



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2014

**LIFE SCIENCES P2
MEMORANDUM**

MARKS: 150

This memorandum consists of 8 pages.

SECTION A**QUESTION 1**

- | | | | |
|-----|--------|--|---------------|
| 1.1 | 1.1.1 | A ✓✓ | |
| | 1.1.2 | C ✓✓ | |
| | 1.1.3 | A ✓✓ | |
| | 1.1.4 | B ✓✓ | |
| | 1.1.5 | B ✓✓ | |
| | 1.1.6 | A ✓✓ | |
| | 1.1.7 | A ✓✓ | |
| | 1.1.8 | D ✓✓ | |
| | 1.1.9 | D ✓✓ | |
| | 1.1.10 | B ✓✓ | (10 x 2) (20) |
| 1.2 | 1.2.1 | Double Helix ✓ | |
| | 1.2.2 | Transcription ✓ | |
| | 1.2.3 | Hydrogen ✓bonds | |
| | 1.2.4 | DNA replication ✓ | |
| | 1.2.5 | tRNA ✓ | |
| | 1.2.6 | Haploid ✓ | |
| | 1.2.7 | Alleles ✓ | |
| | 1.2.8 | Punctuated equilibrium ✓ | |
| | 1.2.9 | Geographic speciation ✓ | |
| | 1.2.10 | Genetic engineering/genetic modification ✓ | (10 x 1) (10) |

1.3 1.3.1 None ✓✓

1.3.2 A only ✓✓

1.3.3 Both A and B ✓✓

1.3.4 A only ✓✓

1.3.5 B only ✓✓

1.3.6 A only ✓✓

1.3.7 Both A and B ✓✓

1.3.8 Both A and B ✓✓

1.3.9 B only ✓✓

1.3.10 A only ✓✓

(10 x 2) (20)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

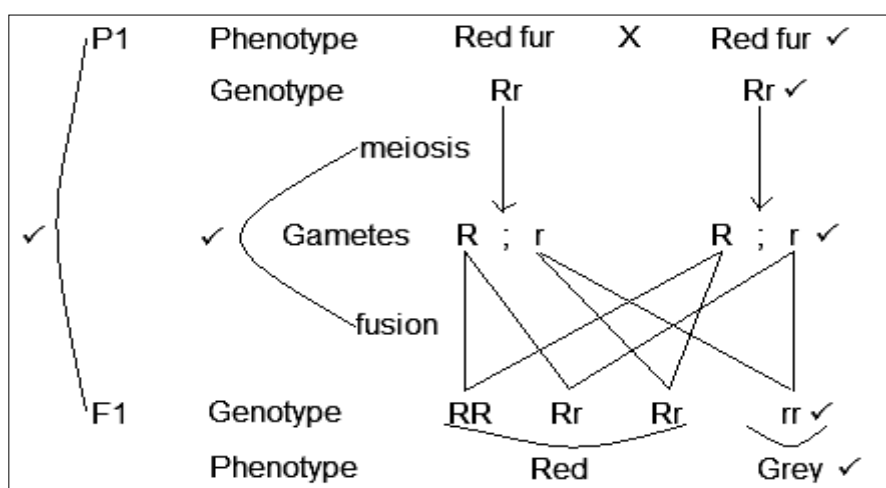
- 2.1 2.1.1 3 ✓pairs (1)
- 2.1.2 Prophase 1 ✓ (1)
- 2.1.3 Crossing over ✓ (1)
- 2.2 2.2.1 (a) 21 ✓ (1)
(b) 6 ✓ (1)
(c) 7 ✓ (1)
- 2.2.2 4 – ACU ✓ 5 – CCU ✓ 6 – GAG ✓ (3)
- 2.2.3 4 – Threonine ✓ 5 – Proline ✓ 6 – Glutamate ✓ (3)
- 2.2.4 valine ✓ (1)
- 2.3 2.3.1 As the age of the mother increases, ✓ the risk of having a Down syndrome child increases. ✓ (2)
- 2.3.2 9 times ✓✓ (2)
- 2.3.3 There are 3 ✓ copies of chromosome number 21 ✓instead of just 2. (2)
- 2.4 2.4.1 B ✓ (1)
- 2.4.2 Organism A ✓ (1)
- 2.4.3
- Fast movement ✓ – to get away from danger ✓
 - Ability to survey surroundings ✓ – to see where the dangers are ✓
 - Freedom of forearm and hand ✓ – for tool use or for defence ✓
 - Exposed to less UV light ✓ – for temperature regulation ✓
 - Display of male genitals ✓ – to attract a mate ✓ (Any 3 x 2) (6)
- 2.4.4 Charles Darwin ✓ (1)

- | | | | | |
|-----|-------|---|-------------|-----|
| | 2.4.5 | <ul style="list-style-type: none"> - As a result of genetic variation ✓ in the giraffe population, some giraffe had longer necks than others. ✓ - As a result of leaves being available, only higher up on trees, ✓ giraffes competed for the leaves. ✓ - Giraffes with shorter necks were outcompeted and died. ✓ - Giraffes' with longer necks survived. ✓ - This is natural selection. ✓ - The gene for longer necks was passed on to subsequent generations. ✓ - Eventually all the giraffes had longer necks. ✓ | (Any 7 x 1) | (7) |
| 2.5 | 2.5.1 | Bonobo ✓ | | (1) |
| | 2.5.2 | 7 mya ✓ (million years ago) | | (1) |
| | 2.5.3 | Orangutan ✓ | | (1) |
| | 2.5.4 | Humans and chimpanzees have a common ancestor ✓ but are not in the same line of development. ✓ | | (2) |

[40]

QUESTION 3

3.1



Individuals with RR will die before birth:

Phenotypic ratio is therefore 2 red fur : 1 grey fur
(rather than 3 red fur : 1 grey fur)

Therefore: 200 } / two thirds of the population has red fur
100 } *✓/ one third of the population has grey fur

Any 6 points from diagram plus 1 compulsory point for the answer above (*)

(7)

3.2 3.2.1 There are more than two alleles ✓ possible at the one locus. ✓

(2)

3.2.2 AB ✓

(1)

3.2.3

$$\left(\frac{49}{100} \times \frac{9\,200\,000}{1} \right) \checkmark = 4\,508\,000 \checkmark \text{ people}$$

(2)

3.3 3.3.1 60 arbitrary units ✓

(1)

3.3.2 60 – 52 ✓ = 8 ✓ arbitrary units

(2)

3.3.3 Grow wheat without insect poison gene. ✓

(1)

3.3.4 It gave a higher yield in fields. ✓

(1)

3.4 3.4.1 Four/4 ✓✓

(2)

3.4.2 (a) $X^H X^h$ ✓

(1)

(b) $X^h Y$ ✓

(1)

3.4.3 • The allele for the trait is carried on the X-chromosome ✓/Y-chromosome does not carry the allele for the trait.

• Males only have one X-chromosome ✓

• A male only needs one recessive allele ✓ to be haemophiliac, whereas for a female to be haemophiliac both alleles must be recessive. ✓

(Any 2 x 1)

(2)

- 3.4.4 50✓%✓ / ½ (1)
- 3.4.5
- To determine if the wife is a carrier. ✓
 - To determine what the chances are of having a child with *haemophilia*. ✓
 - Help them evaluate whether they would cope with such a child. ✓
 - Help them to make an informed decision about whether to have children. ✓ (Any 2 x 1) (2)
- 3.5 3.5.1 There are three bands of the child's DNA, ✓ which are identical to Mary's. ✓ (2)
- 3.5.2 Sam, ✓ because four bands of his DNA matched those of the baby. ✓/None of Johnny's DNA matched the baby's DNA. (2)
- 3.5.3 (a) blood testing ✓ (1)
- (b)
- Other people involved in the conflict can have the same blood type as the accused. ✓
 - It can only show that the accused is not the father. ✓ (Any 1 x 1) (1)
- 3.6 3.6.1 (a) Fewer resistant mosquitoes ✓ / more susceptible mosquitoes (1)
- (b) Equal numbers of both type of mosquitoes. ✓ (1)
- 3.6.2 Many of the susceptible/affected by DDT mosquitoes died because of the DDT application. ✓ The resistant mosquitoes survived. ✓ (2)
- 3.6.3 Those that survived the first DDT application reproduced ✓ to form more offspring. ✓ (2)
- 3.6.4 They were susceptible/affected by DDT ✓ and were therefore killed off. ✓ (2)
- [40]**

TOTAL SECTION B: 80

SECTION C

QUESTION 4

4.1 Trend towards bipedalism

- The foramen magnum is at the base of the skull ✓ so that the head could be held vertically. ✓
- The position of pelvic girdle/at the bottom of the core body ✓ is suitable to carry the weight of the body ✓
- The pelvis is more cup-shaped ✓ which make it suitable to carry the core of the body. ✓
- Their feet are directly under the body ✓ to carry the weight of the body. ✓
- The decrease in the length of arms indicates a decreased dependency on its use in locomotion ✓ and therefore shows a more advanced stage of bipedalism. ✓
- This is usually accompanied by an increase ✓ in the length of the legs. ✓
- Humans have a lumbar curvature of the spine ✓ /S-shaped spinal column for better balance. ✓

Change in diet from raw food to cooked food

- Humans have smaller jaws ✓ for eating cooked food. ✓
- Ape-like beings have more prognathous jaws than human ✓ for scooping the food ✓ /to reduce the dependency on arms. ✓
- Ape-like beings have stronger jaws ✓ to break and chew raw food. ✓
- Brow ridges became less developed in humans ✓ since the action of the smaller jaws did not create forces great enough for skull to have increased strength from the brow ridges. ✓
- Humans have C-shaped jaws ✓ for increased chewing. ✓
- Humans have flat nails and apes have claws ✓ to grab and grip their food. ✓
- Absence of gaps (diastema) in humans between incisors and canines ✓ indicating diet that is more refined. ✓
- Humans have smaller teeth ✓ /incisors and canines for better chewing. ✓
- Humans have flatter molars and pre-molars ✓ for better chewing. ✓

(17)

Marking guidelines for the essay

Relevance (R)	Logical Sequence (L)	Comprehensive (C)
All information provided is relevant to the essay.	Ideas are arranged in a logical/cause-effect sequence.	Both aspects required by the essay have been sufficiently addressed.
Only information relevant to the development of bipedalism and change in diet is given.	Each significance is linked to the relevant aspects.	Both aspects – bipedalism and dietary change – are explained in a minimum of 13 points.

Synthesis (3)

TOTAL SECTION C: 20
GRAND TOTAL: 150