

# PiXL Independence:

## PE – Student Booklet

### KS5

#### Applied Anatomy and Physiology

##### Contents:

- I. Quizzes – 10 credits each
- II. Reading Task – 50 credits
- III. Research Task – 80 credits
- IV. Website Task – 80 credits
- V. Long Answer Questions – 100 credits
- VI. Videos – 50 credits

## I. Quizzes

Complete the quizzes.

*10 credits.*

### Multiple Choice Quiz

#### The Cardiovascular System

1. What is the correct order that an electrical impulse travels through the heart? **(1)**

- |                       |                       |                       |                 |
|-----------------------|-----------------------|-----------------------|-----------------|
| Sinoatrial node       | Bundle of His         | Atrioventricular node | Purkinje fibres |
| Atrioventricular node | Sinoatrial node       | Bundle of His         | Purkinje fibres |
| Sinoatrial node       | Atrioventricular node | Bundle of His         | Purkinje fibres |
| Atrioventricular node | Sinoatrial node       | Purkinje fibres       | Bundle of His   |

2. Which of the following does not play a role in the transportation of oxygen? **(1)**

- Plasma
- Haemoglobin
- Mitochondria
- Platelets

3. Explain the process of venous return and the mechanisms used to support the process. **(4)**

4. Describe how blood is redistributed to the working muscles. **(3)**

5. Define the term 'stroke volume' and explain how this is affected by exercise. **(3)**

6. Outline two types of heart disease. **(2)**

7. Health professionals believe that people who adopt an active lifestyle over a number of years will gain many positive health benefits. Evaluate the impact of endurance activities on the cardiovascular system. **(8)**

## The Respiratory System

1. Which of the following statements is incorrect? **(1)**

Tidal volume is the volume of air breathed in or out in one breath

Residual volume is the amount of air that remains in the lungs after maximal expiration

Inspiratory reserve volume is volume of air that can be forcibly expired after a normal breath

Expiratory reserve volume is volume of air that can be forcibly expired after a normal breath

2. Which of the following do not affect neural control of breathing? **(1)**

Proprioceptors

Baroreceptors

Stretch receptors

Chemoreceptors

3. Explain the passage of air into the body. **(4)**
4. Outline what a spirometer is and how this is affected by exercise. **(2)**
5. Describe how smoking can affect your respiratory system. **(3)**
6. Gas exchange and oxygen delivery influence performance in sport activities. Explain how oxygen diffuses from the lungs into the blood and it is transported to the tissues. **(4)**
7. Evaluate the impact of long term aerobic training and lifestyle choices on the efficiency of the respiratory system. **(8)**

## The Neuromuscular System

1. Which of the following sports is most likely to use slow twitch muscle fibres? **(1)**

Basketball

Road Cycling

Football

Long Jump

2. An isometric contraction is: **(1)**

When there is a concentric muscle contraction

When there is an eccentric muscle contraction

When there is no visible muscle contraction

When there is a sudden relaxation of the muscle contraction

3. Describe the characteristics of the main muscle fibre type used by track sprinters. **(4)**
4. Explain the process of proprioceptive neuromuscular facilitation stretching. **(3)**
5. Outline the role of a motor unit. **(2)**
6. Explain how a netball player can increase the strength of contraction when jumping up to get a rebound from a missed shot. **(4)**
7. Using sporting examples, analyse how the structural characteristics of muscle fibres enable the fibres to be better suited to specific sports. **(8)**

## The Musculoskeletal System and Analysis of Movement in Physical Activities

1. Which of the following is a hamstring muscle? **(1)**

Rectus femoris

Biceps femoris

Vastus lateralis

Vastus medialis

2. Which of the following statements is correct? **(1)**

Abduction and adduction occur in a frontal plane about a sagittal axis

Abduction and adduction occur in a transverse plane about a sagittal axis

Abduction and adduction occur in a frontal plane about a longitudinal axis

Abduction and adduction occur in a transverse plane about a longitudinal axis

3. The picture below shows the release phase of a basketball free throw. Using the picture, identify the joint action, main agonist and the type of muscle contraction occurring at the elbow joint as the basketball players prepares to release the ball. **(3)**



4. When performing the downward phase of a press up, identify the agonist and antagonist. **(2)**
5. Using practical examples, describe the types of muscular contraction. **(4)**
6. Describe the function of a ball and socket joint. **(2)**
7. Using sport examples, explain the joint actions available within the body across the planes of movement and the axes of rotation. **(8)**

## Energy Systems

1. Which of the following is not an energy system?

The aerobic system

The ATP-PC system

The Krebs system

The anaerobic glycolytic system

2. Which of the following is a measurement of energy expenditure?

Skin calliper testing

Indirect calorimetry

Multistage fitness test

Harvard Step test

3. How does the ATP-PC system provide our bodies with energy? **(3)**

4. The 400m hurdles is a sprint race within athletics. Explain how energy is provided at the start of the race and at the midpoint of the race. **(4)**

5. Outline two specialist training methods and how they help to improve energy systems. **(4)**

6. Describe EPOC and the two main components. **(3)**

7. Using examples from a team sport, analyse how players use the three different energy systems throughout a normal competitive game. **(8)**

## II. Reading Task

Choose a scholarly article from the list below. Summarise the key ideas within the article – ideally in ten points. Create 5 questions relating to both the article and your specification.

*50 credits each.*

<https://alsnewstoday.com/2017/10/31/als-study-finds-that-nervous-systems-heart-control-response-depends-on-type-of-disease/>

<http://www.sciencedirect.com/science/article/pii/S073510979390773T>

[https://www.researchgate.net/profile/Eric-Doucet/publication/12015767\\_Impact\\_of\\_high-intensity\\_exercise\\_on\\_energy\\_expenditure\\_lipid\\_oxidation\\_and\\_body\\_fatness/links/00463533ad59054deb000000/Impact-of-high-intensity-exercise-on-energy-expenditure-lipid-oxidation-and-body-fatness.pdf](https://www.researchgate.net/profile/Eric-Doucet/publication/12015767_Impact_of_high-intensity_exercise_on_energy_expenditure_lipid_oxidation_and_body_fatness/links/00463533ad59054deb000000/Impact-of-high-intensity-exercise-on-energy-expenditure-lipid-oxidation-and-body-fatness.pdf)

<https://academic.oup.com/biomedgerontology/article/55/7/B336/2948070>

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.654.4991&rep=rep1&type=pdf>

<http://hyper.ahajournals.org/content/46/4/667.short>

### **III. Research Task**

Part 1: Select 4 main ideas within the text and produce a spider diagram of the main points and prior learning you know regarding key quotes from the text.

Part 2: Research and find an article which supports or disclaims the ideas in the original article. Write a paragraph to summarise your findings. In this paragraph you must provide a sporting example to support your findings.

Part 3: Draw upon examples from sport and real-life occurrences to create your own newspaper article on the topic area.

*80 credits.*



#### IV. Website Task

Website task: Select a website and design a PowerPoint presentation you could give to a group of students just beginning the A Level PE course. Include key notes you could discuss on each slide.

*80 credits.*

- Cardiovascular system: <http://www.innerbody.com/image/cardov.html>
- Respiratory system: <https://www.livescience.com/22616-respiratory-system.html>
- Neuromuscular system: <https://aneskey.com/neuromuscular-anatomy-and-physiology/>  
(focus on the anatomy and not the diseases associated with it.)
- Musculoskeletal system: <https://my.clevelandclinic.org/health/articles/normal-structure-and-function-of-the-musculoskeletal-system>
- Analysis of movement: <https://www.brianmac.co.uk/moveanal.htm>
- Energy systems: <http://www.idealit.com/fitness-library/the-three-metabolic-energy-systems>

## V. Long Answer Questions

Choose a longer answer question from the question bank below. Write a response to the question. You must include a plan of what you are going to include, a key word board and your final written answer, completed in full sentences and paragraphs.

*100 credits each.*

1. Within athletics, a performer can compete at a mixture of different distances, 100m, 800m and 5000m. Explain how each of the energy systems would contribute to the mix of these athletics events for both an elite athlete and a recreational runner. **(15)**
2. Evaluate the effects of an impact sport and a repetitive action sport on the muscular and skeletal system of a young performer. Use sporting examples to justify your answer. **(15)**
3. Analyse the effects that specialist training methods can have on an individual's cardiovascular and respiratory system. Evaluate how this impacts an individual in sport. **(15)**
4. Analyse the impact of physical activity and sport on the health of the individual. Design a training programme suitable for a person recovering from a heart attack over a 6 week period. **(15)**
5. Evaluate the effectiveness of muscle fibres within a range of sports and analyse the impact training has on fibre type. **(15)**

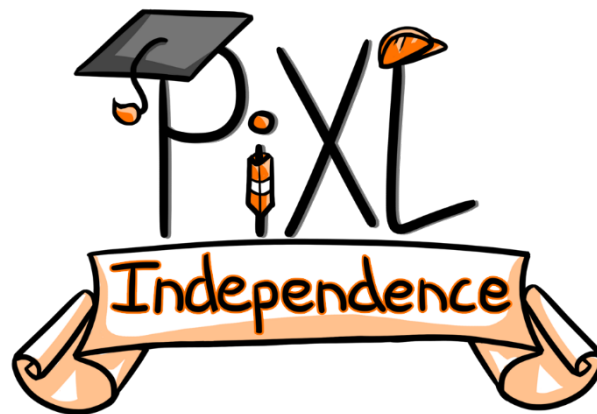
## VI. Videos

Produce a video that shows the use of the body in a practical way. The video must include key sporting examples and clear explanations of what is occurring within the video.

Try to include the whole unit topic in one video.

*50 credits per topic.*

- Cardiovascular system
- Respiratory system
- Neuromuscular system
- Musculoskeletal system
- Analysis of movement
- Energy systems



**Commissioned by The PiXL Club Ltd.**

This resource is strictly for the use of member schools for as long as they remain members of The PiXL Club. It may not be copied, sold, or transferred to a third party or used by the school after membership ceases. Until such time it may be freely used within the member school.

All opinions and contributions are those of the authors. The contents of this resource are not connected with, or endorsed by, any other company, organisation or institution.

PiXL Club Ltd endeavour to trace and contact copyright owners. If there are any inadvertent omissions or errors in the acknowledgements or usage, this is unintended and PiXL will remedy these on written notification.