



**EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE**

Home of Examinations and Assessment, Zone 6, Zwelitsha, 5600

REPUBLIC OF SOUTH AFRICA, Website: [www.ecdoe.gov.za](http://www.ecdoe.gov.za)

**2023 NSC CHIEF MARKER'S REPORT**

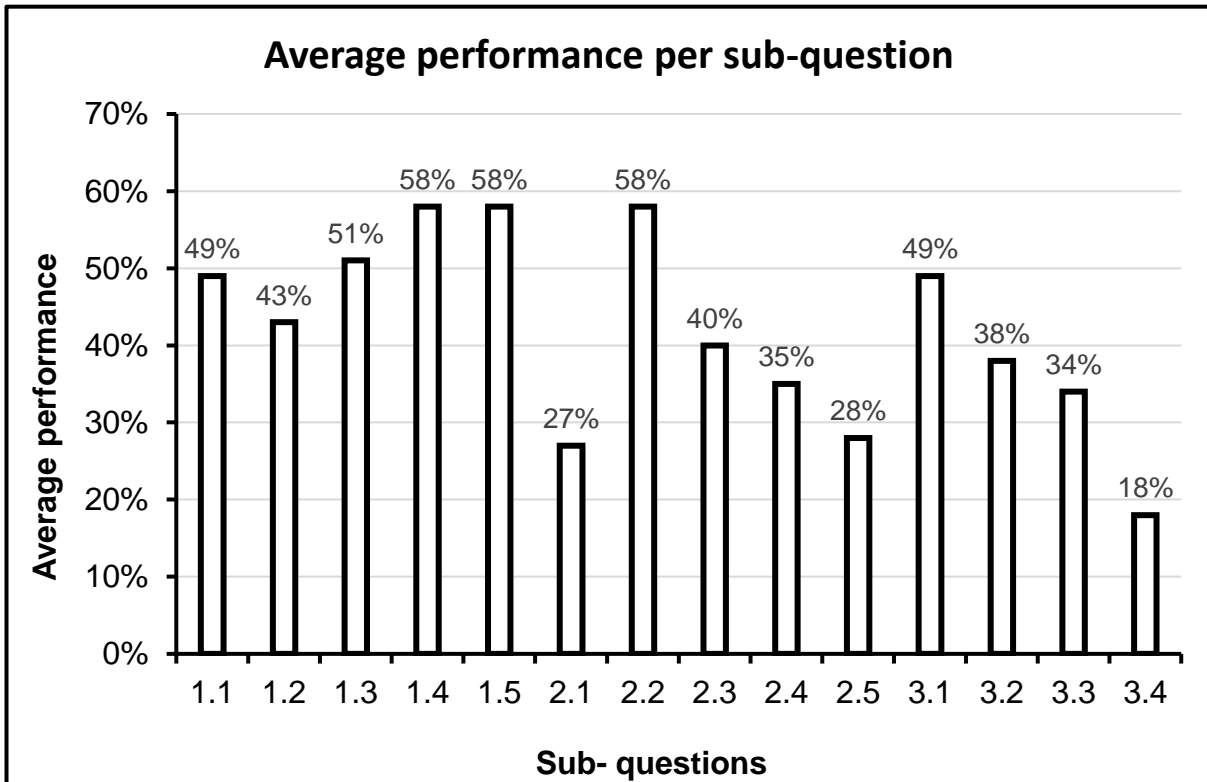
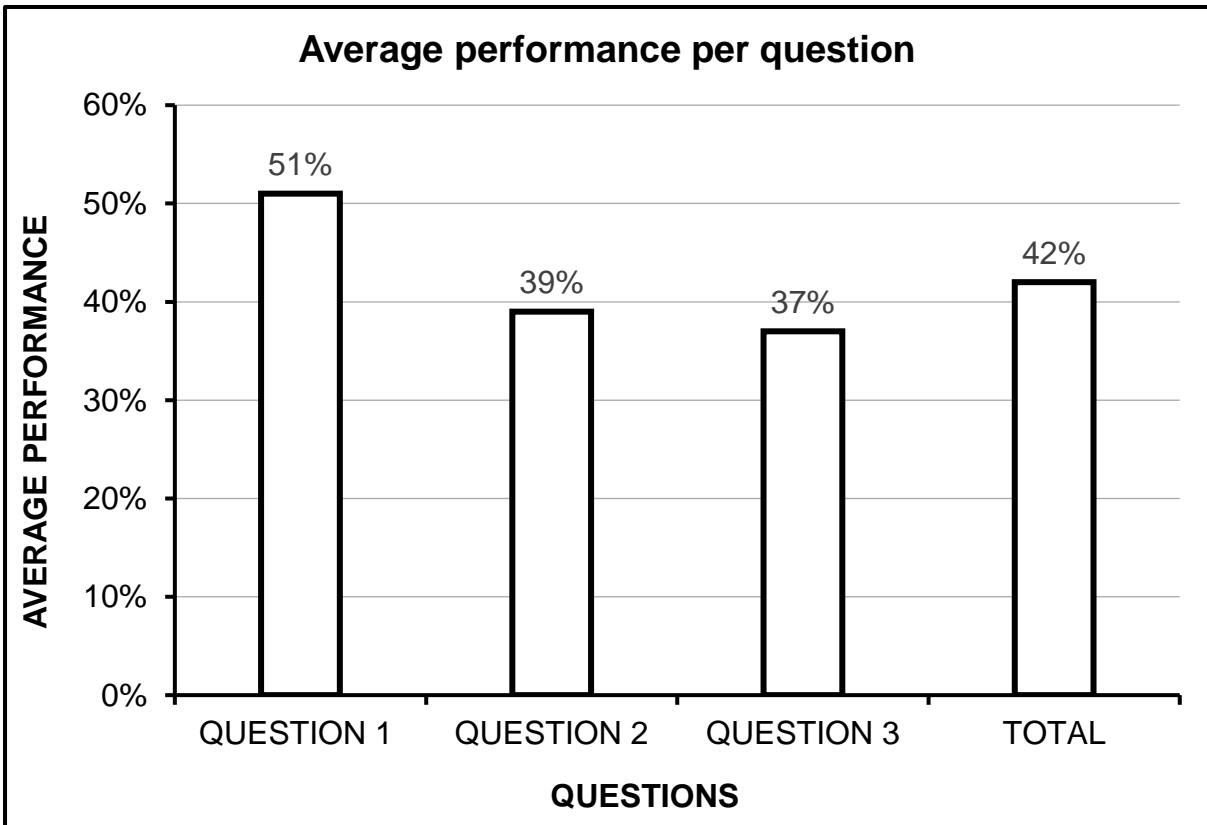
|                                   |                      |   |   |
|-----------------------------------|----------------------|---|---|
| <b>SUBJECT</b>                    | <b>LIFE SCIENCES</b> |   |   |
| <b>QUESTION PAPER</b>             | 1                    | 2 | 3 |
| <b>DURATION OF QUESTION PAPER</b> | 2 ½ HOURS            |   |   |
| <b>PROVINCE</b>                   | EASTERN CAPE         |   |   |
| <b>DATES OF MARKING</b>           | 4 – 19 DECEMBER 2023 |   |   |

**SECTION 1: (General overview of Learners Performance in the question paper as a whole)**

Candidates and teachers viewed the 2023 paper as a fair one. Candidates performed better in Life Sciences Paper 1 in 2023 than in the previous year. An increase is evident in the percentage of learners who passed as well as an increase in the number of learners achieving level 6 and 7. Higher marks were obtained in question 1 due to the high number of level 1 questions in this section. Question 3 was the most poorly answered question with most learners giving incomplete responses. This question contained the highest percentage of level 3 and 4 questions.

The general performance of the learners was evaluated from a random sample of 100 scripts from the 12 districts in the province. Only one script was sampled per centre to allow sampling over a wide range of centres.

The graph below depicts the average performance based on raw marks of the candidates per question and average performance in the paper as a whole:



Candidates still struggled with higher order questions especially those that require them to describe and explain. The investigative type questions are particularly challenging even for

the strong candidates. Most rely on memory and are not able to explain a new concept or result. This is due to too much emphasis placed on learning for the examination rather than learning for understanding. This can be seen from candidate's "textbook" answers to questions that require application to new situations.

Language remains a barrier to second language candidates. Some do not have the vocabulary to explain questions properly and lose marks because their word choice changes the meaning of their answer. The use of mother tongue question papers in the trial examination helped them to understand but it was a disadvantage to them in the final examinations as candidates must now write in English for the first time with no help. Candidates therefore did not understand certain questions in the paper.

**SECTION 2: Comment on candidates' performance in individual questions**

**QUESTION 1**

**(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?**

The learner performance was relatively higher than the rest of the questions. This is because this question was constructed mainly of level 1 questions which requires simple recall and comprehension. Although, the candidates were expected to score about 80 -90% in this section, they only scored an average of 58%. This is a real concern to all.

| <b>QUESTION 1 RASCH ANALYSIS - (AVERAGE PERCENT PER SUB-SECTION)</b> |            |            |            |            |
|--|------------|------------|------------|------------|
| <b>1.1</b>   | <b>1.2</b> | <b>1.3</b> | <b>1.4</b> | <b>1.5</b> |
| 49   | 43         | 51         | 58         | 58         |

This was the highest scoring question as candidates attempted all questions and very few left questions unanswered.

**Question 1.1**

Candidates performed poorly in questions 1.1.5 and 1.1.7.

**Question 1.2**

There has been an improvement in candidates' performance in this terminology question.

**Question 1.3**

Most candidates only got 1.3.3 correct.

**Question 1.4**

This question was well answered with many candidates.

**Question 1.5**

This question was also well answered.

**(b) Why were the questions poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.**

|     |  |
|-----|--|
| 1.1 | Multiple Choice<br>In multiple choice question only ONE letter is asked for. If candidates write TWO letters |
|-----|--|

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|           | <p>it is immediately marked wrong even if the first one is correct. Candidates need to follow instructions.</p> <p>The question asked for a hormone that could kill broad-leaved weeds.</p>   |
| 1.1.5     | <p>The answer was: C Auxins only. Learners still have an aversion to plant hormones and this section is often rushed through in class as it fits between two important sections of the Endocrine System and Evolution.</p>  |
| 1.1.7     | <p>The question asked for the characteristic that causes sperm to move faster.</p> <p>The answer was: A oval-shaped head. Candidates did not understand the term <i>oval</i>. Teachers should familiarise candidates with all features that make sperm effective swimmers. The shape of the sperm can also be referred to as torpedo due to the pointed tip.</p>  |
| 1.2       | <p>Terminology – Spelling continues to be a problem. Many words are spelt so poorly that the meaning changes e.g. epididymis (where sperm is stored temporarily) was spelt epidemis (epidermis) which is the outer layer of the skin.</p>   |
| 1.2.1     | <p>Viporous was not accepted.</p>   |
| 1.2.2     | <p>Ureter was not accepted.</p>   |
| 1.2.4     | <p>Glucogen/Glucagon were common answers that were not accepted.</p>  |
| 1.2.5     | <p>Candidates did not understand that the placenta acts as a micro-filter. A micro-filter selectively allows small molecules such as gases, nutrients etc. to move through. The placenta acts as a micro-filter between the mother's blood and that on the foetus. It allows oxygen and nutrients to move from the mother's blood to the embryo's blood, while Carbon dioxide and wastes move from the embryo's blood to the mother's</p> |
| 1.2.6     | <p>blood.</p>   |
| 1.2.7     | <p>Chorion was a common incorrect answer. Candidates still confuse choroid with chorion.</p>  |
| 1.2.9     | <p>Node of Ranvier and Schwann cell were accepted although they are not required to be taught according to the examination guidelines.</p>  |
| 1.2.10    | <p>Myelin alone was not accepted as it is not the complete term.</p> <p>Epididymis was poorly spelt.</p>  |
| 1.3       | <p>In Afrikaans some educators are still using old terminology e.g. <i>bytestis</i>. <b>Epididimis</b> should be used.</p>  |
| 1.3.1     | <p>Candidates do not follow the instructions. Instructions required candidates to write <b>A Only / B only / BOTH A and B</b> or <b>None</b>. Learners only wrote the letter. They were credited but should follow instructions and only write one of the expected responses.</p>   |
| 1.4.1 (a) | <p>Candidates could not distinguish that oogenesis produces 1 mature gamete (ovum) and 3 polar bodies while spermatogenesis produces 4 mature gametes (sperm cells)</p>   |
| (b)       | <p>Semi-circular canal✓ - Semi-circular was not accepted as it is not the complete name</p>   |

|           |   |
|-----------|---|
| 1.4.2     | In Afrikaans Halfmaanvormige sirkels was not accepted<br>Oval window✓ - Candidates confused it with round window.   |
| 1.5.1     | Eustachian tube was poorly spelt.   |
| 1.5.1 (c) |   |
| 1.5.2 (b) | Names of structures was asked for and descriptions (e.g. ball of cells) was not accepted.<br>Blastocyst✓ - Blastocyte was not accepted as it refers to a different structure in the body.                                   |
| 1.5.3     | Endometrium✓ - Endometrial lining was accepted but uterine wall/ling was not as the uterine wall consists of various layers including the endometrium and muscle tissue.  |
| 1.5.5     | Chorion✓ - Choroid was a common incorrect answer.<br><br>Meiosis and Mitosis are still confused. Candidates are unsure where mitosis and meiosis take place in the cycle of life.<br>Choroid was incorrectly answered here. |

**(c) Provide suggestions for improvement in relation to Teaching and Learning**

- The learners are still struggling to comprehend biological terms. This requires continuous drilling. It is better to compile a list of biological terms per topic for the learners to revise the terms effectively. Short 10 minutes tests can be administered and marked immediately at the end of a topic to reinforce what was learnt. Correct spelling should be enforced for these tests.
- Crosswords are a fun way to learn terminology and encourage correct spelling. Teachers can use these as homework activities.
- Diagrams without labels should be given to learners to identify the parts and their functions. This can be done as homework or tests.
- Compile questions from previous question papers for revision purposes.
- Teaching should be in English and scientific terminology should be used while explaining so that candidates can familiarize themselves with how to explain concepts.

**(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.**

- Encourage learners to pay attention to the correct spelling. (Processes, biological terms. etc.)

- Avoid using abbreviations

## QUESTION 2

### (a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

The performance in this question varied greatly across centres. The question contained a good balance of higher order and lower order questions. Candidates generally attempted most questions with top achievers scoring high marks. Weaker candidates struggled to apply the knowledge that was required by some questions.

#### QUESTION 1 RASCH ANALYSIS - (AVERAGE PERCENT PER SUB-SECTION)

| 2.1 | 2.2 | 2.3 | 2.4 | 2.5 |
|-----|-----|-----|-----|-----|
| 27  | 58  | 40  | 35  | 28  |

#### Question 2.1

This question was the worst performing question. Learners struggle to understand the strategy of amplexus. They could not relate to how it benefitted the frog.

#### Question 2.2

This question was fairly well answered by most candidates as it included the graph.

#### Question 2.3

This question was answered better than expected as many answers could be extracted from the text.

#### Question 2.4

This level 1 question on the brain was poorly answered as candidates battled to score in 2.4.3 and 2.4.4.

#### Question 2.5

Most candidates performed very badly in this question. They were not able to apply their knowledge to this specific situation.

**(b) Why were the questions poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.**

|                  |  |
|------------------|--|
| 2.1              | Learners were not able to relate to the strategy of Amplexus.  |
| 2.1.1            | Many candidates thought that the diagram depicted internal fertilisation and did not read the explanation in the stem of the question.   |
| 2.1.2            | Learners understood that eggs would dry out on land but could not explain why and so lost a mark. It was because they do not have a shell.   |
| 2.1.3 /<br>2.1.4 | Learners confused amplexus (when the male climbs onto the back of a female and grasps her) with the fact that they release over 6000 eggs due to the sentence structuring in the stem. The memo accounted for this, and two contrasting options were catered for in the marking guidelines.  |
| 2.2.2            | Both these questions required learners to explain (in a cause-and-effect way). Learners often gave the effect of the strategy without the cause. This was not credited as the cause should always be given first.<br><i>The concept of Amplexus should not be taught as it is not in the examination guidelines, but it can be used as an example of how reproductive strategies can be applied to real life situations.</i>   |
| 2.2.3 (b)        | The functions of the individual accessory glands are not required by the examination guidelines. Teachers should teach the collective function of all three glands. If the function of a gland is asked, then any of the accessory gland functions will be accepted as indicated in the marking guidelines. Candidates need to fully explain functions in a cause-and-effect way. They should state the characteristic of the fluid and how it functions during reproduction. (i.e. The fluid is alkaline which neutralizes the acidity in the vagina and allows sperm to survive) |
| 2.3.1 (a)        | Many candidates drew bar graphs, line graphs and even pie charts and tables instead of histograms. Learners also transposed axis. Marks were awarded for correct features, and candidates did not lose all 6 marks for the wrong graph. Candidates did not always draw only the four bars required. Some only drew two while others drew eight.  |
| 2.3.3            | Candidates write Graafian follicle cyst and corpus luteum cyst instead of the structure  |

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|           | <p>on its own and lost marks</p>   |
| 2.3.4     | <p>Candidates could not explain using their knowledge why the hormone they stated in 2.3.2 (b) was high. Because there were 3 possible hormones that were correct for 2.3.2 (b), learners were required to explain why the hormone that they had answered in 2.3.2 (b) was high. They were given no credit if they answered why another hormone was high.</p>  |
| 2.4.1 (a) | <p>Candidates did not understand that the corpus luteum cyst would prevent the corpus luteum from degenerating. The corpus luteum would therefore continue to produce progesterone which would inhibit the pituitary from producing FSH and therefore no follicle would develop and no ovum would be produced. Candidates referred to the thickening of the endometrium which would not prevent a woman falling pregnant.</p>  |
| 2.4.3     | <p>Many candidates wrote medulla oblongata instead of spinal cord. The medulla oblongata is higher up at part label D.</p>   |
| 2.4.4     | <p>Candidates could not describe the location of the corpus collosum. The marking guidelines required candidates to state it was found <i>between the two hemispheres of the cerebrum</i> for 2 marks. They lost both marks if they stated <i>brain</i> instead of <i>cerebrum</i>. This is because the corpus collosum is only found in the cerebrum. The cerebellum also has two hemispheres, but it is connected by the vermis. They also lost marks is they said <i>underneath the cerebrum</i>.</p> |
| 2.5.1     | <p>This question was very poorly answered because candidates could not explain themselves correctly. It was evident from the answers that they understood the answer but did not explain fully. Many gave the function of the parts of the brain rather than applying their knowledge to the question being asked. They needed to relate the function of the affected part of the brain to what the learner was experiencing.</p>  |
| 2.5.2 (a) |  |
| 2.5.2 (b) | <p>Candidates were required to state that a reflex action was a:<br/><i>rapid, involuntary response</i> (all three aspects were required for one mark)<br/><i>to a stimulus</i>. (many candidates to not include this fact and lost a mark)</p>  |
| 2.5.3     | <p>This level 1 question was poorly answer even though it is stated in the examination guidelines.</p> <p>The answer to this question was in the text. However, candidates referred to the own knowledge which was mostly incorrect.</p>   |



This was a higher order question and therefore required a specific response rather than a general account. The reflex arc in this question referred to the specific example of the knee-jerk which has no interneuron in it. If the candidate included the interneuron in the pathway, they were penalized 2 marks as the sequence was incorrect. The candidate was also required to state where the receptor was found (in the patella tendon) as well as mentioning the effector (quadricep muscle). All this information was in the diagram. However, most candidates only gave the general account for a reflex arc and were only credited 1 mark.

**QUESTION 3**

**(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?**

This question was very poorly answer. With the average mark being under 40% for all sub-sections.

| 3.1 | 3.2 | 3.3 | 3.4 |
|-----|-----|-----|-----|
| 49  | 38  | 34  | 18  |

**Question 3.1**  
Candidates performed fairly well in this question on Alzheimer's disease as many of the responses were found in the text.

**Question 3.2**  
Candidates' achievement varied in this question. The two 5 mark questions in 3.2.3 and 3.2.4 on homeostasis proved a downfall of those that did not know their homeostasis.

**Question 3.3**  
Candidates lost marks in this question on thermoregulation if the explained both vasodilation and vasoconstriction in Question 3.3.4.

**Question 3.4**

This question on plant hormone was the lowest performing question in the paper. Learners still struggle to move past the explanations for phototropism and geotropism to fully understand the section of work.

**(b) Why were the questions poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.**

|           |  |
|-----------|--|
| 3.1.1     | Candidates did not know what happens to the nerve tissue in the brain in Alzheimer's disease. Many wrote that the myelin sheath degenerates. Myelin sheath degenerates in Multiple Sclerosis. In Alzheimer's disease it is the nerve tissue that degenerates or plaques/proteins form around nerve tissue  |
| 3.1.2     | Candidates wrote incomplete answers. They did not copy the full quote from the   |
| 3.1.2(a)  | extract.   |
| 3.1.2 (b) | Candidates write both <i>Age and family history</i> when asked for a genetic risk factor and therefore lost the mark. It should only be <i>Family history</i> .  |
| 3.1.3     | Candidates were required to write factors that they considered when selecting participants. Some candidates are still interchanging validity and reliability and   |
| 3.1.4     | therefore wrote factors to improved reliability.<br>Candidates were not specific about how the scientists improved reliability. It is expected that candidates recall the specific way in which the scientists increased reliability e.g. <b>37</b> females (not large sample size) and repeated experiment <b>3 times a</b>   |
| 3.1.5     | <b>week for 3 months</b> (not repeat experiment)<br>This question was very poorly answered. Candidates could not understand and explain why the investigation did not prove that exercise does not reduce the risk of getting Alzheimer's disease.   |
| 3.2.3     | Many candidates could not associate the correct hormone, aldosterone, with the homeostasis of salt in the blood. Insulin, ADH and Thyroxin were all used to explain this question.<br>When explaining this homeostasis question, candidates lost marks for leaving out the key words <b>MORE, INCREASES, REABSORBED</b> and <b>IN THE BLOOD</b><br>When the adrenal gland is stimulated it produces <b>MORE</b> aldosterone, which <b>INCREASES</b> the permeability of the renal tubules, and <b>MORE</b> salt is <b>REABSORBED</b> into the blood. This increases the salt concentration <b>IN THE BLOOD</b> .<br>Candidates were not credited if they stated that salt concentration increases <i>in the body</i> . This is because the renal tubules are also in the body and the salt concentration in the tubules is decreasing. |
| 3.2.4     | Candidates also confused the hormone responsible for osmoregulation. Aldosterone, Thyroxin and Insulin were all given as being responsible.<br>Those candidates that did know the correct hormones performed well in this question. When explaining how the secretion of the pituitary gland affects the kidney, candidates lost marks for leaving out the key words <b>MORE, INCREASES and</b>  |

|                               |   |
|-------------------------------|---|
| <p>3.3.1 (a)</p> <p>3.3.3</p> | <p><b>REABSORBED.</b></p> <p><b>MORE</b> ADH is secreted which makes the renal tubules <b>MORE</b> permeable. <b>MORE</b> water is <b>REABSORBED.</b></p> <p>Candidates were not credited if they used the word absorbed instead of reabsorbed. It is important that reabsorbed is used as the water was in the blood vessels before it was filtered into the nephron during glomerular filtration. Therefore, the water will now be moving back into the blood. i.e. reabsorbed</p> <p>Temperature regulation was not credited as it is not the correct term.</p> <p>Candidates struggled to apply the formula for percentage change to this question. Most candidates scored 1 mark for (x100). Candidates should use the following formula:</p>  |
|                               | $\frac{\text{Final value} - \text{Initial value}}{\text{Initial value}} \times 100 = \text{percentage change}$  |
| <p>3.3.4</p>                  | <p>e.g. <math>\frac{35.4 - 37.4}{37.4} \times 100 = -5.34\%</math> This indicates a 5,34 % decrease</p> <p>The answer for a percentage decrease should not be left as a negative but should be stated as a percentage decreases as in the example above.</p> <p>This same formula can be used for a percentage increase. The answer would then be positive.</p> <p>This question required learners to explain the roles of the sweat gland and blood capillaries in lowering the skin temperature. Candidates were required to explain the process of vasodilation which leads to more blood travelling to the skin, more sweat being produced, more heat being lost through evaporation and radiation which would lower the skin temperature.</p> <p>Many candidates were not sure whether to write vasodilation or vasoconstriction. They therefore wrote that before exercise vasoconstriction took place and after exercise vasodilation took place. They were awarded NO marks if they wrote both accounts as this was a higher order question which required them to analyze the graph and explain what caused the decrease in temperature during exercise.</p> <p>The candidates were not credited for the following reasons:</p> <ul style="list-style-type: none"> <li>• The candidate could not expect the marker to choose the correct answer if both were given. The principle of mark first one did not apply here as</li> </ul> |

|  |   |
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|  | <p>candidates cannot be credited for a "lucky guess". Some candidates lost up to 6 marks here as they wrote both accounts.</p> <ul style="list-style-type: none"> <li>• The decrease in skin temperature took place during exercise and at the end of the exercise period the skin had already cooled down. After exercise there was a rest period during which the skin temperature increased again.</li> <li>• This question focused on <b>skin temperature</b> and not body temperature. The blood vessels and sweat glands bring about a change in the skin temperature.</li> </ul> <p>3.4</p> <p>3.4.1 (a) This question was very poorly answered. Candidates still spend too little time studying plant hormones. They are only taught the functions of the hormones together with phototropism and geotropism. No time is spent in class looking at investigative questions on this topic.</p> <p>3.4.2 Candidates wrote the <i>effect of auxin</i> as the independent variable. This is incorrect as the <i>effect of auxin</i> is the growth of the lateral branches. The independent variable is the <i>presence or absence of auxin</i>.</p> <p>3.4.3 Candidates do not understand the concept of validity. They could not relate to the question that asked why environmental conditions were kept the same. This is to ensure validity so that only the independent factor is being changed (auxin) therefore the results would be due to auxins and nothing else.</p> <p>3.4.4 Candidates could not explain the use of agar without auxin in plant C. It was set up as a control to show that the results in Plant D were due to auxins and not due to the agar being used.</p> <p>Candidates lost marks because they wrote an account of what occurred during the investigation instead of stating the conclusion. Candidates should refer to the aim of the investigation which is stated in the first paragraph to write the conclusion. They should use the same variables as found in the aim.</p> <p>e.g.</p> <p>Aim: The investigation was done to determine the effect of auxin on the growth of lateral branches.</p> <p>Conclusion: The presence of auxins slows down the growth of lateral branches.</p> |
|--|---|

| <b>(c) Provide suggestions for improvement in relation to Teaching and Learning</b>   |
|---|
| <ul style="list-style-type: none"> <li>• Graph work should be taught and tested from Grade 8. It should be taught and tested every year with increasing difficulty as graphs and tables should be easy marks for candidates to score.</li> <li>• Teachers are focusing on teaching common questions found in previous year's examinations. They are then disappointed when they do not appear. Often terming the examination unfair. Examinations need to show a degree of uniqueness each here in order</li> </ul> |

to maintain the quality and standard of the questioning. Focusing only on these set questions develops poor teaching.

- Teachers need to teach for understanding and not just teaching set answers for examinations. Higher order questions cannot be answered using textbook explanations but require the candidate to understand their work to apply it to new situations. Higher order questions in past papers should be used to encourage thinking and understanding.
- Candidates require more practice in reading for understanding. Homework, tests and exams should include short passages that require learners to read and apply their knowledge in order to answer questions.
- Candidates should be exposed to different examples when teaching. E.g. different scenarios of reflex actions.
- Candidates should be exposed to more practical based questions during lessons and for homework. They should practice identifying variables, writing the aim. Explaining the aim of a control in the experiment and using the data to draw a conclusion.
- Plant hormones are given too little time on the term planner. Only 3 days are allocated to it. Yet it is often used for higher level questions. This is not enough time in the planner for teaching this topic especially when teachers rush through it so that they can teach Evolution before trial examinations. More time needs to be allocated to work through investigative type questions on this topic.
- Focus on instructional verbs in the question when revising. Ensure that learners understand that **EXPLAIN** questions should be answered in a cause-and -effect manner. A **DESCRIPTION** requires a step by step sequence of the process. When asked to give **TWO** factors, only the first two answers will be marked.

**(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.**

- Subject Advisors are encouraged to develop workshops to train teachers on how to set papers based on the different cognitive levels. They are not aware of what the cognitive levels entail and often express unfairness in a paper based on the level 4 questions.
- Regular workshop for teachers to empower and equip them to handle high order questions.
- Teachers should be encouraged to develop their own teaching material and note in line with the examination guidelines and not rely on textbooks only.
- Subject Advisors are encouraged to help develop revision material for their district using past question papers and covering a range of questions.
- Candidates should be encouraged to set out the paper correctly.
  - They should start each question on a new page.
  - They should leave a line between each answer.
  - They should not write on top of work they have scratched out as this makes it very difficult for markers to read.

- Subject advisors should continue their efforts yearly to train new teachers on the scientific method.