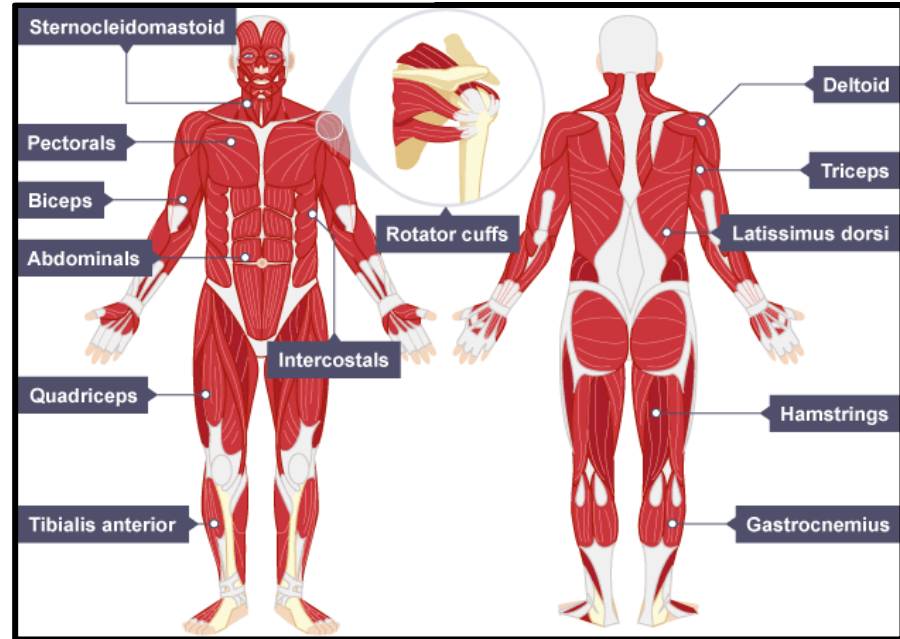
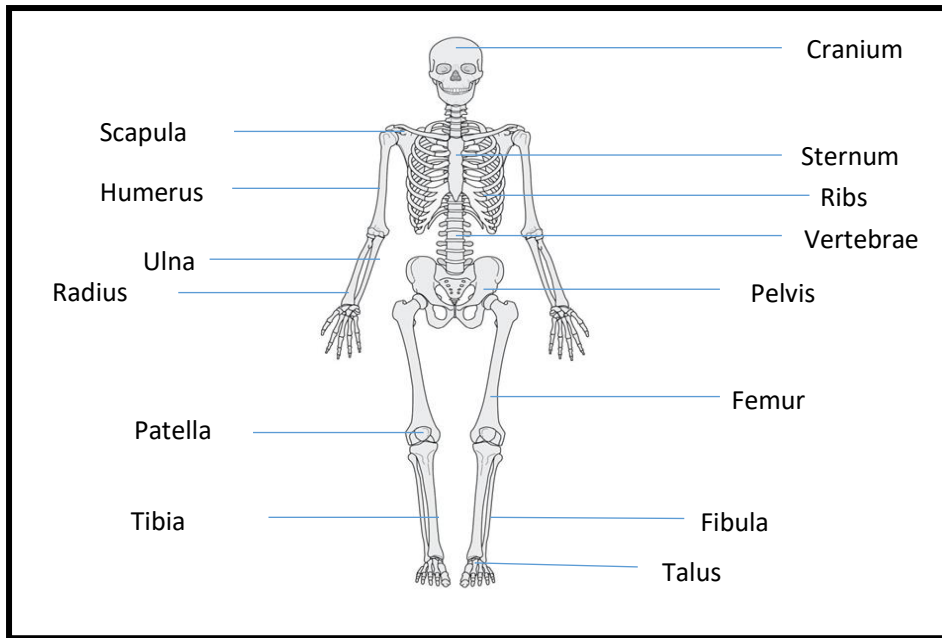
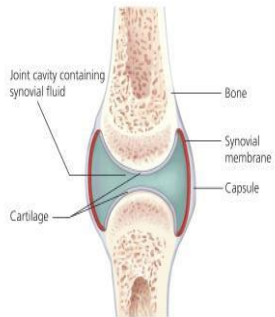


Yr 9 PE Theory - Muscular and Skeletal



Function of the Skeleton

- **Support:** the bones are solid and rigid. They keep us upright and hold the rest of the body – the muscles and organs – in place.
- **Movement:** the skeleton helps the body move by providing anchor points for the muscles to pull against.
- **Structural shape and points for attachment:** the skeleton gives us our general shape such as height and build. The skeleton also provides anchorage points for the muscles to attach via tendons, so when muscles contract movement occurs.
- **Protection:** certain parts of the skeleton enclose and protect the body's organs from external forces e.g. the brain is inside the cranium. This function is especially important in activities that involve contact. E.g. rugby, boxing.
- **Production of Blood Cells:** the bone marrow in long bones and ribs produce red and white blood cells.
- **Mineral Storage:** bones store several minerals e.g. calcium, which can be released into the blood when needed.



Synovial Joints

Cartilage covers ends of bones providing a smooth, friction-free surface; cushions and protects the joint.

Synovial membrane produces synovial fluid; lines the inside of the joint capsule.

Synovial fluid is produced by the synovial membrane to lubricate the joint; reduces friction and wear.

The joint **capsule** is made of tough fibrous tissue – surrounds and supports synovial joints; usually also supported by ligaments.

Ligaments join bone to bone; found in the outer layer of the capsule; strengthens the joint to prevent unnecessary movements and possible dislocations.

Bursae are synovial fluid-filled bags found in the synovial membrane; help reduce friction from movement at a joint.

Yr 9 PE Theory - Muscular and Skeletal Systems

1 How do MUSCLES WORK?

Muscles can only PULL they cannot push. This means that they must work in pairs to allow parts of the body to move back and forth. THESE PAIRS ARE CALLED **ANTAGONISTIC PAIRS**.

Antagonistic Pairs

- A muscle must work in partnership with another muscle to allow movement to occur.
- The muscle that causes the movement (the pulling muscle) is called the **AGONIST** or **PRIME MOVER**. When this muscle contracts it becomes shorter.
- During this time the other muscle within this partnership is relaxing. This muscle is called the **ANTAGONIST** and is lengthening while it relaxes.

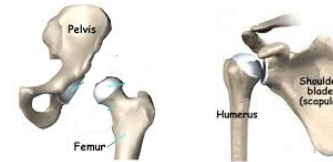
EXAMPLES:

When we flex our elbow the bicep is the **agonist** and the tricep is the **antagonist**. However these roles are reversed when the elbow extends, with the tricep becoming the **agonist** and the bicep becoming the **antagonist**.

When dorsiflexion occurs in our ankle the tibialis anterior is the **agonist** and the gastrocnemius is the **antagonist**. However these roles are reversed when plantar flexion occurs at the ankle, with the gastrocnemius becoming the **agonist** and the tibialis anterior becoming the **antagonist**.

Types of Joint

Ball and Socket Joint









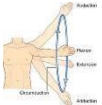

Location in Body: Shoulder and Hip
Type of Movement Allowed by Joint: Flexion, Extension, Adduction, Abduction, Rotation

Hinge Joint



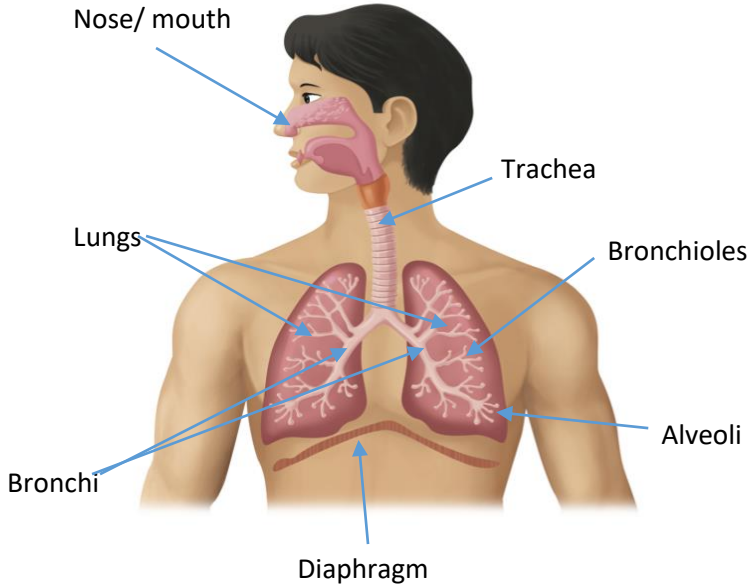
Location in Body: Knee and Elbow
Type of Movement Allowed by Joint: Flexion and Extension

3. Movements at a joint

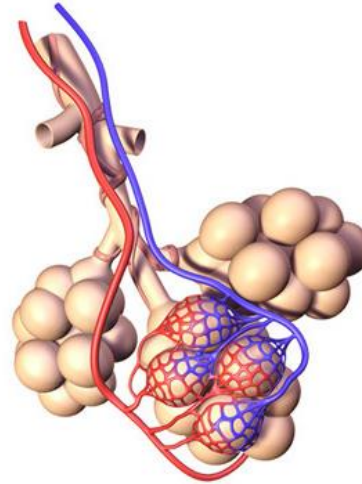
Flexion Decreasing the angle at a joint (bending) 	Adduction Limbs moving towards the midline of the body. 	Rotation A twisting/turning action around a joint. 	Dorsi-Flexion (ankle joint) When the toes are turned up to the body. 
Extension Increasing the angle at a joint (straightening) 	Abduction Limbs moving away from the midline of the body. 	Circumduction A combination of flexion, extension, adduction & abduction. 	Planter-Flexion (ankle joint) When the toes are pointed away from the body. 

Yr 9 PE Theory – Respiratory System

1. Components of the Respiratory system



2. Alveoli



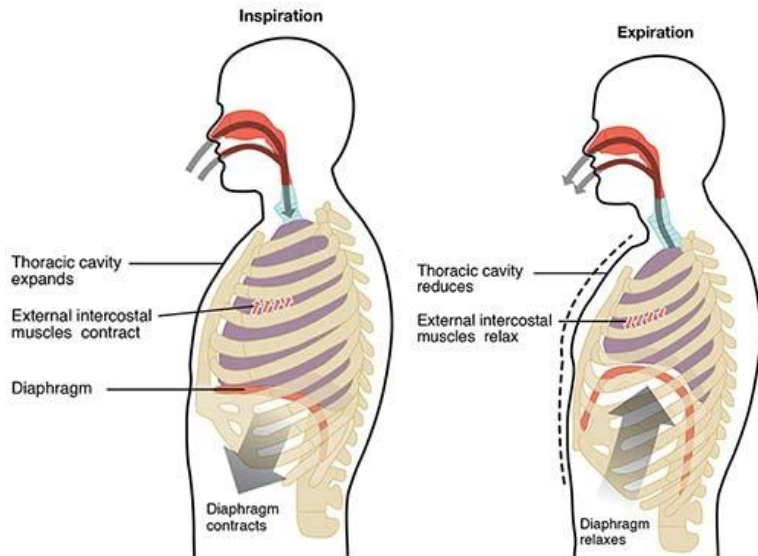
Structure – resemble bunch of grapes

Function – **gaseous exchange**:
oxygen from lungs into blood
carbon dioxide from blood to lungs

Features assisting Gaseous Exchange

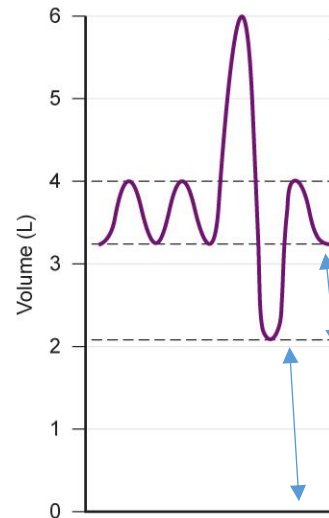
- **Large surface area** of alveoli
- **Thin walls**
- Lots of **capillaries** (large **blood supply**)
- **Short distance** for diffusion
- Gases move from **high to low concentration**

3. Breathing In (Inspiration) and out (expiration)



Spirometer – Lung Volumes

A – Tidal Volume B – Inspiratory Reserve Volume



Inspiratory Reserve Volume – the amount of extra air forcibly inhaled during a deep breath in

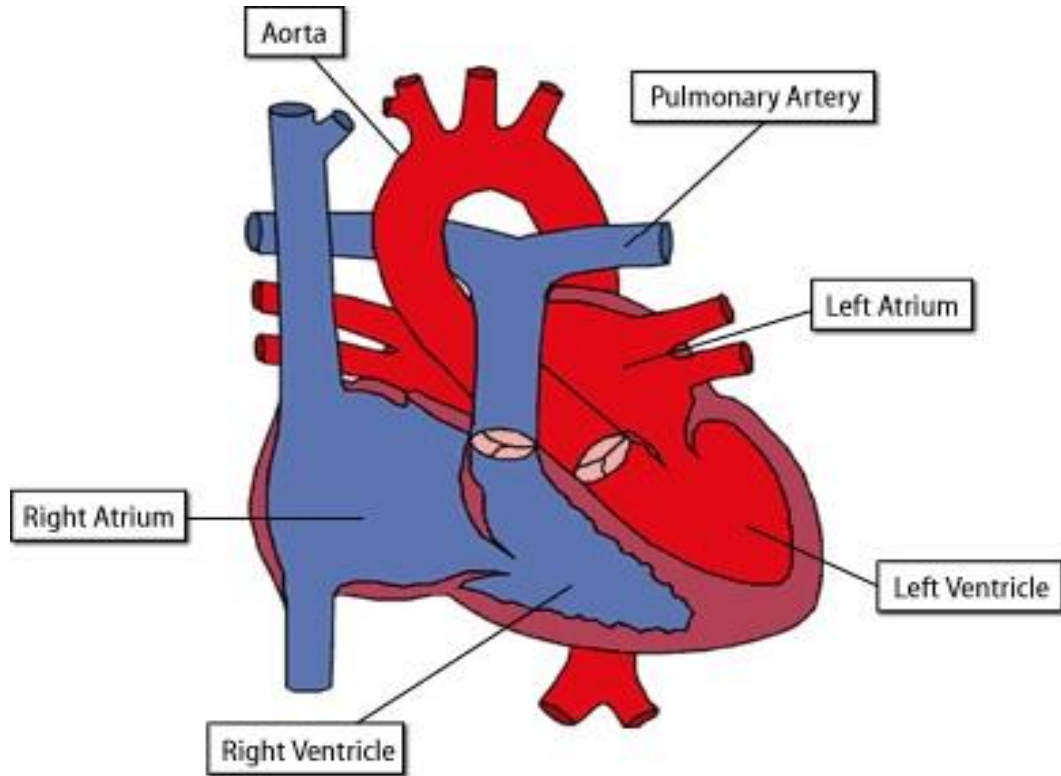
Tidal Volume - The amount of air entering and leaving lungs during normal breathing at rest

Expiratory Reserve Volume – the amount of extra air forcibly exhaled during a deep breath in

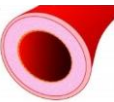

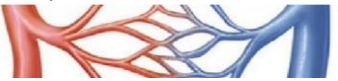
Residual Volume – the amount left in the lungs following maximal exhalation

Yr 9 PE Theory – Circulatory System

1. Structure of the heart



2. Blood Vessels

Arteries	Veins	Capillaries
<ol style="list-style-type: none"> Away from the heart Oxygenated blood (except pulmonary artery) Thick/elastic walls High pressure Small lumen 	<ol style="list-style-type: none"> Back to the heart Deoxygenated blood (except pulmonary vein) Thin walls + larger lumen Lower pressure Valves 	<ol style="list-style-type: none"> In the tissue Site of gaseous exchange Very thin walls 

3. Cardiac Cycle – Pathway of blood

- Deoxygenated blood** enters into the **right atrium**.
- and then into the **right ventricle**.
- The pulmonary artery then transports **deoxygenated blood** to the lungs where gas exchange occurs (blood becomes **oxygenated**).
- The pulmonary vein then transports **oxygenated blood** back to the heart (into the **left atrium**)
- and then into the **left ventricle**
- so **oxygenated blood** can be ejected and transported to the body via the **aorta**.