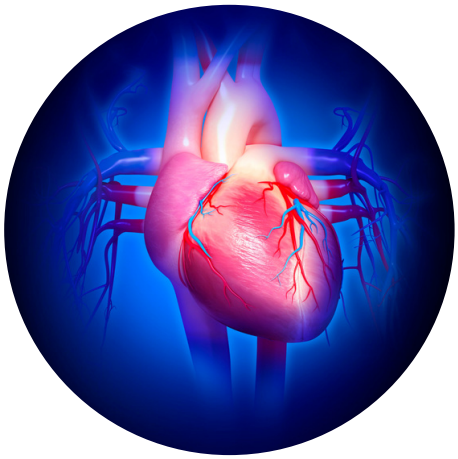
OCR GCSE PE

GCSE PE Revision Booklet

Applied Anatomy & Physiology

Name: _____



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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.

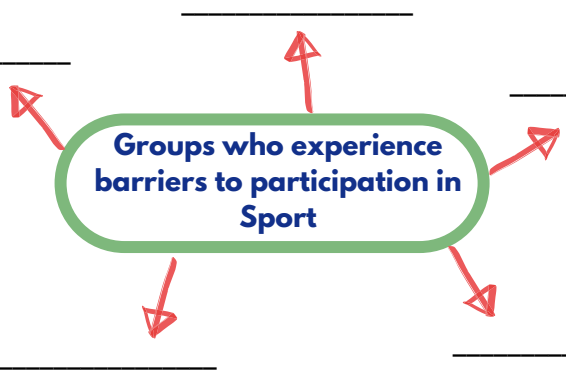
As you can see, there are two gaps in the definition of heart rate shown below.

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

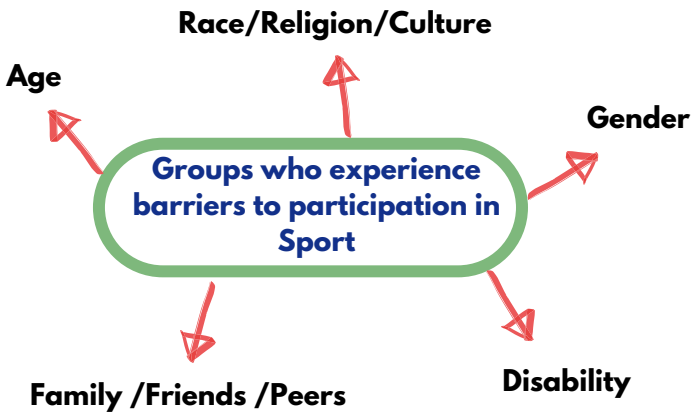
You simply need to fill in the gaps in order to complete the definition.

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

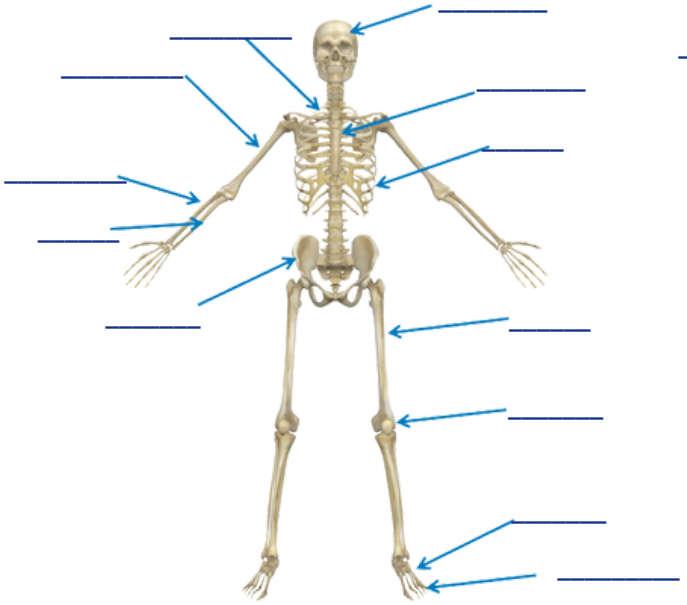
The example below shows that you need to complete the spider diagram covering the barriers to participation.

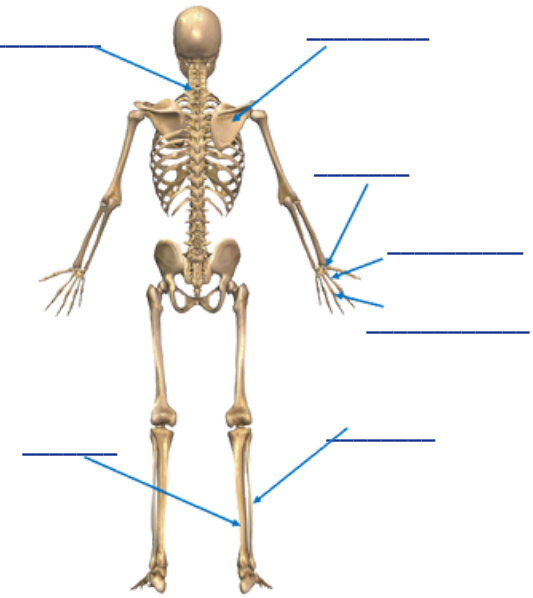


After filling in the gaps, the completed spider diagram should look like this:



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

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 _____

Ball & Socket Joints

Shoulder Joint

Hip Joint

Hinge Joints

Elbow Joint

Ankle Joint

Knee Joint

Complete the table with the bones found at each location.

Location	Bones at the location
Head/neck	• _____ • _____
Shoulder	• _____ • _____
Chest	• _____ • _____
Elbow	• _____ • _____ • _____
Hip	• _____ • _____
Knee	• _____ • _____ • _____
Ankle	• _____ • _____ • _____

Articulating Bones - which bones articulate at the following joints?

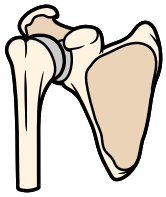
Ball & Socket Joints

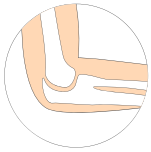
Hip Joint

- _____
- _____

Shoulder Joint

- _____
- _____





Hinge Joints

Elbow Joint

- _____
- _____
- _____

Knee Joint

- _____
- _____

1 Markers

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

---

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

A) Humerus
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
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)

---

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)

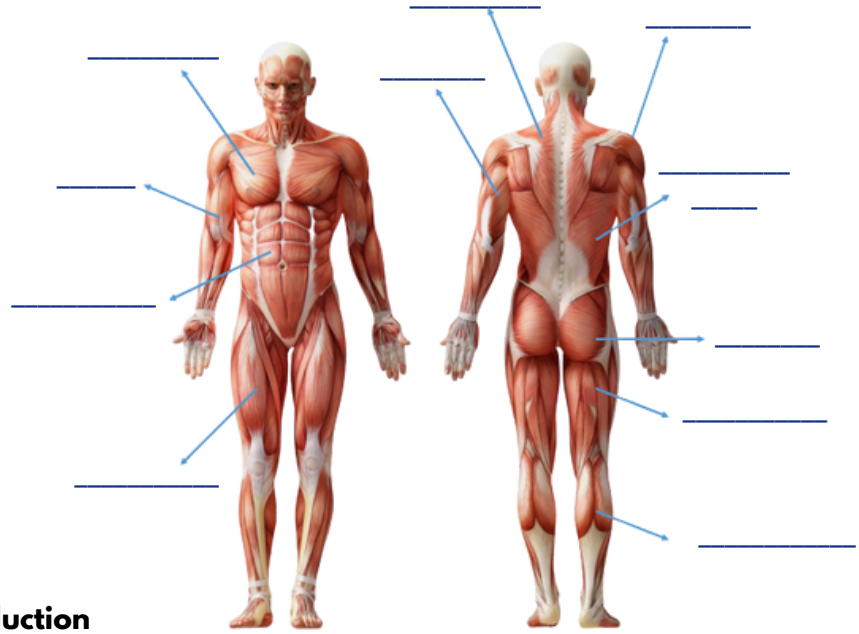
6. Aside from 'protection', explain how one other function of the skeletal system allows a netball player to produce an effective performance. (3 marks)

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

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)



Joint Actions

Flexion

Adduction

Rotation

Abduction

As one muscle CONTRACTS, another muscle will RELAX

CONTRACTS = Agonist

RELAX = Antagonist

PE COMPONENT 1 - MUSCULAR SYSTEM

Joint Actions

- Flexion is the _____ of the angle at a joint
- Extension is the _____ of the angle at a joint
- Abduction is movement _____ from the midline of the body
- Adduction is movement _____ the midline of the body
- Rotation is the action of _____ around an axis or centre

_____ Muscle

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

Biceps & _____

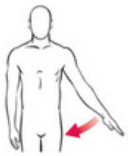
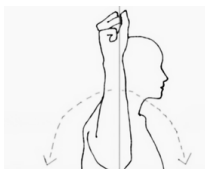
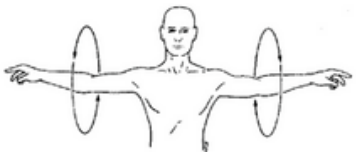
Quadriceps & _____

Antagonistic Pairs

_____ & Gluteals

_____ & Deltoid

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

Image	Movement	Location
	_____	**Hinge Joints:** _____ _____ **Ball & Socket Joints:** _____ _____
	_____	
	_____	**Ball and Socket Joints e.g.** _____
	_____	
	_____	
	_____	

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 -** _____	_____	_____
Throwing Action 	**Elbow -** _____	_____	_____

Bicep Curl

		Agonist	Antagonist
Lifting the dumbbell 	**Elbow -** _____	_____	_____
Lowering the dumbbell 	**Elbow -** _____	_____	_____

Antagonistic Pairs of Muscles

Gastrocnemius and tibialis anterior at the ankle Jumping

	Type of Movement	Agonist	Antagonist
Take off 	Ankle - _____	_____	_____
Throwing Action 	Ankle - _____	_____	_____

Quadriceps and Hamstrings at the knee - Kicking a ball

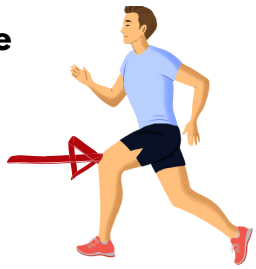
		Agonist	Antagonist
Preparation Phase 	Knee - _____	_____	_____
Strike 	Knee - _____	_____	_____

Antagonistic Pairs of Muscles

Hip Flexors and Gluteus Maximus at the hip
Kicking a ball

	Type of Movement	Agonist	Antagonist
Preparation Phase 	Hip - _____	_____	_____
Strike 	Hip - _____	_____	_____

Quadriceps and Hamstrings at the knee - Running

		Agonist	Antagonist
Drive 	Knee - _____	_____	_____
Recovery 	Knee - _____	_____	_____

1 Markers

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

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

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)

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

3 Markers

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

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

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.

Fulcrum – The axis around which the lever rotates

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

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

1st Class → _____ in the Middle

2nd Class → _____ in the Middle

3rd Class → _____ in the Middle

1.2.3. F.L.E

This can be remembered using 'Fly Little Elf'

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

First Class Lever Systems:

Rowing

Load - Water
Fulcrum - Top of Oar
Effort - _____

Tricep Dip

Load - Body weight through the hands
Fulcrum - _____
Effort - _____

Second Class Lever Systems:

Calf Raise & Long Jump

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

PE COMPONENT 1 - LEVER SYSTEMS

Third Class Lever Systems:

Bicep Curl

Fulcrum - _____
Effort - _____
Load - Dumbbell/Barbell

Kicking a Ball

Fulcrum - _____
Effort - _____
Load - Ball

Mechanical Advantage = Effort Arm ÷ Resistance Arm.

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

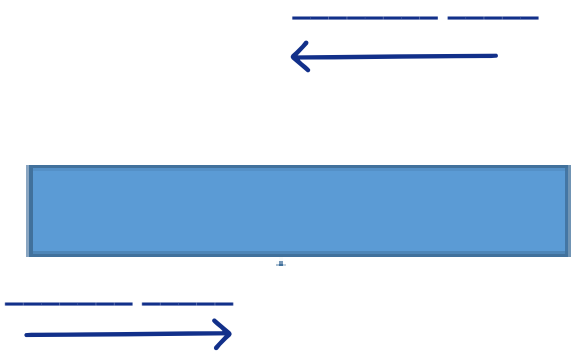
1. Complete the linear versions of the three classes of lever systems
2. Label the effort and load/resistance arms
3. Interpret the mechanical advantage of that lever

Fulcrum

Effort

L Load

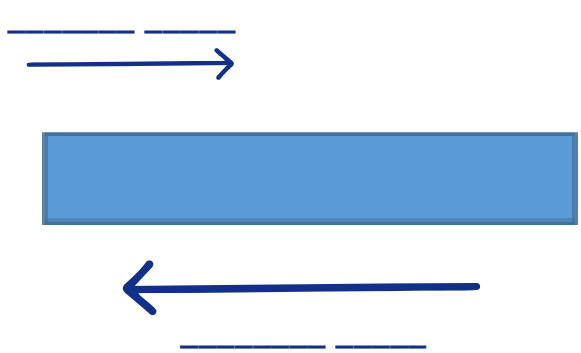
1st Class Lever



Mechanical Advantage Interpretation:

A First Class Lever System

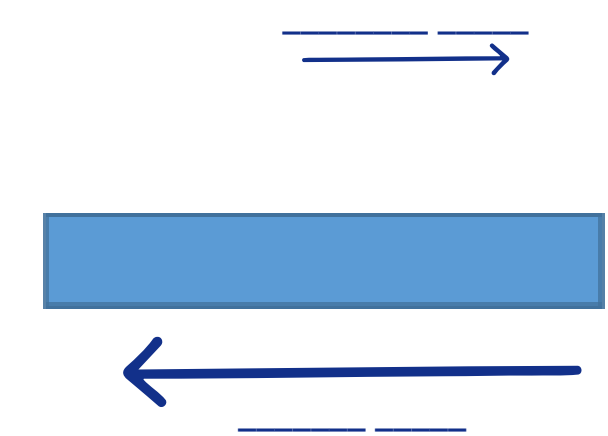
2nd Class Lever



Mechanical Advantage Interpretation:

A Second Class Lever System

3rd Class Lever



Mechanical Advantage Interpretation:

A Third Class Lever System

1 Markers

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

---

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
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)

---

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

---

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)

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)

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)

PE COMPONENT 1 - PLANES & AXES

Planes of Movement

_____ Plane

_____ Plane

_____ Plane

Frontal Plane

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

Sagittal Plane

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

Longitudinal Axis

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

Transverse Axis

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

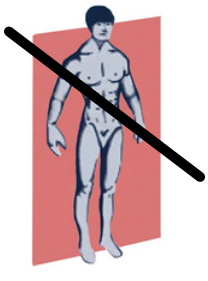
Transverse Plane

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

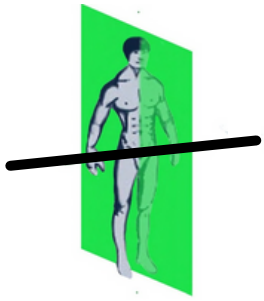
Frontal Axis

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

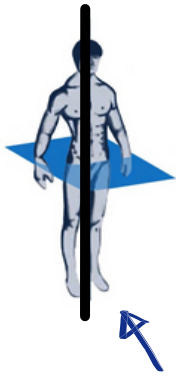
Axes of Rotation



_____ Axis



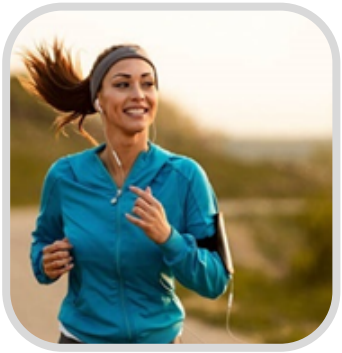
_____ Axis



_____ Axis

1 Markers

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



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

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

2 Markers

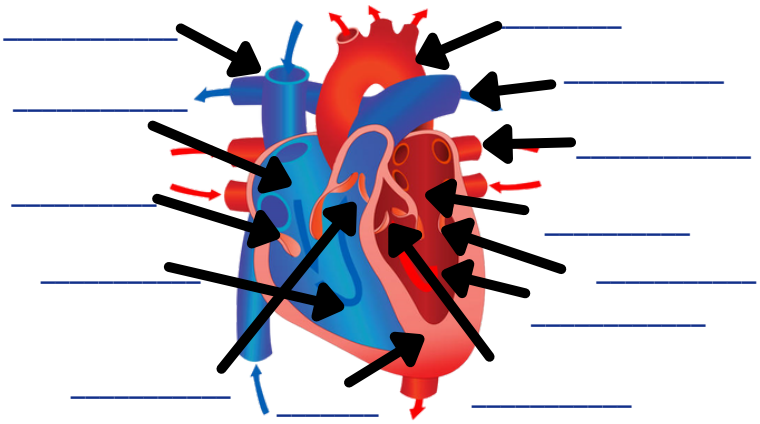
3. The image below shows a cartwheel being performed. Identify the plane and axis about which a cartwheel takes place. (2 marks)

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

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)

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)



Vascular Shunting Mechanism

Vasodilation

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

Vasoconstriction

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

Dilate = Diameter Increases

Constrict = Diameter Decreases

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

Arteries	→	Carry blood _____ from the heart	→ _____ & muscular walls
Veins	→	Carry blood _____ the heart	→ Thin walls
Capillaries	→	Connect artries & veins. Allows diffusion to take place	→ Very ____ 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 _____ 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 _____ each _____

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

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

Summarise the characteristics of each blood vessel type

	Size/Diameter	Wall Thickness	Valves
Arteries	_____	_____	____
Veins	_____	_____	____
Capillaries	_____	_____	____

Pathway of blood (starting from the right ventricle)

Right ventricle

Valve: _____ _____

_____ _____

_____ (gaseous exchange - blood is _____)

_____ _____

_____ _____

Valve: _____

_____ _____

_____(gaseous exchange - blood is _____)

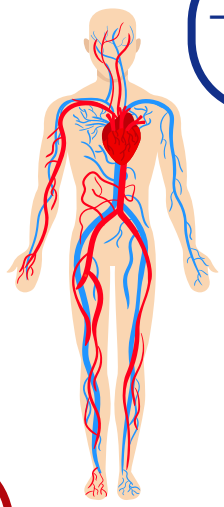
_____ _____

Valve: _____

_____ _____

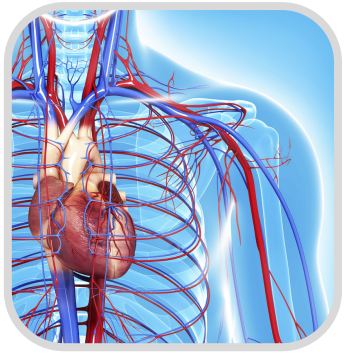
_____

Valve: _____ _____



1 Markers

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

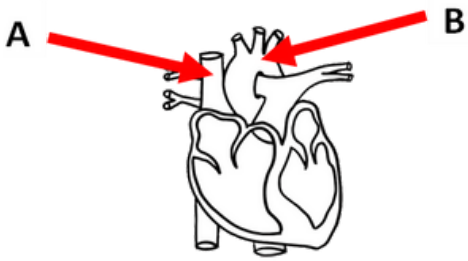


2. Which of the following is the correct definition of Stroke Volume? (1 mark)

A) The amount of times the heart beats each minute
B) The amount of blood that is ejected from the heart each beat
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)



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

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.

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

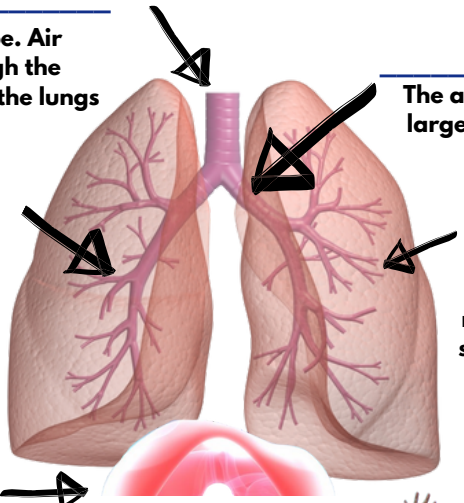
7. Outline three features of veins. (3 marks)

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

_____
The air travels through larger branches called Bronchi

_____
The air then reaches smaller branches called Bronchioles

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



_____
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

- _____ **Rate:** The number of breaths taken in a minute
- **Minute** _____**:** The volume of gas inhaled or exhaled from the lungs per minute
- _____ **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 _____ exercise due to a lack of _____ being present in the muscles - this is known as oxygen debt
- This is toxic and causes your muscles to ache and _____ (and eventually stop working)

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

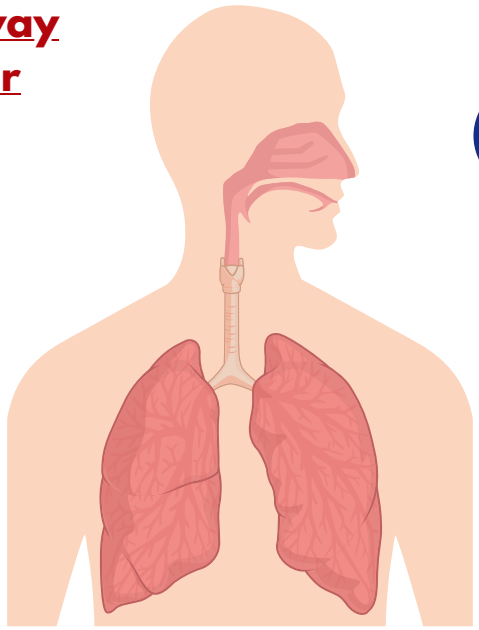
Aerobic Respiration

Glucose + _____ = Energy + _____ + Water

Anaerobic Respiration

Glucose = Energy + _____

Pathway of air



_____

_____

_____

_____

_____

Mechanics of Breathing

At Rest

	Inhalation	Exhalation
Intercostals	_____	_____
Rib Cage	_____ ____ _____	_____ ____ _____
Diaphragm	_____	_____

During Exercise

	Lungs expand/contract due to
Inspiration	_____
Rib Cage	_____ _____

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
D) Tidal Volume

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

A) Trachea
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)

2 Markers

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

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

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)

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)

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)

PE COMPONENT 1 - EFFECTS OF EXERCISE

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

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

The Short-Term Effects of Exercise On Muscles

- Muscle _____
- Increased Muscle _____
- _____ Acid
- Increased _____ debt
- _____ of Blood Flow

Heart Rate - The amount of times the heart _____ per _____

Stroke Volume - The amount of _____ ejected from the heart each _____

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

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

- Increased _____ Rate
- Increased _____ Rate/Depth
- Increased _____ Volume

The Long Term Effects of Exercise on Cardio-Respiratory System

- Increased Resting _____ Volume
- Increased _____ of Diaphragm/Intercostal Muscles
- _____ Hypertrophy
- Increased Maximum _____ Output
- Faster recovery back to _____ heart rate
- Increased number of _____ and increased capillarisation
- Increased _____ Capacity/ _____ Capacity
- Decreased _____ Heart Rate

The Long-Term Effects of Exercise on Musculoskeletal System

Increased _____ Density	Weight bearing activities such as jogging strengthen the muscles and bones
Muscular _____	Increase in size and strength of skeletal muscles
Increased Strength of _____ /Tendons	This will mean that an athlete is less likely to pick up injuries
Increased resistance to _____	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
D Reduced tidal volume

2 Markers

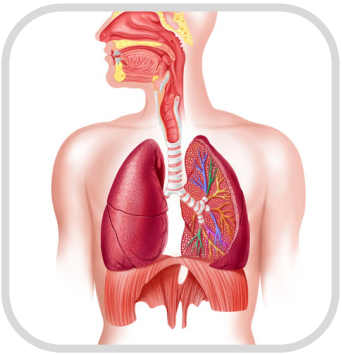
2. State two short-term effects of exercise on the muscular system. (2 marks)

_____

_____

_____

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



_____

_____

_____

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)

_____

_____

_____

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)

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

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