | Develop understanding of the disadvantages. |  |
| Spectator behaviour (the positive and the negative effects of spectators at events). | The positive influence of spectators at matches/ events:* creation of atmosphere
* home-field advantage (for home team/individuals).

The negative influence of spectators at matches/events:* negative effect on performance as a result of increased pressure
* potential for crowd trouble/hooliganism
* safety costs/concerns
* negative affect on participation numbers amongst younger performers.

Focus on the advantages and disadvantages on sport generically but should be applied to varying examples.  | Develop an understanding of the advantages and disadvantages generically.Apply to varying examples. |  |
| Reasons why hooliganism occurs. | Reasons for hooliganism:* rivalries
* hype
* fuelled by alcohol/drugs
* gang culture
* frustration (eg at official's decisions)
* display of masculinity.

Focus should remain on these reasons although students can develop other reasons deemed justifiable.  | Develop a basic understanding of why hooliganism occurs.Develop the breadth of understanding.Apply this understanding to varying examples.See box below. |  |
| Strategies employed to combat hooliganism/ spectator behavior. | Strategies include:* early kick-offs
* all-seater stadia
* segregation of fans
* improved security
* alcohol restrictions
* travel restrictions/banning orders
* education/promotional activity/campaigns and high profile endorsements.

Students should be taught to evaluate the effectiveness of these strategies, eg high costs of security versus safety of spectators. Reasoned conclusions should be made to justify thinking.  | Recap of knowledge from the box above.Develop understanding of varying strategies.Apply this understanding to different sporting events.Develop reasoned conclusions to evaluate the effectiveness of these strategies. |  |

**Health, fitness and well-being (Paper 2)**

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| **Learning objective** | **Learning activity** | **Application** |  |
| Linking participation in physical activity, exercise and sport to health, well-being and fitness, and how exercise can suit the varying needs of different people. | Reasons for participation in physical activity, exercise and sport, and how performance in physical activity/sport can increase health, well-being and fitness.Physical health and well-being:* improves heart function
* improves efficiency of the body systems
* reduces the risk of some illness
* able to do everyday tasks
* to avoid obesity.

Mental health and well-being:* reduces stress/tension
* release of feel good hormones (serotonin)
* able to control emotions.

Social health and well-being:* opportunities to socialize/make friends
* cooperation
* teamwork
* have essential human needs (food, shelter, clothing).

Fitness:* improves fitness
* reduces the chances of injury
* can aid in the physical ability to work, eg on your feet all day/manual labour.
 | Recap what health & fitness mean.Develop the ability to explain the 3 concepts (physical, mental, social).Link exercise to the effects on each. |  |
| The consequences of a sedentary lifestyle. | Definitions of sedentary and lifestyle.Students should be able to explain the possible consequences of a sedentary lifestyle:* weight gain/obesity
* heart disease
* hypertension
* diabetes
* poor sleep
* poor self-esteem
* lethargy.
 | Understand the terms.Explain the terms.Apply knowledge of the terms to consequences. |  |
| Obesity and how it may affect performance in physical activity and sport. | Definition of obesity.Knowledge should be developed to explore how obesity may affect performance in physical activity and sport:* limits stamina/ cardiovascular endurance
* limits flexibility
* limits agility
* limits speed/power.

Causes ill health (physical):* cancer
* heart disease/heart attacks
* diabetes
* high cholesterol.
* Causes ill health (mental):
* depression
* loss of confidence.

Causes ill health (social):* inability to socialize
* inability to leave home.
 | Knowledge of what obesity is.Basic understanding of how it affects performance.Specific links to how it affects the aspects of health.  |  |
| Somatotypes. | Definitions of the following body types:* endomorph
* mesomorph
* ectomorph.

Students should be able to identify the most suitable body type for particular sports (or positions within a sport) and justify their choice with reasoned conclusions. | Know the body type names.Explanation of each body type.Application to varying sporting examples.Evaluate the appropriateness of the body types to sporting examples with reasoned justifications. |  |
| Energy use. | Knowledge on energy.Energy is measured in calories (Kcal) and is obtained from the food we eat.The average adult male requires 2,500 Kcal/day and the average adult female requires 2,000 Kcal/day but this is dependent upon:* age
* gender
* height
* energy expenditure (exercise).
 | Recall what is meant by energy.Recall the number of calories needed by an average male/female.Make links to the boxes below on what happens when too many/too little calories are consumed. |  |
| Nutrition – reasons for having balanced diet. | The concept that there is no food that contains all the nutrients the body needs.A balanced diet contains lots of different types of food to provide the suitable nutrients, vitamins and minerals required.The reasons for a balanced diet:* unused energy is stored as fat, which could cause obesity (particularly saturated fat)
* suitable energy can be available for activity
* the body needs nutrients for energy, growth and hydration.
 | Knowledge of the term balanced diet.Explanation of the term.Evaluation of why a balanced diet is needed. |  |
| Nutrition – the role of carbohydrates, fat, protein and vitamins/minerals. | * A balanced diet contains 55–60% carbohydrate, 25–30% fat, 15–20% protein
* **Carbohydrates** are the main and preferred energy source for all types of exercise, of all intensities.
* **Fat** is also an energy source. It provides more energy than carbohydrates but only at low intensity.
* **Protein** is for growth and repair of muscle tissue.
* **Vitamins** and **minerals** are for maintaining the efficient working of the body systems and general health.

Students do not need to know about specific vitamins and minerals. | Understand the constituents of a balanced diet.Understand the recommended % intake.Evaluate the importance of each element. |  |
| Reasons for maintaining water balance (hydration). | Definition of dehydration.Water balance (hydration) prevents dehydration.Teaching should develop understanding of the consequences of dehydration:* blood thickening (increased viscosity), which slows blood flow
* increases in heart rate/heart has to work harder/irregular heart rate (rhythm)
* increase in body temperature/ overheat
* slowing of reactions/ increased reaction time/poorer decisions
* Muscle fatigue/cramps.
 | Knowledge of the term dehydration.Knowledge of the consequences.Evaluate why water intake is required, making reasoned conclusions. |  |