Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie 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.

Copyright reserved

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.

Copyright reserved

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)

Copyright reserved

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)

Copyright reserved

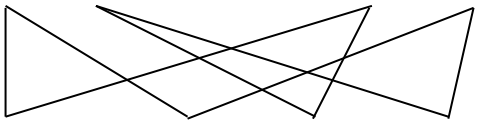
2.3 2.3.1 (a) Female with blood group B ✓ (1)

(b) I^AI^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

P_1	Phenotype	Blood type AB	x	Blood type O✓	
	Genotype	I^AI^B ✓	x	ii ✓	
Meiosis					
	G/gametes	I^A , I^B	x	i , i ✓	
Fertilisation					
F_1	Genotype	I^Ai ;	I^Ai ;	I^Bi ;	I^Bi ✓
	Phenotype	2 Blood group **A**	: 2 Blood group **B**		

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

OR

P_1	Phenotype	Blood group AB male/dad	x	Blood type O ✓ female/mother
	Genotype	I^Ai ✓	x	I^Bi ✓
Meiosis				
	G/gametes	I^A , i	x	I^B , i ✓

Fertilisation
F_1

Gametes	**I^A**	**I^B**
i	I^Ai	I^Bi
i	I^Ai	I^Bi
Correct genotypes ✓		

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

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

P_1 and F_1 ✓
Meiosis and fertilisation ✓ **Any 5 + *1 Compulsory** (6)

2.4 2.4.1 (a) Ovum ✓ (1)

(b) Uterus ✓ (1)

2.4.2 $\frac{63,3}{100}$ ✓x 395 ✓ = 250 ✓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

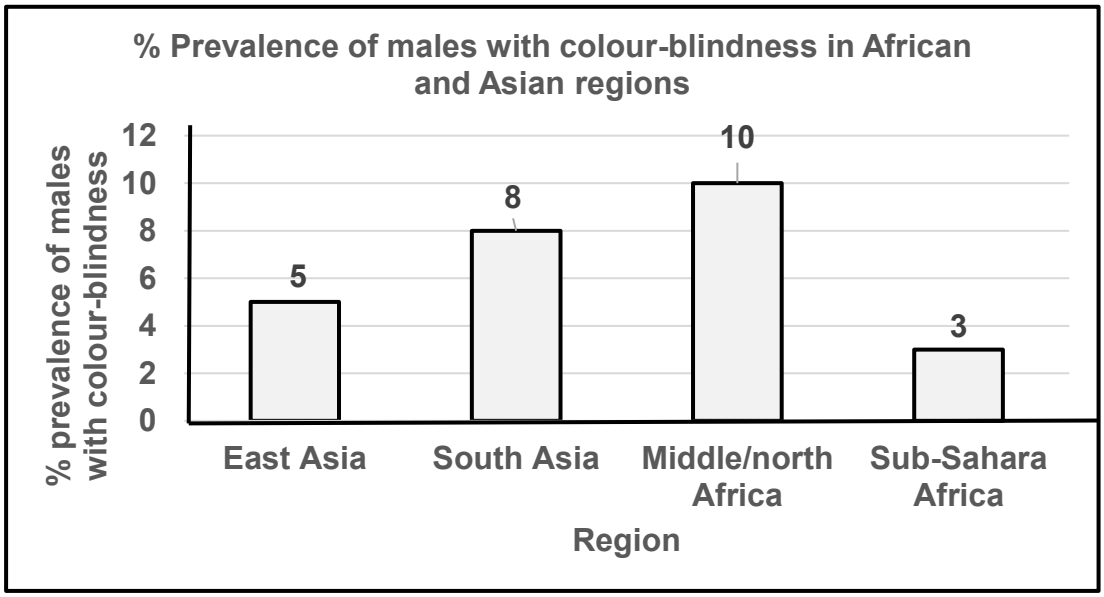
3.1 3.1.1 Sub-Sahara Africa ✓ (1)

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)**	- Equal space and width of bars for X-axis - Correct scale for Y-axis	1
Plotting of co-ordinates **(P)**	- 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

Copyright reserved

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

Copyright reserved