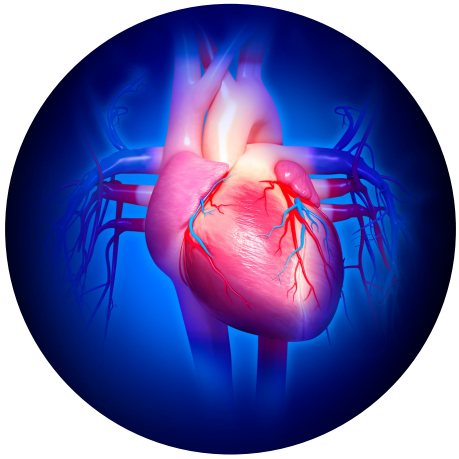
OCR GCSE PE

Free Topic

GCSE PE Revision Booklet

Applied Anatomy & Physiology

Answers



Contents Page

Introduction

This revision work-booklet includes topic overview sheets and exam questions.

The topic overview sheets include a range of key information, images and diagrams in order to help you revise each topic. There are lots of gaps within these sheets which you will need to fill in. Lets look at an example.

As you can see, there are two gaps in the definition of heart rate shown below.

Heart Rate ⇨ **The amount of _____ the heart beats each _____**

You simply need to fill in the gaps in order to complete the definition.

Heart Rate ⇨ **The amount of times the heart beats each minute**

The example below shows that you need to complete the spider diagram covering the barriers to participation.

Groups who experience barriers to participation in Sport

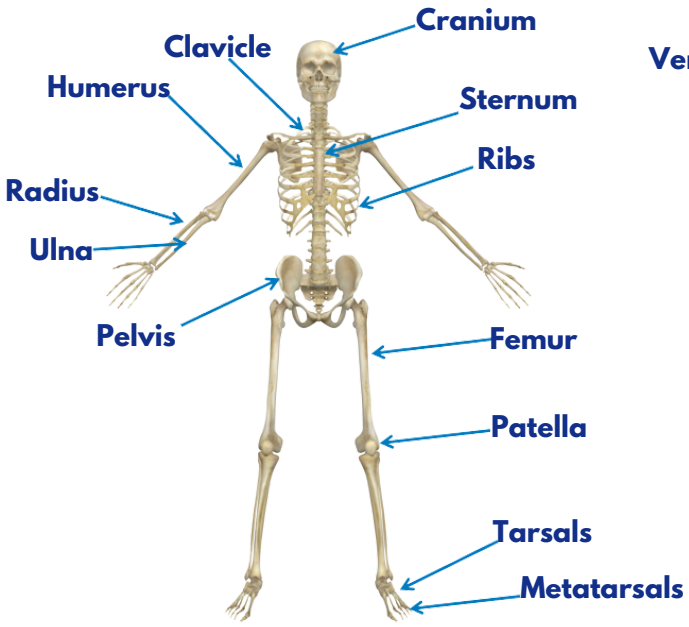
_____ _____ _____ _____

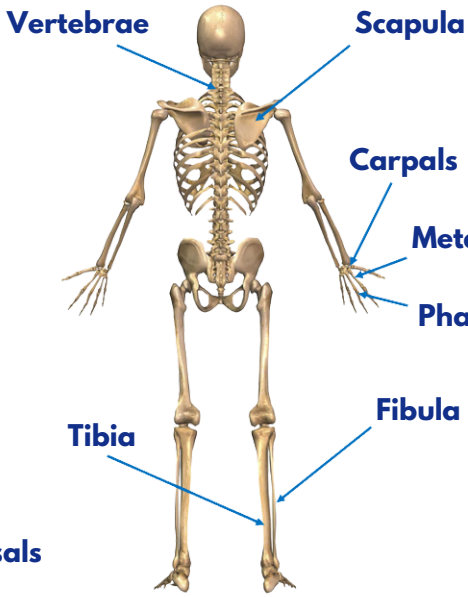
After filling in the gaps, the completed spider diagram should look like this:

Groups who experience barriers to participation in Sport

Race/Religion/Culture | **Age** | **Gender** | **Family /Friends /Peers** | **Disability**

You will also be required to answer a number of exam questions throughout the booklet. Read each question carefully and pay close attention to the amount of marks available.





Functions of Skeletal System

- Protection of Vital Organs
- Support
- Joints for Movement
- Red & White Blood Cell Production
- Posture
- Storing Minerals e.g. Calcium & Phosphorus

PE COMPONENT 1 - SKELETAL SYSTEM

Role of Joints

- **Ligaments** - Connect bones to bones
- **Cartilage** - Protects joints and bones
- **Tendons** - Connect bones to muscle tissue

A synovial joint is a place where two or more bones meet

Joints are important for movement and rotation

Ball & Socket Joints

Hinge Joints

Complete the table with the bones found at each location.

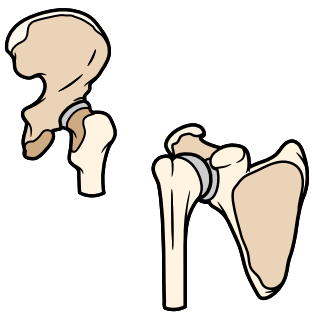
Location	Bones at the location
Head/neck	• Cranium • Vertebrae
Shoulder	• Scapula • Humerus
Chest	• Ribs • Sternum
Elbow	• Humerus • Radius • Ulna
Hip	• Pelvis • Femur
Knee	• Femur • Tibia • Patella (in front of knee joint)
Ankle	• Tibia • Fibula • Talus

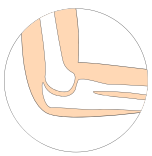
Articulating Bones - which bones articulate at the following joints?

Ball & Socket Joints

Hip Joint
- Pelvis
- Femur

Shoulder Joint
- Humerus
- Scapula





Hinge Joints

Elbow Joint
- Humerus
- Radius
- Ulna

Knee Joint
- Femur
- Tibia

1 Markers

1. Give an example of a hinge joint in the body. (1 mark)

Mark One – Knee/Elbow

2. Which one of these bones is located between the elbow and shoulder joint?

A) Humerus - Correct Answer
B) Scapula
C) Radius
D) Femur

3. Which of the following is a function of the skeletal system? (1 mark)

A) Storing vitamins
B) Storing minerals - Correct Answer
C) Storing oxygen
D) Storing blood

2 Marker

4. Give an example of a ball & socket joint in the body and explain how this joint is important for performance in a sport of your choice. (2 marks)

Mark One – The shoulder is an example of a ball & socket joint

Mark Two – This is important in cricket as it allows the circumduction required when bowling the ball

Accept Other Appropriate Answers (including shoulder or hip as examples of ball & socket joints)

3 Markers

5. Protection is a function of the skeletal system. Explain how the application of this function can have a positive effect on performance when heading a ball in football. (3 marks)

Mark 1 – When heading the ball the cranium will protect the player
Mark 2 – The cranium will protect the brain from becoming injured
Mark 3 – This allows the footballer to continue playing the match without becoming injured/Allows the player to make a successful header without sustaining an injury

Accept Other Appropriate Answers

6. Aside from 'protection', explain how one other function of the skeletal system allows a netball player to produce an effective performance. (3 marks)

Mark 1 – A function of the skeletal system is 'movement'
Mark 2 – Joints allow for movement e.g. the knee joint
Mark 3 – The knee joint allows for flexion and extension which are important actions when producing an effective shot in netball

OR

Mark 1 – A function of the skeletal system is 'red and white blood cell production'
Mark 2 – Red blood cells carry oxygen around the body
Mark 3 – Having enough red blood cells is important to the netballer as they need to supply oxygen to their working muscles in order to produce energy throughout a match. This will prevent the player from becoming tired/fatigued

Accept Other Appropriate Answers (including 'posture', 'mineral storage' and 'support' as functions of the skeletal system)

7. State 3 examples of bones that can be found at the site of the arm. (3 marks)

Mark 1 - Humerus
Mark 2 - Radius
Mark 3 - Ulna

6 Marker

8. Name two functions of the skeleton and explain how these functions are provided by the skeleton.

Justify why these functions are relevant to performance in a sporting activity of your choice. (6 marks)

A01 = 2, A02 = 2, A03 = 2

A01- One function of the skeleton is protection
A02 - Protection is provided by (flat) bones/ligaments and tendons provide protection at joints/cartilage provides protection
A03 - Rugby involves tackling whereby poor technique can result in a bang to the head. The cranium is important to protect the brain in this instance/ If a player is tackled offensively by an opponent in the midriff, their ribs will be required to protect them from damage to their lungs

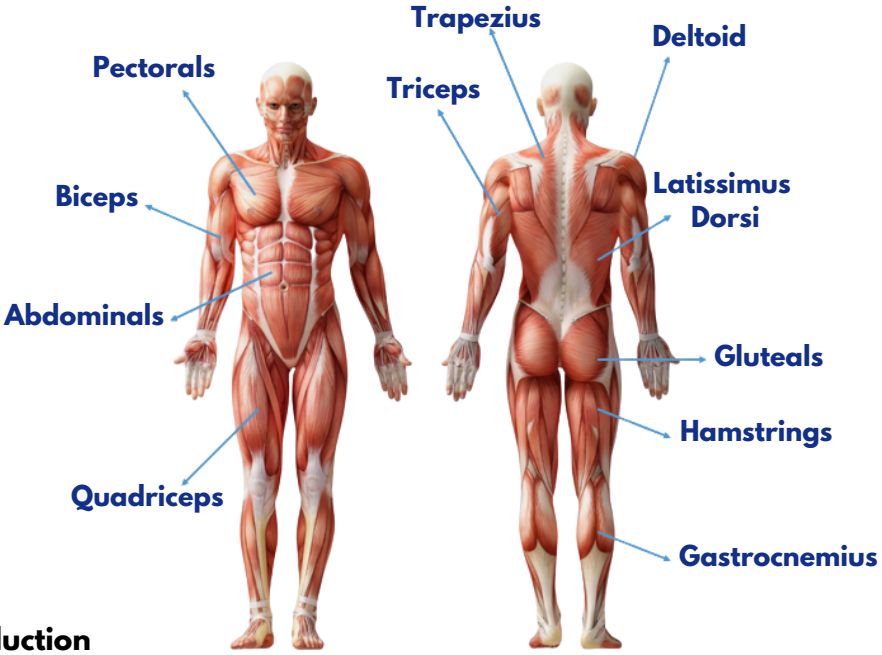
A01 - A further function of the skeleton is movement
A02 - Joints allow movement to occur/tendons join muscles to bones, allowing movement to occur
A03 – Joints such as the knee allow players to use flexion to crouch down to make a tackle/tendons and ligaments allow for a wide range of movement, meaning a player can get low enough to scrummage effectively

Functions of the Skeletal System that can be discussed:
1. Protection of Vital Organs
2. Posture
3. Movement (Joints)
4. Mineral Storage (Calcium & Phosphorus)
5. Blood Cell Production (Red & White)
6. Support

Joint Actions

Adduction

Abduction



As one muscle CONTRACTS, another muscle will RELAX

PE COMPONENT 1 - MUSCULAR SYSTEM

RELAX = Antagonist

CONTRACTS = Agonist

Joint Actions

- Flexion is the narrowing of the angle at a joint
- Flexion is the narrowing of the angle at a joint
- Extension is the widening of the angle at a joint
- Abduction is movement away from the midline of the body
- Adduction is movement towards the midline of the body
- Rotation is the action of rotating around an axis or centre

Biceps & Triceps

Fixator Muscle

This is a muscle which acts as a stabiliser and helps the agonist work effectively during movement

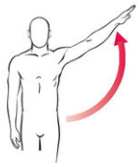
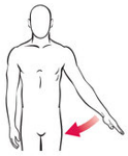
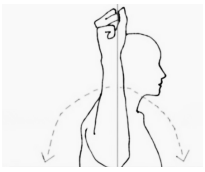
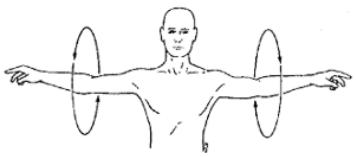
Quadriceps & Hamstrings

Antagonistic Pairs

Abdominals & Gluteals

Pectorals & Deltoid

Identify the joint action movement in the image and locations this occurs.

Image	Movement	Location
	Flexion	Hinge Joints: Elbow Hip Ball & Socket Joints: Knee Shoulder
	Extension	
	Abduction	Ball and Socket Joints e.g. Shoulder
	Adduction	
	Rotation	
	Circumduction	

Antagonistic Pairs of Muscles

Antagonistic pairs of muscles create opposing movements at joints to allow physical activities.

Biceps and Triceps at the elbow - Football Throw-in

	Type of Movement	Agonist	Antagonist
Preparation Phase 	Elbow - Flexion	Bicep	Tricep
Throwing Action 	Elbow - Extension	Tricep	Bicep

Bicep Curl

		Agonist	Antagonist
Lifting the dumbbell 	Elbow - Flexion	Bicep	Tricep
Lowering the dumbbell 	Elbow - Extension	Tricep	Bicep

Antagonistic Pairs of Muscles

Gastrocnemius and tibialis anterior at the ankle Jumping

	Type of Movement	Agonist	Antagonist
Take off 	Ankle - Plantarflexion	Gastrocnemius	Tibialis Anterior
Throwing Action 	Ankle - Dorsiflexion	Tibialis Anterior	Gastrocnemius

Quadriceps and Hamstrings at the knee - Kicking a ball

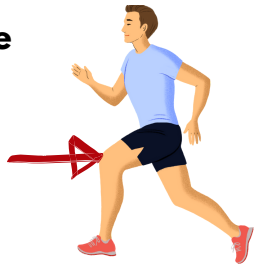
		Agonist	Antagonist
Preparation Phase 	Knee - Flexion	Hamstrings	Quadriceps
Strike 	Knee - Extension	Quadriceps	Hamstrings

Antagonistic Pairs of Muscles

Hip Flexors and Gluteus Maximus at the hip
Kicking a ball

	Type of Movement	Agonist	Antagonist
Preparation Phase 	Hip - Extension	Gluteals	Hip Flexors
Strike 	Hip - Flexion	Hip Flexors	Gluteals

Quadriceps and Hamstrings at the knee - Running

		Agonist	Antagonist
Drive 	Knee - Flexion	Hamstrings	Quadriceps
Recovery 	Knee - Extension	Quadriceps	Hamstrings

1 Markers

1. What is the name of the muscle shown in the image below? (1 mark)

Mark One – Gastrocnemius

2. What is the name of the muscle shown in the image below. (1 mark)

Mark One – Pectorals

2 Markers

3. The image below shows a long jumper during a performance. In the image, extension is being shown at the knee joint. Name the agonist and antagonist muscles that create this action. (2 marks)

Mark One – The agonist muscle is quadriceps
Mark Two – The antagonist muscle is the hamstring

4. Using an example, define the term 'fixator muscle'. (2 marks)

Mark One – A fixator is a muscle which acts as a stabiliser to support the agonist muscle
Mark Two – For example, whilst taking a shot in football the abdominals will act as a fixator muscle and keep the body stable

Accept other appropriate answers

3 Markers

5. Analyse the antagonistic muscle action taking place at the elbow as the goalkeeper makes the save. (3 marks)

Mark One – The antagonistic muscle action is extension at the elbow joint
Mark Two – The tricep is the agonist/muscle contracting
Mark Three – The bicep is the antagonist/muscle relaxing

6. Muscle work together as antagonistic pairs. Give three examples of antagonistic pairs that work together. (3 marks)

Any 3 from:

- **Biceps and triceps**
- **Hamstring and quadriceps**
- **Abdominals and gluteals**
- **Pectorals and deltoid**

4 Markers

7. Using an example from a sport of your choice, identify the two types of movement that can occur at the knee joint.

Mark One – Flexion takes place at the knee joint
Mark Two – For example, as a footballer prepares to take a shot, flexion will take place
Mark Three – Extension takes place at the knee joint
Mark Four – For example, as a rugby player kicks the ball, extension will take place during the follow through

Accept other appropriate answers and examples

PE COMPONENT 1 - LEVER SYSTEMS

Fulcrum – The axis around which the lever rotates

Load – The force of the thing that you want to move

Effort – The force that is applied by the user of the lever system

1st Class → Fulcrum in the Middle

2nd Class → Load in the Middle

3rd Class → Effort in the Middle

1.2.3. F.L.E

This can be remembered using 'Fly Little Elf'

First Class Lever Systems:

Nodding your Head

Load - Weight of the head through the chin
Fulcrum - The joint at the top of the neck
Effort - The muscles at the bottom of the neck

Rowing

Load - Water
Fulcrum - Top of Oar
Effort - Biceps

Tricep Dip

Load - Body weight through the hands
Fulcrum - Elbow
Effort - Triceps

Second Class Lever Systems:

Calf Raise & Long Jump

Fulcrum - Balls of the Feet
Load - Bodyweight through the centre of the foot
Effort - Gastrocnemius

Third Class Lever Systems:

Bicep Curl

Fulcrum - Elbow
Effort - Biceps
Load - Dumbbell/Barbell

Kicking a Ball

Fulcrum - Knee
Effort - Quadriceps
Load - Ball

Mechanical Advantage = Effort Arm ÷ Resistance Arm.

Lever System	Advantage	Disadvantage
1st Class	Mechanical Advantage - A large load can be lifted with relatively little effort	Slower Movement
2nd Class	Mechanical Advantage - A large load can be lifted with relatively little effort	Slower Movement
3rd Class	Fast Movement	Mechanical Disadvantage - large effort is needed to lift a relatively small load

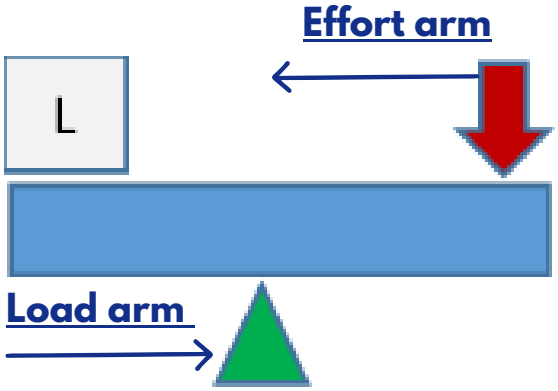
1. Draw linear versions of the three classes of lever systems
2. Label the effort and load/resistance arms
3. Interpret the mechanical advantage of that lever

Fulcrum

Effort

L Load

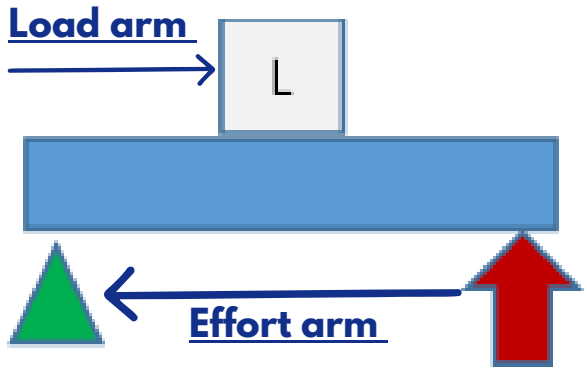
1st Class Lever



Mechanical Advantage Interpretation:

A First Class Lever System may have a mechanical advantage or a mechanical disadvantage depending on the length of the effort arm in relation to the load/resistance arm.

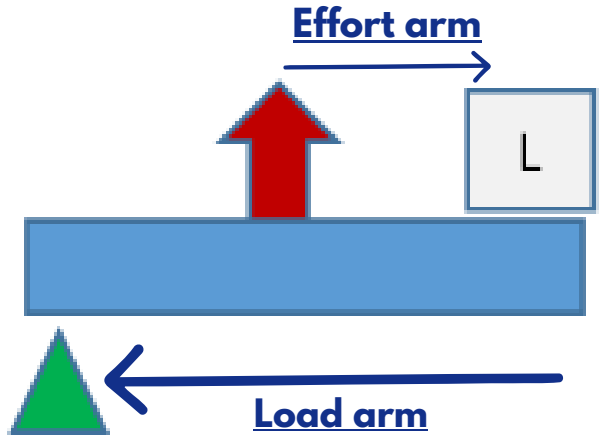
2nd Class Lever



Mechanical Advantage Interpretation:

A Second Class Lever System will always have a mechanical advantage due to the effort arm being longer than the load arm.

3rd Class Lever



Mechanical Advantage Interpretation:

A Third Class Lever System will always have a mechanical disadvantage due to the load arm being longer than the effort arm.

1 Markers

1. Give an example of a first class lever system. (1 marks)

Mark One – Nodding the head OR Rowing a boat OR Tricep Dip

2. Which of the following is an example of a 2nd class lever system? (1 mark)

A) Tricep Dip
B) Bicep Curl
C) Calf Raise - Correct Answer
D) Nodding the Head

2 Markers

3. A bicep curl is being performed in the image below. Identify the type of lever system being used. Justify your answer. (2 marks)

Mark One – A bicep curl is a third class lever system
Mark Two – This is because the effort is in the middle

4. First class lever systems have a mechanical advantage. Describe what is meant by a mechanical advantage. (2 marks)

Mark One – A mechanical advantage is when a large load can be lifted with relatively little effort
Mark Two – Effort arm ÷ Resistance Arm

4 Markers

5. The picture below shows a performer 'taking-off' in the sport of long jump. Identify the type of lever system being used at the ankle joint and outline the fulcrum, load and effort. (4 marks)

Mark One – The lever system being shown at the ankle joint is a 2nd class lever system
Mark Two – The fulcrum is the balls of the feet
Mark Three – The load is the bodyweight through the centre of the foot
Mark Three – The effort is the gastrocnemius

6. The picture shows an athlete performing a tricep dip. Identify the type of lever system being used at the elbow joint and outline the fulcrum, load and effort. (4 marks)

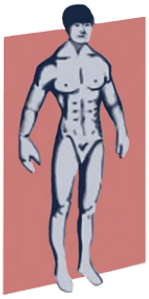
Mark One – The lever system being shown at the elbow joint is a 1st class lever system
Mark Two – The fulcrum is the elbow
Mark Three – The load is the bodyweight through the centre of the hands
Mark Four – The effort is the triceps

7. The picture shows an athlete performing a bicep curl. Identify the type of lever system being used at the elbow joint and outline the fulcrum, load and effort. (4 marks)

Mark One – The lever system being shown at the elbow joint is a 3rd class lever system
Mark Two – The fulcrum is the elbow
Mark Three – The load is the dumbbell/weight
Mark Four – The effort is the biceps

PE COMPONENT 1 - PLANES & AXES

Planes of Movement



Frontal Plane

Sagittal Plane

Transverse Plane

Frontal Plane

- The Frontal Plane divides the body so that there are front and back sections
- Movement in a sideways direction takes place through the frontal plane

Longitudinal Axis

- The Longitudinal Axis runs through the body as a vertical line
- When rotation takes place around the longitudinal axis this will result in spinning taking place

Sagittal Plane

- The Saggital Plane splits the body down the middle resulting in a left side and a right side
- Walking or running forwards results in movement through the sagittal plane

Transverse Axis

- The Transverse Axis runs from 'hip to hip'
- When rotation takes place around the transverse axis this will result in a forward or backward roll

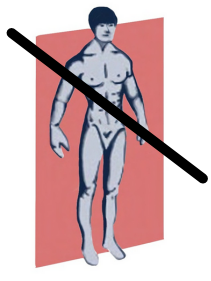
Transverse Plane

- The Transverse Plane divides the body across the middle so that there is a top and bottom section
- Rotational movement such as spinning takes place within the transverse plane

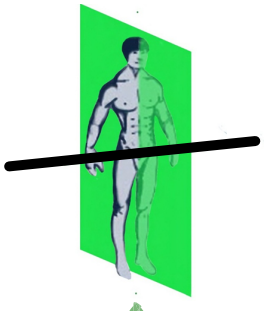
Frontal Axis

- The Frontal Axis 'stabs' through the body.
- When rotation takes place around the frontal axis this will result in a cartwheel taking place

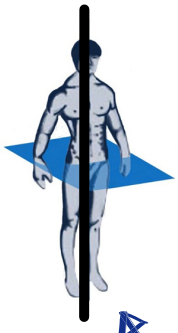
Axes of Rotation



Frontal Axis

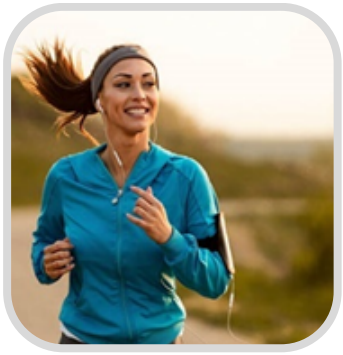


Transverse Axis



Longitudinal Axis

1 Markers



1. The image below shows a runner. What plane of movement does running take place within? (1 mark)

Mark One – Running takes place within the sagittal plane

2. Which of the following movements takes place around the longitudinal axis?

A) Cartwheel
B) Backward Roll
C) Ice Skating Spin - Correct Answer
D) Forward Roll

2 Markers

3. The image below shows a cartwheel being performed. Identify the plane and axis about which a cartwheel takes place. (2 marks)

Mark One – A cartwheel takes place within the frontal plane
Mark Two – A cartwheel takes place within the frontal axis

4. The image shows a somersault being performed. Identify the plane and axis about which a somersault takes place. (2 marks)

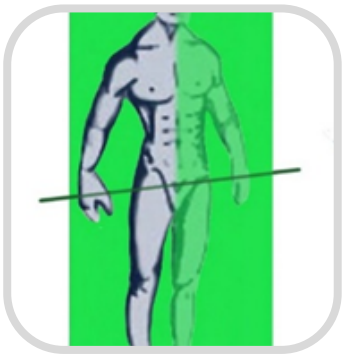
Mark One – A somersault takes place within the sagittal plane
Mark Two – A somersault takes place within the transverse axis

3 Markers

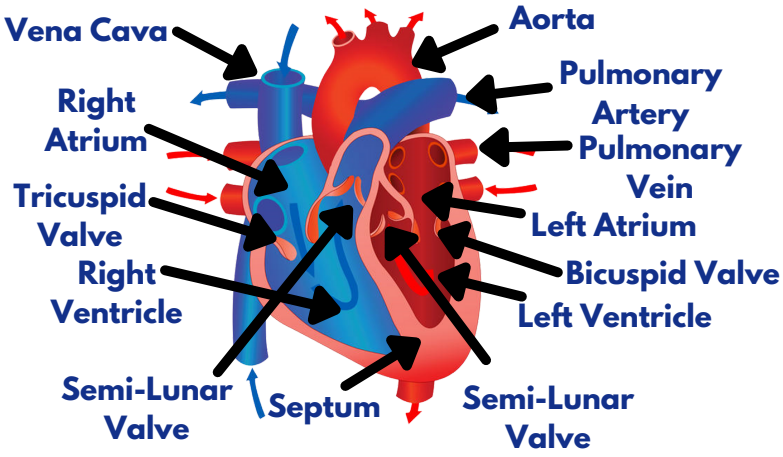
5. Identify the plane and axis shown in the image below. Give an example of a sporting action used within this plane and axis. (3 marks)

Mark One – The plane being shown is the transverse plane
Mark Two – The axis is the longitudinal axis
Mark Three – Moving through this plane and around this axis will result in a twist jump (within ice skating/trampolining) (Accept discus/hammer throw)

6. Identify the plane and axis shown in the image below. Give an example of a sporting action used within this plane and axis. (3 marks)



Mark One – The plane being shown is the sagittal plane
Mark Two – The axis is the transverse axis
Mark Three – Moving through this plane and around this axis will result in a forward roll/backward roll/somersault



Vascular Shunting Mechanism

Vasodilation ↓

Blood vessels become wider, increasing the amount of blood that is delivered to active areas

Dilate = Diameter Increases

Vasoconstriction ↓

Blood vessels become narrower, restricting the amount of blood that is delivered to inactive areas

Constrict = Diameter Decreases

- Valves in the heart open and close to allow blood to pass through
- Valves prevent the back-flow of blood

Arteries →	Carry blood away from the heart →	Thick & muscular walls
Veins →	Carry blood towards the heart →	Thin walls
Capillaries →	Connect artries & veins. Allows diffusion to take place →	Very thin walls

PE COMPONENT 1 - CV SYSTEM

Blood is made up of four different components

One of these components are the red blood cells, also known as Erythrocytes

Red blood cells are responsible for:
- transporting oxygen to the working muscles
- transporting carbon dioxide to the lungs

Red blood cells contain Haemoglobin - they carry oxygen from the lungs to the muscles & have no nucleus, allowing for more space for carrying oxygen

Heart Rate → The amount of times the heart beats each minute

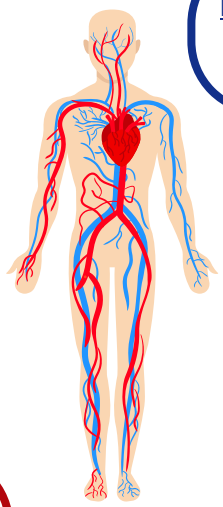
Stroke Volume → The amount of blood that is ejected from the heart each beat

Cardiac Output → Heart Rate x Stroke Volume – The amount of blood that is ejected from the heart each minute

Summarise the characteristics of each blood vessel type

	Size/Diameter	Wall Thickness	Valves
Arteries	Up to 10mm	Thick & Muscular	No
Veins	Up to 10mm	Thin	Yes
Capillaries	5-10 micrometers	Thin	No

Pathway of blood (starting from the right ventricle)



Right ventricle

Valve: Semi-Lunar Valve

Pulmonary Artery

Lungs (gaseous exchange - blood is oxygenated)

Pulmonary Vein

Left Atrium

Valve: Bicuspid Valve

Left Ventricle

Valve: Semi-Lunar Valve

Aorta

Body (gaseous exchange - blood is deoxygenated)

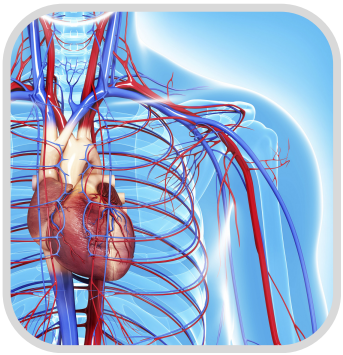
Vena Cava

Right Atrium

Valve: Tricuspid Valve

1 Markers

1. What type of blood vessel carries blood away from the heart.? (1 mark)



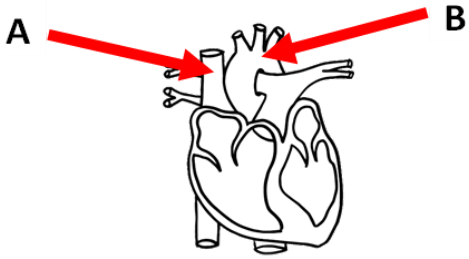
Mark One - Artery

2. Which of the following is the correct definition of Stroke Volume? (1 mark)

A) The amount of times the heart beats each minute
B) The amount of blood that is ejected from the heart each beat - Correct Answer
C) The amount of blood that is ejected from the heart each minute
D) An increase in heart rate that typically occurs just before an activity is to be undertaken

2 Markers

3. What do letters A & B represent in the image below? (2 marks)



Mark One – A represents the Vena Cava
Mark Two – B represents the Aorta

4. Explain why vascular shunting takes place during exercise. (2 marks)

Mark One - Active muscles require more oxygen during exercise
Mark Two - Less blood is distributed/required by other organs during exercise (e.g. stomach/digestive system)

3 Markers

5. Blood is made up of 4 components. Discuss the functions of components of blood listed below. (3 marks)

Red Blood Cells. White Blood Cells. Platelets.

Mark One – Red blood cells are responsible for carrying oxygen around the body
Mark Two – White blood cells are responsible for fighting illness/destroy pathogens/fight bacteria
Mark Three – Platelets are responsible for clotting blood

Accept other appropriate answers

6. Define the term vascular shunting and explain how vascular shunting will occur during a 400m swim. (3 marks)

Mark One – Vascular shunting is a process that increases blood flow to active areas during exercise/diverts blood flow away from inactive areas/the redistribution of blood flow

Mark Two – During the 400m swim, the blood vessels leading to active areas such as the arms and legs will experience vasodilation (they will widen). This will allow more oxygenated blood to reach these active areas

Mark Three – During the 400m swim, the blood vessels leading to inactive areas such as the stomach/digestive system will experience vasoconstriction (they will narrow). This will restrict the blood flow as the inactive areas do not require as much oxygenated blood

Accept other appropriate answers

7. Outline three features of veins. (3 marks)

Mark One – Veins contain valves which prevent the backflow of blood
Mark Two – Veins carry blood at low pressure
Mark Three – Veins have thin walls

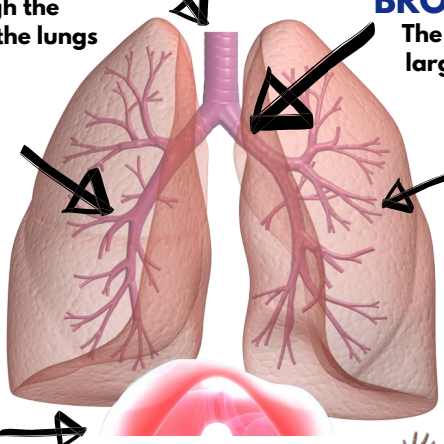
Accept other appropriate answers

TRACHEA
AKA Wind Pipe. Air travels through the trachea to reach the lungs

BRONCHI
The air travels through larger branches called Bronchi

BRONCHIOLES
The air then reaches smaller branches called Bronchioles

ALVEOLI
At the end of the bronchioles lies millions of tiny air sacs called alveoli. This is where gas exchange takes place



DIAPHRAGM
Responsible for inspiration
Moves to a flat position when inhaling to push the lungs up, enabling air to rush in
When exhaling moves to a dome position, allowing the lungs to lower and air to rush out

Lung Volumes

- **Breathing Rate:** The number of breaths taken in a minute
- **Minute ventilation:** The volume of gas inhaled or exhaled from the lungs per minute
- **Tidal volume:** The amount of air which enters the lungs during normal inhalation at rest or during exercise

PE COMPONENT 1 - RESPIRATORY SYSTEM

Lactic Acid

- Lactic acid builds up following anaerobic exercise due to a lack of oxygen being present in the muscles - this is known as oxygen debt
- This is toxic and causes your muscles to ache and cramp (and eventually stop working)

	Inhaled Air	Exhaled Air
Oxygen	21%	16%
Carbon Dioxide	0.04%	4%

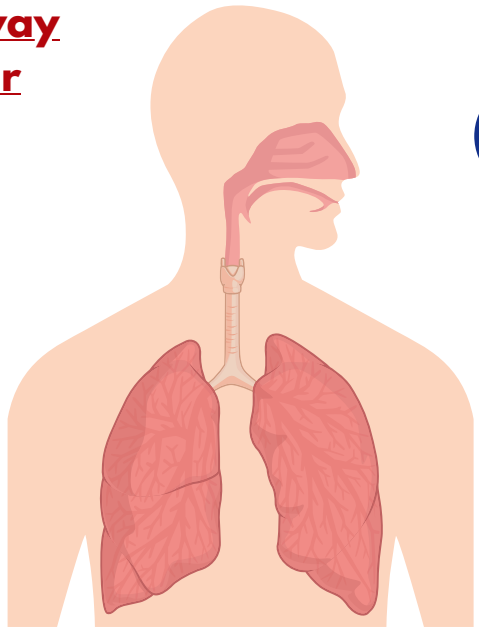
Aerobic Respiration

Glucose + Oxygen = Energy + CO2 + Water

Anaerobic Respiration

Glucose = Energy + Lactic Acid

Pathway of air



- Mouth/nose
- Trachea
- Bronchi
- Bronchioles
- Alveoli

Mechanics of Breathing

At Rest

	Inhalation	Exhalation
Intercostals	Contract	Relax
Rib Cage	Upwards and Outwards	Downwards and Inwards
Diaphragm	Contracts/Flattens	Relaxes/Domed

During Exercise

	Lungs expand/contract due to
Inspiration	Use of pectorals and sternocleidomastoid
Rib Cage	Abdominal muscles cause rib cage to be pulled down quicker

1 Markers

1.Which one of these lung volumes is defined as 'The volume of gas inhaled or exhaled from the lungs per minute'? (1 mark)

A) Residual Volume
B) Breathing Rate
C) Minute Ventilation- Correct Answer
D) Tidal Volume

2.Which part of the respiratory system is also know as the 'wind pipe'? (1 mark)

A) Trachea - Correct Answer
B) Bronchi
C) Bronchioles
D) Diaphragm

3. Gas exchange takes place at the alveoli. Describe one feature of the alveoli which makes it ideal for gas exchange. (1 mark)

Mark One – The alveoli have thin walls
OR – The alveoli have a large surface area
OR – The alveoli are surrounded by capillaries

Accept other appropriate answers

2 Markers

4. Describe the difference between aerobic respiration and anaerobic respiration. (2 marks)

Mark One – Aerobic respiration occurs when energy is produced with oxygen present
Mark Two – Anaerobic respiration occurs when energy is produced without oxygen present/with lactic acid as a by-product

5. Define tidal volume and explain what will happen to tidal volume during exercise. (2 marks)

Mark One – Tidal volume is the amount of air inspired or expired with each normal breath (at rest or during exercise)
Mark Two – During exercise tidal volume will increase due to an increase in breathing rate/increase in demand for oxygen

3 Marker

6. Gas exchange takes place at the alveoli. Describe three features of the alveoli which makes it ideal for gas exchange. (3 marks)

Mark One – The alveoli have thin walls
Mark Two – The alveoli have a large surface area
Mark Three – The alveoli are surrounded by capillaries

4 Marker

7. Diffusion takes place at the site of the lungs. Explain the process of diffusion at the site of the lungs. (4 marks)

Mark One – Diffusion is when gases move from an area of high concentration to an area of low concentration
Mark Two – (At the lungs) the alveoli have a high concentration of oxygen and a low concentration of carbon dioxide
Mark Three – The bloodstream has a high concentration of carbon dioxide and a low concentration of oxygen
Mark Four – Therefore the oxygen will travel down the concentration gradient from the alveoli to the bloodstream/The Co2 will travel down the concentration gradient from the bloodstream to the alveoli

Accept other appropriate answers

6 Markers

8. Using practical examples, explain the difference between aerobic and anaerobic exercise.

Justify the use of aerobic and anaerobic exercise for a 1500m runner. (6 marks)

A01 = 2, A02 = 2, A03 = 2

A01 - Aerobic exercise is when oxygen is required in order to produce energy
A02 - An example of aerobic exercise is a marathon runner who needs to supply oxygen to their muscles in order to produce energy throughout the whole duration of a race
A03 - Aerobic exercise is used during a 1500m race during the middle part of the race whereby the athlete will be using oxygen to produce energy in order to consistently run at the required pace without tiring quickly

A01 - Anaerobic exercise is when no oxygen is required in order to produce energy
A02 - An example of anaerobic exercise is a weight lifter who produces a powerful contraction without the time or need to use oxygen to contribute to energy production
A01 - Anaerobic exercise is used during a 1500m race in the latter stages of the race and particularly the last 100m. This is because the performer will be using a sprint finish in involving powerful contractions whereby energy will be produced without oxygen. This will ensure that the performer maximises their chances of performing to their best ability and may give them a better chance of winning the race

PE COMPONENT 1 - EFFECTS OF EXERCISE

The Short-Term Effects of Exercise ⇨ During or immediately after exercise

The Long Term Effects of Exercise ⇨ Months or Years of taking part in training/exercise

The Short-Term Effects of Exercise On Muscles

- Muscle Fatigue
- Increased Muscle Temperature
- Lactic Acid
- Increased oxygen debt
- Redistribution of Blood Flow

Heart Rate - The amount of times the heart beats per minute

Stroke Volume - The amount of blood ejected from the heart each beat

Cardiac Output - The amount of blood ejected from the heart per minute. Heart Rate X Stroke Volume

The Short-Term Effects of Exercise on Cardio-Respiratory System:

- Increased Heart Rate
- Increased Breathing Rate/Depth
- Increased Stroke Volume

The Long Term Effects of Exercise on Cardio-Respiratory System

- Increased Resting Stroke Volume
- Increased Strength of Diaphragm/Intercostal Muscles
- Decreased Resting Heart Rate
- Cardiac Hypertrophy
- Increased Lung Capacity/ Vital Capacity
- Increased Maximum Cardiac Output
- Increased number of alveoli and increased capillarisation
- Faster recovery back to resting heart rate

The Long-Term Effects of Exercise on Musculoskeletal System

Increased Bone Density	Weight bearing activities such as jogging strengthen the muscles and bones
Muscular Hypertrophy	Increase in size and strength of skeletal muscles
Increased Strength of Ligaments /Tendons	This will mean that an athlete is less likely to pick up injuries
Increased resistance to fatigue	Muscular endurance will be improved

1 Marker

1.Which one of the following is a long term benefit of exercise? (1 mark)

A Higher resting heart rate
B Higher blood pressure
C Lower Resting Heart Rate - Correct Answer
D Reduced tidal volume

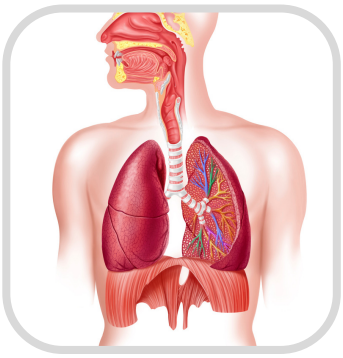
2 Markers

2. State two short-term effects of exercise on the muscular system. (2 marks)

Mark One – Increase in muscle temperature
Mark Two – Fatigue/lactic acid/oxygen debt

Accept other appropriate answers (e.g. redistribution of blood flow)

3. State two short-term effects of exercise on the cardio-respiratory system. (2 marks)



Mark One – Increased heart rate
Mark Two – Increased breathing rate/depth

Accept other appropriate answers (e.g. increased stroke volume)

4. A long-term effect of exercise is 'muscular hypertrophy'. Explain what is meant by this term and evaluate how muscular hypertrophy will increase performance in a sport of your choice. (2 marks)

Mark One – Muscular hypertrophy is when muscle size/mass and strength increase
Mark Two – This will be beneficial to a weightlifter who will experience an increase in power as a result of having bigger muscles. Therefore they will be able to lift a heavier weight and give themselves a better chance of winning competitions

Accept other appropriate answers

3 Markers

5. Naomi is a long-distance swimmer. She has taken part in a six-week training programme.

Evaluate how the long-term effects of exercise on the cardio-respiratory system could be beneficial to a swimmer. (3 marks)

Mark One – The swimmer will have a faster recovery rate back to resting heart rate. Therefore during training they will recover quicker and will be able to increase the amount of sets (intervals) that they take part in each session
Mark Two – The swimmer will have experienced cardiac hypertrophy. This is the increase in size and strength of the heart. Therefore the heart will be capable of pumping out more blood per beat (stroke volume) during exercise resulting in the working muscles fatiguing at a slower rate
Mark Three – The swimmer will have an increase in number of alveoli. This means that more oxygen will diffuse into the bloodstream and that the working muscles will be able to produce more energy during a race

Accept other appropriate answers (e.g. increased strength of diaphragm/increased lung capacity/increased resting stroke volume/decreased resting heart rate)

6. State three short-term effects of exercise on the cardio-respiratory system.(3 marks)

Mark One – Increased breathing rate/depth
Mark Two – Increased heart rate
Mark Three – Increased stroke volume

Accept other appropriate answers

UNIT CHECKLIST
Skeletal System

Bones/Skeleton

- Identify the following bones; Cranium, vertebrae, ribs, sternum, clavicle, scapula, pelvis, humerus, ulna, radius, carpals, metacarpals, phalanges, femur, patella, tibia, fibula, tarsals, metatarsals. ☐

Functions of the Skeleton

- Understand the 6 functions of the skeletal system and be able to apply each function to performance in physical activity. ☐

Structure of a Synovial Joint

- Define the term 'synovial joint'. Give examples of different types of joint e.g. hinge, ball & socket ☐

UNIT CHECKLIST
Muscular System

Muscles of the Body

- Identify the location of the muscles within the body: Understand the role of tendons (attaching muscle to bones) and ligaments (attaching bones to bones). ☐

Muscles & Movement

- Understand the different types of movement that muscles can create at each joint: flexion/extension, abduction/adduction, rotation, circumduction. Apply these movements to specific sporting actions ☐
- Know the definitions and roles of the following; Agonist, antagonist, fixator, antagonistic muscle action. ☐

UNIT CHECKLIST
Lever Systems

1st, 2nd & 3rd Class Lever Systems

- Identification of first, second and third class lever systems. ☐
- Identify sporting movements which use a first, second or third class lever system ☐

Mechanical advantage

- An understanding of mechanical advantage in relation to the three lever systems ☐
- Understand the equation that can be used to calculate mechanical advantage ☐

UNIT CHECKLIST
Planes & Axes of Movement

Planes of Movement

- Identification of the three planes of movement ☐
- Be able to give sporting examples of each plane of movement ☐

Axes of Rotation

- Identification of the three axes of rotation ☐
- Be able to give sporting examples of each axis of rotation ☐

UNIT CHECKLIST
Effects of Exercise

Short-Term Effects of Exercise (immediately during exercise)

- Give examples of the short-term effects of exercise ☐
- Be able to apply the effects to examples from physical activity/sport ☐

Long-Term Effects of Exercise (months and years of exercising)

- Give examples of the long-term effects of exercise ☐
- Be able to apply the effects to examples from physical activity/sport ☐

UNIT CHECKLIST
Cardiovascular System

Blood Vessels - Structure

- [ ] Understand the three type of blood vessels and their differing features

Blood Vessels - Functions

- [ ] Understand the role that blood vessels have in gas exchange, blood flow, redistribution of blood flow.

Structure of the Heart

- [ ] Positioning of the atria and ventricles
- [ ] Understand the pathway of blood as it moves between the lungs-heart-body

Cardiac Output, Stroke Volume and Heart Rate

- [ ] Be able to define and explain each of these terms

UNIT CHECKLIST
Respiratory System

Pathway of Air

- [ ] Identify the pathway that air takes from the nose/mouth through to the alveoli

Gas Exchange

- [ ] Understand where and how gas exchange takes place. Be able to describe the features of the alveoli that make gas exchange possible/efficient

Mechanics of Breathing

- [ ] Understand the interaction of the intercostal muscles and diaphragm whilst breathing

Key Terms

- [ ] Know the definitions of breathing rate, tidal volume, minute ventilation

Aerobic/Anaerobic Exercise

- [ ] Know the definitions of – aerobic exercise, anaerobic exercise
- [ ] Be able to apply practical examples of aerobic and anaerobic activities in relation to intensity and duration