



Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Departement van Onderwys
Porafensie Ya Kapa Botjhabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2026

LIFE SCIENCES P2 MARKING GUIDELINE

MARKS: 150

This marking guideline consists of 11 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. 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 | D ✓✓ | | |
| | 1.1.2 | B ✓✓ | | |
| | 1.1.3 | C ✓✓ | | |
| | 1.1.4 | B ✓✓ | | |
| | 1.1.5 | A ✓✓ | | |
| | 1.1.6 | A ✓✓ | | |
| | 1.1.7 | D ✓✓ | | |
| | 1.1.8 | B ✓✓ | | |
| | 1.1.9 | B ✓✓ | | |
| | 1.1.10 | D ✓✓ | (10 x 2) | (20) |
| 1.2 | 1.2.1 | Messenger RNA ✓/mRNA | | |
| | 1.2.2 | Colour-blindness ✓ | | |
| | 1.2.3 | Protein ✓ | | |
| | 1.2.4 | Stem cells✓ | | |
| | 1.2.5 | Nitrogenous base ✓ | | |
| | 1.2.6 | Cradle of humankind ✓ | | |
| | 1.2.7 | Anticodon ✓ | | |
| | 1.2.8 | Cultural evidence ✓ | (8 x 1) | (8) |
| 1.3 | 1.3.1 | B only ✓✓ | | |
| | 1.3.2 | None ✓✓ | | |
| | 1.3.3 | A only ✓✓ | (3 x 2) | (6) |
| | 1.4.1 | (a) Codominance ✓ | | (1) |
| | | (b) Incomplete✓dominance | | (1) |
| | 1.4.2 | RW ✓ | | (1) |

- 1.4.3 (a) Monohybrid ✓cross (1)
- (b) Pink flower ✓colour (1)
- (c) (Law of) segregation ✓ (1)
- 1.4.4 1 red coat : 2 roan coat : 1 white coat ✓✓ (2)
- 1.5 1.5.1 Artificial selection ✓ (1)
- 1.5.2 - High milk production ✓/ high average milk yield
- Disease resistance ✓
(Mark first TWO only) (2)
- 1.5.3 (a) 5th ✓generation (1)
- (b) 1st ✓ generation (1)
- 1.5.4 (a) Biological ✓ evolution (1)
- (b) Continuous ✓ variation (1)
- (c) Line ✓ graph (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

- 2.1 2.1.1 Two/2 ✓ (1)
- 2.1.2 Neighbour ✓ (1)
- 2.1.3 - 2 DNA bands on the child's ✓ DNA profile
 - match those of the mother's DNA profile ✓
 - All the remaining DNA bands of the child match with the DNA bands of the neighbour ✓ (3)
- 2.1.4 - Identification of genetic disorders ✓
 - Matching tissues for organ transplants ✓ (2)
- 2.1.5 - The DNA profile produced from the crime scene DNA sample is compared with the DNA profiles produced from DNA samples collected from suspects ✓
 - DNA bands from the crime scene are compared to the DNA bands of the possible suspect(s) ✓
 - If all the DNA bands of the crime scene DNA sample match the DNA bands of the suspect ✓.
 - Then the suspect is the culprit ✓/committed the offence/was present at the crime scene when the offense was made. Any 3 (3)
- 2.2 2.2.1 Telophase I ✓ (1)
- 2.2.2 (a) (It) "condenses"/ (shortens and thickens) to form chromatids ✓ (1)
- (b) (It) replicates/DNA replication occurs (1)
- 2.2.3 - Chromosomes consist of TWO identical chromatids ✓
 - which are joined at a centromere ✓
 - Each chromatid contains a DNA molecule ✓
 - with the same sequence of genes ✓ (4)
- 2.2.4 - in Anaphase II ✓
 - centromere split/sister chromatids separate/pulled to opposite poles of the cell ✓ (2)
- 2.2.5 (a) Cytokinesis ✓ (1)
- (b) - Aurora B kinase gene mutation involves a change in the nucleotide/ nitrogenous base sequence of a DNA ✓ molecule whilst
 - Down syndrome is characterised by a **chromosomal** mutation ✓/change in the number of chromosomes
 - At position 21 ✓ (3)

- 2.3 - A sperm is a gamete ✓
 - produced by meiosis ✓
 - Therefore, it must have haploid number/23 chromosomes
 - to overcome the doubling effect of fertilisation ✓ (4)
- 2.4 2.4.1 452×3 ✓
 = 1 356 ✓ nucleotides (2)
- 2.4.2 (a) PAH gene is found on chromosome 12 ✓/gene causing PKU is not found on the gonosomes /sex chromosomes (1)
 (b) Can cause intellectual disability ✓ in humans (1)
- 2.4.3 (a) Translation ✓ (1)
 (b) A change in the sequence of nucleotides on a DNA molecule ✓ (1)
 (c) - The DNA base triplet changes to ACC from GCC ✓
 - mRNA codon will be UGG instead of CGG ✓
 - tRNA anticodons will be ACC instead of GCC ✓
 - leading to amino acid Tryptophan instead of arginine ✓
 - A defective enzyme is formed, which cannot not change phenylalanine in the liver to tyrosine ✓*
 Any 3 + *1 compulsory (4)
- 2.5 2.5.1 Homozygous recessive ✓ (1)
- 2.5.2 (a) Four ✓/4 (1)
 (b) Nn ✓ (1)
 (c) Male with PKU ✓ (1)
- 2.5.3 • The occurrence of PKU will be lower ✓/ PKU is less prevalent in this pedigree
 • Since PKU is caused by two recessive alleles ✓
 • The dominant allele masks the recessive allele in a heterozygous condition ✓ (3)

2.5.4 P1 Phenotype Male without PKU X Female without PKU ✓
 Genotype Nn X NN ✓

Meiosis

Gametes

Fertilisation

F₁ genotype NN NN Nn Nn ✓
 Phenotype (100%) offspring without PKU ✓
 50% chance of having a child with heterozygous genotype ✓*

P1 and F1 ✓

Meiosis and fertilization ✓

P1 Phenotype Male without PKU X Female without PKU ✓
 Genotype Nn X NN ✓

Meiosis

Fertilisation

Gametes	N	n
N	NN	Nn
n	Nn	nn
1 mark for correct gametes 1 mark for correct genotypes		

Phenotype (100%) offspring without PKU ✓
 50% chance of having a child with heterozygous genotype ✓*

P1 and F1 ✓

Meiosis and fertilization ✓

Any 5 + *1 compulsory (6)
[50]

QUESTION 3

- 3.1 3.1.1 Agriculture ✓ (1)
- 3.1.2 - Decreases appetite ✓
 - Makes the person feel full ✓
(Mark first TWO only) (2)
- 3.1.3 - A plasmid is removed ✓ from a bacterium
 - It is cut-open using special enzymes ✓
 - The **GLP-1 gene** is removed from a human pancreatic cell ✓* and
 - inserted into the plasmid to form the recombinant DNA ✓
 - Recombinant DNA is re-inserted into the bacterium ✓
 - The bacterium is placed in the fermentation tank to reproduce many identical bacteria ✓
 - The bacteria produces semaglutide which is extracted to make wegovy pills ✓*/medication
(2 Compulsory marks* + any 3) (5)
- 3.1.4 Pills are easy to self-administer at home while injections often require medical assistance/ carry risk of infection ✓✓
OR
 Pills are painless while needles are painful and people are scared of needles ✓✓ (2)
- 3.2 3.2.1 (a) Consuming naturally fermented fruit ✓ (1)
- (b) To ensure reliability ✓ of the investigation (1)
- 3.2.2 - Measuring the alcohol vapour inside the fruit ✓
 - Chemical tests that change colour when ethanol (alcohol) is present. ✓
(Mark first TWO only) (2)
- 3.2.3 - A control group would not ingest naturally fermented fruit ✓
 - In order to establish whether alcoholic concentration is due to fermented fruit intake or not ✓ (2)
- 3.2.4 $\frac{3}{100} \times 470 = 14,1$ ✓g (3)
- 3.2.5 - Fruits have low concentration of alcohol ✓
 - Chimpanzees have become resistant/used to alcohol in fruits ✓ (2)
- 3.3 3.3.1 (a) Biogeography ✓ (1)
- (b) Speciation ✓ (1)
- 3.3.2 Habitat isolation ✓
 These lizards occupy different islands separated by oceans ✓ (2)

- 3.3.3 - All South-island lizards had smaller heads with a weaker bite force ✓
 - Due to changes in diet from eating insects to eating tough plant material ✓
 - Lizards used their jaws more to grind tough plant material ✓
 - South-island lizards evolved/developed larger heads with a stronger bite force ✓ due to large jaws
 - The larger head with a stronger bite force was acquired ✓ by the offspring
 - and passed on to future generations ✓ (5)

- 3.3.4 - The population/ancestral population of the Italian wall lizard species become separated into three islands ✓*
 by oceans ✓
 - The population separated into three/3 populations ✓*
 - There was no gene flow between the three/3 populations ✓
 - Each population became exposed to different environmental conditions ✓
 - natural selection occurred independently in each of the three populations ✓
 - such that the individuals of the (three/3) populations become very different from each other ✓
 - genotypically and phenotypically ✓
 - even if the three populations were to mix again ✓
 - they will not be able to interbreed ✓
 - Three different species are now formed, the North-island, Central-island and South-island lizards ✓*. **3 compulsory* + Any 3** (6)

3.4 3.4.1 (a) Foramen magnum ✓ (1)

(b) Brow ridge ✓ (1)

- 3.4.2 - Five/5 fingers ✓/digits in each hand
 - Opposable thumb ✓
 - Nails ✓
(Mark first THREE only) (3)

- 3.4.3 - the vertebral column of *A. afarensis* is less S-shaped ✓/curved than *H. sapiens*
 - but more curved ✓ compared to primitive hominids (2)

3.4.4 T ✓

<i>A. afarensis</i>	<i>H. sapiens</i>
Eats raw/harder food ✓	Eats softer/cooked food ✓

(Mark first ONE only) Table 1 + 2 (3)

- 3.4.5 - Fossils of *Australopithecus* were found in Africa only ✓
- Fossils of *Homo habilis* were found in Africa only ✓
- The oldest fossils of *Homo erectus* and *homo sapiens* were found in Africa ✓/the younger fossils of *Homo erectus* and *homo sapiens* were found in other parts of the world
- This indicates that humans originated in Africa and migrated from Africa to the rest of the world ✓

(4)

[50]**TOTAL SECTION B: 100****GRAND TOTAL: 150**