



ASSESSMENT AND EXAMINATIONS DIRECTORATE

Bundy Park, Private Bag 4571, King William's Town, 5600

REPUBLIC OF SOUTH AFRICA, Website: www.ecdoe.gov.za

NSC 2015 CHIEF MARKER'S REPORT

SUBJECT	LIFE SCIENCES		
PAPER	1		
DATE OF EXAMINATION:	13-11-2015	DURATION:	2$\frac{1}{2}$ HOURS

This section of the instrument is aimed at providing valuable feedback to schools, subject advisors, teachers and learners about common errors committed by candidates in the answering of questions, to assist teachers and subject advisors to identify areas that need to be given special attention in the teaching and learning of the subject in 2016.

Your responses will be based on two parts:

Section 1: General overview of Learner performance in the question paper as a whole

Section 2: Comment on candidates' performance on individual questions (Detailed explanations must be provided **per question** as follows: (You may include sub questions where necessary))

- General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?
- Why the question was poorly answered?
- Provide suggestion for improvement in relation to teaching and learning
- Describe any other specific observations relating to responses of learners
- Any other comments useful to teachers, subject advisors, teacher development

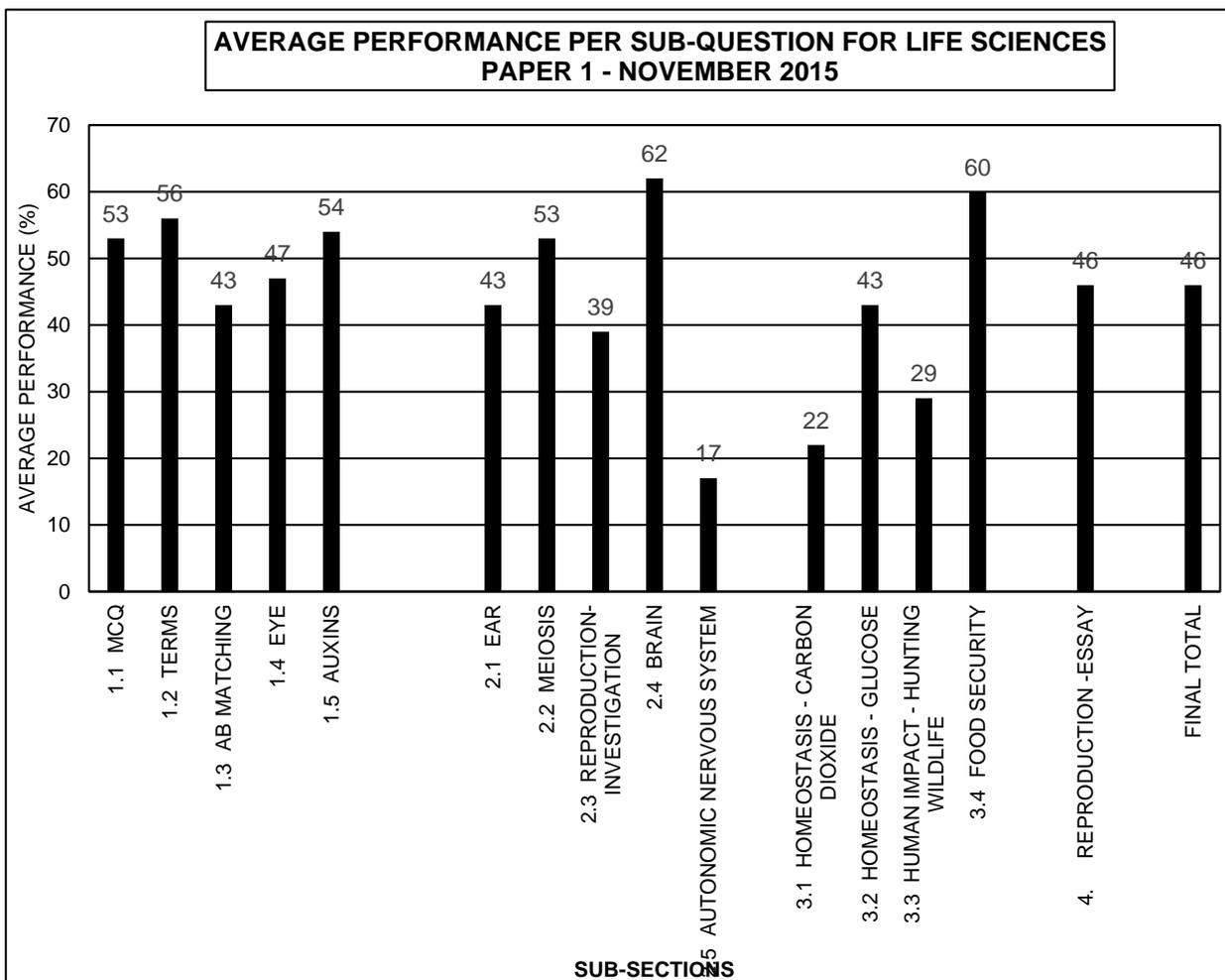
SECTION 1: (General overview of Learner Performance in the question paper as a whole)

Since the question paper seemed relatively less challenging than in previous years, it would have been expected that learners would achieve at a higher level than they actually did. In reality only just over half of the candidates were able to meet the pass requirements for this paper. Perhaps, one of the factors contributing to the poor performance of so many learners, is that there have been many huge gaps in their academic progression towards grade 12.

It is most disappointing that relatively very few candidates were able to achieve Level 6 and 7. The vast majority of candidates achieved a level 2, which is the minimum requirement to pass.

The graph below reflects the average performance per sub-section of the question paper of a random sample of only 100 candidates. The small sample size probably accounts for the graph below not reflecting the actual performance by the approximately 53 000 learners overall.

Since the question paper seemed relatively less challenging than in previous years, it would have been expected that learners would achieve at a higher level than they did.



SECTION 2: Comment on candidates' performance in individual questions

(It is expected that a comment will be provided for each question on a separate sheet).

SECTION A

QUESTION 1

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

Most of the learners were able to achieve satisfactory results.

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

1.1 (Multiple choice questions)

1.1.7 *Most learners could not answer this question as it required greater insight and comprehension. The female sea horse deposits eggs into the pouch of the male sea horse. The pouch is an external body part but not a reproductive structure. Therefore, the fusion of gametes takes place outside the female reproductive organ and hence the process is regarded as **external fertilisation**. Besides that no transfer of male gametes to female reproductive organ takes place in this context. The eggs are hatched outside the female reproductive organ and therefore it is regarded as **ovipary**. Hence option C is chosen as the correct answer. (In ovovivipary the fertilised eggs are hatched in the female reproductive organ and delivered. The term internal fertilisation was misconstrued by many learners. The internal fertilisation is the fusion of male and female gametes that **takes place in the female reproductive organ**. In vivipary the further development of the foetus takes place in the female reproductive system and it is attached to the mother's body through an umbilical cord.)*

QUESTION 1.2

- *Common names will not be accepted as correct scientific (biological) terms. It is important to learn the correct spelling of all biological terms. Testron instead of testosterone is not acceptable. Other examples:*

1.5.1 Phototropism as photropism.

1.5.4 Inhibit as inhabitant. Absciscic acid as acidic acid.

- The biological terms must not be confused. e.g. Auxin and axon (In terms of **Principle 12** this response is not accepted. Principle 12 of marking guideline clearly states that if the answer presented means something else in Life Sciences or if it is out of context, no marks will be awarded).
- 1.2.6 Although the stratosphere is one of the atmospheric layers that contains ozone, it was not accepted as a correct response. The ozone component of the stratosphere will be damaged or disintegrated by the high concentration of CFCs whereas the stratosphere will still remain as one of the layers of the atmosphere.
- 1.2.7 FSH and LH were credited as alternative correct responses since they also play a role in the maturation of sperms. This information was not mentioned in the assessment guidelines, therefore, **it is not necessary to teach this information to our learners**. Human males secrete traces of female hormones in their bodies. Furthermore, all hormones have complex and integrated functions. At a grade 12 level a specific function is allocated to a hormone to avoid confusion. ICSH was also accepted as a correct answer.

QUESTION 1.3

- Learners will be **penalised** from next year onwards if they fail to write **A ONLY, B ONLY** or **BOTH A AND B** as indicated in the instruction. It is therefore imperative that teachers convey this information to their learners.
- 1.3.1
BOTH A AND B is accepted as the correct response because in both types of fertilisation a large number of gametes are produced and released to increase the chances of fertilisation to ensure the survival of the species. e.g. human semen consists of a large number of sperms. Learners were confused by this question, because they associate external fertilisation with many ova and internal fertilisation with few ova, which is correct. The question, however, did not stipulate whether the gametes referred were male or female.

QUESTION 1.4

➤ 1.4.1

(a) *Ciliary body was not accepted as the correct response because the label points directly to ciliary muscles which are enclosed in the ciliary body. The ciliary body **does not contract or relax by itself**. It is the ciliary muscles that contract, causing the stretching of suspensory ligaments. The suspensory ligaments **do not actually either contract or relax, they become taut or slack, depending on the action of the ciliary muscles**. Therefore, Label B (Suspensory ligaments) was not accepted as the correct response for the above reason.*

QUESTION 1.5

➤ 1.5.1

Some learners identified the growth movement as geotropism. The reason why the response could not have been a geotropism, is that the question specified that the movement was towards the stimulus.

➤ 1.5.3

Some learners wrote the answer as auxon – they were confusing the terms auxin and axon.

© Provide suggestions for improvement in relation to Teaching and Learning

Teachers must emphasize:

- *the use of **correct terminology**.*
- *the relationship between **structure and function**.*

(d) Describe any other specific observations relating to responses of learners

- *Learners are expected to follow instructions strictly to avoid being penalised. According to the instruction, learners are expected to write only the letter (A-D) next to the question number (1.1.1 – 1.1.10) on the ANSWER BOOK. The learners are not asked to cross the relevant letter in the grid provided on the first page of the ANSWER BOOK.*

- *Learners are expected to choose the answer and write only **one letter** as the*



correct choice. e. g. A, B, C or D. A, C for example will be marked INCORRECT. No term or phrase will be accepted either. Any deviation from the instruction will be penalised as per principle of marking memorandum. (**Principle 14**: if only the letter is asked for but only the name is given (and vice versa) **DO NOT CREDIT**.)

- (e) Any other comments useful to teachers, subject advisors, teacher development etc.

Teacher knowledge regarding plant tropisms needs to be developed.

SECTION B

QUESTION 2

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

The majority of learners fared poorly in those sub-sections of the question which required explanations.

- (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

- 2.1.2 Most Learners failed to distinguish between an explanation and a description. Many learners described the function of the Eustachian tube instead of explaining the effects of a blockage in the Eustachian tube. The blockage **causes** an imbalance in pressure on either sides of the tympanic membrane. The **reason** for the pressure build up is due to that fact that air is unable to move either into or out of the Eustachian tube. The **effect** or **consequence** of this pressure imbalance adversely affects the normal functioning of ossicles in transferring vibrations to the inner ear. It also affects the functioning of the tympanic membrane due to possible damage to this structure, resulting in hearing loss. An explanation requires a learner to explain the cause and effect with valid reasons. This question tested learners' higher order cognitive ability.

- 2.1.3 Some learners could not describe the process in the correct sequence. Some attempted to describe the hearing process by referring to the role of organ of Corti. Many other learners gave the incorrect processing unit of the brain instead of the cerebellum. (A description is something a learner can learn directly from a text book) Some learners incorrectly identified the maculae as the structures involved. Teachers should emphasize the difference in functions of cristae and maculae.

QUESTION 2.2

- 2.2.1 (a) Homologous chromosome was not accepted because the diagram given in the question paper represented Metaphase 2.
- 2.2.3 Chromosomes at the **equator** are arranged individually, not as pairs. Therefore, homologous chromosomes was not credited.
- 2.2.4 Most learners failed to show **complementary chromosomes** correctly. They were unable to shade the relevant areas of the chromosomes resulting from crossing over. It seems that the concept of complementary chromosomes is alien to most of our learners. Teachers must carefully explain the effects of crossing over to their learners. No marks were credited when a candidate drew chromatids instead of chromosomes. Homologous pairs are separated and pulled to the opposite poles. This question is a perfect example of a higher cognitive order question. It forced learners to reverse their thinking by considering what happened at a previous stage rather than at a stage which was to follow. This question certainly test learners' abstract thinking ability. The learners were expected to work out the number of chromosomes and their orientation and location. The ability to translate their thinking into the form of a diagram was another skill tested in this question. The skill of formulating an appropriate caption for this diagram is also another skill but no marks were allocated this time.

QUESTION 2.3

- 2.3.1 Our learners should be able to identify all the possible steps involved at a **planning stage** of an investigation. They are expected to take on the role of an investigator performing the specific investigation described. All the crucial decisions on procedural issues are taken during this time to conduct an investigation with valid and reliable outcomes. One word answers will not be credited in the future. e.g. sample size, age group. Answers should be more specific and relevant to the investigation. Many learners had difficulty in distinguishing between the planning stages and the actual carrying out the research procedure.
- 2.3.2 (a) and (b) were not clearly understood by many of our learners. Both questions (a) and (b) required an explanation.
- 2.3.2 (a) Learners were expected to **analyse** the data to understand the trend before establishing the cause and its effect. Valid reason(s) must be given. The change in diameter is a progressive event that takes place at various stages of the menstrual cycle. Ovulation **causes** a decrease in the diameter of the follicle and transforms it into a corpus luteum (**effect**). In the absence of fertilization (**cause**) a further decrease in the diameter of the corpus luteum takes place (**effect**), and eventually disintegrates.
- 2.3.2 (b) Learners are expected to **explain** the effects of artificially induced levels of progesterone. The hormone progesterone **causes** the inhibition of FSH (**effect**). The absence of FSH (**cause**) prevents the further development of follicles. Therefore the size of the follicles remain the same (**effect**).

QUESTION 2.4

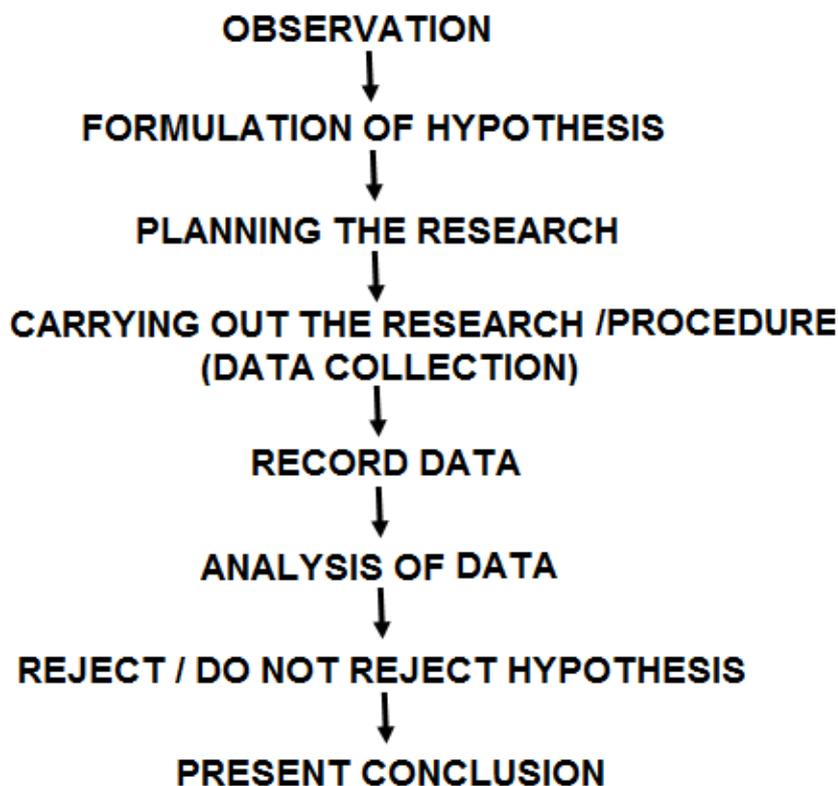
- 2.4.2 Most of the learners were successful in answering this question. There are, however, learners who are unable to distinguish between voluntary and involuntary activities. The cerebrum controls the **voluntary muscular activities**.

QUESTION 2.5

The majority of our learners were unable to answer this question. This section was not sufficiently emphasized in our classrooms. Many learners described the reflex action instead.

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

It is essential that the teachers themselves become fully acquainted with the all the steps involved in the research process. The steps involved are given below:



- (d) Describe any other specific observations relating to responses of learners

Some learners described the functioning of both the cristae and maculae, instead of the cristae alone. Teachers should therefore emphasize the difference between the functions of these two structures.

- (e) Any other comments useful to teachers, subject advisors, teacher development etc.

The research process would be a worthwhile topic for a teacher development



QUESTION 3

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

The overall performance of the candidates was fair.

- (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

➤ *Some learners used a flow chart to describe the process but were not credited. learners were penalized because they were asked to **describe** the entire process.*

*(**Principle 7:** If flow charts are given instead of description: Candidates will lose all marks). The learners should be made aware of this principle.*

- *Learners should be taught how to describe a process in the correct sequential order. Most of the responses were a collection of muddled up facts with no logical link. Key words were used with no logical reference to sequence of events. Key words were not marked if they were did not correctly fit the sequence of events.*
- *Because this topic was covered in grade 11, many teachers seem to have neglected to revise it again under homeostasis, as this question was very poorly answered. References to the hormones thyroxin and adrenalin were included by the learners. These were not credited.*

QUESTION 3.2

➤ *3.2.1 Many learners struggled to write the caption correctly. Teachers should emphasize that the caption must **represent both dependent and independent variables.***

➤ *3.2.2 and 3.2.3 A narrow range of values for both upper and lower values were accepted since the graph was not drawn on a grid. 3.2.3 Most learners were unable to give the correct answer. They should have measured from the time of glucose ingestion at 1 hour.*



the first time the blood glucose level dropped to normal. i.e. within the period of X. Many appeared to have given the duration of period X as the answer.

- 3.3.4 (b) Learners are expected to give an observable reason from the graph to substantiate the status of Thabiso being diabetic. Many learners wrote that Thabiso's blood glucose level was high. This response was not accepted as correct because blood glucose level fluctuates during the day depending on the type of food consumed. If the level of glucose rises above the normal level, our built-in homeostatic mechanism will be activated to normalize the blood glucose concentration. Therefore, high glucose level does not mean that the person is diabetic. But, Thabiso is diabetic because his blood glucose level is higher than normal from the start of the investigation. Therefore, learners are expected to respond by stating that Thabiso is diabetic because his blood glucose concentration is **higher than the normal level**, indicated in the question. (between 80 and 120mg/100cm³). Many learners gave the reason as Thabiso's blood glucose level being higher than that of Mo. This was not credited, because the blood glucose level of healthy individuals does vary within the normal range. The fact that one individual's blood glucose level is higher than another's, does not indicate that the person with the higher level is diabetic.
- 3.2.5 Many learners did not read this question carefully, as they described the changes in Mo's glucose level even before period X, stating that the level increases/is increasing, which was not correct.

It was impressive that most learners were familiar with the role of insulin in reducing blood glucose level.

- 3.3.3 Learners did not read the question carefully enough. They overlooked the word **increase**. They therefore, explained reasons for the illegal killing of wildlife, rather than the reasons for the **increased** in illegal killing of wildlife. This is the reason why the answers poverty and unemployment were not accepted. **Increased poverty** and **increased unemployment**, however, were accepted.



QUESTION 3.3

- 3.3.4 Teachers are reminded that concepts taught in grade 10 and 11 may also have relevance in answering grade 12 questions.
- 3.3.5 Learners struggled a lot to answer this question, as it required fairly sophisticated application of their biological understanding.

QUESTION 3.4

- 3.4.1 Learners are encouraged to study definitions.
- 3.4.5 Most learners able to plot the bars correctly.

The following common errors were noted, however:

- **Type of graph:** Many learners drew histograms, while a few drew pie charts. Some of the learners drew bars for all nine provinces. Because they did not read the question carefully, they lost this mark.
- **Caption:** Many learners had only one variable represented in the caption. Many learners did not specify **three provinces** instead they used the term provinces alone.
- **Scale:**
- **Scale on X-axis:** Learners drew bars of different widths. The spaces between the bars also varied in width.
Scale on Y-axis: Learners failed to start with zero.
Learners did not make the length of the scale line between the marked points represent the same number of units.
Learners wrote only the values of the bars they had drawn on the Y-axis.
- **Labels:** Learners failed to write the label (Province) on the X-axis. A few did not identify the bars they had drawn.
Many learners failed to score the mark for the label because they omitted the unit (%) on the Y-axis.

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

Teachers are encouraged to explain very carefully to their learners which type of



graphical representation is most appropriate for the particular data given in any question.

(d) Describe any other specific observations relating to responses of learners

- Teachers should be encouraged to help learners to see the link between information which they may come across in newspapers, magazines, cartoons or any other resource materials and topics studied in the Life Sciences curriculum.
- Although the extract given in question 3.3 was entitled 'HUNTING WILDLIFE FOR FOOD', many learners referred to the poaching of animals both for medicinal purposes and for parts such as rhino horns.

(e) Any other comments useful to teachers, subject advisors, teacher development etc.

Although **Human impact on the environment** is studied in grade 11, it is important that this material be revised in grade 12 before the trial examinations.

QUESTION 4

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

Most candidates managed the question reasonably well.

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

Many learners did well at describing the structural suitability of sperm cells for their function. They linked the specific structure (feature) with its function. It is encouraging to note that the teachers are emphasizing the link between the structure and function.

*Learners have an inaccurate understanding of the term fertilization. Learners must be made aware of that the correct definition of fertilization is the fusion of male and female gamete **nuclei**. Most learners failed to mention that the zygote is **diploid**. Some learners confused with the concepts of mitosis and meiosis. The teachers are encouraged to ensure that these concepts are well understood. Learners incorrectly used the term "blastocyte" instead of "blastocyst".*

SYNTHESIS:

Many learners did not get a mark for relevance because they included many details which were not relevant to the question, although they relate to the topic of reproduction. Please, note that the criteria for relevance have changed. All the information provided must be relevant to the **specific question**, rather than to the topic in general. In order to score the mark for “comprehensive”, learners need to pay adequate attention to each aspects of the question.

© Provide suggestions for improvement in relation to Teaching and Learning

- One of the most important skills required in answering the essay question is the ability to **structure** the essay. This is particularly important since the learners are not given specific directives regarding the format of the essay.
- The essay question must be read several times to ensure that the learner understands exactly what is being asked. They are advised to underline/ highlight the key concepts included.
- Learners are encouraged to **plan** their essay before starting to answer it. This may take the form of a mind map where appropriate. **(NB: The mind map is just to help and must NOT replace the essay as the answer)** This is more likely to ensure that their essay will be written in a **logical** manner, and that they will be awarded the mark for the logical sequence under **synthesis**.
- Caution must be taken not to include material which is not directly **relevant** to the specific question. In this way, they will not lose the mark for **relevance**.
- The mark for ‘**comprehensive**’ will only be awarded if an adequate number of facts is included under each section of the essay topic.

(d) Describe any other specific observations relating to responses of learner

- Many learners used the general term ‘villi’ instead of ‘chorionic villi’.
- It is most significant that when the formation of the zygote is described that the **diploid** nature of this structure be mentioned.

(e) Any other comments useful to teachers, subject advisors, teacher development.

Teachers are encouraged to give learners homework tasks which include answering essay topics from previous examination question papers.

G.J LE ROUX

NAME OF THE CHIEF MARKER:



SIGNATURE

12/12/2015

DATE

