



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**SEPTEMBER 2019**

**LIFE SCIENCES P2  
MARKING GUIDELINE**

**MARKS: 150**

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This marking guideline consists of 12 pages.

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**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. Marking guideline 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.

**SECTION A****QUESTION 1**

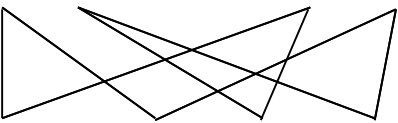
- |     |        |   |          |      |
|-----|--------|---|----------|------|
| 1.1 | 1.1.1  | B ✓✓  |          |      |
|     | 1.1.2  | A ✓✓  |          |      |
|     | 1.1.3  | B ✓✓  |          |      |
|     | 1.1.4  | A ✓✓  |          |      |
|     | 1.1.5  | B ✓✓  |          |      |
|     | 1.1.6  | C ✓✓  |          |      |
|     | 1.1.7  | C ✓✓  |          |      |
|     | 1.1.8  | D ✓✓  |          |      |
|     | 1.1.9  | D ✓✓  |          |      |
|     | 1.1.10 | C ✓✓  | (10 x 2) | (20) |
| 1.2 | 1.2.1  | Homozygous ✓  |          |      |
|     | 1.2.2  | (Gregor) Mendel ✓                                   |          |      |
|     | 1.2.3  | Reproductive isolating mechanisms ✓                 |          |      |
|     | 1.2.4  | Stem cells ✓  |          |      |
|     | 1.2.5  | Double helix ✓                                      |          |      |
|     | 1.2.6  | Interphase ✓  |          |      |
|     | 1.2.7  | Prognathous ✓                                       |          |      |
|     | 1.2.8  | Down Syndrome ✓/ Trisomy 21                         |          | (8)  |
| 1.3 | 1.3.1  | B only ✓✓   |          |      |
|     | 1.3.2  | A only ✓✓   |          |      |
|     | 1.3.3  | A only ✓✓   | (3 x 2)  | (6)  |
| 1.4 | 1.4.1  | Meiosis ✓   |          | (1)  |
|     | 1.4.2  | (a) Crossing over ✓                                 |          | (1)  |
|     |        | (b) testis ✓ / testicle                             |          | (1)  |
|     | 1.4.3  | (a) A – Chromatid ✓                                 |          | (1)  |
|     |        | (b) B – Centromere ✓                                |          | (1)  |
|     |        | (c) C – Homologous chromosomes / pair / bivalents ✓ |          | (1)  |
|     |        | (d) D – Centriole ✓/centrosome                      |          | (1)  |
|     | 1.4.4  | (a) Metaphase I ✓                                   |          | (1)  |
|     |        | (b) Anaphase II ✓                                   |          | (1)  |
|     | 1.4.5  | TWO ✓/2   |          | (1)  |
| 1.5 | 1.5.1  | Two characteristics ✓ are involved in the cross     |          | (1)  |
|     | 1.5.2  | BbHh ✓  |          | (1)  |
|     | 1.5.3  | (a) Bbhh ✓  |          | (1)  |
|     |        | (b) Black, horned ✓                                 |          | (1)  |
|     | 1.5.4  | 8 ✓✓  |          | (2)  |

**TOTAL SECTION A: 50**

## QUESTION 2

- 2.1 2.1.1 Protein synthesis ✓ (1)
- 2.1.2 (a) mRNA ✓/ messenger RNA (1)
- (b) Ribosome ✓ (1)
- (c) Nuclear membrane ✓ (1)
- 2.1.3 A G U ✓ (1)
- 2.1.4 S – R – P – Q ✓✓ (2)
- 2.1.5 Cytoplasm ✓ (1)
- 2.1.6 - The DNA molecule unwinds ✓  
- and unzips / weak hydrogen bonds break ✓  
- one side of the DNA molecule forms a template ✓  
- free floating **RNA** nucleotides from the nucleolus ✓  
- join to their complementary base pairs ✓ (T-A; C-G)  
- to form a new strand of mRNA ✓ (Any 5 x 1) (5)
- 2.1.7 - If nitrogenous base A was replaced by G it would mean that the codon would change to AGC ✓  
- which may code for a different anticodon ✓/UCA instead of AGU  
- and a different the amino acid ✓  
- which may change the protein formed ✓ (4)
- 2.2 2.2.1 A sudden change in the DNA sequence ✓/ structure of a gene leading to altered characteristics. (1)
- 2.2.2 Pedigree ✓ diagram (1)
- 2.2.3 3 ✓ (1)
- 2.2.4 - Because individual 8/13/15 has the disease ✓  
- therefore his/her parents must both be carriers of the disease ✓  
- but they do not express the characteristic ✓  
- therefore, it must be recessive (3)

2.2.5

<b>P<sub>1</sub></b>	Phenotype	Normal male	x	Normal female ✓
	Genotype	Nn	x	Nn ✓
Meiosis	<b>G/gametes</b>	N , n	x	N , n ✓
Fertilisation				
<b>F<sub>1</sub></b>	Genotype	NN ; Nn ; Nn ; nn ✓		
	Phenotype	3 Normal and 1 cystic fibrosis		

They have a **25%** ✓\* chance of having a child with cystic fibrosis

P<sub>1</sub> and F<sub>1</sub> ✓

Meiosis and fertilisation ✓

(1\* compulsory + Any 5)

OR

<b>P<sub>1</sub></b>	Phenotype	Normal male	x	Normal female ✓												
	Genotype	Nn	x	Nn ✓												
Meiosis	<b>G/gametes</b>	N , n	x	N , n ✓												
Fertilisation		<table border="1"> <tr> <td>Gametes</td> <td><b>N</b></td> <td><b>n</b></td> </tr> <tr> <td><b>N</b></td> <td>NN</td> <td>Nn</td> </tr> <tr> <td><b>n</b></td> <td>Nn</td> <td>nn</td> </tr> <tr> <td colspan="3">Correct genotypes ✓</td> </tr> </table>			Gametes	<b>N</b>	<b>n</b>	<b>N</b>	NN	Nn	<b>n</b>	Nn	nn	Correct genotypes ✓		
Gametes	<b>N</b>	<b>n</b>														
<b>N</b>	NN	Nn														
<b>n</b>	Nn	nn														
Correct genotypes ✓																
<b>F<sub>1</sub></b>																

Phenotype 3 Normal and 1 cystic fibrosis

They have a **25%** ✓\* chance of having a child with cystic fibrosis

P<sub>1</sub> and F<sub>1</sub> ✓

Meiosis and fertilisation ✓

(1\* compulsory + Any 5)

(6)

- 2.3.1 Any disease or abnormal condition that is determined by a gene/allele that is carried on the gonosomes ✓/sex chromosomes/ X or Y chromosomes. (1)
- 2.3.2 At the age of 3 ✓years old (1)
- 2.3.3
- The gene is found on the X chromosome ✓
  - Boys only have one X chromosome ✓
  - If that X chromosome carries the Duchenne's gene ✓
  - the boy will have Duchenne's muscular dystrophy ✓
  - as there is no other allele to mask it. ✓ (Any 4 x 1) (4)
- 2.4 2.4.1 Cloning ✓ (1)
- 2.4.2
- Allows people to produce organisms with selected beneficial traits ✓
  - Animals in danger of extinction could be saved. ✓
  - Production of organs ✓ for transplants
- Mark first TWO only** (Any 2 x 1) (2)
- 2.4.3
- A diploid cell ✓ / a cell with all the genetic information is needed
  - as a gamete is a haploid cell ✓ / only contains half the genetic information (2)

**[40]**

**QUESTION 3**

3.1 3.1.1 A and C ✓✓ (2)

3.1.2 - Organisms that have similarities in the structure ✓  
- indicates common ancestry ✓ (2)

3.1.3 - Fossil record ✓  
- Biogeography ✓  
- Genetics ✓  
**Mark First TWO only** (Any 2 x 1) (2)

3.2 3.2.1 - Random arrangement of chromosomes ✓ } **OR** Meiosis ✓  
- crossing over ✓  
- random mating ✓  
- random fertilisation ✓  
- mutations ✓  
**Mark first THREE only** (Any 3 x 1) (3)

3.2.2 - The deer are either black or white. ✓  
- There is no intermediate characteristic ✓/grey (2)

3.2.3

Darwinism	Punctuated Equilibrium
Gradual change ✓	Rapid change ✓
takes place over a long period of time ✓	takes place with in a relatively short period of time ✓
Change is continuous ✓	Long periods of no change ✓

**Mark first TWO only** Table ✓ + Any 4 (5)

3.3 - The common ancestor ✓original baobab population  
- was separated ✓into different populations  
- by the sea ✓\*/due to continental drift  
- There was no gene flow ✓between the populations  
- Each population was exposed to different environmental conditions ✓/  
different selection pressures.  
- Natural selection occurred independently ✓in each population.  
- the individuals in the two populations became different ✓from each  
other over time  
- genotypically and phenotypically ✓  
- Even if the two are to mix again ✓  
- they will not be able to interbreed ✓  
- forming different baobab species (1\* compulsory + Any 5) (6)



3.4 3.4.1 Breed of Dog ✓

Genetic disease ✓

**Mark first TWO only**

(2)

3.4.2 Percentage of Mixed breed dogs with cataracts

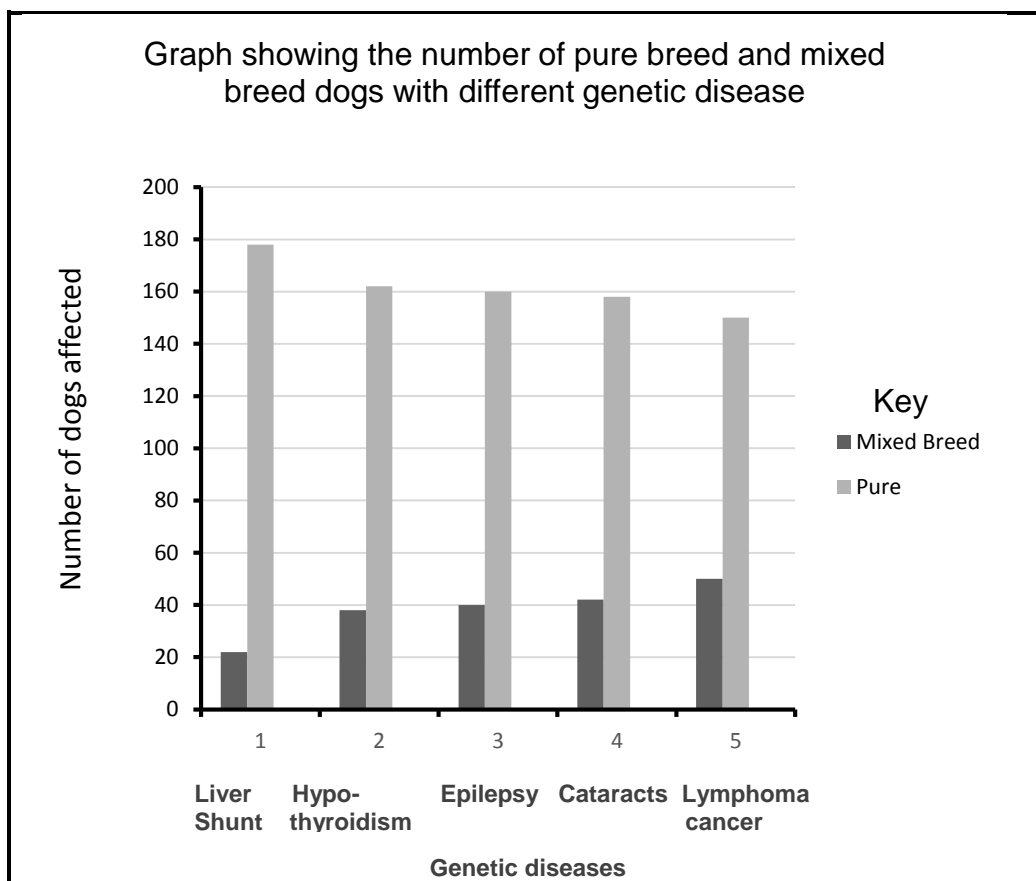
$$= \left[ \frac{42}{200} \times 100 \right] \checkmark = 21\% \checkmark$$

(2)

3.4.3 Pure breed dogs suffer from genetic diseases more than mixed breed dogs ✓✓

(2)

3.4.4



**Marking guideline:**

Caption (C)	1 Mark
Both variables included	
Type of graph (T)	1 Mark
X-axis label, width of bars even (X)	1 Mark
Y-axis label and scale (Y)	1 Mark
Plotting of point (P)	0 Mark – No points plotted correctly
	1 Mark – 1 to 6 points plotted correctly
	2 Marks – all points plotted correctly

(6)

- 3.4.5 Natural selection takes place due to selective pressure of the environment. ✓/Individuals with characteristics that help them to survive in nature are selected.  
In artificial selection humans are the selective pressure. ✓/ The characteristics that are selected is what humans want/not necessarily helping them to survive. (2)
- 3.4.6 All dogs are able to interbreed ✓ and produce fertile offspring. ✓ (2)
- 3.4.7 It is not ethically correct ✓ as more artificially bred / pure breed dogs suffer from genetic diseases than mixed breed dogs. ✓ (2)

**TOTAL SECTION B: 80**

**SECTION C****QUESTION 4****Changes in the skull and parts of the skeleton that support bipedalism:**

- The foramen magnum has moved to the base of the skull ✓ so that the head can be held vertically. ✓/spinal cord can be in line with the brain
- The position of the pelvic girdle moved to under / the bottom of the core body ✓ so it is suitable to carry the weight of the upper body ✓
- The pelvis has become more cup shaped / wider and shorter ✓ which makes it suitable to carry the core / weight of the upper body ✓
- The vertebral column changed from C-shape to S-shaped ✓/greater lumbar curvature in spine for better balance ✓/support of upper body weight

(Any 3 x 2) (6)

**Changes in skull that support change in diet:**

- Reduction in the size of teeth ✓/ canines ✓
- Reduction in jaw size ✓
- Reduction of cranial brow ridges ✓
- and cranial ridges ✓due to
- smaller muscles for chewing✓
- Indicate that modern humans changed from a diet of raw food ✓ to
- a diet of softer/ cooked food ✓
- that does not require the same amount of chewing ✓/tearing/biting

(Any 6 x 1) (6)

**Changes in the skull that support improved communication and use of tools:**

- a larger cranium ✓
- indicated a larger brain size ✓
- which can process a larger amount of information ✓
- at a faster speed ✓
- This has led to the development artificial language ✓ for communication
- And the invention / greater use of tools and weapons ✓

(Any 5 x 1) (5)

**ASSESSING THE PRESENTATION OF THE ESSAY**

<b>Criterion</b>	<b>Relevance (R)</b>	<b>Logical sequence (L)</b>	<b>Comprehensive (C)</b>
<b>Generally</b>	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.
<b>In this essay in Q4</b>	<p>Only information relevant to the description of:</p> <ul style="list-style-type: none"> <li>- Changes in skull and skeleton that support bipedalism, change in diet and improved communication and use of tools.</li> </ul> <p>There is no irrelevant information.</p>	<p>All the information regarding the:</p> <ul style="list-style-type: none"> <li>- Changes in skull and skeleton that support bipedalism, change in diet and improved communication and use of tools.</li> </ul> <p>Is given in a logical manner.</p>	<p>At least:</p> <ul style="list-style-type: none"> <li>– <b>4/6</b> for changes in skull and skeleton that support bipedalism</li> <li>– <b>4/6</b> for changes in skull that support changes in diet</li> <li>– <b>3/5</b> for improved communication and use of tools</li> </ul>
<b>Mark</b>	<b>1</b>	<b>1</b>	<b>1</b>

**CONTENT** (17)  
**SYNTHESIS** (3)

**TOTAL SECTION C:** 20  
**GRAND TOTAL:** 150