



Mike  
Tyler  
Sport

# ANATOMY & PHYSIOLOGY

## *Revision Booklet*

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*@MikeTylerSport*

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## **Foreword**

## About me

I'm Mike, and I live in the West Midlands, England. I have a degree in Sport Science from Loughborough University, the world's top university for Sport.

I have been teaching A&P for nearly a decade. I have taught Anatomy and Physiology for BTEC, OCR, NCFE and A-Level. I love A&P, because I love the brilliance of the human body. I love how our bodies move, and play, and heal, and work. No one could ever build a machine so complex and awe-inspiring.

I don't just teach in a classroom, but I am on YouTube, too. You can subscribe to my YouTube channel for more Sport-related content, just search for MikeTylerSport or click the YouTube icon.



## About you

You're studying Anatomy and Physiology. You're probably studying it at school or college, and you need to deepen your understanding. Perhaps you even have an exam soon. You know you need to revise, but perhaps you aren't sure where to start or how to revise effectively. This booklet is for you.

By working through these tests, and spreading them out over time, you can give yourself a fighting chance of learning what you need to learn to really bolster your A&P subject knowledge.

Don't sit and do them all in one go. Do one or two a day, and keep returning to them, working your way through them until you can do the whole lot without any trouble. There are seven tests for each body system: start with test one!

## About this booklet

This revision booklet is designed to help Level 3 learners prepare for examinations in Anatomy and Physiology.

While this booklet is produced specifically for the new (from 2016) BTEC Level 3 Unit One specification, there is a lot of crossover in content with several other specifications. You might find this helpful if you are studying any of the following Level 3 courses:

- BTEC Nationals in Sport
- BTEC Nationals in Sport & Exercise Science
- OCR Technicals in Sport & Physical Activity
- NCFE in Sport & Physical Activity

Of course, even if you're not studying on any of these, you're welcome to make use of this booklet to deepen your knowledge of Anatomy and Physiology.

## How to use this Revision Booklet

*Study the graphic organisers*

All the basic material you need to know before you can really become proficient in A&P is contained in each of the Graphic Organisers. Take the time to look at them, investigate them, try to become familiar with them. They are colour coded, with one for each of the five body systems.

Skeletal	Red
Muscular	Yellow
Cardiovascular	Blue
Respiratory	Green
Energy Systems	Purple

### ***Watch the related YouTube videos***

My YouTube channel contains several videos which link directly to these tests and are designed to give you a deeper understanding of the subject. The videos should help you do well in these tests and in your exam, but more importantly will help you deepen your understanding of Anatomy and Physiology. Just search for

MikeTylerSport or click the YouTube icon

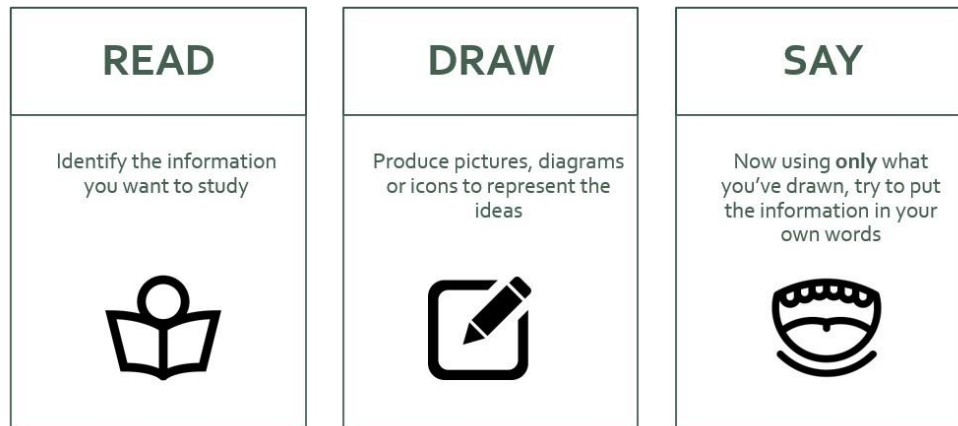


### ***Use some of the revision techniques on the next page***

There are loads of different ways to revise, but one of the most important things to remember is that you should revise a little bit, and often. Don't try to cram everything into your brain on the night before the exam. This strategy may feel like it's working but the science shows that it is not very helpful for a subject like A&P where you really need to know your stuff, and how it all links together.

The next page includes my top three techniques for effective revision, besides working through the tests in this booklet.

## Other Revision Techniques



## Revision Cards

**Side One:** A Question

**Side Two:** The Answer

<p><b>Name the five functions of the CV System</b></p>	<ol style="list-style-type: none"> <li>1. Delivery of Oxygen &amp; Nutrients</li> <li>2. Removal of Waste Products</li> <li>3. Thermoregulation</li> <li>4. Fighting Infection</li> <li>5. Blood Clotting</li> </ol>
--	--

*Write several, mix them up, then select a few to answer from memory*

## Progress Checker

The Progress Checker is where you record your grades from each test.

You only need to write **FAIL**, **PASS**, or **EXCEL** in each box. Each test will tell you how many marks are needed for each grade.

The tests are graded as follows:

Below 60%	FAIL
60 – 80%	PASS
Above 80%	EXCEL

You should aim to be able to sit *any test* in this booklet and achieve an EXCEL grade! If this means retaking tests, then that is fine. Just make sure there is at least one day's gap between attempts.

Write your grades **in pencil** so that you can easily update them as you improve.

Test S1	Test S2	Test S3	Test S4	Test S5	Test S6	Test S7

### Skeletal

--	--	--	--	--	--	--

Test C1	Test C2	Test C3	Test C4	Test C5	Test C6	Test C7

Test R1	Test R2	Test R3	Test R4	Test R5	Test R6	Test R7

Test E1	Test E2	Test E3	Test E4	Test E5	Test E6	Test E7
Test M1	Test M2	Test M3	Test M4	Test M5	Test M6	Test M7

### Muscular

## Cardiovascular

## Respiratory

## Energy Systems

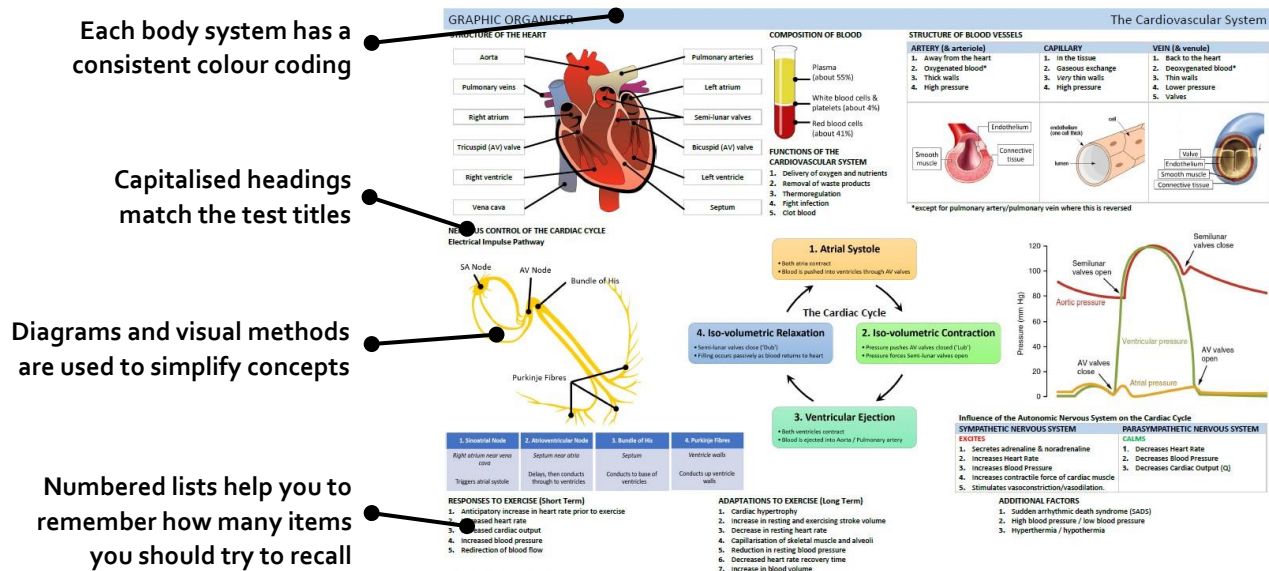
## Graphic Organisers

The graphic organisers on the next few pages focus on the central and most essential information that you will need to know in order to develop a strong understanding of Anatomy and Physiology. They don't cover everything, but they are a good starting point.

There is one graphic organiser for each of the body systems.

Once you have taken a test, return to the Graphic Organisers to mark your answers.

You should **always** correct any mistakes or missed answers after taking the test.

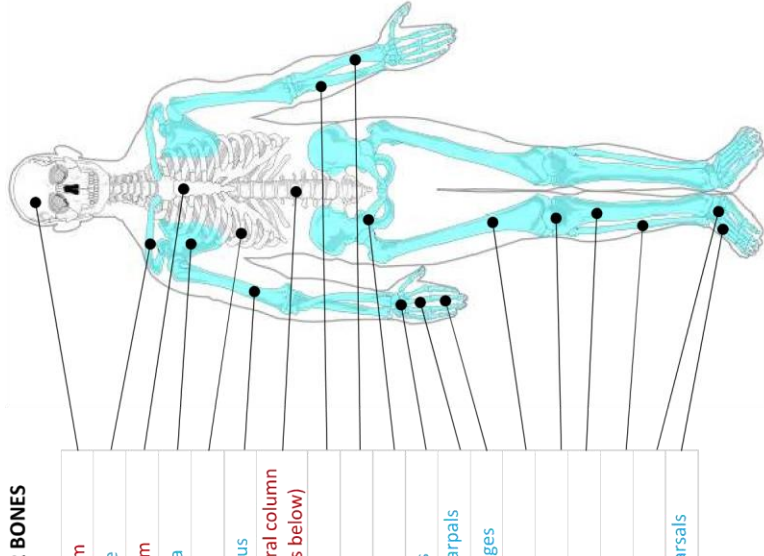




DF BONES & THEIR FUNCTIONS

DF Bone	Function	Example
Long Bones	Leverage & red blood cell production	Femur, Humerus
Short Bones	Weight bearing	Tarsals, Carpals
Flat Bones	Protection	Cranium, Sternum
Sesamoid Bones	Reducing friction across a joint, embedded in a tendon	Patella
Irregular Bones	Individualised functions	Pisiform

BONES



OF THE SKELETON

Red & Appendicular in Blue  
(arm above)

al, 12 Thoracic, 5 Lumbar,  
4 Coccygeal vertebrae

re & Alignment (as shown)

Deviations

s: excessive curvature of thoracic spine  
t: excessive curvature of lumbar spine

USES TO EXERCISE (Short Term)

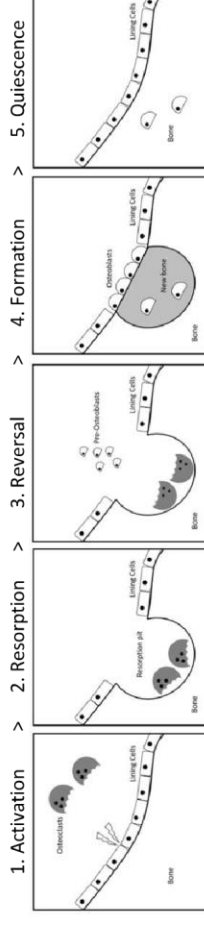
stimulated increase of mineral uptake in bones due to weight bearing exercise

The Skeletal System

FUNCTIONS OF THE SKELETON

1. Supporting framework
2. Protection
3. Attachment for muscle
4. Blood cell production
5. Store of minerals
6. Leverage
7. Weight bearing
8. Reducing friction across joints

PROCESS OF BONE GROWTH



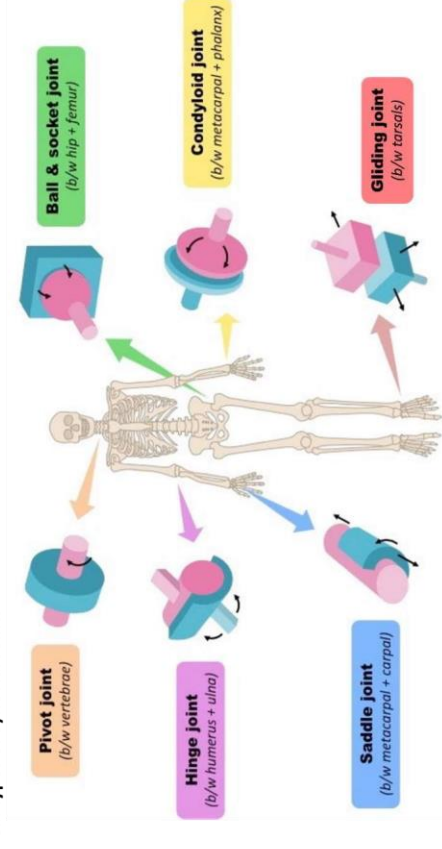
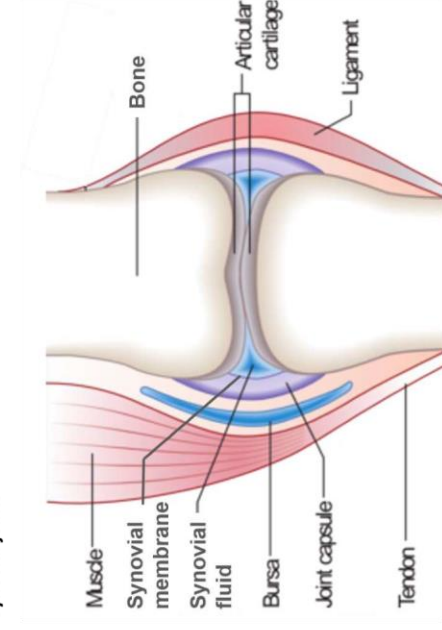
JOINTS

Classifications

1. Fibrous (fixed)
2. Cartilaginous (slightly moveable)
3. Synovial (freely moveable)

Synovial joints

Six types of synovial joints



Bones forming specific joints

<b>Shoulder</b>	Scapula, Clavicle, Humerus
<b>Joint Type:</b> Ball & Socket	
<b>Elbow</b>	Humerus, Radius, Ulna
<b>Joint Type:</b> Hinge	
<b>Wrist</b>	Carpals, Radius, Ulna
<b>Joint Type:</b> Hinge	
<b>Hip</b>	Ilium, Pubis, Ischium, Femur
<b>Joint Type:</b> Ball & Socket	
<b>Knee</b>	Femur, Tibia, Fibula
<b>Joint Type:</b> Hinge	
<b>Ankle</b>	Tibia, Fibula, Talus
<b>Joint Type:</b> Hinge	

Movements available in synovial joints

Flexion	Extension	Dorsi- & Plantar-flexion	Lateral Flexion	Horizontal Flexion	Horizontal Extension
Hyperextension	Abduction & Adduction	Rotation	Circumduction	Horizontal Abduction	Horizontal Adduction

ADAPTATIONS TO EXERCISE (Long Term)

1. Increased bone strength
2. Increased ligament strength

ADDITIONAL FACTORS

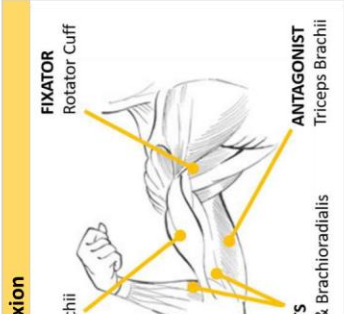
Skeletal disease: exercise offsets the risks of arthritis, osteoporosis

Age: Young children at risk of greenstick fracture, resistance training may stunt growth (though disputed)

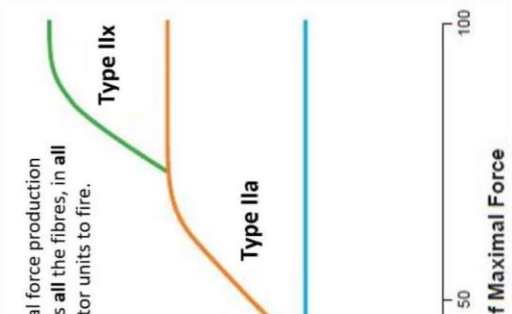
The Muscular System

that pull in the opposite direction.

ment (also called prime mover)  
uld make opposite joint movement)  
e production)  
ising the muscle's origin)



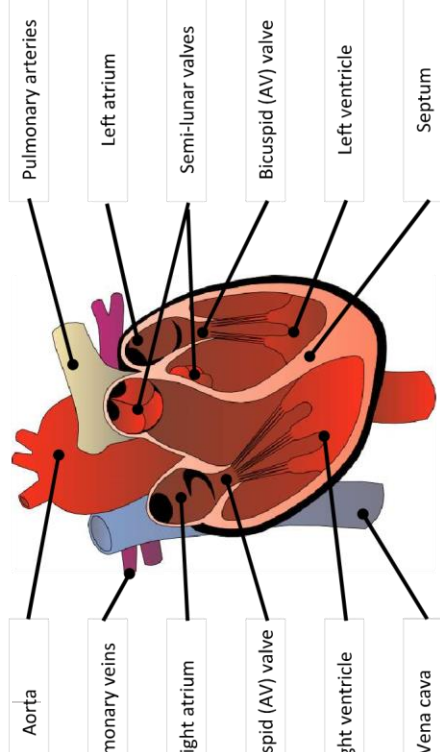
RACTION



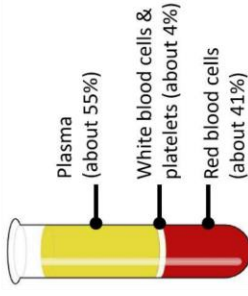
muscle contraction

# The Cardiovascular System

## STRUCTURE OF THE HEART



## COMPOSITION OF BLOOD

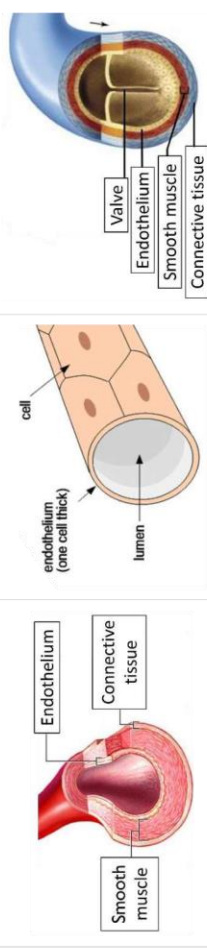


## FUNCTIONS OF THE CARDIOVASCULAR SYSTEM

1. Delivery of oxygen and nutrients
2. Removal of waste products
3. Thermoregulation
4. Fight infection
5. Clot blood

## STRUCTURE OF BLOOD VESSELS

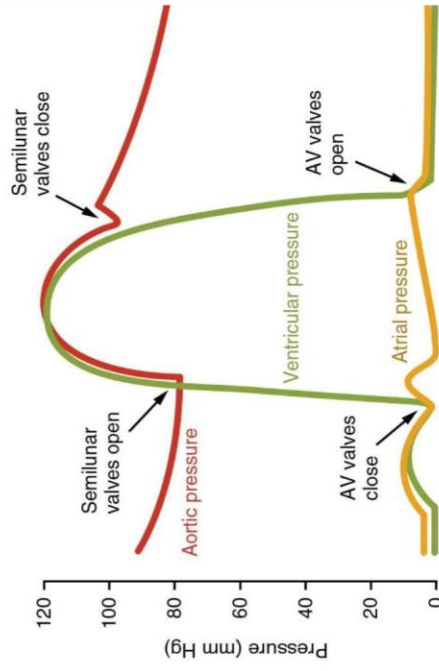
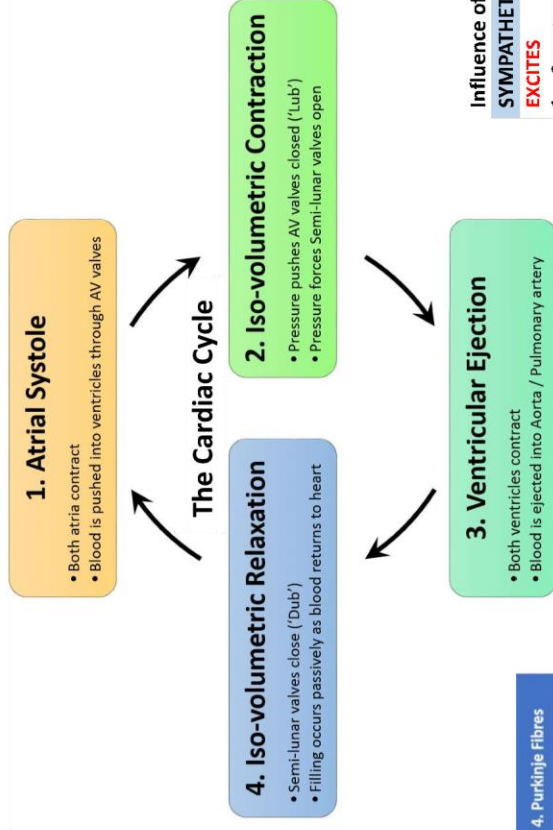
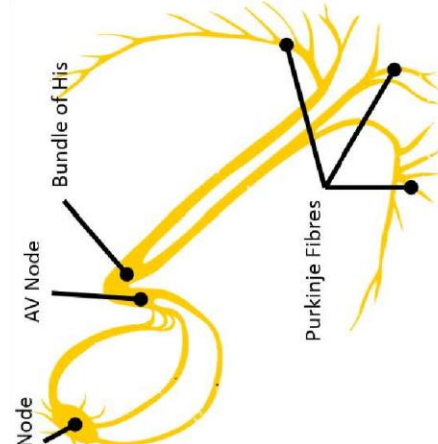
ARTERY (& arteriole)	CAPILLARY	VEIN (& venule)
<ol style="list-style-type: none"> <li>1. Away from the heart</li> <li>2. Oxygenated blood*</li> <li>3. Thick walls</li> <li>4. High pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. In the tissue</li> <li>2. Gaseous exchange</li> <li>3. Very thin walls</li> <li>4. High pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. Back to the heart</li> <li>2. Deoxygenated blood*</li> <li>3. Thin walls</li> <li>4. Lower pressure</li> <li>5. Valves</li> </ol>



\*except for pulmonary artery/pulmonary vein where this is reversed

## US CONTROL OF THE CARDIAC CYCLE

### al Impulse Pathway



## Influence of the Autonomic Nervous System on the Cardiac Cycle

SYMPATHETIC NERVOUS SYSTEM	PARASYMPATHETIC NERVOUS SYSTEM
<b>EXCITES</b>	<b>CALMS</b>
<ol style="list-style-type: none"> <li>1. Secretes adrenaline &amp; noradrenaline</li> <li>2. Increases Heart Rate</li> <li>3. Increases Blood Pressure</li> <li>4. Increases contractile force of cardiac muscle</li> <li>5. Stimulates vasoconstriction/vasodilation.</li> </ol>	<ol style="list-style-type: none"> <li>1. Decreases Heart Rate</li> <li>2. Decreases Blood Pressure</li> <li>3. Decreases Cardiac Output (Q)</li> </ol>

## ADDITIONAL FACTORS

1. Sudden arrhythmic death syndrome (SADS)
2. High blood pressure / low blood pressure
3. Hyperthermia / hypothermia

## ADAPTATIONS TO EXERCISE (Long Term)

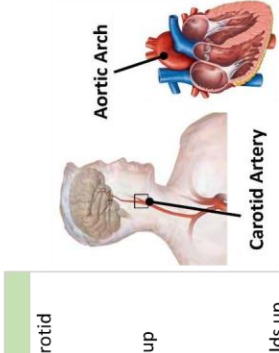
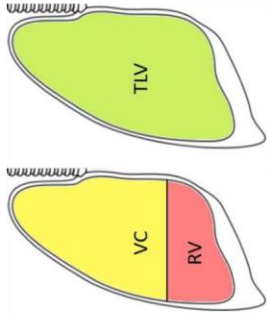
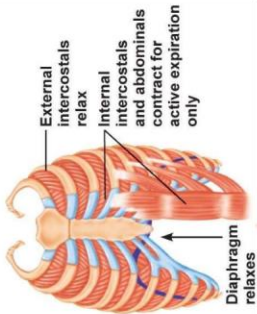
1. Cardiac hypertrophy
2. Increase in resting and exercising stroke volume
3. Decrease in resting heart rate
4. Capillarisation of skeletal muscle and alveoli
5. Reduction in resting blood pressure
6. Decreased heart rate recovery time
7. Increase in blood volume

## ADAPTATIONS TO EXERCISE (Short Term)

1. Respiratory increase in heart rate prior to exercise
2. Increased heart rate
3. Increased cardiac output
4. Increased blood pressure
5. Increased direction of blood flow

# The Respiratory System

## Expiration



2. ATP Structure		3. ATP Breakdown	4. ATP Resynthesis
ATP consists of 3 phosphates attached to an Adenine group.		The final phosphate is broken off & energy is released. Energy is now available for muscular contraction. ADP is left.	Resynthesis of ATP from ADP occurs via 3 pathways. The pathway used will be determined by intensity/duration, fuel source & availability of oxygen.

2. THE LACTATE ENERGY SYSTEM

**Type:** Anaerobic Glycolysis  
**Fuel Source:** Glycogen  
**Duration:** Approx. 10 secs to 2 mins  
**Recovery Time:** 1-2 hours  
**Used in:** Stop/start games, field & court sports

3. THE AEROBIC ENERGY SYSTEM

**Type:** Aerobic Glycolysis (& Lipolysis)  
**Fuel Source:** Glycogen and Fat  
**Duration:** Longer than 2 mins  
**Recovery Time:** 24-48 hours  
**Used in:** Long distance & endurance events


1		ATP requires resynthesizing
2		Glycogen is present in the muscle cell and in the liver.
3		Glucose/Glycogen is broken down to provide the energy required. Enzymes speed up the process.
4		Pyruvate is also produced. Since no oxygen is available this is converted into lactate.
5		1 Glycogen molecule produces 3 new ATP molecules.

1		ATP requires resynthesizing
2		Glycogen is present in the muscle cell and in the liver.
3		Glucose/Glycogen is broken down to provide the energy required. Enzymes speed up the process.
4		Pyruvate is also produced. Oxygen is available so pyruvate is broken down into Acetyl CoA
5		Or, Acetyl CoA can be created from fats by a process called beta-oxidation
6		Acetyl CoA passes through the Krebs Cycle and the Electron Transport Chain (ETC). By products include CO2, O2 and H2O. More energy is produced here.
7		1 Glycogen molecule produces about 34 new ATP molecules.

ADDITIONAL FACTORS

- 1. Diabetes (hypoglycaemic attack)
- 2. Children's lack of a lactate system

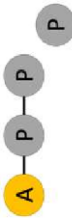


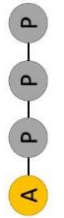
1. ATP Availability



ATP is stored in the muscles.  
It is readily available to be broken down.  
No other compound can be used by the body.

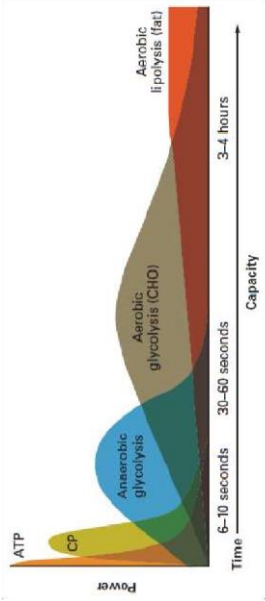
1. THE ATP-PC (ALACTIC) ENERGY SYSTEM

Type: Anaerobic  
Fuel Source: Creatine Phosphate (PC)  
Duration: Approx. 6-10 seconds  
Recovery Time: About 3 mins  
Used in: Sports requiring explosive power

1		ATP requires resynthesizing
2		Creatine Phosphate is present in the muscle cell
3		Creatine Phosphate is broken down to provide the energy required.
4		1 PC molecule produces 1 new ATP molecule.

ENERGY CONTINUUM

At any given time, all the energy systems are in use. The proportion is determined by intensity of demand for energy.



ADAPTATIONS TO EXERCISE (Long Term)

ATP-PC (alactic) energy system

- 1. Increased creatine stores.

Lactate energy system

- 1. Increase tolerance to lactate.

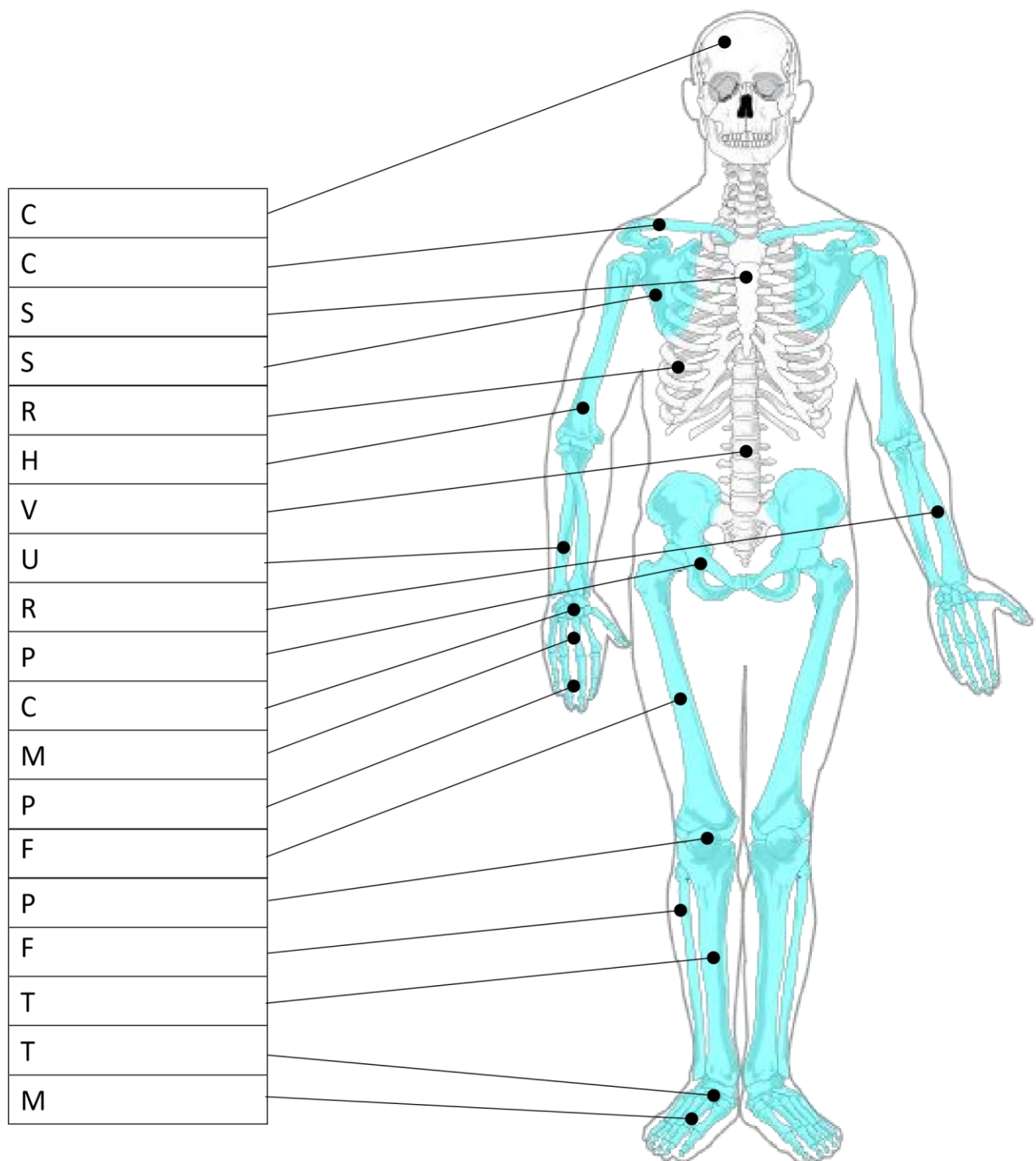
Aerobic energy system

- 1. Increased use of fats as an energy source.
- 2. Increased storage of glycogen.
- 3. Increased numbers of mitochondria.

Test S1: Major Bones

NAME	SCORE
	/28

GRADE (Circle)		
Under 16 FAIL	17 to 22 PASS	Over 22 EXCEL



14

## Areas of the Skeleton

Identify the two divisions of the skeleton

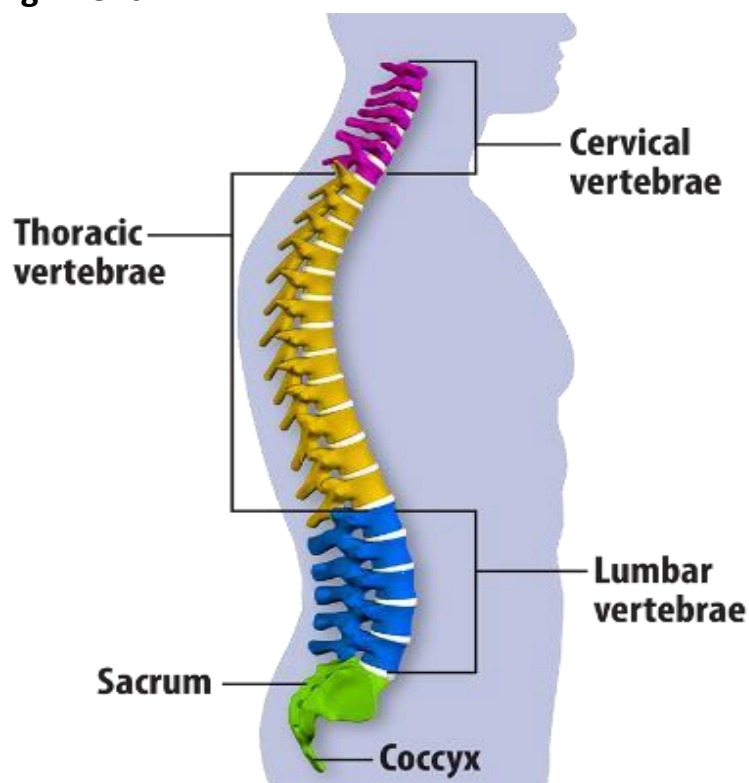
A	The central part of the skeleton, mainly for protection
---	---

A	The limbs, mainly for movement
---	--------------------------------

**Spine:** how many vertebrae in each section?

<input type="text"/>	Cervical	<input type="text"/>	Thoracic	<input type="text"/>	Lumbar
<input type="text"/>	Sacral	<input type="text"/>	Coccygeal vertebrae		

**Curvature & Alignment:**



### Postural Deviations

Kyphosis: excessive curvature of the \_\_\_\_\_ spine

Lordosis: excessive curvature of the \_\_\_\_\_ spine

## Test S2: Types and Functions of Bones

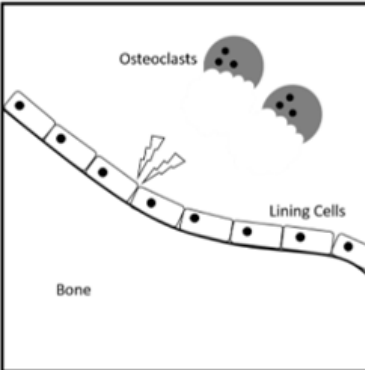
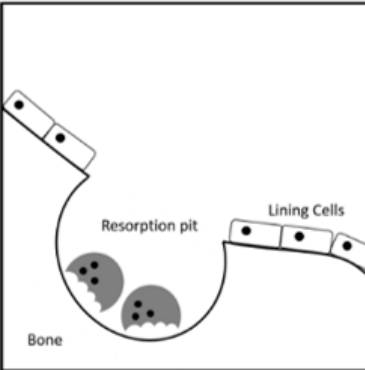
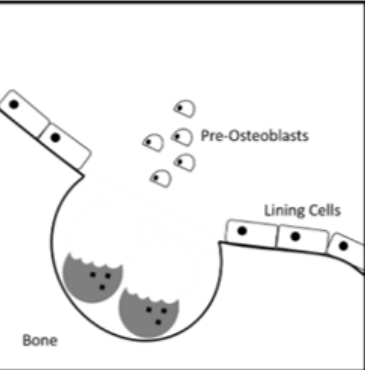
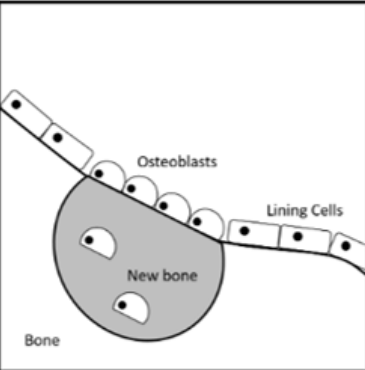
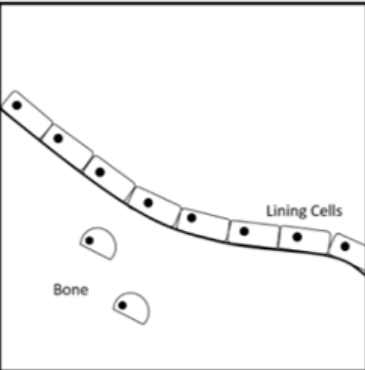
NAME	SCORE
	/20

GRADE (Circle)		
Under 12 <b>FAIL</b>	12 to 16 <b>PASS</b>	Over 16 <b>EXCEL</b>

**Types and functions of bones:** complete this table by naming the five types of bones and providing examples of each

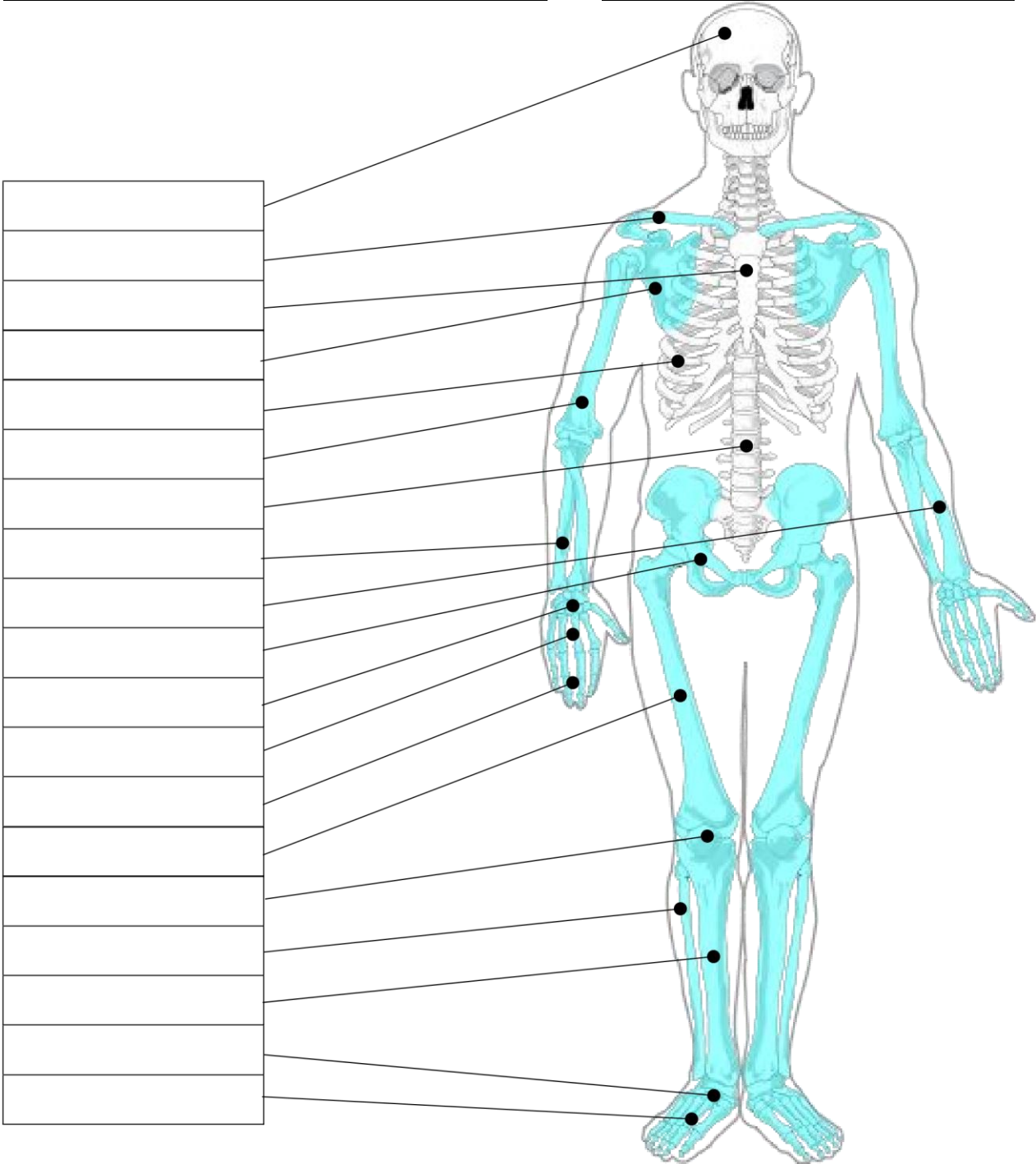
Type of Bone	Function	Example
1. L	Leverage & red blood cell production	
2. S	Weight bearing	
3. F	Protection	
4. S	Reducing friction across a joint, embedded in a tendon	
5. I	Individualised functions	

**Process of Bone Growth:** Complete the table to describe bone remodelling

Phase Name					
Diagram	 <p>Diagram 1: Shows the initial bone surface. A layer of 'Lining Cells' covers the 'Bone'. 'Osteoclasts' are shown as large, dark, multi-lobed cells beginning to resorb the bone surface.</p>	 <p>Diagram 2: A 'Resorption pit' has formed. 'Osteoclasts' are active within the pit, and 'Lining Cells' line the edges of the pit.</p>	 <p>Diagram 3: 'Pre-Osteoblasts' (small, light-colored cells) are entering the resorption pit from the surrounding tissue.</p>	 <p>Diagram 4: 'Osteoblasts' (small, light-colored cells) are now within the pit, and 'New bone' (shaded gray area) is being formed at the base of the pit. 'Lining Cells' are still present on the outer edge.</p>	 <p>Diagram 5: The process is complete. The 'New bone' has been formed, and the 'Lining Cells' have migrated back to the original bone surface. The 'Bone' is now restored.</p>
Description					

Test S3: Major Bones & Functions of the System

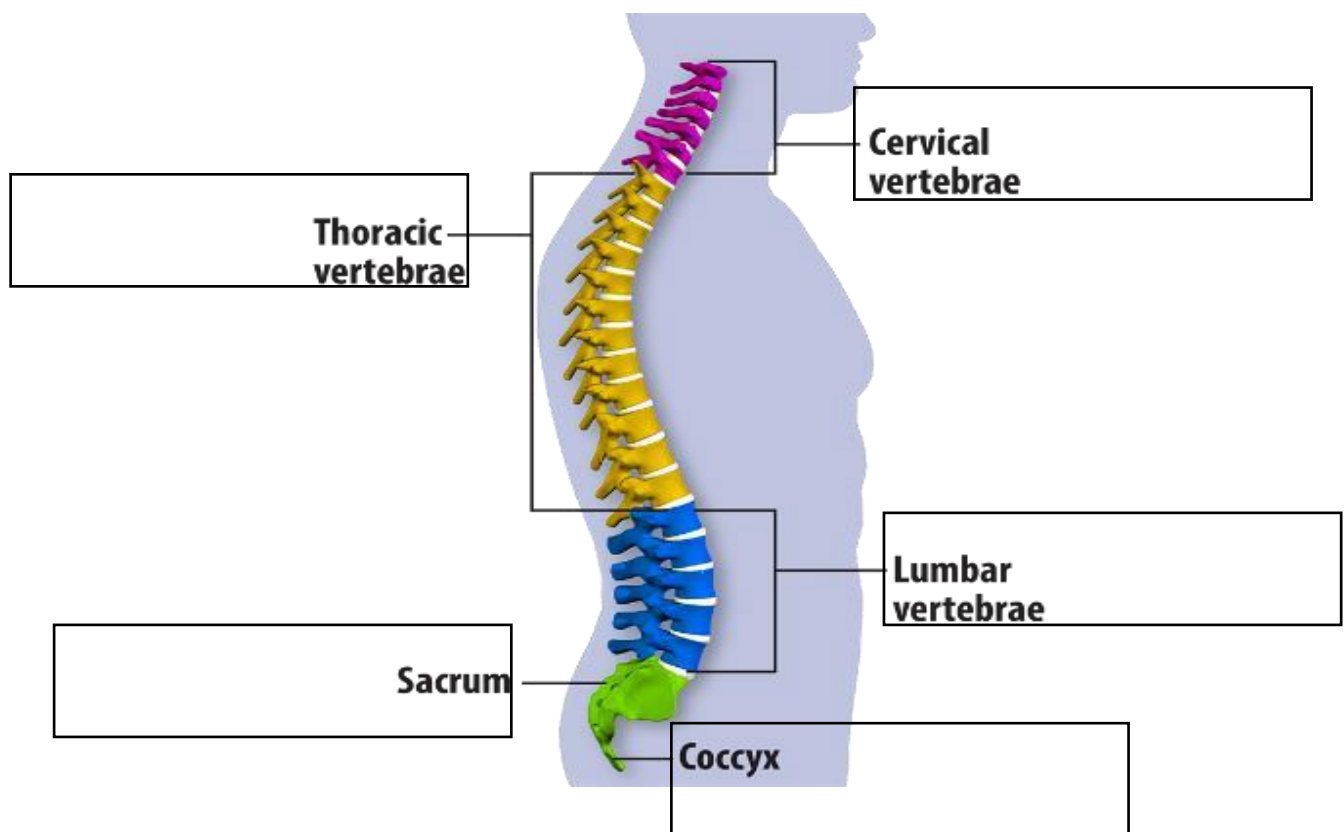
NAME	SCORE	GRADE (Circle)		
		Under 19 FAIL	19 to 25 PASS	Over 25 EXCEL
	/32			



**Functions of the Skeleton:** complete the list to show the 8 functions of the skeleton

1. S _____ f _____
2. P _____
3. A _____ for m _____
4. B _____ c _____ p _____
5. S _____ of m _____
6. L _____
7. W _____ b _____
8. R _____ f _____ across j _____

**Spine Curvature & Alignment:** label the sections of the spine



19

### Test S4: Joint Classifications and Types

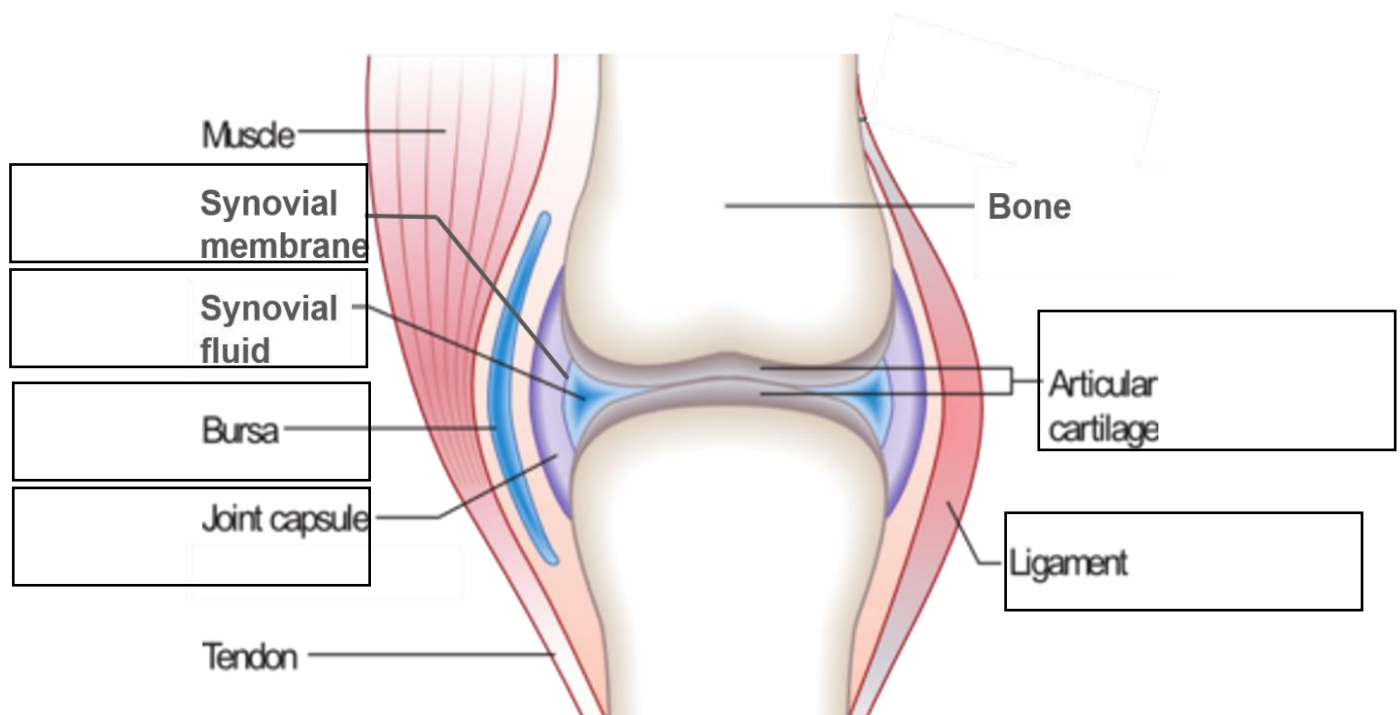
NAME	SCORE
	/21

GRADE (Circle)		
Under 13 <b>FAIL</b>	13 to 17 <b>PASS</b>	Over 17 <b>EXCEL</b>

Name the three classifications of joint

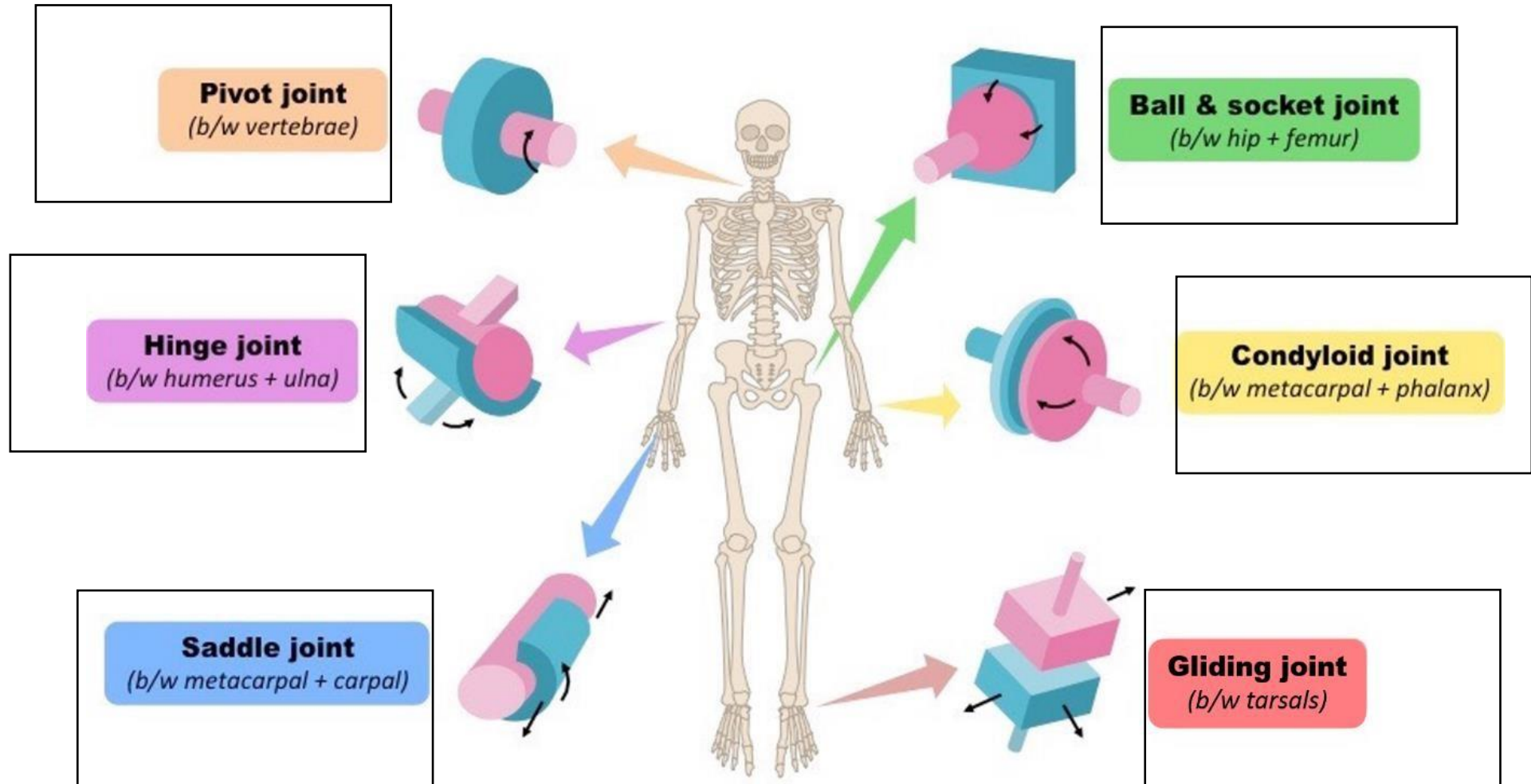
<b>F</b>
<b>C</b>
<b>S</b>

Complete the diagram below by adding labels





Joint types: Name each joint and give one example in the skeleton





## Test S5: Functions of the System, Bones Forming Joints & Movements

Available

NAME	SCORE
	/38

GRADE (Circle)		
Under 23 <b>FAIL</b>	23 to 30 <b>PASS</b>	Over 30 <b>EXCEL</b>


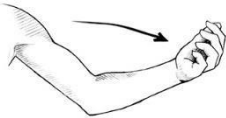
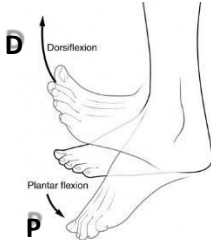
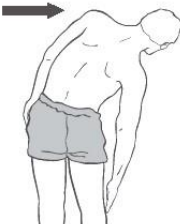
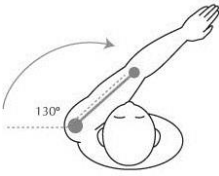
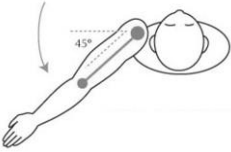
### Functions of the Skeleton

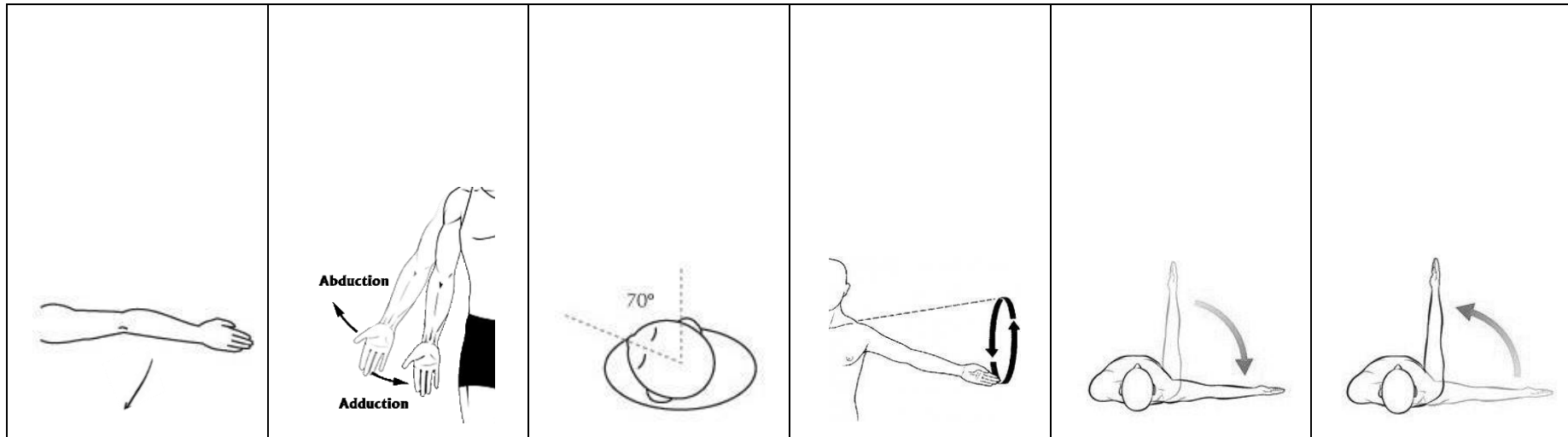
1. S _____ f _____
2. P _____
3. A _____ for m _____
4. B _____ c _____ p _____
5. S _____ of m _____
6. L _____
7. W _____ b _____
8. R _____ f _____ across j _____

**Bones forming various joints:** Name the bones which make up each joint.

JOINT	TYPE	BONES
Shoulder	Ball & Socket	S _____, C _____, H _____
Elbow	Hinge	H _____, R _____, U _____
Wrist	Hinge	C _____, R _____, U _____
Hip	Ball & Socket	Ilium, Pubis, Ischium, & F _____
Knee	Hinge	F _____, T _____, F _____
Ankle	Hinge	T _____, F _____, T _____

Movements available at synovial joints: Name the movement(s) shown in each diagram.

		2			
					
	2				

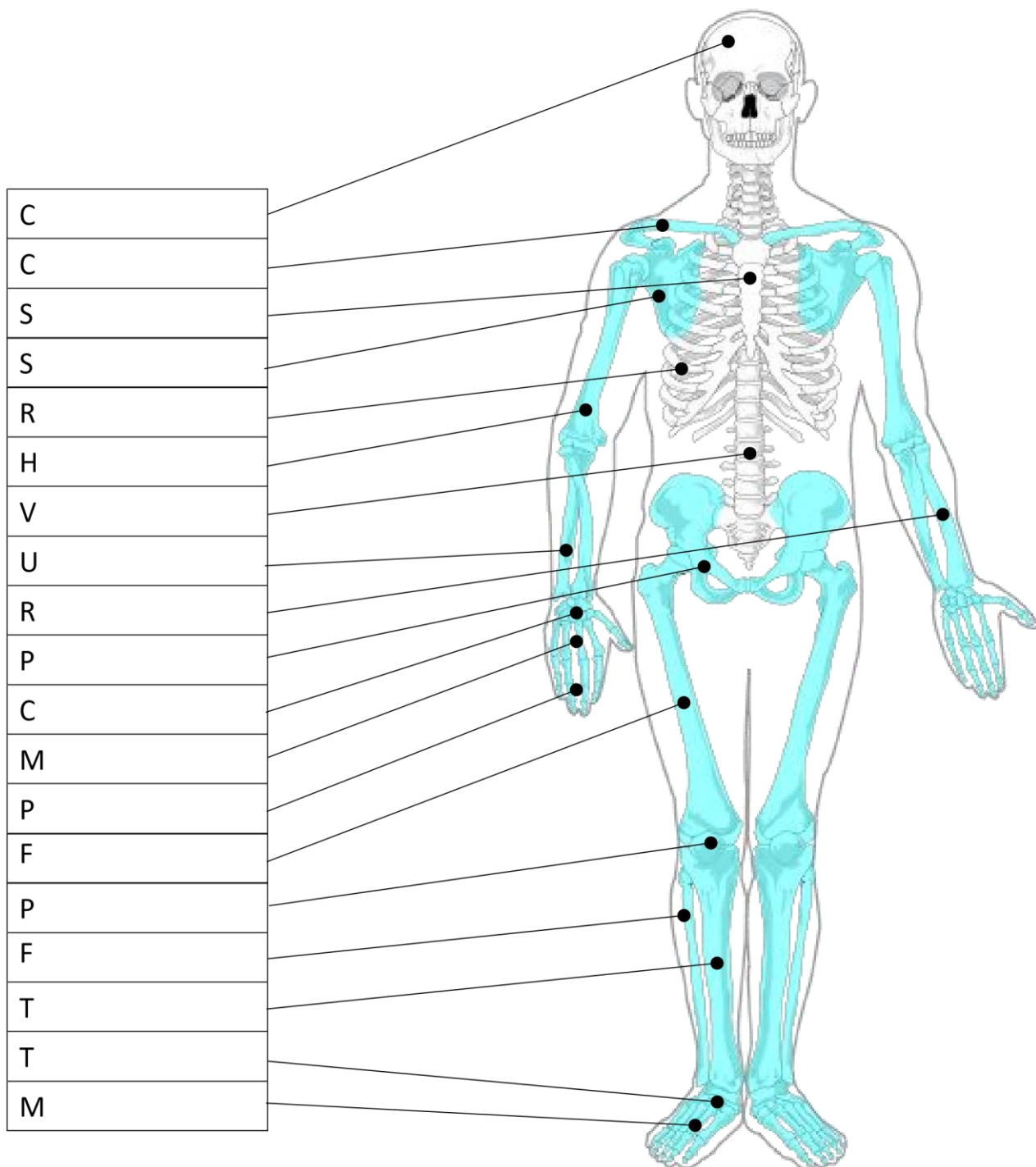


(n.b. where a 2 appears, you need to give two answers)

## Test S6: Major Bones, Joint Classifications & Types, & Responses to Exercise

NAME	SCORE
	/43

GRADE (Circle)		
Under 26 <b>FAIL</b>	26 to 34 <b>PASS</b>	Over 34 <b>EXCEL</b>



## Areas of the Skeleton

Identify the two divisions of the skeleton

A	The central part of the skeleton, mainly for protection
A	The limbs, mainly for movement

**Spine:** how many vertebrae in each section?

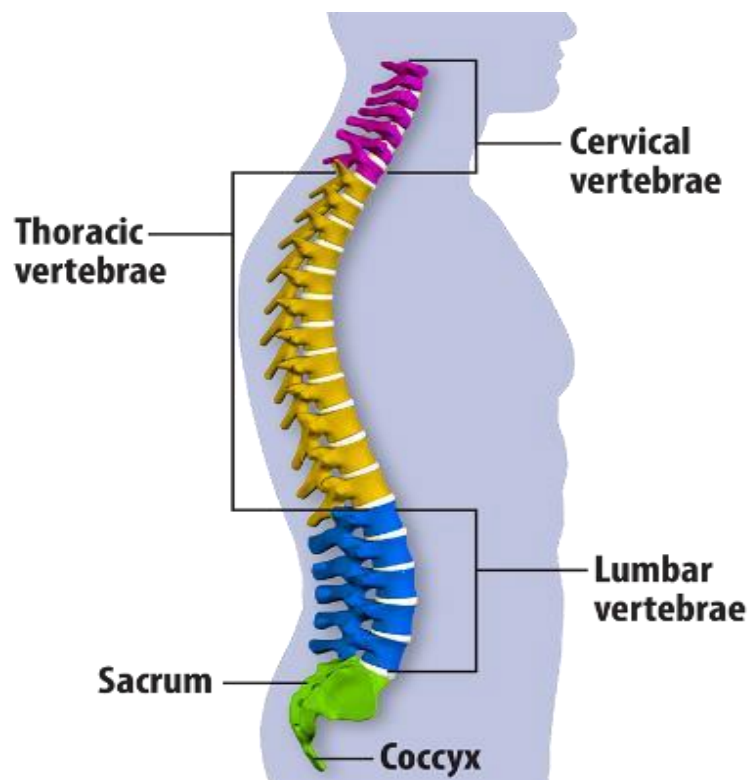
<input type="text"/>	Cervical	<input type="text"/>	Thoracic	<input type="text"/>	Lumbar
<input type="text"/>	Sacral	<input type="text"/>	Coccygeal vertebrae		

## Curvature &

**Alignment:**

**Postural**  
name the two  
deviations that  
definitions given

**Deviations:**  
postural  
match the



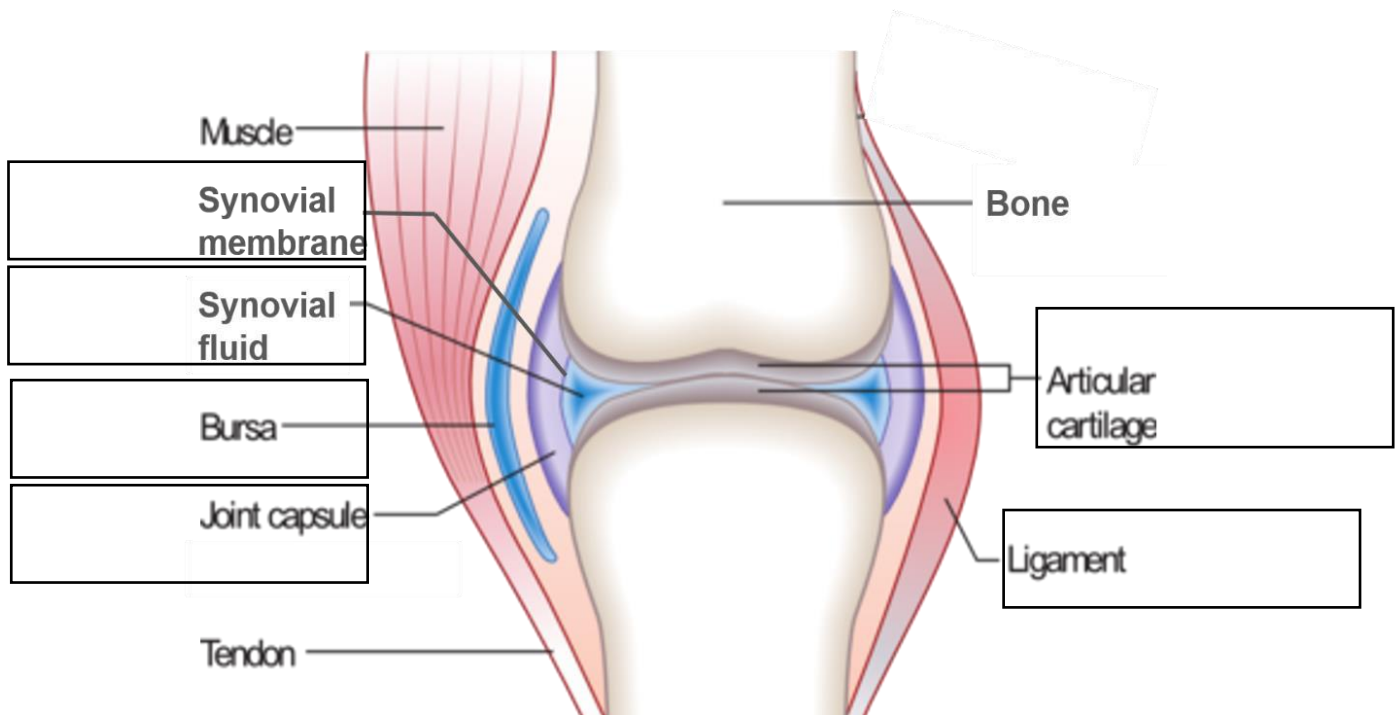
	...is excessive curvature of the <b>thoracic</b> spine
	...is excessive curvature of the <b>lumbar</b> spine

**Classifications of joints:** Name the two missing types of joint

<b>F</b>
<b>C</b>

## Synovial

**Synovial Joints:** Complete the diagram below by adding labels



**Joint types:** The diagram above shows a synovial joint. Name the 6 **types** of synovial joint

1	2	3
4	5	6

**Responses to exercise:** Give ONE response that the skeletal system makes to exercise

## Test S7: Types & Functions of Bones, Bones Forming Joints, Movements Available, Adaptations to Exercise

NAME	SCORE
	/63

GRADE (Circle)		
Under 37 FAIL	37 to 50 PASS	Over 50 EXCEL

**Types and functions of bones:** complete this table by naming the five types of bones and providing examples of each

Type of Bone	Function	Example
1. L		
2. S		
3. F		
4. S		
5. I		

**Bones forming various joints:** Name the bones which make up each joint and say what type of joint it is.

Joint	Type	Bones
Shoulder		S_____, C_____, H_____
Elbow		H_____, R_____, U_____
Wrist		C_____, R_____, U_____

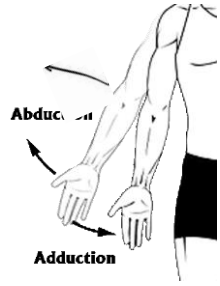



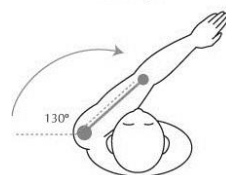
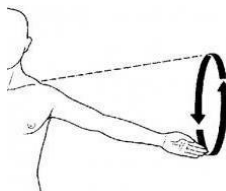
<b>Hip</b>		Ilium, Pubis, Ischium, & F_____
<b>Knee</b>		F_____, T_____, F_____
<b>Ankle</b>		T_____, F_____, T_____

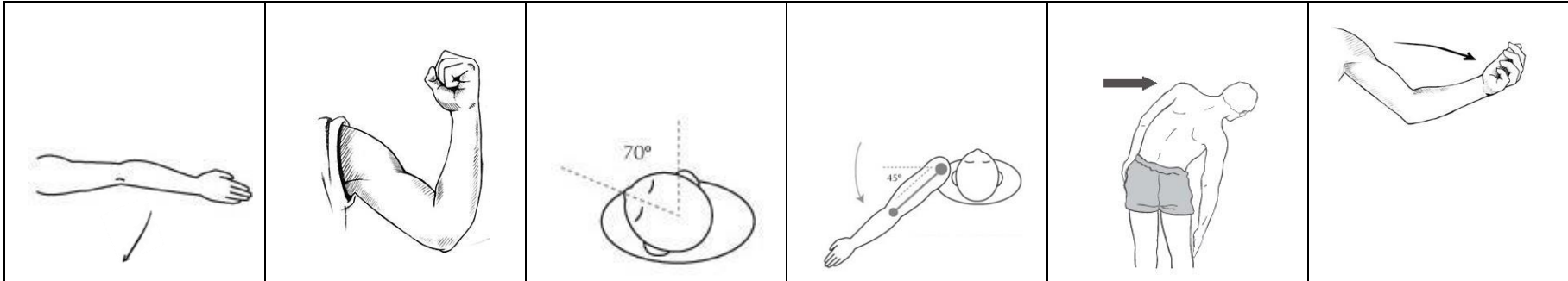
**Process of Bone Growth:** Complete the table to describe bone remodelling

Phase Name					
Diagram	<p>Diagram 1: Shows a cross-section of bone with a layer of lining cells. Osteoclasts are shown resorbing the bone surface.</p>	<p>Diagram 2: A resorption pit has formed, with osteoclasts continuing to resorb the bone. Lining cells are present at the edges of the pit.</p>	<p>Diagram 3: Pre-osteoblasts are entering the resorption pit. The osteoclasts are still present at the bottom of the pit.</p>	<p>Diagram 4: Osteoblasts are forming new bone within the resorption pit. The osteoclasts are still present at the bottom of the pit.</p>	<p>Diagram 5: The bone remodelling process is complete. The new bone has formed, and the osteoclasts and pre-osteoblasts have disappeared. The bone surface is now smooth and covered by lining cells.</p>

Description					

**Movements available at synovial joints:** Name the movement(s) shown in each diagram.

2		2			
					



(n.b. where a 2 appears, you need to give two answers)

**Adaptations to exercise:** Give TWO adaptations that the skeletal system makes to exercise


## Test M1: Types of Muscle

NAME	SCORE
	/19

GRADE (Circle)		
Under 12 <b>FAIL</b>	12 to 16 <b>PASS</b>	Over 16 <b>EXCEL</b>

### Types of Muscle

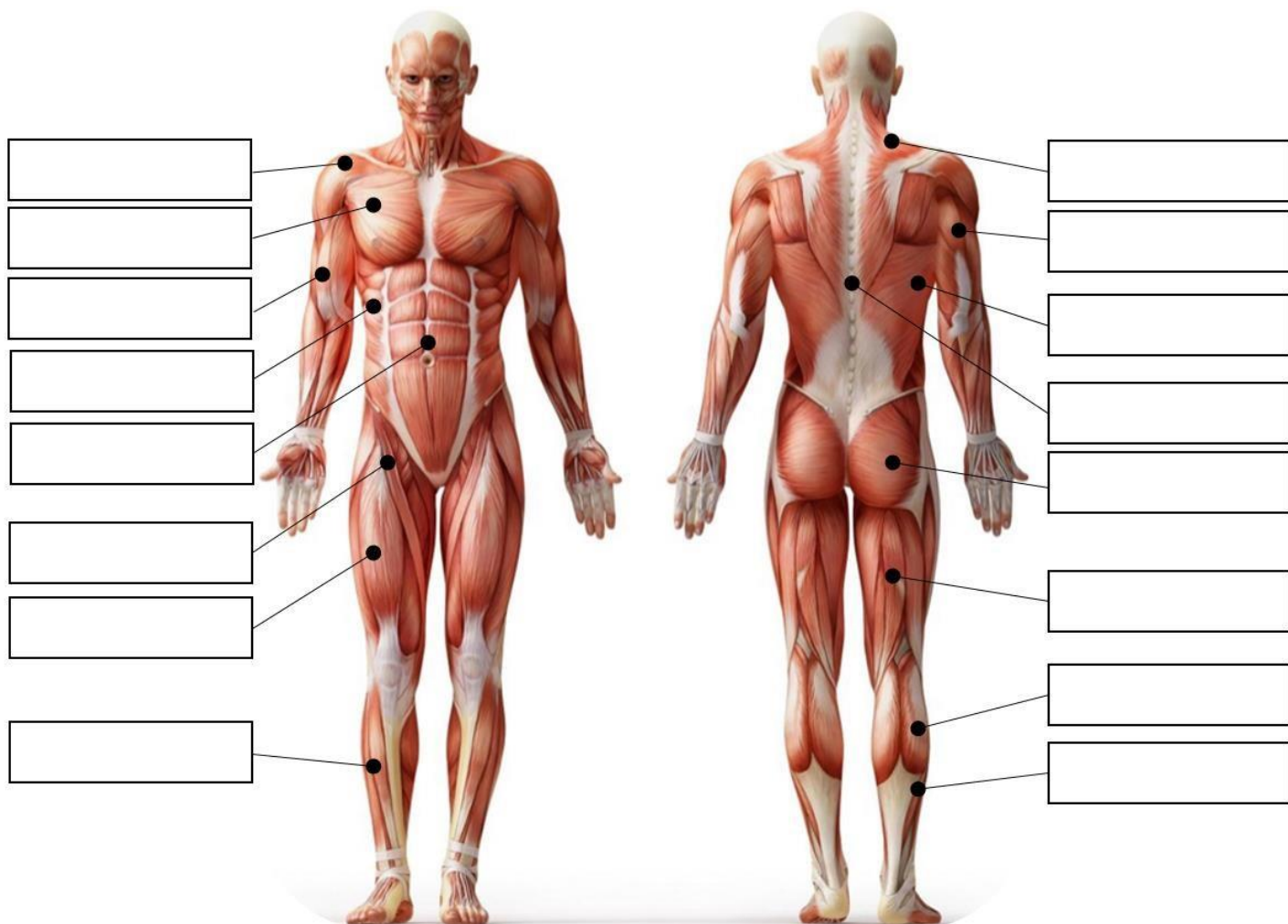
In the first column, identify the THREE types of muscle in the human body.

Muscle	Characteristics	Example
	Non-fatiguing, involuntary	Heart (only)
	Fatiguing, voluntary	Biceps, Triceps, Soleus, etc.
	Involuntary, slow contraction	Internal organs, blood vessels

### Major Muscles:

Label the diagram below with the names of the muscles.

:



## Test M2 Types of Muscle

NAME	SCORE
	/26

GRADE (Circle)		
Under 16 <b>FAIL</b>	16 to 21 <b>PASS</b>	Over 21 <b>EXCEL</b>

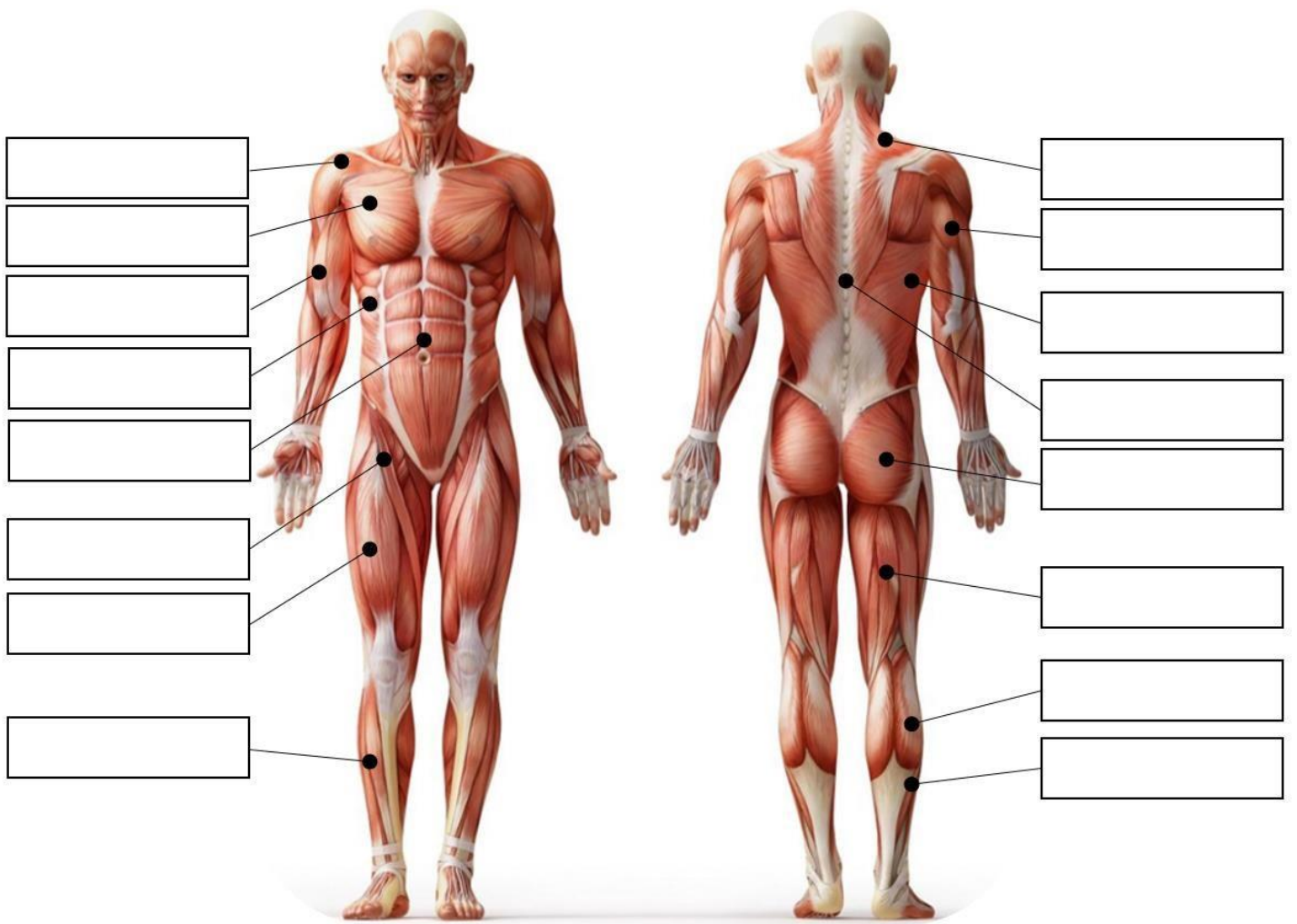
## Types of Muscle

Identify the THREE types of muscle in the human body. Add an example.

Muscle Type	Characteristics	Example
	Non-fatiguing, involuntary	
	Fatiguing, voluntary	
	Involuntary, slow contraction	

## Major Muscles:

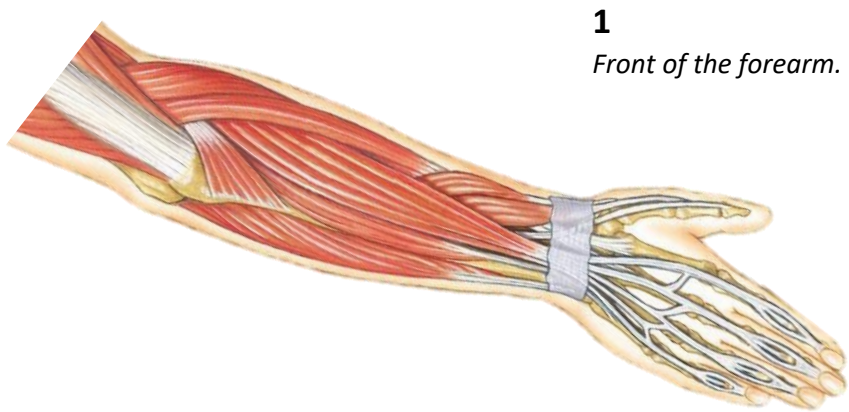
Label the diagram below with the names of the muscles.



:

## Muscles of the Wrist

Look at the diagram below. Identify which group of muscles accurately completes the



No.	Muscle Group in the wrist
1	F _____ / P _____ Group
2	E _____ / S _____ Group

table

2

*Back of the forearm*

## Test M3 Types of Muscle & Antagonistic Pairs

NAME	SCORE
	/18

GRADE (Circle)		
Under 11 <b>FAIL</b>	11 to 14 <b>PASS</b>	Over 14 <b>EXCEL</b>

### Types of Muscle

Identify the THREE types of muscle in the human body. Add an example.

Muscle Type	Characteristics	Example
	Non-fatiguing, involuntary	
	Fatiguing, voluntary	
	Involuntary, slow contraction	

### Antagonistic Pairs

Identify the muscle role that matches the description

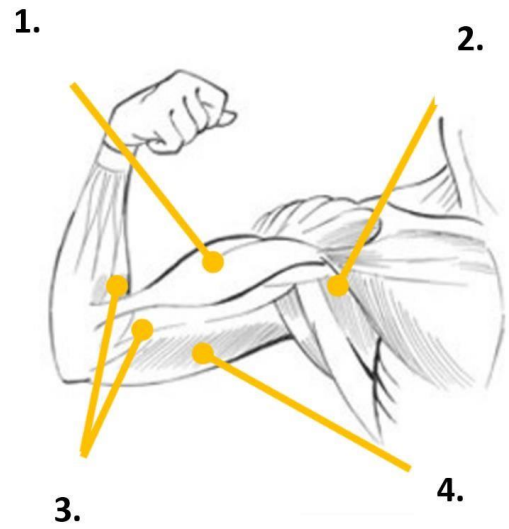
<b>A</b>	muscle that contracts to produce movement (also called prime mover)
<b>A</b>	muscle that relaxes (if contracted would make opposite joint movement)
<b>S</b>	muscle that assists the agonist (in force production)
<b>F</b>	muscle that assists the agonist (by stabilising the muscle's origin)

:

### Application: Bicep Flexion

Identify the muscles that perform the above four roles in this example.

No.	Role	Muscle name(s)
1	A	
2	F	
3	S	
4	A	



## Test M4 Major Muscles & Types of Contraction

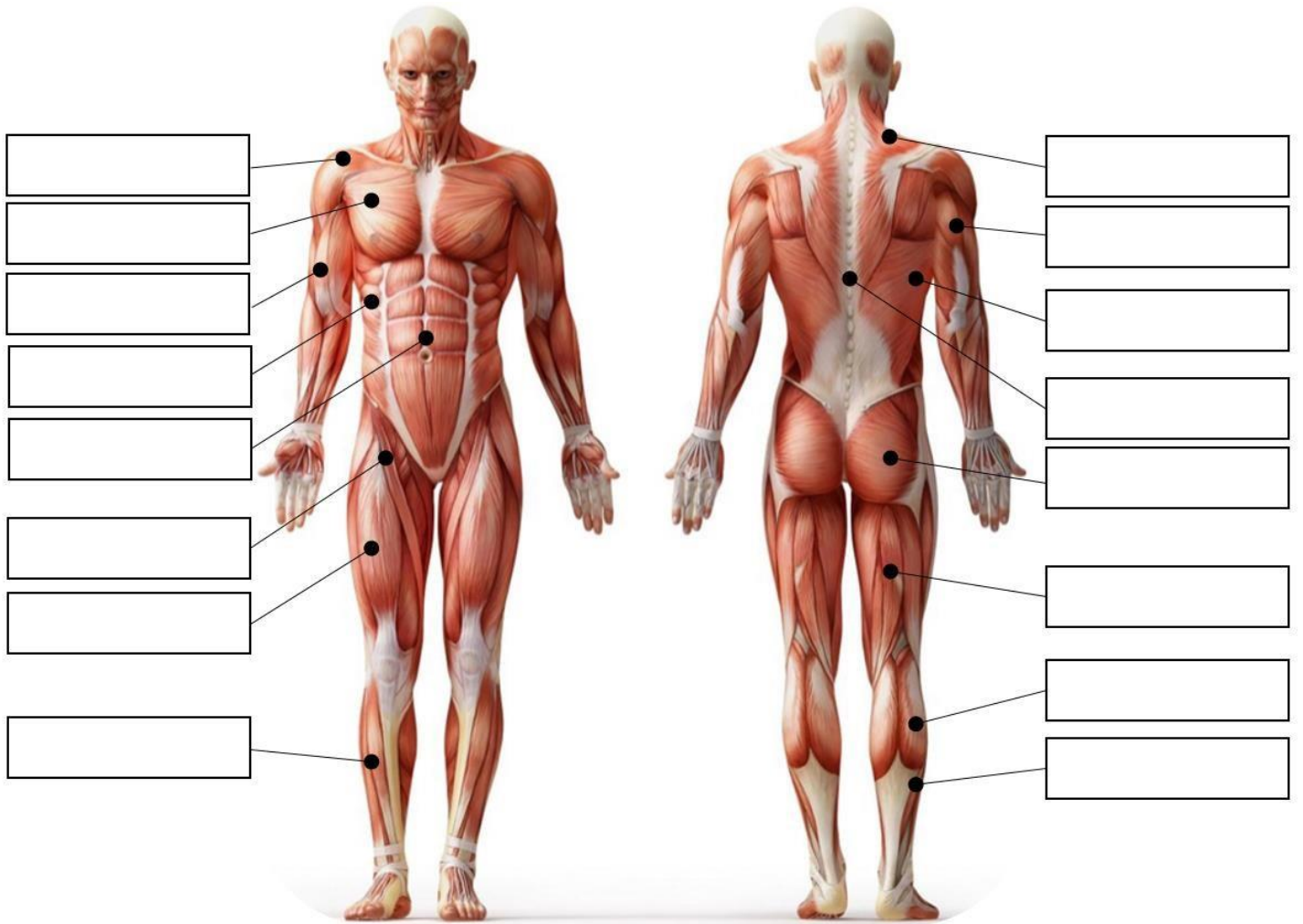
NAME	SCORE
	/23

GRADE (Circle)		
Under 14 <b>FAIL</b>	14 to 18 <b>PASS</b>	Over 18 <b>EXCEL</b>

### Major Muscles:

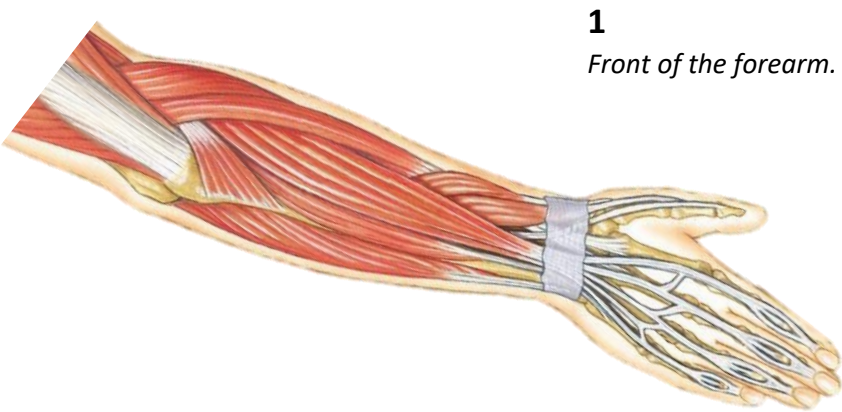
Label the diagram below with the names of the muscles.

:



Muscles of the Wrist

Look at the diagram below. Identify which group of muscles accurately completes the



No.	Muscle Group in the wrist
1	F _____ / P _____ Group
2	E _____ / S _____ Group

table

2  
Back of the forearm

Types of Muscle Contraction

Complete the table with the THREE types of muscle contraction

Contraction	As muscle contracts...	Used for...
-------------	------------------------	-------------

:

<b>I</b>	...no change in muscle length	Static holds (e.g. iron cross)
<b>C</b>	...muscle shortens	Movement
<b>E</b>	...muscle lengthens	Slowing and braking movements

### Test M5 Antagonistic Pairs & Fibre Types

NAME	SCORE	GRADE (Circle)		
		Under 17 <b>FAIL</b>	17 to 23 <b>PASS</b>	Over 23 <b>EXCEL</b>
	/29			

### Antagonistic Pairs

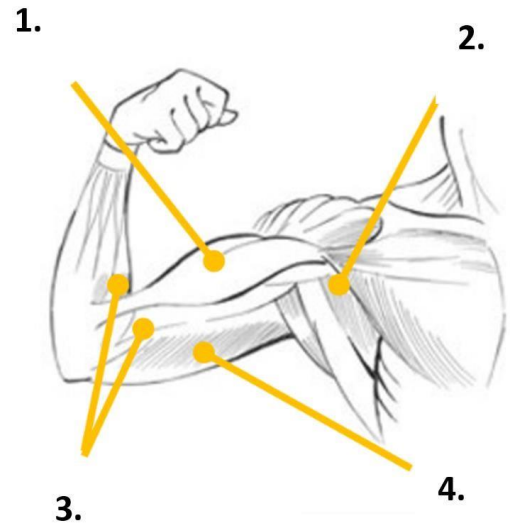
Identify the muscle role that matches the description

	muscle that contracts to produce movement (also called prime mover)
	muscle that relaxes (if contracted would make opposite joint movement)
	muscle that assists the agonist (in force production)
	muscle that assists the agonist (by stabilising the muscle's origin)

### Application 1: Bicep Flexion

Identify the muscles that perform the above four roles in this example.

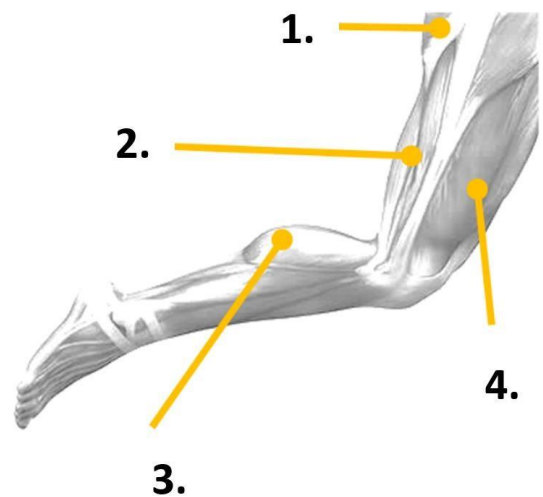
No.	Role	Muscle name(s)
1		
2		
3		
4		



### Application 2: Hamstring Flexion

Identify the muscles that perform the above four roles in this example.

No.	Role	Muscle name(s)
1		
2		
3		
4		



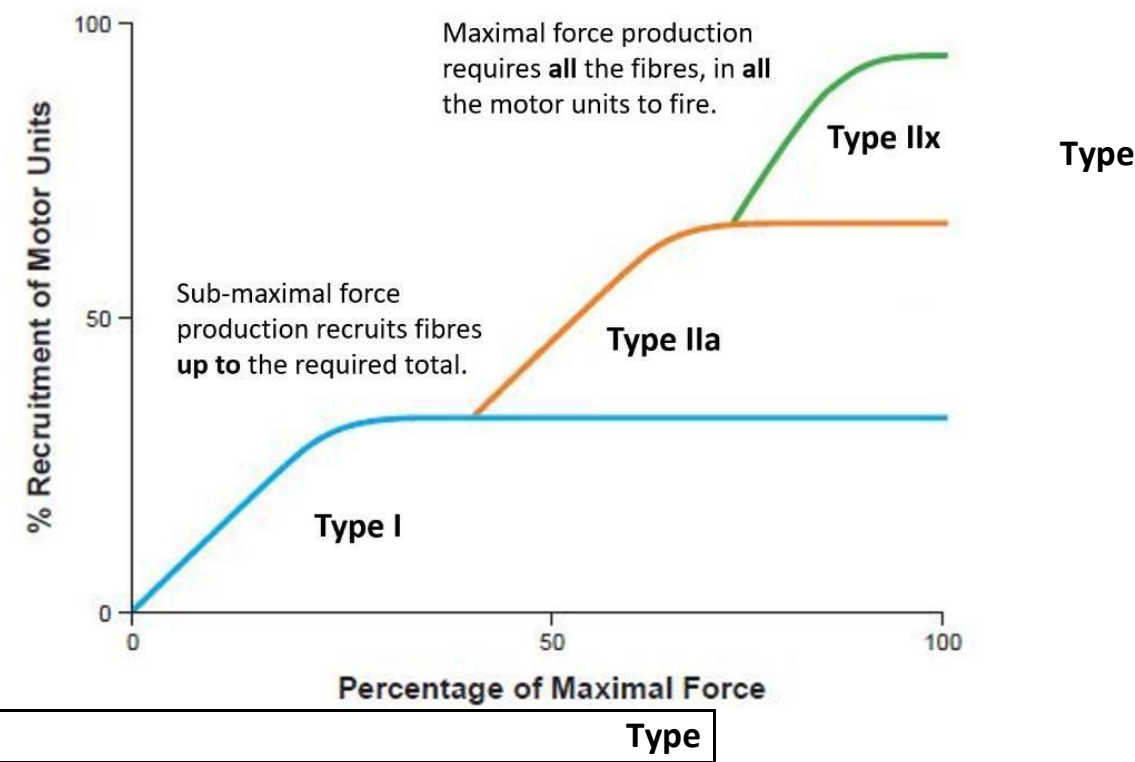
**Fibre Types:** Fill the gaps in the table

Fibre Type	Type I	Type IIa	Type IIx
<b>Twitch Speed</b>	Slow	Fast	Fast
<b>Force</b>	Low		Very High
<b>Fatigue</b>		Medium	Fast
<b>Recovery</b>	Slow	Medium	Fast

:

<b>ATP Source</b>	Oxidative		Glycolytic
<b>Blood Supply</b>	High	High	
<b>Myoglobin</b>	High	High	Low
<b>Colour</b>	Red	Red	
<b>Mitochondria</b>		High	Low
<b>Recruitment</b>	First	Second	Third
<b>Diameter</b>	Small	Medium	Large
<b>Suitable for...</b>	Endurance	Games	Speed

**Nervous Control:** Identify the correct order of fibre type recruitment



Type

**Test M6: Types of Muscle, Types of Contraction & Responses to Exercise**

NAME		SCORE			GRADE (Circle)		
					Under 13	13 to 17	Over 17
					FAIL	PASS	EXCEL

**Types of Muscle**

Identify the THREE types of muscle in the human body. Add an example.

Muscle Type	Characteristics	Example
	Non-fatiguing, involuntary	
	Fatiguing, voluntary	
	Involuntary, slow contraction	

## Types of Muscle Contraction

Complete the table with the THREE types of muscle contraction

Contraction	As muscle contracts...	Used for...
	...no change in muscle length	
	...muscle shortens	
	...muscle lengthens	

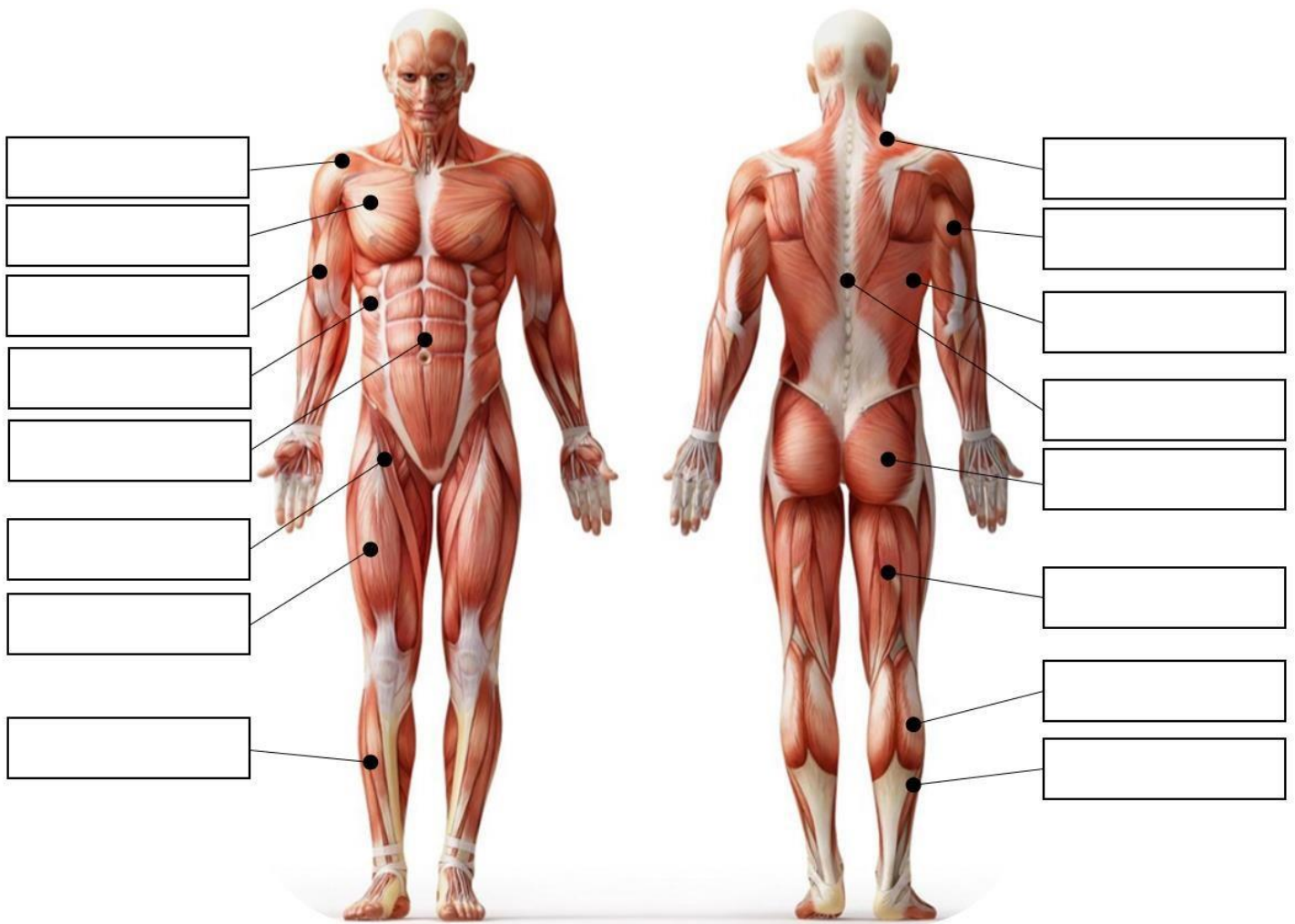
**Responses to exercise:** Complete the FIVE muscular system responses to exercise

1	Increased B_____ S_____
2	Inceased M_____ T_____
3	Inceased M_____ P_____
4	L_____ (high intensity exercise)
5	M_____ - T_____ (resistance exercise)

## Test M7: Major Muscles, Types of Contraction, Fibre Types, & Nervous Control

NAME	SCORE
	/37

GRADE (Circle)		
Under 23 <b>FAIL</b>	23 to 30 <b>PASS</b>	Over 30 <b>EXCEL</b>



## Types of Muscle Contraction

Complete the table with the THREE types of muscle contraction

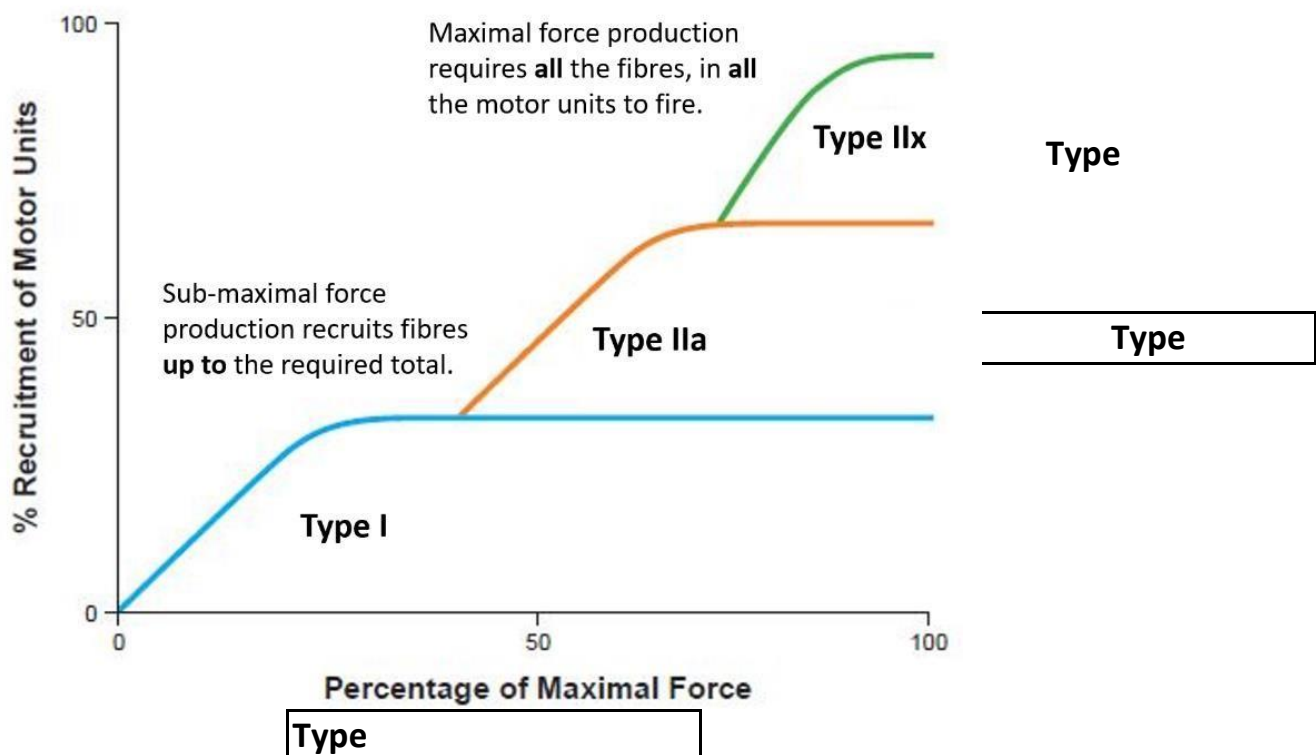
Contraction	As muscle contracts...	Used for...
	...no change in muscle length	
	...muscle shortens	
	...muscle lengthens	

**Fibre Types:** Fill the gaps in the table

Fibre Type	Type I	Type IIa	Type IIx
Twitch Speed		Fast	Fast

<b>Force</b>	Low		Very High
<b>Fatigue</b>		Medium	Fast
<b>Recovery</b>	Slow	Medium	
<b>ATP Source</b>	Oxidative		Glycolytic
<b>Blood Supply</b>	High	High	
<b>Myoglobin</b>	High	High	Low
<b>Colour</b>	Red	Red	
<b>Mitochondria</b>		High	Low
<b>Recruitment</b>	First		Third
<b>Diameter</b>	Small	Medium	Large
<b>Suitable for...</b>			

**Nervous Control:** Identify the correct order of fibre type recruitment



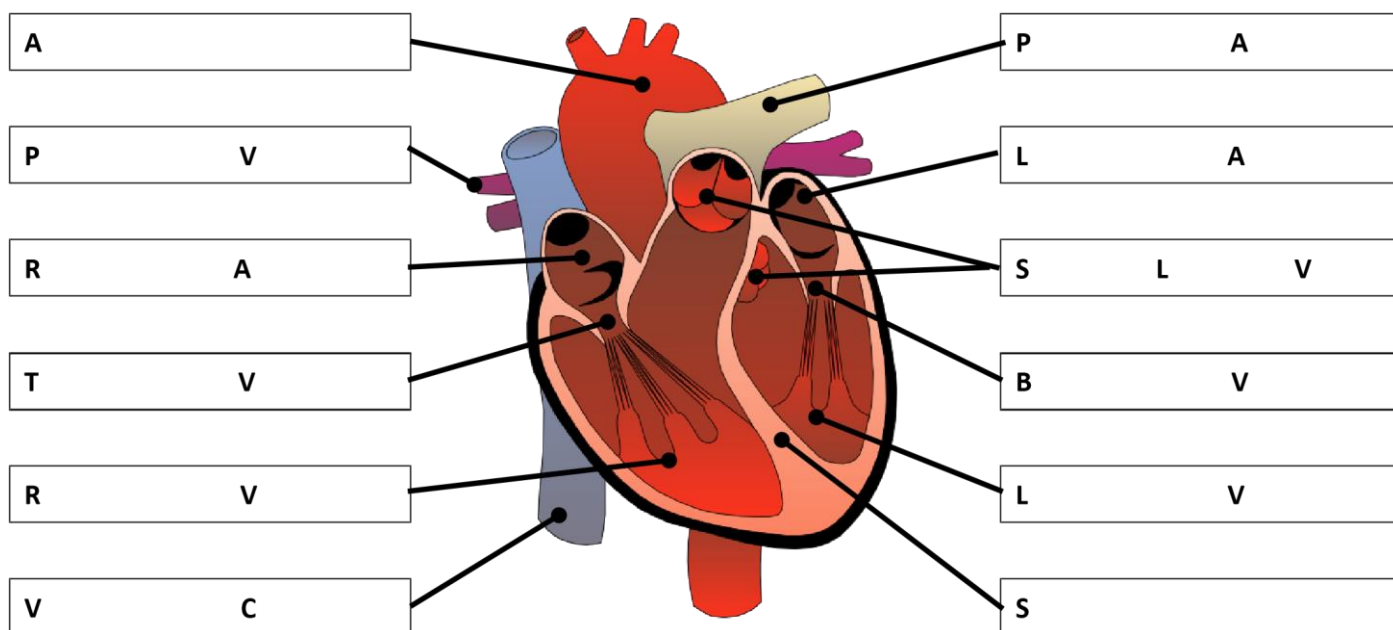
## Test C1: Structure of the System

NAME	SCORE
	/18

GRADE (Circle)		
Under 11 <b>FAIL</b>	11 to 14 <b>PASS</b>	Over 14 <b>EXCEL</b>

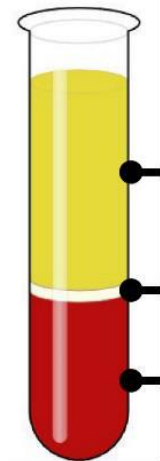
### Structure of the Heart

Label the diagram



### Composition of Blood

Name the component of blood, and say what percentage of the total volume it makes up.



Component	Percentage
P	%
W	%
R	%

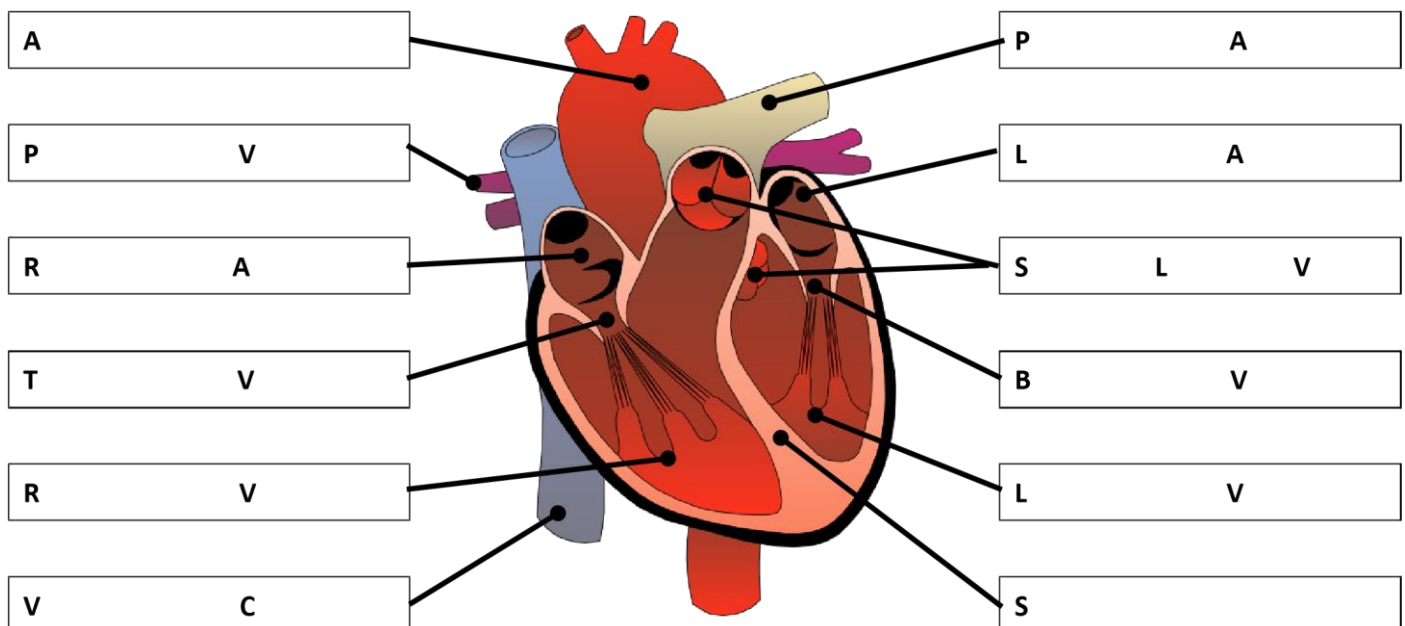
## Test C2: Structure of the System

NAME	SCORE
	/23

GRADE (Circle)		
Under 14 FAIL	14 to 18 PASS	Over 18 EXCEL

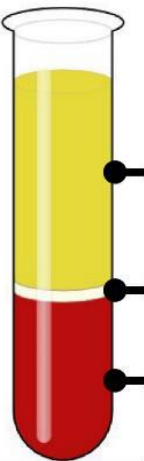
## Structure of the Heart

Label the diagram



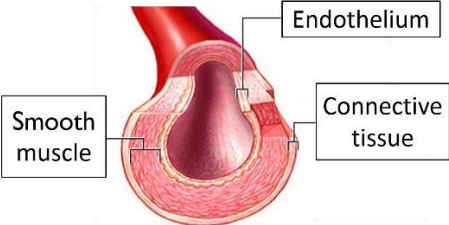
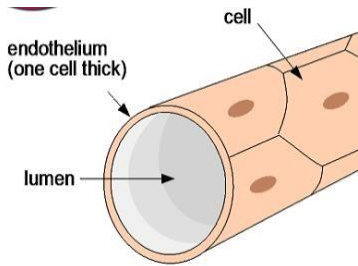
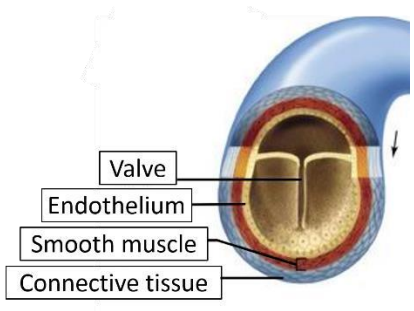
## Composition of Blood

Name the component of blood, and say what percentage of the total volume it makes up.



Component	Percentage
P	%
W	%
R	%

## Blood Vessels: Supply the missing words

ARTERY (& arteriole)	CAPILLARY	VEIN (& venule)
<ol style="list-style-type: none"> <li>1. Away from the heart</li> <li>2. Oxygenated blood*</li> <li>3. T_____ walls</li> <li>4. High pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. In the tissue</li> <li>2. G_____ exchange</li> <li>3. Very thin walls</li> <li>4. High P_____</li> </ol>	<ol style="list-style-type: none"> <li>1. Back to the heart</li> <li>2. D_____ blood*</li> <li>3. Thin walls</li> <li>4. Lower pressure</li> <li>5. V_____</li> </ol>
		

\*except for pulmonary artery/pulmonary vein where this is reversed

## Test C3: Structure of the System and Functions of the System

NAME	SCORE	GRADE (Circle)		
	/18	Under 11 <b>FAIL</b>	11 to 14 <b>PASS</b>	Over 14 <b>EXCEL</b>

### Blood Vessels: Supply the missing words

ARTERY (& arteriole)	CAPILLARY	VEIN (& venule)
<ol style="list-style-type: none"> <li>1. A _____ from the heart</li> <li>2. O _____ blood*</li> <li>3. T _____ walls</li> <li>4. High pressure</li> </ol>	<ol style="list-style-type: none"> <li>1. In the T _____</li> <li>2. G _____ exchange</li> <li>3. Very thin walls</li> <li>4. High P _____</li> </ol>	<ol style="list-style-type: none"> <li>1. Back to the H _____</li> <li>2. D _____ blood*</li> <li>3. Thin walls</li> <li>4. Lower P _____</li> <li>5. V _____</li> </ol>

\*except for pulmonary artery/pulmonary vein where this is reversed

### Functions of the Cardiovascular System: Identify the FIVE functions of the system

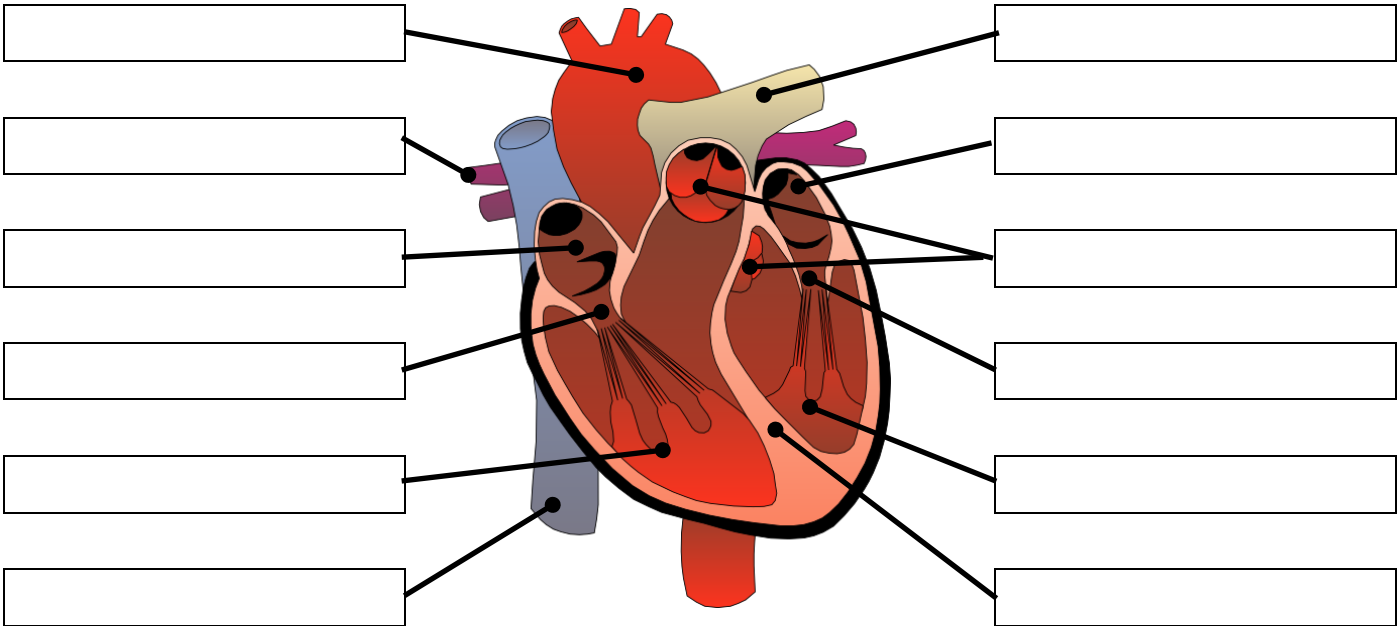
1. Delivery of O _____ and N _____
2. R _____ of W _____ P _____
3. T _____
4. Fight I _____
5. Clot B _____

Test C4: Structure of the System and the Cardiac Cycle

NAME		SCORE			GRADE (Circle)		
					Under 12	12 to 16	Over 16
					FAIL	PASS	EXCEL

Structure of the Heart

Label the diagram



Cardiac Pathway

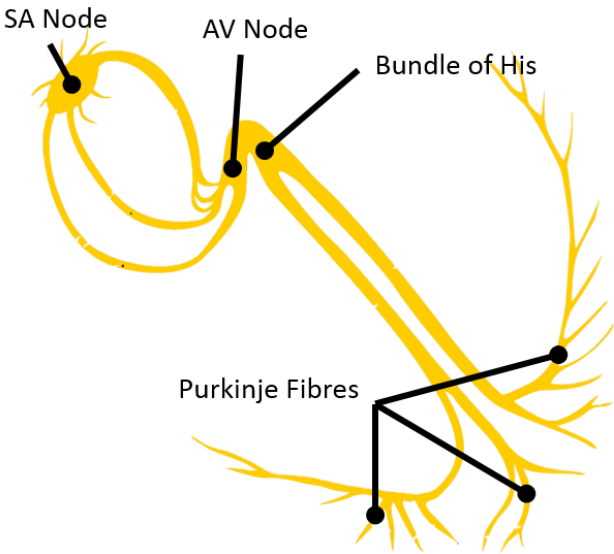
Cycle: Electrical Impulse

1.	Node	2.	Node
----	------	----	------

Complete the labels

3. B of H

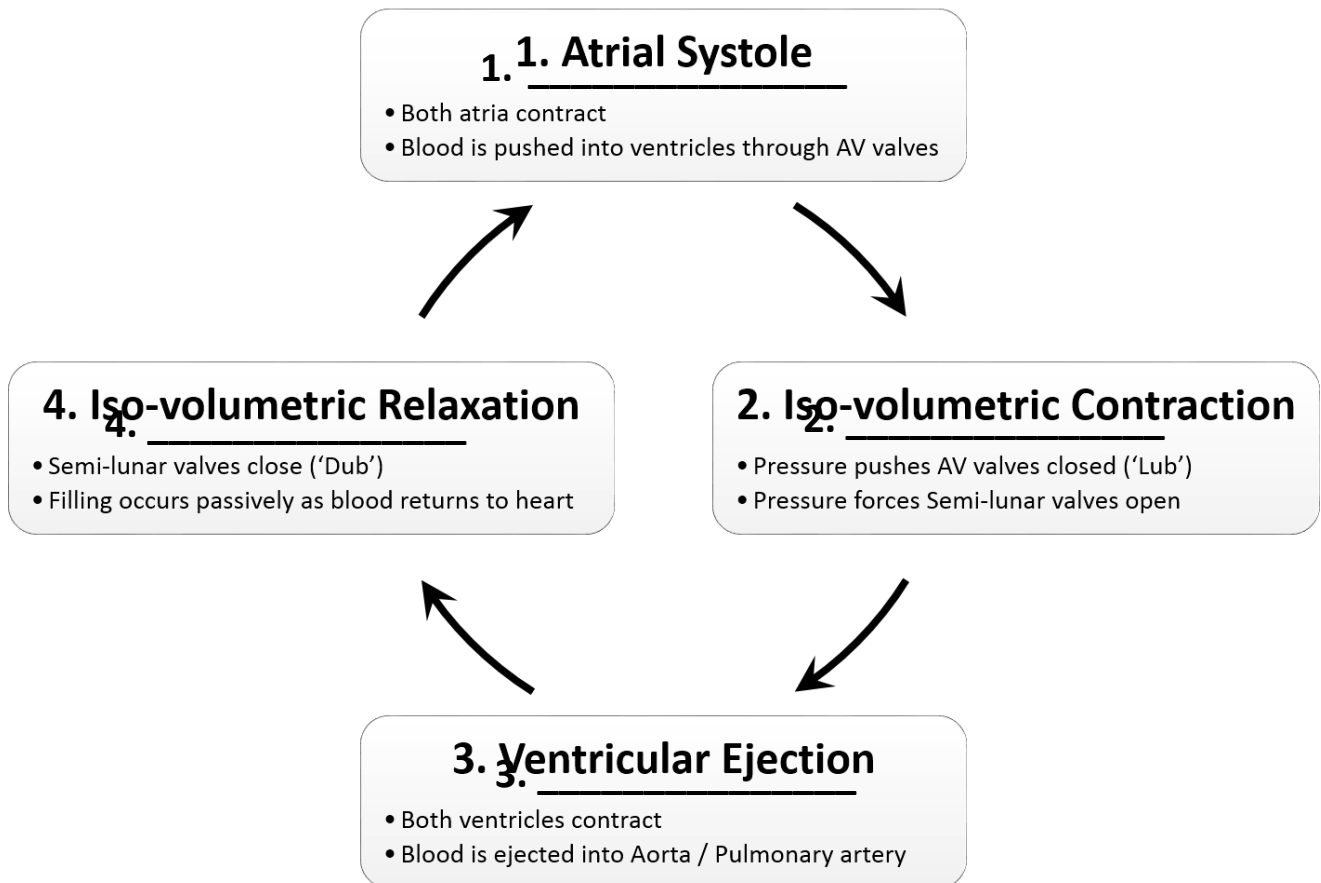
4. P F



## Cardiac Cycle

On the diagram below supply the correct headings for each of the stages of the Cardiac Cycle. Choose from:

Iso-volumetric Contraction	Iso-volumetric Relaxation
Atrial Systole	Ventricular Ejection



## Test C5: Structure of the System, Functions of the System, & the Cardiac Cycle

NAME	SCORE	GRADE (Circle)
------	-------	----------------

	/35
--	-----

Under 21 <b>FAIL</b>	21 to 28 <b>PASS</b>	Over 28 <b>EXCEL</b>
-------------------------	-------------------------	-------------------------

## Blood Vessels: Supply the missing words

ARTERY (& arteriole)	CAPILLARY	VEIN (& venule)
5. A _____ from the heart 6. O _____ blood* 7. T _____ walls 8. High pressure	5. In the T _____ 6. G _____ exchange 7. Very thin walls 8. High P _____	6. Back to the H _____ 7. D _____ blood* 8. Thin walls 9. Lower P _____ 10. V _____

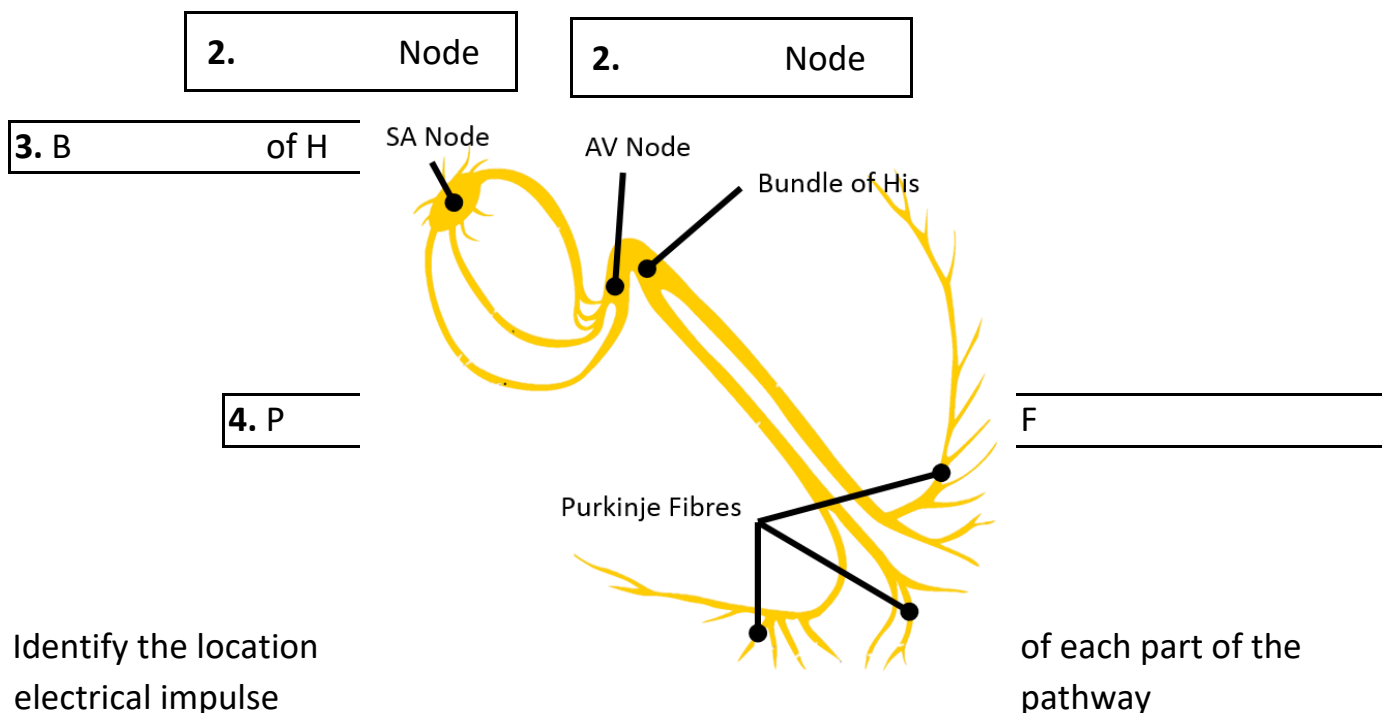
\*except for pulmonary artery/pulmonary vein where this is reversed

## Functions of the Cardiovascular System: Identify the FIVE functions of the system

1. Delivery of O _____ and N _____
2. R _____ of W _____ P _____
3. T _____
4. Fight I _____
5. Clot B _____

## Cardiac Cycle: Electrical Impulse Pathway

Complete the labels



Identify the location  
electrical impulse

of each part of the  
pathway

Order	1.	2.	3.	4.
Where	Right A _____ near vena cava	S _____ near atria	S _____	V _____ walls
Function	Triggers atrial systole	Delays, then conducts through to ventricles	Conducts to base of ventricles	Conducts up ventricle walls

## Influence of the Autonomic Nervous System on the Cardiac Cycle

Complete the table

SYMPATHETIC NERVOUS SYSTEM	PARASYMPATHETIC NERVOUS SYSTEM
<b>EXCITES</b> 1. Secretes A _____ & noradrenaline 2. Increases H _____ R _____ 3. Increases B _____ P _____ 4. Increases contractile force of C _____ muscle 5. Stimulates vasoconstriction/V _____.	<b>CALMS</b> 1. Decreases H _____ R _____ 2. Decreases B _____ P _____ 3. Decreases C _____ O _____ (Q)

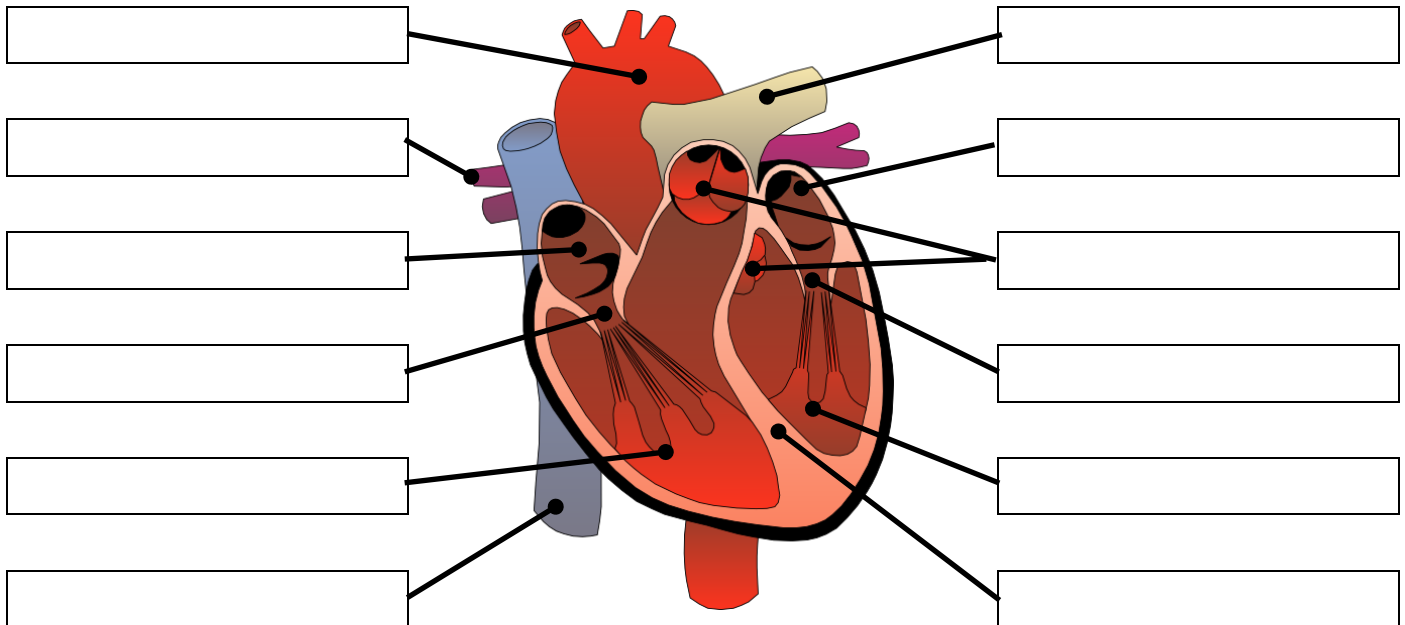
## Test C6: Structure of the System, Cardiac Cycle, & Responses to Exercise

NAME	SCORE
	/33

GRADE (Circle)		
Under 20 <b>FAIL</b>	20 to 26 <b>PASS</b>	Over 26 <b>EXCEL</b>

## Structure of the Heart

Label the diagram



Identify the location of each part of the electrical impulse pathway

Order	1.	2.	3.	4.
Where				
Function	Triggers atrial systole	Delays, then conducts through to ventricles	Conducts to base of ventricles	Conducts up ventricle walls

## Influence of the Autonomic Nervous System on the Cardiac Cycle

Complete the table

SYMPATHETIC NERVOUS SYSTEM	PARASYMPATHETIC NERVOUS SYSTEM
<b>EXCITES</b> 1. Secretes A _____ & noradrenaline 2. Increases H _____ R _____ 3. Increases B _____ P _____ 4. Increases contractile force of C _____ muscle 5. Stimulates vasoconstriction/V _____.	<b>CALMS</b> 1. Decreases H _____ R _____ 2. Decreases B _____ P _____ 3. Decreases C _____ O _____ (Q)

## Responses to Exercise

Complete the table

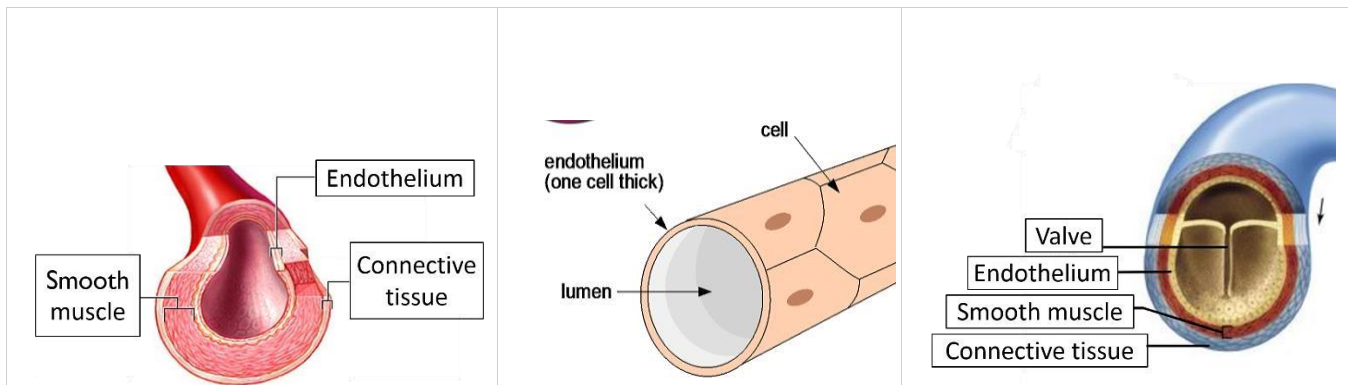
1. Anticipatory I _____ in H _____ R _____ prior to exercise
2. Increased H _____ R _____
3. Increased C _____ O _____
4. Increased B _____ P _____
5. Redirection of B _____ F _____

## Test C7: Structure of the System, Cardiac Cycle, & Adaptations to Exercise

NAME	SCORE	GRADE (Circle)		
	/27	Under 16 <b>FAIL</b>	16 to 22 <b>PASS</b>	Over 22 <b>EXCEL</b>

**Blood Vessels:** Supply the missing words

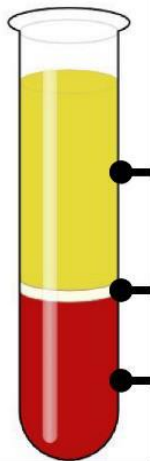
ARTERY (& arteriole)	CAPILLARY	VEIN (& venule)
1. A _____ from the heart	1. In the T _____	1. Back to the H _____
2. O _____ blood*	2. G _____ exchange	2. D _____ blood*
3. T _____ walls	3. Very thin walls	3. Thin walls
4. High pressure	4. High P _____	4. Lower P _____
		5. V _____



\*except for pulmonary artery/pulmonary vein where this is reversed

## Composition of Blood

Name the component of blood, and say what percentage of the total volume it makes up.

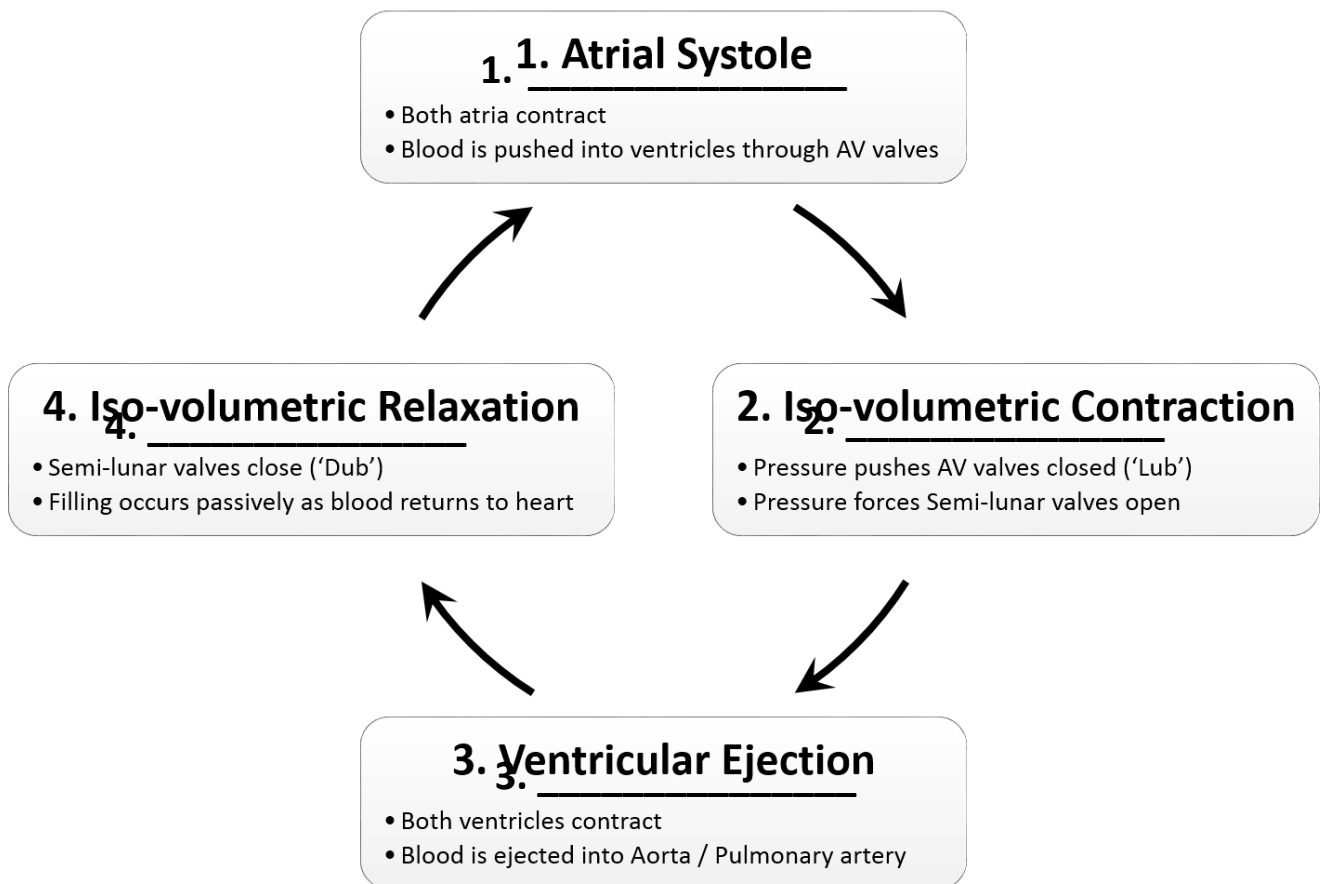


Component	Percentage
	%
	%
	%

## Cardiac Cycle

On the diagram below supply the correct headings for each of the stages of the Cardiac Cycle. Choose from:

Iso-volumetric Contraction	Iso-volumetric Relaxation
Atrial Systole	Ventricular Ejection



## Adaptations to Exercise

Complete the table

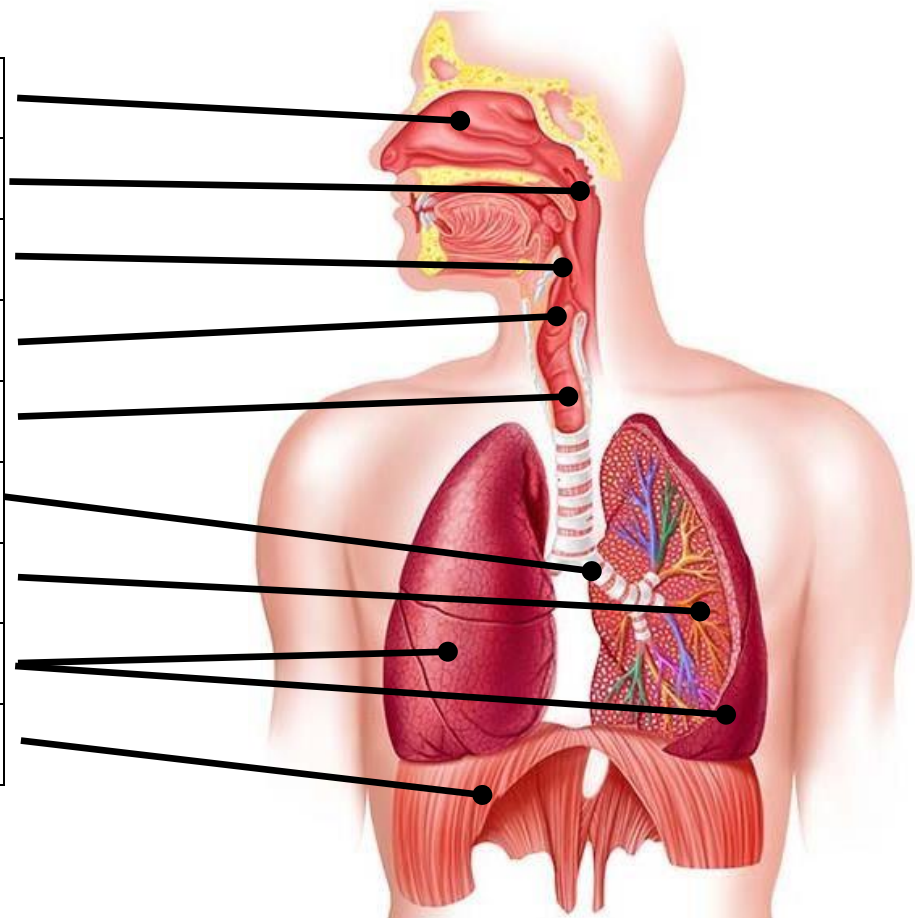
1. C_____ H_____
2. Increased in R_____ and E_____ S_____ V_____
3. Decrease in R_____ H_____ R_____
4. C_____ of S_____ M_____ and A_____
5. Reduction in R_____ B_____ P_____
6. Decreased H_____ R_____ R_____ Time
7. Increase in B_____ V_____

### Test R1: Structure of the System

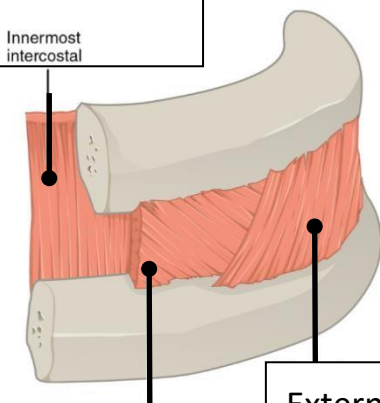
NAME	SCORE
	/15

GRADE (Circle)		
Under 10 <b>FAIL</b>	10 to 12 <b>PASS</b>	Over 12 <b>EXCEL</b>

N
P
E
L
T
B
B
L
D



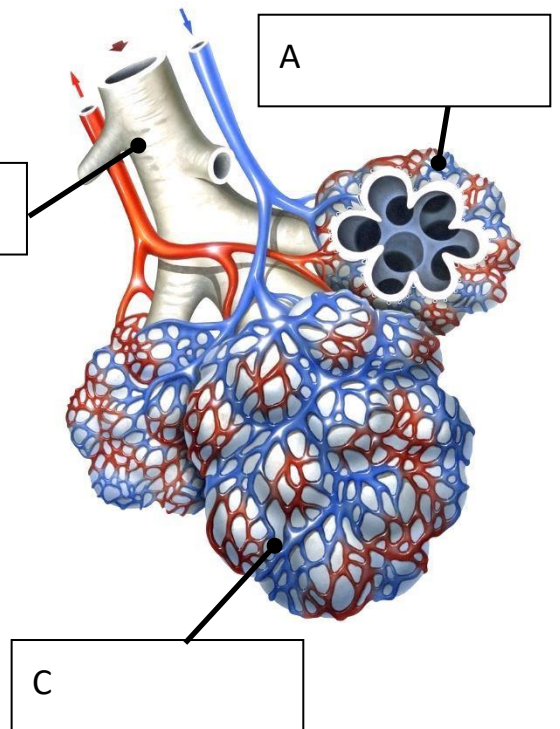
Innermost  
I



Internal  
I

External  
I

B



## Test R2: Mechanisms of Breathing

NAME	SCORE
	/12

GRADE (Circle)		
Under 7 <b>FAIL</b>	7 to 10 <b>PASS</b>	Over 10 <b>EXCEL</b>

**Inspiration and Expiration:** complete this table by saying what happens to each of these when breathing in / out

	Inspiration	Expiration
Diaphragm		
External Intercostals		
Chest cavity		
Thoracic Pressure		
Air flows		

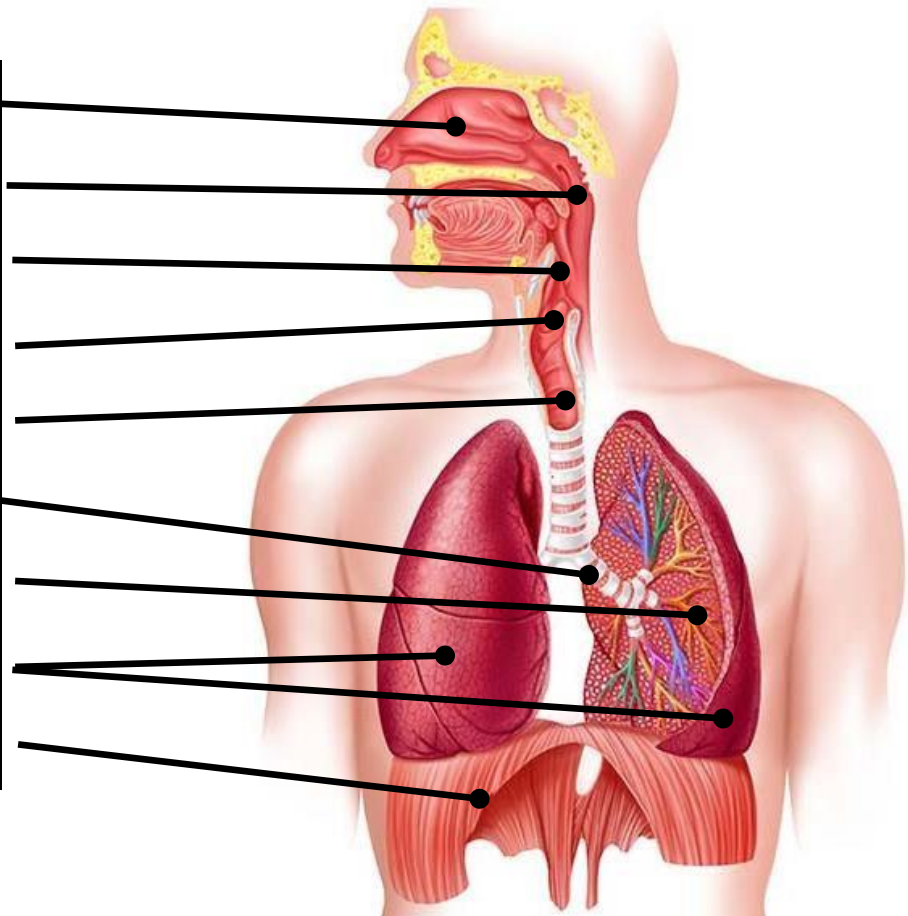
\*During exercise exhalation becomes an **a**\_\_\_\_\_ process.

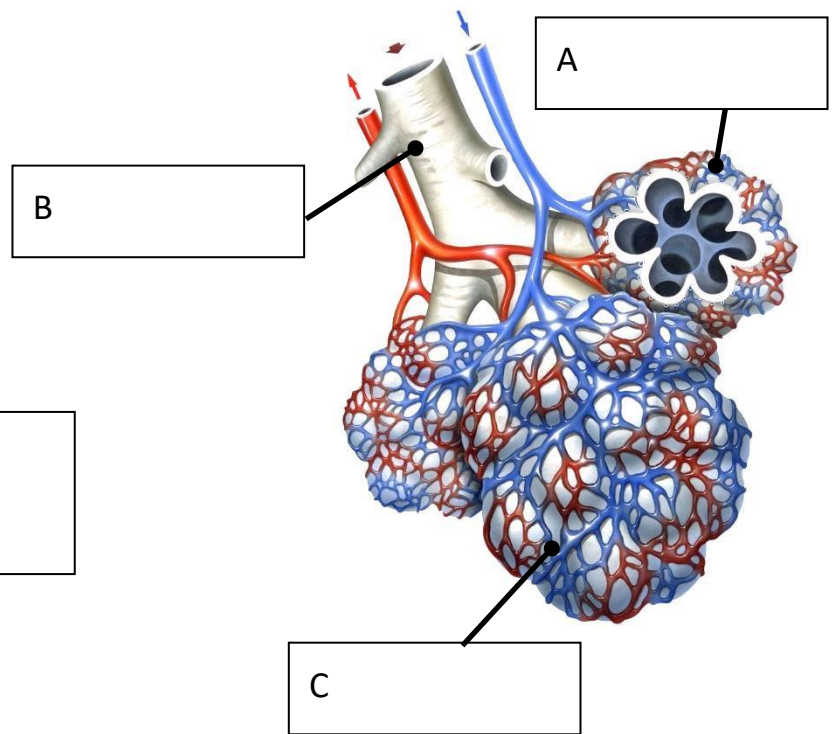
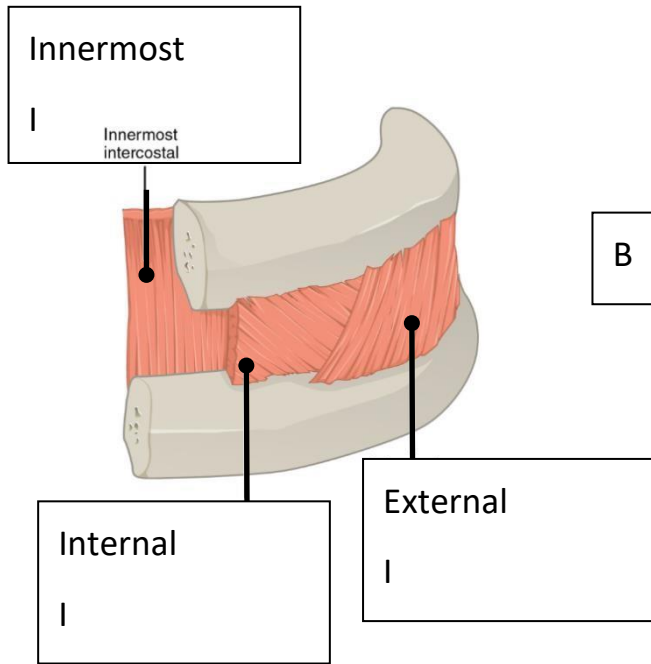
The internal intercostal muscles contract to pull the rib cage **d**\_\_\_\_\_.

Test R3: Structure of the System & Lung Volumes

NAME	SCORE	GRADE (Circle)		
		Under 12 FAIL	12 to 16 PASS	Over 16 EXCEL
	/20			

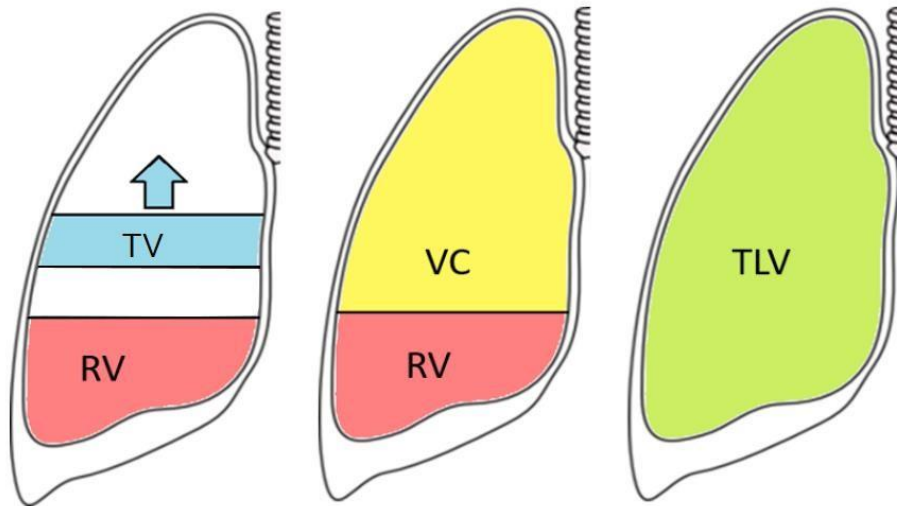
N
P
E
L
T
B
B
L
D





**Lung Volumes:** complete this table by giving the correct name for each of these lung volumes . The diagram may help.

Lung Volume	Definition
	Total air inhaled/exhaled in one breath under resting conditions*
	Maximum amount of air that can be expired after a maximum inhalation
	Amount of air remaining in the lungs after a forced exhalation
	Maximum amount of air in the lungs after a maximum inspiration
	Total amount of air inhaled / exhaled per minute



#### Test R4: Mechanisms of Breathing & Gaseous Exchange

NAME	SCORE
	/22

GRADE (Circle)		
Under 13 <b>FAIL</b>	13 to 17 <b>PASS</b>	Over 17 <b>EXCEL</b>

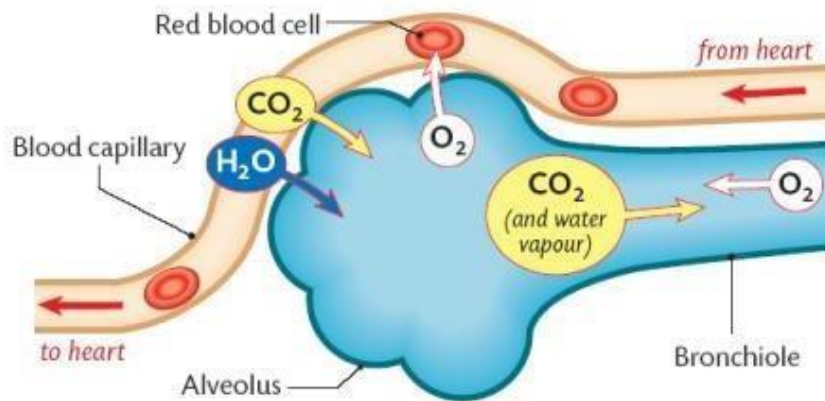
**Inspiration and Expiration:** complete this table by saying what happens to each of these when breathing in / out

	Inspiration	Expiration
Diaphragm		
External Intercostals		
Chest cavity		
Thoracic Pressure		
Air flows		

\*During exercise exhalation becomes an **a**\_\_\_\_\_ process.

The internal intercostal muscles contract to pull the rib cage **d**\_\_\_\_\_.

**Gaseous Exchange:** complete the statements below. This diagram may help.



### **Inspiration**



1. Inspired oxygen arrives at the a\_\_\_\_\_
2. O\_\_\_\_\_ dissolves in the moist alveolar membrane
3. Oxygen diffuses through the m\_\_\_\_\_
4. Each alveolus is surrounded by c\_\_\_\_\_
5. Oxygen is taken up by the r\_\_\_\_\_ blood cells

### **Expiration**



1. CO<sub>2</sub> is a product of r\_\_\_\_\_
2. CO<sub>2</sub> arrives in the b\_\_\_\_\_ from the body
3. CO<sub>2</sub> dissolves at the moist m\_\_\_\_\_
4. CO<sub>2</sub> d\_\_\_\_\_ across the thin alveolar membrane
5. CO<sub>2</sub> is breathed out, along with water v\_\_\_\_\_

## Test R5: Gaseous Exchange & Control of Breathing

NAME	SCORE
	/19

GRADE (Circle)		
Under 11 <b>FAIL</b>	11 to 15 <b>PASS</b>	Over 15 <b>EXCEL</b>

**Gaseous Exchange:** complete the statements below.

### *Inspiration*



6. Inspired oxygen arrives at the a \_\_\_\_\_
7. O \_\_\_\_\_ dissolves in the moist alveolar membrane
8. Oxygen diffuses through the m \_\_\_\_\_
9. Each alveolus is surrounded by c \_\_\_\_\_
10. Oxygen is taken up by the r \_\_\_\_\_ blood cells

### *Expiration*



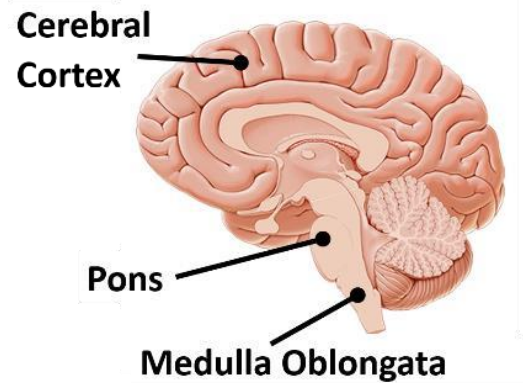
6. CO<sub>2</sub> is a product of r \_\_\_\_\_
7. CO<sub>2</sub> arrives in the b \_\_\_\_\_ from the body
8. CO<sub>2</sub> dissolves at the moist m \_\_\_\_\_
9. CO<sub>2</sub> d \_\_\_\_\_ across the thin alveolar membrane
10. CO<sub>2</sub> is breathed out, along with water v \_\_\_\_\_

## Control of Breathing

Breathing is controlled in two main ways, Neural and Chemical control.

## 1. Neural Control

Which parts of the brain exerts <b>Involuntary Control</b> over breathing?
1.
2.
Which part of the brain exerts <b>Voluntary control</b> over breathing?
1.



## 2. Chemical Control: for each of the following write the word UP or DOWN

**Chemoreceptors detect change in blood CO<sub>2</sub> concentration.**

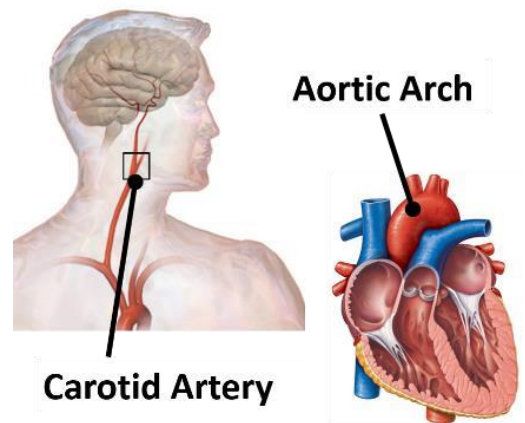
Do these go UP or DOWN during exercise?

- CO<sub>2</sub> concentration \_\_\_\_\_ •
- Breathing rate \_\_\_\_\_
- CO<sub>2</sub> removal \_\_\_\_\_

**Chemoreceptors detect change in pH (acidity) Do**

these go UP or DOWN during exercise?

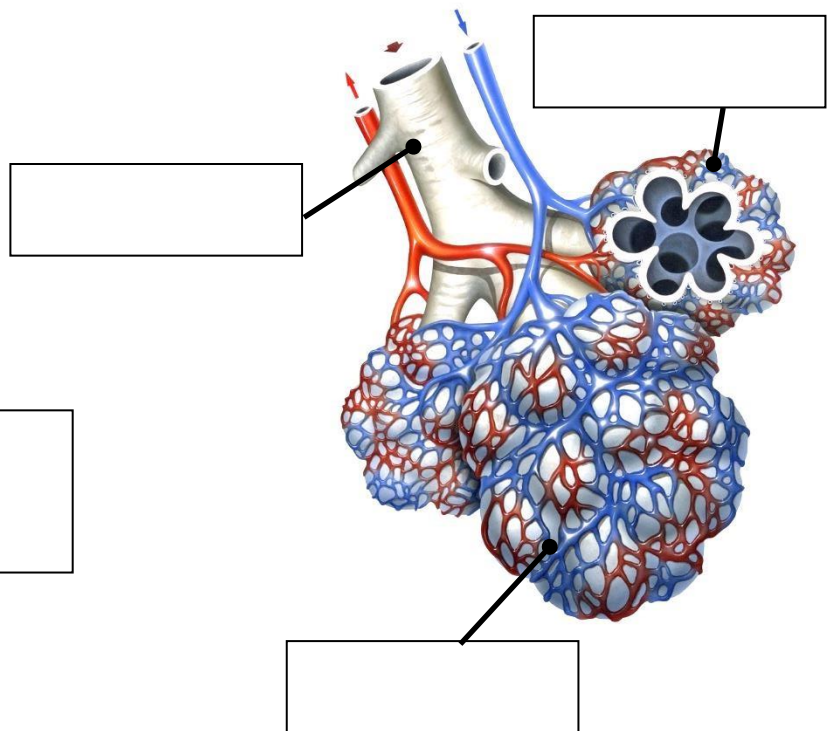
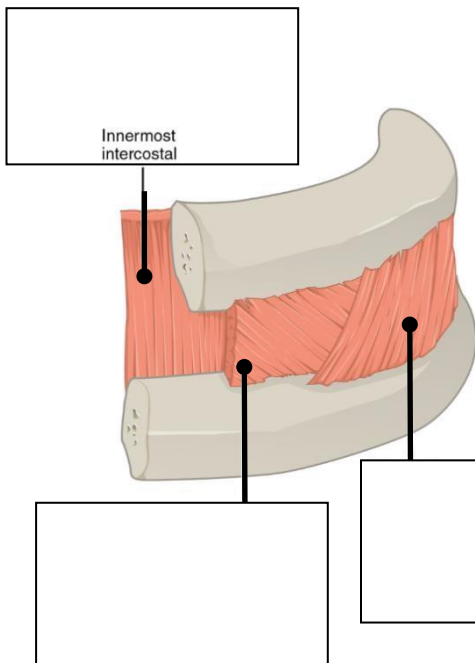
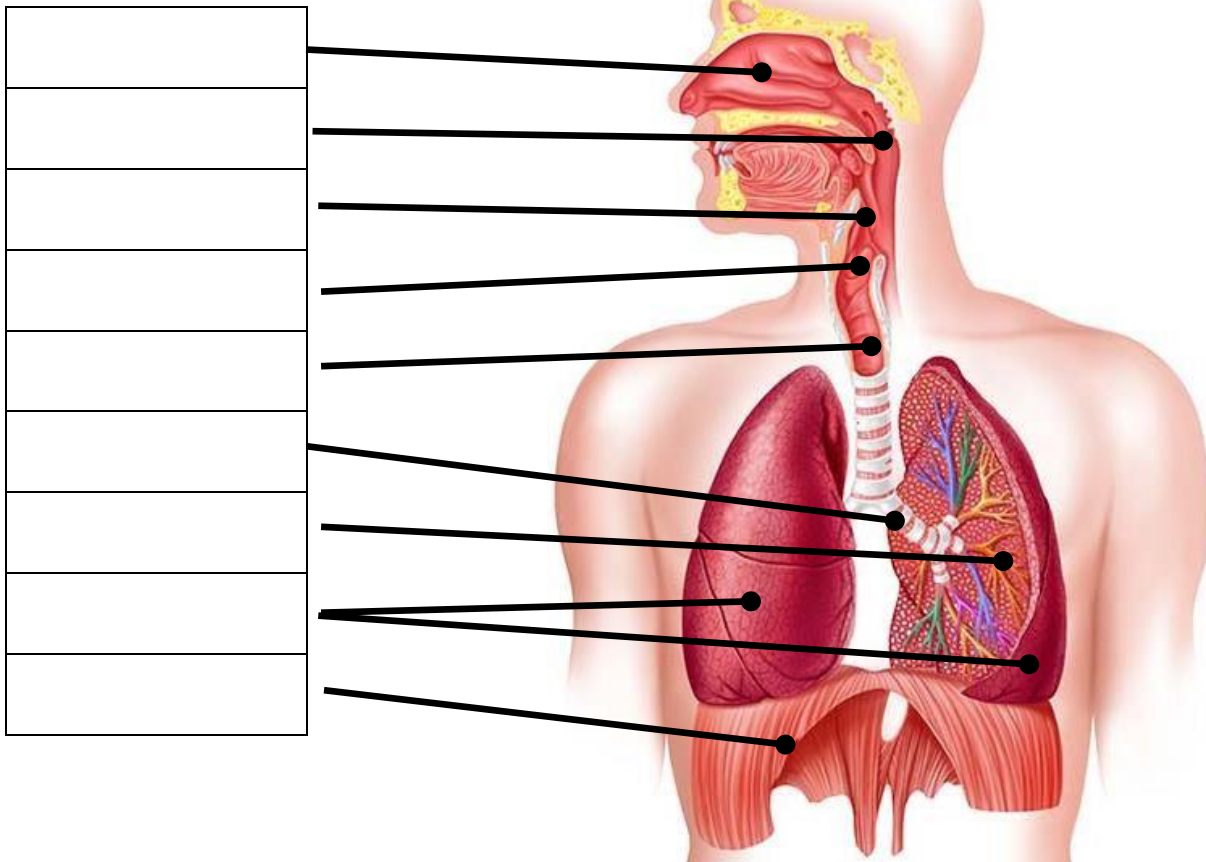
- Blood lactate \_\_\_\_\_ •
- Breathing rate \_\_\_\_\_ •
- Lactate breakdown \_\_\_\_\_



**Test R6: Structure of the System, Lung Volumes & Mechanisms of Breathing**

NAME	SCORE
	/37

GRADE (Circle)		
Under 22 <b>FAIL</b>	22 to 30 <b>PASS</b>	Over 30 <b>EXCEL</b>



**Lung Volumes:** complete this table by giving the correct name and definition for each of the lung volumes.

Lung Volume	Definition
	Total air inhaled/exhaled in one breath under _____ *
	Maximum amount of air that can be expired after _____
	Amount of air remaining in the lungs after _____
	Maximum amount of air in the lungs after _____
	Total amount of air inhaled / exhaled per _____

**Mechanisms of Breathing:** complete this table by saying what happens to each of these when breathing in / out

	Inspiration	Expiration
Diaphragm		
External Intercostals		
Chest cavity		
Thoracic Pressure		
Air flows		

\*During exercise exhalation becomes an **a**\_\_\_\_\_ process.

The internal intercostal muscles contract to pull the rib cage **d**\_\_\_\_\_.

### Test R7: Mechanisms of Breathing, Control of Breathing, & Adaptations to Exercise

NAME	SCORE	GRADE (Circle)		
	/23	Under 14 <b>FAIL</b>	14 to 18 <b>PASS</b>	Over 18 <b>EXCEL</b>

**Inspiration and Expiration:** complete this table by saying what happens to each of these when breathing in / out

	Inspiration	Expiration
Diaphragm		
External Intercostals		
Chest cavity		

<b>Thoracic Pressure</b>		
<b>Air flows</b>		

\*During exercise exhalation becomes an **a**\_\_\_\_\_ process.

The internal intercostal muscles contract to pull the rib cage **d**\_\_\_\_\_.

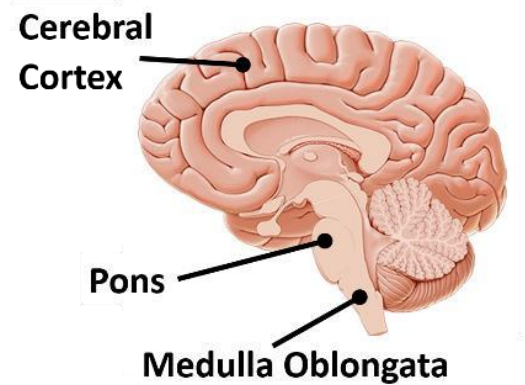
**Adaptations to exercise:** Give TWO adaptations that the respiratory system makes to exercise


## Control of Breathing

Breathing is controlled in two main ways, Neural and Chemical control.

### 1. Neural Control

Which parts of the brain exerts <b>Involuntary Control</b> over breathing?
1.
2.
Which part of the brain exerts <b>voluntary control</b> over breathing?
1.



### 2. Chemical Control: for each of the following write the word UP or DOWN

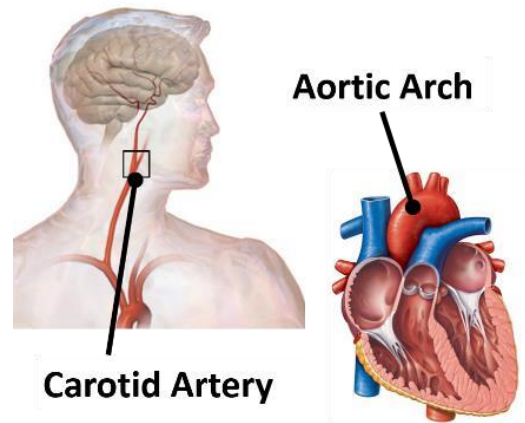
**Chemoreceptors detect change in blood CO<sub>2</sub> concentration.**

Do these go UP or DOWN during exercise?

- CO<sub>2</sub> concentration \_\_\_\_\_ •
- Breathing rate \_\_\_\_\_
- CO<sub>2</sub> removal \_\_\_\_\_

**Chemoreceptors detect change in pH (acidity)** Do these go UP or DOWN during exercise?

- Blood lactate \_\_\_\_\_ •
- Breathing rate \_\_\_\_\_ •
- Lactate breakdown \_\_\_\_\_



Test :


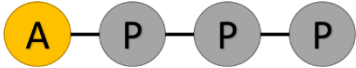
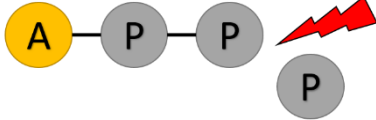
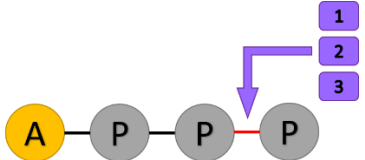
## Test E1: The Role of ATP

NAME	SCORE
	/6

GRADE (Circle)		
Under 4 FAIL	4 PASS	Over 4 EXCEL

### The role of ATP in exercise

Provide the missing words in the table below

1. ATP Availability	2. ATP Structure	3. ATP Breakdown	4. ATP Resynthesis
			
<p>ATP is stored in the M_____.</p> <p>It is readily available to be broken down.</p> <p>No other compound can be used by the body.</p>	<p>ATP consists of 3 P_____ attached to an Adenine group.</p>	<p>The final P_____ is broken off &amp; E_____ is released.</p> <p>Energy is now available for muscular C_____.</p> <p>ADP is left.</p>	<p>Resynthesis of ATP from ADP occurs via T_____ pathways.</p> <p>The pathway used will be determined by intensity/duration, fuel source &amp; availability of oxygen.</p>


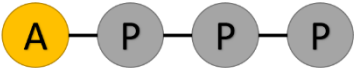
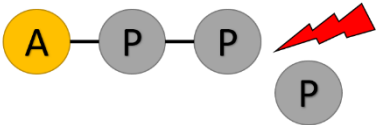
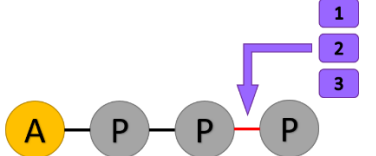
## E2 ATP and the ATP-PC System

NAME	SCORE
	/13

GRADE (Circle)		
Under 8 <b>FAIL</b>	8 to 10 <b>PASS</b>	Over 10 <b>EXCEL</b>

### The role of ATP in exercise

Provide the missing words in the table below

5. ATP Availability	6. ATP Structure	7. ATP Breakdown	8. ATP Resynthesis
			
<p>ATP is stored in the M_____.</p> <p>It is readily available to be broken down.</p> <p>No other compound can be used by the body.</p>	<p>ATP consists of 3 P_____ attached to an Adenine group.</p>	<p>The final P_____ is broken off &amp; energy is released.</p> <p>Energy is now available for muscular C_____.</p> <p>ADP is left.</p>	<p>Resynthesis of ATP from ADP occurs via T_____ pathways.</p> <p>The pathway used will be determined by intensity/duration, fuel source &amp; availability of oxygen.</p>

**Test :**

**The ATP-PC (Alactic) Energy System:** Supply the missing words below

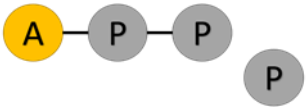
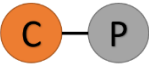
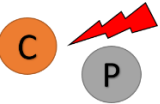
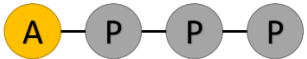
**Type:** A\_\_\_\_\_

**Fuel Source:** C\_\_\_\_\_ Phosphate (CP)

**Duration:** Approx. \_\_\_\_\_ seconds

**Recovery Time:** About \_\_\_\_\_ mins

**Used in:** Sports requiring explosive P\_\_\_\_\_

1		ATP requires R_____
2		Creatine Phosphate is present in the muscle cell
3		Creatine Phosphate is broken down to provide the E_____ required.
4		1 PC molecule produces 1 new ATP M_____.


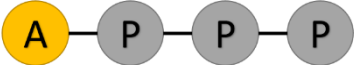
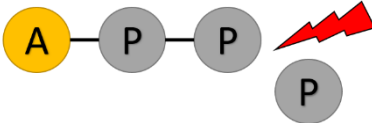
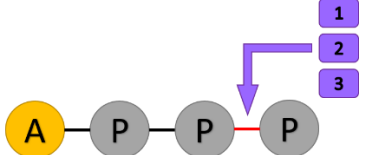
## E3 The Lactate System

NAME	SCORE
	/17

GRADE (Circle)		
Under 10 FAIL	10 to 14 PASS	Over 14 EXCEL

### The role of ATP in exercise

Provide the missing words in the table below

1. ATP Availability	2. ATP Structure	3. ATP Breakdown	4. ATP Resynthesis
			
<p>ATP is stored in the M_____.</p> <p>It is readily available to be broken down.</p> <p>No other compound can be used by the body.</p>	<p>ATP consists of 3 P_____ attached to an Adenine group.</p>	<p>The final P_____ is broken off &amp; energy is released.</p> <p>Energy is now available for muscular C_____.</p> <p>ADP is left.</p>	<p>Resynthesis of ATP from ADP occurs via T_____ pathways.</p> <p>The pathway used will be determined by intensity/duration, fuel source &amp; availability of oxygen.</p>

**Test :**

**The Lactate Energy System:**

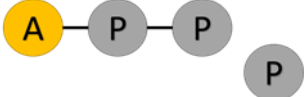

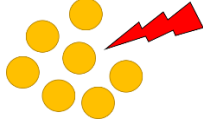
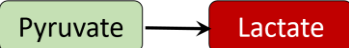
**Type:** A \_\_\_\_\_ Glycolysis

**Fuel Source:** G \_\_\_\_\_

**Duration:** Approx. \_\_\_\_\_ secs to \_\_\_\_\_ mins

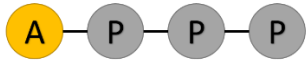
**Recovery Time:** \_\_\_\_\_ hours

**Used in:** Stop/start games, field & court sports

1		ATP requires R _____
2		Glycogen is present in the muscle cell and in the L _____. Glucose is present in the B _____
3		Glucose/Glycogen is broken down to provide the energy required. E _____ speed up the process.
4		P _____ is also produced. Since no oxygen is available this is converted into L _____.

Supply the missing words below

5



1 Glycogen molecule produces \_\_\_\_\_ new ATP molecules.

## E4 ATP-PC and Lactate Energy Systems

NAME	SCORE	GRADE (Circle)		
	/20	Under 12 <b>FAIL</b>	12 to 16 <b>PASS</b>	Over 16 <b>EXCEL</b>

**The ATP-PC (Alactic) Energy System:** Supply the missing words below

**Type:** A \_\_\_\_\_

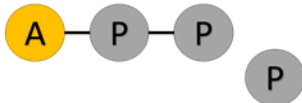
**Fuel Source:** C \_\_\_\_\_ Phosphate (CP)

**Duration:** Approx. \_\_\_\_\_ seconds

**Recovery Time:** About \_\_\_\_\_ mins

**Used in:** Sports requiring explosive P \_\_\_\_\_

1



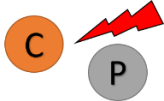
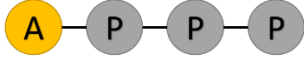
ATP requires R \_\_\_\_\_

2



Creatine Phosphate is present in the muscle cell

**Test :**

3		Creatine Phosphate is broken down to provide the E_____ required.
4		1 PC molecule produces 1 new ATP M_____.

### The Lactate Energy System:

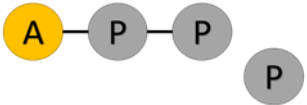

**Type:** A\_\_\_\_\_ Glycolysis

**Fuel Source:** G\_\_\_\_\_

**Duration:** Approx. \_\_\_\_\_ secs to \_\_\_\_\_ mins

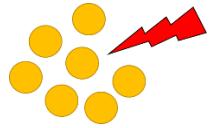
**Recovery Time:** \_\_\_\_\_ hours

**Used in:** Stop/start games, field & court sports

1		ATP requires R_____
2		Glycogen is present in the muscle cell and in the L_____. Glucose is present in the B_____

Supply the missing words below

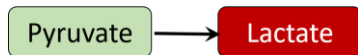
3



Glucose/Glycogen is broken down to provide the energy required.

E\_\_\_\_\_ speed up the process.

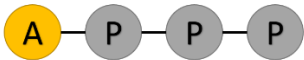
4



P\_\_\_\_\_ is also produced.

Since no oxygen is available this is converted into L\_\_\_\_\_.

5



**1 Glycogen molecule produces \_\_\_\_\_ new ATP molecules.**


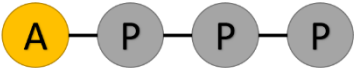
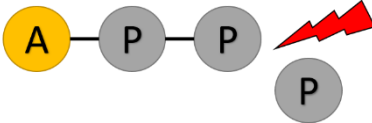
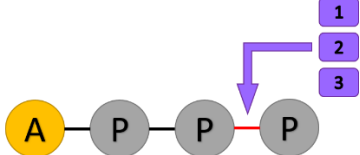
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## Test E5 Lactate and Aerobic Energy Systems

NAME	SCORE	GRADE (Circle)		
	/15	Under 9 FAIL	9 to 12 PASS	Over 12 EXCEL

### The role of ATP in exercise

Provide the missing words in the table below

1. ATP Availability	2. ATP Structure	3. ATP Breakdown	4. ATP Resynthesis
			
<p>ATP is stored in the M_____.</p> <p>It is readily available to be broken down.</p> <p>No other compound can be used by the body.</p>	<p>ATP consists of 3 P_____ attached to an Adenine group.</p>	<p>The final P_____ is broken off &amp; energy is released.</p> <p>Energy is now available for muscular C_____.</p> <p>ADP is left.</p>	<p>Resynthesis of ATP from ADP occurs via T_____ pathways.</p> <p>The pathway used will be determined by intensity/duration, fuel source &amp; availability of oxygen.</p>

Supply the missing words below

## The Aerobic Energy System:

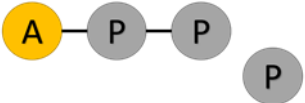

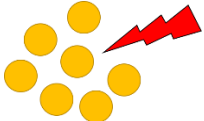
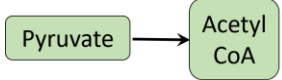
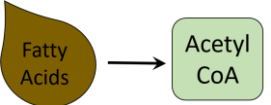
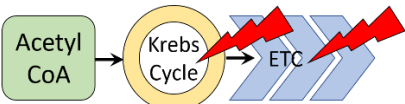

**Type:** Aerobic Glycolysis (& L\_\_\_\_\_)

**Fuel Source:** G\_\_\_\_\_ and F\_\_\_\_\_

**Duration:** Longer than \_\_\_\_\_ mins

**Recovery Time:** 24-48 hours

**Used in:** Long distance & endurance events

1		ATP requires R_____
2		Glycogen is present in the muscle cell and in the L_____. Glucose is present in the B_____
3		Glucose/Glycogen is broken down to provide the energy required. Enzymes speed up the process.
4		Pyruvate is also produced. Oxygen is available so pyruvate is broken down into Acetyl CoA
5		Or, Acetyl CoA can be created from fats by a process called B_____-O_____
6		Acetyl CoA passes through the K_____ Cycle and the Electron Transport Chain (ETC) By products include CO <sub>2</sub> , O <sub>2</sub> and H <sub>2</sub> O. More energy is produced here.
7		<b>1 Glycogen molecule produces about 34 new ATP molecules.</b>


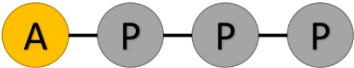
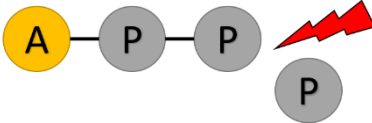
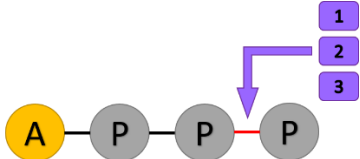
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## Test E6 Lactate and Aerobic Energy Systems

NAME	SCORE	GRADE (Circle)		
	/31	Under 19 FAIL	19 to 25 PASS	Over 25 EXCEL

### The role of ATP in exercise

Provide the missing words in the table below

1. ATP Availability	2. ATP Structure	3. ATP Breakdown	4. ATP Resynthesis
			
<p>ATP is stored in the M_____.</p> <p>It is readily available to be broken down.</p> <p>No other compound can be used by the body.</p>	<p>ATP consists of 3 P_____ attached to an Adenine group.</p>	<p>The final P_____ is broken off &amp; energy is released.</p> <p>Energy is now available for muscular C_____.</p> <p>ADP is left.</p>	<p>Resynthesis of ATP from ADP occurs via T_____ pathways.</p> <p>The pathway used will be determined by intensity/duration, fuel source &amp; availability of oxygen.</p>

## The Lactate Energy System: Supply the missing words below

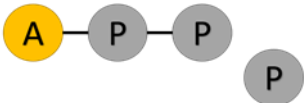

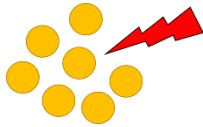
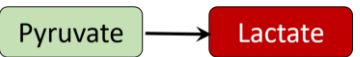
**Type:** A \_\_\_\_\_ Glycolysis

**Fuel Source:** G \_\_\_\_\_

**Duration:** Approx. \_\_\_\_\_ secs to \_\_\_\_\_ mins

**Recovery Time:** \_\_\_\_\_ hours

**Used in:** Stop/start games, field & court sports

1		ATP requires R _____
2		Glycogen is present in the muscle cell and in the L _____. Glucose is present in the B _____
3		Glucose/Glycogen is broken down to provide the energy required. E _____ speed up the process.
4		P _____ is also produced. Since no oxygen is available this is converted into L _____.

5		1 Glycogen molecule produces _____ new ATP molecules.
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**The Aerobic Energy System:** Supply the missing words below

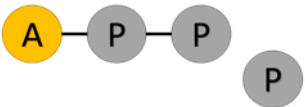

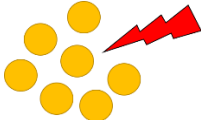
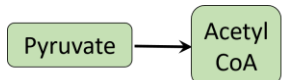

**Type:** Aerobic Glycolysis (& L\_\_\_\_\_)

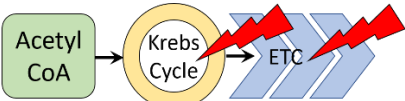
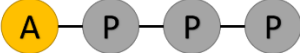
**Fuel Source:** G\_\_\_\_\_ and F\_\_\_\_\_

**Duration:** Longer than \_\_\_\_\_ mins

**Recovery Time:** \_\_\_\_\_ hours

**Used in:** Long distance & endurance events

1		ATP requires R_____
2		Glycogen is present in the muscle cell and in the L_____. Glucose is present in the B_____
3		Glucose/Glycogen is broken down to provide the energy required. Enzymes speed up the process.
4		Pyruvate is also produced. Oxygen is available so pyruvate is broken down into Acetyl CoA
5		Or, Acetyl CoA can be created from fats by a process called B_____-O_____


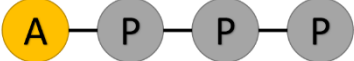
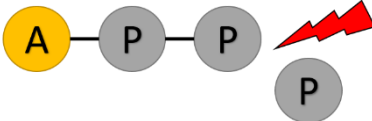
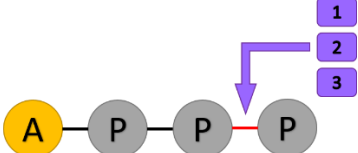
6		Acetyl CoA passes through the K_____ Cycle and the Electron Transport Chain (ETC) By products include _____, _____ and _____. More energy is produced here.
7		1 Glycogen molecule produces about 34 new ATP molecules.

### Test E7: Lactate System, Aerobic System and Adaptations to exercise (of all three systems)

NAME	SCORE	GRADE (Circle)		
		Under 25 <b>FAIL</b>	25 to 33 <b>PASS</b>	Over 33 <b>EXCEL</b>
	/41			

### The role of ATP in exercise

Provide the missing words in the table below

5. ATP Availability	6. ATP Structure	7. ATP Breakdown	8. ATP Resynthesis
			

<p>ATP is stored in the M_____.</p> <p>It is readily available to be broken down.</p> <p>No other compound can be used by the body.</p>	<p>ATP consists of 3 P_____ attached to an Adenine group.</p>	<p>The final P_____ is broken off &amp; energy is released.</p> <p>Energy is now available for muscular C_____.</p> <p>ADP is left.</p>	<p>Resynthesis of ATP from ADP occurs via T_____ pathways.</p> <p>The pathway used will be determined by intensity/duration, fuel source &amp; availability of oxygen.</p>
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**The Lactate Energy System:** Supply the missing words below

**Type:** A\_\_\_\_\_ Glycolysis

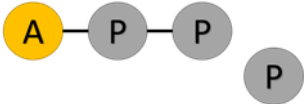
**Fuel Source:** G\_\_\_\_\_

**Duration:** Approx. \_\_\_\_\_ secs to \_\_\_\_\_ mins


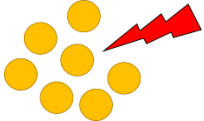
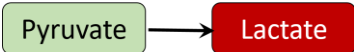
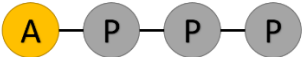
**Recovery Time:** \_\_\_\_\_ hours

**Used in:** Stop/start games, field & court sports

1



ATP requires R\_\_\_\_\_

2		Glycogen is present in the muscle cell and in the L_____. Glucose is present in the B_____
3		Glucose/Glycogen is broken down to provide the energy required. E_____ speed up the process.
4		P_____ is also produced. Since no oxygen is available this is converted into L_____.
5		<b>1 Glycogen molecule produces _____ new ATP molecules.</b>

**The Aerobic Energy System:** Supply the missing words below

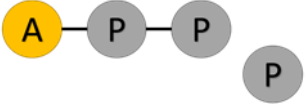

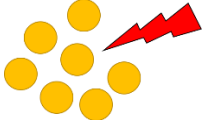
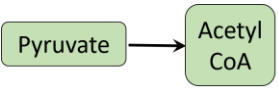
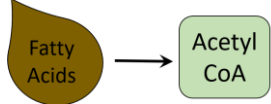
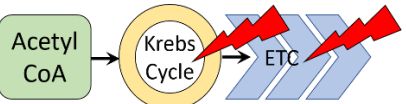

**Type:** Aerobic Glycolysis (& L\_\_\_\_\_)

**Fuel Source:** G\_\_\_\_\_ and F\_\_\_\_\_

**Duration:** Longer than \_\_\_\_\_ mins

**Recovery Time:** \_\_\_\_\_ hours

**Used in:** \_\_\_\_\_

1		ATP requires R_____
2		G_____ is present in the muscle cell and in the liver. G_____ is present in the bloodstream
3		Glucose/Glycogen is broken down to provide the energy required. E_____ speed up the process.
4		P_____ is also produced. O_____ is available so P_____ is broken down into Acetyl CoA
5		Or, Acetyl CoA can be created from fats by a process called B_____ - O_____
6		Acetyl CoA passes through the K_____ Cycle and the E_____ Transport Chain By products include CO <sub>2</sub> , O <sub>2</sub> and H <sub>2</sub> O. More energy is produced here.
7		<b>1 G_____ molecule produces about _____ new ATP molecules.</b>

### Adaptations to Exercise (of the ATP-PC & Lactate systems)

Give one adaptations to exercise of the ATP-PC system

1.

Give one adaptations to exercise of the Lactate system

**1.**

Give THREE adaptations to exercise of the Lactate system

**1.**

**2.**

**3.**



**Mike  
Tyler  
Sport**