



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P1

NOVEMBER 2010

FINAL MEMORANDUM

MARKS: 150

This memorandum consists of 12 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2010

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 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 is incorrect, do not credit. If sequence and links becomes correct again, resume credit.
9. **Non-recognized 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. Indicate that the candidate's numbering is wrong.
11. **If language used changes the intended meaning**
Do not accept.
12. **Spelling errors**
If recognizable accept provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names given in terminology**
Accept, provided it was accepted at the National memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**
No credit.
15. **If units are not given in measurements**
Memorandum will allocate marks for units separately, except where it is already given in the question.
16. Be sensitive to the **sense of an answer, which may be stated in a different way.**
17. **Caption**
Credit will be given for captions to all illustrations (diagrams, graphs, tables, etc.) except where it is already given in the question.
18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears 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. No changes must be made to the marking memoranda. In exceptional cases, the Provincial Internal Moderator will consult with the National Internal Moderator (and the External moderators if necessary).
20. Only memoranda bearing the signatures of the National Internal Moderator and the UMALUSI moderators and distributed by the National Department of Basic Education via the Provinces must be used in the training of markers and in the marking.

SECTION A**QUESTION 1**

1.1	1.1.1	C✓✓		
	1.1.2	C✓✓		
	1.1.3	B✓✓		
	1.1.4	D✓✓		
	1.1.5	A✓✓	(5 x 2)	(10)
1.2	1.2.1	Phenotype✓		
	1.2.2	Cancer✓		
	1.2.3	Chromatids✓/daughter chromosomes		
	1.2.4	Gametogenesis ✓		
	1.2.5	Homologous✓/bivalent/tetrad/homologues		
	1.2.6	Replication✓		
	1.2.7	Haemophilia✓		(7)
1.3	1.3.1	B✓		
	1.3.2	G✓		
	1.3.3	A✓		
	1.3.4	F✓		
	1.3.5	E✓		(5)
1.4	1.4.1	(a) B✓		(1)
		(b) b✓		(1)
	1.4.2	1✓ 2✓ 8✓		(3)
		(Mark first THREE only)		(5)
1.5	1.5.1	3✓		(1)
	1.5.2	ATG✓		(1)
	1.5.3	It determines the codes✓ for the sequence of amino acids ✓ which determines the type of protein ✓	max	(2)
	1.5.4	(a) AUG✓		(1)
		(b) - tRNA picks up specific amino acids✓ - its anticodon✓ matches up with the codon of mRNA - therefore the amino acids are arranged in a particular sequence✓ - to form particular polypeptides✓/proteins <i>(If any examples of anticodons and codons are given, consult the Senior Marker)</i>	any	(3)
				(8)

- 1.6 1.6.1 36.7⁰C✓ (2)
- 1.6.2 0.3✓ (1)
- 1.6.3 The woman is fertile from day 12✓/ 14/ovulation occurs because the temperature✓rises✓ (3)
(6)
- 1.7.1 Accept any ONE value between 13.5 to14✓ years (1)
- 1.7.2 Most girls✓ reach puberty before✓ boys/
Boys✓ reach puberty after✓ girls

OR

Most girls reach puberty at age 12 -13✓ years and boys at age 14 -15✓ years/ Most boys reach puberty at age 14 -15✓ years and girls at age 12 – 13✓ years (2)

- 1.7.3 Some girls✓ reach puberty at a later stage✓

OR

Not all girls✓ of 16 have reached puberty✓/any correct physiological reason e.g. hormonal imbalance, diet, strenuous training programme (2)

- 1.7.4 - **Emotionally immature**✓not easy to change from being a teenager to a parent✓/not responsible yet
- **Not yet financially independent**✓and the costs✓/medical/clothes/food of raising a baby is high
- **Need education**✓/qualifications to get a good job✓
- **To raise a baby needs time**✓/effort and no freedom✓for the teenager/cannot keep baby
- **Teenager's body not physically ready**✓and pregnancy may lead to complications✓
- **Girls will be stigmatised**✓and chances of finding a partner are reduced✓
(Do not accept STD's in answer) any 2 x 2
(Mark first TWO only) (4)
(9)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

- 2.1 2.1.1 C – spindle threads✓/spindle fibres
D – **homologous chromosomes**✓/bivalent/tetrad/homologues (2)
- 2.1.2 (a) **Metaphase 1**✓ (1)
(b) Chromosomes are aligned at the equator✓ in homologous pairs✓/bivalent/tetrad/homologues (2)
- 2.1.3 Crossing over✓ (1)
- 2.1.4 Homologous chromosomes/bivalent/tetrad line up ✓ at the equator
Chromatids from homologous chromosomes overlap✓/cross
Part/s of one chromatid become exchanged✓/genetic material for part/s of its homologous partner✓ max (3)
- 2.1.5 Promotes genetic variation✓ in the gametes/offspring will be different from the parents (1)
- 2.1.6 (a) 2✓ (1)
(b) 2✓ (1)
(12)
- 2.2 2.2.1 The gene for curly hair is dominant✓ and the dominant condition shows up✓ in either the homozygous or heterozygous condition (2)

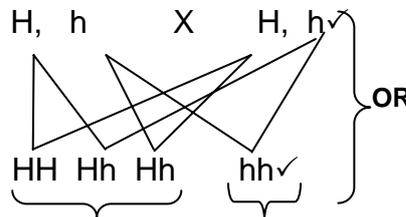
2.2.2

		Man	X	Woman
P₁	Phenotype	Curly hair	X	Curly hair✓
	Genotype	Hh	X	Hh✓

Meiosis
Gametes/G

Fertilisation

F₁ Genotype



Gametes	H	h
H	HH	Hh
h	Hh	hh

OR

1 mark for correct gametes
1 mark for correct genotypes

Phenotype Curly hair Straight hair✓

1 mark for stating P₁ and F₁
1 mark for stating meiosis and fertilisation

If another letter is used, candidates will lose marks for P₁

F₁ genotypes

any (6)
(8)

2.3

DNA	RNA
1. Double✓ stranded molecule/ paired bases	Single✓ stranded molecule/ unpaired bases
2. Contains deoxyribose✓ sugar	Contains ribose✓ sugar
3. Contains the nitrogenous base thymine✓	Contains the nitrogenous base uracil✓
4. A is proportional to T and G is proportional to C✓	Different relative numbers of A, T, C, G✓
5. Longer✓	Shorter✓
6. Helix shape✓	No Helix✓

(Mark first THREE only)

Any 3 x 2
+ 1 for presenting a table **(7)**

2.4 2.4.1 Test tube 2✓ (1)

2.4.2 Percentage of A does not equal T and percentage of C does not
equal G✓ in test tube 2 therefore no base pairing✓

OR

The percentages of A is equal to T and C is equal to G✓ in test
tube 1 therefore base pairing✓

Therefore test tube 2 contains the single stranded virus
DNA molecule

(2)
(3)
[30]

QUESTION 3

- 3.1 3.1.1 C - Endometrium✓/placenta /uterus/uterine wall/myometrium
D - Ovary✓ (2)
- 3.1.2 1 - Ovulation✓
2 - Fertilisation✓
3 - Mitosis✓/ cell division/growth/cleavage (3)
- 3.1.3 (a) 23✓ (1)
(b) 46✓/23 pairs (1)
- 3.1.4
-
- Caption: 1 mark
Label: any 4 correct labels: 4 marks (5)
- 3.1.5 Shock absorber✓/prevents physical or mechanical damage
Protects the foetus from drying out✓
Insulates the foetus against temperature fluctuations✓
Allows foetal movement for growth and development✓
(Mark first TWO only) any (2)
- 3.1.6 (a) Oxygen✓
(Dissolved) food✓ (examples e.g. glucose, amino acids, water)
Antibodies✓
(Mark first ONE only) any (1)
- (b) Metabolic waste✓
Carbon dioxide✓
Nitrogenous waste/(examples e.g. urea, ammonia, uric acid)
Water ✓ any (1)
(Mark first ONE only) (16)
- 3.2 Non-identical✓/fraternal/dizygotic twins (1)
are produced when **(two egg cells)✓** are **(fertilised by two sperms)✓** (2)
- Identical✓/monozygotic twins/(Siamese/conjoined) (1)
are formed when **(one sperm)✓ fuses with (one egg cell)✓**
to form a zygote which then splits up into two (incomplete split) (2)
(6)

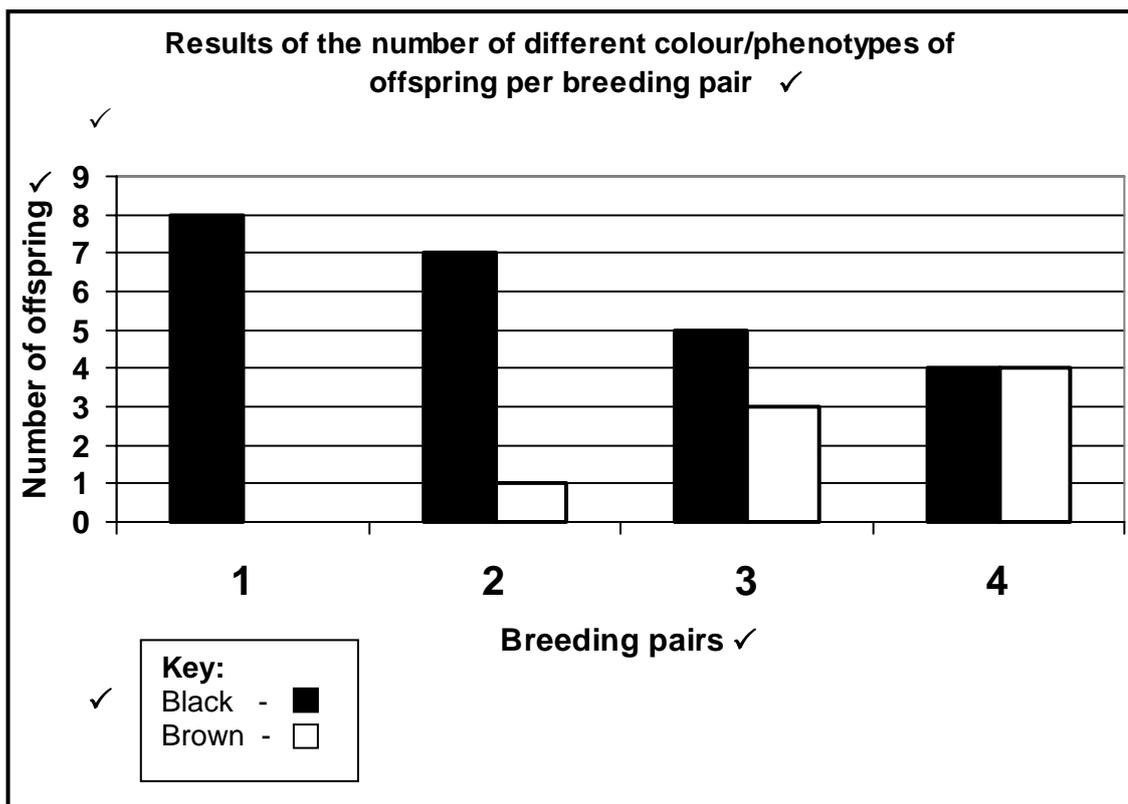
3.3	3.3.1	18✓	(1)
	3.3.2	Honey bees✓	(1)
	3.3.3	Very little nectar✓/food available/bats go off to sleep/nocturnal	(1)
	3.3.4	Attracts pollinators✓/for pollination	(1)
	3.3.5	Pollination occurs over more days✓ ensures that most flowers✓ get pollinated/increases the chances of pollination/not to attract too many pollinators at once to prevent damage to the flowers	(2)
	3.3.6	(a) Seed✓	(1)
		(b) Fruit✓	(1)
			(8)
			[30]

TOTAL SECTION B: 60

SECTION C

QUESTION 4

- 4.1 4.1.1 Female✓ (1)
- 4.1.2 Has two X chromosomes✓/XX/chromosomes number 23 are similar/ no Y chromosome (1)
- 4.1.3 Down's✓ Syndrome/trisomy 21 (1)
- 4.1.4 Carries 3✓/extra chromosome(s) on number 21✓ (2)
- OR**
- 47✓ chromosomes (allocate 1 mark) (5)
- 4.2 4.2.1 24 : 8✓(accept different correct working) = 3 : 1✓ (2)
- 4.2.2 To increase the reliability of the results✓✓ (2)
- OR**
- 4.2.3 Reduces chances of errors✓✓ any (2)



NOTE:

If the wrong type of graph is drawn:

- Marks are forfeited for 'correct type of graph' ; 'drawing of graph'

If graphs are not drawn on the same system of axes:

- Mark the first graph only using the given criteria –
Candidates will lose 2 marks for the incorrect drawing of the pair of bars

Mark allocation of the graph

Correct type of graph (T)	1
Caption for graph	1
Correct label for X-axis	1
Graphs labelled/key provided for 2 graphs	1
Correct label for Y-axis	1
Appropriate scale for Y-axis	1
Drawing of bars (D)	1 mark if 1 pair of bars plotted correctly 2 marks if 2 to 3 pairs of bars plotted correctly 3 marks if all 4 pairs of bars are plotted correctly

(9)
(13)

- 4.3 4.3.1 Communicate to learners/parents/school/education department about purpose, procedures and safety✓
Permission from education department✓/parent/learner/school
Determine what sample size is appropriate✓
Random sample must be taken (not gender and age)
Arrange all logistics such as:
- necessary equipment✓
- venue✓
- trained personnel✓/coordinator at school
- budget available✓
- storage needed✓
- transport of equipment✓
- Inform school of the day and time✓ that the research will take place
- draw up a table✓/recording sheet to record information
Ensure confidentiality✓ any (4)
(Accept any correct answer with PLANNING before drawing blood)
(Mark first FOUR only)
- 4.3.2 Personnel should wear gloves✓
Sterilise the learner's arm✓/finger
Use new/sterile syringes✓/lancets/cotton wool etc. for every learner tested
Apply pressure to stop bleeding✓
Monitor learners while and after drawing blood✓
Avoid injury to learners✓/draw blood from vein not artery
Safe disposal of waste✓
(Mark first THREE only) any (3)
(7)

4.4 Possible answer

Stem cells are (actively) dividing✓ cells that are not yet differentiated✓/
not yet mature could give rise to different types of cells (2)

Source: Embryo✓
Blood in umbilical cord✓/cord blood
Placenta✓
Bone marrow✓ any (2)

(Mark first TWO only)

- Arguments for use of stem cells
 - **Provide replacements for tissues**✓^S /organs damaged by age✓^R/trauma/disease/improve quality of life
 - **Used for research**✓^S to see whether it can cure different diseases✓^R e.g. cancer/more reliable results when human stem cells are used
 - **Stem cells from e.g. the blood from the umbilical cord can be stored**✓^S when needed in future because it would not be rejected✓^R by the body’s immune system any 2 x 2 (4)
(Mark first TWO only)

- Arguments against use of stem cells
 - **Expensive**✓^S research money could be used for other needs✓^R
 - **Only rich people**✓^S /**expensive** can afford to store✓^R stem cells for later use
 - **Interfere with religion** ✓^S/**culture/creation** because it is immoral✓^R /unethical/we cannot play God
 - **Moral**✓^S /**ethical objection** because we are destroying a human life✓^R
 - **The dangers**✓^S of using stem cells are unknown and may be a risk✓^R
 - **Can lead to illegal trade**✓^Sin embryos /the placentas of new-born babies/ to make money✓^R
 - **Embryos conceived and then aborted**✓^S /abandoned/ to use✓^R the stem cells from the placenta any 2 x 2 (4)
(Mark first TWO only)

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Description
3	Explains 2 valid arguments for and 2 against the use of stem cells
2	Explains 1 valid argument for and 1 argument against the use of stem cells OR Explains 2 valid arguments for and 1 against the use of stem cells OR Explains 1 valid argument for and 2 against the use of stem cells
1	Describe at least 1 statement for and 1 statement against the use of stem cells OR explains 1 valid argument for OR 1 argument against the use of stem cells
0	Has not attempted/has not written anything other than question number/no correct information

Synthesis (3)
(15)
TOTAL SECTION C: 40
GRAND TOTAL: 150