



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

NOVEMBER 2015 (2)

MEMORANDUM

MARKS: 150

This memorandum consists of 10 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **If more information than marks allocated is given**
Stop marking when maximum marks is reached and put a wavy line and 'max' in the right-hand margin.
2. **If, for example, three reasons are required and five are given**
Mark the first three irrespective of whether all or some are correct/incorrect.
3. **If whole process is given when only a part of it is required**
Read all and credit the relevant part.
4. **If comparisons are asked for but descriptions are given**
Accept if the differences/similarities are clear.
5. **If tabulation is required but paragraphs are given**
Candidates will lose marks for not tabulating.
6. **If diagrams are given with annotations when descriptions are required**
Candidates will lose marks.
7. **If flow charts are given instead of descriptions**
Candidates will lose marks.
8. **If sequence is muddled and links do not make sense**
Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.
9. **Non-recognised abbreviations**
Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of the answer if correct.
10. **Wrong numbering**
If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.
11. **If language used changes the intended meaning**
Do not accept.
12. **Spelling errors**
If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names are given in terminology**
Accept, provided it was accepted at the national memo discussion meeting.
14. **If only the letter is asked for but only the name is given (and vice versa)**
Do not credit.

15. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately.
16. **Be sensitive to the sense of an answer, which may be stated in a different way.**
17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.
18. **Code-switching of official languages (terms and concepts)**
A single word or two that appear(s) in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.
19. **Changes to the memorandum**
No changes must be made to the memoranda without consulting the provincial internal moderator who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).
20. **Official memoranda**
Only memoranda bearing the signatures of the national internal moderator and the Umalusi moderators and distributed by the National Department of Basic Education via the provinces must be used.

SECTION A**QUESTION 1**

1.1	1.1.1	C✓✓		
	1.1.2	B✓✓		
	1.1.3	C✓✓		
	1.1.4	D✓✓		
	1.1.5	C✓✓		
	1.1.6	B✓✓		
	1.1.7	B✓✓		
	1.1.8	B✓✓	(8 x 2)	(16)
1.2	1.2.1	tRNA✓/transfer RNA		
	1.2.2	Double helix✓		
	1.2.3	Gene✓		
	1.2.4	Punctuated equilibrium✓		
	1.2.5	Gonosomes✓		
	1.2.6	Cloning✓		
	1.2.7	Phenotype✓		
	1.2.8	Evolution✓/Darwinism	(8 x 1)	(8)
1.3	1.3.1	A only✓✓		
	1.3.2	Both A and B✓✓		
	1.3.3	A only✓✓		
	1.3.4	Both A and B✓✓	(4 x 2)	(8)
1.4	1.4.1	A – Nuclear membrane✓ B – Cell membrane✓ C – Chromosome✓ F – Homologous pair of chromosomes✓/Bivalent		(4)
	1.4.2	(a) I✓ (b) II✓/III		(1) (1)
	1.4.3	(a) D✓ – spindle fibres✓/spindle (b) E✓ – centromere✓		(2) (2) (10)
1.5	1.5.1	(a) Deoxyribose sugar✓ (b) Nucleotide✓		(1) (1)
	1.5.2	• To ensure that each daughter cell has the correct amount of DNA✓ • Identical chromosomes✓/same genetic material to the parent cell		(2)
	1.5.3	Interphase✓		(1)
	1.5.4	T✓/thymine		(1)
	1.5.5	- Incorrect base-pairing✓ - T with C instead of T with A ✓/C with T instead of C with G		(2) (8) [50]

SECTION B**QUESTION 2**

- 2.1 2.1.1 As organism uses a structure or organ regularly ✓
it becomes better developed or enlarged ✓
OR
If an organism does not use structure or organ frequently ✓
it becomes less developed or reduced. ✓
AND
Characteristics developed ✓ during the life of an individual
(acquired characteristics) can be passed on to their offspring ✓. (4)
- 2.1.2 - Acquired characteristics are not inherited ✓/do not cause any
change to the DNA of an organism's gametes (sperms or ova)

- Organisms/Populations did not evolve because they want to
evolve ✓/Lamarck's theory is deterministic (2)
- 2.1.3 A hypothesis is a statement that still needs to be tested ✓ whereas
a theory is a statement that has already been tested ✓ multiple
times/is supported by evidence (2)
(8)
- 2.2 2.2.1 NN ✓ or Nn ✓ (2)
- 2.2.2 2 ✓ (1)
- 2.2.3 8 ✓
9 ✓
12 ✓
13 ✓ (Any 2) (2)
(Mark first TWO only)
- 2.2.4 - If the allele for PKU was sex-linked, parents 1 and 2 could not
have produced an affected daughter ✓ (individual number 6)
- since this daughter would have to inherit one recessive allele ✓
- from each parent ✓ to be affected
OR
- Individuals 8, 12, and 13 would have been affected ✓
- Since mothers 3 and 6 are affected as they (8, 12 and 13) ✓
inherited one X chromosome from their respective mothers ✓
OR
- More females than males are affected ✓ by the disorder
- Females would have to inherit two alleles ✓ in order to have the
disorder
- This would result in fewer females than males being affected ✓ (3)
(8)

2.3	2.3.1	Strand 1✓	(1)
	2.3.2	(a) mRNA✓	(1)
		(b) Polypeptide✓/Protein	(1)
	2.3.3	(a) GCU✓	(1)
		(b) UUC✓	(1)
		(c) AAC✓	(1)
	2.3.4	Ribosome✓	(1)
	2.3.5	Translation✓	(1)
	2.3.6	- The double helix unwinds✓ - And the hydrogen bonds between the two strands break✓ - The two strands separate✓/unzip - One strand is used as a template✓ - to form mRNA✓ - using free RNA nucleotides from the nucleoplasm✓ - The mRNA is complementary✓ to the DNA	(5)
		(Any 5)	(5)
			(13)
2.4	2.4.1	Two✓	(1)
	2.4.2	bR,✓br✓	(2)
	2.4.3	(a) Bbrr✓	(1)
		(b) White rough coat✓	(1)
		(c) 3 black rough: 3 black smooth: 1 white rough: 1 white smooth✓✓ (Ratio can be in any order)	(2)
	2.4.4	$(\frac{3}{8} \times \frac{64}{1})$ ✓ = 24✓	(2)
	2.4.5	Bb✓Rr✓	(2)
			(11)
			[40]

QUESTION 3

- 3.1 3.1.1 Foramen magnum✓ (1)
- 3.1.2
- | DIAGRAM C | DIAGRAM D |
|---|---|
| 1. Large canines✓ | 1. Small canines✓ |
| 2. Diastema/spaces are present between the teeth✓ | 2. Diastema/spaces between the teeth are not present✓ |
| 3. Jaw is U-shaped✓ | 3. Jaw is C-shaped✓ |
- 1 for the table + any 2 x 2 (5)
- (Mark first TWO only)**
- 3.1.3 (a) B✓ (1)
- (b) A✓ (1)
- 3.1.4 - The foramen magnum/**X** in humans is located below and central/more forward position in the skull ✓
- organism is bipedal✓/since the spinal cord enters vertically (2)
- 3.1.5 - The spine is S-shaped✓
- to balance the weight above the hips✓/to support the weight of a bipedal organism (2)
- (12)**
- 3.2 3.2.1 1 year✓ (1)
- 3.2.2 Vancomycin✓ (1)
- 3.2.3 - Originally very few of the bacteria had resistance to the antibiotic✓
- The medication was not prescribed often✓/not over-prescribed
- People completed their prescription✓
- It took long to develop resistance✓
(Mark first ONE only) (Any 1) (1)
- 3.2.4 - There was variation✓ within the bacteria population
- where some bacteria were less resistant✓ to the antibiotic
- and other bacteria were more resistant✓ to the antibiotic
- When using the antibiotic the less resistant bacteria are immediately killed✓
- and the more resistant bacteria survive✓
- If the person does not complete the course of antibiotics✓
- These resistant bacteria reproduce✓
- and the whole population consists of resistant bacteria✓ in subsequent generations (Any 6) (6)
- (10)**

3.3 3.3.1 Blood group A/B/AB/O occurs most frequently ✓✓

OR

None of the blood groups occurs in a greater frequency than the others ✓✓/The distribution of all blood groups are equal

(2)

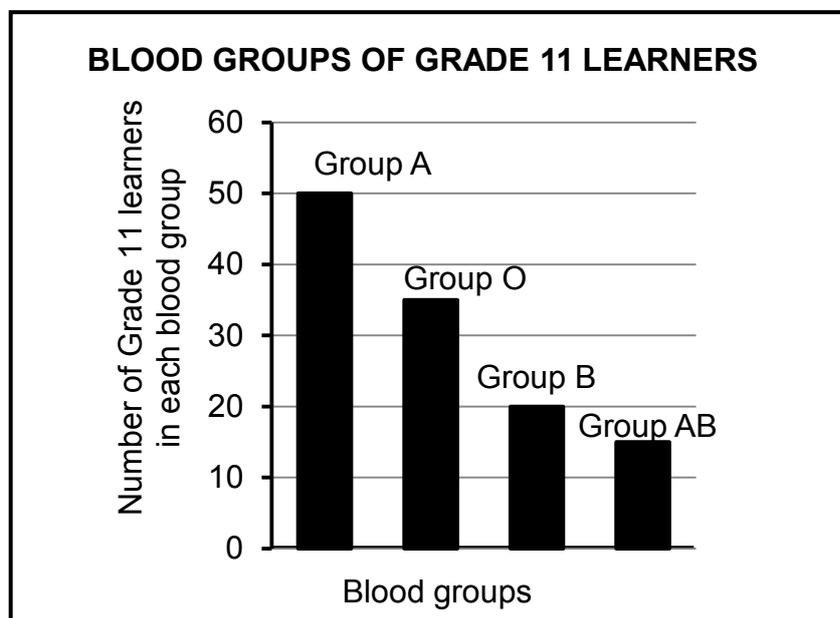
- 3.3.2
- Get permission from all stakeholders✓
 - Design a record sheet✓
 - Set date/time✓
 - Arrange a venue✓
 - Ensure that learners know their blood groups✓

(Mark first TWO only)

(Any 2)

(2)

3.3.3



Rubric for the mark allocation of the bar graph

Correct type of graph	1
Title of graph	1
Correct labels for X-axis and Y-axis	1
Correct scale for X-axis and Y-axis	1
Plotting of bars	1: 1 to 3 bars plotted correctly 2: all 4 bars plotted correctly

NOTE:

If the wrong type of graph is drawn:

- Marks will be lost for 'correct type of graph'

If axes are transposed:

- Marks will be lost for labelling and scaling of X-axis and Y-axis

(6)

	3.3.4	Blood group O✓ occurs most frequently✓	(2)
	3.3.5	- Both blood groups A and B individuals may have the recessive allele✓/i - while blood group O individuals have two recessive alleles✓/ii - which therefore maintains/increases the occurrence of the recessive /i allele in the population✓	(3) (15)
3.4	3.4.1	Some have light coloured skin and others have dark coloured skin✓	(1)
	3.4.2	Dark coloured✓	(1)
	3.4.3	Not visible✓/camouflaged to most predators in the night✓	(2) (4)
			[40]
		TOTAL SECTION B:	80

SECTION C**QUESTION 4****Speciation**

- If a population of a single species becomes separated✓
- by a geographical barrier ✓(sea, river, mountain, lake)
- There is now no gene flow✓ between the populations/the populations can no longer interbreed.
- Since each population may be exposed to different environmental conditions✓,
- natural selection occurs independently in each of the two populations✓
- such that the individuals of the two populations become very different✓
- from each other genotypically and phenotypically.✓
- Even if the populations were to mix again,✓
- they will not be able to reproduce✓ with each other
- They have thus become different species✓

(Any 9) (9)

Reproductive isolating mechanisms

- Breeding at different times of the year✓
- One species is fertile when the other is not✓
- Species-specific courtship behaviour✓
- Courtship behaviour of one species will not attract other species✓
- Adaptation to different pollinators✓
- Pollinator of one species is not adapted to pollinate another species✓
- Infertile offspring✓
- A new species cannot form because they cannot produce fertile offspring✓
- Pheromones✓ are used to attract mates
- If the pheromones are not correct they will not mate✓
- Different genitalia✓
- Unsuitable/incompatible reproductive organs prevents mating✓

(Any 4 x 2) (8)

OR ANY OTHER SCIENTIFICALLY CORRECT EXAMPLE, E.G. GAMETE ISOLATION

Content: (17)
Synthesis: (3)
(20)

ASSESSING THE PRESENTATION OF THE ESSAY

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
Generally	All information provided is relevant to the question	Ideas are arranged in a logical/cause-effect sequence	All aspects required by the essay have been sufficiently addressed
In this essay in Q4	Only information regarding speciation and reproductive isolating mechanisms is given. (no irrelevant information).	Speciation through geographic isolation is described in the correct sequence and reproductive isolating mechanisms are given with the relevant effects.	At least 6 correct points on speciation through geographic isolation and 6 correct points on reproductive isolation mechanisms are given
Mark	1	1	1

TOTAL SECTION C: 20
GRAND TOTAL: 150