



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL
SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2
SEPTEMBER 2021
REVISED MARKING GUIDELINES
09 SEPTEMBER 2021

MARKS: 150

This Marking Guideline consists of 12 pages

REVISED MARKING GUIDELINE**PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2021**

- 1. If more information than marks allocated is given**
Stop marking when the maximum mark 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 the whole process is given when only part of it is required**
Read all and credit the relevant part.
- 4. If comparisons are asked for and descriptions are given**
Accept if 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 becomes correct again, resume credit.
- 9. Non-recognisable 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, 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 Provincial memo discussion meeting.
- 14. If only letter is asked for and only name is given (and vice versa)**
No credit.
- 15. If units are not given in measurements**
Memorandum will allocated marks for units separately, except where it is already given in the question.
- 16. Be sensitive to the sense of an answer, which may be stated in a different way.**

REVISED MARKING GUIDELINE**17. Caption**

Credit will be given for captions to all illustrations (diagrams, graphs, tables etc.) except where it is already given in the question.

18. Code-switching of official languages (terms and concepts)

A single word or two that appears 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.

REVISED MARKING GUIDELINE

Adjusted marks indicated in YELLOW for Schools that were not able to present Human Evolution to their learners due to COVID disruptions

SECTION A**QUESTION 1**

1.1

1.1.1	B	✓✓		
1.1.2	B	✓✓		
1.1.3	C	✓✓		
1.1.4	B	✓✓		
1.1.5	C	✓✓		
1.1.6	A	✓✓		
1.1.7	C	✓✓		
1.1.8	B	✓✓		
1.1.9	C	✓✓		
1.1.10	D	✓✓	(10x2)	(20)
			(7x2)	(14)

1.2

1.2.1	Punctuate equilibrium	✓		
1.2.2	Homologous	✓		
1.2.3	Biogeography	✓		
1.2.4	Transitional	✓		
1.2.5	Double helix	✓		
1.2.6	Incomplete dominance	✓		
1.2.7	Gene pool	✓		
1.2.8	Foramen magnum	✓		
1.2.9	Continuous variation	✓	(9x1)	(9)
			(7x1)	(7)

1.3

1.3.1	A only	✓✓		
1.3.2	B only	✓✓		
1.3.3	A only	✓✓		
1.3.4	None	✓✓		
1.3.5	A only	✓✓	(5x2)	(10)
			(4x2)	(8)

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1.4

1.4.1 Suspect 3 ✓✓ (2)

1.4.2 The bands of the DNA profile of the skin ✓ found under the nails of the victim matches the bands of the DNA profile of the blood of suspect 3 ✓ (2)

1.4.3 Human error could have occurred in the laboratory ✓
Specimens could have been deliberately swapped in the laboratory ✓
Sample of a DNA taken from the victim could not give accurate profile/
large length of DNA is required to get accurate profile ✓
(Any 2) (2)

1.4.4

- Paternity tests ✓
 - Determining identity of dead persons ✓
 - Determining genetic disorders ✓
 - Tracking individuals in population ✓
- (Mark first THREE only)** (3)

1.4.5 The process by which the DNA of a person/ organism is analysed ✓
to obtain a barcode pattern ✓ (2)
(11)

TOTAL SECTION A: 50

TOTAL SECTION A: 40

SECTION B**QUESTION 2**

2.1

2.1.1 Speciation ✓ (1)

2.1.2

- The fruit flies were separated into two groups ✓ (populations) of the same species ✓
- There is now no gene flow between the two populations ✓
- The fruit flies had different sources of food ✓ / lived under different environmental conditions
- The fruit flies underwent natural selection independently ✓ in each trough.
- Natural selection continued in each trough over many generations, ✓ resulting in each trough having a species that was quite different ✓ genotypically ✓ and phenotypically ✓ from species of the other trough.
- These differences prevented them from interbreeding ✓ and this led to the formation of two new species. ✓

(Any 6) (6)

2.1.3

Lamarck	Darwin
1. Law of use and disuse ✓	1. Natural selection ✓
2. Acquired characteristics are passed on to the next generation ✓	2. Genetic characteristics can be inherited by offspring from parents ✓
3. Organisms have an internal drive to change ✓ / deterministic	3. Organisms do not have an internal drive to change ✓ / nature selects
4. Individuals change ✓	4. Populations change ✓
5. Infers that there is no extinction because organisms adapt and survive ✓	5. Extinction occurs since organisms may have features that do not favour survival ✓

Rubric to assess the Table

Criterion	Mark
A comparison table is drawn with clear headings for each column	1
Any 2 corresponding differences	2 + 2
	(5)

(12)

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2.2

2.2.1 Process A-Translocation✓/ transcription
Organelle B-Ribosome✓ (2)

2.2.2 Translation✓*

- The mRNA strand from the nucleus becomes attached to the ribosome✓ with its codons exposed.
 - Each tRNA molecule carries a specific amino acid✓ according to its anti-codon✓
 - The anti-codon matches up with/is complementary to the codon of the mRNA✓
 - So that the amino acids are placed in the correct sequence✓
 - Adjacent amino acids are linked to form a protein. ✓
- (1x compulsory mark ✓* + any 4 correct points) (5)

2.2.3 (a) Gene mutation ✓ (1)

(b) The amino acid coded for by the changed codon may be:

- different to the original amino acid ✓
- Thus causing a different protein to be produced ✓

OR

- The same as the original amino acid ✓
- Thus there will be no change to the protein produced ✓ (4)

(12)

2.3

2.3.1 50% ✓✓ (2)

2.3.2 **P2** Phenotype Green leaves x Green leaves✓
Genotype Gg x Gg✓
Meiosis
↓ ↓ ↓ ↓
G/Gametes G g x G g ✓
Fertilization
F2 Genotype GG Gg Gg gg ✓
Phenotype 3 green leaves and 1 variegated leaves✓

OR

Gametes	G	g
G	GG	Gg
g	Gg	gg
Correct gametes ✓ Correct offspring genotypes✓		

Phenotype 3 green leaves and 1 variegated leaves✓

P2 and F2 ✓

Meiosis and fertilization ✓

Any 6 (6)

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- 2.3.3 (a) One✓/1 (1)
 (b) Two✓/2 (1)
 (c) One✓/1 (1)
- 2.3.4 Mendel's Principle of Independent Assortment:
- The various 'factors'/ alleles controlling the different characteristics/ genes are separate entities, ✓ not influencing each other in any way, and sort themselves out independently during gamete formation. ✓
- OR**
- The alleles of two (or more) different genes✓ get sorted into gametes independently of one another. ✓
- OR**
- The allele that a gamete receives for one gene✓ does not influence the allele received for another gene✓
- (2)
(13)
- 2.4
- 2.4.1 Crossing over ✓ (1)
- 2.4.2 D – Centriole✓ (1)
- 2.4.3 Part F / Spindle threads:
- Allows for the attachment✓ of chromosomes. ✓
 - Contracts ✓ to move chromosomes towards opposite poles ✓
- (any 1 x 2) (2)
- 2.4.4 The chromosomes are arranged in homologous pairs ✓ at the equator. ✓ (2)
- 2.4.5 Ovary ✓ (1)
- 2.4.6 Anaphase I ✓ (1)
- 2.4.7
- Crossing over takes place✓
 - between homologous chromosomes✓
 - leading to genetic material exchange✓
 - There is also random arrangement✓ of chromosomes along the equator. ✓
 - Different combinations of chromosomes move into each daughter cell✓
 - thus leading to variation in gametes✓ produced.
- (5)
(13)

TOTAL QUESTION 2: 50

REVISED MARKING GUIDELINE**QUESTION 3**

3.1

3.1.1 4✓ (1)

3.1.2 Not sex-linked ✓/ No (1)

This disorder occurs equally frequently in males and females ✓

The alleles do not occur on the X-chromosome ✓

This is a dominant allele and the phenotype of polydactyly will be present even in the heterozygous genotype ✓ (Any 2) (2)

(3)

3.1.3 (a) 2: Ff ✓

(b) 10: Ff ✓ (2)

3.1.4 (a) 14: unaffected female ✓

(b) 18: affected male ✓ (2)

3.1.5 4✓ generations (1)**(Omitted from original Memo)**

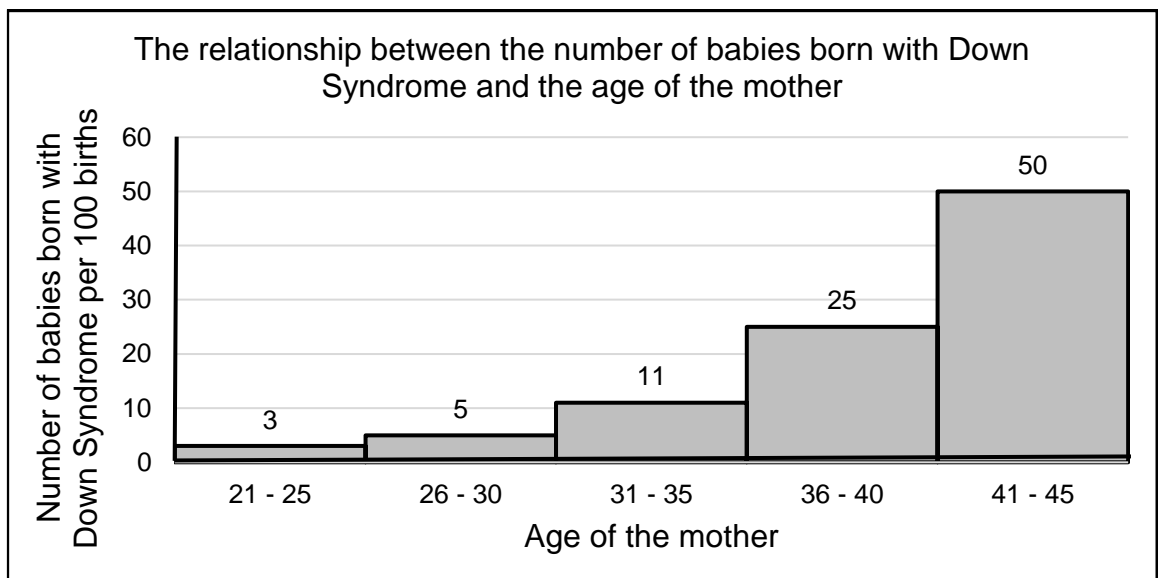
3.1.6 No. ✓

Homozygous condition in the offspring is only possible if both parents have the affected allele ✓. (2)

(11)

3.2

3.2.1



REVISED MARKING GUIDELINE**Guideline for assessing the graph**

CRITERION	ELABORATION	MARK
Correct type of graph	Histogram: No spaces between the bars	1
Caption for the graph	Both variables included	1
Correct label for X and Y - axes	X-axis: Age of mother Y-axis: Number of babies born with Down syndrome	1
Correct scale for X and Y - axes	X-axis: Bars must be the same width Y-axis: Suitable scale for the values	1
Plotting of points	3 to 5 bars plotted and drawn correctly	2
	Only 1 to 2 bars plotted and drawn correctly	1

(6)

- 3.2.2 The chances of having a child with Down syndrome significantly increases with the increased age of the biological mother ✓✓

OR

The chances of having a child with Down syndrome is significantly lower, the younger the biological age of the mother ✓✓

(2)

- 3.2.3 This condition occurs during meiosis in the production of egg cells/ ova/ oogenesis ✓

When chromosome pairs do not separate in Anaphase in the first meiotic division ✓

Resulting in a gamete with two copies of chromosome 21 instead of one ✓

This is called non-disjunction ✓*

The chromosomal abnormality is called Trisomy 21 ✓*

(2 x **compulsory mark** ✓* + any 2) (4)

- 3.2.4 She needs to be made aware that she has a high risk of having a baby with Down syndrome. ✓

Recommend that if she decides to go ahead with the pregnancy, she should have:

- an ultrasound of the foetus ✓
- a blood test to determine any abnormalities ✓
- an amniocentesis to check the chromosome composition/karyotype of the foetus ✓ (Any one)

Present an alternative option of adoption of a healthy child ✓ and not run the risk of having a child with Down syndrome. (Any 3) (3)

(15)

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3.3

3.3.1 (a) A ✓ (1)

3.3.2

Diagram A	Diagram B
1. Brow ridges less pronounced ✓	1 Brow ridges more pronounced ✓
2 Larger cranium/brain ✓	2 Smaller cranium/brain ✓
3 Jaws not prognathous ✓	3 Jaw protrudes ✓ (prognathous)
4 Developed chin ✓	4 Chin not developed ✓
5 Rounder cranium ✓	5 Elongated cranium ✓
6 Zygomatic arch less developed ✓	6 Zygomatic arch more developed ✓
7 Smaller lower jaw	7 Larger lower jaw

Rubric to assess the Table

Criterion	Mark
A comparison table is drawn with clear headings for each column	1
Any 3 corresponding differences	3 x 2
	(7)

3.3.3 *H. erectus* was the first *Homo* species ✓* to move out of Africa.
Their large bodies ✓ and well adapted pelvic girdles ✓ made them better bipedal runners and walkers ✓ over long distances than *H. sapiens*
(1 x **compulsory** ✓* + any 1 other) (2)

3.3.4 *Ardipithecus* ✓
Australopithecus ✓ (2)
(12)

3.3. For schools that did not present Human Evolution: disregard Q 3.3 (0)

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3.4

3.4.1 Tortoise B ✓

Island X is dry and has shrub-height Cactus plants ✓

Tortoise B has a long neck ✓

which can be used to reach the cactus fruit ✓ on which it feeds

(3)

3.4.2

- The common ancestral species originated from the South American mainland ✓
- The Galapagos islands formed through volcanic activity ✓
- Some of the tortoises may have been swept out to sea during a storm ✓ / flood
- And washed ashore on 2 different islands in the Galapagos ✓
- The original population was therefore separated by the Pacific Ocean and the islands that they inhabited ✓*
- Each island has different environmental conditions ✓ / causing changes in vegetation
- Each group of tortoises underwent natural selection independently ✓
- Some tortoises that had longer necks (Group B) survived better on island X ✓ than on island Y, because they could feed on the cactus plants ✓
- While tortoises with shorter necks (Group A) survived better on island Y ✓ than island X, because they could feed on low growing grass ✓
- Each group became genotypically and phenotypically ✓ different ✓
- which might have prevented them from interbreeding ✓
- They become reproductively isolated ✓
- leading to the formation of new species ✓

(1 x **compulsory** ✓* + any 8 others) (9)

(12)

TOTAL QUESTION 3: [50]**TOTAL SECTION B: 100****GRAND TOTAL : 150****RECOMMENDATION**

Adjusted marks indicated in YELLOW for Schools that were not able to present Human Evolution to their learners due to COVID disruptions

ADJUSTED MARKS**TOTAL QUESTION 3: [38]****TOTAL SECTION B: 88****GRAND TOTAL : 128****Raw mark obtained** x 150 = **converted mark** out of 150**128**