Bentley Wood
High School for Girls

# Physical Education Bridging Work

## Year 10 into 11 for 2021/22

Name: _____

Tutor Group: _____

Teacher: _____

# OCR GCSE (9-1) Physical Education

# Revision Booklet

## Paper 1

Physical factors affecting performance (01)

Name:

# Revision Check List

Below is all of the information and skills that the exam board, OCR, state that you need to know ahead of your exam in their specification.

In the question paper you will be tested on how well you have acquired the knowledge, skills and understanding set out in this specification.

Tick off when you have revised and tested yourself on each section below.

| | Revised | Tested |
|---|---|---|
| 1.1.a The location of the 19 major bones in the body. | | |
| 1.1.a The 6 functions of the skeleton. | | |
| 1.1.a The structure and location of the major joints of the body. | | |
| 1.1.a The types of movement possible at the major joints of the body. | | |
| 1.1.a The roles of ligaments, cartilage and tendons. | | |
| 1.1.b The location and role of the 11 major muscles in the body. | | |
| 1.1.b The definitions and roles of the agonist, antagonist and fixator in an antagonistic muscular action. | | |
| 1.1.c The 3 types of lever in the body, with sporting examples. | | |
| 1.1.c The 3 planes of movement and 3 axes of rotation. | | |
| 1.1.d The structure and function of the cardiovascular system. | | |
| 1.1.d The structure and function of the respiratory system. | | |
| 1.1.d The definitions and examples of aerobic and anaerobic exercise. | | |

| | Revised | Tested |
|---|---|---|
| 1.1.e The short-term effects of exercise on the body systems. | | |
| 1.1.e The long-term effects of exercise on the body systems. | | |
| 1.2.a The definitions of the 10 components of fitness. | | |
| 1.2.a Sporting examples of when the 10 components of fitness are required. | | |
| 1.2.a The fitness tests for the 10 components of fitness. | | |
| 1.2.b The 4 principles of training and how they can be used to increase fitness. | | |
| 1.2.b The elements of the FITT principle and how this can be used to increase fitness. | | |
| 1.2.b The 7 methods of training and when these would be used. | | |
| 1.2.b The key components of a warm up and a cool down. | | |
| 1.2.b The physical benefits of a warm up and a cool down. | | |
| 1.2.c The 5 methods of reducing the risk of injury in sport. | | |
| 1.2.c The potential hazards that could occur in the 5 main facilities. | | |

# Contents



# How this booklet works

In this booklet you will revise the information for the Paper 1 units (1.1.a – 1.2.c).

As well as the main revision content, there will also be questions in red boxes for you to test yourself and answer. Your teacher will have the answers to these.

In your exam you will need to apply your knowledge to sporting examples (AO2). There will be 20 marks available for this on each paper.

Therefore, throughout this booklet in the blue boxes you will need to apply the content to sporting examples. For these you can either choose one of the six sportspeople below or give your own relevant example.

Anthony Joshua - Boxer

Harry Kane - Footballer

Katarina Johnson-Thompson – Heptathlete

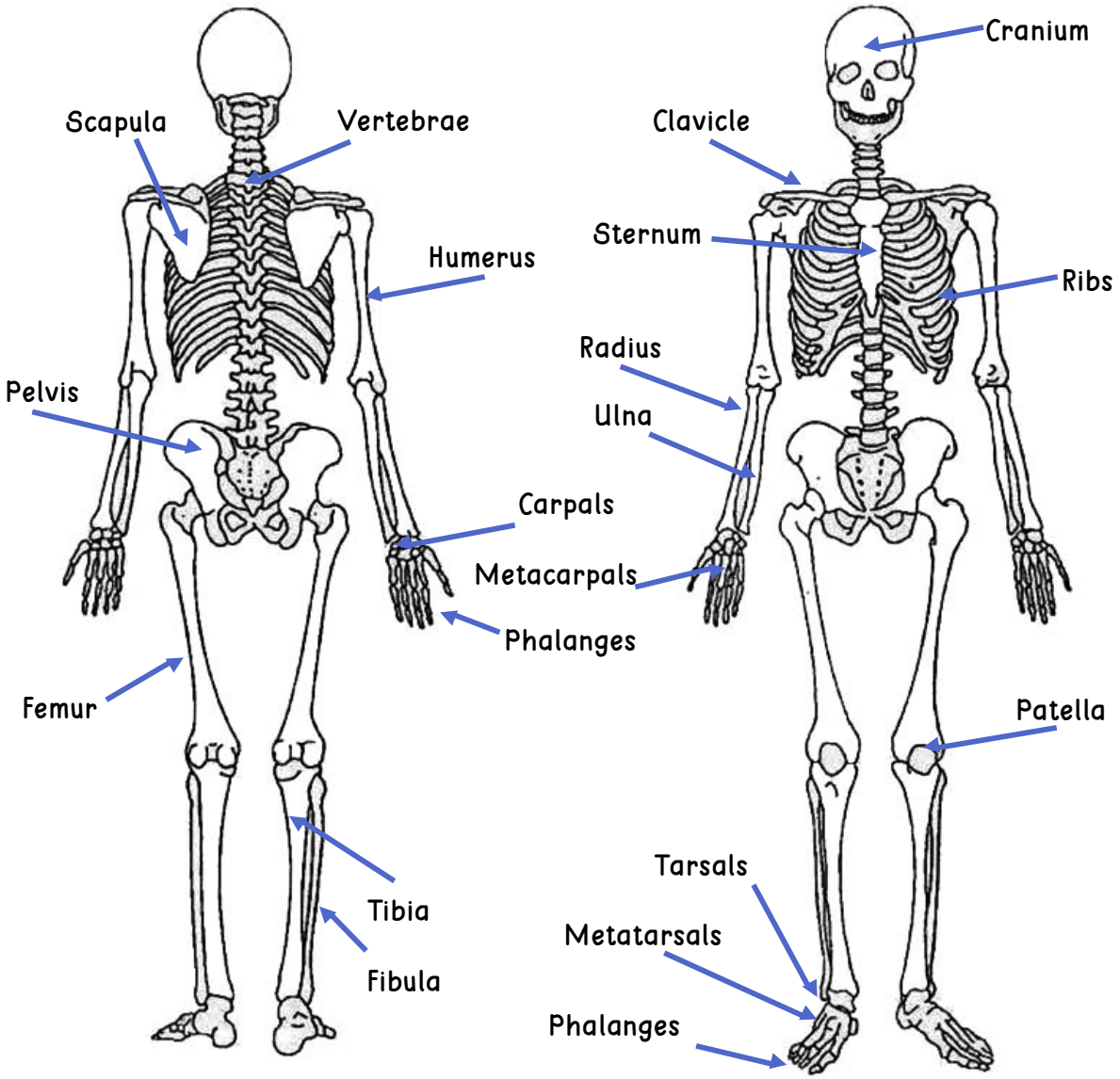
Jonny Brownlee – Triathlete

Johanna Konta – Tennis Player

Luke Gale – Rugby Player

# The Skeletal System

The adult skeleton has 206 bones and provides the framework for all movement. You need to know the 19 bones below.




Using the sports people on page 3 choose three sporting actions and list the major bones involved.

| Sports person: | Sporting action: | Bones involved: |
|---|---|---|
| | | |
| | | |
| | | |

# The Functions of the Skeleton

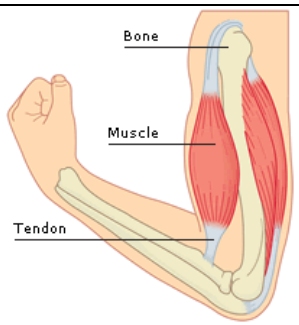
The skeleton provides vital functions. There are 6 functions that you need to be aware of.

## Support

The skeleton gives the body support, enabling us to stand.

The bones of the body are held together by ligaments.

The skeleton provides a framework for the muscles, which are attached to the bones by tendons.



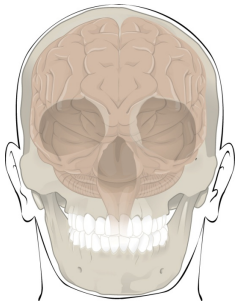

Use the sports people on page 3 to give a sporting example of who would benefit from this function. **Challenge** – Try to use a different sports person for each function.

## Protection

Some of our body parts, such as the brain, are very delicate and need protection.

Bones can protect body parts from impacts and injuries.

Examples include the cranium protecting the brain and the rib cage protecting the lungs and heart.



Use the sports people on page 3 to give a sporting example of who would benefit from this function. **Challenge** – Try to use a different sports person for each function.

## Movement

Muscles are attached firmly to bones forming levers to allow for sporting movements.

When the muscles contract they pull on the bone, creating movement.

Use the sports people on page 3 to give a sporting example of who would benefit from this function. **Challenge** – Try to use a different sports person for each function.

## Posture

The skeleton acts as a framework.

Muscles are firmly attached to bones forming our body shape, this holds us upright.

Use the sports people on page 3 to give a sporting example of who would benefit from this function. **Challenge** – Try to use a different sports person for each function.

## Mineral Storage

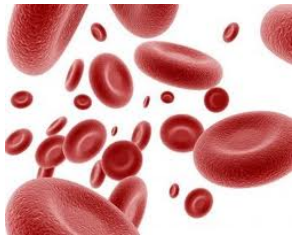

The minerals in your bones serve two main functions.

Minerals transform spongy bone matrix into a rigid structure and in turn increase density and strength.

Your bones also function as a mineral storage depot, releasing dissolved calcium, phosphorus and magnesium into your bloodstream if needed.

Use the sports people on page 3 to give a sporting example of who would benefit from this function. **Challenge** – Try to use a different sports person for each function.

## Blood Cell Production



The ends of long bones and some other bones including the ribs, humerus, femur and even vertebrae bones, contain red bone marrow.

This is where the red blood cells that carry oxygen are produced.

Use the sports people on page 3 to give a sporting example of who would benefit from this function. **Challenge** – Try to use a different sports person for each function.

A function of the skeleton is that it stores minerals, this aids a weightlifter by ensuring they have strong bones and a strong base of support. With sporting examples, analyse how else the skeleton enables a person to take part in sport.

# The Structure of the Skeletal System

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

A synovial joint is a freely moveable joint in which the bones surfaces are covered by cartilage and connected by a fibrous connective tissue capsule lined with synovial fluid.

The skeletal system has a number of joints which are responsible for the huge range of movement.

## Hinge Joints

Hinge joints work like a hinge on a door and can bend to allow movement in two directions only.

These joints are extremely powerful and by working with surrounding muscles they can produce power and speed. For example, *the knee drive in a 100m sprint.*

Examples: The **knee** (femur and tibia) and **elbow** (humerus, radius, ulna).

Movements possible at hinge joints: Flexion and Extension.

## Ball and Socket Joints

Ball and socket joints are the most moveable joints in the body, allowing movement in all directions.

Most sporting movements require the type of movement that the shoulder and hip allow. For example, *a tennis serve.*

Examples: The **shoulder** (humerus and scapula) and **hip** (pelvis and femur).

Movements possible at hinge joints: Flexion, Extension, Adduction, Abduction, Rotation and Circumduction.

Using the sports people on page 3 identify some sporting actions which require movement at a hinge joint and a ball and socket joint.

| Sports person: | Sporting action involving a hinge joint: | Sporting action involving a ball and socket joint: |
|---|---|---|
| | | |
| | | |
| | | |

Hinge and ball and socket joints allow different types of movement. There are 6 basic types of movements that can occur at such joints.

## Flexion

The bending or flexing of a limb.

Occurs at: Hinge joints and ball and socket joints.

Example: A rugby player would create flexion at the knee when preparing for a conversion kick.

Give two sporting examples of when this movement occurs using the sports on page 3:

## Extension

The straightening or extending of a limb.

Occurs at: Hinge joints and ball and socket joints.

Example: A boxer would extend their arm at the elbow on the follow through of a jab.

Give two sporting examples of when this movement occurs using the sports on page 3:

## Rotation

Rotation is where the bone turns around its longitudinal axis.

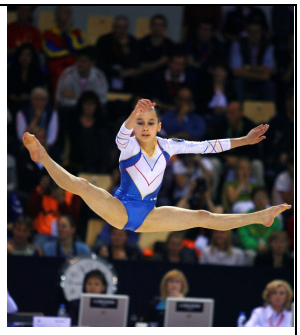
When rotation occurs, your hand will turn from facing up to down (or vice versa).

Occurs at: Ball and socket joints.

Example: A tennis player uses rotation at the shoulder joint when playing a topspin forehand shot.

Give two sporting examples of when this movement occurs using the sports on page 3:

## Abduction



The sideways movement of a limb away from the midline of the body.

Occurs at: Ball and socket joints.

Example: A gymnast abducts their legs at the hips when performing a straddle jump.

Give two sporting examples of when this movement occurs using the sports on page 3:

## Adduction

The sideways movement of a limb towards the midline of the body.

Occurs at: Ball and socket joints.

Example: A swimmer adducts their arms at the shoulders back towards the body during the breast stroke action.

Give two sporting examples of when this movement occurs using the sports on page 3:

## Circumduction

This is where the limb moves in a circle.

Occurs at: Ball and socket joints.

Example: A cricketer uses circumduction at the shoulder when performing a bowl.

Give two sporting examples of when this movement occurs using the sports on page 3:

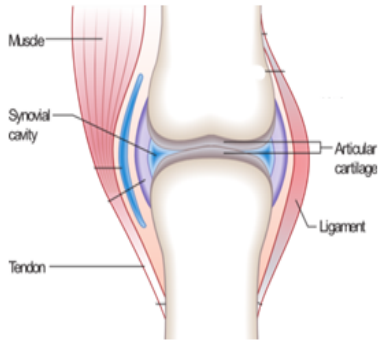
# The Roles of Ligaments, Cartilage and Tendons

## Ligaments

These are found between bones and attach bone to bone.

They are bands of connective tissue that are very tough and resilient.

**Function:** The ligaments prevent movements that are extreme and help stop dislocation.




Give a sporting example of when this function would be beneficial:

## Cartilage

Cartilage is a soft connective tissue.

Cartilage may be torn with a forceful knee movement. For example, a footballer dribbling around a defender may twist their knee while their foot is still in the ground.

**Function:** The cartilage reduces friction and acts as a shock absorber for the joint.

Give a sporting example of when this function would be beneficial:

## Tendons

Muscles are attached to bones via tendons.

Tendons are strong and can be a little flexible.

**Function:** As well as attaching muscles and bones, the tendons also help to transmit the power needed to move bones. When a muscle shortens, it pulls on the tendons; this pulls on the bones to which the tendons are attached and causes movement.

Give a sporting example of when this function would be beneficial:

# Quick Questions – The Skeletal System

1. Name the four bones found in the leg. (4)

2. Name the two articulating bones at the shoulder joint. (2)

3. Name the six functions of the skeleton. (6)

4. Name and explain two functions of the skeleton that would be important to a horse rider. (4)

5. Explain, with a sporting example, how the function of the skeleton blood cell production can be beneficial. (2)

6. Name the two types of joint in the body, giving the locations of each. (4)

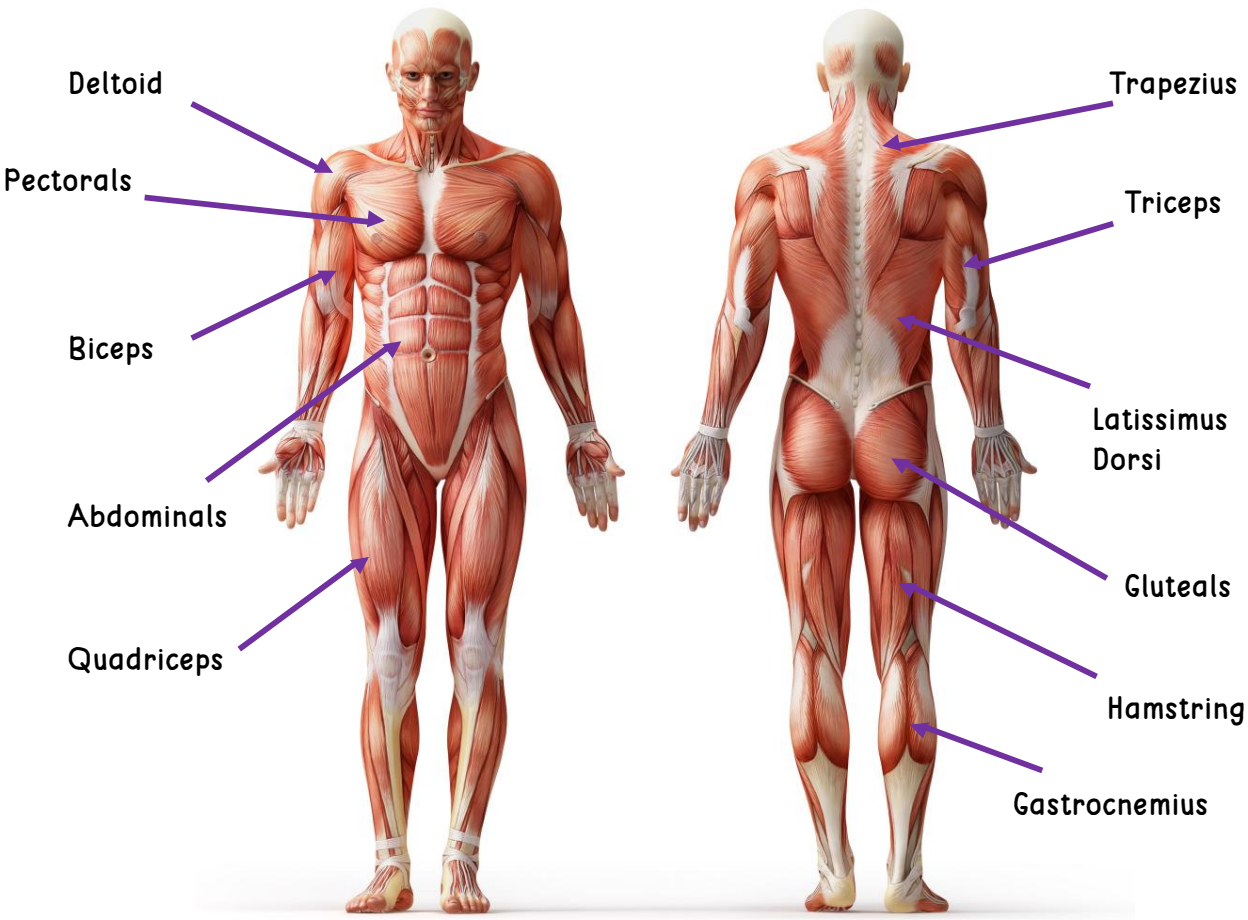
7. Using an example from the sport of your choice, identify the two types of movement that can occur at a hinge joint. (4)

8. Explain, with a sporting example, the function of ligaments. (3)

9. Other than ligaments, state the two other connective tissues found at joints. (2)

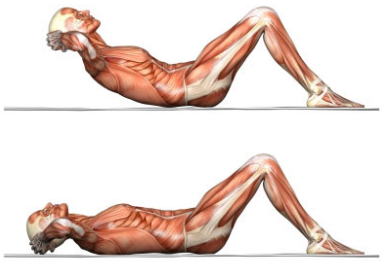
# The Muscular System

The muscular system allows us to move and perform sporting actions. You need to know the 11 muscles below.




Each muscle is responsible for creating a particular movement.

| | |
|---|---|
| **Deltoid**<br><br>Function: Allows abduction, adduction, flexion, extension, rotation and circumduction at the shoulder. | Causes flexion and abduction at the shoulder to lift arms and make a block in volleyball.<br><br>  |
| Give a sporting example: | |

| | |
|---|---|
| **Pectorals**<br><br>Function: Allows adduction at the shoulder and inward rotation of the arm. | Causes adduction at the shoulder to bring the arms together and hold onto and opponent during a tackle in rugby.<br>  |
| Give a sporting example: | |
| **Trapezius**<br><br>Function: Allows extension at the neck and horizontal extension at the shoulder (moving the arms backwards). | Causes horizontal extension at the shoulder to prepare for a smash shot in badminton.<br>  |
| Give a sporting example: | |
| **Latissimus Dorsi**<br><br>Function: Allows adduction at the shoulder. | Causes adduction at the shoulder to bring the arms back towards the body during the butterfly stroke.<br>  |
| Give a sporting example: | |
| **Abdominals**<br><br>Function: Allows flexion at the spine (sitting upwards). | Causes flexion at the spine to perform a sit up.<br>  |
| Give a sporting example: | |

| | |
|---|---|
| **Biceps**<br><br>Function: Allows flexion at the elbow. | Causes flexion at the elbow to raise the dumbbell during a bicep curl.<br>  |
| Give a sporting example: | |
| **Triceps**<br><br>Function: Allows extension at the elbow. | Causes extension at the elbow to extend the arm to perform the push pass in netball.<br>  |
| Give a sporting example: | |
| **Gluteals**<br><br>Function: Allows flexion and extension at the hip. | Causes flexion at the hip to bring the leg forward during the 100m sprint.<br>  |
| Give a sporting example: | |

| | |
|---|---|
| **Quadriceps**<br><br>Function: Allows extension at the knee. | Causes extension at the knee to straighten the leg when kicking the ball in football. |
| Give a sporting example: |  |
| **Hamstrings**<br><br>Function: Allows flexion at the knee. | Causes flexion at the knee to bend the leg in preparation for striking the ball for a conversion in rugby. |
| Give a sporting example: |  |
| **Gastrocnemius**<br><br>Function: Allows plantar flexion at the ankle (pointing the toes). | Causes plantar flexion at the ankle to point the toes when making a movement look aesthetically pleasing in gymnastics. |
| Give a sporting example: |  |

# Antagonistic Pairs

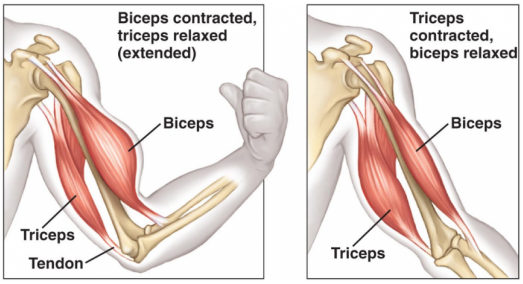
There are a vast range of movements that can be created by the human body. To produce these movements the muscles must contract. When they contract they **shorten,** pulling on the bone to cause movement. When muscles relax they lengthen.

As muscles can only pull they must work in partnership with another muscle. These pairs of muscles are called **antagonistic pairs.**

Antagonistic pairs are made up of three components. These are **key terms** which you must know.

- **The Agonist:** This is the muscle that contracts to allow the movement (the pulling muscle), also known as the prime mover. When this muscle pulls it becomes shorter.
- **The Antagonist:** This is the other muscle in the partnership which relaxes whilst the agonist contracts. This muscle becomes longer.
- **The Fixator:** This is the muscle that stabilises the joint. It does not move but contracts to fix the muscles to the bone.

There are two main antagonistic pairs in the body.

| | |
|---|---|
| **Biceps and Triceps**<br>• These muscles create movement at the elbow joint.<br>• The biceps contracts to flex (bend) the arm whilst the triceps relaxes.<br>• The triceps contracts to extend the arm whilst the bicep relaxes. |  |
| **Hamstrings and Quadriceps**<br>• These muscles create movement at the knee joint.<br>• The hamstring contracts to flex (bend) the leg whilst the quadriceps relaxes.<br>• The quadriceps contracts to extend the leg whilst the hamstring relaxes. |  |

| | |
|---|---|
|  |  |
| Identify and describe the role of the agonist and the antagonist in all stages of the sporting action above: | |
| | |
|  |  |
| Identify and describe the role of the agonist and the antagonist in all stages of the sporting action above: | |
| | |
|  |  |
| Identify and describe the role of the agonist and the antagonist in all stages of the sporting action above: | |
| | |

# Quick Questions - The Muscular System

1. Describe the locations of the trapezius, latissimus dorsi and the deltoid. (3)

2. Name the three muscles in the leg. (3)

3. Name the muscle which contracts to flex the spine, allowing a sit up. (1)

4. Name the muscle which contracts to extend the arm at the elbow. (1)

5. With a sporting example, describe the role of the gastrocnemius. (2)

6. With a sporting example, describe the role of the pectorals. (2)

7. Describe the role of the agonist in an antagonistic pair. (1)

8. Describe the role of the fixator in an antagonistic pair. (1)

9. Explain how the biceps and triceps work as an antagonistic pair. (3)

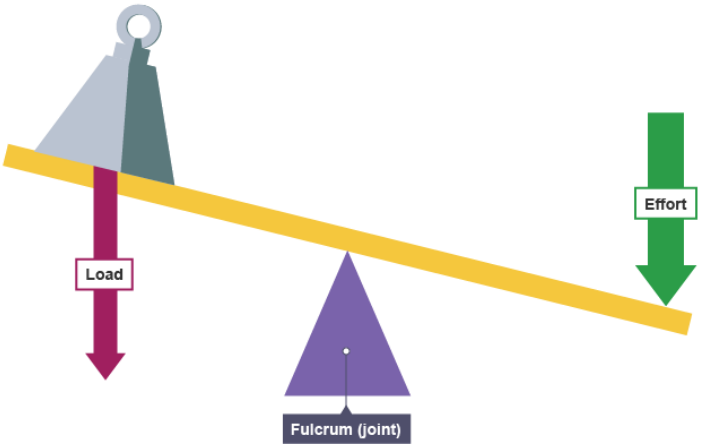
10. Explain how the hamstring and quadriceps work as an antagonistic pair. (3)

# Lever Systems

The joints of our skeleton act as levers to allow movement. When the muscles contract they pull on bones, creating movement.

All levers have three parts:

- **The Fulcrum:** This is the fixed point of movement, generally at the centre of a joint.
- **The Load:** This is the weight of the body or anything it is carrying. This will move as a result of the effort on the lever.
- **The Effort:** This is the muscular force that moves the load.



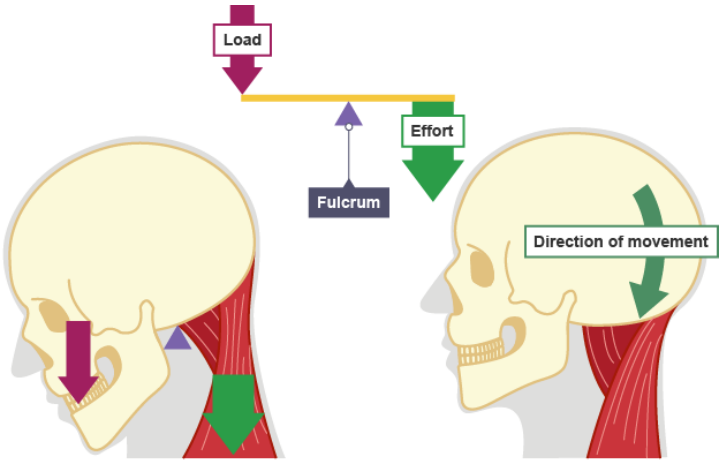

There are three classes of lever in the body.

## 1st Class Lever

This type of lever is found in the neck when raising your head.

The fulcrum is in the middle of the effort and the load.

The neck muscles provide the effort, the neck is the fulcrum and the weight of the head is the load.




Give two sporting examples of when this lever would be used:

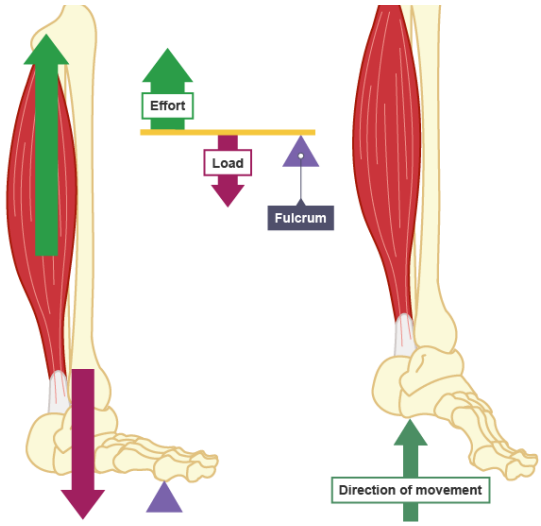
## 2nd Class Lever

This type of lever is found in the ankle area when standing on tiptoes.

The load is in the middle between the fulcrum and the effort.

The ball of the foot is the fulcrum, the weight of the body is the load and the gastrocnemius muscle provides the effort.

2nd class levers offer a mechanical advantage due to the greater distance between the effort and the fulcrum. This means they can move a larger load with a smaller effort.



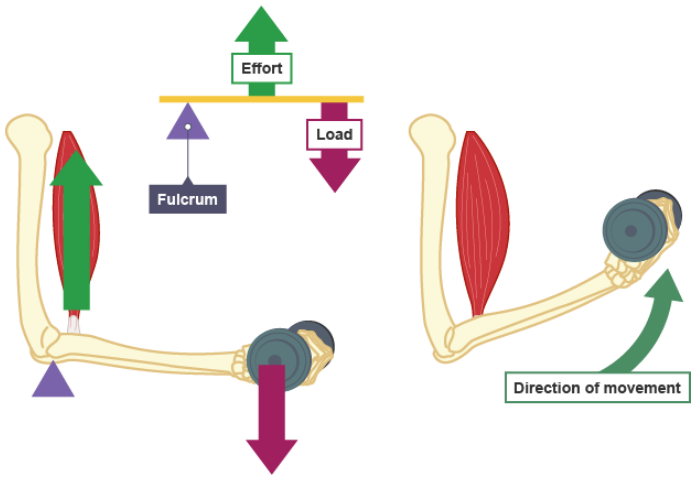

Give two sporting examples of when this lever would be used:

## 3rd Class Lever

This type of lever is found at the elbow when raising and lowering the forearm.

The effort is in the middle between the fulcrum and the load.

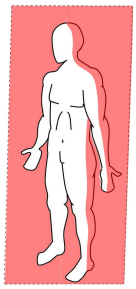
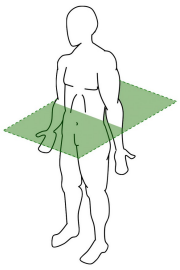
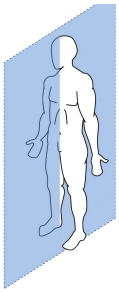
The elbow joint is the fulcrum, the weight of the forearm and anything it may be holding is the load and the biceps muscle provides the effort.

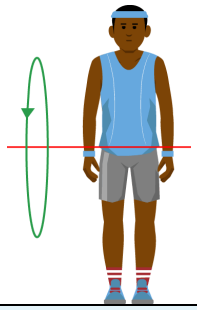
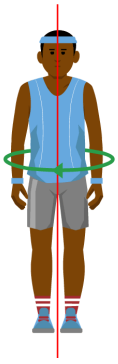
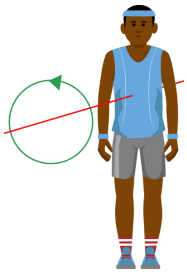



Give two sporting examples of when this lever would be used:

# Planes of Movement and Axes of Rotation

All movements occur in different planes and around different axes. A plane is an imaginary flat surface that runs through the body whereas an axis is a line which the body rotates or spins around.

| Frontal Plane | Transverse Plane | Sagittal Plane |
|---|---|---|
| Passes from side to side, dividing the body into front and back.<br>  <br>Abduction and adduction movements occur in this plane, eg. Star jumps and a cartwheel. | Passes through the middle of the body, dividing the body into top and bottom.<br>Rotational movements occur in this plane, eg. A pirouette in dance.<br>  | Passes vertically through the middle of the body, dividing the body into left and right.<br>  <br>Flexion and extension movements occur in the place, eg. Running. |
| Give a sporting example: | Give a sporting example: | Give a sporting example: |

| Transverse Axis | Longitudinal Axis | Frontal Axis |
|---|---|---|
| Runs through the centre of the body from left to right.<br>A person rotates around this axis when performing a somersault.<br>  | Runs through the centre of the body from top to bottom.<br>A person rotates around this axis when spinning.<br>  | Runs through the centre of the body from front to back.<br>A person rotates around this axis when performing a cartwheel.<br>  |
| Give a sporting example: | Give a sporting example: | Give a sporting example: |

# Quick Questions - Levers, Planes and Axes

1. Draw and label a 1st class lever. (1)

   _____

2. Draw and label a 2nd class lever. (1)

   _____

3. Draw and label a 3rd class lever. (1)

   _____

4. Give a sporting example of when a 1st class lever would be used. (1)

5. Give a sporting example of when a 2nd class lever would be used. (1)

6. Give a sporting example of when a 3rd class lever would be used. (1)

7. Identify the plane of movement that splits the body into front and back. (1)

8. Name the plane of movement which a squat would take place in. (1)

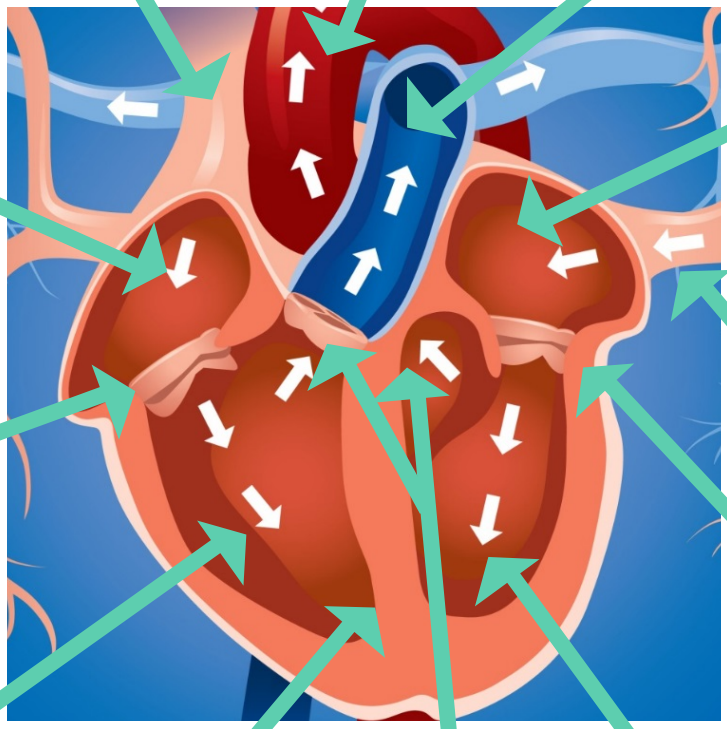
9. Name the axis of rotation that a forward roll would take place on. (1)

10. State a sporting action which would involve rotation around the longitudinal axis. (1)

# The Structure of the Cardiovascular System

The cardiovascular system consists of the heart, the blood and the blood vessels. The main functions of the system are to transport oxygen and nutrients around the body and to remove waste products.

The heart is a muscular pump that is divided into two halves. You need to be aware of the path that the blood takes through the heart, naming the following components.

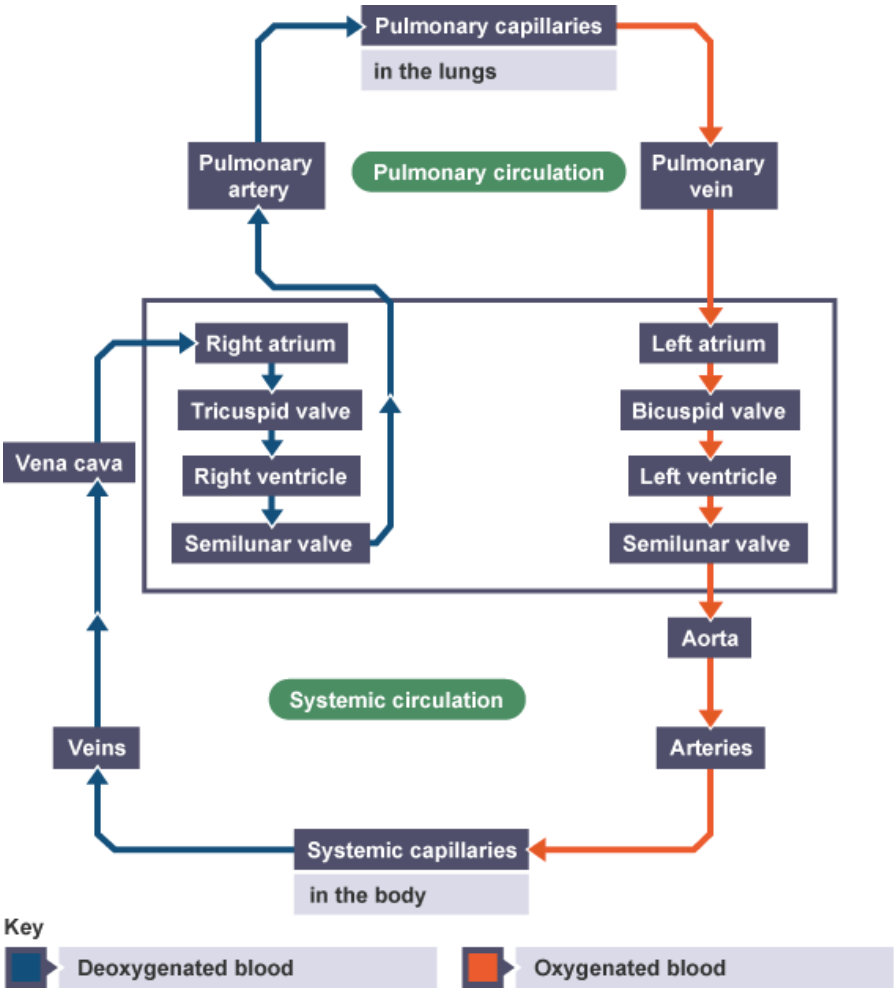


# The Double-Circulatory System and the Pathway of the Blood

The heart works as a dual action pump with two pumps working at the same time to pump blood in two different directions. This is known as the double-circulatory system.

The right-hand side of the heart collects deoxygenated blood from the body and pumps it to the lungs to collect more oxygen. This is called **pulmonary circulation.** The blood is carried back from the body to the heart in the vena cava. It travels into the right atrium, through the tricuspid valve into the right ventricle. The heart then pumps the blood through the semilunar valve and into the pulmonary artery which takes the blood to the lungs where it becomes oxygenated.

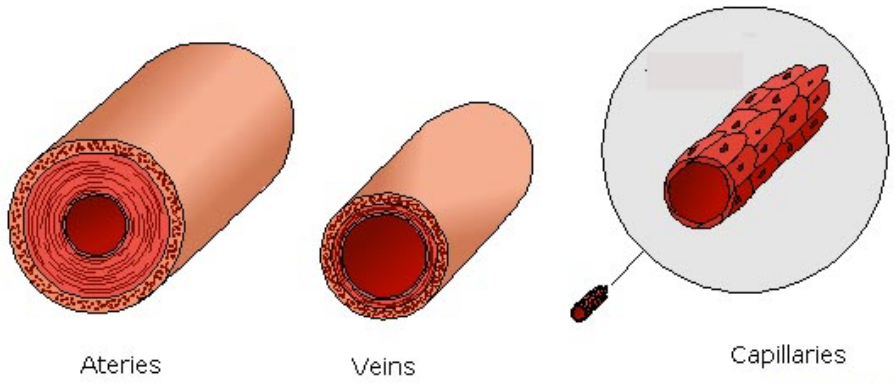
The left-hand side of the heart collects oxygenated blood from the lungs and sends it around the body to be used by the muscles/organs. This is known as **systemic circulation.** After receiving oxygen at the lungs, the blood returns to the heart via the pulmonary vein. It enters the left atrium, through the bicuspid valve into the left ventricle. The heart pumps the blood through the semilunar valve into the aorta which transports the blood to where it is needed in the body.



# Blood Vessels and Red Blood Cells

Blood is transported around the body in three different types of blood vessels.

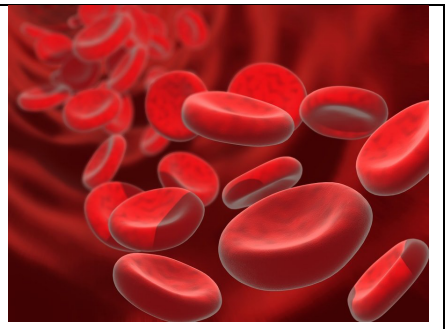
| Arteries | Capillaries | Veins |
|---|---|---|
| They have thick muscular walls and carry blood at high pressure.<br><br>**Function:** To carry blood away from the heart. This is usually oxygenated blood with the exception of the pulmonary artery. | They have very thin walls (one cell thick) allowing gas and nutrients to transfer in and out of blood.<br><br>**Function:** To allow gases and nutrients to transfer between the blood and the body cells. | They have thin walls and feature valves which prevent the back flow of blood.<br><br>**Function:** To carry blood towards the heart. This is usually deoxygenated blood with the exception of the pulmonary vein. |




## Red Blood Cells

Red blood cells carry oxygen from the lungs to the muscles and remove carbon dioxide from the muscles to the lungs.

They contain **haemoglobin** which allows them to carry oxygen to the working muscles. Without these cells performers would fatigue and stop.



Give a sporting example of how red blood cells aid a sports performer:

# Cardiovascular Values

The heart's function is to pump the blood around the body. To assess the heart's performance, we must consider the following key terms.

## Heart Rate

Heart rate (HR) is the number of times the heart beats per minute.

The average resting heart rate is approximately 70 beats per minute (BPM). During exercise the HR increases to send more blood and oxygen to the working muscles.

Explain what would happen to Anthony Joshua's heart rate during a fight and how this aids his performance:

## Stroke Volume

Stroke volume (SV) is the amount of blood pumped out the left ventricle per beat.

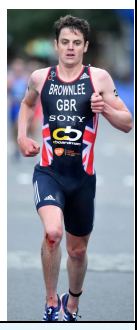
During exercise the SV increases to send more blood and oxygen to the working muscles.

Explain what would happen to Johanna Konta's stroke volume during a match and how this aids her performance:

## Cardiac Output

Cardiac output (CO) is the amount of blood pumped out of the left ventricle per minute.

This can be calculated by multiplying the heart rate (HR) by the stroke volume (SV). During exercise the CO increases to send more blood and oxygen to the working muscles.



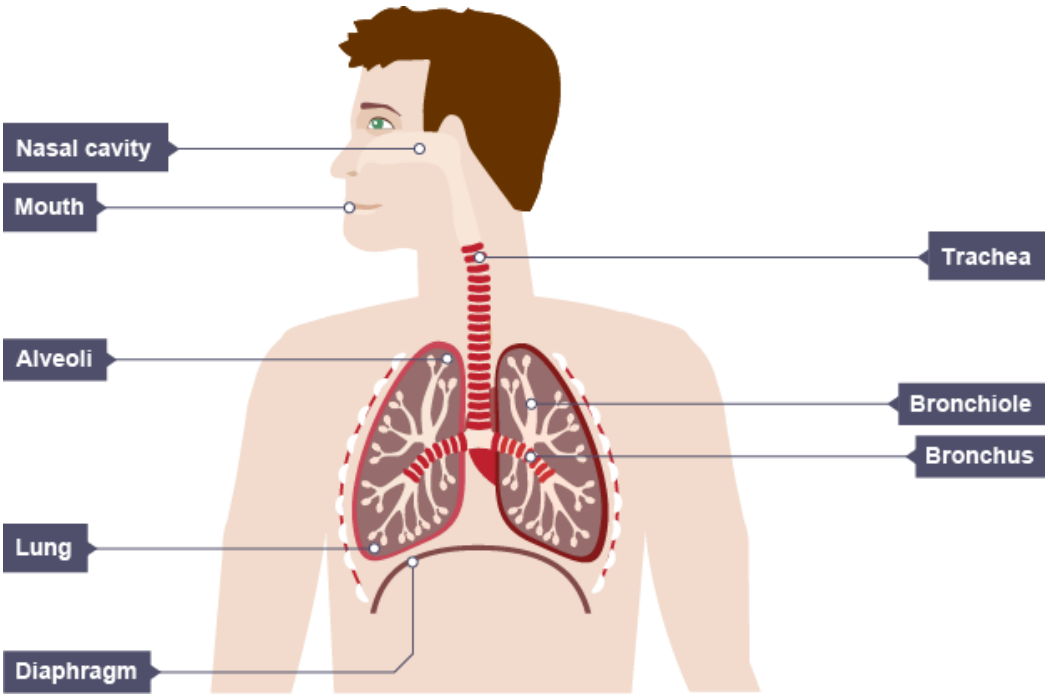

Explain what would happen to Jonny Brownlee's cardiac output during a race and how this aids his performance:

# The Structure of the Respiratory System

The respiratory system involves the lungs and works closely with the cardiovascular system. The function of the respiratory system is to transport air into the lungs to allow the diffusion of oxygen into the blood stream.

You need to be aware of the path that the air takes into the lungs naming the following components:

- Mouth and Nose: Air enters the body through the mouth and nose where it is warmed up.
- Trachea: It travels into the trachea which is sometimes known as the windpipe.
- Bronchi: The trachea divides into two bronchi, there is one bronchus in each lung.
- Bronchiole: The bronchus splits into bronchioles which are smaller tubes which the air travels through.
- Alveoli: There are millions of tiny air sacs (alveoli) at the end of the bronchioles which is where gaseous exchange takes place.




The diaphragm and intercostal muscles are also important in the breathing process.

- The diaphragm is a sheet of muscle below the lungs. This contracts and moves downwards to increase the size of the chest cavity.
- The intercostal muscles are found between the ribs and move the ribs up and out which helps to make the cavity bigger and decrease the air pressure inside, sucking air into the lungs.

# Respiratory Values

To assess the performance of the respiratory system we measure how much air is inspired or expired each minute.

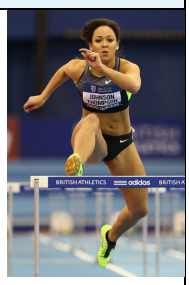
## Breathing Rate

Breathing rate is the number of breaths taken in one minute.

During exercise the breathing rate increases to make more oxygen available for the working muscles.

Explain what would happen to Luke Gale's breathing rate during a match and how this aids his performance:

## Tidal Volume

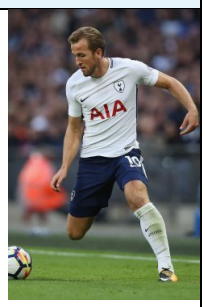


Tidal volume (TV) is the amount of air inspired or expired in a normal breath.

During exercise the tidal volume increases to make more oxygen available for the working muscles.

Explain what would happen to Katarina Johnson-Thompson's tidal volume during a race and how this aids her performance:

## Minute Ventilation



Minute ventilation is the amount of air inspired or expired in one minute.

This can be calculated by multiplying the breathing rate by the tidal volume. During exercise the minute ventilation increases to make more oxygen available for the working muscles.

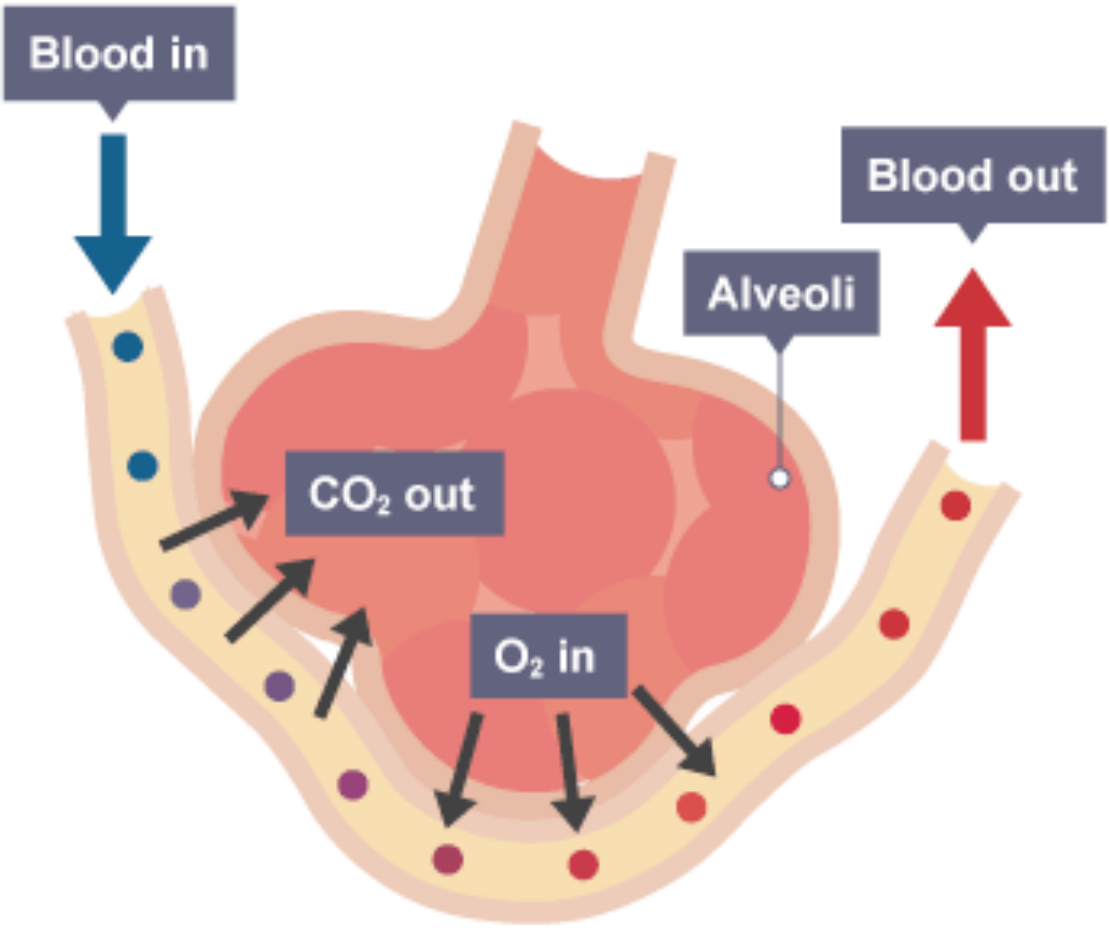
Explain what would happen to Harry Kane's minute ventilation during a match and how this aids his performance:

# Gaseous Exchange

Gaseous exchange occurs in the lungs at the alveoli where diffusion takes place. This is when gas moves from an area of high concentration to low concentration.

There is a high concentration of oxygen in the alveoli following inhalation and a low concentration of oxygen in the blood, therefore the oxygen diffuses from the alveoli into the blood where it can be taken to the heart where it is then pumped to where it is needed.

There is a high concentration of carbon dioxide in the blood and a low concentration in the blood, so the carbon dioxide diffuses into the alveoli where it can be exhaled.



# Anaerobic and Aerobic Exercise

Anaerobic exercise is *'exercise which does not allow for the predominant usage of oxygen'.*

Anaerobic exercise is performed in the absence of oxygen, the body can provide energy very quickly for sports such as a javelin throw or a gymnastics vault which only last a few seconds.

It is high intensity, short duration exercise and can only be sustained for a short period of time, mainly due to the build-up of lactic acid (Glucose > Energy + Lactic Acid).

Examples include sprinting, the long jump, making a tackle in football and serving in tennis.

Using the sports on page 3, give three sporting examples of anaerobic exercise:

Aerobic exercise is *'the use of oxygen for the duration of the exercise'.*

Aerobic exercise is performed with oxygen, the aerobic system produces the majority of energy whilst our bodies are taking part in low-intensity exercise for long periods of time such as jogging or long-distance cycling.

It is lower intensity, longer duration exercise that can be sustained for a prolonged period of time as there is lots of glucose available (Glucose + Oxygen > Energy + Water + Carbon Dioxide).

Examples include marathon running, swimming and jogging back into position in a team sport.

Using the sports on page 3, give three sporting examples of aerobic exercise:

# Quick Questions - The Cardiovascular and Respiratory Systems

1. Name the three types of blood vessel. (3)

2. Name the valves that are located between the atria and ventricles in the heart and explain their function. (3)

3. Name the blood vessel responsible for transporting the blood from the heart to the body. (1)

4. The amount of times the heart beats per minute is the definition of which key term? (1)

5. Explain what happens to stroke volume during exercise and why. (3)

6. Describe the function of the red blood cells and explain how they aid a sportsperson during performance. (3)

7. Name the five parts of the respiratory system that the air passes through. (5)

8. Explain the process of gaseous exchange. (4)

9. With a sporting example, explain anaerobic respiration. (2)

10. With a sporting example, explain aerobic respiration. (2)

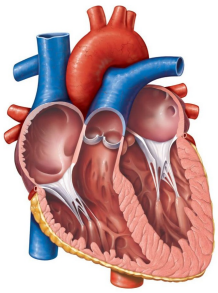
# The Short Term Effects of Exercise

To participate in exercise a person's cardiovascular, respiratory and muscular systems must all work together to supply the working muscles with energy and remove any waste products.

## The Cardiovascular System

Heart Rate, Stroke Volume and Cardiac Output increase

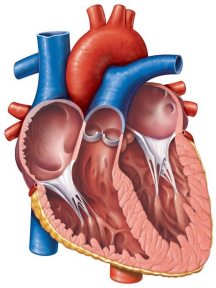
When exercise begins our heart rate increases to supply the working muscles with more blood which carries oxygen. The amount of blood leaving the heart per beat/minute (stroke volume/cardiac output) increases also meaning that more blood and therefore more oxygen reaches the muscles. This also allows more energy to be created allowing the performer to continue to work at a high intensity.



Using a sports person from page 3 give a sporting example of when this effect would occur and how this would benefit performance:

Blood is redistributed to the working muscles (Vascular Shunt)

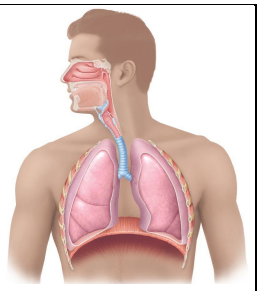
During exercise the cardiovascular system sends the blood so that more goes to the working muscles and less goes to other body organs such as the digestive system. This redistribution is caused by the vascular shunt mechanism. This process will cause more blood to travel to the working muscles to allow exercise to take place.



Using a sports person from page 3 give a sporting example of when this effect would occur and how this would benefit performance:

## The Respiratory System

Breathing Rate, Tidal Volume and Minute Ventilation increase



As we exercise we require more oxygen to create energy. For this to occur we breathe quicker allowing more oxygen to reach our muscles. This results in the amount of air being inspired and expired per minute increasing as the body requires us to take in more oxygen (minute ventilation). As a result of the demand for oxygen we also take deeper breaths, resulting in an increased tidal volume.

Using a sports person from page 3 give a sporting example of when this effect would occur and how this would benefit performance:

## The Muscular System

Muscle Temperature increases

As muscles work to create energy their temperature increases. This increase makes muscles more flexible and reduces the chance of injury,

Using a sports person from page 3 give a sporting example of when this effect would occur and how this would benefit performance:

Lactic Acid is produced

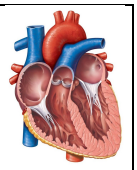
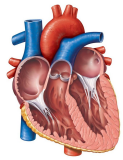
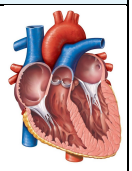
Lactic acid is a bi-product of exercising without using oxygen (anaerobically). Lactic acid causes muscular pain and can lead to the activity being stopped or slowed down.

Using a sports person from page 3 give a sporting example of when this effect would occur and how this would benefit performance:

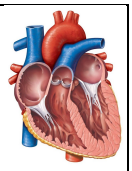
# The Long Term Effects of Exercise

Taking part in regular exercise will lead to the body systems adapting to cope with the demands of exercise. This benefits performance and increases health.

## The Cardiovascular System

| |
|---|
| Heart hypertrophy occurs<br><br>The heart is a muscle so as a result of training it becomes larger and stronger. This means each beat forces out a larger amount of blood than a normal heart, increasing the amount of oxygen and therefore energy that can be produced by the athlete.  |
| Using a sports person from page 3 give a sporting example of how this effect aids performance: |
| Resting stroke volume increases<br><br>As the heart is larger in size and stronger it can pump more blood in each beat (stroke volume).  |
| Using a sports person from page 3 give a sporting example of how this effect aids performance: |
| Resting heart rate decreases<br><br>The increased size of the heart and the amount of blood ejected per beat (stroke volume) means that it takes less beats in a minute (heart rate) to supply the body with enough oxygen at rest. This means there is less strain on the heart at rest. Fitter athletes have lower resting heart rates.  |
| Using a sports person from page 3 give a sporting example of how this effect aids performance: |

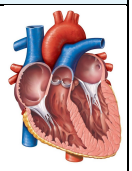
Cardiac output increases



Cardiac output is heart rate x stroke volume, therefore the faster a heart can beat and the more blood it can eject per beat results in how high a person's cardiac output is. Increased cardiac output allows an athlete to work harder for longer as more blood can be delivered to the working muscles.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

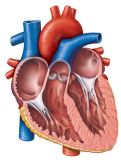
Recovery rate increases



Training will result in heart rate recovering quicker after exercise as the bigger, stronger heart can deliver blood quicker to produce a quicker recovery rate (heart rate returning back to resting).

Using a sports person from page 3 give a sporting example of how this effect aids performance:

Capilliarisation increases

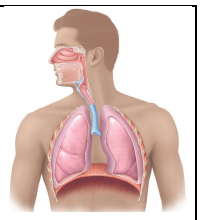


As a result of regular training new capillaries can be produced. This increase allows more blood flow and therefore more oxygen to be delivered to the working muscles. Existing capillaries also become more efficient.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

# The Respiratory System

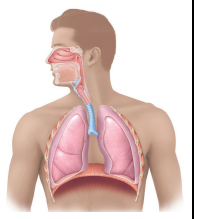
Aerobic capacity increases



Through endurance training the ability to breathe in, transport and use oxygen will increase. This allows better delivery of oxygen and removal of carbon dioxide to and from working muscles. This means an athlete can increase the intensity and duration of performance without fatigue.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

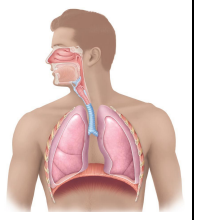
Respiratory muscles become stronger



This allows more air to be breathed in and out. As a result, more oxygen can be delivered to the working muscles with more CO2 and waste being disposed of. The resting respiratory rate will decrease showing an increase in fitness of the athlete.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

Increase in tidal volume and minute ventilation during exercise



An athlete's lung size will increase and as a result so will their tidal volume and ability to provide a steady flow of oxygen to oxygenate the blood. The more oxygen they can deliver to the muscles the more energy they will be able to create.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

# The Muscular System

Muscle hypertrophy occurs

The muscles increase in size and strength (hypertrophy) due to regular resistance training. As you train at high intensities your fast twitch muscle fibres increase in size. This in turn leads to an increase in muscular strength and speed which will improve the performance of the athlete.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

Muscular strength increases

As the muscles adapt to regular high intensity training they become stronger. This happens as the muscle fibres become thicker and can operate with more strength.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

Muscular endurance increases

As the muscles adapt to regular endurance training they become able to work for longer periods of time. This happens as the slow twitch muscle fibres associated with endurance activities increase by up to 20%. This gives a higher potential for energy production.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

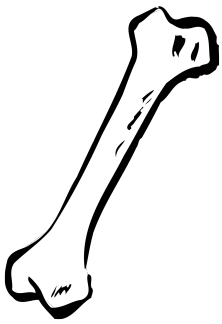
Increased resistance to fatigue

As the muscles adapt to regular training they increase the amount of time they can work for before fatiguing. This happens as the muscles have become stronger and more efficient meaning they can create more energy to delay the onset of fatigue.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

## The Skeletal System

Bone density increases



Regular weight bearing training will strengthen bone matter usually through lifting weights or using weight machines. Thicker bones allow more force to be delivered and more pressure to be withstood. It also helps prevent the onset of osteoporosis.

Using a sports person from page 3 give a sporting example of how this effect aids performance:

# Quick Questions - The Effects of Exercise of the Body Systems

1. Name three short term effects of exercise on the cardiovascular system. (3)

2. Explain how an increase in muscle temperature can be beneficial to a sportsperson. (1)

3. Name and explain how the respiratory system responds to exercise to meet the demands of the activity. (4)

4. State the mechanism that causes the blood to be redistributed to the working muscles. (1)

5. Explain muscular hypertrophy and how it can benefit performance with a sporting example. (3)

6. Name and explain the long term effect of exercise on the skeletal system. (2)

7. Discuss what happens to resting heart rate as a result of regular exercise. (3)

# The Components of Fitness

Fitness can be broken down into 10 different components. Sporting activities have different requirements and therefore particular components are more important to some activities than others.

| | |
|---|---|
| **Agility**<br><br>**Definition:** The ability to change direction at speed.<br><br>**Fitness Test:** The Illinois Agility Test | **Sporting Example:**<br><br>A netballer would use agility to step one way then another to dodge and get free from their marker. This would allow them to get into a space to receive the ball, keeping possession from their team and potentially leading to a goal scoring opportunity.  |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

| | |
|---|---|
| **Balance**<br><br>**Definition:** The ability to stay upright or in control of body movement.<br><br>**Fitness Test:** The Standing Stork Test | **Sporting Example:**<br><br>A discus thrower would need balance to keep control of the body's movement when they are spinning in the circle preparing to throw the discus. Having high levels of balance will allow them to build the speed necessary to throw the discus as far as possible without falling out of the circle and scoring a foul.  |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

| | |
|---|---|
| **Cardiovascular Endurance**<br><br>**Definition:** The ability to continue exertion while getting energy from the aerobic system used to supply the body with energy.<br><br>**Fitness Test:** The Multi Stage Fitness Test and The 12 Minute Cooper Run | **Sporting Example:**<br>  <br>A long-distance runner needs cardiovascular endurance to ensure that they are able to complete a long-distance race. Their heart and lungs need to work effectively to provide their muscles with oxygen to work for the long period of the race at a high level. If they did not have good cardiovascular endurance then they wouldn't be able to supply the body with the oxygen needed to exercise and would have to stop resulting in a slower time. |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

| | |
|---|---|
| **Coordination**<br><br>**Definition:** The ability to move two or more body parts under control, smoothly and efficiently.<br><br>**Fitness Test:** The Ball Wall Throw Test | **Sporting Example:**<br>  <br>A basketball player would need coordination to dribble up the court with the ball to create a scoring opportunity. They need to use their arms to dribble, legs to run and eyes to look up at where they are going in order to stay in possession of the ball and move up the court effectively without losing control. |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

| | |
|---|---|
| **Flexibility**<br><br>**Definition:** The range of movement available around a joint.<br><br>**Fitness Test:** The Sit and Reach Test | **Sporting Example:**<br>  <br>A hockey player needs flexibility in their shoulder and hip joints to reach and intercept the ball, the also need it to perform a slap hit. Having a good range of movement will allow them to bring the stick back further and hit the ball with more power. If they didn't have good flexibility then they would not be able to get into certain positions to receive the ball and could become injured more easily. |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

| | |
|---|---|
| **Muscular Endurance**<br><br>**Definition:** The ability to move your body and muscles repeatedly without fatiguing.<br><br>**Fitness Test:** The 1 Minute Sit Up Test and The 1 Minute Press Up Test | **Sporting Example:**<br>  <br>A tennis player needs muscular endurance so that they can use their biceps, triceps and deltoid to perform the forehand and backhand actions repeatedly, allowing them to return the ball with enough power to put it past their opponent. If they didn't have this then they would be too tired to run to and make enough contact with the ball to return it over the net, losing the point. |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

| Power | Sporting Example: |
|---|---|
| **Definition:** The ability to exert a maximal force in as short a time as possible.<br><br>**Fitness Test:** The Standing Jump Test and The Vertical Jump Test |  <br>A footballer needs power when striking the ball from distance. They would need to move their leg very quickly and exert a maximal force onto the ball. This will make the shot difficult for the goalkeeper to save and result in a higher chance of winning. If the footballer didn't have power their shot would be slower and easier to save. |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

| Reaction Time | Sporting Example: |
|---|---|
| **Definition:** The ability to respond quickly to a stimulus.<br><br>**Fitness Test:** The Ruler Drop Test |  <br>A tennis player would need good reaction time when they are receiving a serve, this would allow them to get into a good position to return the serve. If they were unable to react quick enough then they would not be able to return the serve and would lose the point. |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

| Speed | Sporting Example: |
|---|---|
| **Definition:** The ability to move quickly across the ground or move limbs rapidly through movements.<br><br>**Fitness Test:** The 30m Sprint Test |  <br>A cricketer needs speed when bowling the ball, this is because they need to have a quick run up and move their arm quickly to produce a fast bowl that is difficult for the batter to hit. This would give them more chance of hitting the stumps. If their bowling action was not quick enough then their bowl would be easier for the batter to hit, allowing them to potentially score a lot of runs. |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

| Strength | Sporting Example: |
|---|---|
| **Definition:** The maximum force a muscle/group of muscles can apply against a resistance.<br><br>**Fitness Test:** The Grip Strength Dynamometer Test and 1 Repetition Maximum Test |  <br>A rugby player needs strength when they are in a rugby scrum to push against their opponents and win possession of the ball. If they didn't have strength in the scrum then they would not only lose the ball but could also become injured. |
| Using a sports person from page 3 give a sporting example of when this component is needed in sport: | |

# Quick Questions - The Components of Fitness

1. Name the component of fitness defined as 'the range of movement available around a joint'. (1)

2. Define the components of fitness agility and muscular endurance. (2)

3. Name and explain two important components of fitness to a gymnast. (4)

4. Name and explain two important components of fitness to a golfer. (4)

5. The 30m sprint test and the standing jump test measure which components of fitness? (2)

6. Give a sporting example of who would require cardiovascular endurance. (2)

7. Discuss the relative importance of power to a boxer and a swimmer. (3)

8. Discuss the relative importance of speed to a sprinter and a long-distance runner. (3)

# The Principles of Training

There are certain principles of training which should be followed to improve performance. Principles are accepted rules of action or conduct, in this instance athletes follow these principles to ensure they can improve their performance in **their** sport.

| | |
|---|---|
| **Specificity**<br><br>Definition: The training must be matched to the needs of the sporting activity and individual.<br><br>Explanation: Every sport has its own specific needs, divers and long-distance runners would obviously train differently. It is important that the performer trains by working on practices or components important to **their** sport.<br><br>Sporting Example: A goalkeeper would apply the principle of specificity in training by working on saving penalties instead of taking shots like a striker. This would benefit their performance when they come to compete as it will make them move likely to save shots. | Explain how a sports person from page 3 would use this principle to improve fitness/performance: |

| | |
|---|---|
| **Progression**<br><br>Definition: Gradual increases in exercise in order for the body to adapt through overload.<br><br>Explanation: This involves working harder than normal and **gradually** increasing the amount of exercise you do. This causes the body to adapt to the training levels and therefore get fitter.<br><br>Sporting Example: An aspiring long-distance runner would apply the principle of progression in training by gradually increasing the distance that they run each time they train. For example, if they currently run 10km they may increase this by 500m-1km each time they train This will increase their cardiovascular endurance allowing them to increase fitness and perform better in events. | Explain how a sports person from page 3 would use this principle to improve fitness/performance: |

| Overload | Explain how a sports person from page 3 would use this principle to improve fitness/performance: |
|---|---|
| Definition: A greater than normal stress that is applied on the body for training adaptations to take place.<br><br>Explanation: Athletes need to monitor performance/training levels and adjust the amount of work done in order to increase fitness to a higher level. To achieve this the body must work harder to be put under stress, this will force the body into adapting to these demands (get fitter).<br><br>Sporting Example: A weightlifter would apply the principle of overload in training by increasing the amount that they can lift comfortably. For example, if they can currently bicep curl 30kg then they will increase this to 35kg to put the muscles under stress and cause them to become stronger. | |

## The FITT Principle:

The FITT principle is a way of using the principle of overload to get the most out of training. This stands for:

F – Frequency – The number of times exercise takes place per week.
I – Intensity – How hard and intense the exercise is.
T – Time – How long exercise goes on for.
T – Type – The kind of exercise that takes place/the method of training used.

These aspects can be increased to apply overload and increase fitness.

| Reversibility | Explain how a sports person from page 3 would use this principle to improve fitness/performance: |
|---|---|
| Definition: Any adaptation that takes place as a result of training will be lost if you stop training.<br><br>Explanation: This is a principle that we do not want to occur. Reversibility is the process of losing fitness levels due to not training.<br><br>Sporting Example: A footballer who becomes injured and cannot train will experience reversibility. Following their injury before competing they will complete some rehab and training to build their fitness back up again. | |

# The Methods of Training

Fitness is very important to all physical activities. A number of training methods can be used to improve fitness. Each method of training improves specific aspects of fitness and therefore each method suits different sports and activities.

| Continuous Training | Sporting Example: |
|---|---|
| Definition: Training that involves activity without rest intervals.<br><br>Description: This training involves exercising at a steady, regular pace (eg. Jogging). It lasts for at least 30 minutes and is aerobic.<br><br>Components developed: Cardiovascular endurance and muscular endurance. |  <br>A long-distance runner would use continuous training in training to increase their cardiovascular endurance. In training they would run continuously without rests for at least 30 minutes. This would help them when competing as they will be able to supply the body with the oxygen needed to exercise for a long period of time, allowing them to complete the race without stopping. |
| Using the sports on page 3, give an example of a sports person who would use this method of training to improve their performance: | |

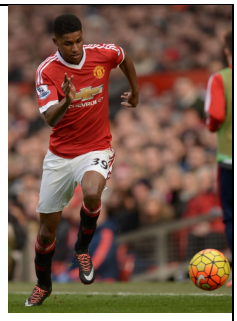
## Fartlek Training

**Definition:** Training which varies in intensity and duration and consists of bursts of intense effort alternating with less strenuous activity.

**Description:** This training involves exercising at different intensities/speeds. For example, 1 lap jogging, 1 lap sprinting, 1 lap running.

**Components developed:** Cardiovascular endurance and speed.

**Sporting Example:**



A footballer would use fartlek training to develop their speed. In training they would run at varying speeds and intensities switching between jogging, running and sprinting. This would help them in a match as this method is similar to a game where they may be jogging then need to sprint to get into space during an attack. This will allow them to outrun their opposing player and get to the ball first.

Using the sports on page 3, give an example of a sports person who would use this method of training to improve their performance:

## Interval Training

**Definition:** Training that incorporates periods of exercise and rest.

**Description:** This involves working at a high intensity and having rest periods. An example would be sprinting 30m and walking back to the start before repeating this again.

**Components developed:** Speed and cardiovascular endurance.

**Sporting Example:**


A sprinter would use interval training to increase their speed. In training they would sprint short distances at a high intensity with rest periods. This would benefit them when it comes to their event as they will have increased their speed and will therefore be able to move as quickly as possible down the track.

Using the sports on page 3, give an example of a sports person who would use this method of training to improve their performance:

## Circuit Training

**Definition:** A series of exercises performed at stations that focus on different muscle groups.

**Description:** This training involves exercising around different stations that focus on different muscles of the body. It can also be skill specific though with stations such as shooting, passing and 1v1's etc.

**Components developed:** Cardiovascular endurance, muscular endurance and strength.

**Sporting Example:**

A rugby player would use circuit training to develop their muscular endurance and all-round strength. In training they would work at stations such as press ups, sit ups and squats as well as some skill stations such as using tackle bags or agility ladders. This would help them in a match as they would have an increased muscular endurance and therefore would be able to perform strong tackles late into the game without tiring.

Using the sports on page 3, give an example of a sports person who would use this method of training to improve their performance:

## Weight Training

**Definition:** Training that uses free weights or resistance machines.

**Description:** This involves using weights or resistance machines to increase strength by lifting high weights at low repetitions or muscular endurance by lifting low weights at high repetitions.

**Components developed:** Strength, muscular endurance and power.

**Sporting Example:**


A shot put thrower would use weight training to develop their strength. In training they would lift heavy weights at low repetitions. This would benefit them when they come to compete as they will be able to push the shot put further than previously due to their developed strength.

Using the sports on page 3, give an example of a sports person who would use this method of training to improve their performance:

## Plyometics Training

**Definition:** A method of training that uses jumping, hopping and bounding to increase power.

**Description:** This training involves movements such as jumping, hopping, bounding and skipping and increases the speed of the muscular contractions, causing increased power.

**Components developed:** Power.

**Sporting Example:**

A high jumper would use plyometrics to develop their power. In training they would perform jumping exercises such as jumping on and off of boxes to increase the power in their legs. This will benefit when they come to compete as before taking off to clear the bar they will be able to exert more power into the ground and jump higher, therefore clearing a higher bar than previously.

Using the sports on page 3, give an example of a sports person who would use this method of training to improve their performance:

## High Intensity Interval Training

**Definition:** Exercise that alternates between high intensity and periods of recovery.

**Description:** Also known as HIIT, this involves high intensity anaerobic exercises such as burpees and jumping jacks followed by a brief recovery time. It lasts around 20-30 minutes.

**Components developed:** Cardiovascular endurance and muscular endurance.

**Sporting Example:**

A tennis player would use HIIT to develop their muscular endurance. In training they would complete exercises such as burpees, jumping lunges and resistance band pulls. This would benefit them in a match as they will be able to use their muscles without fatiguing, this will allow them to continue to sprint for the ball and play forehand/backhand shots repeatedly late into the set.

Using the sports on page 3, give an example of a sports person who would use this method of training to improve their performance:

# Warming Up and Cooling Down

Every exercise session should feature both a warm up and a cool down.

| Stages of a Warm Up: | The Effects of a Warm Up: |
|---|---|
| 1. Pulse Raiser: This would include exercises that slowly increase the heart rate. For example, jogging and side steps.<br>2. Mobility: This involves exercises that take the joints through their range of movement. For example, arm swings.<br>3. Stretching: This involves static stretches where you remain still or dynamic stretches that involve movement. For example, 'open the gate'.<br>4. Dynamic Movements: This involves movements that show a change in speed or direction. For example, shuttle runs.<br>5. Skill Rehearsal: This involves practicing common skills from the activity such as passing drills. | • The body temperature increases preventing injury and overheating.<br>• The heart rate increases to allow the body to cope with the demand for oxygen once exercise begins.<br>• Blood flow and oxygen to the muscles increases.<br>• Flexibility of the muscles, ligaments and tendons increases decreasing the chance of injury and allows a greater range of movement.<br>• The speed of muscular contractions increase as warm muscles can produce more explosive actions. |

Using the sports on page 3, discuss three of the stages of a warm up that the sportsperson would use before exercise, linking your answer to the effects of a warm up:

| Stages of a Cool Down: | The Effects of a Cool Down: |
|---|---|
| 1. Low Intensity Exercise: This involves exercise such as jogging and lowers the heart rate and body temperature back to normal.<br><br>2. Stretching: This includes gentle, static stretches of the major muscles/joints in the body. | • The heart and breathing rate is gradually lowered.<br>• Body temperature is slowly brought back down to normal.<br>• Blood and oxygen continues to circulate around the body which helps to remove waste products.<br>• Stretching prevents joint and muscle soreness (DOMS).<br>• Lactic acid and carbon dioxide are removed. |

Using the sports on page 3, discuss three of the benefits of a cool down that the sportsperson would experience as a result of cooling down:

# Quick Questions – Applying the Principles of Training

1. Name the four principles of training. (4)

2. Explain the principle of specificity and how a golfer would use this in their training programme. (3)

3. Discuss reversibility and when this may occur. (3)

4. Gradual increases in exercise in order for the body to adapt through overload defines which principle of training? (1)

5. Name the 7 methods of training. (7)

6. Discuss fartlek training, giving a sporting example of who may use this method. (3)

7. Name and explain a method of training that could be used to aid a rugby players performance. (3)

8. Which method of training involves jumping, hopping and bounding to develop power? (1)

9. Name the five stages of a warm up. (5)

10. Explain one of the benefits of completing a cool down at the end of exercise. (2)

# Preventing Injury in Physical Activity

Injuries are an unfortunate part of sport and physical activity, However, there are actions which we can take to reduce the risk of these injuries occurring,

| | |
|---|---|
| **Wearing personal protective clothing**<br><br>In most sports participants wear protective clothing to reduce their chances of injury. In some sports it is compulsory to wear protective clothing, for example shin pads in football.<br><br>Each item of protective clothing will protect a body part from an injury. For example, a batter in cricket would wear a helmet so that if the ball is bowled fast and bounces up at their head the damage done can be minimalised.<br><br>It is important that protective clothing is checked to be in good condition prior to participating. | Using the sports on page 3, explain how one of these sports people may use this method to prevent injury: |

| | |
|---|---|
| **Correct clothing/footwear**<br><br>Wearing the incorrect clothing or footwear for your sport could cause an injury. Participants must ensure that the clothing they wear is suitable to the activity, for example a gymnast wearing a leotard to avoid getting caught on any equipment.<br><br>Many sports require specialist footwear such as football boots with studs for grip or running shoes to absorb any impact.<br><br>Participants should also ensure they have their hair tied back, have their laces tied and have no jewellery on. | Using the sports on page 3, explain how one of these sports people may use this method to prevent injury: |

| | |
|---|---|
| **Completing a warm up/cool down**<br><br>Before exercise a thorough warm up should be completed. Warming up the muscles and the joints helps to prevent injury during activity as they are more flexible and prepared for any sudden movements or changes in pace. This can reduce the chances of muscle strains.<br><br>Performing a cool down at the end the activity helps to remove lactic acid from the muscles and restores them to the length they were prior to exercise. This helps to reduce the risk of injury in the following session. | Using the sports on page 3, explain how one of these sports people may use this method to prevent injury: |

| | |
|---|---|
| **Ensuring an appropriate level of competition**<br><br>Within sport, especially contact sport, it is important that the competitors are evenly matched or balanced. If not there is a greater risk of injury.<br><br>To balance the competition participants are usually the same weight, age, gender and of a similar ability. Some sports such as boxing feature weight divisions whilst children will usually compete in age groups (under 11's etc.). In most sports, particularly contact sport, men play against men and women against women.<br><br>This is because in most cases one competitor could have an unfair advantage. For example, in boxing physical size is an advantage so it would be unfair to place a heavyweight up against a lightweight and serious injuries are more likely to occur. | Using the sports on page 3, explain how one of these sports people may use this method to prevent injury: |

| | |
|---|---|
| **Lifting and carrying equipment safely**<br><br>Some sports require equipment which may be large and heavy. It is important that this is moved correctly to prevent injuries such as back strains.<br><br>When lifting an object, the person should bend their knees, keep their back straight, keep the object close to the body and lift with the legs. Examples of equipment which would require care during set up would include vaulting boxes, trampolines and goal posts. | Using the sports on page 3, explain how one of these sports people may use this method to prevent injury: |

# Potential Hazards in Sport Settings

Before use sporting facilities should be checked for any potential hazards.

| Sports Hall | Fitness Centre | Playing Field |
|---|---|---|
| The floor should be well maintained and have no slip hazards/spillages.<br><br>Any equipment not in use should be stored safely aware from the activity.<br><br>Any trip hazards such as dividing curtains and benches should be minimised. | Users should receive training on how to use the equipment.<br><br>There should be supervision.<br><br>Any equipment, weights and machines should be checked and maintained. They should also be stored away when not in use. | The playing surface should be well maintained with no holes or mounds. The grass should be short and surface should be even.<br><br>Any litter or objects such as stones on the pitch should be removed. |

| Artificial Outdoor Areas | Swimming Pool |
|---|---|
| The surface should be smooth and level with adequate levels of sand/water/rubber applied.<br><br>The pitch should be checked for litter and objects. | The pool should be well maintained with balanced chemical levels, no cracked tiles or trip hazards.<br><br>There should be a lifeguard and signs featuring information regarding the rules and pool depth. |

# Quick Questions – Preventing Injury in Physical Activity and Training

1. Name the five methods of reducing the chance of injury in sport. (5)

2. Explain the why it is important for a footballer to wear the correct clothing/footwear during a match. (3)

3. Name an item of protective clothing worn by a cyclist and when this would benefit them in sport. (2)

4. With a sporting example, explain the importance of matching the competition in sport. (3)

5. Explain why it is important that a 100m sprinter completes a thorough warm up prior to competing. (3)

6. State two hazards which could occur within a sports hall and give an example of an injury which may happen as a result. (4)

7. State two hazards which could occur within a fitness centre and give an example of an injury which may happen as a result. (4)

8. State a hazard which could occur at a swimming pool and give an example of an injury which may happen as a result. (2)