



Revision Series 2024

# BTEC Level 3 Sport and Exercise Science: Unit 2 Functional Anatomy

◆ Notes pages ◆



The EverLearner

## How to use this revision session and notes

- Complete this document when doing the live or on-demand revision shows.
- The imagery contained in the notes is designed for you to be able to study the core subject knowledge prior to the live session.
- During the live session, James will guide you through how to use that knowledge in your exam.
- Focus on the skills that James is presenting as much as the content. In most cases, students have a knowledge of the topic but struggle to respond to the command in the question. This is a focus of our revision.
- Complete the notes pages as extensively as possible and, if necessary, return to the show to complete it more than once in order to make the fullest notes possible.
- Have the National Mock Exam to hand and, ideally, your completed, marked version of it.
- Have the [exam infographics](#) to hand. These will be referred to throughout the show.

### My ticklist:

- Notes pages
- Exam infographics
- Exam paper
- Exam mark scheme
- Exam model answers

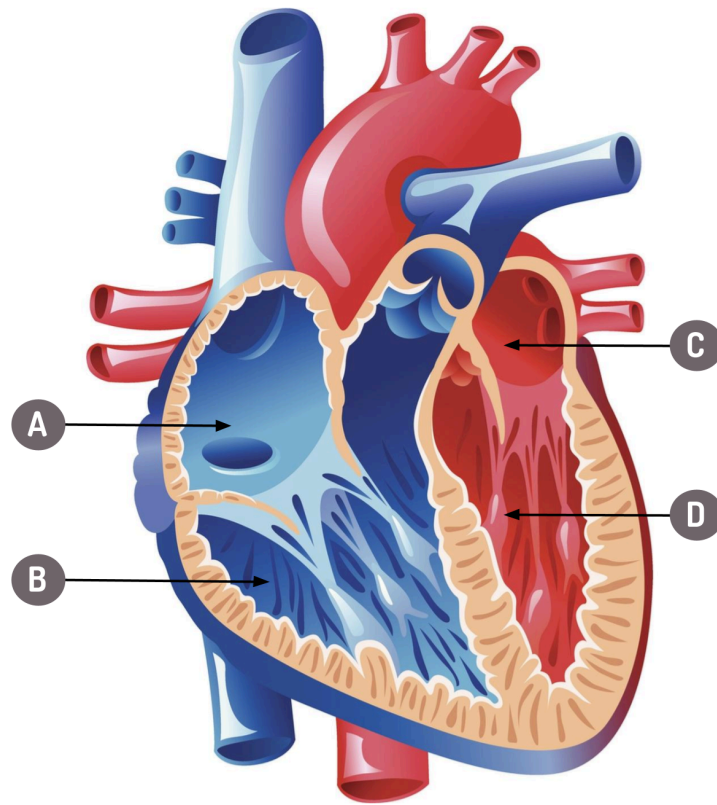
## During the live show, we will cover...

Topic 1: Location, anatomy and function of cardiovascular components.....	3
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We will also cover a wide array of exam skills including command terms for shorter and longer questions as well as the extended writing requirements of the paper.

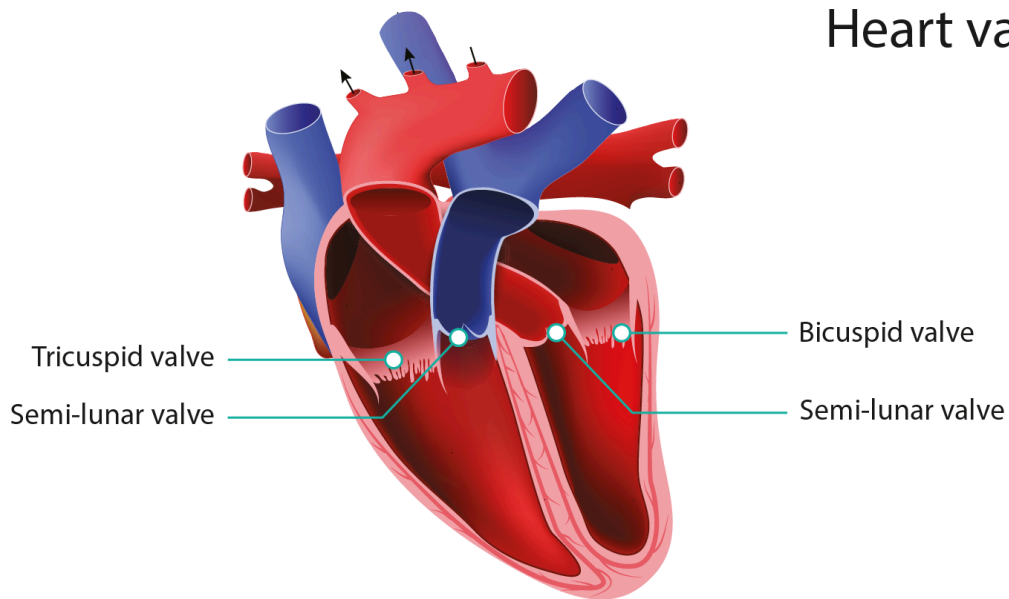
You may also find it useful to study our previous revision shows when different samples of content and skills have been developed.

# Topic 1: Location, anatomy and function of cardiovascular components



Chamber	Role
Atria	Upper chambers
	Receive blood
Ventricles	Lower chambers
	Eject blood

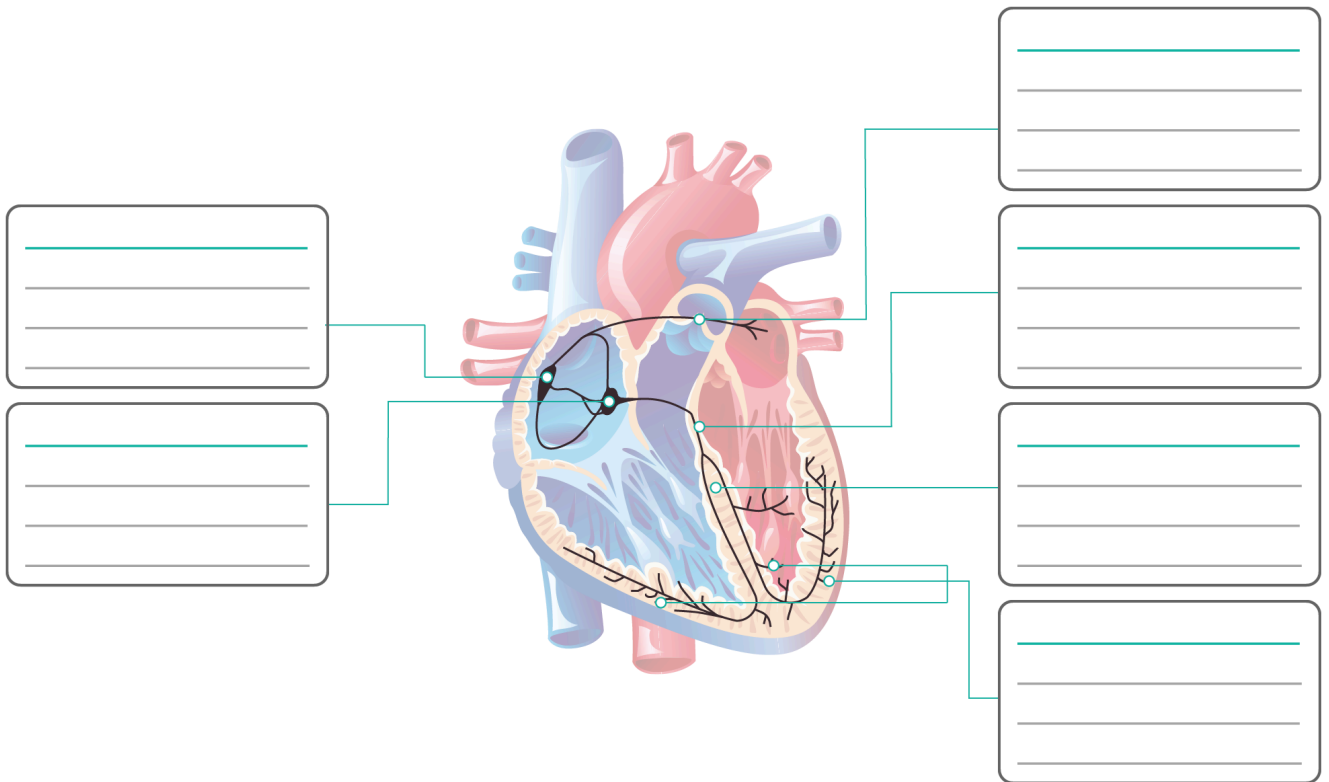
# Heart valves



Heart valve	Description	Type	Blood vessel	Description
Bicuspid	Mitral valve	Artery	Aorta	Exits left ventricle
	Between the left atrium and left ventricle			Robust/Strong/Elastic
Prevents blood re-entering the left atrium	High pressure blood			
Tricuspid	Between the right atrium and right ventricle		Pulmonary artery	Oxygenated
	Prevents blood re-entering the right atrium	Carries blood to the whole body		
Semilunar	Pulmonary (right) and aortic (left)	Vein	Vena cava	Exits right ventricle
	Prevents blood flowing in the wrong direction			Deoxygenated
Tricuspid	Between the right atrium and right ventricle		Pulmonary vein	Carries blood to the lungs
	Prevents blood re-entering the right atrium			Inferior and superior
Bicuspid	Between the left atrium and left ventricle		Aorta	Pocket valves
	Prevents blood re-entering the left atrium			Low pressure blood
Semilunar	Pulmonary (right) and aortic (left)	Pulmonary vein	Deoxygenated	
	Prevents blood flowing in the wrong direction		Carries blood to the right atrium	
Tricuspid	Between the right atrium and right ventricle	Pulmonary vein	From the lungs	
	Prevents blood re-entering the right atrium		Oxygenated	
Bicuspid	Between the left atrium and left ventricle	Aorta	Carries blood to the left atrium	
	Prevents blood re-entering the left atrium			

Want to know more? Watch the FREE tutorial "The heart" on [TheEverLearner.com](https://www.theeverlearner.com)

## Topic 2: Cardiac cycle

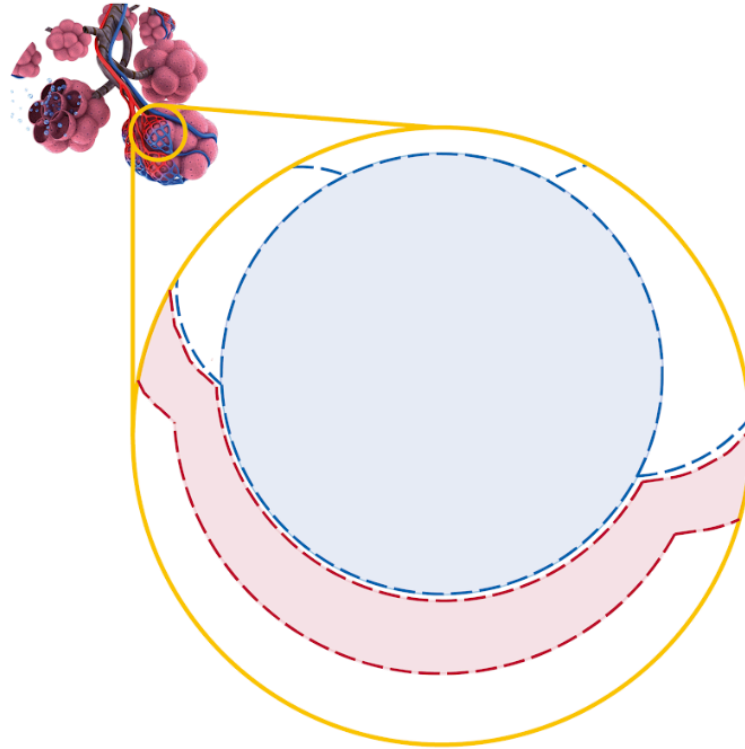


Phase		Role and timing
Systole	Atrial	
	Ventricular	
Diastole	Atrial	
	Ventricular	



Want to know more? Watch the FREE tutorial "Cardiac cycle" on [TheEverLearner.com](https://www.theeverlearner.com)

# Topic 3: Function of the respiratory system - Gaseous exchange

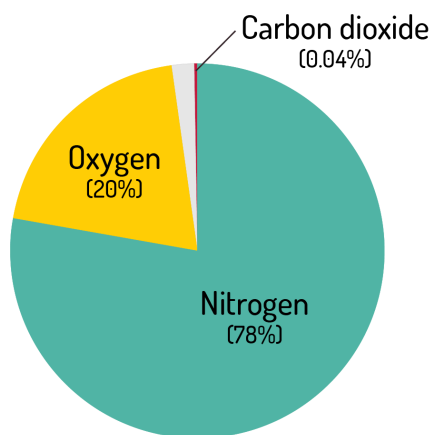


Draw what James draws in relation to gaseous exchange at the muscle tissue.

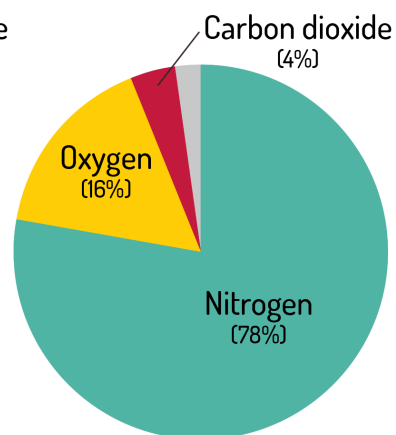
## Effect of differing intensities of exercise and recovery on gas exchange at the alveoli and muscle

Exchange at rest	Exchange during submaximal exercise	Exchange during maximal exercise	Exchange during recovery
Through the process of diffusion	<b>Increased</b> diffusion gradient	<b>Further increased</b> diffusion gradient	
Net movement of gases down the diffusion gradient from high to low concentration across a partially permeable membrane	<b>Greater quantities</b> of oxygen move from high concentration in the alveolus to <b>even lower</b> concentration in the capillary	<b>Yet even greater</b> quantities of oxygen move from high concentration in the alveolus to <b>yet even lower</b> concentration in the capillary	
Oxygen moves from high concentration in the alveolus to low concentration in the capillary	<b>Greater quantities</b> of carbon dioxide moves from <b>even higher</b> concentration in the capillary to low concentration in the alveolus	<b>Yet even greater quantities</b> of carbon dioxide moves from <b>yet even higher</b> concentration in the capillary to low concentration in the alveolus	
Carbon dioxide moves from high concentration in the capillary to low concentration in the alveolus			

Inhaled air  
(Breathed in)



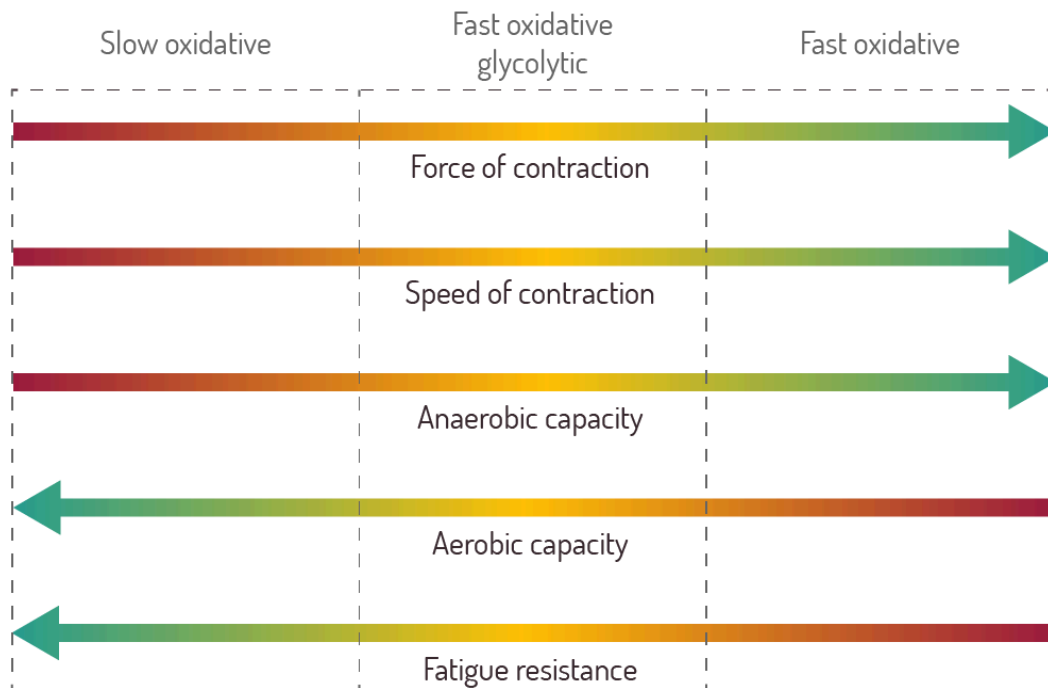
Exhaled air  
(Breathed out)



Want to know more? Watch the FREE tutorial "Gaseous exchange" on [TheEverLearner.com](https://www.theeverlearner.com)



# Topic 4: Muscle types



Slow Twitch (Type I)		Fast Oxidative Glycolytic (Type IIa)		Fast Glycolytic (Type IIx)	
Structural	Functional	Structural	Functional	Structural	Functional
Small muscle fibre diameter	_____	Large muscle fibre diameter	_____	Large muscle fibre diameter	_____
Small motor neurone size	_____	Large motor neurone size	_____	Large motor neurone size	_____
Red in colour	_____	Reddish in colour	_____	White in colour	_____
High mitochondrial density	_____	Low mitochondrial density	_____	Low mitochondrial density	_____
High myoglobin content	_____	Low myoglobin content	_____	Low myoglobin content	_____
High capillary density	_____	High glycogen stores	_____	High glycogen stores	_____
Low myosin ATPase	_____	Medium PC stores	_____	High PC stores	_____

Slow Twitch (Type I)		Fast Oxidative Glycolytic (Type IIa)		Fast Glycolytic (Type IIx)	
Structural	Functional	Structural	Functional	Structural	Functional
Low PC stores	_____	Low capillary density	_____	Low capillary density	_____
_____	_____	High myosin/ATPase	_____	High myosin/ATPase	_____

Athlete	% of muscle fibres sampled from the biopsy		
	Type I slow oxidative	Type IIa fast oxidative glycolytic	Type IIx fast glycolytic
<b>Sandra</b>	20	60	20
<b>Milo</b>	9	14	77
<b>Yan</b>	60	19	11
<b>Clinton</b>	30	51	19

Athlete	Sporting activity most suited to	Justification	Sporting activity least suited to	Justification
Sandra	_____	_____	_____	_____
Milo	_____	_____	_____	_____
Yan	_____	_____	_____	_____
Clinton	_____	_____	_____	_____

Activity - Look closely at this model answer. By reading it, you should be able to work out the command word for the question and also what the question is.

*Type IIx muscle fibres provide high contraction speed to allow a footballer to jump high and head the ball. These muscle fibres also provide a high force of contraction to allow the footballer to sprint quickly and powerfully to recover the ball after losing possession. Lastly, type IIx muscle fibres recover relatively quickly from exhaustion, so the footballer can continually attack and defend at sufficient intensity for 90 minutes.*

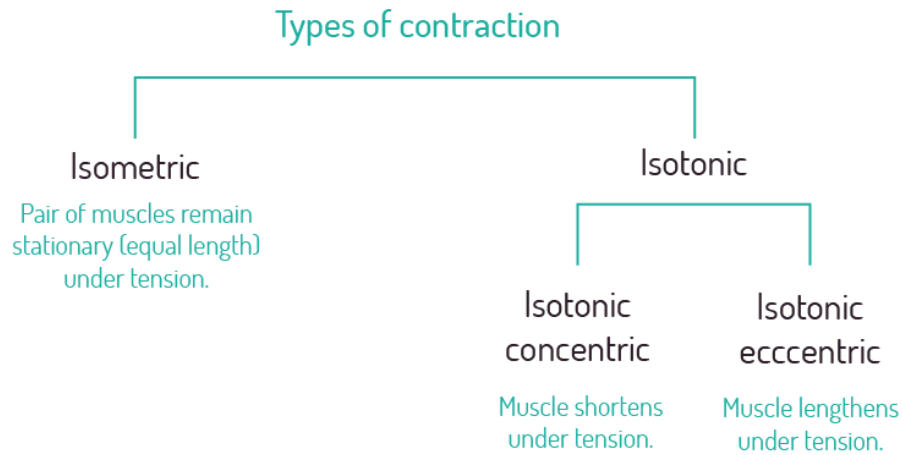
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Want to know more?

Watch the tutorial "Muscle fibre types" on [TheEverLearner.com](https://www.theeverlearner.com) (subscribers only).

# Topic 5: Neuromuscular process of muscle contraction - Types of contraction



## Elbow action in a push-up

Phase A



Phase B



Movement	Joint	Phase	Prime mover	Contraction type
Press-up	Elbow	Upward	_____	_____
		Downward	_____	_____

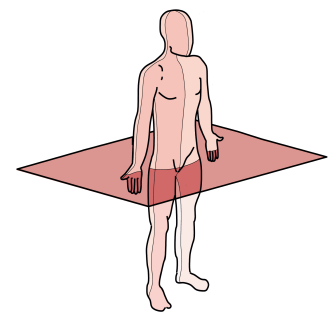
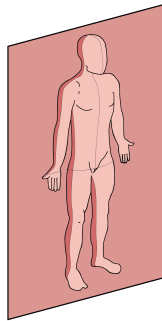
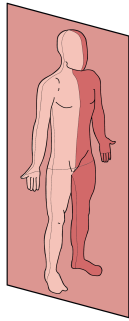
## Hip, knee and ankle action in vertical jump

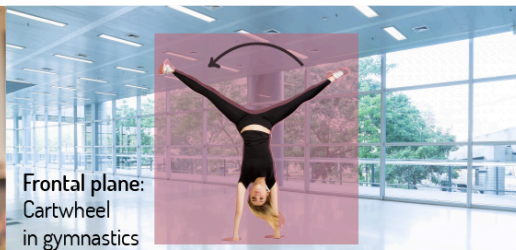


Movement	Joint	Phase	Prime mover	Contraction type
Vertical jump	Hip	Take off	Gluteals	_____
		Landing	Gluteals	_____
	Knee	Take off	Quadriceps	_____
		Landing	Quadriceps	_____
	Ankle	Take off	Gastrocnemius	_____
		Landing	Gastrocnemius	_____

Want to know more? Watch the tutorial "Types of contraction" on [TheEverLearner.com](https://www.theeverlearner.com) (subscribers only).

# Topic 6: Planes of movement



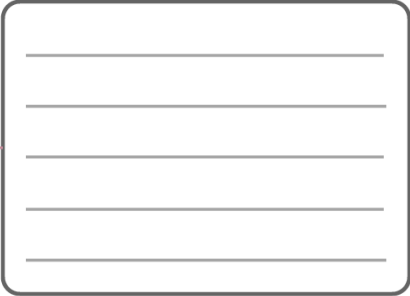



Want to know more? Watch the tutorial "Planes" on [TheEverLearner.com](https://www.theeverlearner.com) (subscribers only)

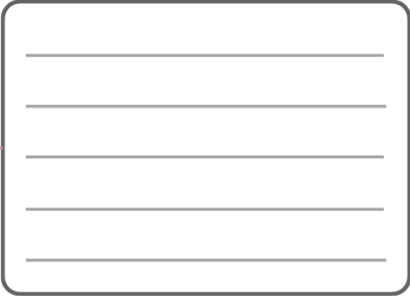
# Topic 7: Phases of sport and exercise movement

## Phases of movement

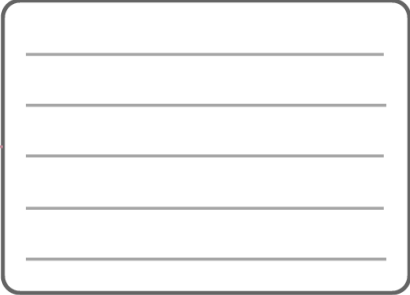
1. Preparation



2. Execution



3. Follow through





Using the table below, describe the three phases of movement of this table tennis serve.

Phase	Weight transfer	Arm position	Hip rotation
Preparation	_____ _____ _____	_____ _____ _____	_____ _____ _____
Execution	_____ _____ _____	_____ _____ _____	_____ _____ _____
Follow through	_____ _____ _____	_____ _____ _____	_____ _____ _____

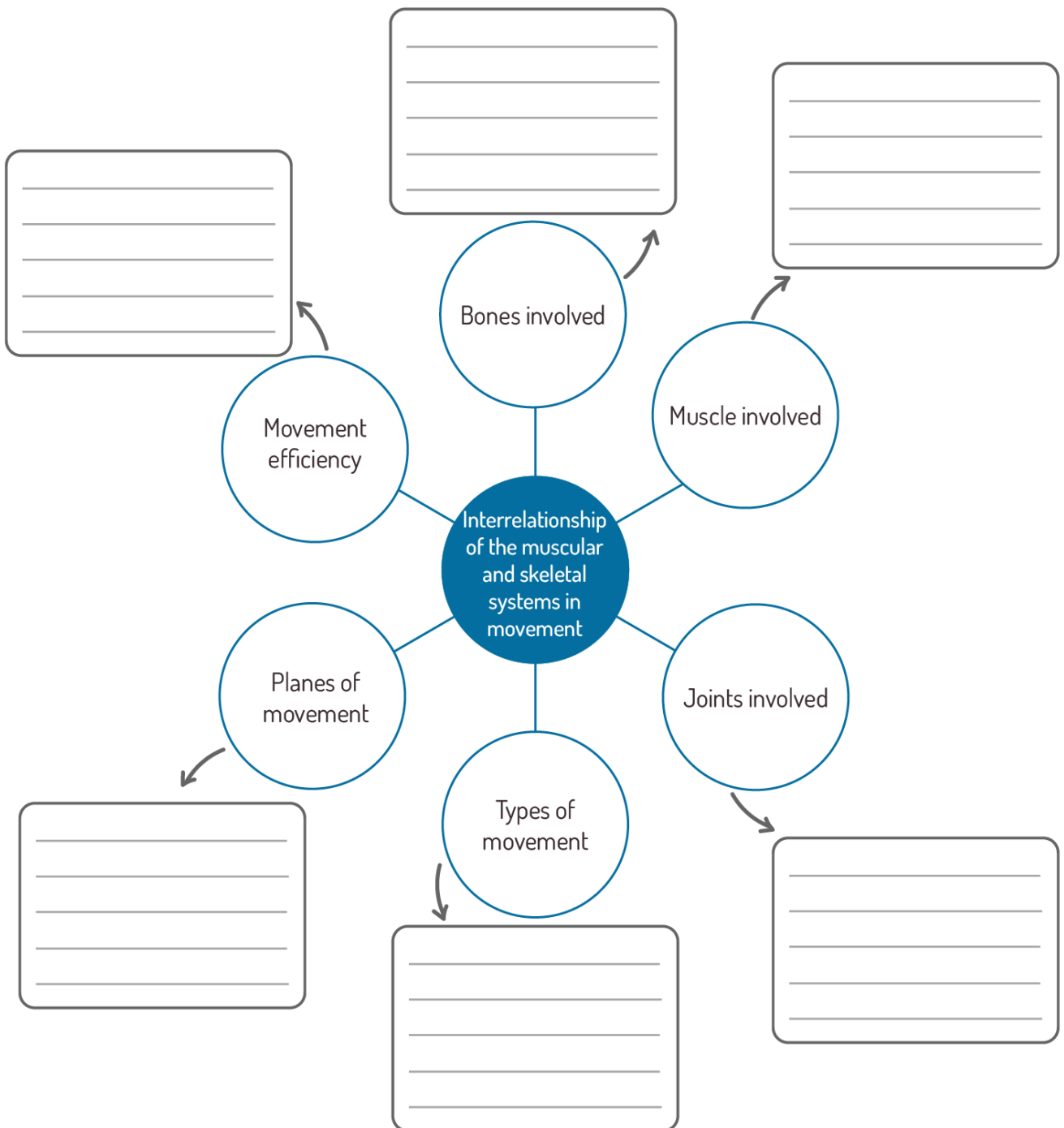


Want to know more?

Watch the tutorial "Phases of movement" on [TheEverLearner.com](https://www.theeverlearner.com) (subscribers only).

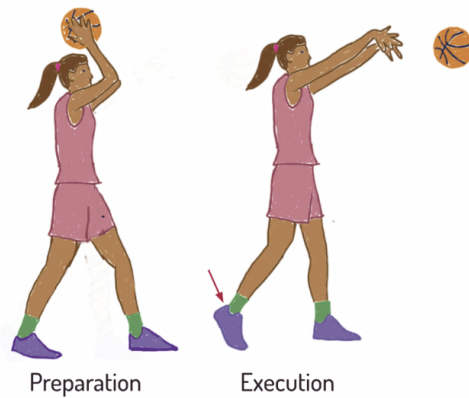


# Topic 8: Interrelationship of the muscular and skeletal systems in movement analysis



15. Review the image of an athlete completing an overhead pass. Analyse how the axial and appendicular **skeletons** allow the movement necessary at the:

- Elbows
- Wrists
- Right ankle to move from preparation to execution



Elbows: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Wrists: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Right ankle: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Marks: [8]