



Northern Cape Department of Education

PROVINCIAL PREPARATORY EXAMINATION

GRADE 12

**LIFE SCIENCES
PAPER 2
SEPTEMBER 2026
MARKING GUIDELINES**

MARKS: 150

These marking guidelines consist of 12 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 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 standardisation 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. The 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 learner's 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.
19. **Changes to the marking guideline**
No changes must be made to the marking guidelines. The provincial internal moderator must be consulted, who in turn will consult with the national internal moderator.

SECTION A**QUESTION 1**

1.1	1.1.1	A ✓✓		
	1.1.2	C ✓✓		
	1.1.3	C ✓✓		
	1.1.4	B ✓✓		
	1.1.5	D ✓✓		
	1.1.6	B ✓✓		
	1.1.7	D ✓✓		
	1.1.8	B ✓✓		
	1.1.9	C ✓✓		
	1.1.10	A ✓✓	(10 x 2)	(20)
1.2	1.2.1	Single strand ✓		
	1.2.2	Interphase ✓		
	1.2.3	Nucleotides ✓		
	1.2.4	(Gene) mutation ✓		
	1.2.5	Mitochondrial DNA ✓/mtDNA		
	1.2.6	Ribose ✓		
	1.2.7	Uracil ✓		
	1.2.8	Incomplete dominance ✓	(8 x 1)	(8)
1.3	1.3.1	B only ✓✓		
	1.3.2	Both A and B ✓✓		
	1.3.3	A only ✓✓	(3 x 2)	(6)
1.4	1.4.1	3✓/Three		(1)
	1.4.2	(Blood group) B ✓		(1)
	1.4.3	(a) I ^B i ✓		(1)
		(b) I ^A i ✓		(1)
	1.4.4	(a) Ethan ✓		(1)
		(b) Denwion ✓ and the father ✓		(2)
	1.4.5	Complete ✓ dominance		(1)
	1.4.6	25✓%		(1)
				(9)

1.5	1.5.1	Karyotype ✓	(1)
	1.5.2	44✓	(1)
	1.5.3	The one chromosome (X-chromosome) will be much larger than the other one (Y-chromosome) ✓/There will be one X-chromosome and one Y-chromosome/ XY	(1)
	1.5.4	(a) 21✓	(1)
		(b) 3✓	(1)
	1.5.5	Non-disjunction✓	(1)
	1.5.6	Gametes✓	(1)
			(7)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

- 2.1 2.1.1 (a) DNA✓/Deoxyribonucleic acid✓ (1)
(b) Ribosome ✓ (1)

- 2.1.2 Cytoplasm/ ribosome✓ (1)

- 2.1.3 - It (tRNA) brings **specific** amino acids✓
- to the ribosome✓
- to form the **required/desired** protein✓ (Any 2 x 1) (2)

2.1.4

TRANSCRIPTION	DNA REPLICATION
Part of the DNA unwinds ✓	The whole DNA molecule unwinds ✓
One DNA strand acts as a complement ✓/template	Both DNA strands act as templates ✓
Adenine pairs up with uracil ✓	Adenine bonds with thymine✓
mRNA codons receive code from DNA basis triplets✓	DNA nucleotides bond with DNA nucleotides ✓
Takes place during protein synthesis✓	Takes place during cell division ✓/mitosis/meiosis
A mRNA molecule is formed✓ at the end	A (identical) DNA molecule is formed✓
Any TWO comparisons + correct table format (T✓) (Mark first TWO only)	

(5)
(10)

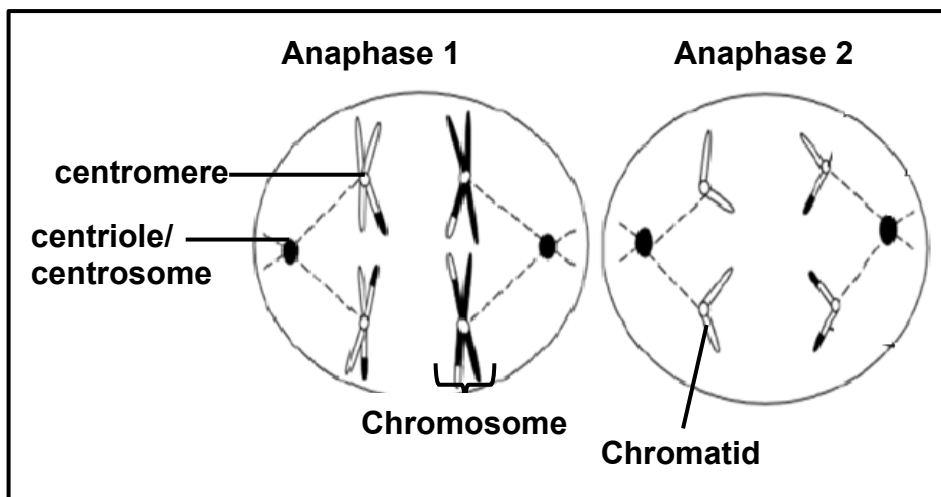
- 2.2 2.2.1 A ✓- Spindle fibre ✓/thread (2)

- 2.2.2 Metaphase I ✓/one (1)

- 2.2.3 Homologous chromosome **pairs** ✓
are aligned at the equator✓ of the cell (2)

- 2.2.4 - **Random arrangement of chromosomes** ✓*
- forms cells that differ genetically. ✓
- This leads to increased genetic variation in a population ✓
- which will cause some individuals to have a favourable characteristic and others/some to have unfavourable characteristics ✓
- When environmental conditions change ✓
- those with favourable characteristics will survive ✓
- and those with unfavourable characteristics will die ✓
* **Compulsory mark** + Any 4 (5)

2.2.5



Criteria to assess diagrams		
Criteria	Letter	Mark
Correct headings for both drawings	H	1
Chromosomes/chromatids appearance indicate crossing over	C	1
Chromosomes/chromatids pulled towards opposite poles	P	1
ANY TWO correct labels	L	2

No marks for spindle fibre(s) (Label A)

(5)
(15)

- 2.3 2.3.1 (a) Homozygous recessive ✓ (1)
- (b) Homozygous dominant✓/heterozygous (1)

2.3.2 DO NOT ACCEPT ANY GENOTYPES AS NO GENOTYPES WERE GIVEN

- Individual **P** is an unaffected✓ male
- therefore, **P**/he has ONE dominant allele✓/'unaffected' allele
- Individual **R** is homozygous recessive✓/has two alleles for albinism/is a female with albinism
- In the child/offspring, the dominant allele of the father/**P** masks the recessive allele received from the mother/**R** ✓

OR

- The unaffected condition is (expressed in) the dominant condition✓
- which can be expressed either as homozygous dominant✓
- or in the heterozygous state when the dominant allele masks the recessive allele ✓

(3)**2.3.3**

$$\frac{1}{4} \checkmark \times 100 \checkmark = 25 \checkmark \%$$

(3)**(8)****2.4**

P₁ Phenotype: Male x Female ✓

Genotype: XY x XX ✓

*Meiosis**Fertilisation*

F₁ Genotype: $\begin{array}{cc} X & Y \\ \diagdown & \diagup \\ XX & XY \end{array}$ x $\begin{array}{cc} X & X \\ \diagup & \diagdown \\ XY & XX \end{array}$ ✓

Phenotype: $\underbrace{XX}_{\text{Female}}$: $\underbrace{XY}_{\text{Male}} \checkmark$

P₁ and F₁✓*Meiosis & Fertilisation* ✓**OR**

P₁ Phenotype: Male x Female ✓

Genotype: XY x XX ✓

*Meiosis**Fertilisation*

	X	Y
X	XX	XY
X	XX	XY
1 mark for correct gametes		
1 mark for correct genotypes		

F₁ Phenotype: Female : Male ✓

P₁ and F₁✓*Meiosis & Fertilisation* ✓

Any 6

(6)

- 2.5 2.5.1 To investigate whether /determine how genetically modified plants affect the yield of pea seed ✓✓ **(TWO or nothing)** (2)
- 2.5.2 (a) Yield of pea seed✓ (1)
- (b) 400 pea seeds were grown in each field ✓ (1)
- (c) - (Same) size of field✓
 - (Same) type/NPK of fertiliser✓
 - 80 kg/amount of fertiliser given to **each field** ✓
 - **400** pea seeds sown on **each field**✓
 - (Same) species of (pea) plant (**not seed**)
 Only take information stated in the passage
 (Mark first TWO only) Any (2)
- 2.5.3 - To serve as control✓
 - so that it can be compared with the other group✓
 - and show that the inserted gene is the only factor that affected the results ✓/ensures validity of investigation (3)
- 2.5.4 Genetically modified pea seed produces 800 kg per field and non-genetically modified pea seed 400 kg per field✓✓

OR

Genetically modified pea seed produces a larger yield per field than the non-genetically modified pea seed ✓✓ (2)

(TWO OR NOTHING)

(11)

[50]

QUESTION 3

- 3.1 3.1.1 Dihybrid✓ cross (1)
- 3.1.2 ffft/ttff✓ (1)
- 3.1.3 (a) FT, Ft, fT, ft ✓✓ **(TWO or nothing)** (2)
- (b) Purple flowers with short stems✓ (1)
- (5)**
- 3.2 3.2.1 - It helped them grip branches✓ and
- maintain balance while climbing ✓
(Mark first ONE only) Any (1)
- 3.2.2 - The ancestors of capuchin monkeys had short tails✓
- The ancestors continually stretched✓/used their tails
- to be able to grip onto tree branches✓/maintain balance
- As a result, their tails became longer✓ and
- this **characteristic** was passed on to the next generation✓
Any (4)
- 3.2.3 - There is no evidence to show that acquired traits✓
are inherited ✓.
- There is no evidence that structures used more/less
frequently✓
became more/less developed✓.
- A change in phenotype✓/physical appearance
does not lead to a change in genotype✓/genetic material.
Any 1 x 2 (2)
- (7)**
- 3.3 - **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✓
- The oldest **fossils** of *Homo sapiens* were found in Africa✓ (5)

- 3.4 3.4.1 A group of organisms with similar characteristics✓
that can interbreed to produce fertile offspring.✓ (2)
- 3.4.2 (a) (Jumping) gene✓ mutation (1)
- (b) The change in the (gene responsible for the) colour of the moth✓
prevented the moth from being eaten✓/camouflaged the moth from the predators (2)
- 3.4.3 - The favourable characteristic for moths is the dark colour✓
- which ensures the blend/match with the smog covered trees in the polluted environment✓
- and therefore, they will survive.✓
- The unfavourable characteristic for moths is the light colour✓, and they do not blend/match with the smog covered trees in the polluted environment✓
- and therefore, they will die.✓ Any (4)
- 3.4.4 - The light-coloured moths survived **and** reproduced✓
- passing the **allele for the light colour** in moths to their offspring✓ (2)
(11)
- 3.5 3.5.1 - Bare fingertips✓/nails instead of claws
- Opposable thumbs✓
- Fingerprints ✓
- Five fingers ✓/digits
(Mark first ONE only) Any (1)
- 3.5.2 - More forward position of the foramen magnum ✓
develops the ability to walk on two feet ✓/bipedalism
- Larger cranium ✓/more rounded cranium
increases the brain size ✓/more intelligent
- Flatter face ✓/less sloping forehead/non-prognathous/more developed chin/smaller canines/no diastema/prominent brow ridge appears
due to softer food ✓/smaller muscles for chewing
- Well-developed chin ✓
enables the development of speech ✓ Any 3 x 2 (6)

3.5.3 Humans:

- teeth are smaller✓
suited to their diet of softer, cooked food✓

Apes:

- teeth/canines are larger✓
for grinding and chewing raw food✓

(4)

Credit if in a table – **do not credit the table**

(11)

- 3.6 3.6.1 - The continents drifted away from each other✓/continental drift took place
- Each continent ended with the plants of the original population on it✓

(2)

- 3.6.2 - The *Proteaceae* had one common ancestor✓
- When the continental drift ✓occurred
- the (*Proteaceae*) population was split✓ (into two) /became separated
- Since each population may be exposed to different environmental conditions✓/to different selection pressures
- natural selection occurs independently✓ in each population
- such that the individuals of the populations became very different✓from each other
- genotypically and phenotypically✓
- to form different species.✓

Any

(7)

- 3.6.3 - They/the scientists would allow the plants to interbreed✓
to see if they can produce fertile offspring.✓
- DNA profiling was used✓
to compare that the DNA was different✓
- Pollination/fertilisation could not take place✓
because of different structures in flowers✓/different flowering seasons

(2)

(11)

[50]

TOTAL SECTION B: 100
GRAND TOTAL: 150