
**GCSE
PHYSICAL EDUCATION
8582/1**

Paper 1 The human body and movement in physical activity and sport

Mark scheme

June 2023

Version: Final 1.0



Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

0 1

Which **one** of these structures attaches muscles to bones?

[1 mark]

Marks for this question: AO1 = 1

Answer D – Tendons (1)

0 2

Which **one** of these describes stroke volume?

[1 mark]

Marks for this question: AO1 = 1

Answer C – The volume of blood pumped by the heart in one contraction (1)

0 3

Which **one** of these muscles is found in the leg?

[1 mark]

Marks for this question: AO1 = 1

Answer B – Gastrocnemius (1)

0 4

Lisa is doing light aerobic training to maintain a level of general fitness.

In which **one** of these training seasons is she working in?

[1 mark]

Marks for this question: AO1 = 1

Answer B – Post-season (1)

0 5

Which **one** of these describes an isometric contraction?

[1 mark]

Marks for this question: AO1 = 1

Answer C – The muscle remains the same length (1)

0 6

Which **one** of these movements takes place in a frontal plane?

[1 mark]

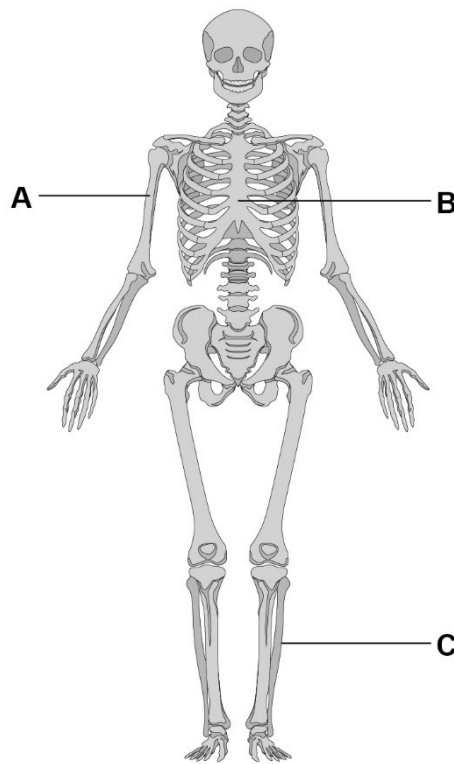
Marks for this question: AO2 = 1

Answer D – Star jump (1)

0 7

Figure 1 shows a human skeleton.

Figure 1



Identify the bones labelled **A**, **B** and **C** in **Figure 1**.

[3 marks]

Marks for this question AO1 = 3

Award **one** mark for each of the following up to a maximum of **three** marks.

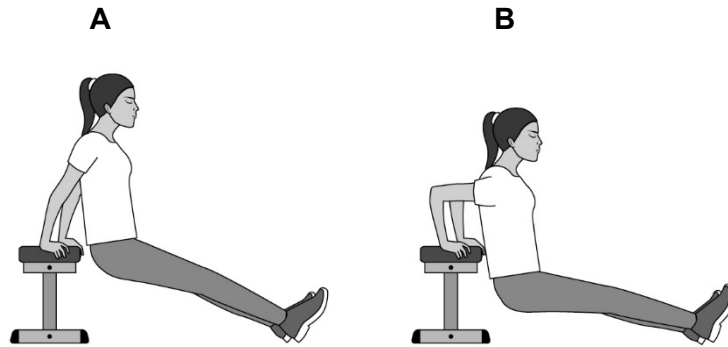
- **A** = Humerus (1)
- **B** = Sternum (1)
- **C** = Fibula (1)

Maximum 3 marks

0 8

Figure 2 shows an athlete in two different positions (**A** and **B**) as the athlete performs a tricep dip.

Figure 2



Use **Figure 2** to help answer the following questions.

0 8

. 1

Identify the joint action taking place at the **elbow** as the arm moves from **A** to **B**.

[1 mark]

Marks for this question AO2 = 1

Award **one** mark for identifying the joint action taking place at the **elbow** as the arm moves from **A** to **B**

- Flexion (1)

Maximum 1 mark

0 8

. 2

Identify the main antagonist at the **elbow** as the arm moves from **A** to **B**.

[1 mark]

Marks for this question AO2 = 1

Award **one** mark for identifying the main antagonist at the **elbow** as the arm moves from **A** to **B**.

- Bicep (1)

Maximum 1 mark

08.3

Identify the type of isotonic muscle contraction that is taking place at the **elbow** as the arm moves from **A** to **B**.

[1 mark]

Marks for this question AO2 = 1

Award **one** mark for identifying the type of isotonic muscle contraction taking place at the **elbow** as the arm moves from **A** to **B**.

- Eccentric (1)

Maximum 1 mark

09

Dynamic strength is required to perform in a 1000m rowing race.

Define 'dynamic strength'.

Justify why dynamic strength is important in a 1000m rowing race.

[4 marks]

Marks for this question AO1 = 1, AO3 = 3

Award **one** mark for a definition and a further **three** marks for the justification.

AO1 (sub-max 1 mark)

- Ability of the muscles or muscle groups to undergo repeated contractions or movements (1)

AO3 (sub-max 3 marks)

- Races usually take a long time to complete (3.30 – 10 minutes) (1)
- Dynamic strength enables their limbs to carry out the strokes required to complete the race (1)
- Dynamic strength delays the onset of muscular fatigue (1)
- Dynamic strength allows rowers to perform at their optimal levels for longer (1)
- Dynamic strength allows a rower to increase their capacity to train for longer periods of time (1)
- Dynamic strength may result in increased levels of cardiovascular endurance (1)

Accept any other suitable response.

Maximum 4 marks

1 0

Chris is an experienced 25-year-old 800m runner.

Table 1 shows Chris's heart rate in beats per minute (bpm) at **the start** and **during** an 800m race.

Table 1

Distance (m)	Heart rate (bpm)
0	80
200	130
400	140
600	160
800	200

1 0 . 1 Draw a line graph on the graph paper below to show Chris's heart rate at **the start** and **during** an 800m race.

Label the axes.

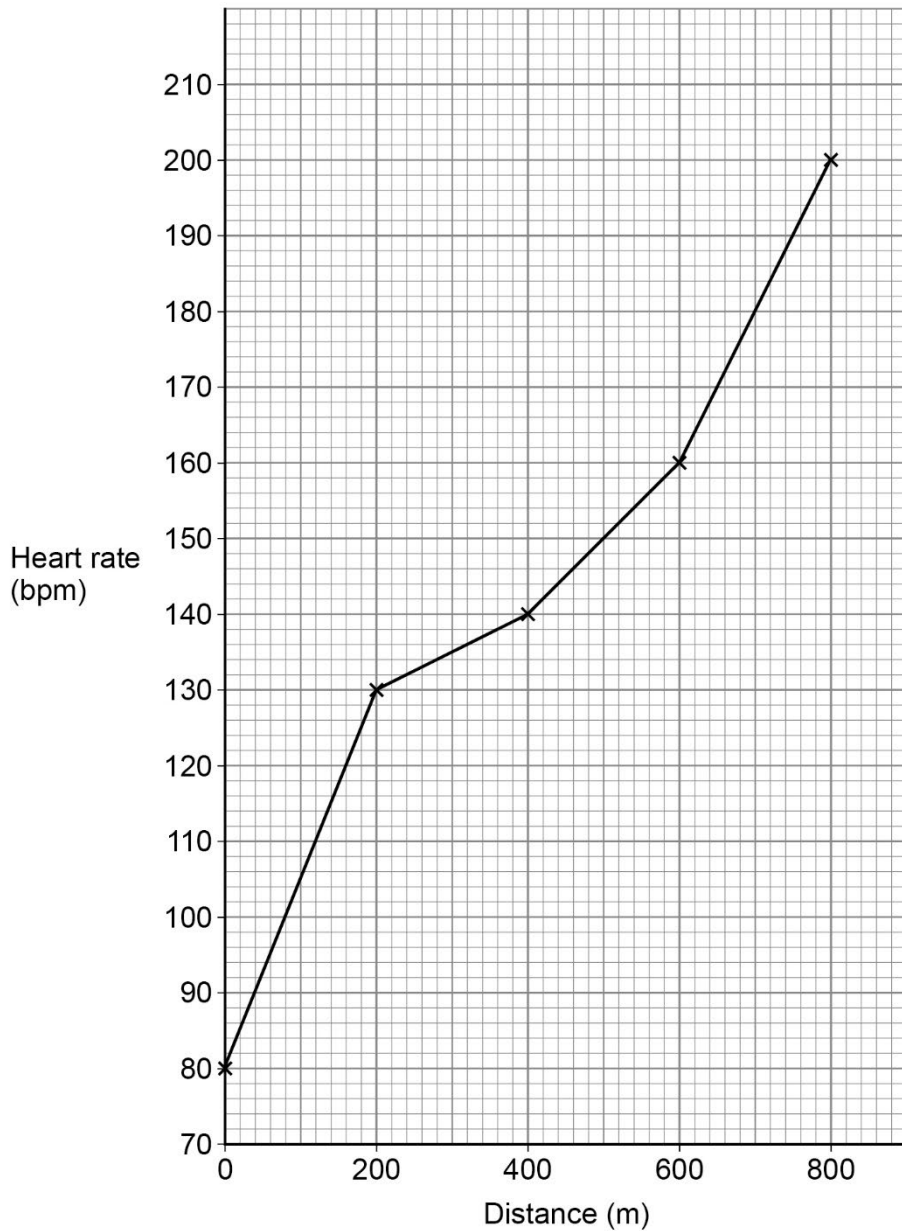
[2 marks]

Marks for this question AO2 = 2

Award **one** mark for each of the following up to a maximum of **two** marks.

- Axes are labelled (1)
- Line graph drawn correctly (1)

Maximum 2 marks



1 0 . 2

Chris has a resting heart rate of 50 beats per minute (bpm).

Explain why Chris's heart rate is higher at the start of the race than his resting heart rate.

[2 marks]

Marks for this question AO2 = 2

Award **one** mark for each of the following up to a maximum of **two** marks.

- He may have elevated his heart rate by warming up (1)
- Anticipatory rise (1)
- Hormone adrenaline is released (1)
- Excited or stressed or aroused (1)

Maximum 2 marks

1 0 . 3

Explain **three** factors that can affect Chris's speed of recovery.

[3 marks]

Marks for this question AO2 = 3

Award **one** mark for each of the following up to a maximum of **three** marks.

- Chris being an experienced runner will recover quicker due to a better aerobic capacity (1)
- As Chris is 25 years-old his heart rate will decrease quicker than an older person (1)
- Chris may participate in a cool down which will speed up removal of lactic acid or bring heart rate to normal slowly (1)
- The manipulation of diet to repair muscles or replenish energy stores or replace essential nutrients (1)
- Chris could drink fluids to ensure he is hydrated (1)
- Ice baths to prevent DOMS or remove lactic acid (1)

NB Hydration can be linked to diet manipulation but cannot be credited twice.

Accept any other suitable response.

Maximum 3 marks

1 0 . 4

Chris's breathing rate will change during the race.

Define tidal volume.

Explain the changes that occur to Chris's tidal volume during the 800m race.

[3 marks]

Marks for this question AO1 = 1, AO2 = 2

Award **one** mark for each of the following up to a maximum of **three** marks.

AO1 (sub-max 1 mark)

- The volume of air inspired **OR** expired/exchanged per breath (1)

AO2 (sub-max 2 marks)

- Tidal volume increases due to an increased depth of rate breathing (1)
- Due to a higher demand for oxygen (1)

Maximum 3 marks

1 1

Describe the pathway of blood from when it enters the heart on the right side to where it leaves the heart on the left side.

[5 marks]

Marks for this question AO1 = 5

Award **one** mark for each of the following points up to a maximum of **five** marks.

- Blood enters the heart via the right atrium (1)
- To the right ventricle (1)
- Pulmonary artery or lungs or pulmonary vein (1)
- To the left atrium (1)
- Then into the left ventricle (1)

Maximum 5 marks

1	2	<p>EPOC is excess post-exercise oxygen consumption.</p> <p>Explain how EPOC is caused.</p> <p>Give a sporting example when EPOC is likely to occur.</p>	[4 marks]
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Marks for this question AO1 = 3, AO2 = 1

Award up to **three** marks for explaining the process of EPOC and a further **one** mark for an example of a sporting action.

Cause (sub-max 3 marks)

- Caused due to vigorous (anaerobic) exercise (1)
- Lactic acid is built up (1)
- Need to maintain an elevated breathing rate (1)
- To repay the oxygen debt (1)

Example (sub-max 1 mark)

- After sprinting (1)
- After running 1500m (1)
- After a game of netball (1)

Accept any other suitable response.

Maximum 4 marks

1	3	.	1	<p>Define abduction.</p> <p>Use an example of a sporting action in your answer.</p>	[2 marks]
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Marks for this question AO1 = 1, AO2 = 1

Award **one** mark for a definition and **one** further mark for an example.

AO1 (sub-max 1 mark)

- Movement of the bone or limb away from the midline of the body (1)

AO2 (sub-max 1 mark)

- Performing the pull phase in the breaststroke (1)
- Extending an arm sideways when stretching to catch a ball (1)
- Outward phase of a star jump (1)

Accept any other suitable definition of abduction. Sporting examples must relate to where abduction occurs with the performer in that sport. Only one example can be credited.

Maximum 2 marks

1 3 . 2

Name the type of joint where abduction can take place.

[1 mark]

Marks for this question AO1 = 1

Award **one** mark for naming the type of joint where abduction takes place.

- Ball and socket (1)
- Ball and socket joint (1)

Maximum 1 mark

1 4

Delayed onset of muscle soreness (DOMS) can occur after vigorous exercise.

Evaluate the use of ice baths to prevent DOMS.

[4 marks]

Marks for this question AO3 = 4

Award **one** mark for each of the following up to a maximum of **four** marks.

- Used to bring about vasoconstriction / vasodilation to help remove lactic acid and reduce swelling / inflammation from micro tears in the muscles (1)
- Many anaerobic sports produce lactic acid and ice baths can help to reduce DOMS due to vasoconstriction which forces out blood containing lactic acid (1)
- Vasodilation floods the muscles with oxygenated blood after which vasoconstriction helps to flush away waste products to alleviate DOMS (1)
- Ice baths may not be accessible in many sports situations (only usually available to elite performers) and they may require some help to prepare an ice bath (1)
- A relatively quick and simple method requiring little / no specialist equipment (1)
- Many believe an active recovery of 10 minutes low intensity exercise is just as beneficial (1)
- Relatively unpleasant experience due to extreme cold on the body (1)

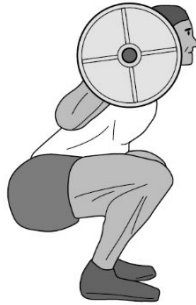
Accept any other suitable response.

Maximum 4 marks

1 5

Figure 3 shows a person performing a back squat.

Figure 3



1 5 . 1

Identify the class of lever used at the **knee** whilst performing the back squat in **Figure 3**.

[1 mark]

Marks for this question AO2 = 1

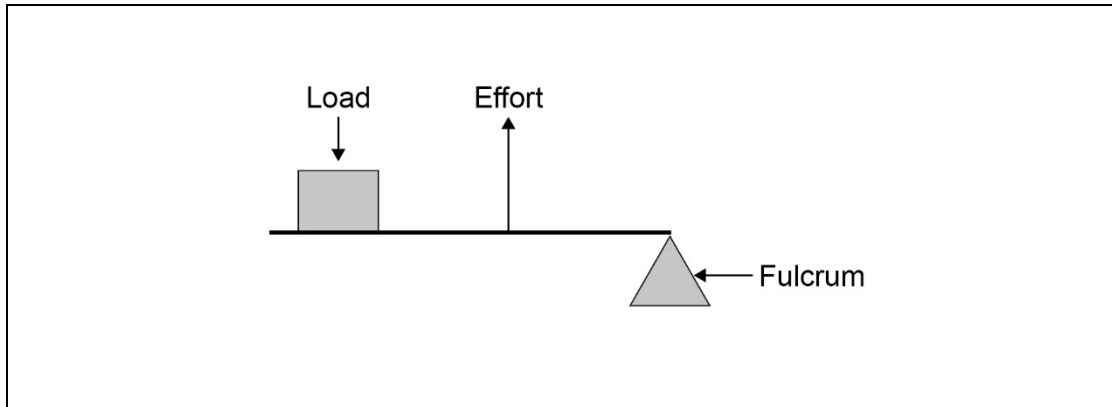
Award **one** mark for identifying the class of lever in **Figure 3**.

- Third class lever (1)

Maximum 1 mark

1 5 . 2 Draw a fully labelled diagram to show the class of lever identified in **Question 15.1**.
[2 marks]

Marks for this question AO2 = 2



Award **one** mark for each of the following.

- A correctly drawn diagram (1) – Load, Effort and Fulcrum in correct order (Effort must be in the middle)
- A correctly labelled diagram (1) – arrow pointing in the correct direction for effort, load above the line, fulcrum below the line, effort above or below the line.

NB Accept resistance instead of load and R/L F and E. Do not award marks for drawing a third class lever if they do not identify it in **Question 15.1**.

Maximum 2 marks

1 5 . 3 Explain why the lever in **Figure 3** has a low mechanical advantage.
[2 marks]

Marks for this question AO2 = 2

Award **one** mark for each of the following points up to a maximum of **two** marks.

- Effort arm is shorter than the resistance arm or resistance arm is longer than the effort arm (1)
- $MA = \text{Effort arm} \div \text{resistance arm}$ or load (1)
- Third class levers allow joints to move very quickly over a large range of movement (1)
- Third class levers have a mechanical advantage of less than one (1)

Accept any other suitable explanation why a third class lever has a low mechanical advantage.

Maximum 2 marks

1 6 . 1

A weightlifter must calculate their workload intensity correctly.

State how a weightlifter would calculate their workload intensity.

[1 mark]

Marks for this question AO1 = 1

Award **one** mark for each of the following points up to a maximum of **one** mark.

- A percentage of 1RM (1)
- A percentage of 1 rep maximum (1)

Maximum 1 mark

1 6 . 2

Describe how a weightlifter would calculate their workload intensity if they were trying to improve their muscular endurance.

[2 marks]

Marks for this question AO1 = 2

Award **one** mark for each of the following points up to a maximum of **two** marks.

- Low weights and high repetitions (1)
- Below 70% of one rep max (1)
- Approximately three sets of 12–15 repetitions (1)

Maximum 2 marks

1 6 . 3

Discuss whether the One Rep Max Test is a relevant test for a gymnast.

[4 marks]

Marks for this question AO3 = 4

Award **one** mark for each of the following points up to a maximum of **four** marks.

Agree (sub-max 2 marks)

- Strength is a key component of fitness for a gymnast (1)
- Strength is used in many of the individual disciplines of gymnastics (vault / beam) as well as floor routines (1)
- There are a variety of One Rep Max Tests to test different types of strength (1)

Disagree (sub-max 2 marks)

- The test is not sport specific and does not test the different intensities that are required in gymnastics eg moving bodyweight quickly (1)
- The test does not test any of the skill-based requirements of a gymnast (eg, somersaults, balances or equivalent examples) (1)
- Can be argued that other components of fitness are more important eg, flexibility to perform gymnastic moves, power to continually move bodyweight quickly (1)

Accept any other suitable discursive point around the relevance of the One Rep Max Test for a gymnast.

Maximum 4 marks

1 7

Poppy is a 100 metre sprinter.

1 7 . 1

Speed is important to Poppy.

Name and describe a test that measures speed.

[4 marks]

Marks for this question AO1 = 4

Award **one** mark for each of the following up to a maximum of **four** marks.

Test

- 30 Metre Sprint test.

Description

- Two markers the correct distance apart (1)
- Use a flying start (1)
- Run as fast as you can (1)
- Performer is timed between the two markers (1)

NB If the test is incorrect, no marks awarded for the description.

Maximum 4 marks

1	7	2	Define reaction time.
			State one reason why reaction time is important to Poppy.
			[2 marks]

Marks for this question AO1 = 1, AO2 = 1

Award **one** mark for each of the following points up to a maximum of **two** marks.

AO1 (sub-max 1 mark)

- The time taken to initiate a response to a stimulus (1)

AO2 (sub-max 1 mark)

- React to the gun quicker (1)
- Get off the blocks faster (1)
- Get in front of the other runners (1)

Maximum 2 marks

1	8	Describe the process of high altitude training.
		Use a sporting example in your answer.
		[3 marks]

Marks for this question AO1 = 2, AO2 = 1

AO1 (sub-max 2 marks)

- There is less oxygen in the air (1)
- The body compensates by making more red blood cells (1)
- The body becomes more efficient when return to sea level (1)
- Oxygen carrying capacity increases (1)
- At sea level, able to perform at a greater intensity for longer (1)

AO2 (sub-max 1 mark)

- Long distance runner / cyclist / swimmer
- Any aerobic athlete

Maximum 3 marks

1	9	Evaluate the importance of agility and flexibility in a 200m freestyle swimming race.
		[6 marks]

Marks for this question: AO1 = 1, AO2 = 2, AO3 = 3

Level	Marks	Description
3	5–6	Knowledge of agility and flexibility is accurate and generally well detailed. Application to a 200m swimmer is mostly appropriate, clear and effective. Evaluation is thorough, reaching valid and well-reasoned conclusions as to the effectiveness for both components of fitness. The answer is generally clear, coherent and focused, with appropriate use of terminology throughout.
2	3–4	Knowledge of agility and flexibility is evident but is more detailed for one than the other. There is some appropriate and effective application to a 200m swimmer, although not always balanced and presented with clarity. Any evaluation is clear but reaches valid and well-reasoned conclusions for one component of fitness more than the other. The answer lacks coherence in places, although terminology is used appropriately on occasions.
1	1–2	Knowledge of agility and flexibility is limited. Application to a 200m swimmer is either absent or inappropriate. Evaluation is poorly focused or absent, with few or no reasoned conclusions for either component of fitness. The answer as a whole lacks clarity and has inaccuracies. Terminology is either absent or inappropriately used.
0	0	No relevant content.

Possible content may include:

AO1 – Knowledge of agility and flexibility eg

- Agility – the ability to move and change direction quickly (at speed) whilst maintaining control.
- Flexibility – the range of movements possible at a joint.

AO2 – Application to a 200m swimmer eg

- A swimmer requires agility to enable them to turn quickly at the end of the pool.
- A swimmer doesn't require a high level of agility as they swim in straight lines in lanes.
- A swimmer requires flexibility to help prevent injuries.
- A swimmer requires flexibility to exert more power through the water.
- A swimmer requires flexibility to extend their arms at the finish.
- A swimmer requires flexibility to improve their technique and swimming efficiency.
- A swimmer requires flexibility to assist in diving at the start of a race.

AO3 – Evaluate the importance of agility and flexibility in a 200m freestyle swimming race, eg

Agility

- Any changes in direction could result in leaving a lane and being disqualified from the race.
- A swimmer will benefit from good agility to enable them to turn quicker and therefore record a faster time.

Flexibility

- Flexibility is the ability to use power through the full range of motion of a joint, helping the swimmer to exert more force through the water resulting in a faster time.
- Flexibility helps increase the length of the arm reach enabling the swimmer to swim quicker.
- Flexibility will allow the swimmer to extend their ankles and legs through a greater range of movement, enabling them to kick harder, resulting in more speed through the water.
- Flexibility will enable a swimmer to turn quicker at the end of the pool and therefore record a faster time.
- Flexibility will enable a swimmer to stretch further, increasing the chances of winning the race (arms) or completing a tumble turn (legs) quicker.
- Flexibility will enable a swimmer to have a greater range of movement at a joint therefore they may be able to have a better and more efficient technique when performing the freestyle.

Credit other suitable responses relevant to the question.

Maximum 6 marks

2	0	Using the principles of training, analyse how the long-term benefits of training are important to a games player.	[9 marks]
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Marks for this question: AO1 = 2, AO2 = 2, AO3 = 5

Level	Mark	Descriptor
3	7–9	Knowledge of the principles of training and the long-term benefits of training is accurate and generally well detailed. Application to a games player is mostly appropriate, clear and effective. Analysis is thorough, reaching valid and well-reasoned conclusions. The answer is generally clear, coherent and focused, with appropriate use of terminology throughout.
2	4–6	Knowledge of the principles of training and / or the long-term benefits of training is evident but is more detailed for one than the other. There is some appropriate and effective application to a games player, although not always balanced and presented with clarity. Any analysis is clear, reaching valid and well-reasoned conclusions for one part of the question more than the other. The answer lacks coherence in places, although terminology is used appropriately on occasions.
1	1–3	Knowledge of the principles of training and the long-term benefits of training is limited. Application to a games player is either absent or inappropriate. Analysis is poorly focused or absent, with few or no reasoned conclusions. The answer as a whole lacks clarity and has inaccuracies. Terminology is either absent or inappropriately used.
0	0	No relevant content.

Possible content may include:

AO1 – Knowledge of the principles of training and the long-term benefits of training eg

Principles of training

- Specificity
- Progressive overload (FITT)
- Tedium

Long-term benefits of training

- Body shape may change.
- Improvements to specific components of fitness.
- Build muscular strength.
- Improve muscular endurance.
- Improve speed.
- Improve suppleness.
- Build cardiovascular endurance.
- Improve stamina.
- Increase in the size of the heart (hypertrophy).

- Lower resting heart rate (bradycardia).

AO2 – Application of the principles of training and the long-term benefits of training to a games player eg

Principles of training

- Games players need to apply the principles of training (SPORT and FITT) if they are to make progress in their sport or activity.
- Games players need to train specifically for their chosen sport or activity.
- Games players require a range of the components of fitness to perform, depending on their sport or activity.
- Games players need to work on their fitness and bring about long-term improvements if they are to progress.

Long-term benefits of training

- By applying the principles of fitness to exercise over months and years a games player may experience many beneficial long-term effects on their body.

AO3 Using the principles of training to gain fitness, analyse how the long-term benefits of training are important to a games player eg

Principles of training

- A games player would train specifically for the demands of their sport or activity eg a games player would practice, dribbling, passing and shooting.
- A games player may also work on both the aerobic (low-intensity movement around the pitch / court) and anaerobic (sprinting and jumping) system as most games require both energy systems.
- A games player may work specifically on the position or role they play in the game.
- A games player would develop their skills and fitness by using progressive overload, so that they can gradually improve both skills and fitness. This would be achieved by gradually increasing FITT.
- A games player would look to include variety into their training sessions so as not to suffer from tedium and lose motivation for training and playing.

Long-term benefits of training

- A games player's body shape may change allowing them to be more agile and energy efficient whilst playing their chosen sport or activity.
- A games player may gradually improve numerous components of fitness to enable them to play with more success or at a higher level, eg agility to dribble around opponents and power to jump higher when attacking a ball.
- A games player may increase their muscular strength so that they can shoot further from further out or throw a long pass effectively.
- A games player may improve their muscular endurance allowing them to play at a higher intensity of longer or complete the game.
- A games player may increase their speed enabling them to move up and down the pitch / court quicker, eg a fast break or moving quickly back into a defensive position.
- A games player may increase their suppleness which will help in their technique and help to prevent overstretching injuries.
- A games player may increase their cardiovascular endurance and stamina enabling them to continue playing the game and recovering quicker.

- A games player may see an increase in the size of their heart (hypertrophy) and a lower resting heart rate (bradycardia) which will assist in meeting the oxygen demands of the sport and enable them to recover quicker.
- A games player will learn and appreciate the need for following various methods of recovery from playing the games eg cool down, manipulation of diet, ice baths / massage.
- A games player will learn and appreciate the need to follow a number of considerations to prevent injury, eg correct technique / warm up.

Credit other suitable responses relevant to the question.

Maximum 9 marks

Question	AO1	AO2	AO3
1	1		
2	1		
3	1		
4	1		
5	1		
6		1	
7	3		
8.1		1	
8.2		1	
8.3		1	
9	1		3
10.1		2	
10.2		2	
10.3		3	
10.4	1	2	
11	5		
12	3	1	
13.1	1	1	
13.2	1		
14			4
15.1		1	
15.2		2	
15.3		2	
16.1	1		
16.2	2		
16.3			4
17.1	4		
17.2	1	1	
18	2	1	
19	1	2	3
20	2	2	5
Total	33	26	19