

# Topic Guide 1: Applied Anatomy and Physiology

**GCSE (9-1) Physical Education**

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**Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Physical Education (1PE0)**

**Pearson Edexcel Level 1/Level 2 GCSE (9-1) in Physical Education  
(Short Course) (3PE0)**

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# Topic Guide: GCSE Physical Education 2016 and 2017 – Applied Anatomy and Physiology

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## Introduction

This topic guide gives an overview of the specification topic: Applied anatomy and physiology. The guide is designed to give support by detailing content changes in relation to this topic and to give further clarity over the required breadth and depth that needs to be covered. The guide signposts possible resources to aid preparation and delivery and also gives some teaching ideas to assist with planning and delivery.

## Content and content changes

### Component 1, Topic 1: Applied Anatomy and Physiology

Subject content	What learners need to learn
	<p>In this topic, learners will develop knowledge and understanding of the key body systems and how they impact on health, fitness and performance in physical activity and sport through the following content.</p>
<p><b>1.1</b> <b>The structure and functions of the musculo-skeletal system</b></p>	<p><b>1.1.1</b> The functions of the skeleton applied to performance in physical activities and sports: protection of vital organs; muscle attachment; joints for movement; platelets; red and white blood cell production; storage of calcium and phosphorus</p>
	<p><b>1.1.2</b> Classification of bones: long (leverage); short (weight bearing); flat (protection, broad surface for muscle attachment); irregular (protection and muscle attachment), applied to performance in physical activities and sports</p>
	<p><b>1.1.3</b> Structure: cranium; clavicle; scapula; five regions of the vertebral column (cervical, thoracic, lumbar, sacrum, coccyx); ribs; sternum; humerus; radius; ulna; carpals; metacarpals; phalanges (in the hand); pelvis; femur; patella; tibia; fibula; tarsals; metatarsals; phalanges (in the foot); and their classification and use applied to performance in physical activities and sports</p>
	<p><b>1.1.4</b> Classification of joints: pivot (neck – atlas and axis); hinge (elbow, knee and ankle); ball and socket (hip and shoulder); condyloid (wrist); and their impact on the range of possible movements</p>
	<p><b>1.1.5</b> Movement possibilities at joints dependent on joint classification: flexion; extension; adduction; abduction; rotation; circumduction; plantar-flexion; dorsiflexion and examples of physical activity and sporting skills, and techniques that utilise these movements in different sporting contexts</p>
	<p><b>1.1.6</b> The role of ligaments and tendons, and their relevance to participation in physical activity and sport</p>
	<p><b>1.1.7</b> Classification and characteristics of muscle types: voluntary muscles of the skeletal system; involuntary muscles in blood vessels; cardiac muscle forming the heart; and their roles when participating in physical activity and sport</p>

Subject content	What learners need to learn
<p><b>1.1</b> <b>The structure and functions of the musculo-skeletal system</b></p>	<p><b>1.1.8</b> Location and role of the voluntary muscular system to work with the skeleton to bring about specific movement during physical activity and sport, and the specific function of each muscle (deltoid, biceps, triceps, pectoralis major, latissimus dorsi, external obliques, hip flexors, gluteus maximus, quadriceps, hamstrings, gastrocnemius and tibialis anterior)</p>
	<p><b>1.1.9</b> Antagonistic pairs of muscles (agonist and antagonist) to create opposing movement at joints to allow physical activities (e.g. gastrocnemius and tibialis anterior acting at the ankle – plantar-flexion to dorsiflexion; and quadriceps and hamstrings acting at the knee, biceps and triceps acting at the elbow, and hip flexors and gluteus maximus acting at the hip – all flexion to extension)</p>
	<p><b>1.1.10</b> Characteristics of fast and slow twitch muscle fibre types (type I, type IIa and type IIx) and how this impacts on their use in physical activities</p>
	<p><b>1.1.11</b> How the skeletal and muscular systems work together to allow participation in physical activity and sport</p>
<p><b>1.2</b> <b>The structure and functions of the cardio-respiratory system</b></p>	<p><b>1.2.1</b> Functions of the cardiovascular system applied to performance in physical activities: transport of oxygen; carbon dioxide and nutrients; clotting of open wounds; regulation of body temperature</p>
	<p><b>1.2.2</b> Structure of the cardiovascular system: atria; ventricles; septum; tricuspid; bicuspid and semi-lunar valves; aorta; vena cava; pulmonary artery; pulmonary vein; and their role in maintaining blood circulation during performance in physical activity and sport</p>
	<p><b>1.2.3</b> Structure of arteries, capillaries and veins and how this relates to function and importance during physical activity and sport in terms of: blood pressure; oxygenated and deoxygenated blood; and changes due to physical exercise</p>
	<p><b>1.2.4</b> The mechanisms required (vasoconstriction, vasodilation) and the need for redistribution of blood flow (vascular shunting) during physical activities compared to when resting</p>
	<p><b>1.2.5</b> Function and importance of red and white blood cells, platelets and plasma for physical activity and sport</p>
	<p><b>1.2.6</b> Composition of inhaled and exhaled air and the impact of physical activity and sport on this composition</p>
	<p><b>1.2.7</b> Vital capacity and tidal volume, and change in tidal volume due to physical activity and sport, and the reasons that make the change in tidal volume necessary</p>
	<p><b>1.2.8</b> Location of the main components of the respiratory system (lungs, bronchi, bronchioles, alveoli, diaphragm) and the role in movement of oxygen and carbon dioxide into and out of the body</p>

## Topic Guide: Applied Anatomy and Physiology

Subject content	What learners need to learn
<b>1.2</b> <b>The structure and functions of the cardio-respiratory system</b>	<b>1.2.9</b> Structure of alveoli to enable gas exchange and the process of gas exchange to meet the demands of varying intensities of exercise (aerobic and anaerobic)
	<b>1.2.10</b> How the cardiovascular and respiratory systems work together to allow participation in physical activity and sport
<b>1.3</b> <b>Anaerobic and aerobic exercise</b>	<b>1.3.1</b> Energy: the use of glucose and oxygen to release energy aerobically with the production of carbon dioxide and water; the impact of insufficient oxygen on energy release; the by-product of anaerobic respiration (lactic acid)
	<b>1.3.2</b> Energy sources: fats as a fuel source for aerobic activity; carbohydrates as a fuel source for aerobic and anaerobic activity
<b>1.4</b> <b>The short- and long-term effects of exercise</b>	<b>1.4.1</b> Short-term effects of physical activity and sport on lactate accumulation, muscle fatigue, and the relevance of this to the player/performer
	<b>1.4.2</b> Short-term effects of physical activity and sport on heart rate, stroke volume and cardiac output, and the importance of this to the player/performer
	<b>1.4.3</b> Short-term effects of physical activity and sport on depth and rate of breathing, and the importance of this to the player/performer
	<b>1.4.4</b> How the respiratory and cardiovascular systems work together to allow participation in, and recovery from, physical activity and sport: oxygen intake into lungs; transfer to blood and transport to muscles; and removal of carbon dioxide
	<b>1.4.5</b> Long-term effects of exercise on the body systems (see 3.4.1–3.4.4)
	<b>1.4.6</b> Interpretation of graphical representations of heart rate, stroke volume and cardiac output values at rest and during exercise

Some of this topic is covered in the current (2009) GCSE PE Specification. Where there are significant changes/additions, these are highlighted below; a lot of these topics, however, will be familiar to those who previously taught the 1827 GCSE PE syllabus. The main difference between the 2009 specification and this specification is the return to the requirement for learners to know about the structure and function of the body systems.

Subject content	Comments
<b>1.1.2 Classification of bones</b>	Long (leverage), short (weight bearing), flat (protection, broad surface for muscle attachment), irregular (protection and muscle attachment), applied to performance in physical activities and sports
<b>1.1.3 Structure of the skeletal system</b>	Cranium, clavicle, scapula, five regions of the vertebral column (cervical, thoracic, lumbar, sacrum, coccyx), ribs, sternum, humerus, radius, ulna, carpals, metacarpals, phalanges (in the hand), pelvis, femur, patella, tibia, fibula, tarsals, metatarsals, phalanges (in the foot), and their classification and use applied to performance in physical activities and sports
<b>1.1.4 Classification of joints</b>	Pivot (neck – atlas and axis), hinge (elbow, knee and ankle), ball and socket (hip and shoulder), condyloid (wrist), and their impact on the range of possible movements
<b>1.1.7 Classification and characteristics of muscle types</b>	Voluntary muscles of the skeletal system, involuntary muscles in blood vessels, cardiac muscle forming the heart, and their roles when participating in physical activity and sport
<b>1.1.10 Characteristics of fast and slow twitch muscle fibre types</b>	Type I, type IIa and type IIx, and how this impacts on their use in physical activities
<b>1.1.11 How the skeletal and muscular systems work together to allow participation in physical activity and sport</b>	
<b>1.2.2 Structure of the cardiovascular system</b>	Atria, ventricles, septum, tricuspid, bicuspid and semi-lunar valves, aorta, vena cava, pulmonary artery, pulmonary vein, and their role in maintaining blood circulation during performance in physical activity and sport
<b>1.2.3 Structure of blood vessels and how this relates to function and importance during physical activity and sport</b>	In terms of: arteries; capillaries and veins; blood pressure; oxygenated; deoxygenated blood and changes due to physical exercise
<b>1.2.5 Function and importance of red and white blood cells, platelets and plasma for physical activity and sport</b>	

## Topic Guide: Applied Anatomy and Physiology

Subject content	Comments
<b>1.2.6 Composition of inhaled and exhaled air and the impact of physical activity and sport on this composition</b>	This section requires learners to know the percentages of oxygen and carbon dioxide in inhaled and exhaled air and reasons for the changes in these percentages
<b>1.2.8 Location of the main components of the respiratory system</b>	The respiratory system (lungs, bronchi, bronchioles, alveoli, diaphragm) and the role in movement of oxygen and carbon dioxide into and out of the body
<b>1.2.9 Structure of alveoli to enable gas exchange and the process of gas exchange to meet the demands of varying intensities of exercise (aerobic and anaerobic)</b>	
<b>1.2.10 How the cardiovascular and respiratory systems work together to allow participation in physical activity and sport</b>	

As can be seen from the table above, there is a significant amount of new content that learners can be assessed on. All of this content will be relatively easy to research. Many PE text books will have this information to give valuable background information for the 2009 specification, giving learners a better foundation on which to base their understanding of the adaptations to the body systems as a result of training.

All specification topics have the same Assessment Objectives. This means any topic within Component 1 and Component 2 could be used to assess the learner's:

- knowledge and understanding of factors underpinning performance
- ability to apply their knowledge and understanding of factors underpinning performance
- ability to analyse and evaluate factors underpinning performance.

In this topic, learners will develop knowledge and understanding of the body systems through this content.

# Applied Anatomy and Physiology: the structure and functions of the musculo-skeletal system

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## 1.1 The skeletal and muscular systems

Learners will be expected to **know and understand**:

- the functions of the skeleton
- classification of bones
- the structure of the skeleton
- the classification of joints
- movement possibilities at joints
- the role of ligaments and tendons
- classification and characteristics of muscle types
- location and role of voluntary muscles
- antagonistic pairs of muscles
- characteristics of muscle fibre types.

Learners should be aware of the four types of synovial joints identified in the specification. Learners will not be assessed on the joint types not listed in the specification. The number of movement possibilities at joints has increased compared to the 2009 specification so that learners can be more informed when analysing movement; this has resulted in an increase in antagonistic muscle pairs so that muscle action can be matched to relevant joint action.

Learners will be expected to **apply** their knowledge.

For example:

- by considering how the functions of the skeleton aid performance in a specific sporting scenario
- by explaining links between muscle fibre type and performance in a range of activities.

Learners will be expected to **analyse and evaluate**.

For example:

- how the skeletal and muscular systems work together to allow participation in sport
- analysis of selected sporting techniques to establish muscle action and impact on joints and performance.

# Applied Anatomy and Physiology: the structure and functions of the cardio-respiratory system

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## 1.2 The cardiovascular and respiratory systems

Learners will be expected to **know and understand**:

- the functions of the cardiovascular system
- the structure of the cardiovascular system
- the structure and function of blood vessels (arteries, capillaries, veins)
- vascular shunting
- the function of blood cells, platelets and plasma
- the composition of inhaled and exhaled air
- lung volumes (vital capacity, tidal volume)
- the structure of the respiratory system
- the structure of the alveoli
- gas exchange.

Learners will be expected to **apply** their knowledge.

For example:

- discussing how the cardiovascular and respiratory systems work together to ensure the performer is able to meet the physical demands of their sport.

Learners will be expected to **analyse and evaluate**.

For example:

- the importance of vascular shunting in maintaining performance levels in an aerobic activity.

# Applied Anatomy and Physiology: anaerobic and aerobic exercise

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## 1.3 Energy and energy sources

Learners will be expected to **know and understand**:

- that energy is released when oxygen and glucose are combined (aerobic respiration)
- that carbon dioxide and water are the by-products of aerobic respiration
- that lack of oxygen will reduce the length of time energy can be produced for and, therefore, the length of time a performer may exercise for at that intensity
- that lack of oxygen is due to anaerobic activity
- that lactic acid/lactate is the by-product of anaerobic respiration
- that fats are the fuel source for aerobic activity
- that carbohydrates can be used as the fuel source for anaerobic and aerobic activity.

Note this is an introduction to energy systems. There is no need to go into the different types of energy systems or ATP resynthesis at level 2.

Learners will be expected to **apply** their knowledge.

For example:

- by considering the likely energy sources for a range of practical activities or sports.

Learners will be expected to **analyse and evaluate**.

For example:

- assess the impact of lack of carbohydrate for a long distance runner in the final lap of a race.

## Applied Anatomy and Physiology: the short-term effects of exercise

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### 1.4 The short-term effects of exercise on the body systems

Learners will be expected to **know and understand**:

- the short-term effects of aerobic and anaerobic training and exercise on the:
  - musculo-skeletal system
  - cardio-respiratory system.
- the importance of these effects on performance.

Learners should be familiar with the terms musculo-skeletal and cardio-respiratory systems, and of the systems they comprise, as assessment questions may use any of this terminology.

Learners will be expected to **apply** their knowledge.

For example:

- by explaining why a performer may experience muscle fatigue in a specific sporting scenario, e.g. in extra time in a football match.

Learners will be expected to **analyse and evaluate**.

For example:

- the possible impact of rest periods within a training session on a player's ability to work anaerobically during the training session.

## Applied Anatomy and Physiology: activity ideas

### Functions of the skeleton – activity 1

Have a small group discussion, considering possible functions of the skeleton then feedback and summarise. A few video clips of particular actions that emphasise the various roles of the skeleton could be used as stimulus material (e.g. an eventful game or activity could be used) for example, clips of:

- martial arts/boxing contest
- a scrum/tackle in rugby
- gymnasts holding a balance
- butterfly swimming race
- images of 'bloodied' players.

Create a table identifying all functions, giving examples of the relevance of each function to the sport.

Functions of the skeleton	Relevance of each function to the sport
Protection of vital organs	
Muscle attachment	
Joints for movement	
Platelets, red and white blood cell production	
Storage of calcium and phosphorus	

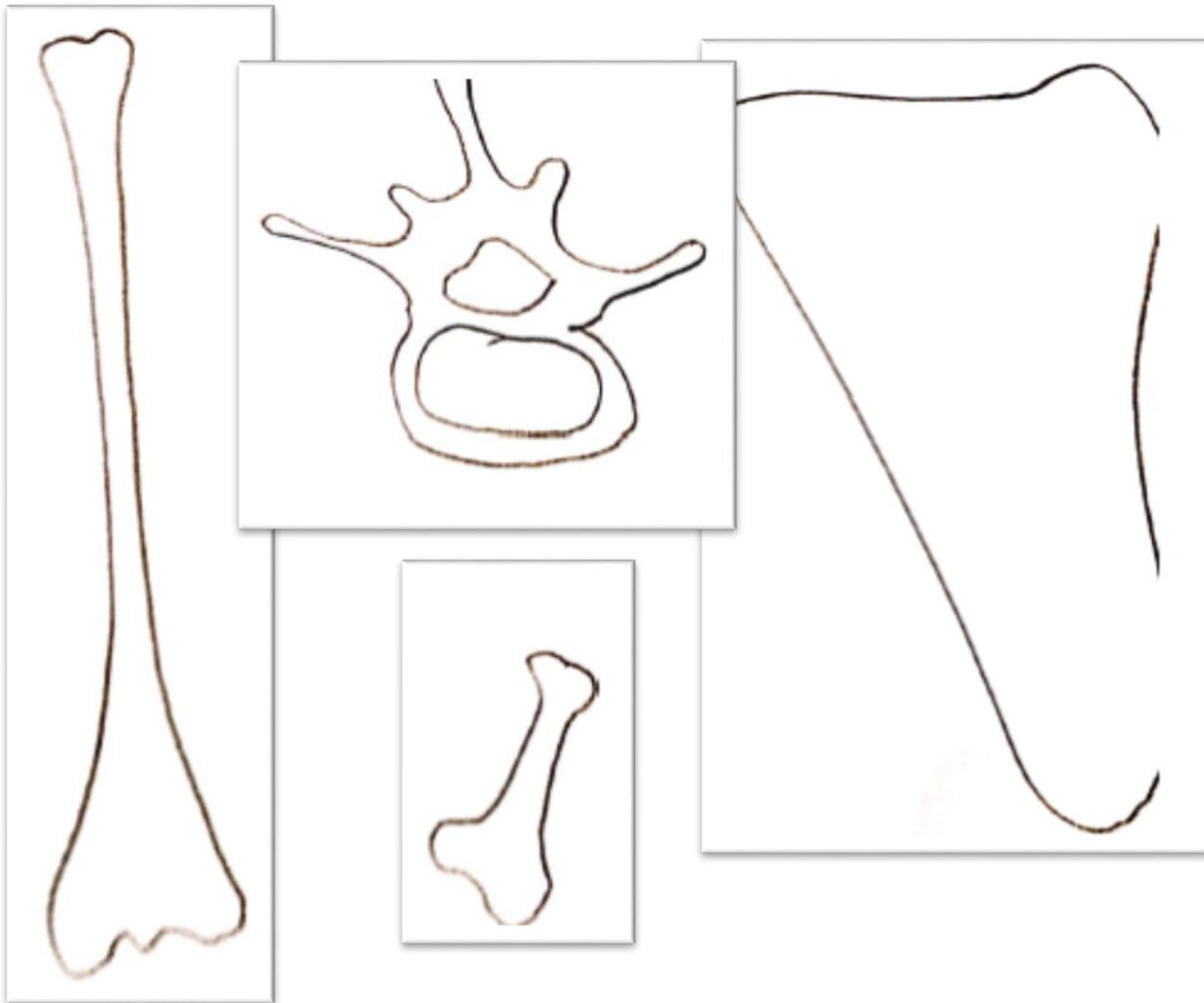
## Classification of bones – activity 2

Using images of each type of bone, discuss the differences between them and decide if this helps in naming them. You could give names and ask groups to use these to name the bones. Some learners will be able to look at the shape of the bone and link it to some of the functions, especially if named examples are given and learners know where they are located. (A similar set of activities could be used when discussing the muscular system.)

Create a table (see example below) to extend the discussion on classification of bones and record ideas.

### Classification of Bones

Name these different types of bones



**Classification of Bones**

Type	Role	Example of location	Example of use in sports performance
Long			
Short			
Flat			
Irregular			

### Structure of the skeleton – activity 3

Write the name of each bone from the specification onto a sticky label and (carefully) stick on a partner in the correct location of the bone.

In pairs, one person lays on several large sheets of paper while their partner draws around them to give an outline of a big body. Working in pairs, draw a life size skeleton inside the outline and label the bones.

After a group discussion on the role of ligaments and tendons, add examples of these to the big body.

Place the big bodies on the wall for future reference.

This activity could be extended, by building on previous learning; for example, learners could recall the names of the bones and match each bone to one of the bone types to complete the table.

For example:

Name of bone	Location	Type	Role	Applied to sport
Humerus	Upper arm	Long	Leverage	Bowling a cricket ball

**Movement possibility at joints – activity 4**

Knowledge should be reinforced through practical sessions; for example, during a practical-theory session, learners could take it in turns to step out of the practical activity and observe the play, making a note of the different movements they see, e.g. plantar-flexion – pointing the toes down –when jumping up to intercept the ball.

**Role of voluntary muscles – activity 5**

Similarly, knowledge of muscle action should be reinforced through practical activity. In the same way, learners could observe for a few minutes, this time collecting information on muscles responsible for certain joint actions. A table could be designed (example below) and pre-populated with any of the columns completed to help the learner. Rather than a general practical session, a specific skills circuit could be devised. At each station learners complete the drill but before moving on, they analyse the movement they were just engaged in.

Action at joint	Agonist	Antagonist	Location	Applied to sport
Flexion at elbow		Tricep	Upper arm	Bicep curl
	Quadriceps			
Plantar-flexion				
				Sit up
	Tibialis anterior			
			Upper leg	

## Characteristics of muscle fibre types – activity 6

Practical activity or sports video clips could be used to introduce the different muscle fibre types, with discussion on the main type used for particular activities. Diagrams could be created highlighting the characteristics of **each** fibre type.

### CHARACTERISTICS OF FAST TWITCH TYPE IIX MUSCLE FIBRES



## Structure of the cardiovascular system – activity 7

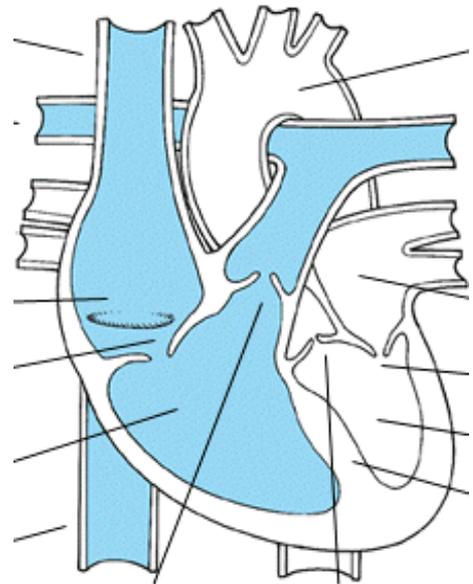
A good starting point could be labelling blank diagrams to help learn the names and locations of all of the relevant components.

### TASK

- Place the words in the correct places on the diagram of the heart.

**Left atrium, right atrium, left ventricle, right ventricle, septum, tricuspid valve, bicuspid valve, semi-lunar valves, aorta, vena cava, pulmonary artery, pulmonary vein.**

- Add arrows to show the direction of blood flow.



## Vascular shunting – activity 8

The importance of blood and its role in transporting gases and nutrients should be linked to performance to give context in relation to sport and activity.

Learners need to understand the terms:

- vasoconstriction – narrowing of the blood vessels
- vasodilation – widening of the blood vessels
- vascular shunting – the use of vasoconstriction and vasodilation to move blood from inactive areas to active areas.

Below are some discussion points.

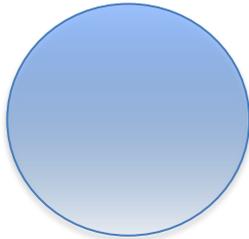
- Where is the blood needed during exercise?
- What will the blood vessels near the muscles do?
- Where is the blood needed just after a meal?
- What will the blood vessels near the stomach do?
- What are the implications of this in terms of timing of eating and exercising?

## Composition of inhaled and exhaled air – activity 9

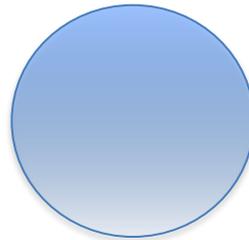
Research activity

1.
  - Which gases make up the air breathed in?
  - What is the percentage of each gas in inhaled air?
  - (Note that 'air' is a collection of gases)
  - Create a pie chart to show the percentages of these gases in the inhaled air.
2.
  - What are the percentages of each gas in exhaled air?
  - Create a pie chart to show the percentages of these gases in the air.
3.
  - What has happened? (Has any percentage increased or decreased?)
  - Add a short explanation below your pie chart to account for the differences in the inhaled and exhaled air and the impact that physical activity has had.

**Inhaled air before activity**



**Exhaled air after activity**



**Explanation:**

## The short-term effects of exercise – activity 10

This will best be experienced through practical activity. This could be a sports activity or fitness session, whichever is most appropriate for the group, or facilities.

During the session, learners should experience both aerobic and anaerobic activity, after each they could complete a quick checklist before continuing with the activity, possible headings for the checklist are shown below. This should help reinforce knowledge of short-term effects of aerobic and anaerobic exercise.

Activity	Heart Rate			Breathing Rate			Muscle Fatigue			Temperature		
	Resting	Increase	Large increase	Resting	Increase	Large increase	None	Slight	Tired	Normal	Warm	Hot

## **Developing statements in written responses**

To ensure learners acquire the ability to use their knowledge and understanding to develop any response to match the demands of the question, they should practice this skill. This skill can be developed in the classroom by giving a series of statements that need justifying. This idea can be applied to any theoretical topic in the specification. For example, learners could be given the following statements and asked to expand on them to develop the initial point being made.

- One function of the skeleton is to protect the vital organs, this is important in physical activity and sport....
- The ball and socket joint has the largest range of movement....
- The respiratory system works with the cardiovascular system to ensure sufficient oxygen gets to the working muscles....
- Unlike arteries, veins have valves to prevent backflow of blood....

## Sample assessment questions

Most questions will demand a range of skills from the response, for example, question 2 spans knowledge and application, question 3 spans knowledge, application and evaluation. A demonstration of all skills is required to gain the maximum marks in this question. The questions below will also span skills with the exception of question 1a, 1b, 8 and 10.

### Assessment of knowledge:

- 1 (a) Which one of the following muscle fibre types is best suited for use in a 100 m sprint?

(1)

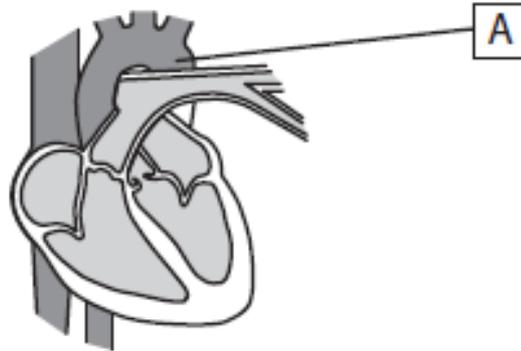
<b>A</b>	Type I	[ ]
<b>B</b>	Type IIa	[ ]
<b>C</b>	Type IIx	[ ]
<b>D</b>	Slow twitch	[ ]

- (b) Which one of the following is the correct composition of inhaled air?

(1)

<b>A</b>	Oxygen 21%, carbon dioxide 4%, nitrogen 79%	[ ]
<b>B</b>	Oxygen 16%, carbon dioxide 4%, nitrogen 79%	[ ]
<b>C</b>	Oxygen 79%, carbon dioxide 4%, nitrogen 0.04%	[ ]
<b>D</b>	Oxygen 21%, carbon dioxide 0.04%, nitrogen 79%	[ ]

8 **Figure 7** shows a cross-section of the heart.



**Figure 7**

Complete the following statements about the labelled structures of the heart in **Figure 7**.

The structure labelled **A** in **Figure 7** is the

\_\_\_\_\_.

This blood vessel

carries\_\_\_\_\_blood out

of the heart to the\_\_\_\_\_.

**Assessment of ability to apply knowledge:**

2 Protection is a function of the skeletal system.

Explain, using one example, how the skeletal system’s protective function aids performance in physical activity and sport.

(3)

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5 Muscles work with the skeleton to bring about specific sporting movements.

Complete **Table 2** by:

(a) stating the function of each muscle

(b) giving an example of a specific sporting movement that uses each muscle.

Muscle	(a) Function	(b) Specific sporting movement
Triceps	(1)	(1)
Quadriceps	(1)	(1)

**Table 2**

10 Explain why tidal volume increases when a performer takes part in physical activity.

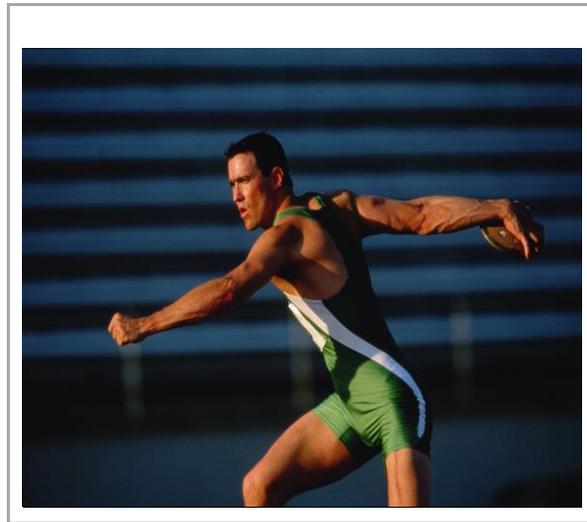
(3)

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**Assessment of ability to analyse and evaluate:**

3 **Figure 3** shows an athlete preparing to throw the discus.



**Figure 3**

© Mike Powell/Getty Images

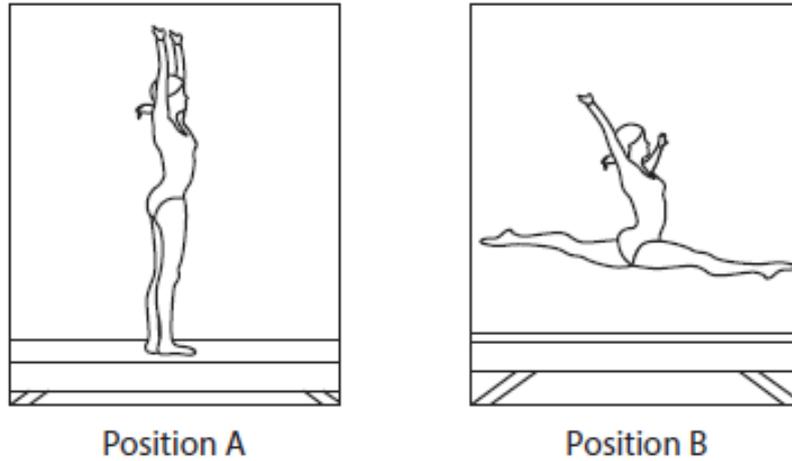
Analyse, using **one** example, how **one** of the ball and socket joints in the body allows the athlete to throw the discus.

(3)

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- 7 **Figure 6** shows a gymnast moving from a standing Position A on the beam to a split Position B in the air.



**Figure 6**

Analyse the movement and muscle action at the ankle as the performer in **Figure 6** moves from Position A to Position B.

(4)

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## **Extended answer responses**

In the new specification there will be two extended answer questions at the end of each paper. These questions will be marked out of 9 marks. The increase in the available number of marks should allow a better differentiation between learners, and give more opportunity to reward learners for the skills they demonstrate.

Each extended answer question will be used to assess the learner's ability to:

- demonstrate knowledge and understanding (AO1)
- apply their knowledge and understanding (AO2)
- analyse and evaluate relevant knowledge and understanding (AO3).

Each of these Assessment Objectives will be credited with a maximum of three of the nine available marks. This means that a learner who is very knowledgeable about a topic but unable to apply their knowledge could still gain 3 marks for their knowledge. If they were able to apply this knowledge the number of marks gained could increase to 6 marks. If they are able to form a judgement based on the knowledge presented they will be able to access the final 3 marks for these questions.

In this sample question, learners are asked to evaluate the extent to which the redistribution of blood flow is necessary during a hockey match.

A learner that knows about redistribution of blood flow and responds by simply describing the process could gain 3 marks. Example statements that could give access to these knowledge marks (AO1) are shown in the mark scheme on page 42 of the Sample Assessment Materials (SAMs).

Compare that type of response to the learner who is able to apply their knowledge of redistribution of blood flow to the question context (AO2), i.e. the hockey match. For example, if they are very active in the hockey match, blood vessels supplying the digestive system would vasoconstrict, while the blood vessels that supply the working muscles would vasodilate, increasing blood flow to the working muscles. This learner could score up to 6 marks.

Finally, a learner that is able to analyse and evaluate (AO3) would gain access to the last set of 3 marks. For example, they may consider the potential negative impact of redistribution away from the digestive system, meaning that the hockey player would need to consider their diet carefully and timing of food intake before they played. This might be offset against the advantage of redistribution of blood, meaning muscles have better access to nutrients and oxygen allowing higher level of performance.

## Resources

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**Short sports clips to demonstrate functions of skeleton in use**

<https://www.youtube.com>

edexcel 



ALWAYS LEARNING

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