

NSC 2016 CHIEF MARKER'S REPORT

SUBJECT	LIFE SCIENCES		
PAPER	1		
DATE OF EXAMINATION:	11- 11- 2016	DURATION:	2 $\frac{1}{2}$ HOURS

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

The Life Sciences Paper 1 question paper was compiled carefully to assess learners of various academic capabilities. It contained all the cognitive ingredients to stimulate analytical and lateral thinking of learners. At first glance the paper seemed to be less challenging, but the results indicate that the paper was not as easy as it was rated initially. It was a fair and balanced assessment instrument, designed to accommodate learners of different languages, cultural and socio-economic backgrounds.

It was most disappointing to note the vast number of learners who had clearly made inadequate preparation for the examination. This lack of motivation and application to their work is cause for great concern.

The language barrier persists. This presents huge challenges to learners themselves, their teachers and to those who mark their examination scripts. In addition, the problem is compounded by very poor handwriting in some instances.

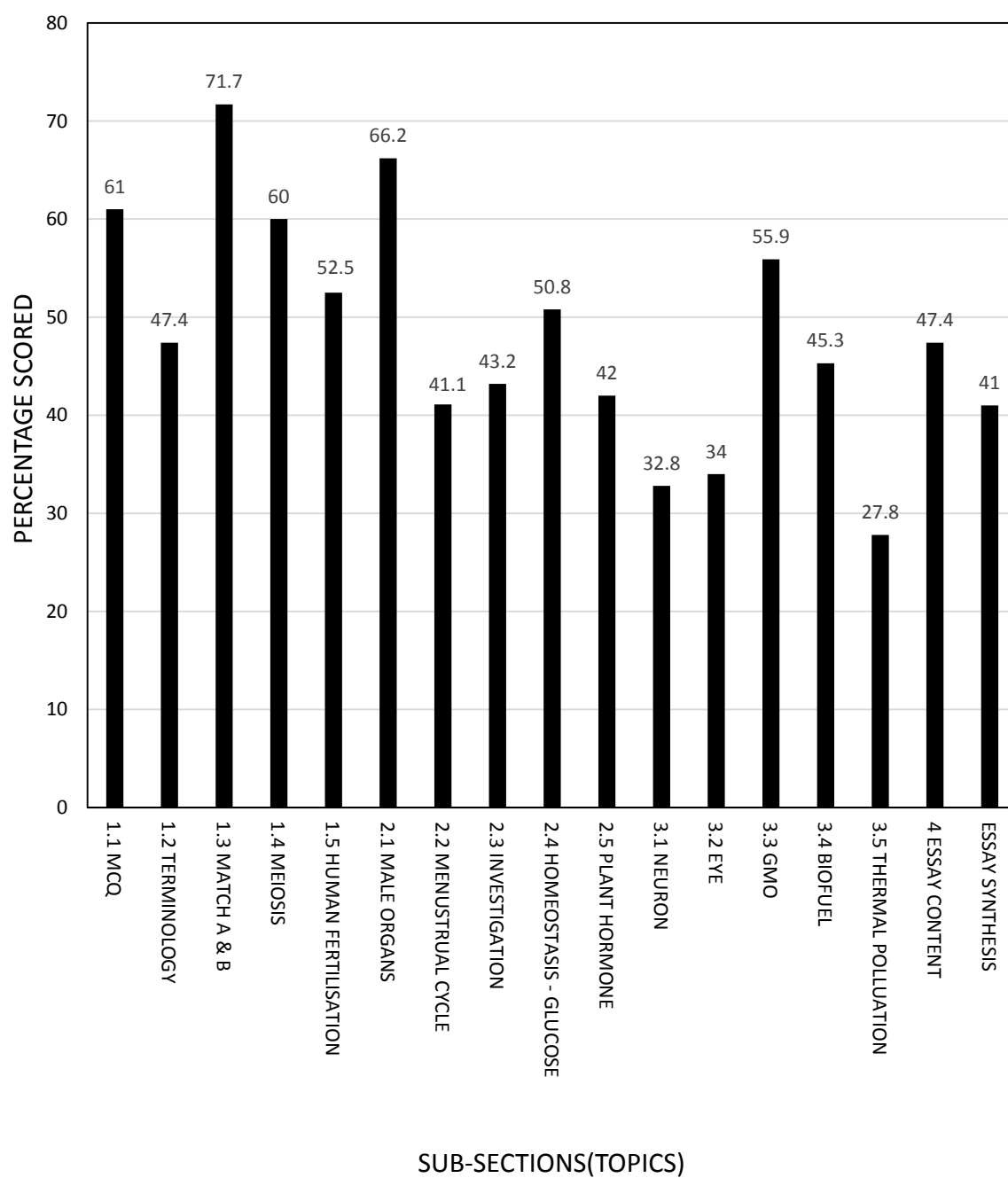
Active commitment and sustained effort are required by all stakeholders to alter the present disconcerting scenario. In addition, parent involvement should be encouraged and would be most welcome.

Consistent in-service teacher training is required to improve the content knowledge and methodology of teachers requiring assistance in these areas.

The data presented in the graph below were gathered from 100 random scripts – 30 from candidates scoring in the range 0 – 44, 40 from candidates scoring in the range 45 – 109 and 30 from candidates scoring in the range 110 – 150.

Life Sciences Paper 1 - November 2016

Percentage scored per question sub-section



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).

QUESTION 1		
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?		
Average mark from the sample of 100 :		
SUB-QUESTION	TOPIC OR ASPECT TESTED	AVERAGE % FROM SAMPLE
1.1	Multiple choice questions	61.0
1.2	Biological terminology	47.4
1.3	Column A & B Match	71.7
1.4	Meiosis	60.0
1.5	Human fertilisation	52.5

- The answering of question 1.1 on the grid proved to be problematic. Some candidates did not realise that they should use the grid provided, as this was not stated explicitly in the instruction. Instead, these candidates wrote the correct letter, and then put an X over their answer.
Many candidates wrote only the letter of the correct answer.
Some candidates answered on the grid and in addition wrote down the letter of the correct answer, thus answering the question twice.
- Candidates who made use of the grid sometimes answered the questions in the incorrect sequence. This made accurate marking more difficult. Several candidates did not number their answers at all. Some candidates answered part of the question on the first grid provided, while the rest was completed on the second grid. This proved to be challenging to mark especially if the candidates had not numbered their answers.
- We recommend that in future the learners be asked to write only the letter of the correct answer next to the number of each question. This would facilitate the accurate marking of this question.

(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.		
1.1.7 The graph showed illustrates food insecurity, while the question asked about the opposite, food security. This confused many learners, who answered correctly without necessarily understanding the question.		
1.1.8 and 1.1.9 These questions required candidates to do a considerable amount of reading.		
1.1.9 This question about an investigation clearly showed that learners find it difficult to distinguish between the planning steps and the carrying out of an investigation.		
1.2 Spelling of biological terms is very poor e.g. allantois, fallopian tube.		
1.2.2 Many candidates wrote medulla oblongata as the answer. This means that they did not read the question carefully, which clearly asked for a part of the peripheral nervous system.		

- 1.2.3 Candidates wrote only abscisic, instead of abscisic acid.
- 1.2.4 Some candidates wrote carbon footprint instead of footprint. This answer could not be accepted because they have completely altered the meaning of their answer.
- 1.2.6 Many pupils wrote amniotic membrane. Candidates must pay more careful attention to the functions of the membranes in the amniotic egg.
- 1.2.7 Many candidates mistakenly wrote uterine wall, while the question clearly asked for the **inner lining of the uterus**.
- 1.4.1 (b) **B** - Many learners wrote centrosome instead of centriole. The centrosome is actually comprised of two centrioles. In the diagram given the centrioles have separated, and therefore should no longer be referred to as a centrosome.
(c) **C** – The answer sister chromatid was not accepted because the sister chromatids are identical structures. After crossing over they are no longer identical and therefore, can no longer be called sister chromatids. Once these chromatids have separated they may be correctly referred to as daughter chromosomes.
- 1.4.2 It is surprising to discover how many candidates were unable to arrange the phases of meiosis in the correct sequence.
- 1.4.3 Many candidates were unable to answer this question correctly. The topic of meiosis must receive more attention.
- 1.5.1 Many learners appear not to have studied the structure of the ovum, as specified in the CAPS document. The reason for this is most likely that this diagram is not included in many text books. It is imperative that teachers of guided by the CAPS document rather than by the textbook.
- 1.5.2 Some learners wrote only the letter rather the letter and the name.
(a) Some candidates used the label “body”. This was not accepted despite this label being used in some textbooks.

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

- Biological terminology must be emphasized and drilled throughout the year, as, without knowledge of the terms, learners are unable to express themselves scientifically.
- Teachers need to make sure that the learners **understand** the consecutive stages of meiosis. Meiosis is actually a continuous, sequential process.
- Teachers must adhere to the CAPS guidelines and not depend on textbooks alone to prepare learners for examination e.g. Question 1.5. The diagram of a human ovum is not included in several textbooks, and as a result even top achieving learners lost marks because they had not been exposed to the diagram.

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

- Handwriting of many learners requires improvement as it borders on being illegible.
- Candidates sometimes make errors with the numbering of their answers.

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

- Poor spelling, especially of biological terms could be improved by repeated visual exposure to the terms. This can be achieved by leaving a list of relevant terms currently being taught, displayed in the classroom.

QUESTION 2

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

Average mark from the sample of 100 :		
SUB-QUESTION	TOPIC OR ASPECT TESTED	AVERAGE % FROM SAMPLE
2.1	Male organs	66.2
2.2	Menstrual cycle	41.1
2.3	Investigation	43.2
2.4	Homeostasis - Glucose	50.8
2.5	Plant hormones	42.0

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

- 2.1.3 The essence of this answer was made of three parts.
- The consequence of wearing tight underwear - infertility
 - The cause of this consequence – high temperature/ pressure
 - The effect of high temperature/ pressure
- The learners were **not credited** for describing sperm formation under normal conditions.
- Some learners incorrectly state that the testes should be at a temperature of 2°C, while the correct fact is that ideal sperm production takes place at a temperature 2°C lower than normal body temperature.
- 2.2.2 Instead of saying that LH stimulates ovulation, candidates should specify that it is **high levels** of this hormone which actually stimulate ovulation.
- 2.2.3 Candidates mistakenly wrote that the fertility monitor is used to determine whether one is pregnant or not.
- 2.2.5 By studying the graph given, candidates should have realized that the period of highest fertility was of three days duration.
- 2.2.6 Very few learners achieved full marks for this question. They understood the function of progesterone, but were unable to translate this into why it would not make sense to use progesterone levels to monitor fertility.
- Candidates were expected to write that the level of **progesterone increases** after ovulation and not to say that the **progesterone is secreted** only after ovulation. There is always a certain amount of progesterone in the blood.
- 2.3.1 Learners did not read the question carefully. This asked that the effect of caffeine after 15 minutes be described. Some learners gave only the temperature after 15 minutes in their answer.
- 2.3.3 The part of the question which related to vasoconstriction was fairly well answered. The part which related to metabolism was answered extremely poorly. Candidates failed to realise that increase in metabolism included an increase in respiration, which produces more heat.
- 2.3.4 Candidates were asked to state two factors that **were kept constant**. This

means that learners needed to refer to the particular investigation as described in the question, rather than mentioning factors which they thought **should** have been kept constant.

Some candidates gave incomplete answers e.g. **time** rather than time intervals between measurements; **energy drink** rather than type of energy drink or amount of energy drink.

2.4 Some learners confused the hormones glucagon and insulin.

Teachers are encouraged to help learners distinguish between glucose, glycogen and glucagon.

2.5.1 This question was generally poorly answered. Some candidates wrote about geotropism and when they did identify the response shown as a phototropism, they failed to specify that it was a positive phototropism. Teachers are urged to explain carefully the interaction between auxins, light and gravity. It is also important that the candidates distinguish between light and unilateral light.

2.5.2 Learners have a very poor understanding of apical dominance, and whether this is caused by the presence or absence of auxins.

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

- It must be emphasized to learners that if a question asks to explain, both the cause and effect must be included in their response.
- Teachers are encouraged to explain to learners how biological phenomena can be applied to real life situations e.g. 2.1.3.
- Graph reading skills must be emphasized. Lack of such skills were in evidence in learner responses to question 2.2.
- Teachers should point out to learners the connection between different topics covered. In real life, these do not occur in isolation e.g. 2.3.3. No learners were able to make the connection between metabolic rate and the rate of respiration (Grade 11).
Learners should be encouraged to think laterally.
- The logical sequence of events in any process must be pointed out to learners e.g. 2.4. The steps in achieving homeostasis should not be presented randomly. Each step follows the previous one logically.
- The section on plant hormones appears to have been badly neglected by teachers. This was clear in learner responses.

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

- Flow charts were given in the place of descriptions. No marks were awarded.

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

- Experimental design: Teachers must familiarise themselves with the steps involved in undertaking a scientific investigation. Teachers are encouraged to make use of past question papers to revise experimental procedure with their learners. This is extremely important, as every question paper tests this skill.

QUESTION 3

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

Average mark from the sample of 100 :		
SUB-QUESTION	TOPIC OR ASPECT TESTED	AVERAGE % FROM SAMPLE
3.1	Neurons	32.8
3.2	Eye	34.0
3.3	GMO	55.9
3.4	Biofuel	45.3
3.5	Thermal pollution	27.8

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

- 3.1.1 Many learners identified the diagram as a sensory neuron. Teachers are urged to point out the differences in structure between sensory and motor neurons.
- 3.1.2 Many learners stated incorrectly that the part B carries impulses from the dendrites.
- 3.1.3 Several candidates scored only 1 mark out of 2 because they mentioned only one part of the answer. Learners must use the term “insulation” rather than “cover” or “protect”.
- 3.2.1 (b) Many learners confused the terms **choroid** and **chorion**.
- 3.2.3 Many learners seemed not to understand the term “consequences” as they described the visual defect rather than its consequences i.e the defect was long sightedness, and the consequence of this defect is that one cannot see nearby objects clearly; the image is blurred/ out of focus.
- 3.2.4 The consequence of light falling on part A is that no image will be formed / the person cannot see, not that the person will be **blind**.
- 3.2.5 This question was poorly answered by the majority of learners. It required learners to identify two structural features of the lens, and then explain how each is an adaptation for its function. Most candidates failed to identify the structural features first and therefore lost all the marks. Many learners described only the process of accommodation. This did not answer the question.
Some learners confused the terms “refraction”, “reflection” and “diffraction”.
- 3.3.2 Learners were confused by this question. They wrote about the general advantages of GM food rather than referring to the context of the passage provided, which referred specifically to the advantages of delaying the ripening process. The focus was on **economic advantage** of fruits having a longer shelf life.
- 3.3.3 Learners were expected to refer to **specific climatic changes** which have a negative effect on food security e.g. soil erosion is not a climatic change. Learners were expected to use the terms “drought” or “floods”, rather than “little rain” or “heavy rain”.
- 3.4.3 The majority of learners had difficulty in understanding and answering this question. Failing to comprehend what the question asked, they quoted extracts from the text provided.

3.4.4	Most learners described the disadvantages of using gasohol in warm climates, as described in the extract, rather than mentioning the advantages of using gasohol in colder climates, as asked.
3.5	The vast majority of learners did not understand exactly what is meant by thermal pollution. In their answers they described pollution by chemicals such as fertilizers and pesticides. Answers included reference to global warming, acid rain etc. Teachers must ensure that the work covered in grade 11 is revised in grade 12.
(c)	Provide suggestions for improvement in relation to Teaching and Learning
	<ul style="list-style-type: none"> When studying a diagram learners must pay attention to all labels, functions and adaptations of parts for their functions e.g. question 3.1 and 3.2.
(d)	Describe any other specific observations relating to responses of learners
	<ul style="list-style-type: none"> Some learners run the risk of having parts of their answers left unmarked in error because they separate the sub- sections of a question from each other.
(e)	Any other comments useful to teachers, subject advisors, teacher development etc.
	<ul style="list-style-type: none"> Workshops covering aspects of the syllabus which teachers find difficult should be organised. Making use of quality common tasks and exams set and moderated by subject advisers is strongly recommended.

QUESTION 4		
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?		
<i>Average mark from the sample of 100 :</i>		
SUB-QUESTION	TOPIC OR ASPECT TESTED	AVERAGE % FROM SAMPLE
Essay		
Content	Hearing and the effect of adrenalin	47.4
Synthesis		41.0
In general this essay was better answered than essays in previous years. Learners had clearly benefitted from exposure to memos of recent examination papers.		
(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.		
<ul style="list-style-type: none"> Many learners included information that was not directly related to the hearing process, and therefore lost the mark for “relevance” e.g. how balance is achieved. Some learners lost the mark for logic because they wrote the steps involved in the hearing process in the incorrect sequence. 		
(c) Provide suggestions for improvement in relation to Teaching and Learning		
<ul style="list-style-type: none"> Teachers are encouraged to distinguish clearly between the terms sound waves (in the air), vibrations (in a solid structure), pressure waves (in a liquid) and impulses (electrical signals transmitted by nerve fibres). Teachers should help learners to distinguish between terms such as the auditory nerve and auditory canal. 		
(d) Describe any other specific observations relating to responses of learners		
<ul style="list-style-type: none"> Learners’ answers showed inadequate planning. Learners should be taught how to plan, using a mind map, before they begin to answer the essay. 		
(e) Any other comments useful to teachers, subject advisors, teacher development etc.		
<ul style="list-style-type: none"> Teachers should provide learners with essay topics from previous examination papers, giving them the opportunity to practise the skill of essay writing. 		