



Province of the
EASTERN CAPE
EDUCATION

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

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2025

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 the 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 | C ✓✓ | | |
| | 1.1.2 | C ✓✓ | | |
| | 1.1.3 | D ✓✓ | | |
| | 1.1.4 | B ✓✓ | | |
| | 1.1.5 | C ✓✓ | | |
| | 1.1.6 | D ✓✓ | | |
| | 1.1.7 | A ✓✓ | | |
| | 1.1.8 | D ✓✓ | | |
| | 1.1.9 | D ✓✓ | | |
| | 1.1.10 | A ✓✓ | (10 x 2) | (20) |
| | | | | |
| 1.2 | 1.2.1 | DNA profile ✓ | | |
| | 1.2.2 | Nucleoplasm ✓ | | |
| | 1.2.3 | Incomplete ✓ dominance | | |
| | 1.2.4 | Geographic ✓ barrier | | |
| | 1.2.5 | Adaptation to different pollinators ✓ | | |
| | 1.2.6 | Haemophilia ✓ | | |
| | 1.2.7 | Random ✓ mating | | |
| | 1.2.8 | Punctuated equilibrium ✓ | (8 x 1) | (8) |
| | | | | |
| 1.3 | 1.3.1 | A only ✓✓ | | |
| | 1.3.2 | A only ✓✓ | | |
| | 1.3.3 | A only ✓✓ | (3 x 2) | (6) |
| | | | | |
| 1.4 | 1.4.1 | (a) (diagram) 1 ✓ | | (1) |
| | | (b) (diagram) 2 ✓ | | (1) |
| | | | | |
| | 1.4.2 | Crossing over ✓ | | (1) |
| | | | | |
| | 1.4.3 | Prophase 1 ✓ | | (1) |
| | | | | |
| | 1.4.4 | Somatic ✓ | | (1) |
| | | | | |
| | 1.4.5 | (a) Four ✓/4 | | (1) |
| | | | | |
| | | (b) Two ✓/2 | | (1) |
| | | | | |
| | 1.4.6 | Four ✓/4 | | (1) |

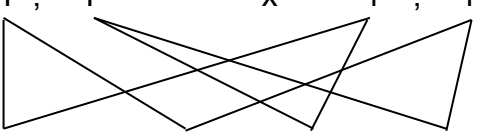
- | | | | |
|-----|-------|---|-----|
| 1.5 | 1.5.1 | Dihybrid ✓cross | (1) |
| | 1.5.2 | DDLI ✓ | (1) |
| | 1.5.3 | (a) Dark feather colour with short tails ✓✓ | (2) |
| | | (b) Complete ✓dominance | (1) |
| | 1.5.4 | (Parent) 1 ✓ | (1) |
| | 1.5.5 | (Principle of) Segregation ✓
(Principle of) Independent assortment ✓
(Mark first TWO only) | (2) |

TOTAL SECTION A: 50

QUESTION 2

- 2.1 2.1.1 (a) DNA replication ✓ (1)
- (b) Transcription ✓ (1)
- 2.1.2 Nucleus ✓ (1)
- 2.1.3 Interphase ✓ (1)
- 2.1.4 - Each tRNA carries a specific amino acid ✓
- When the anticodon on the tRNA ✓
- Matches the codon on the mRNA ✓
- Then tRNA brings the required amino acid to the ribosome ✓
- Amino acids become attached to each other by peptide bonds ✓
- To form the required protein ✓ (Any 5 x 1) (5)
- 2.1.5 - DNA provides the genetic code for protein synthesis ✓
- that is copied to molecule R ✓/mRNA carries the coded message (2)
- 2.1.6 (a) ACG AUG UCC ✓✓ (2)
- (b) Threonine ✓✓ (2)
- 2.2 2.2.1 Chromosomal ✓ mutation (1)
- 2.2.2 (a) 44 ✓ (1)
- (b) 3 ✓/three (1)
- 2.2.3 XYY ✓ (1)
- 2.2.4 A person with Down syndrome will have:
- THREE /3 chromosomes at position 21 ✓ and
- two/2 gonosomes ✓ instead of three
- In Jacob's syndrome there are TWO ✓/2 chromosomes at position 21 (3)
- 2.2.5 - Non-disjunction occurs ✓/ failure of chromatids to separate
- At position 23 ✓
- During anaphase II ✓
- A sperm cell has an extra chromosome ✓/2 chromosomes on chromosome 23/ XY gonosome
- The abnormal sperm cell fertilises a normal ovum ✓/
- Resulting in a zygote with THREE ✓/3 gonosomes/XYY/47 chromosomes (6)

- 2.3 2.3.1 (a) Female with blood group B ✓ (1)
- (b) $I^A I^B$ ✓ (1)
- 2.3.2 Two ✓/2 (1)
- 2.3.3 - If the child inherits allele I^A from Lisa and allele I^B from Jade ✓
 - The child's blood group will be AB ✓
 - If the child inherits allele i from each parents ✓
 - The child's blood group will be O ✓ (Any 3) (3)

2.3.4	P₁	Phenotype	Blood type AB	x	Blood type O ✓
		Genotype	$I^A I^B$ ✓	x	ii ✓
	Meiosis	G/gametes	I^A , I^B	x	i , i ✓
	Fertilisation				
	F₁	Genotype	$I^A i$; $I^B i$; $I^B i$ ✓		
		Phenotype	2 Blood group A : 2 Blood group B		

They have a 0% ✓*chance of having a child with blood group **O**.

OR

P₁	Phenotype	Blood group AB	x	Blood type O ✓
		male/dad		female/mother
	Genotype	I ^A i ✓	x	I ^B i ✓
Meiosis	G/gametes	I ^A , i	x	I ^B , i ✓
Fertilisation				
F₁				

Phenotype 2 Blood group **A** : 2 Blood group **B**

They have a 0% ✓*chance of having a child with blood group **O**.

P₁ and F₁ ✓

Meiosis and fertilisation ✓

Any 5 + *1 Compulsory

(6)

- 2.4 2.4.1 (a) Ovum ✓ (1)
- (b) Uterus ✓ (1)
- 2.4.2 $\frac{63,3}{100} \checkmark \times 395 \checkmark = 250 \checkmark$ cattle cloned (3)
- 2.4.3 - More cattle will have similar alleles ✓/ same genotype for all characteristics
- Variation will decrease ✓ (2)
- 2.4.4 - More muscle/meat production ✓
- High milk production ✓/quality
- Better meat quality ✓
- Resistance to disease ✓ (Any 3 x 1) (3)
- [50]**

QUESTION 3

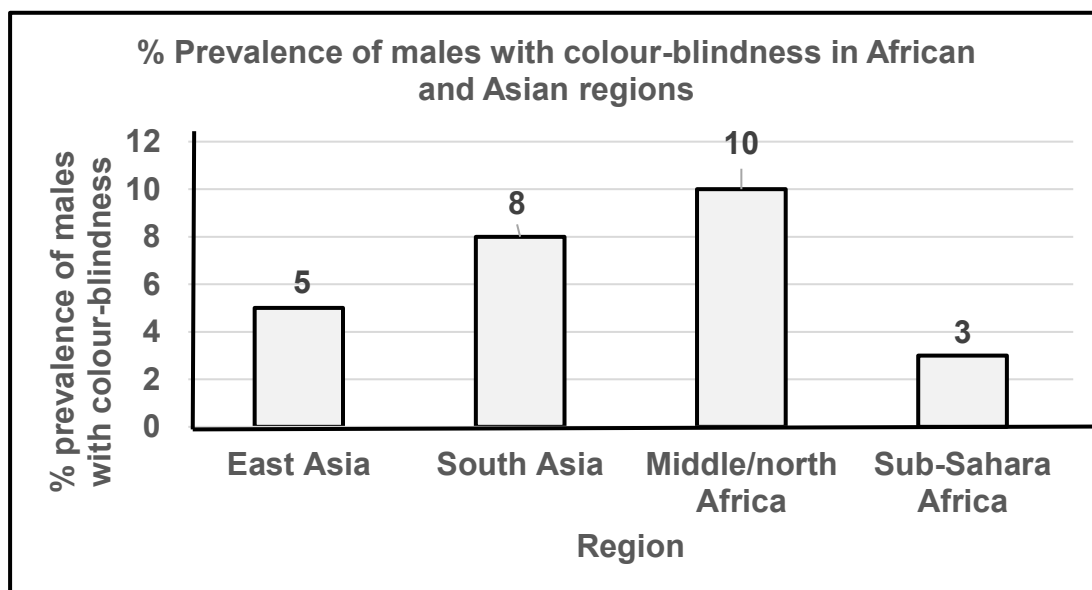
3.1 3.1.1 Sub-Sahara Africa ✓ (1)

- 3.1.2 - Under/lack of reporting ✓ of cases
 - Lack/poor testing facilities ✓

(Mark first ONE only) (Any 1) (1)

- 3.1.3 - Females need two recessive alleles on each X-chromosome to be colour-blind ✓
 - If there is a dominant allele on the X-chromosome it will mask the expression of a recessive allele ✓ on the other X-chromosome in a female who is not colour blind. (2)

3.1.4

**Guideline for assessing the graph**

CRITERIA	ELABORATION	MARK
Type of graph (T)	Bar graph drawn	1
Caption of graph (C)	Both variables included	1
Axes labels (L)	X- and Y-axis correctly labelled with units	1
Scale for X- and Y-axis (S)	<ul style="list-style-type: none"> - Equal space and width of bars for X-axis - Correct scale for Y-axis 	1
Plotting of co-ordinates (P)	<ul style="list-style-type: none"> - 1 to 3 required co-ordinates plotted correctly - All 8 co-ordinates plotted correctly - All 4 required co-ordinates plotted correctly. 	1 1 2

(6)

Histogram or line graph drawn

- Lose marks for type of graph and for scale

Transposed axes

- Can get full credit, if axes labels are also swapped and bars are horizontal
- If labels are not corresponding, then lose marks for labels and scale
- Check that the plotting is correct for the given labels

- 3.2 3.2.1 - Cultural ✓ evidence
- Fossil ✓ evidence
(Mark first TWO only) (2)
- 3.2.2 - Taung child ✓
- Mrs Ples ✓
- Little foot ✓
(Mark first TWO only) (Any 2 x 1) (2)
- 3.2.3 Mousterian tools ✓ (1)
- 3.2.4 Three ✓/3 (1)
- 3.2.5 (a) *Homo habilis* ✓ (1)
(b) First to use tools ✓ (1)
- 3.2.6 - Increased brain size ✓ led to
- increased intelligence ✓ leading to
- the development of complex tools ✓ (3)
- 3.3 3.3.1 (a) LCT gene mutation ✓ (1)
(b) Lactose tolerance ✓ (1)
- 3.3.2 Discontinuous ✓ variation (1)
- 3.3.3 - 470 individuals used ✓
- Individuals were from different ethnic groups ✓
- Individuals were from three different African countries ✓/Kenya, Tanzania and Sudan (3)
- 3.3.4 - Amount ✓ of lactose solution
- Concentration ✓ of lactose solution
(Mark first TWO only) (2)
- 3.3.5 - In order to establish the baseline ✓
- So that increases in blood glucose levels show lactase activity ✓/
indicate lactose tolerance (2)
- 3.3.6 - Sequenced the DNA of the participants on chromosome 2 ✓ /
Determine the sequence of nucleotides on DNA
- To identify mutations on the LCT gene ✓/ Compare to normal DNA/
lactose intolerant individuals. (2)

- 3.4 3.4.1 Large scale over-fishing ✓ (1)
- 3.4.2 - The mutation was useful ✓/ beneficial/resulted in a reduced body size that is not targeted for fishing
- Increasing the survival chances ✓ of the Atlantic codfish (2)
- 3.4.3 - There was genetic variation in the codfish ✓ population
- Some had experienced mutations on the GHR genes that resulted in smaller body size and faster maturations rates others did not ✓
- When over-fishing occurred ✓
- Codfish without the mutation on the GHR genes/larger body sizes and slower maturations rates died ✓
- Those with the mutation on the GHR genes/smaller body sizes and faster maturation rates survived ✓
- and reproduced ✓
- passing on the allele with mutations on the GHR genes/smaller body size and faster maturation rates to their offspring ✓
- the next generation has a higher proportion of codfish with mutations on the GHR genes ✓/smaller body sizes and faster maturation rates (Any 7) (7)
- 3.5 3.5.1 *Out of Africa* ✓ *hypothesis* (1)
- 3.5.2 - Modern humans originated in Africa ✓ and then
- Migrated to other continents ✓/rest of the world (2)
- 3.5.3 - Smaller cranium size ✓
- Foramen magnum at a more backward position ✓ on the skull
- Prominent/large brow-ridges ✓
- Protruding jaws ✓/prognathous
- Rectangular palate ✓
(Mark first THREE only) (Any 3) (3)
- 3.5.4 Cradle of Humankind ✓ (1)
- [50]

TOTAL SECTION B: 100
GRAND TOTAL: 150