

Examiners' Report/
Principal Examiner Feedback

Summer 2013

Principal Learning Sport and Active
Leisure

SL303: Science and Technology in
Sport and Active Leisure

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General Comments

This was the fourth series for this paper. The paper appeared to be accessible to students with the full range of marks being achieved. Most students were able to respond effectively to the majority of the questions. There was evidence that most students had been effectively prepared, with the majority responding positively to the tasks set, offering valid answers. Almost all of the students answered all questions.

On the whole, students appeared to be familiar with the command verbs in the questions. Students also appeared to manage their time effectively and most were able to fit their answers into the spaces provided on the question paper. The vast majority of students appeared to complete the paper in the time available, with little evidence of rushed work towards the end.

It was clear that a minority of students did not make full use of the stimulus material provided in the questions. The emphasis in this paper is on student's application of their knowledge to a variety of practical situations. The higher marks, particularly in levels of response questions, will always focus on the ability to demonstrate application rather than theory. Students need to ensure that any ideas or suggestions they make are realistic and appropriate for the circumstances of the stimulus.

As this is a work-related subject, the external examination seeks to put the students in applied situations and ask them to respond to these. It is essential that centres stress to students the need to read the stimulus information carefully before they answer questions, and be prepared to use that information within their responses. Where students are unable to apply the stimulus in their answer it will significantly restrict the number of marks students can receive. Generic responses will only gain limited credit.

The mark scheme rewards students who demonstrate their ability to use higher level skills in their responses, the mark scheme does not allow for more points to be awarded at the same level. Hence it will be student's ability to both apply their responses and offer a correct interpretation of the command words that will allow them to rise to the top levels of the mark scheme.

Individual Questions

The wording and terminology used in the questions appeared to be accessible to the students and they were able to complete the paper in the time available.

Question 1a

Most students were able to identify two of the bones at the elbow joint correctly to score 2 marks. The radius and ulna were the most popular responses.

Question 1b1

Most students identified the joint type in the elbow, hinge or synovial were popular correct answers, 1 mark.

Question 1b2

Many students correctly identified extension as the movement at the elbow joint, scoring 1 mark.

Question 1b3

Some students were able to identify the muscle as the biceps brachii to score 1 mark although there was some confusion with the triceps.

Question 1b4

Some students were able to correctly identify the muscle contraction as eccentric to score 1 mark. Several students incorrectly spelt 'eccentric', if the word spelt was clearly meant to say 'eccentric' and not 'concentric' the mark was awarded.

Question 1c

Most students were able to access one mark by stating the function of the axial or appendicular skeletons but not both. Students commonly identified that the axial skeleton is the core of the skeleton, however this is not specific enough as it does not refer to bones. A few students identified that its function is the protection of organs. Some stated that the appendicular skeleton is made up of the limbs. Very few students referred to both the axial and appendicular skeletons with enough detail to achieve 2 marks.

Question 2

This question was generally well answered. Vasodilation and vasoconstriction were correctly identified by students to describe how the CV system uses thermoregulation to maintain a stable body temperature to achieve 2-3 marks. Common answers included an example of sweat glands under the surface of the skin releasing sweat, however this was not always followed up by adding and 'this causes heat loss by evaporation, regulating the temperature of the body'. Another popular response was an example of hairs lying flat on the body to prevent heat being trapped, allowing the body to cool down.

Question 3

This question had a mixed response from students. Most students were able to identify two hormones produced by the endocrine system, adrenalin,

testosterone and EPO were popular answers. But most responses were answered on a basic level, with very little linkage to improving performance. For example students may have described testosterone as a male hormone which can increase muscle mass and strength but not have added how extra strength could help to improve performance. Insulin was often named but its description and link to performance was not always clear, students seemed to be unsure of the role of this hormone. Better students had qualified their answers with how their named hormones may affect sports performance. For example, there would be a clear description of what the hormone is, what it does and how it can affect sports performance. Erythropoietin (EPO), is released from the kidneys and acts on the bone marrow, causing an increase red blood cell production, this increases the oxygen carrying capacity of the blood, allowing more oxygen to be sent to the working muscles so that the athlete can perform aerobically for longer 4 marks.

Question 4

Overall this question was answered poorly. Students had to describe the function of the aerobic system during an endurance activity. Students often referred to 'using oxygen' but did not develop their answers any further. Students may have identified the fuel sources as oxygen and glucose or stated that fats can be used as a secondary source or have given the equation for the metabolism of glucose to produce energy, $\text{Glucose} + \text{Oxygen} = \text{Carbon Dioxide} + \text{Water} + \text{Energy}$, but very few included more than one of these examples in their answers. For example students could have described that the function of the aerobic system is to produce energy / ATP, using oxygen and a fuel source. The primary fuel source is glucose and fat will be used once athletes have depleted their muscle glycogen/glucose stores, 4 marks. The students seemed to have a gap in their knowledge about this topic.

Question 5a

This question was not answered well with most students accessing only 1 mark. To achieve 2 marks students will have referred to acceleration as being the rate at which velocity changes and may have included the equation: $\text{Acceleration} = \frac{\text{change in velocity}}{\text{time taken}}$. Most students did not define acceleration well and some were unclear as to what acceleration is and referred to speed and increasing speed.

Question 5b

This question was generally answered very well. This question allowed students to identify basic methods to increase work, securing them 1-2 marks. Students who then went on in more detail to explain how these methods could be used specifically to increase the amount of work done scored higher marks. Basic responses included, increasing weight/resistance and increasing distance. There were a few students who went on to develop their responses to achieve higher marks by describing that increasing the amount of resistance or weight means that the athlete has to produce more force to overcome gravity and that work can be increased by increasing the distance through which force is applied, an athlete can do this by lifting the weight higher or further, 4 marks.

Question 6a

This question was answered very well with most students achieving the full 2 marks available. Strength and continuous training were common responses identified to prepare for an expedition.

Question 6b

To answer this question students had to explain why the two training methods chosen in 6a, would be suitable to prepare for an expedition. Most students produced a basic explanation of one or both training methods with some link to increasing strength and or endurance. Basic responses lacked depth and application and needed more explanation of how the training methods would help Laura with her expedition preparation. For example, strength training helps Laura to prepare her body to adapt to work better during the expedition. Better students would explain that continuous training or prolonged aerobic training will improve Laura's cardiovascular endurance, her body will adapt by the heart becoming bigger and stronger and pumping blood to the working muscles more quickly, enabling Laura to walk the 30 mile trek without being as tired as she would without the training.

Question 7

This question allowed students to draw upon a good range of examples, with most choosing to use football academies as their example. Commonly students gave a basic description of how football academies work but with little mention of how they help to develop performance and how this is specifically carried out within the academy. Basic answers will have included some examination of the principles or stages involved, with limited links to effects on performance, 2-3 marks. Better students will have carried out a thorough examination of the use of identification and development programmes in developing athletes and improving performance. Students will have described the framework of the LTAD programme and how it aims to support and progress athletes by using trained coaches throughout the progressive levels. Students will have made explicit links to the effects on performance to achieve marks in mark band 3.

Question 8a

Overall this question was not answered well. Most students gave basic explanations of some or one way in which technology has improved performance of Paralympic equipment. Commonly students choose to describe wheelchairs or prosthetic limbs. Weaker answers were vague rather than focussed on specific technological advancements, mark band 1. Better students will have given a detailed explanation of how advances in technology have led to improved equipment which has then led to athletes improving their sports performance. These students will have examined two or more specific pieces of technology or equipment and will have made direct links to increasing sports performance. For example, lighter wheelchairs are more manoeuvrable as they have less momentum at a given speed, this would be an advantage in any sport where agility is important, lighter chairs will allow the athlete to accelerate more quickly and achieve higher speeds, this is because the chair has less inertia to overcome, mark band 3.

Question 8b

This type of question has been used in all of the SL303 exam question papers. However, this series most students seemed to be unable to access marks outside of mark band 1. Students produced very basic answers, which were limited to often naming tests but with no reference to exactly how they would be carried out. Most answers lacked any real structure and did not mention the strengths and weaknesses of the tests being carried out and references to how an evaluation would be conducted were simplistic. Often students referred to testing procedures and the testing environment being maintained, the same athletes being used, age and sex of the athletes carrying out the tests but with no real application. These were suggestions rather than important to the scientific testing of their equipment. To access higher marks students should produce a detailed explanation of how scientific testing could be conducted, the tests used will be named and their protocols, validity and reliability will be discussed. Answers will refer to the strengths and weaknesses of scientific tests being carried out and there will be a clear conclusion and evaluation of the testing procedures.

Recommendations

- Students need to understand the active verbs **identification**, **outline**, and **describe** when considering their response.
- Students should take care to read the questions in detail.
- Students could be encouraged to practise exam technique.
- Ensure that students are aware of the content of the Specification for ZSL30/01
- Practitioners can attend Edexcel training events e.g. feedback on assessments events.

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