EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE
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REPUBLIC OF SOUTH AFRICA, Website: www.ecdoe.gov.za

2024 NSC CHIEF MARKER'S REPORT

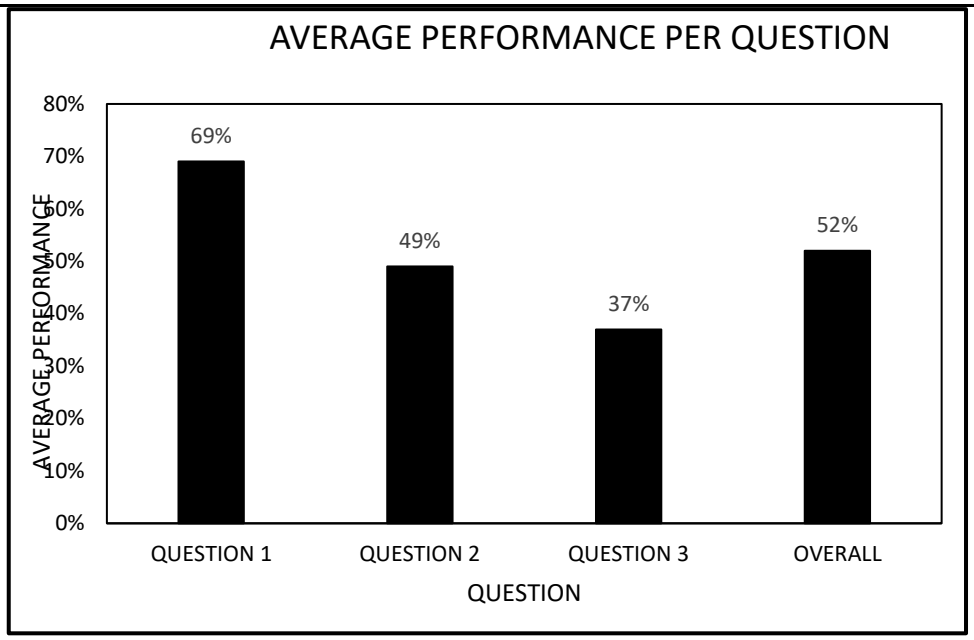
SUBJECT	**LIFE SCIENCES**		
QUESTION PAPER	1		
DURATION OF QUESTION PAPER	2 ½ HOURS		
PROVINCE	**EASTERN CAPE**		
NAME OF THE INTERNAL MODERATOR	**RENE SCHONEGEVEL-BISHOP**		
NAME OF THE CHIEF MARKER	**NOBUHLE MAMPOFU**		
DATES OF MARKING	**27 NOVEMBER 2024 – 13 DECEMBER 2024**		
HEAD OF EXAMINATION:	**MR E MABONA**		

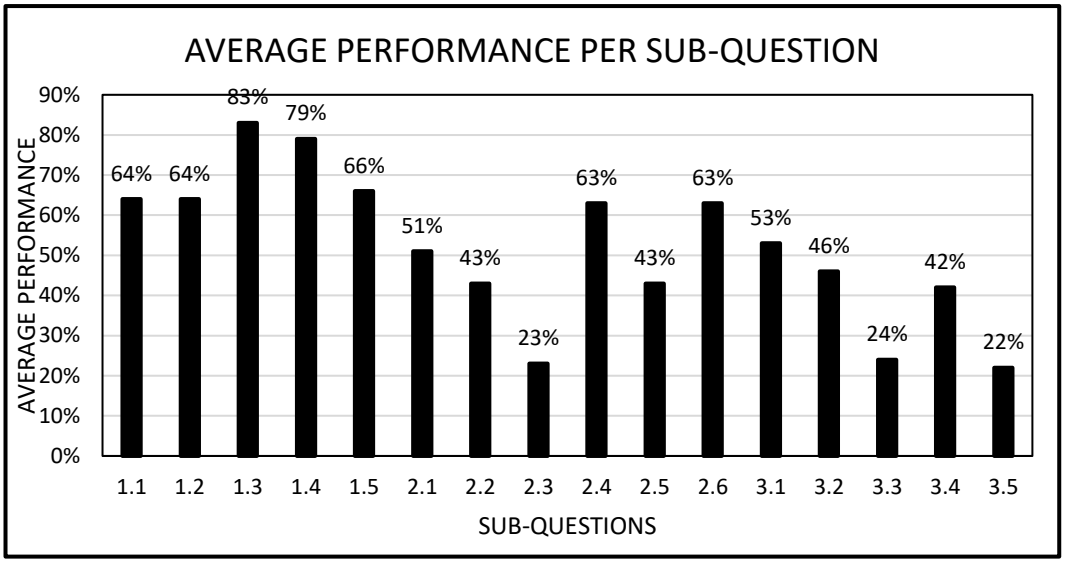
SECTION 1: (General overview of Learners Performance in the question paper as a whole)

The Life sciences paper 1 of 2024 was a fair paper that upheld the same high standard of questioning and innovation that we have come to expect. It was well balanced in terms of cognitive and difficulty levels and accommodated all candidate abilities.

The difficulty level of the paper is generally regarded as moderate to difficult. There were some challenging questions included in the paper to distinguish between low academic achievers and top-academic achievers. There were also sufficient opportunities provided to low academic achievers to score at least a pass mark. Candidates performed particularly well in Question 1 which contained only level A and B questions. Questions 2 and 3 separated the top-achievers from the rest.

The language use in this paper, as well as in the marking guidelines was very accommodating to second language learners which boosted overall performance in the province. It allowed candidates to express their Life Sciences knowledge without having to first overcome the language barrier.


AVERAGE PERFORMANCE PER QUESTION
AVERAGE PERFORMANCE
80%
70%
60%
50%
40%
30%
20%
10%
0%
69%
49%
37%
52%
QUESTION 1
QUESTION 2
QUESTION 3
OVERALL
QUESTION


AVERAGE PERFORMANCE PER SUB-QUESTION
AVERAGE PERFORMANCE
90%
80%
70%
60%
50%
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10%
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2.2
2.3
2.4
2.5
2.6
3.1
3.2
3.3
3.4
3.5
SUB-QUESTIONS

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?

Candidates performed very well in this question as it only consisted of level A and B questions. Majority of the learners attempted to answer all questions. Very few questions were left unanswered.

The average for the question in the item analysis was 69%

QUESTION 1 ITEM ANALYSIS (AVERAGE PERCENTAGE PER SUB-QUESTION)				
1.1	**1.2**	**1.3**	**1.4**	**1.5**
64%	64%	83%	79%	66%

Question 1.1 Multiple Choice

Candidates performed poorly in questions 1.1.8 and 1.1.10

Question 1.2 Terminology

There has been an overall improvement in the terminology question this year.

Question 1.3

This question was very well answered. This sub-question was the best performing question in the paper with many learners getting full marks.

Question 1.4

This question on the male reproductive system was the second best performing sub-question in the paper despite some teacher's reservations that the front view of the male reproductive system would be unfamiliar to candidates

Question 1.5

This question on the endocrine and thermoregulation systems was also well answered.

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

Question 1.1

Learners still writing two letters instead of one and thereby losing marks.

1.1.8 This question about functions of the amniotic fluid was the worst performed multiple choice question.

1.1.9 Candidates could not identify that the round window absorbs pressure from the inner ear.

1.1.10 Candidates struggled to map the pathway of the nerve impulses for balances.

Questions 1.2

Learners still have difficulty with spelling in question 1.2 (terminology question).

1.2.1 Candidates wrote umbilical artery/vein instead of umbilical cord.

1.2.2 Many candidates wrote peripheral nervous system instead of autonomic nervous system.

1.2.3 Candidates wrote maculae instead of cristae.

1.2.4 Candidates are not being taught individual bones of the ossicles.

1.2.7 Candidates do not know the basic functions of plant hormones.

Question 1.4

Some candidates did not recognise front view of male reproductive system and confused it with the female system. The text clearly stated it was the male system showing the candidates are not reading questions fully.

1.1.1 Candidates losing marks as they do not write both LETTER AND NAME but give only letter or name not both.

(a) Candidates incorrect spelling of urethra cost them marks

(c) Candidates cannot differentiate between epididymis and vas deferens

1.4.2 (a) Prostate gland incorrectly written (prostaste, protest)

Question 1.5

Learners struggled to identify glands from the diagram.

1.5.3 Candidates could not identify hormone and organ responsible for water regulation

(b) Candidates were asked to identify the organ. Instead, they write “renal tubules in kidney” or “cortex of kidney”. They need to identify only the organ as the question asked, which is the target which is the kidney.

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

- **Continual drilling of biological terms for each topic.**
- **Use of crosswords to improve spelling of terms.**

- **Draw up test sheets of terminology using past question papers.**
- **Use of correct English terminology will ensure candidates are familiar with terms.**
- **Use of diagrams to show positions of glands and organs.**
- **Candidates need to follow instructions and leave a line between questions and start each question on a new page as this aids marking.**
- **Emphasis must be placed on spelling of terminology as learners are influenced by accents of teachers which leads to incorrect spelling.**
- **An attempt must be made to improve learner handwriting as many candidates have illegible handwriting which makes marking difficult. Teachers need to apply for concessions for these candidates as their handwriting is a disadvantage to them.**

QUESTION 2 (Summary)

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

Candidates' performance in this question varied across centres. Candidates that were well prepared attempted most of the question 2. The mixture of lower order and higher order questions meant that marks varied amongst candidates and separate the different levels of candidates.

The average for the question in the item analysis was 49%

QUESTION 2 ITEM ANALYSIS (AVERAGE PERCENTAGE PER SUB-QUESTION)					
2.1	**2.2**	**2.3**	**2.4**	**2.5**	**2.6**
51%	43%	23%	63%	43%	63%

Question 2.1 Female Reproductive System

Fairly well answered as there were a number of level A and B questions in this sub-question

Question 2.2 Hormones of the menstrual cycle

Candidates still struggle to explain how the female hormone influence each other.

Question 2.3 Cataracts

This question was very poorly performed as candidates struggle to describe why cataracts cause vision loss.

Question 2.4 Long-sightedness

Candidates performed well in this question they were able to describe the cause of long-sightedness

Question 2.5 Neurons

Candidates struggle to relate what they have studied to what is shown in the diagram.

Question 2.6 Myelinated & Unmyelinated Neurons

Candidates answered this sub-question fairly well as the information was given in the graph. However, many still struggle to describe relationships shown in a graph.

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

Question 2.1

2.1.1 (b) Many candidates incorrectly identified the structure as the graafian follicle instead of the ovary. Teachers need to used diagrams when explaining ovulation to show learners that the ovum is released from the ovary into the fallopian tubes.

2.1.2 Candidates were required to give two visible reasons why there was an increased chance of fertilization. Most learners correctly identified that "the ovum had been released" but stated that there where "many sperm" which was not accepted as there were only a few sperm drawn in the diagram. The correct reason was that "the sperm were in the fallopian tubes/ close to the ovum"

2.1.3 The explanation of oogenesis is stated in the 2021 Examination Guidelines and should be taught as per the guidelines not as in some textbooks. Candidates lost marks as they left out key words when explaining. The following were common errors:

- "Cells in the ovary undergo mitosis" instead of DIPLOID cell in the ovary undergo mitosis
- "One follicle enlarges and undergoes meiosis" instead of one CELL IN THE follicle undergoes meiosis.
- "To produce an ovum" instead of one of the four cells produced forms a HAPLOID ovum

Candidates are also not aware that the production of follicles takes place before birth while meiosis only takes place at puberty when FSH levels increase.

2.1.4 Candidates gave characteristics of why the uterus was more suitable instead of why the fallopian tube was not suitable and would lead to the embryo's death. Candidates need to specifically describe why the fallopian tube is unsuitable. Candidates need to answer questions directly.

Question 2.2

2.2.3 Candidates could not explain why FSH increased from day 24 but rather explain the function of FSH. FSH increased because the levels of progesterone decrease and therefore the production of FSH by the pituitary is no longer inhibited.

2.2.4 Candidates still struggle to calculate percentage increase and decrease. This was highlighted in the November 2023 Chief Markers and Diagnostic Reports but there has not been much improvement in

performance Candidates also get confused when they get an answer of 300% which is the correct answer. Instead, they crossed it out and redid the calculation incorrectly. Candidates need more practice of percentage increase/decrease calculations, but they also need to understand what a percentage increase means.

2.2.6 Candidates could not explain what causes the increase in progesterone from day 20 if a female is pregnant. Rather they explained the function of progesterone in pregnant female. E.g. Progesterone is needed to thicken the endometrium. This was not accepted as it is a function of progesterone and not the reason it increases.

Progesterone increases in a pregnant female because:

- the corpus luteum does not degenerate and continues to produce progesterone
- the placenta develops which secretes progesterone

Many candidates summarised this as "Corpus Luteum continues secreting progesterone" implying that it does not disintegrate. They lost a mark as it was not clearly stated.

Question 2.3

2.3.2 The question required candidates to use information in the passage to explain why cataracts cause vision loss. Many candidates answered the whole question using quotes from the text without adding their own explanation while others did not use the text at all. Candidates were required to extract the quote that "protein structures in the eye start to disintegrate and clump together" and then explain how this would lead to vision loss. This question required candidates to take information from the text and then explain how this could lead to visual loss.

Some candidates identified the correct statement but the copied it incorrectly by leaving out words or changing words. They lost the mark as leaving out or changing words would change the meaning of the sentence. Candidates need to learner to copy correctly from the text.

Candidates also incorrectly stated that the cataract prevents light from entering the eye. The cataract allows light into the eye but does not allow it to pass through the lens.

Question 2.4

Candidates answered this question poorly. They were unable to explain how long-sightedness affects vision and how lenses cure this.

2.4.1 Candidates failed to identify the structure of the eyeball that causes long-sightedness. It is caused when the eyeball is too short. Many referred to the lens not being able to become convex enough. This was not accepted as the lens is not part of the eyeball structure.

2.4.2 Candidates struggle to explain why the convex lenses helped improved vision. Convex lenses cause light to be refracted MORE causing the image to fall on the retina.

Question 2.5

Candidates can identify the type of neuron but could not give visible reasons for there choice. The table below shows both structural and functional differences candidates should be able to identify.

Motor neuron	Sensory neuron
Multipolar – multiple dendrites and one axon	Unipolar – a single long process splitting into two branches
Short dendrites	Long dendrites
Long axon	Relatively short axon
Cell body is located at one end	Cell body located towards middle
Transmits impulse from receptors to interneurons	Transmits impulse from interneurons to effectors

Question 2.6

2.6.2 Candidates struggled to describe differences and relationships shown in the graph due to lack of language ability. They used words like higher and greater instead of faster to describe speed. Candidates also stated values instead of describing the difference between the speed of myelinated and unmyelinated neurons. Mathematics candidates should also be discouraged from using the term "directly proportional" as this is not credited in Life Sciences. Candidates need to describe the relationship using the changes (increase/decrease) that take place.

Candidates could also not identify the dependant and independent variable. They incorrectly stated: "As the impulse speed increases, the diameter increases".

QUESTION 3

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

Question 3 was the lowest performing question in the paper as it contained most of the level C and D questions.

The average for the question in the item analysis was 37%

QUESTION 3 ITEM ANALYSIS (AVERAGE PERCENTAGE PER SUB-QUESTION)				
3.1	**3.2**	**3.3**	**3.4**	**3.5**
53%	46%	24%	42%	22%

Question 3.1 Vertebrate Reproductive Strategies

This sub-question had the highest performance average in question 3.

Question 3.2 Pupillary Mechanism

This question had an average performance as candidates could score marks for labels and explaining the pupillary mechanism which most are familiar with.

Question 3.3 Investigation of effect of Insulin on blood glucose levels

This question was very poorly answered. Candidates understanding of insulin's role in controlling blood glucose is misinformed.

Question 3.4 Homeostatic control of thyroxin

This question had an average performance with most candidates scoring marks in 3.4.1 and 3.4.2.

Question 3.5 Effect of auxins on tropisms

This was the lowest performing sub-question in the paper. Candidates still struggle to explain the role of plant hormones (especially auxin) in plants.

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

Question 3.1

3.1.1 Some candidates ignored the instruction to quote from the passage and thus lost marks when they gave a definition of oviparous.

3.1.2 In this question on the advantages of internal fertilisation, many candidates referred to advantages for embryos/foetus instead or gametes. They were not credited as internal fertilisation does not benefit the embryo/foetus but rather it is advantageous because it increases that chance that gametes fuse together by bringing the gametes into close contact, protects the gametes from predators and harsh environmental conditions, allows reproduction to take place on land and requires fewer gametes. Many candidates just wrote "they are/it is protected" not stating that it was the gametes that were protected. They were not credited.

3.1.3 Candidates confuse altricial development with precocial development. They do not know the specific traits of altricial development such as:

- eyes are closed
- bodies do not have down feathers
- unable to move
- dependant on parents for food and protection when they hatch

Candidates lost marks for answering "need parental care" without specifying what care was required specifically in altricial birds.

Candidates also lost marks for stating that "they are BLIND". In Life Sciences, the word blind refers to not being able to see at all due to damage in the eye. The hatchling can see but eyes are still closed.

3.1.4 Candidates did not relate the fact that birds that have altricial development have very little yolk in their eggs which meant that their incubation is short because there is not enough nutrition and are therefore not fully developed when born.

Question 3.2

3.2.1 Candidates did not read the description for the diagram and confused it as a cell. They labelled X and Y as the cell / cytoplasm or nucleus. Candidates need to carefully read the decriptions above diagrams to fully understand them.

3.2.2 Candidates explained how the pupillary mechanism worked instead of what makes it a reflex action. It is a reflex action as it is a **rapid, involuntary action** in response to a stimulus. In this case the **stimulus is light**.

3.2.4 Candidates write explanations for both Diagram A and B. They were credited if they explained B correctly. Candidates should answer the question asked and not write all information as this could disadvantage them in future examinations.

Many candidates explained accommodation instead.

Question 3.3

3.3.1 Candidates do not understand the function of the control.

A control is the setup that does not contain the independent variable (it has been omitted).

In this question the control is the group of people with diabetes as they do not have the independent variable (insulin).

The control is set up to ensure that it is the INDEPENDENT VARIABLE that is causing the EFFECT and no other variable.

In this question the control is to ensure that it is the INSULIN that causes the CHANGE IN BLOOD GLUCOSE LEVELS and no other variable.

Candidates incorrectly answered that it is to compare results with healthy group or to see the effect of insulin. These statements do not explain the intention of using a control in an experiment.

Many candidates wrote the aim as the explanation for a control and were not credited.

3.3.2 The function of insulin is not correctly understood by candidates. Many wrote that it "converts glucose to glycogen" and were not credited. Insulin does not directly convert the glucose to glycogen but stimulates the liver to do this.

The explanation describes the role of insulin in reducing blood glucose in the body:

- Insulin opens cell doors - Insulin acts like a key to open the doors of your cells, allowing glucose to leave your bloodstream and enter your cells.
- Glucose is used for cellular respiration - Your cells use some of the glucose for energy.
- Excess glucose is stored - Your body stores any remaining glucose in your liver, muscles, and fat cells for later use.

Once the glucose moves into your cells, your blood glucose levels should return to normal. If you don't have enough insulin, glucose can't get into your cells and builds up in your blood, leading to high blood sugar and diabetes.

Another side effect of low insulin levels is that if glucose cannot get into the cell there will not be enough glucose in the cell for cellular respiration to take place, leading to a lack of energy.

Many candidates could not describe how insulin decreased blood glucose levels and wrote the whole homeostatic control mechanism that reduces blood glucose levels .

3.3.4 Candidates struggled to use the data in the table to explain why Group Y was the healthy group. They were not specific enough in their answers as needed to state the times at which glucose was within normal limits. They wrote general statements that were not scientifically correct. E.g. Group Y glucose levels are normal. This is not correct as the level at 60 minutes is above normal. Candidates need to learn how to use data from graphs and tables as evidence.

Many candidates only gave one or two reasons instead of all three required in this answer.

Question 3.4

3.4.1 Candidates answered "homeostasis" instead of "negative feedback mechanism"

3.4.3 Many candidates read the negative feedback diagram incorrectly. They did not follow the arrows in the diagram. They therefore incorrectly answered that the thyroxin levels were HIGH and described how the pituitary gland produces less TSH to stimulate the thyroid to produce less thyroxin. They lost 2 marks for incorrect levels of hormones. They were still credited for the glands that were stimulated.

3.4.4 Candidates did not link the role of thyroxin in controlling the metabolism to the effect of under secretion. An under secretion would mean that the metabolic rate would be low which would mean that not as much glucose will be used and more will be stored as fat. Therefore, increasing body mass. It is not correct to say that less fat will be broken down as this will not increase body mass by it would mean they would not loose as much. Body mass will only increase if MORE glucose is stored as fat.

Question 3.5

This question on plant hormones was extremely poorly answered. Candidates are still not able to identify independent and controlled variables. These variables should be read directly from the text.

3.5.1 (a) The independent variable should be read from the aim. In this question the independent variable was AUXIN. Some candidates wrote "concentration of auxin" and "effect of auxin" which were incorrect.

(b) The controlled variable should be read directly from the procedure in the question. Here only variables that would affect the investigation directly were considered. These variables were the plant species, the amount of light/darkness and the duration in darkness.

3.5.2 (b) Many candidates wrote no growth. This is incorrect. There would be no upward growth but there will be growth of lateral branches.

3.5.3 Candidates were required to say that each group would have four plants which makes it a sufficient sample size to be reliable. Candidates were not credited for say 12 plants as this does not indicate how many plants were in each group.

3.5.4 Candidates performed very poorly in this question. They confused it with geotropism and phototropism. There was no effect of light or gravity in this investigation.

Candidates narrated what they know about tropisms instead of applying the concept to the given situation. This shows that teachers are not teaching for understanding but rather teaching candidates to memorise phototropism and geotropism. Candidates also confused let and right side.

Agar is still unfamiliar to many candidates indicating that teachers have not used practical applications in activities in class. Agar jelly is an important tool in scientific investigation. It should be introduced in Grade 11 when studying bacteria. Agar plates containing nutrients are used for cultivating bacteria.

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

- The use of the 2021 Examination Guidelines is a vital teaching tool and should be the first document that should be consulted when teaching. The Examination Guidelines contains explanations for certain concepts that are meant to guide teachers as to the depth of understanding candidates require. E.g. oogenesis, spermatogenesis.
- Teachers need to spend time teaching calculations each year to ensure candidates have basic mathematical skills. These skills should be assessed from Grade 10 to ensure that candidates have a good understanding by Grade 12.
- Scientific Investigation should be taught at the start of each year and questions should be included at the end of each topic as practice.
- Application questions also need to be added at the end of each topic and should be included in all tests All skills should also be tested in informal tasks so as to expose candidates to all cognitive levels and levels of difficulty. These informal tasks should be marked according to the memo, which will train candidates on how to answer.
- Teachers need to demonstrate more practicals to learners. The use of YouTube clips and videos will also help learners understand Life Sciences in a practical way. Candidates need to see equipment like a clinostat. See agar jelly and how it is used. Otherwise, they will never fully understand their use.
- Teachers need to train learners to unpack, analyse and understand the question before answering.

Words that were commonly confused and used incorrectly in this paper

- Ovary, ovum, graafian follicle and corpus luteum
- Cornea and lens
- LH, progesterone and oestrogen
- Autonomic and automatic
- Circular and ciliary muscles
- Parts of the eye – cornea, lens and iris

Afrikaans words that should are not be used in teaching

Correct term	Terms not to use
Buis van Fallopius	Eierleier
Goiter	Kropgeswel
Vas deferens	Spermbuis
Akson en dendriete	Uitloper(s)
Epididimus	Bytestis
Diabetes	Suikersiekte
Tiroiedklier	Skildklier
Timpanium	Oordrom
Koglea	Slakkehuis

Other Afrikaans terms not to use in teaching

Meesterklier

Saadleier

Uitgroeisels

Uitsteeksels

Kopsenuwee

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

- Teachers should refrain from teaching directly from one textbook as it does not prepare candidates adequately. Textbook should be used as referenced only and Examinations guidelines should be consulted in all topics to determine depth of teaching.
- Teachers need to continue teaching for understanding instead of for the exam. There has been a good improvement in candidates understanding of Life Sciences, but learners are losing marks as they cannot apply knowledge to a new situation.

- The use of past papers for teaching and revision is good practice but should not be the only tool in determining how a topic is taught. Practical application through understanding is important to include in all teaching.
- 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 it makes it very difficult for markers to read.
- Teacher development is needed in the province to improve teachers understanding of the Scientific Investigation.
  Digital workshops online that are SACE accredited would be an incentive to teachers to upgrade their skills