GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

JUNE EXAMINATION
GRADE 12

2024

MARKING GUIDELINES

LIFE SCIENCES

14 pages

PRINCIPLES RELATING TO THE MARKING OF LIFE SCIENCES

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are reached and place a wavy line and 'max' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark only the first three irrespective of whether all or some are correct/incorrect.

3. **If whole process is given when only part of it is required**
   Read all and credit relevant part.

4. **If comparisons are asked for and descriptions are given**
   Accept if 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 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, 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 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 guidelines 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.

19. **Changes to the marking guidelines**
No changes must be made to the marking guidelines without consulting the provincial internal moderator.

AMENDMENT TO MARKING GUIDELINES

JUNE 2024 PROVINCIAL EXAMINATION

ATTENTION

THE CHIEF INVIGILATOR

SUBJECT / *VAK*	**LIFE SCIENCES / LEWENSWETENSKAPPE**
DATE OF EXAMINATION	**5 JUNE / *JUNIE* 2024**

The errata for the Marking Guidelines of LIFE SCIENCES has reference.

There are notes to the marking guidelines which appear at the end of this document. These matters were addressed at the Marking Standardisation Meeting.

To ensure that candidates are not disadvantaged nor prejudiced in way, you are advised to please mark the paper out of 148 marks instead of 150 and then the learners' marks must be converted to a mark out of 150. E.g., Should a learner attain 85/148 then that mark is recalculated as 86/150.

Use the formula: $\frac{a}{148}$ **x** 100 = *b.* *Then,* $\frac{b}{100}$ **x** 150 = *c*

C is the mark that is entered into SASAMS ***out of 150****.*

Mr. Jonathan Williams

DIRECTOR: EXAMINATIONS MANAGEMENT
5 JUNE 2024

SECTION A

QUESTION 1

1.1	1.1.1	D ✓✓		
	1.1.2	C ✓✓		
	1.1.3	B ✓✓		
	1.1.4	B ✓✓		
	1.1.5	C ✓✓		
	1.1.6	D ✓✓		
	1.1.7	A ✓✓		
	1.1.8	D ✓✓		
	1.1.9	C ✓✓		
	1.1.10	A ✓✓	(10 x 2)	**(20)**
1.2	1.2.1	Implantation ✓/choronic villi		
	1.2.2	Biotechnology ✓		
	1.2.3	Co-dominance ✓		
	1.2.4	Chiasma ✓/Chiasmata		
	1.2.5	Pedigree✓ diagram		
	1.2.6	Pupillary mechanism ✓		
	1.2.7	Eustachian tube ✓		
	1.2.8	Corpus callosum ✓	(8 x 1)	**(8)**
1.3	1.3.1	A only ✓✓		
	1.3.2	None ✓✓		
	1.3.3	Both A and B ✓✓		
	1.3.4	Both A and B ✓✓	(4 x 2)	**(8)**

1.4 1.4.1 Ovipary ✓ (1)

1.4.2 (a) B ✓
(b) C ✓
(c) A ✓ (3)

1.4.3 - Well developed body✓
- Young born with eyes open✓/able to see,
- covered in (down) feathers ✓,
- mobile ✓ when born. (2)
(Mark first TWO only)

(6)

1.5 1.5.1 (a) Pupil dilates ✓ (1)
(b) Beats faster ✓/increases heart rate (1)
(c) Coverts stored glycogen into glucose ✓ (1)

1.5.2 QUESTION REMOVED, the paper will be marked out of 148 ~~**(2)**~~

1.5.3 Cellular respiration ✓ (1)

1.5.4 To increase energy ✓/more ATP production (1)

1.5.5 Parasympathetic ✓ nervous system (1)
(6)

TOTAL SECTION A: 48

SECTION B

QUESTION 2

2.1 2.1.1 Progesterone ✓ (1)

2.1.2
- Endometrium/placenta will not be maintained ✓
- therefore it will disintegrate/breakdown ✓
- It could also cause contractions✓
- resulting in a possible miscarriage ✓ Any (2 x 1) (2)

2.1.3 B ✓ – Umbilical cord ✓ (2)

2.1.4 **There is less fluid *** ✓
- A constant temperature would not be maintained. ✓
- There would no/less shock absorption. ✓
- There would be increased chance of mechanical injury. ✓
- The foetus could dehydrate/desiccate. ✓
- Movement of the foetus would be limited✓/cause more friction

Any 3 + **1 compulsory mark *** (4)
(9)

2.2 2.2.1 LH ✓/Lutenising hormone (1)

2.2.2
- Causes ovulation ✓/releasing of ovum from (graafian) follicle
- Causes formation of the corpus luteum ✓ (2)

2.2.3 Oestrogen ✓
Stimulates production of LH ✓/responsible for the development of secondary characteristics (2)

2.2.4
- Graafian/developing follicle ✓ matures and
- produces oestrogen ✓

- The corpus luteum ✓ is formed
- which produces progesterone ✓ (4)

(9)

2.3 2.3.1
- Brain tissue is generally shrunken ✓
- Abnormal levels of a naturally occurring protein clumps together to form Amyloid plaques ✓ that collect between neurons
- Synaptic loss ✓

(Mark first ONE only) (1)

2.3.2 Motor ✓ neuron (1)

2.3.3 Myelin sheath ✓
provides insulation ✓ to neurons/speeds up transmission of impulses (2)

2.3.4
- Loss of memory ✓
- Confusion ✓
- Poor judgment ✓
- Trouble understanding visual images ✓
- Difficulty with language ✓
- Issues with social behavior ✓

(Mark first TWO only) (2)

2.3.5 C ✓ (1)

2.3.6
- Synapse allows for impulses to travel in one direction from one neuron to another ✓/prevents continuous stimulation of the neurons
- (Synapse loss in the) cerebrum ✓ will lead to Alzheimer's symptoms. (2)

2.3.7 (a) Dentrites ✓ (1)
(b) Axon ✓ (1)
(11)

2.4 2.4.1

Normal eye	Cataract eye
- lens is clear ✓	- lens is cloudy ✓
- Light refracted onto yellow spot of retina ✓/light rays converge	- Light refracted to many parts of the retina ✓/light rays scatter in many directions

Table **(T)**: Columns with headings ✓ (5)

2.4.2 Surgery✓ (1)

2.4.3
- **Accommodation*** ✓ to near vision
- Ciliary muscles contract ✓
- suspensory ligaments slacken ✓
- tension in lens decreases ✓
- lens becomes more convex ✓
- refractive power increases ✓
- a clear image is focused on the retina ✓

Any 4 + **1 complusory mark*** (5)
(11)

2.5 2.5.1 (a) Type of underwear worn ✓/tightness of underwear
(b) Sperm count ✓ (2)

2.5.2 Use **more than 5** men ✓ (1)

2.5.3 - Testes are close to the body ✓
- causes an increase in temperature ✓/above optimal/above 35 °C
- sperm denatures ✓/not healthy
- sperm count decreases ✓ (Any 3) (3)

2.5.4 - To get the baseline ✓/normal levels
- These are used to compare ✓ with when tight-fitting underwear is used (2)

2.5.5 The amount of sperm produced/sperm count while the men wore the tight-fitting underwear ✓✓ (2)
(10)
[50]

QUESTION 3

3.1 3.1.1 Protein synthesis ✓ (1)

3.1.2 A – Transcription ✓
B – Translation ✓ (2)

3.1.3 - It is tRNA ✓
- carries a **specific/required** amino acid✓
- to the ribosome ✓
- when the anticodon on the tRNA matches the codon of the mRNA ✓
(Any 3) (3)

3.1.4 (a) Peptide ✓ bond (1)
(b) E – Proline ✓
F – Threonine ✓ (2)

3.1.5 CGG ✓✓/Cytosine, Guanine, Guanine (2)

3.1.6 (a) Gene ✓ mutation (1)
(b) - Codon GCC (on the mRNA) changed to GCA ✓
- Anticodon CGG (on tRNA) changed to CGU ✓
- Both anticodons GCA and CGU code for Alanine ✓/the same amino acid
- so the protein will not change.✓/No effect
(4)
(16)

3.2 3.2.1 A – Homologous chromosomes ✓ (1)
B – Spindle fibre ✓ (1)

3.2.2 (a) Metaphase 1 ✓ (1)
(b) **Homologous pairs of chromosomes** are arranged at **the equator**✓✓ (2)

3.2.3 Crossing over ✓*
- Pairs of homologous chromosomes lie next to each other ✓
- Chromatids from each homologous chromosomes overlap ✓
- The point/s of crossing over are called chiasma ✓/chiasmata
- Chromatid segments break off and are exchanged ✓/exchange of genetic material ANY 3 + **1* Compulsory** (4)

3.2.4 Crossing over ensures increase in genetic variation ✓/diversity (in gametes/offspring) (1)

3.2.5 23 ✓ (1)

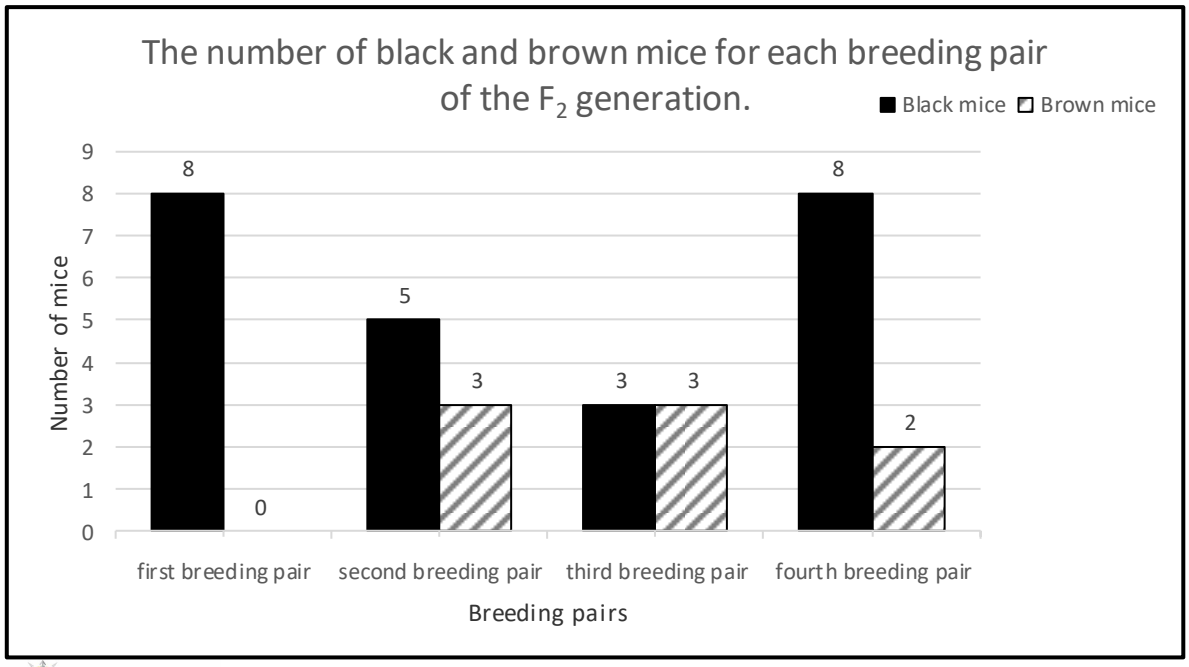
3.2.6
- Non-disjunction ✓ occurred/Chromosome pair/(chromatids) did not separate properly
- During anaphase✓ (2)

(13)

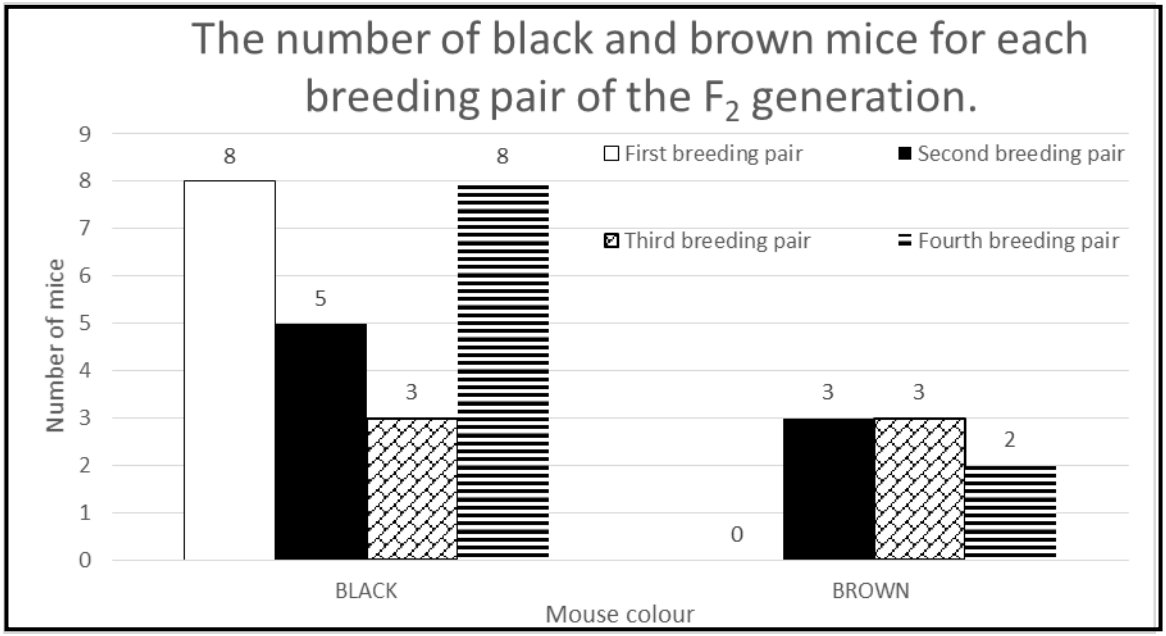
3.3 3.3.1 (8 + 5 + 3 + 8) : (0 + 3 + 3 + 2) ✓/24 : 8
3 : 1 ✓ (2)

3.3.2 The parents (P_1) were black and brown mice ✓/homozygous with contrasting characteristics
The offspring (F_1) generation were all black mice ✓ (2)

3.3.3



OR



Criteria	Mark allocation
Bar graph drawn **(T)**	**1**
Caption of graph **(C)** Includes **number of mice**, **colour** AND **breeding pairs**	**1**
Correct labels on X-axis and Y-axis **(L)**	**1**
Correct scale for Y-axis AND Equal spaces between bars and equal width of bars for X–axis **(S)**	**1**
Plotting**(P)**: 1 to 7 coordinates are plotted correctly ONLY 8 correct coordinates are plotted	 **1** **2**

(6)
(10)

3.4 3.4.1 Alleles are different forms/versions of a gene ✓ (1)

3.4.2 Chromosomal ✓ mutations (1)

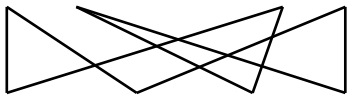
3.4.3 **P_1** Phenotype: Wild type/grey striped x Wild type/grey striped ✓

Genotype Gg x Gg ✓

Meiosis

G/Gametes G, g x G, g ✓

Fertilisation



F_1 Genotype GG Gg Gg gg ✓

Phenotype: 3 with Wild type/grey striped body: 1 ebony/dark body ✓

25%*✓ chance of having an ebony body

P_1 and F_1 ✓

Meiosis and fertilisation ✓ *__1 Compulsory__ + Any 5

OR

P_1

Phenotype: Wild type/grey striped x Wild type/grey striped ✓

Genotype Gg x Gg ✓

Meiosis

Fertilisation

Gamete	G	g
G	GG	Gg
g	Gg	gg

1 mark for correct gametes ✓
1 mark for correct genotypes ✓

F_1 Phenotype: 3 with Wild type/grey striped body: 1 ebony/dark body✓

25% *✓ chance of having an ebony body

P_1 and F_1 ✓

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

3.4.4 Dihybrid ✓ cross (1)

3.4.5 Wild type/grey striped body colour ✓ and vestigial/short wing ✓ (2)

(11)

[50]

TOTAL SECTION B: 100

TOTAL: 148

Additional notes to the marking of Gauteng June 2024

1.1. If the learner gave more than one answer, they will get no marks e.g. 1.1.2 C/D XX

1.2.2 Biotechnology is the “umbrella” term and has different forms including genetic engineering, DNA profiling, stem cells, cloning etc. We are only accepting the term and not the examples of it.

1.2.6 Accept “pupil reflex” even though it’s not in the examination guideline.

1.3.3/4 accept Both✓✓ A and B✓✓ A, B✓✓ but not A/B XX

1.5.1 Accept pupil widens✓ OR increases in diameter✓. No mark for pupil becomes bigger or larger✓ etc.

1.5.2 Has been removed and will not be marked, the total of the paper is 148.

1.5.3 MUST be cellular respiration (BOTH WORDS) no marks for respiration alone as it is often used to refer to breathing.

2.1.2 Endometrium will not be thick enough can be read into the first bullet.

2.2.4 Learners must specify developing/graafian/growing follicle, NO mark for Follicle alone.

Learners can get the marks for hormone names alone. No mark for the origin without linking it to the correct hormone.

2.3.3. Accept Neurilemma✓

Responsible for the repair of damaged neurons✓

- NOTE Knowledge of the Neurilemma is not required based on the examination guidelines.

2.4.3. Bullet 5, we can accept lens becomes more round✓

NO mark for lens becomes round

2.5.1 Tight underwear X

Use of loose fitting and tight fitting underwear✓

2.5.4 This is not the control. It is the starting point/baseline. A control is an experiment done in addition the actual experiment but with the independent variable is excluded.

3.1.3 Learner who discusses both transcription and translation in separate paragraphs, will lose all marks as the first paragraph will be marked. Where one long response is given, apply principle 3 and award marks for the correct portions.

3.1.6 a) Accept point mutation (Please note this is no longer in the examination guidelines)

3.2.2 b) Bivalents cannot be used in place of homologous chromosomes.

3.2.6 Second bullet: accept Anaphase ✓, Anaphase 2✓ or Anaphase 1 or/and 2 ✓ BUT NO MARK for anaphase 1

3.3.3 Mark each criterion independently of the others. No double penalization for the same error.

If a learner separated the bars (not as a double bar graph) they will not be penalized.

If bars of P1/F1 generation are included a maximum of 1 mark can be awarded for plotting.

3.4.5 Learner must mention the characteristic and its specific variant to get the mark.

NO mark for grey/ wild alone without body colour being mentioned. NO mark for vestigial/ short alone without wing being mentioned.