



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES ASSIGNMENT

MARKING GUIDELINES

AUGUST 2023

MARKS: 100

TIME: 2 HOURS

This question paper consists of 10 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. If more information than marks allocated is given Stop marking when maximum marks are 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 part of it is required Read all and credit 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 become correct again, resume credit.
9. Non-recognized abbreviations Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation but credit the rest of 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 recognizable accept provided it does not mean something else in Life Sciences or if it is out of context.
13. If common names given in terminology: only accept if provided as an alternative in the marking guideline.
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: 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, drawings, graphs, tables, etc.) must have a caption
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 answer should be credited, if it is correct.
19. No changes must be made to the marking memoranda without consulting the District Curriculum Advisors.

EVOLUTION BY NATURAL SELECTION: 56 MARKS**QUESTION 1:**

1.1.

1.1.1. 1976✓ (1)

1.1.2. A drop in rainfall causes a drop in seeds / plants ✓ because of drought
that causes a lack of seeds / food for finches ✓, therefore, fewer
finches will survive✓ (3)

(4)

1.2.

1.2.1. Artificial selection✓/ Selective breeding (1)

1.2.2. Humans chose characteristics/traits✓ that they desired and interbred
dogs with this trait✓to produce offspring with desired traits. ✓ (3)

1.2.3 They are able to interbreed with each other ✓ to produce fertile
offspring ✓ (2)

(6)

1.3.

1.3.1. larger / longer / thicker ✓
allow examples eg fewer toes or bones fused

- fewer (bones in total) ✓
allow smaller surface area touching the ground
- fewer bones touching the ground✓ (Any TWO) (2)

1.3.2. The evolution of horse bones is a example evolution, but it does not ✓ support
Lamarck's theory of evolution. Lamarck's theory proposed that organisms could acquire
new traits during their lifetime ✓and pass these acquired traits on to their offspring✓ he
ancestors of modern horses went through a series of adaptations that are primarily
related to changes in their environment, ✓ (First one and any other TWO) (3)

1.3.3. There was a great deal of variation✓ in the size, number and
arrangement of foot bones ✓, some had larger✓ / fewer bones and
were suited to run faster on harder✓ / drier ground ✓ some had smaller ✓
/ many bones and could not run faster✓ and were more easily caught
by predators / they died ✓the ones that could run faster survived and
reproduced ✓ passed the allele for larger✓ / fewer bones to the next

generation ✓ the next generation therefore had a higher proportion of individuals with larger ✓ / fewer bones. (Any 5)

(5)

(10)

1.4.

1.4.1. Allopatric speciation ✓

(1)

1.4.2. Increases diversity of species / biodiversity ✓ Introduces

reproductive isolation mechanisms ✓ Eliminates gene flow between different populations ✓ Decreases extinction rates of species ✓

(Any TWO)

(2)

1.4.3. Species B and C ✓ evolved from species A. ✓

Species A existed prior to species B ✓, and species C evolved at the same time as species B ✓ (any one x 2)

1.4.4. Moth in species A belonged to a single population. The population of species A moths was split into two groups, one on each side of the mountain range. ✓

Gene flow / interbreeding between the two groups was completely eliminated / impossible ✓

Each group was exposed to unique environmental factors / selection pressures ✓

Natural selection occurred independently in each group on either side of the mountain. ✓

Each population became genotypically and phenotypically different from the other population. ✓

If the two groups were to mix again and attempt to interbreed, the offspring would be infertile. Thus two new species will then have been produced. ✓

(6)

(11)**TOTAL QUESTION 1: 31**

QUESTION 2

2.1.

2.1.1.

- (a) period on which investigation was done ✓ (1)
- (b) Percentage (%) of survival rate of different colour lizards ✓

(1)

2.1.2. It decreases survival / lizards may die / is harmful / is lethal to the red lizards ✓ since they will be seen on the black rock by the predators ✓ OR They could not escape predators / catch prey on cold days ✓ as red lizards did not warm up fast on cold days ✓

(Any ONE × 2) (2)

2.1.3. To allow enough time for reproduction and survival ✓ to be able to calculate the percentage to ensure reliability of results ✓ OR A change in population proportions will not be seen over a shorter time period ✓ to ensure reliability of results ✓ (Any ONE × 2) (2)

2.1.4. Conduct the investigation in the same habitat / environment ✓

Use the same sampling technique ✓

Capture the same number of lizards in each sampled generation ✓

Take each sample at the same time of day / weather conditions ✓

(MARK FIRST TWO ONLY – Any 2) (2)

2.1.5. (a)

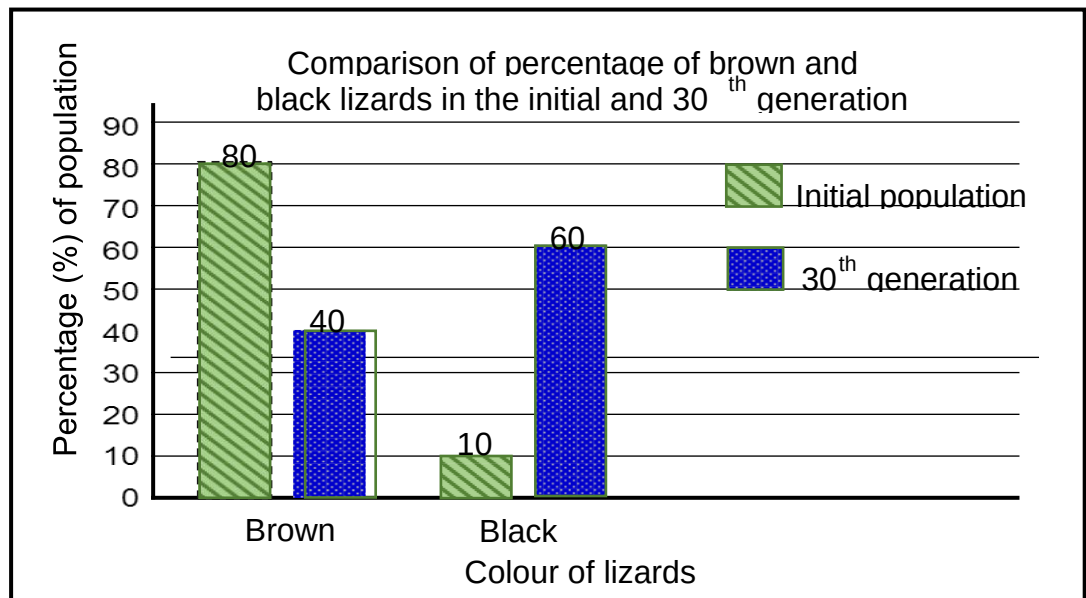
- * Decide on the sample size ✓
- * Decide on the method for recording results ✓
- * Decide on time// date to collect data from the Island
- * Decide on the equipment to use ✓

(Any 3) (3)

(b) $60 - 10\checkmark = 50\checkmark$ Lizards increase

(2)

2.1.6.



Guideline for assessing graph

Bar graph for the required data	✓
Title of graph	✓
Correct label and scale for X-axis	✓
Correct label and scale for Y-axis	✓
Drawing of bars	✓: 1 – 3 bars plotted correctly ✓✓: All 4 bars plotted correctly

(6)

(19)

2.2.1. 2 ✓

(1)

2.2.2. ***Wind blew butterflies to next island✓**

- Thus separating them geographically✓
- As the separate islands had different environmental conditions✓/ have different vegetation/ different food for butterflies
- each group underwent natural selection independently✓.

- and developed differently✓
- genotypically and phenotypically✓
- Gene flow/ reproduction between population A/B and C did not occur✓
- resulting in a new species

***Compulsory 1 + 4 Any** (5)

(6)

TOTAL FOR EVOLUTION BY NATURAL SELECTION: 56

HUMAN EVOLUTION: 44 MARKS

QUESTION 3

3.1.1. A ✓ – modern humans are bipedal, except in early infancy (1)

3.1.2.

Skull A	Skull B
Non prognathous jaw/ Protruding	Prognathous jaw/ protruding
No cranial ridge / no sagittal crest	Cranial ridge present
Larger cranium / brain cavity	Small cranium
Small canines/ teeth	Large canines/ teeth

table - ✓, any two differences ✓✓ (5)

3.1.3. Fast movement ✓ – to get away from danger ✓

Ability to survey surroundings ✓ – to see where the dangers are ✓

Freedom of forearm and hand ✓ – for tool use or for defence ✓

Exposed to less sunlight ✓ – for temperature regulation ✓

Display of genitals ✓ – to attract a mate ✓

(Any THREE ✓ for name, ✓ for explanation) (6)

(12)

3.2.

3.2.1. Lee Berger ✓, at the Malapa caves ✓ (2)

3.2.2. The length of the legs and arms✓ (1)

3.2.3. Shows the characteristics of two different genera or species ✓✓ (2)

3.2.4. A dead end implies the species became extinct ✓ and that this

Species did not evolve any further ✓✓ (3)

3.2.5. It suggests that upright walking (bipedalism) evolved on more than

one path during human evolution. ✓✓ (2)

3.2.6. No ✓. Bipedalism means to habitually walk erect ✓, on two feet, the way a human being ✓ normally walks. Many animals (e.g. a chimpanzee ✓) can stand upright on two legs, but generally walks on all fours ✓.

(5)

(15)

3.3.

3.3.1. A - *Australopithecus*✓B - *H. habilis*✓C - *H. erectus*✓D - *H. neanderthalensis*✓E - *Homo sapiens* ✓**(for each correct answer)**

(5)

3.3.2.

- Freely rotating (movable) long upper limbs elbow joints allowing rotation of the forearm. ✓
- Flat nails instead of claws✓ / bare, sensitive finger tips.
- Flexible wrists that are capable of rotating at least 180°✓ Eyes in Front. ✓
- Opposable thumbs for precision grip. ✓
- Larger brain than other Hominids. ✓
- Binocular vision / stereoscopic vision. ✓
- Sexual dimorphism upright posture / bipedal✓

(Any THREE)

(1 X 3)

(3)

3.3.3.

- Bipedalism ✓
- curved spine✓/S shape
- Flat (non-prognathous) face✓
- semi-circular dental palate
- small teeth✓/ canines
- larger brain✓

(Any THREE)

(1 X 3)

(3)

(11)

3.4. – The "Out-of-Africa" proposes that modern *Homo sapiens* originated in Africa and then spread to other parts of the world✓, eventually replacing or assimilating other *hominin* populations that were already present. Fossil evidence plays a crucial role in supporting this hypothesis since:

- Fossils of *Ardipithecus* were found in Africa **only**✓
- Fossils of *Australopithecus* were found in Africa **only**✓
- Fossils of *Homo habilis* were found in Africa **only**✓
- the **oldest** fossils of *Homo erectus* were found in Africa✓
- while the **younger** fossils *Homo erectus* were found in other parts of the world✓
- oldest fossils of *Homo sapiens* were found in Africa
- while the **younger fossils** of *Homo sapiens* were found in other parts of the world✓

(Any 6)

(6)**TOTAL FOR HUMAN EVOLUTION:****44****GRAND TOTAL: 100**