

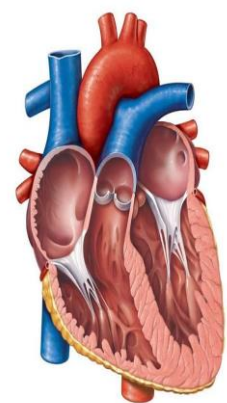
## Unit 1 Single and triple option.

Unit 1 Anatomy and physiology: There is an exam at the end of year 12 for this Unit.

The human body is made up of many different systems that work together and allow us to take part in a huge variety of sport and exercise activities. An athlete can go from rest to all-out sprinting in a matter of seconds, whereas an endurance athlete can continue exercising for many hours at a time. The skeletal and muscular systems work together to allow our bodies to perform a vast range of different movements. Our cardiovascular and respiratory systems act as a delivery service, working together to supply oxygen and nutrients to the body which in turn is used to produce energy for muscular contraction.

On completion of this unit you will

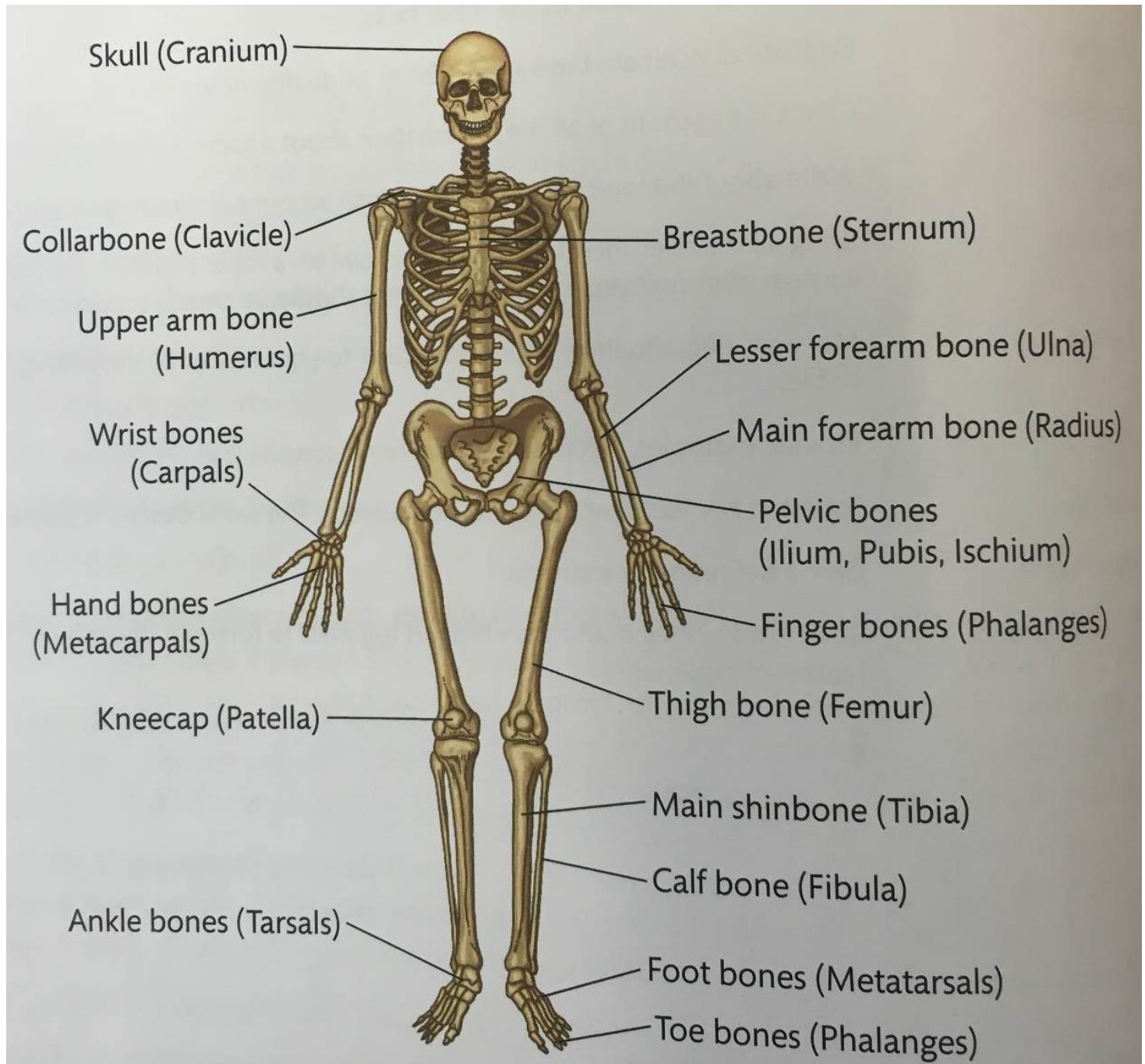
- 1 Know the structure and function of the skeletal system
- 2 Know the structure and function of the muscular system
- 3 Know the structure and function of the cardiovascular system
- 4 Know the structure and function of the respiratory system
- 5 Know the different types of energy systems.



This step up work focusses on the Skeletal System and the muscular systems.

Use the picture below to

1. Learn the name of the bones.
2. Identify where in the body they are e.g. tarsals = ankle bones.



The skeleton can be divided into two parts: 80 bones form your axial skeleton and the other 126 bones form your appendicular skeleton!

### **Axial Skeleton**

This is the main core of your skeleton and consists of:

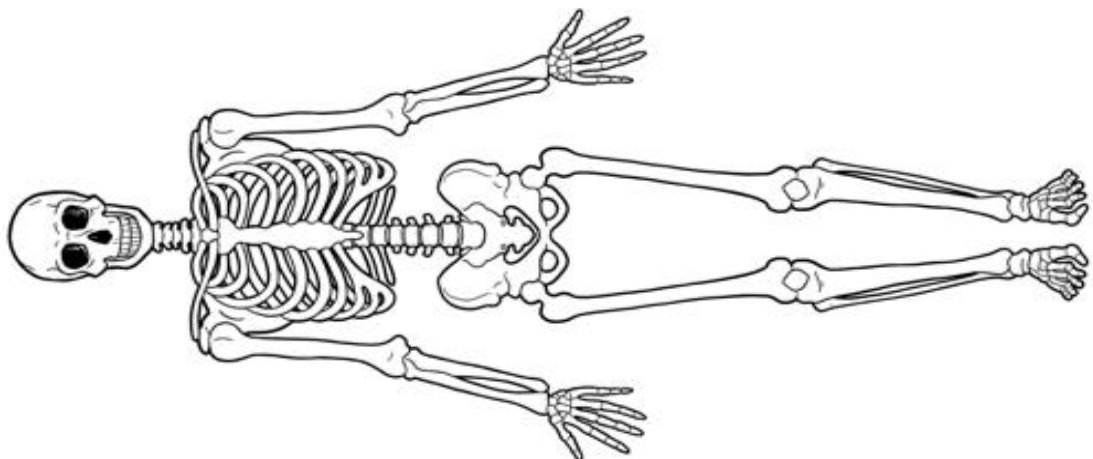
- The skull (cranium and facial bones)
- The thoracic cage (sternum and ribs)
- The vertebral column

### **Appendicular Skeleton**

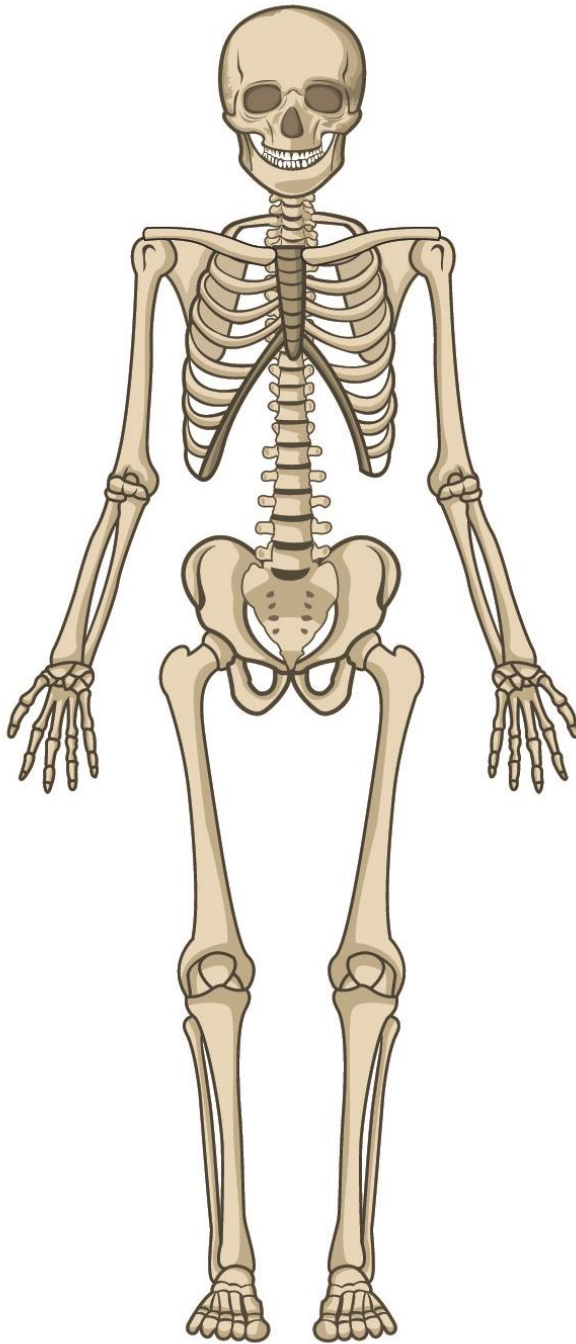
Consists of the bones that are attached to the axial skeleton:

- Upper limbs (Humerus, radius, ulna, carpals, metacarpals and phalanges)
- Lower limbs (Femur, tibia, fibula, patella, tarsals, metatarsal and phalanges)
- Shoulder girdle (clavicle and scapula)
- Pelvic girdle (ilium, pubis and ischium)

Using the skeleton outline below – shade in 2 different colours the axial skeleton and the appendicular skeleton



Test yourself by labelling the skeleton below.



### spine or vertebral column

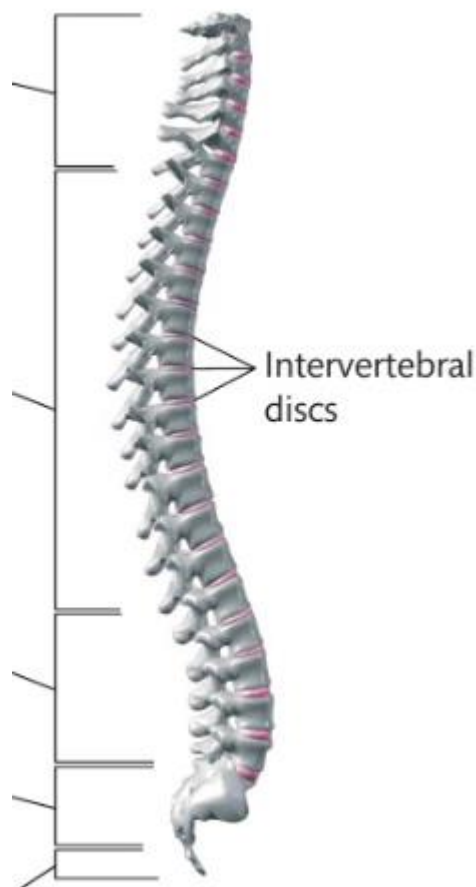
The vertebral column is commonly known as the spine of backbone and extends from the base of the cranium to the pelvis, providing a central axis for the body. It is made up of **33** irregular bones called **vertebrae**.

The vertebral column accounts for around 40% of a person's overall height. The vertebrae are held together by powerful **ligaments**. These allow little movement between adjacent vertebrae but a considerable degree of flexibility along the spine.



Label the areas of the spine in the diagram below

<https://teachmeanatomy.info/back/bones/vertebral-column/>



### ***The spine or vertebral column***



Complete the table by researching facts about each section of the vertebral column.

[https://en.wikipedia.org/wiki/Vertebral\\_column](https://en.wikipedia.org/wiki/Vertebral_column)

<b>Area of the spine</b>	<b>Number of vertebrae</b>	<b>Characteristics: what the vertebrae look like</b>	<b>Function: What does it do?</b>
Cervical			
Thoracic			
Lumber			
Sacral			
Coccyx			

## Postural deviations

The 33 vertebrae of the spine have a distinctive shape when stacked on top of one another. The normal shape consists of a curve when viewed from the side. Occasionally the spine may suffer from disorders which can cause the natural curves to change.


A **neutral spine** refers to a good posture with the correct position of the three natural curves. However there are two postural deviations to the spine. Research to find a description of each one

[https://en.wikipedia.org/wiki/Vertebral\\_column](https://en.wikipedia.org/wiki/Vertebral_column)

Disorder	Description
<u><b>Kyphosis</b></u>	
<u><b>Scoliosis</b></u>	

## Function of the skeletal system

Your skeleton has a number of important functions both in sport and in everyday life. When performing sport or exercise there are **8 main functions**.

 Complete the table giving detailed descriptions of the functions of the skeleton.

[https://en.wikipedia.org/wiki/Human\\_skeleton](https://en.wikipedia.org/wiki/Human_skeleton)

Function	Description	Sport Example
1. Blood production	e.g. red blood cells are made in the bone marrow of long bones.	Red blood cells are needed to deliver oxygen to the working muscles when exercising.
2. Leverage		
3. Muscle attachment		
4. Reducing friction at joints		
5. Support		
6. Protection		
7. Store of minerals		



8. Weight bearing.		
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### ***Main function of different bone types***



Research the five types of bones with example.

[https://www.youtube.com/watch?v=\\_X7qrSHk\\_rQ](https://www.youtube.com/watch?v=_X7qrSHk_rQ)

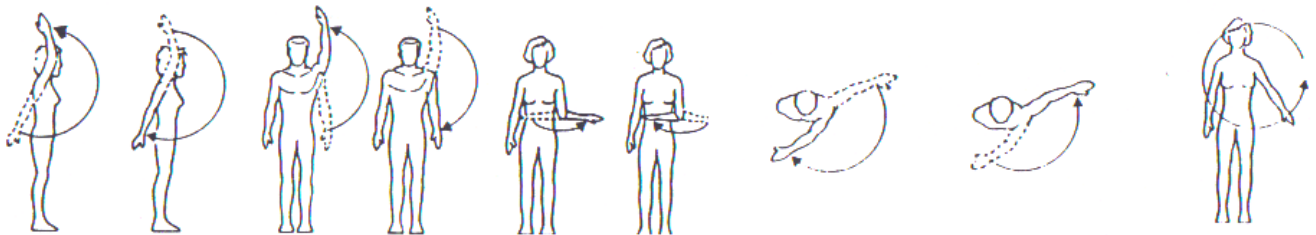
Type of bone	Function	Example
Long	To provide a lever for movement & produce red blood cells	e.g. Femur, humerus
Short		
Flat		
Sesamoid		
Irregular		

There are lots of different movements that occur at different joints. Look at the movement names below. Practice each of these movements and identify the name of each movement. You could play Simon says. Ask someone to test you. For example,.... Simon says flex your shoulder, Simon says extend your wrist, Simon says flex your spine Watch the following video to help you.

<https://www.youtube.com/watch?v=c7e8byZnY6s> allow this video to play through to part B.

### Shoulder movements

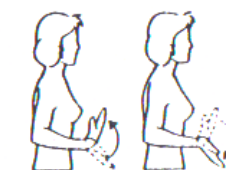
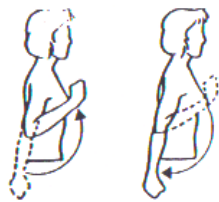
Flexion   Extension   Abduction   Adduction   External Rotation   Internal Rotation   Horizontal Flexion   Horizontal extension   Circumduction



### Elbow movements

### Radio-ulna movements

### Wrist movements

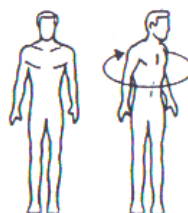
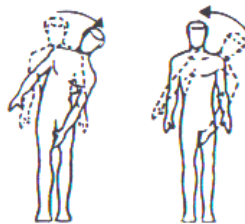
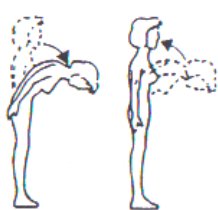


Flexion   Extension

Supination   Pronation

Flexion   Extension

### Spinal movements



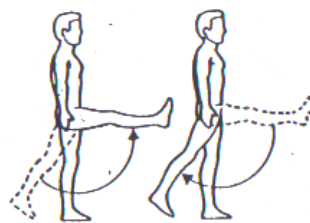
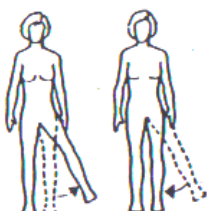
Flexion   Extension

Lateral Flexion

Rotation

Circumduction

### Hip movements



Abduction   Adduction

Flexion   Extension

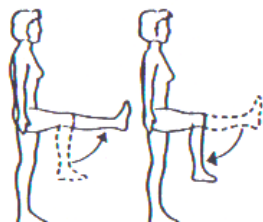
Circumduction

Internal Rotation

External Rotation

### Knee movements

### Ankle movements



Extension   Flexion

Plantar flexion   Dorsiflexion

Read the following information about three factors that affect the skeletal system then answer the exam questions.

### 1.Arthritis

- This is a skeletal disease that can effect people of all ages.
- Osteoarthritis mainly develops in 40+ but can effect all ages.
- Rheumatoid Arthritis normally happens to 40-50 year olds.

Exercise can delay the onset of arthritis due to maintaining healthy joints.

### 2.Osteoporosis

- This is the reduction in bone density.
- Lack of calcium or vitamin D could lead to this.
- Due to this bones can become more brittle.
- This increases the chance of fracturing a bone from even a minor fall.
- Regular weight bearing exercise like walking, and running can reduce age related bone loss by gently putting stress on the bones.

### 3.Age

- The skeletal system is a living tissue that is constantly growing and repairing itself.
- Weight training in children should be avoided due to the harm it can cause.
- Damaging the bone plates in a child can stunt growth.

Anita has the first stages of osteoporosis. She has been told to take part in exercise to help prevent this condition from getting worse.

- 2 (a) Identify **one** type of exercise that Anita could take part in to help prevent the osteoporosis from getting worse.

1 mark

- (b) Explain why weight bearing exercise will help to prevent the osteoporosis from getting worse.

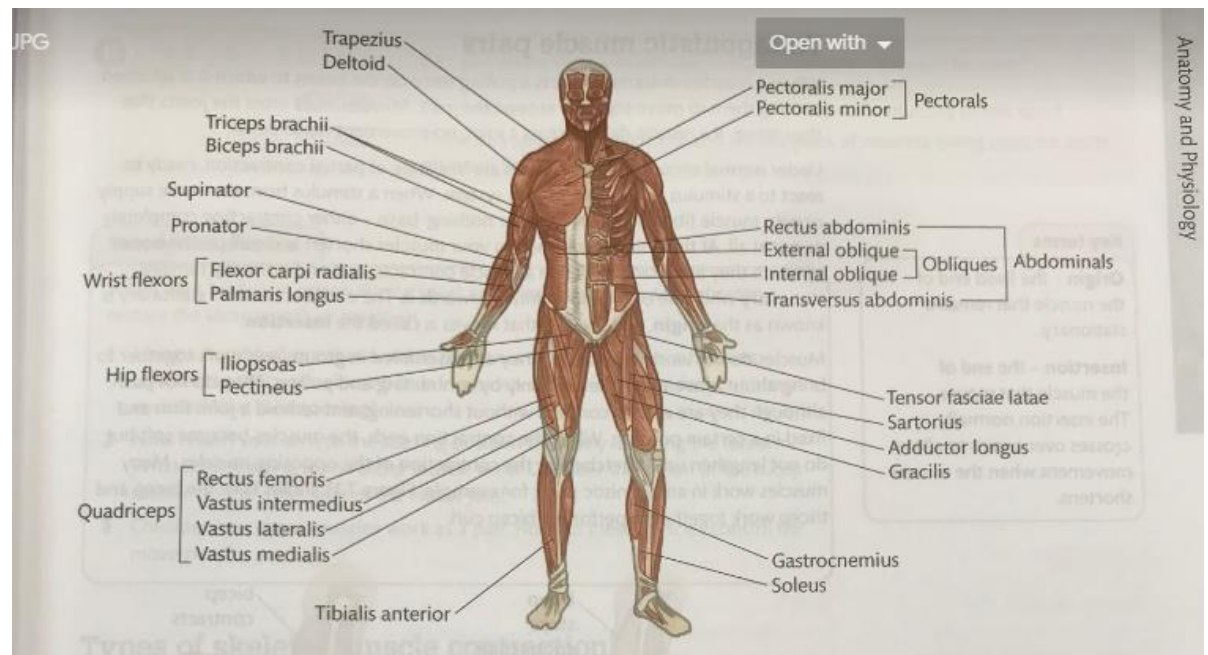
3 marks

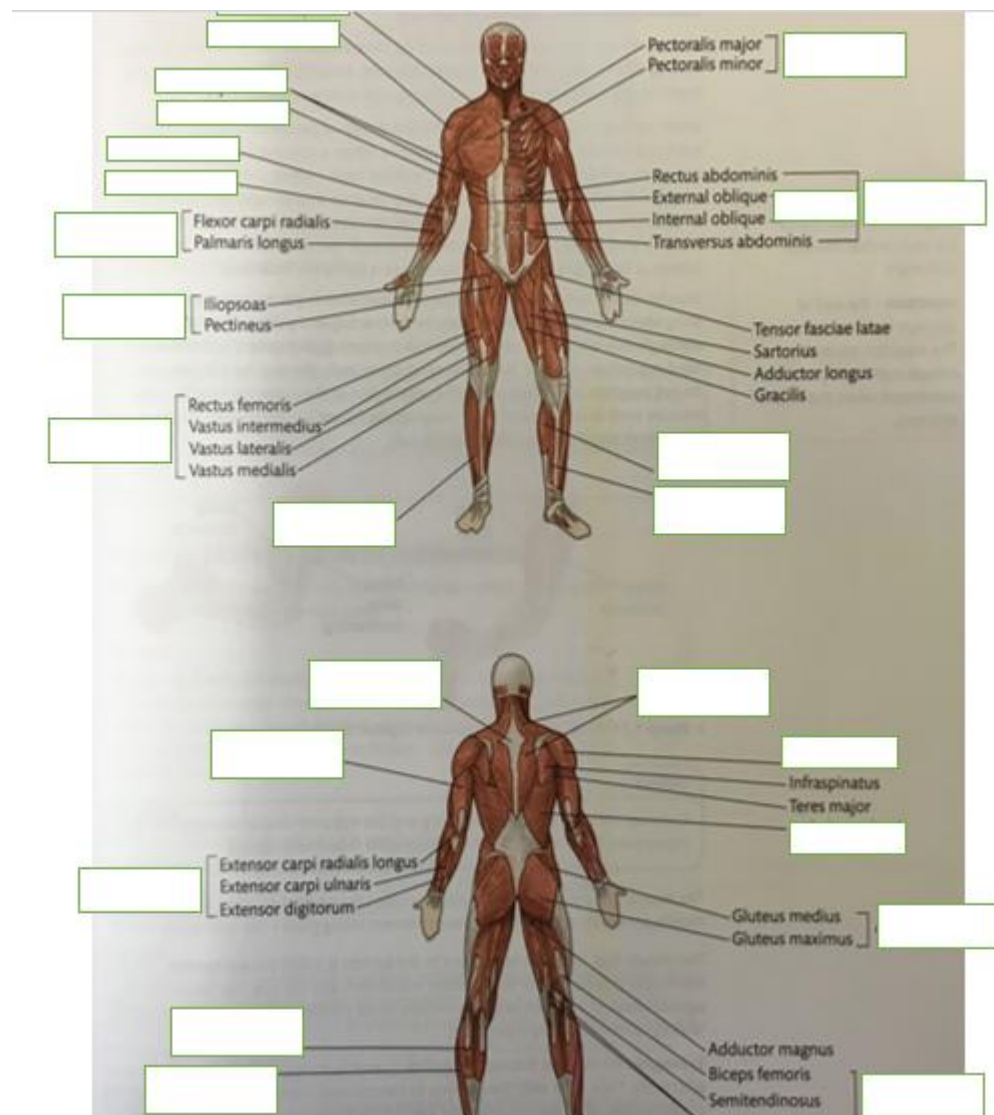
  
  
  
  
  
  

Total for Question 2 = 4 marks

Moving onto look at the muscular system. There are many new muscles to be learned in addition to ones you may have come across in GCSE or Btec Sport.

Devise some way to learn the names of these muscles and then see if you can identify where they are located by testing yourself or getting someone at home to test you. There are some interesting names!! Use google to learn how to say them. Use the blank muscles template to test yourself. You will need to research the muscles on the back of the body.





Muscle work in pairs. Look at the muscle pairs below. Identify where they are to see why they work together. One muscle will contract and the other will relax to allow its paired muscle to contract. E.g the biceps will contract to flex the arm at the elbow and the triceps will relax to allow this to happen. Identify other examples like this. Research some muscles that work in pairs.

e.g. Gastrocnemius and \_\_\_\_\_

## Antagonistic Muscle Groups List



Biceps

Pairs with

Triceps



Back

Pairs with

Chest



Abs

Pairs with

Lower back



Shoulders

Pairs with

Chest / Back



Quadriceps

Pairs with

Hamstring



Tibialis anterior(shin)

Pairs with

Calf muscle

