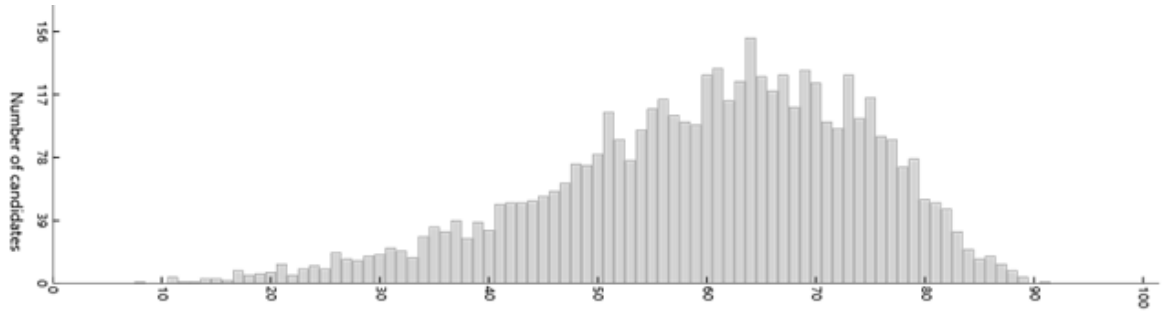
Government of **Western Australia**
School Curriculum and Standards Authority

Summary report of the 2019 ATAR course examination:
Human Biology

Year	Number who sat	Number of absentees
2019	4475	50
2018	4962	54
2017	4861	63
2016	4709	85

Examination score distribution–Written



Summary

Attempted by 4475 candidates	Mean 59.92%	Max 90.89%	Min 8.27%

This year's examination was attempted by 4475 candidates with an overall mean of 59.92%. This mean is consistent with the mean scores of the previous three years, those being 59.69% in 2018, 60.58% in 2017 and 59.70% in 2016. This demonstrates an excellent uniformity in difficulty and accessibility of the paper over the past few years, even though a variety of question types and syllabus points have been covered. The paper discriminated well, producing scores from 8.27% to 90.89%. The paper was an appropriate length with most candidates attempting most questions and finishing the paper.

Section means were:

Section One: Multiple-choice	Mean 74.84%		
Attempted by 4475 candidates	Mean 22.45(/30)	Max 30.00	Min 5.00
Section Two: Short answer	Mean 54.79%		
Attempted by 4475 candidates	Mean 27.39(/50)	Max 45.09	Min 0.47
Section Three: Extended answer	Mean 50.87%		
Attempted by 4431 candidates	Mean 10.17(/20)	Max 18.75	Min 0.00

General comments

Candidates were able to demonstrate good factual recall and basic understanding of the concepts throughout the Human Biology syllabus. While the mean scores in Section One: Multiple-choice and Section Two: Short answer were sound, they were slightly lower than 2018. The mean score in Section Three: Extended answer was above 50%, an improvement by over 8% from 2018. The answers provided in the Section Three: Extended answer showed improvement in writing style from previous examinations. Candidates who showed proof of structured planning or who answered the questions with the aid of tables and annotated diagrams, performed better than those that did not.

Advice for candidates

- The examination is based on the syllabus and not a textbook. Expect coverage of most syllabus points in the examination; however, not every syllabus point will appear in the examination. Although the same syllabus points may appear in consecutive examinations, questions will be structured in different contexts.
- You must read questions fully and ensure you understand the meaning of verbs used in the question. You need to know the difference between a question requiring you to 'name' or 'identify' to one requiring you to 'describe' or 'explain'.
- You need to focus on interpreting the question and providing a concise answer to that question, rather than simply writing down all you have learnt on the relevant topic. Stating key terminology or memorised facts often will not answer a question fully. Instead you need to engage high order thinking skills and apply the materials you have learnt in class to answer the question.
- You are reminded that if information is stated in the question or provided in the data, no points will be awarded for restating the same information in your response. Read the questions thoroughly and ensure responses are covering the required information.
- A common fault in the responses throughout Section Two: Short answer and Section Three: Extended answer sections is the inability to use scientific terminology to construct an analytical answer. Many responses used key terms incorrectly or in some cases did not use key terms at all. You must be able to use the language of Human Biology fluently in the construction of a response in order to demonstrate your understanding of the concepts.
- Take time to plan your response and ensure all parts of the question are addressed.
- You should present annotated diagrams, charts or tables to construct responses to Section Two: Short answer and Section Three: Extended answer questions. This technique not only helps you to write clear and precise answers, but also ensures that markers can easily follow and award marks for responses.

Advice for teachers

- Students require a detailed knowledge of all syllabus points and the ability to apply these points and different contexts. Simple recall and rote learnt facts are not enough for candidates to gain top marks in the examination. Students must be able to think critically and apply their knowledge to unique scenarios.
- There were several specific syllabus points that were not answered well in this year's examination. These include:
    - tool culture
    - bioinformatics and comparative genomics
    - role of thermoreceptors and peripheral vasoconstriction in temperature regulation
    - action potentials.

  Teachers should ensure adequate coverage of these syllabus points in their lessons and assessments.
- Teachers are reminded that the textbook is not the syllabus. Teachers should supplement their teaching and learning with other references and resource materials beyond the textbook.
- Teachers are reminded that there is a list of required mathematical skills in the syllabus document. While basic mathematical and graphing skills have traditionally been well taught, there are many more mathematical skills included in the list. The question this year on percentage change proved to be challenging for a large number of candidates. Give students ample practise at applying all required mathematical skills in a scientific method context.
- Students need to be given ample practise at decoding extended response questions as part of their Human Biology lessons and school-based assessment program. They need substantial practise in breaking down a question and identifying what the question asks of them. Examination technique should be modelled and reinforced throughout the year.

Comments on specific sections and questions
Items in Section One: Multiple-choice worked very well, with mean scores ranging from 52.22% to 98.68%. Some questions were answered very successfully in this section and demonstrated outstanding factual recall of specific syllabus points such as transmission of pathogens, gel electrophoresis, phylogenetic trees and comparisons between the endocrine and nervous systems. Section Two: Short answer was also pleasing with mean scores ranging from 43.16% to 61.92%. Section Three: Extended answer proved the most demanding of the paper with the lowest overall mean of the sections with Question 41 having a mean below 50% while Question 42 had a sound mean of 57.59%.

Section One: Multiple-choice (30 Marks)
Section One: Multiple-choice had an overall mean of 74.84%. The maximum mark achieved on the section was 100.00% and the minimum mark was 16.66%. Generally, questions were well answered with only Questions 6, 7, 14, 19, 23, 24 and 29 having mean scores below 60.00%. Questions 3, 4, 13, 15, 17, 18, 25 and 27 were the easiest with mean scores above 85.00%. As expected, candidates performed well on straightforward recall style questions and found the more complex, multi-step questions challenging.

Question 6 required candidates to distinguish between the control of the experiment and controlled variables of the experiment. A significant number of candidates selected option (b) incorrectly, which listed only controlled variables. Question 7 focused on gene therapy. Many candidates were confused by the alternatives mentioning stem cells and failed to identify that gene therapy involves the transfer of alleles via a vector. Question 14 was a simple terminology question relating to the concept of gene flow. Many candidates did link gene flow to migration, but could not distinguish between the movement of individuals and other species migration. In Question 19, candidates needed to understand the role played by ADH and aldosterone on the nephron. A significant number of candidates selected option (b) incorrectly, which linked ADH to the loop of Henle and not aldosterone. Question 23 required candidates to have a clear understanding of antibiotics, namely their specificity. Many candidates did not appear to understand the terms broad-spectrum and narrow-spectrum. Question 24 focused on cell replacement therapy. Candidates could not identify that this therapy involved transplanting stem cells. Question 29 required a thorough reading of the question and interpretation of the graph. Candidates were asked to find out the age of the specimen if 75% of the isotope had been decayed, however, many selected the alternative where 75% of the isotope remained.

Section Two: Short answer (107 Marks)
Section Two: Short answer had an overall mean of 54.79%. Generally, candidates were able to demonstrate a good recall of basic facts and knowledge. The higher order and application questions were successful in differentiating candidates and allowing the top candidates to show their greater understanding of the course materials. Questions 33, 34, 36, 37, 38 and 40 all had mean scores above 55.00%. Question 37, focusing on biotechnology, was the most successfully completed question in the section. Only Questions 31 and 35 had mean scores below 50%. Question 31, which focused on hominid tools to provide insight into human lifestyle and culture, proved to be the most problematic of all the Section Two: Short answer questions.

Section Three: Extended answer (40 Marks)
Section Three: Extended answer had an overall mean of 50.87%. Question 42 was the most successfully answered question, with a mean of 57.59%. Question 43 had a mean of 50.23% and Question 41 had a considerably lower mean of 40.54%. Generally, candidates who attempted to answer the questions using annotated diagrams and tables were able to construct more precise responses that were easier to understand.