A LEVEL PE Summer Work:

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Course:	**A LEVEL (GCE) PE**
Objective:	Begin to explore some content areas of the course and apply them to exam style questions. This work explores the science sections of course such as Anatomy and Physiology, Biomechanics.
Activity:	Research and read around content areas. Applying learnt knowledge to exam style questions.
Time to be allotted to this task:	*2 hours maximum*

NOTES: Work can be typed or handwritten, Name on the top.

TASK: Muscles, Types of joint and sporting actions

KNEE JOINT ANALYSIS

FIGURE 2: QUADRICEP MUSCLE GROUP

Anterior view

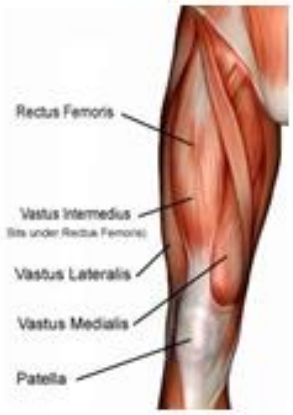


FIGURE 3: HAMSTRING MUSCLE GROUP

Posterior view

The quadricep muscle group is made up of 4 muscles—the rectus femoris, vastus intermedius, vastus lateralis and vastus medialis, as shown in figure 2. The hamstring muscle group is made up of 3 muscles—biceps femoris, semi-membranosus and semitendinosus, as shown in figure 3.

Figure 4 shows a person using a resistance machine to increase leg strength.

The table below shows the joint movement analysis of the knee in the direction of the arrow.

JOINT	SYNOVIAL JOINT TYPE	MOVEMENT	AGONIST	ANTAGONIST
KNEE	HINGE JOINT	EXTENSION	RECTUS FEMORIS VASTUS INTERMEDIUS VASTUS LATERALIS VASTUS MEDIALIS	BICEPS FEMORIS SEMIMEMBRANOSUS SEMITENDINOSUS

Based on the info on the previous page and you own research answer the following question;

3. **Fig. 6.2** shows a performer doing a calf raise.

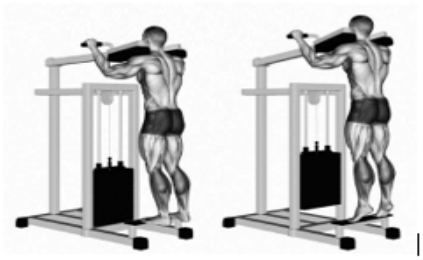


Fig. 6.2

Complete the table below to analyse the movements at the knee and ankle during the upward phase of the lift.

Joint	Joint type	Movement produced	Agonist	Type of contraction
Knee	Hinge	A:	Rectus femoris	B: .....
Ankle	C:	D:	E:	Concentric

[5]

2. **Fig. 1** shows a performer doing a sit up.

Fig. 1

Complete the table below to show the movements that take place at the hip joint during both the upward and downward phases.

Phase	Agonist	Movement produced	Type of contraction
Upward			
Downward			

[6]

TASK: Types of joint and sporting actions

For each type of joint identify the type of movement, and where in the body can it be found (e.g. an example of a ball and socket joint is between the pelvis and femur). Also, state how the range of movement at a joint can be used to complete sporting action (You would use a saddle joint when gripping a racket in tennis or squash)

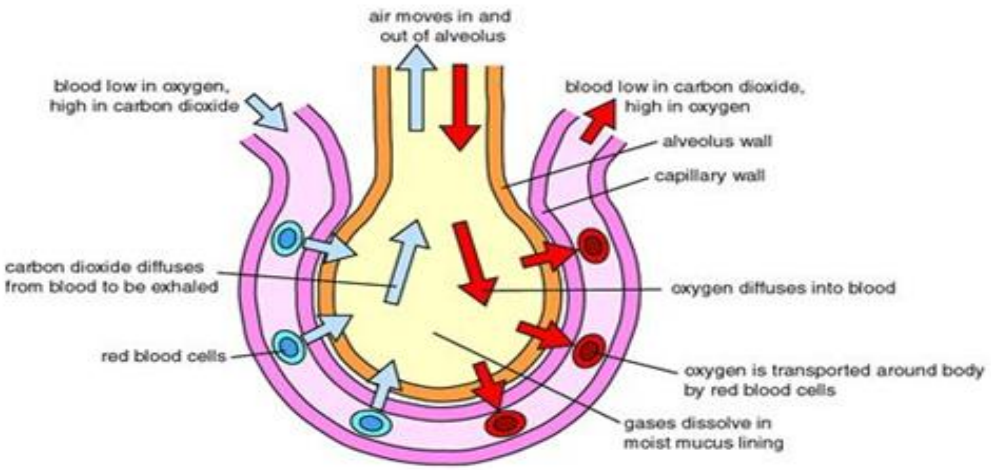
Type of joint	Range of movement?	Where in the body?	Sporting example where this type of joint is used?
Hinge			
Ball and Socket			
Condyloid			
Gliding			
Pivot			
Saddle			

TASK: RESPIRATION AND GASEOUS EXCHANGE

GASEOUS EXCHANGE

Gases, including oxygen and carbon dioxide, move from areas of a high partial pressure to areas of low partial pressure. Gaseous exchange refers to the exchange of oxygen and carbon dioxide and relies on the process of diffusion.

Figure 6 illustrates a simplified version of what occurs at alveolus level.



The diffusion of oxygen occurs as there is a high partial pressure of oxygen in the blood and a low partial pressure of oxygen in the muscle.

The difference in partial pressure creates a diffusion gradient of oxygen between the blood and the muscle, oxygen therefore diffuses from the blood into the muscle.

Similarly, the diffusion of carbon dioxide occurs as there is a high partial pressure of carbon dioxide in the muscle and a low partial pressure of carbon dioxide in the blood.

The difference in partial pressure creates a diffusion gradient of carbon dioxide between the blood and the muscle, so carbon dioxide diffuses from the muscle to the blood.

Research and create a learning resource for the following areas of the A level specification relating to respiration an exercise;

- regulation of breathing during exercise of different intensities and during recovery
  - neural control
  - chemical control
- effect of differing intensities of exercise and recovery on gas exchange at the alveoli and at the muscles
  - changes in pressure gradient
  - changes in dissociation of oxyhaemoglobin.

TASK: BIOMECHANICS, LAW OF MOTION

NEWTON'S LAWS OF MOTION

Newton's First Law: *A body continues in a state of rest or uniform velocity unless it is acted upon by an external force.*

Often termed the Law of Inertia.

Newton's Second Law: *When a force acts upon an object, the rate of change of momentum experienced by the object is proportional to the size of the force and takes place in the direction in which the forces acts.*

Often termed the Law of Acceleration.

Newton's Third Law: *For every action there is an equal and opposite reaction.*

The table below provides an example of how each of Newton's laws of motion can be applied to a sporting example. The example given is taking a penalty in football.

Newton's First Law (Law of Inertia)	Newton's Second Law (Law of Acceleration)	Newton's Third Law
The ball will remain at rest on the penalty spot, until a force is applied upon it from the boot of the footballer. The football will continue to travel in the direction that it was kicked until another force is applied to it (goalkeeper, hitting the net or post).	The greater the force applied by the footballer, the greater the acceleration of the ball.	The foot of the footballer will apply a force to the ball, and the ball will provide an equal and opposite reaction force to the foot of the footballer. If the ball hits the cross-bar, an equal and opposite force is applied by the cross-bar to the ball, resulting in an equal and opposite reaction (the ball bouncing back off the cross-bar).
		

Research and learn about Bernoulli's principle. Apply your knowledge to the following exam question.

5. Fig. 8 shows the design of a Formula One racing car.

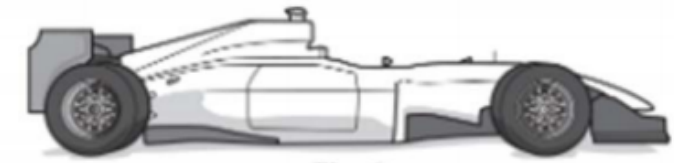


Fig. 8

State Bernoulli's principle, and apply it to the design of Formula One racing cars.

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DOCUMENTS/USEFUL LINKS TO HELP YOU:

PE For A level Year 1 (Honeybourne and Powell): Accredited OCR A level PE textbook - https://www.hoddereducation.co.uk/subjects/sport-pe/products/16-18/ocr-pe-for-a-level-book-1

END RESULT:

You will have produced a series of diagrams and research tasks to use for reference in your Anatomy & Physiology lessons. This will be the first unit covered in your first term.

HAND IN DATE: First lesson of the September 2022 term.