A-LEVEL PHYSICAL EDUCATION – SUMMER WORK 2025

KEY QUESTION – SHOULD ATHLETES USE ERGOGENIC AIDS/PERFORMING ENHANCING DRUGS/ILLEGAL PROCEDURES?

INTRODUCTION

The desire to win at all costs in the competitive world of modern sport means that performers continue to take drugs/various ergogenic aids illegally, despite the obvious risks and consequences. You require an understanding of the **reasons why** sports performers take drugs, possible **arguments for their legalisation** and ways in which drug taking can be **eliminated**. As well as the physiological performance benefits and risks associated with taking illegal drugs/methods.

Task 1: Read the article 'Doping offences that shocked the world' AND' the fight against doping'. See appendix (end of this document)

Task 2: Write your own article concerning the ethics around doping in sport. Explain why some athletes take performance enhancing drugs (e.g. anabolic steroids etc) or participate in illegal methods (e.g. blood doping), despite the risks/consequences.

Include detail on the physiological, social, psychological benefits.

Discuss the consequences and implications to the performers themselves, the sport they are involved in and the impact on society.

Highlight any strategies that are employed to stop the use of illegal drugs and doping.

Should we support a ban? Should we support legalisation?

Conclusion

Task 3: Watch the following Clips

Skeleton, Joints, Muscles, Movements A-Level PE - YouTube

CIE IGCSE PE - Muscle Fibre Types - YouTube

Complete Task 4 and 5

WELCOME TO A-LEVEL P.E. (Anatomy & Physiology)

TASK 4

As part of the Applied anatomy and physiology work, you are required to gain a detailed understanding of the skeletal and muscular systems.

On an A3 piece of paper design a factual poster of two major joints in the body. You should choose a joint from the upper body (shoulder, elbow or wrist) and a joint from the lower body (hip, knee or ankle).

Your poster, must include:

- An anatomical diagram of each joint.
- What type of joint it is (e.g. hinge etc). Wrist is a condyloid joint!
- The bones that articulate at the joint.
- The muscles that are involved at the joint.
- The movements that can take place at the joint (e.g. flexion etc).
- Explanation of the function of the components of a synovial joints (to include – ligaments, tendons, cartilage, synovial fluid, bursa and joint capsule).
- Give detailed practical examples of when the joint is used during sporting actions.

You can present your poster in any way that you would like. Make sure that your information is correct. You can include diagrams.

You will then be required to present this information during a lesson. Go to the OCR A-Level PE website. Then click on planning and teaching resources. There is also a very useful power point on the skeletal and muscular systems that would will help you. You will find it in the Topic exploration packs.

All of your work will be marked

TASK 5

One part of applying the theory to a sporting performance, requires you to produce a movement analysis.

- For **ONE skill from your main sport** (e.g. shooting technique in netball, tennis serve technique or track start off the blocks in swimming etc), you need to identify the **movement phases of one upper body joint and one lower body joint. What you need to do? To identify …**

a) The movements that have taken place at the 2 joints at different stages of the performance of the skill you are looking at e.g. flexion in the preparation phase. There are some new movements that you haven't come across before that you will need to research (they are horizontal flexion and extension at the shoulder, dorsi-flexion and plantar flexion at the ankle, medial and lateral rotation at the shoulder and hip joints)!!

b) The agonist muscle.

c) The antagonist muscle.

d) The joint type e.g. ball & socket.

e) The bones that articulate at the joint.

f) The type of muscle contraction taking place (concentric, eccentric or isometric).

REMEMBER that more than one movement pattern may take place at each joint.

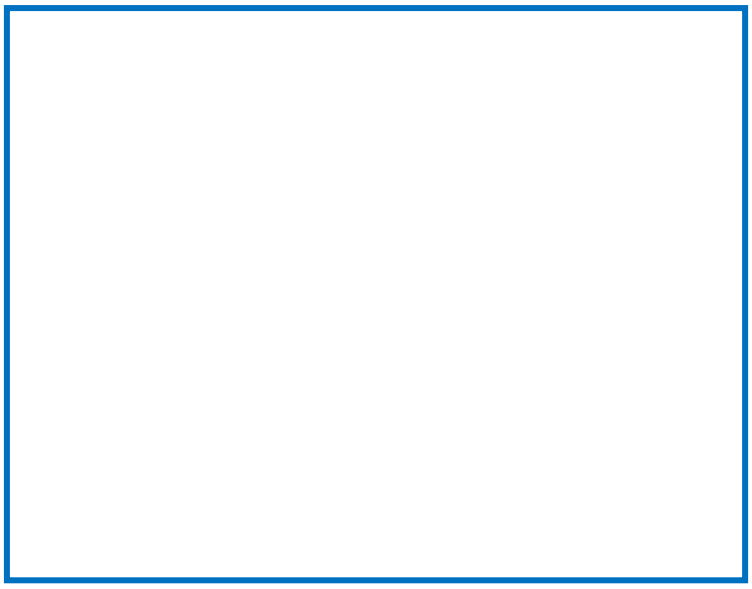
Use the tables to help you

SKILL

IMAGE OF PREPARATION PHASE

IMAGE OF EXECUTION PHASE

IMAGE OF RECOVERY PHASE



SKILL **PHASE**

	JOINT TYPE	BONES AT JOINT	MOVEMENT	AGONIST	ANTAGONIST	TYPE OF CONTRACTION/PLANE OF MOVEMENT
Upper body Joint						
Lower body joint						

SKILL **PHASE**

	JOINT TYPE	BONES AT JOINT	MOVEMENT	AGONIST	ANTAGONIST	TYPE OF CONTRACTION/PLANE OF MOVEMENT
Upper body Joint						
Lower body joint						

SKILL _____ **PHASE** _____

	JOINT TYPE	BONES AT JOINT	MOVEMENT	AGONIST	ANTAGONIST	TYPE OF CONTRACTION/PLANE OF MOVEMENT
Upper body Joint						
Lower body joint						

MOVEMENT ANALYSIS HELP TABLE

JOINT	JOINT MOVEMENT	AGONIST MUSCLE (Concentric Muscle Contraction)	ANTAGONIST MUSCLE (Eccentric Muscle Contraction)
WRIST	FLEXION	WRIST FLEXORS	WRIST EXTENSORS
	EXTENSION	WRIST EXTENSORS	WRIST FLEXORS
ELBOW	FLEXION	BICEPS BRACHII	TRICEPS BRACHII
	EXTENSION	TRICEPS BRACHII	BICEPS BRACHII
SHOULDER	FLEXION	ANTERIOR DELTOID	POSTERIOR DELTOID
	EXTENSION	POSTERIOR DELTOID	ANTERIOR DELTOID
	HORIZONTAL FLEXION	PECTORALIS MAJOR	POSTERIOR DELTOID/TERES MINOR
	HORIZONAL EXTENSION	POSTERIOR DELTOID/TERES MINOR	PECTORALIS MAJOR
	ABDUCTION	MIDDLE DELTOID	LATISSIMUS DORSI
	ADDUCTION	LATISSIMUS DORSI	MIDDLE DELTOID
	MEDIAL ROTATION	SUBSCAPULARIS & TERES MAJOR	INFRASPINATUS & TERES MINOR
	LATERAL ROTATION	INFRASPINATUS & TERES MINOR	SUBSCAPULARIS & TERES MAJOR

JOINT	JOINT MOVEMENT	AGONIST MUSCLE (Concentric muscle contraction)	ANTAGONIST MUSCLE (Eccentric muscle contraction)
HIP	FLEXION	ILIOPSOAS	GLUTEUS MAXIMUS
	EXTENSION	GLUTEUS MAXIMUS	ILIOPSOAS
	ABDUCTION	GLUTEUS MEDIUS & MINIMUS	ADDUCTOR LONGUS, BREVIS & MAGNUS
	ADDUCTION	ADDUCTOR GROUP (Longus, Brevis & Magnus)	GLUTEUS MEDIUS/MINIMUS
	LATERAL ROTATION	GLUTEUS MAXIMUS	GLUTEUS MEDIUS/MINIMUS
	MEDIAL ROTATION	GLUTEUS MEDIUS & MINIMUS	GLUTEUS MAXIMUS
KNEE	FLEXION	HAMSTRING GROUP (Biceps femoris, semitendinosus & semimembranosus)	QUADRICEPS GROUP
	EXTENSION	QUADRICEPS GROUP (Rectus femoris, vastus lateralis, vastus medialis & vastus intermedius)	HAMSTRINGS GROUP
ANKLE	DORSI-FLEXION	TIBIALIS ANTERIOR	GASTROCNEMIUS/SOLEUS
	PLANTAR-FLEXION	GASTROCNEMIUS/SOLEUS	TIBIALIS ANTERIOR

The fight against doping

Daniel Ashworth expands on this issue's poster, charting the fight against doping in sport (see pp. 16–17)

EXAM LINKS

Doping in sport is relevant to the socio-cultural/contemporary issues sections of each of the main exam boards.

The following cases show the challenges that anti-doping organisations have faced and overcome during the fight against doping.

'Supportive means'

Behind the Berlin Wall, the East Germans turned themselves into a sporting powerhouse, consistently finishing in the top three countries at the Summer Olympics. However, after the fall of the wall in 1989, the true extent of how they had achieved their success became known.

This was the first known example of **institutionalised doping**, and the shocking facts and effects are still playing out today. Thousands of athletes, some as young as 8, were given drugs, often through coercion, or after being told they were vitamins to help them improve. It has been estimated that the number of athletes involved could be up to 15,000, with at least one third of them now being affected by life-shortening illnesses.

Athletes were often given a cocktail of drugs, with their regime controlled by East Germany's doping chief Dr Manfred Höppner, who was supported by sports organisations and the *Stasi* (secret police). Hoppner's drug of choice was turinabol, an anabolic steroid, and all athletes were regularly tested before leaving Germany to make sure they would not test positive.

KEY TERM

Institutionalised doping Where doping is the norm within a country or sport and is often promoted by those in charge.

Worse than the cheating itself was the impact on the athletes' long-term health. Heart disease, hormonal problems and cancer are among the health issues athletes now have to live with. Due to the effects of the steroids, the impacts on female athletes have often been much worse, with many reporting deepened voices and excess body hair, as well as problems with pregnancies and hormonal issues, some of which may have led to gender reassignment.

Seoul 1988

The men's 100 m sprint at the 1988 Olympics has been dubbed one of the dirtiest races in history, with four of the top five testing positive and six of the eight finalists being implicated in doping at some point during their careers. Original winner Ben Johnson tested positive for stanozolol, a commonly used anabolic steroid, and later claimed he only used it to 'level the playing field'. The scandal led to a month-long inquiry in Johnson's native Canada, which found evidence of frequent use of performance-enhancing drugs and led to the creation of the Canadian Anti-Doping Program.

The Festina affair

In 1998, a member of the Festina cycling team was stopped at a border crossing into France, and his car was found to contain 400 bottles of steroids, erythropoietin (EPO) and other doping products. French police raided the team's offices and found more evidence of doping, including documents detailing what the riders were taking. This led to the team being expelled from the race and nine of the riders being arrested.

Five of the riders admitted to doping straight away and by the end of the year the entire team had admitted to doing so. During interviews, it became clear that other teams were also doping, and many vocalised their support for the arrested riders and claimed that doping should be legalised. On one stage of the race, riders twice stopped and threatened a mass withdrawal in protest at the treatment of the Festina team.

The farce highlighted the ingrained culture of doping in cycling at the time. Eight of the top ten that year were implicated in doping at some stage in their careers. In 2004, 60 samples from 1998 were reanalysed for EPO, with 34 athletes testing positive.

RESOURCES

de Hon, O. et al. (2014) 'The Prevalence of Doping Use in Elite Sports...', *Sports Medicine*, **www.tinyurl.com/y2cxmu8u**

Majendie, M. (2018) 'The desperate plight of former East Germany athletes', *Evening Standard*, **www.tinyurl.com/y4e72xfu**

The Dubin Inquiry into the Seoul Olympic scandal: **www.tinyurl.com/yyk29ohv**

'Balco Fast Facts', CNN, **www.tinyurl.com/y4lysct9**

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Doping offences that shocked the world

Box 1 'The Clear'

It is often said that the cheats are well ahead of the testers, and the BALCO case was a clear example of this. Victor Conte's San Francisco laboratory had produced a drug they correctly believed was undetectable. Tetrahydrogestrinone (THG, or 'The Clear' as it was known) never showed up in drugs tests.

However, when the former coach of Olympic champion Marion Jones anonymously provided a syringe to USADA, a test was developed. Samples in the USA were re-tested and athletes from a range of sports, including baseball and athletics, were banned. British sprinter Dwain Chambers was one athlete who was caught out by the new test, having been provided with THG, along with other drugs, by Conte. Marion Jones was stripped of her Olympic medals, and eventually imprisoned for 6 months after being charged with lying to federal agents.

1966 Drug testing begins in cycling and football, despite some substances having been banned in sport since the 1920s.

1968 Swedish pentathlete Hans-Gunnar Liljenwall becomes the first athlete to be disqualified from an Olympic Games for using a banned substance. The banned substance was alcohol — he had a drink before the event to steady his nerves.

1988 Ben Johnson is stripped of his Olympic 100 m gold medal after testing positive for anabolic steroids.

2002 The United States Anti-Doping Agency (USADA) and the US federal government begin investigations into the Bay Area Laboratory Co-operative (BALCO), eventually uncovering use of performance-enhancing drug 'The Clear' (Box 1).

British skier Alain Baxter fails a drugs test and loses his Olympic bronze medal. He used a nasal decongestant he believed to be the same as one he had used legally in the UK. However, the US version contained a banned substance without his knowledge. The punishments imposed still applied, as athletes are deemed to be ultimately responsible for what they put in their bodies.

2012 USADA charges cyclist Lance Armstrong with doping, among other violations. He had not tested positive, but USADA had collected enough evidence to charge him anyway. In 2013, Armstrong admitted to doping throughout his career.

2019 USADA bans athletics coach Alberto Salazar following a 5-year investigation, leading to the closing of the highly successful Nike Oregon project. The majority of the high-profile athletes Salazar worked with were not charged with doping.

1960 1970 1980 1990 2000 2010 2020

1967 British cyclist Tom Simpson dies during the Tour de France. His post mortem blamed a combination of heat exhaustion, amphetamines and alcohol. Simpson was Britain's top cyclist at the time and the race was broadcast live. While it was widely known that cyclists used stimulants, his death still caused a shock, and contributed to the mandatory introduction of drug testing at the following year's Olympics.

1974 East Germany begins implementation of 'supportive means' for all athletes (see p. 34).

1998 The Tour de France is rocked by arrests and strikes as the Festina affair is uncovered (see p. 34).

1999 The World Anti-Doping Agency (WADA) is founded after recent high-profile cases and a lack of consistency in anti-doping enforcement worldwide.

2004 WADA introduces the 'whereabouts' rule. This means that selected athletes have to provide a specified location where they can be found for testing for 1 hour every day. This aimed to stop examples occurring such as Dwain Chambers, who successfully avoided tests and used **masking agents**.

2006 Operación Puerto begins. The investigation linked top athletes from tennis and football to a doctor whose home was found to contain packets of blood and performance-enhancing drugs. While many athletes were banned, in some ways the operation was a failure, with many of the blood bags not being identified before the jurisdiction on them ended and they had to be destroyed.

2016 Tennis player Maria Sharapova announces that she has tested positive for newly banned drug meldonium. She was one of several athletes to do so, with many being from eastern Europe where the drug is routinely used, but one of the few charged. Others argued they had stopped using it before it was banned but it had remained in their system.

2020 Three-time Olympic swimming champion Sun Yang is banned for 8 years for failing to cooperate with sample testers. In 2018, Sun's entourage destroyed blood samples collected as part of a doping test.

EXAM LINKS

Doping in sport is relevant to the socio-cultural/contemporary issues sections of each of the main exam boards.

In recent years, doping has frequently made headline news, with top athletes and even entire sporting nations such as Russia being banned from competing. Doping cases are shocking and affect how sport is governed and viewed around the world.

However, despite the high-profile cases outlined here, only 1–2% of samples test positive from the thousands of tests carried out worldwide each year. More worrying is the fact that studies have estimated the actual prevalence to be anywhere between 14 to 39% of the athlete population. Anti-doping organisations still have some way to go to catch up with the cheats, but new scientific techniques, investigations and collaborations are closing the gap.

PEReviewExtras

Download this poster at www.hoddereducation.co.uk/pereviewextras

KEY TERM

Masking agent A reagent that reacts with chemical species, potentially interfering in chemical analysis. In sports, a masking agent is used to hide or prevent detection of banned substances or illegal drugs such as anabolic steroids or stimulants.
Diuretics are the simplest form of masking agent. They work by enhancing water loss via urine excretion and thus diluting the urine, which results in lower concentrations of the banned substance, as more of it is being excreted from the body, making it more difficult for laboratories to detect.

Daniel Ashworth is deputy head of testing at UK Anti-Doping (UKAD).