



Saint Benedict
Catholic Voluntary Academy

2026

**BE
PREPARED**

**Sports
-Cambridge
technical**

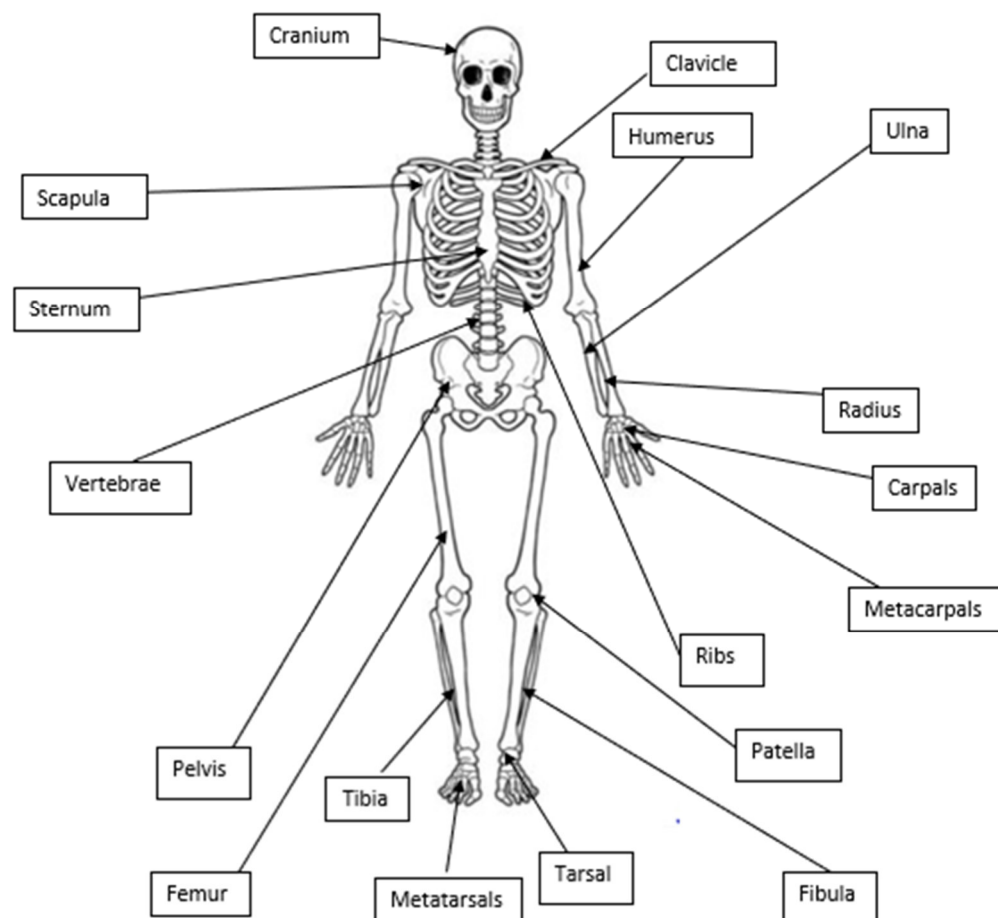


St Ralph
Sherwin
Catholic Multi Academy Trust

OCR Level 3 Cambridge Technical in Sport and Physical activity extended certificate

Unit 1 ANATOMY AND PHYSIOLOGY

To demonstrate knowledge and understanding of the skeleton and muscles



Functions of the skeleton

1. **Support:** The skeleton provides a structural framework for the body and supports the soft tissues.
2. **Movement:** It facilitates movement by serving as points of attachment for muscles.
3. **Protection:** Bones protect internal organs, like the skull protecting the brain and the rib cage safeguarding the heart and lungs.
4. **Mineral Storage:** Bones store minerals, particularly calcium and phosphorus, which can be released into the bloodstream as needed.
5. **Blood Cell Formation:** Red bone marrow is the site for the production of blood cells.

Types of joints

Ball and socket Joint



Elbow
Knee
Ankle

Hinge Joint

Shoulder

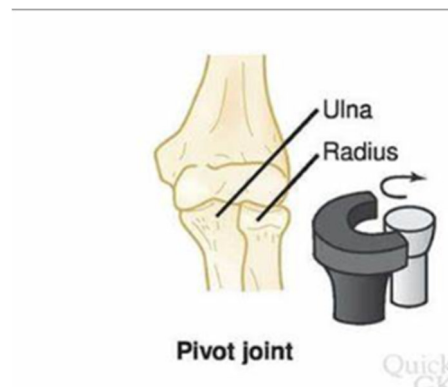
Hip



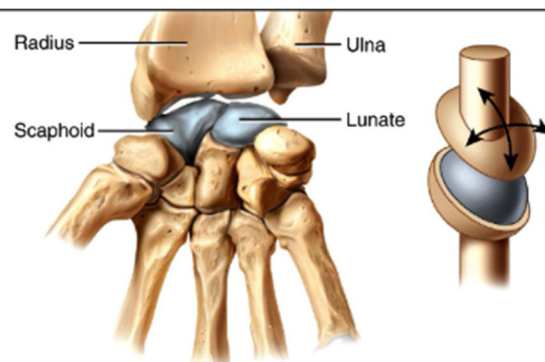
Pivot Joint

Neck

Radio-ulnar



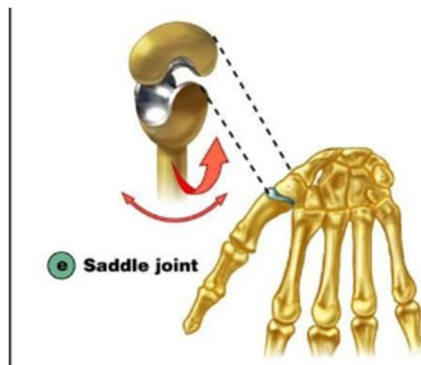
Condyloid Joint



Wrist

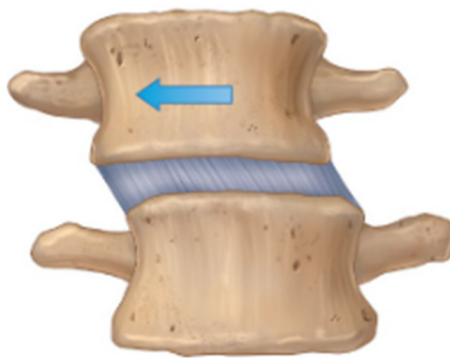
Saddle Joint

Thumb



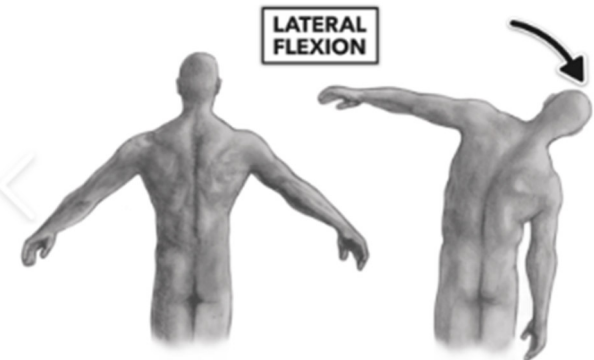
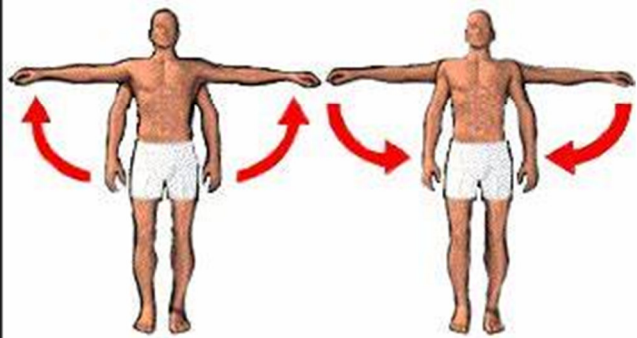
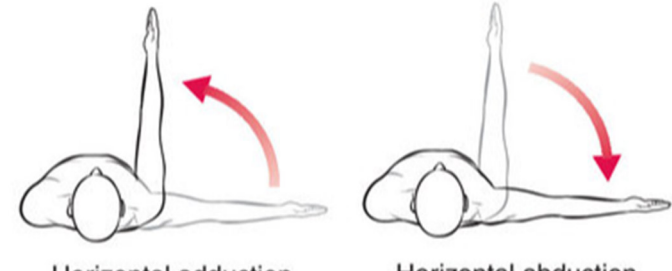
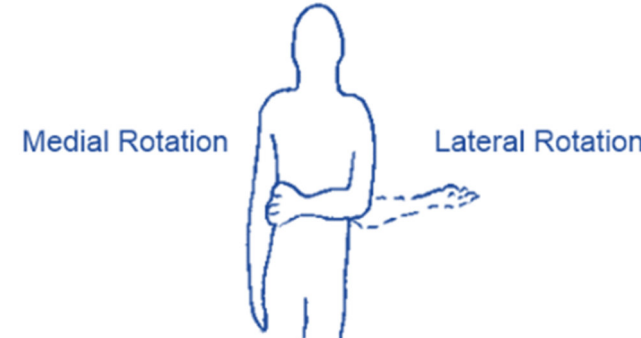
Gliding Joint

Processes of the vertebrae

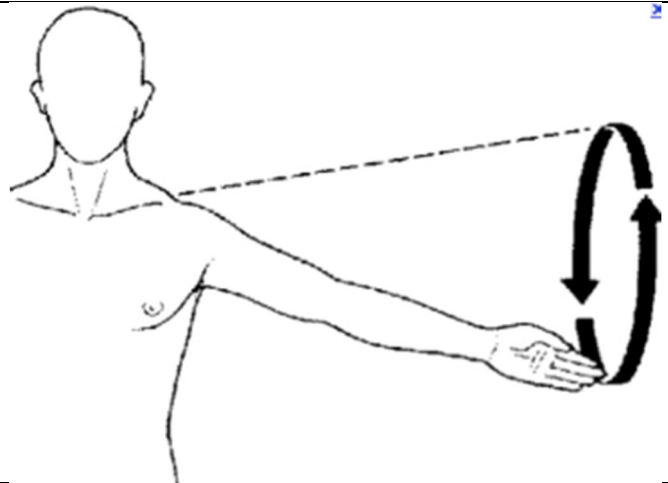


Joint Movements

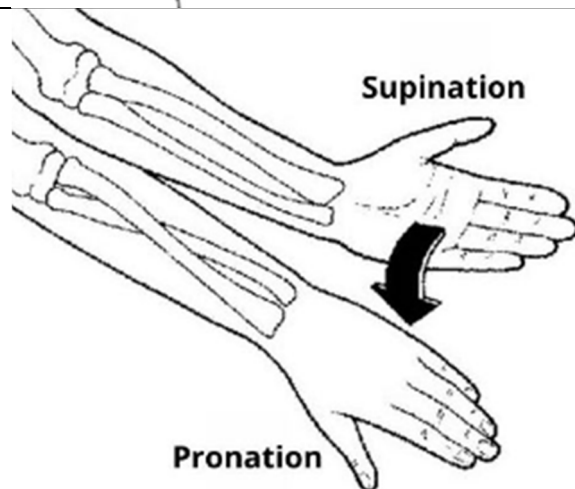
Movement	Image
Flexion and extension	The image contains two sets of diagrams. The left set shows an elbow joint with two positions: 'Flexion' (bent arm) and 'Extension' (straight arm). The right set shows a wrist joint with two positions: 'Flexion' (bent forward) and 'Extension' (bent backward). Dashed lines indicate the neutral reference positions for both joints.

Lateral flexion	 The diagram shows two views of a human torso. On the left, a posterior view shows the arms extended laterally. On the right, a lateral view shows the torso bending to the right, with the right arm extended forward and upward. A black arrow points from the head towards the right shoulder. A label 'LATERAL FLEXION' is in a box above the right arm.
Abduction and adduction	 The diagram shows two frontal views of a male torso. On the left, the arms are extended away from the midline, with red curved arrows indicating the movement. Below this is the label 'Abduction'. On the right, the arms are extended towards the midline, with red curved arrows indicating the movement. Below this is the label 'Adduction'.
Horizontal abduction and adduction	 The diagram shows two top-down views of a person lying on their back with arms extended horizontally. On the left, the right arm moves from a vertical position towards the midline, indicated by a red arrow. Below is the label 'Horizontal adduction'. On the right, the right arm moves from a vertical position away from the midline, indicated by a red arrow. Below is the label 'Horizontal abduction'.
Medial and lateral rotation	 The diagram shows a blue outline of a human torso. The right arm is extended forward. A dashed line shows the arm rotated towards the midline, labeled 'Medial Rotation'. Another dashed line shows the arm rotated away from the midline, labeled 'Lateral Rotation'.

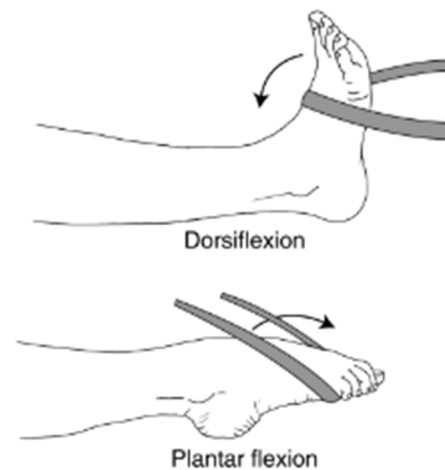
Circumduction



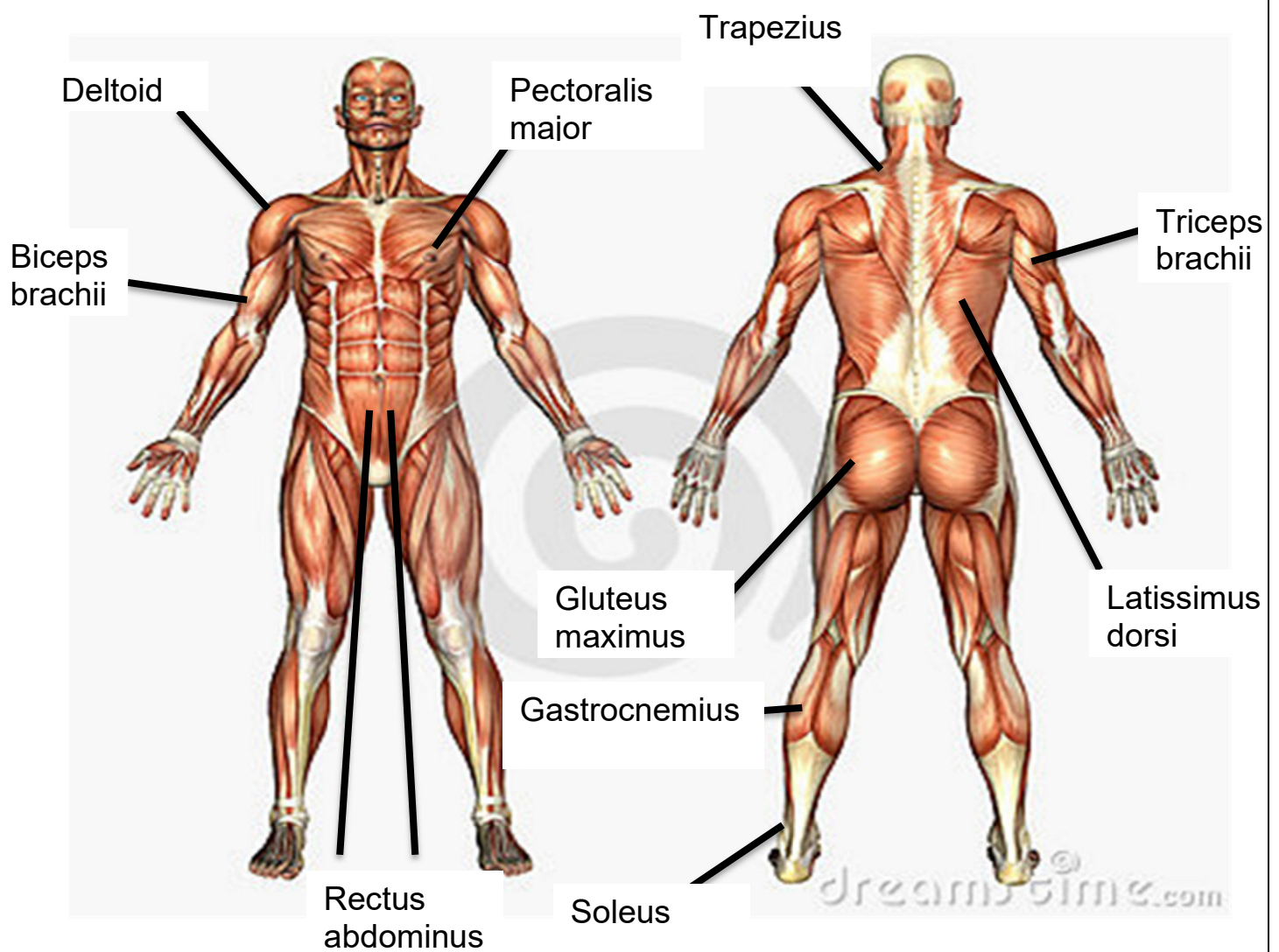
Pronation and supination



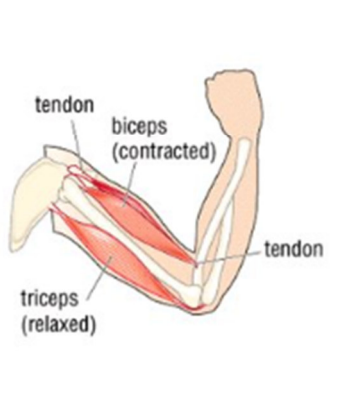
Dorsi flexion and plantar flexion



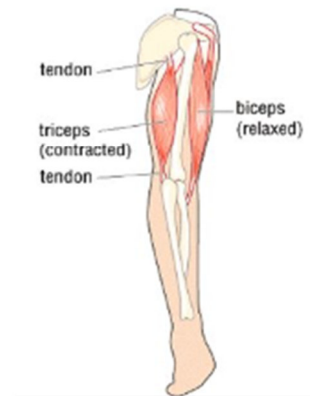
Muscular system



Antagonistic pairs – Bicep Curl



Biceps – Agonist
Triceps – Antagonistic

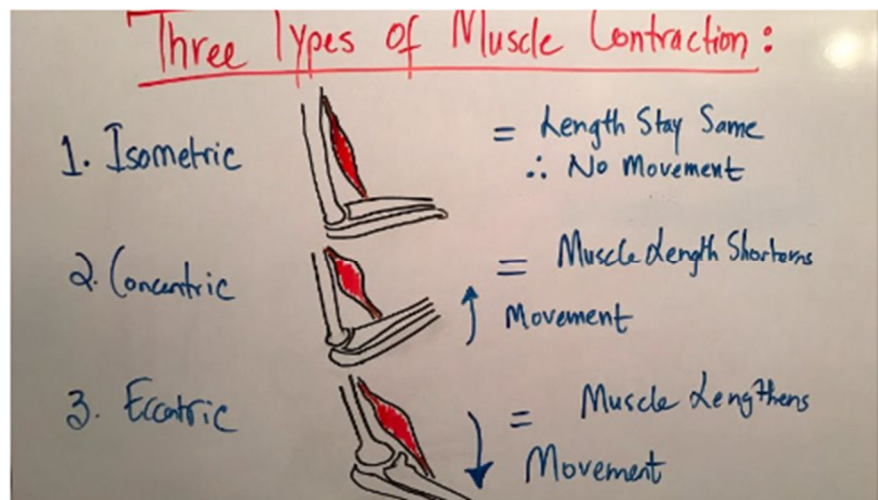


Biceps – Antagonistic
Triceps – Agonist

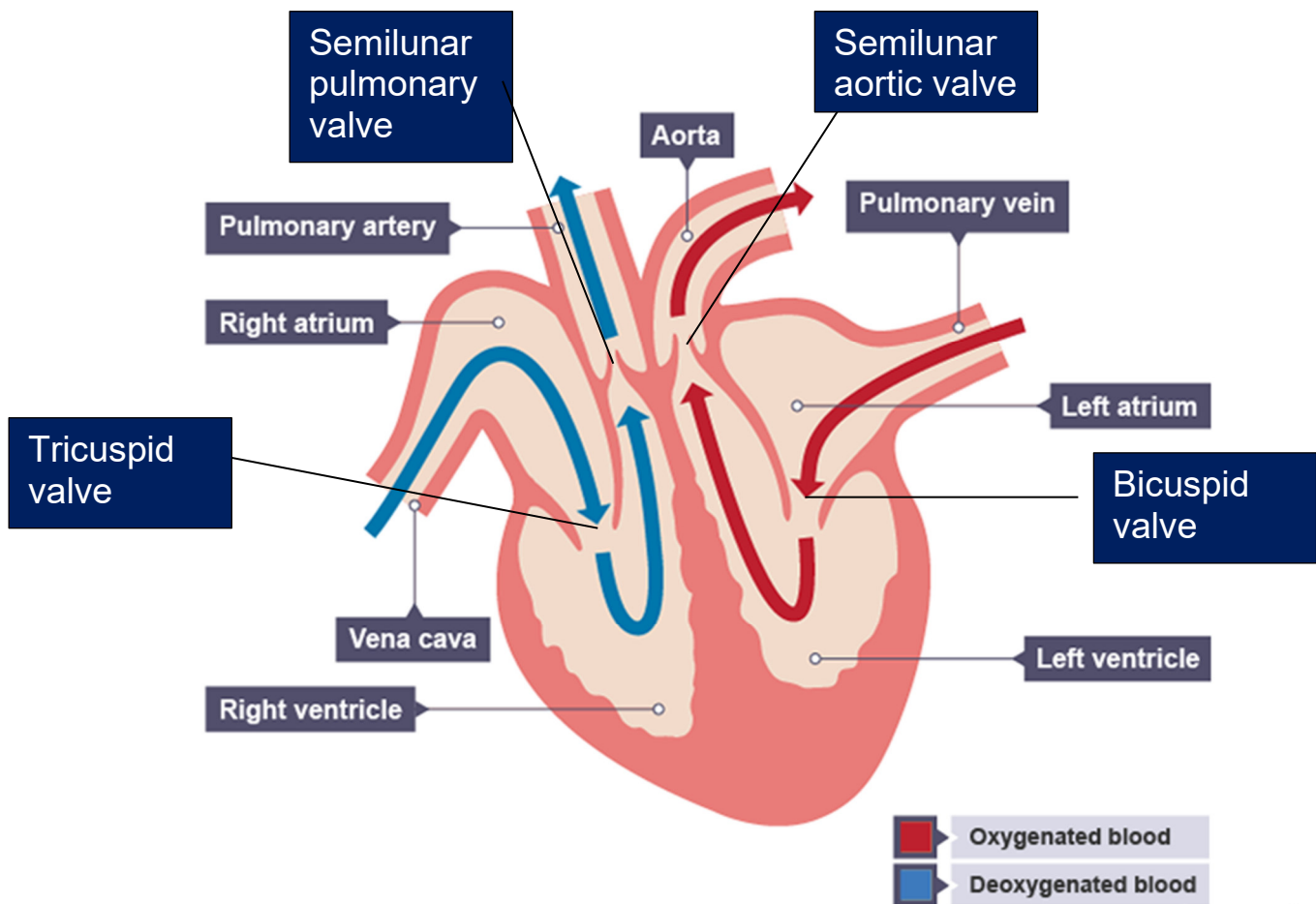
Muscle contraction

Three types

- Isometric
- Concentric
- Eccentric



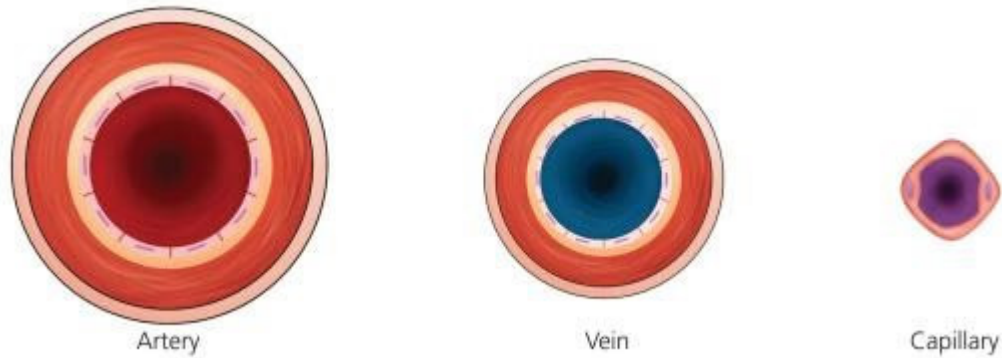
Cardiovascular system



1. Deoxygenated blood enters the right atrium from the vena cava.
2. Blood moves into right ventricle.
3. Blood is pumped into the pulmonary artery.
4. The pulmonary artery carries deoxygenated blood to the lungs.
5. The blood becomes oxygenated in the lungs.
6. Oxygenated blood leaves the lung via the pulmonary vein.
7. Blood enters the left atrium.
8. Blood moves into the left ventricle.
9. Blood is pumped into the aorta, which carries oxygenated blood around the body.

Cardiac Output = Volume of blood the heart is able to pump out in one minute

Stroke Volume = The number of times the heart pumps each minute



Blood vessels carry blood around the body.

Arteries – carry blood away from the heart; high pressure.

Arteries are elastic to maintain blood pressure.

3 arteries 1. Pulmonary 2. carotid 3. Aorta

Blood flows from capillaries into **veins** that lead back to the heart.

Veins - have much thinner walls, because blood pressure is much lower.

Veins have **valves** – prevent backflow of blood.

Veins have large internal diameter (**lumen**).

Capillaries – tiny, thin-walled blood vessels; join arteries and veins.

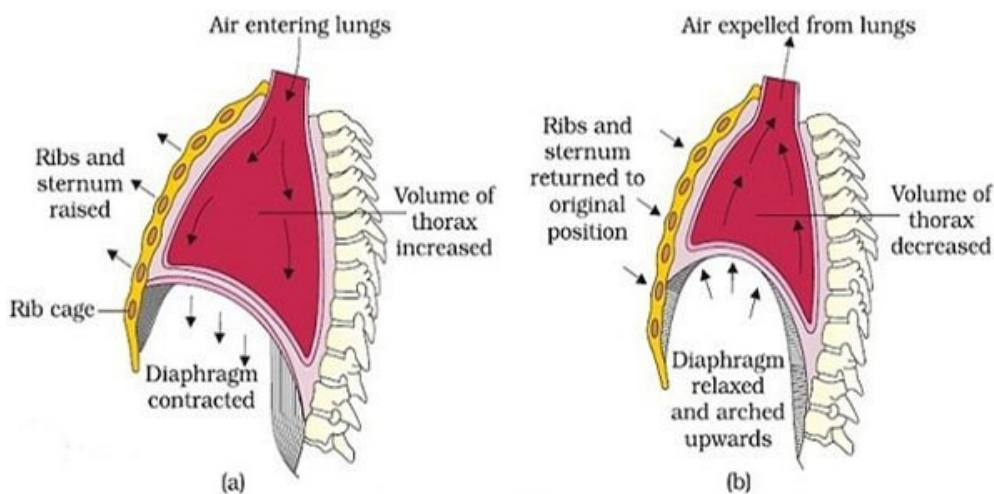
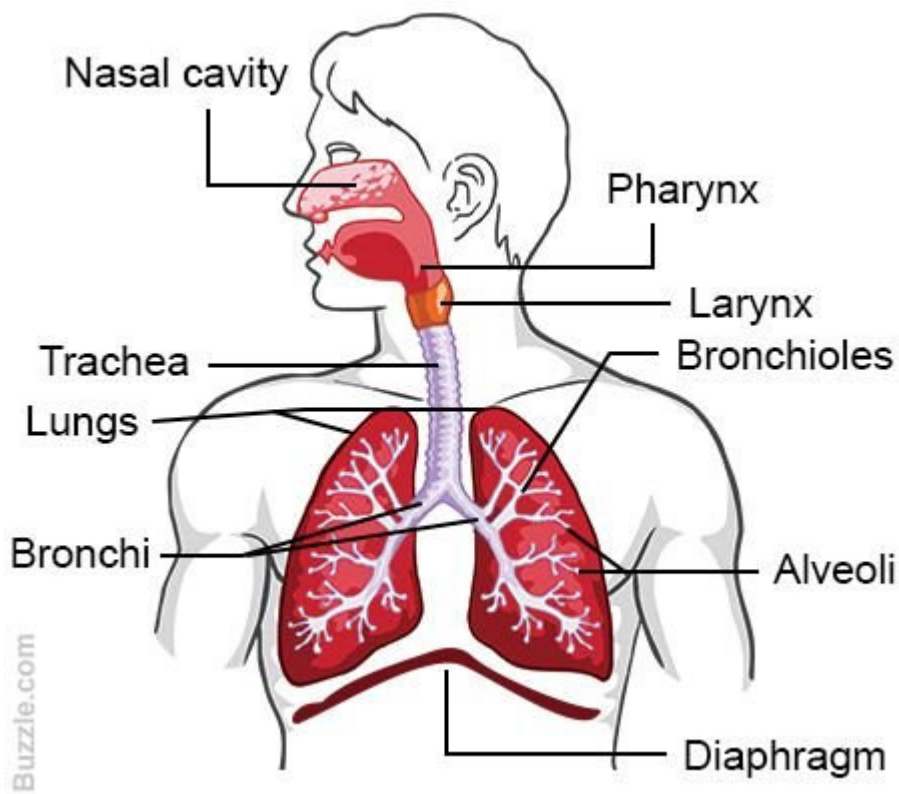
Capillaries allow gas exchange – oxygen passes from blood into tissues and carbon dioxide from tissues into blood.

Nutrients and waste products diffuse into and out of capillaries.

Components of the blood and its functions

Name	Function		
Plasma	Transport nutrients to tissues Transports chemicals to and from tissues.	Liquid part of the blood that transports blood cells throughout the body.	Transport waste products including carbon dioxide
Red blood cells	Transport oxygen via a protein called haemoglobin.	Transports some carbon dioxide by allowing it to bind to the protein haemoglobin the blood cells for removal from the body at the lungs.	
White blood cells	Fight infections	Looks for foreign bodies	
Platelets	Cause blood clots that prevent the body from excess blood loss.	Float around in the body until their is impact or damage and then they swarm the area to minimise bleeding	

The respiratory system



Mechanism of Breathing

a. Inspiration

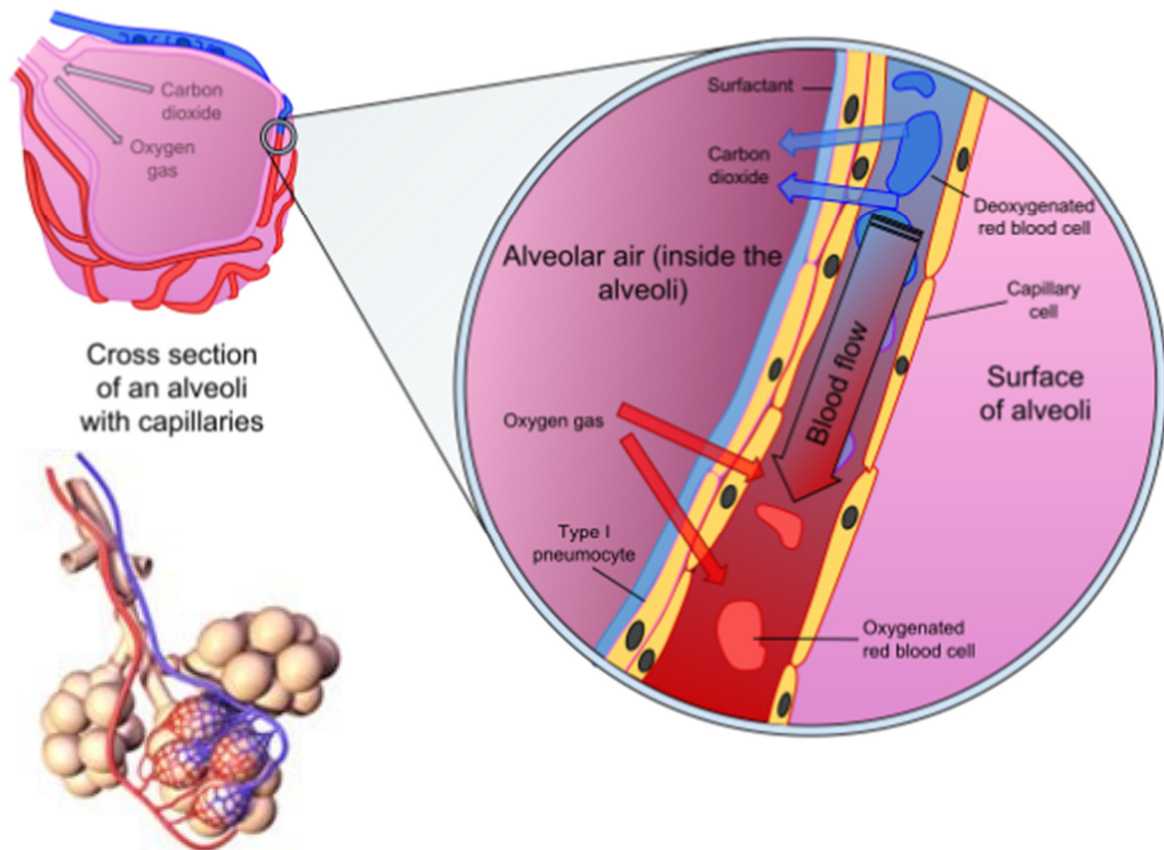
b. Expiration

Two stages

Inhalation – bringing air into the lungs through increasing the volume of the chest cavity

Exhalation – expulsion of air from the lungs by reducing the volume of the chest cavity

Both stages require the muscles of the diaphragm and the intercostal muscles to allow this to happen.



Transport of oxygen into the blood and to the working muscles/organs/cells.

Oxygen diffuses through the walls of the alveoli, through the walls of the capillaries and into the blood.

The opposite happens for carbon dioxide.

This is achieved by the oxygen and carbon dioxide moving from an area of high concentration to an area of low concentration.

Unit 1 exam questions examples

3 Which of the following bones form the elbow joint?

- (a) Humerus, femur and ulna
- (b) Humerus, tibia and fibula
- (c) Humerus, radius and fibula
- (d) Humerus, radius and ulna

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[1]

3

4 Which one of the following describes flexion at a joint?

- (a) Elbow movement during the downward phase of a press up
- (b) Movement at the shoulder when bowling in cricket
- (c) Turning the palms of the hands to face downwards
- (d) Lifting the head to look upwards to take a high catch

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[1]

5 Which one of the following is an effect of a cool down after exercise?

- (a) Reduces adrenaline
- (b) Speeds up the removal of lactic acid
- (c) Slows down the breathing rate
- (d) Reduces oxygen

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7 Which one of the following components of blood carries oxygen as its primary function?

(a) White blood cells

☐

(b) Red blood cells

☐

(c) Platelets

☐

(d) Plasma

☐

[1]

8 Which one of the following respiratory structures warms and moistens air as it is inhaled?

(a) Larynx

☐

(b) Pharynx

☐

(c) Epiglottis

☐

(d) Nasal cavity

☐

[1]

9 What type of joint is found at the base of the thumb?

.....**[1]**

10 What is meant by the term 'isometric muscle contraction'?

.....

.....**[1]**

11 Fig. 11.1 shows the major skeletal muscles of the body.



Fig. 11.1

Identify the muscles labelled A, B, C and D.

A.....

B.....

C.....

D.....

[4]

6

13 Fig.13.1 shows the upward phase of an arm curl.



Fig. 13.1

Identify **one** agonist and **one** antagonist during this phase, and state the type of muscle contraction taking place in the agonist.

Agonist:

Antagonist:

Type of Muscle contraction:

.....

[3]

15. Complete the table below to show the functions of various structures of the heart.

Structure of heart	Function
	Deoxygenated blood enters here from the venae cavae
Tricuspid valve	
Left ventricle	
	Blood vessel that carries deoxygenated blood towards the lungs
	This valve prevents blood flowing back into the left ventricle

[5]

- 17 The following paragraph describes the mechanics of breathing during expiration.

Complete the paragraph using the word bank below.

contract	upwards	relax	decreases	increases
decrease	downwards	inhaled	increase	exhaled

The diaphragm and the external intercostal muscles

This causes the rib cage to move and in.

The volume of the thoracic cavity

This causes the pressure in the lungs to, which means that air is
..... from the lungs.

[5]

- 18 (a) Explain how the mechanics of breathing change during exercise, including the use of other respiratory muscles.

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[5]