



# education

Department of  
Education  
FREE STATE PROVINCE

**GRADE 12**

**LIFE SCIENCES P2**

**SEPTEMBER 2009**

**MARKING GUIDELINE**

**MARKS: 150**

**This memorandum consists of 9 pages.**

## SECTION A

### QUESTION 1

#### 1.1

- 1.1.1 B✓✓
- 1.1.2 C✓✓
- 1.1.3 A✓✓
- 1.1.4 C✓✓
- 1.1.5 B✓✓

(5x2) (10)

#### 1.2

- 1.2.1 Phylogenetic tree✓/cladogram
- 1.2.2 Sympatric speciation✓
- 1.2.3 Food web✓
- 1.2.4 Decomposition✓
- 1.2.5 Neutral mutation✓

(5)

#### 1.3

- 1.3.1 C✓
- 1.3.2 D✓
- 1.3.3 F✓
- 1.3.4 A✓
- 1.3.5 B✓

(5)

#### 1.4

1.4.1 2004✓

(1)

- 1.4.2
  - Paper products ✓
  - Building material ✓
  - Steel ✓
  - Iron✓

(any) (3)

1.4.3  $(388 - 300) = 88$  ✓tons

(1)

- 1.4.4
  - Awareness campaigns -educate✓ the people about the hazards of waste dumps ✓
  - Municipalities should pass legislation✓ to implement a policy to sort and classify household waste into the following categories: glass, plastic, metal, paper and garden refuse✓
  - The three key concepts in waste management are re-used, reduce and recycle✓ Also, more emphasis must be placed on recycling✓

any 3x2 (6)  
**(10)**

## 1.5

- 1.5.1 - The number of bacteria increases✓ (1)
- 1.5.2 - Bacteria ✓ respire using up the oxygen✓ (2)
- 1.5.3 - Plants / animals will die because of the decrease in oxygen level ✓ (2)
- 1.5.4 - Education/ awareness about water pollution✓  
- Clean – up campaign✓  
- Monitoring clean water✓  
- Sanitary systems need to be upgraded and maintained✓  
- Install water taps✓  
- Developing and implementation of government policy✓ / legislation  
- Penalties for polluting water✓  
- Prevent the release of chemicals and other waste into the environment✓  
- Must treat waste activities properly to remove all harmful chemicals into the environment✓  
- The use of biodegradable chemicals and material must be enforced/encouraged✓  
- Report pollute water resource to the relevant government department✓  
**(Mark first FOUR answers only)** any (4)  
**(9)**

## 1.6

- 1.6.1 1 200 ✓ (1)
- 1.6.2 Mammals ✓ (1)
- 1.6.3 Loss of a suitable habitat ✓ because of exploitation (1)
- 1.6.4 - Sustainable hunting✓ - over-exploitation must not be allowed✓  
- Research ✓ - done to look at the reproductive cycle✓/ alternative  
- Source of active ingredient/ cloning✓  
- Penalties✓ for breaking legislation✓  
- Education✓ / campaign – impact and consequences of over exploitation✓  
- Establish more nature reserves✓ - to conserve indigenous animals  
- Controlling exploitation✓ - of indigenous animals by tourists✓  
- Provision for free✓/ cheaper meat – to reduce over dependence on indigenous animals✓  
**(Mark first FOUR answers only)** any (4x2) (8)  
**(11)**

**TOTAL SECTION A: 50**

## SECTION B

### QUESTION 2

#### 2.1

- 2.1.1
- Fish-like/ tubular heart✓
  - Notochord ✓
  - Gill slits/ arches are found in all the vertebrate embryos ✓
  - A tail is found in all the vertebrate embryos✓

**(Mark first FOUR answers only)**

any (4)

#### 2.2.

2.2.1 Advantage - Desirable alleles✓ can be selected and passed on to successive generations✓ (2)

2.2.1 Disadvantage - Reduction of the gene pool✓ /passing on unfavourable characteristics✓ such as the inability to adapt to new environments, difficulty of breeding in captivity✓ and increased ability to contract diseases easily. ✓ (4)

(4)  
(6)

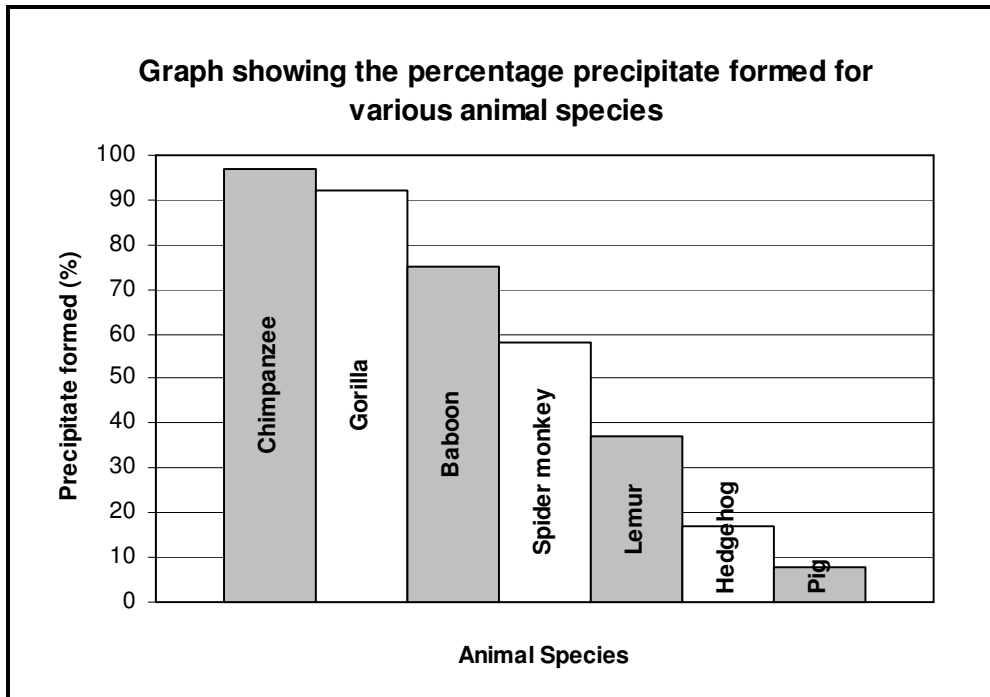
#### 2.3

Ice Ages✓  
Continental drift✓  
Plate Tectonics✓  
Volcanic activity✓  
Disease✓

**(Mark first FOUR answers only)**

any (4)

2.4.1



**Rubric for the mark allocation of the graph**

Correct type of graph	1			
Title of graph (with two variables)	1			
Correct label for X-axis	1			
Correct label for Y-axis	1			
Appropriate scale for X-axis	1			
Appropriate scale for Y-axis	1			
Plotting of the bars	No bars correctly plotted	1 – 2 bars correctly plotted	3 – 6 bars correctly plotted	7 bars correctly plotted
	0	1	2	3

(9)

2.4.2 The antibodies combine to form protein/antibody complexes which settle out as a precipitate. ✓ The more precipitate, the more closely the animals are related. ✓

(2)

2.4.3 Pig ✓ It only forms an 8% precipitate when the blood is exposed to the serum ✓

(2)

- 2.4.4
- Identical DNA compounds ✓
  - Similar sequences of genes ✓
  - Similar portions of DNA with no function ✓
  - Identical protein synthesis ✓
  - Similar metabolic pathways ✓

**Mark first THREE only**

any (3)  
(16)

[30]

### QUESTION 3

#### 3.1

3.1.1 C ✓ → D ✓ → A ✓ **OR** B → D → A **OR**  
E ✓ → D ✓ → A ✓ (3)

3.1.2 Increases ✓ because the pesticide accumulates ✓ in the tissues of the different organisms. (2)

3.1.3 Farmlands in the area using pesticides ✓ the run off water entering ground water which entering the lake ✓ (2)

3.1.4 - Allergies ✓  
- Cancer ✓  
- Gastro- enteritis ✓  
- Typhoid ✓  
**(Mark first TWO only)** any (2)

3.1.5 - Education/awareness about water pollution ✓  
- Clean-up campaign ✓  
- Monitoring of water quality ✓  
- Sanitary systems need to be upgraded and maintained ✓  
- Install taps ✓ /introduce piped-water  
- Developing and implementation of government policy ✓ /legislation  
- Penalties for polluting water ✓  
- Prevent the release of chemicals and other waste into the environment ✓  
- Must treat waste water properly to remove all harmful chemicals before water is released into the environment ✓  
- The use of biodegradable chemicals and materials must be enforced/encouraged ✓  
- Report activities that pollute water resources to the relevant government department ✓  
**(Mark first FOUR answers)** any (4)  
**(13)**

#### 3.2

##### 3.2.1

- Cranium size ✓  
- Arm length relative to body size ✓  
- Length of hand bones ✓  
- Pelvis size ✓  
- Shape and size of the feet ✓  
- Leg length relative to body size ✓  
**(Mark first THREE answers)** any (3)

3.2.2

<i>Homo sapiens</i>	<i>Other primates</i>
1. Larger cranium✓/brain	1. Smaller cranium ✓/brain
2. Flat face✓/ Forehead slope less backwards	2. Face sloping✓/ Foreheads slope much backwards
3. Foramen magnum forward✓/bottom of the skull	3. Foramen magnum at the back of the skull✓
4. Brow ridges are not as pronounced✓	4. Brow ridges pronounced✓
5. Smaller canines✓	5. Larger canines✓
6. Smaller spaces between the teeth	6. Larger spaces between the teeth
7. Jaws with teeth on a gentle/round curve✓	7. Jaws with teeth in a rectangular/U shape✓
8. Less protruding jaws✓	8. More protruding jaws✓/ prognathous
9. Lower jaw has a well developed chin✓	9. Lower jaw has poorly developed chin✓

(Mark first **FOUR** answers)

(any 4 x 2 = 8 + 1 for table)

(9)

(12)

**3.3**

3.3.1 All species of wildflower will survive✓ if the kangaroo rat is present/more moisture✓

OR

Some species of wildflowers✓ will not survive if kangaroo rats are absent/less moisture✓

(2)

3.3.2 (a) Number of wild flower species✓

(1)

(b) Presents of kangaroo rats✓

(1)

3.3.3 The plot that was fenced to eliminate the kangaroo rats✓

(1)

(5)

**TOTAL SECTION B: 60**

## SECTION C

### QUESTION 4

#### 4.1

4.1.1 Mainland South America ✓ (1)

4.1.2 Modified ✓ to eat a variety of different foods e.g. insects, nuts, fruits ✓ (2)

4.1.3 During continental drift ✓  
the finches populations were isolated/separated ✓  
from the original population on different islands ✓  
living under different environmental conditions ✓  
and through natural selection developed into new species ✓  
not able to interbreed after a period of time ✓ (5)

4.2 micro-evolution– small changes ✓ that occur  
within a single ✓ species ✓ /variation within a species (3)

#### 4.3

4.3.1 Set out legislation ✓ by conservation authorities to control removal. ✓  
Collect and distribute seeds ✓ to spread the number of plants over a wide area ✓.  
Domestic cultivation ✓ by traditional healers ✓ / nurseries.  
Monitoring of the number of plants ✓ to ensure that they are not decreasing ✓.  
Replacement ✓ of plant material used. ✓  
**(Mark first TWO answers only)** (any 2X2) (4)

4.3.2 Species can become extinct ✓  
Loss of biodiversity ✓  
People will lose their jobs ✓  
Shortage of food ✓ / leading to starvation  
Reduce opportunities for ecotourism ✓  
Upset the balance of ecosystems ✓ any (2)

#### 4.4

4.4.1 Biodiversity refers to the range of species ✓ in particular environment/  
habitat/ecosystem/ region ✓ (2)

4.4.2 Biodiversity has increased ✓ over time ✓ (2)

4.4.3 During the Precambrian ✓ and the Paleozoic ✓ era the growth was slow,  
thereafter in the Mesozoic ✓ and Cenozoic ✓ are it grew rapid (4)

**(8)**

#### 4.5

- Fossil records show scientists how living organisms have changed over time✓
- When studying the records they look for similarities and differences✓ in the type, origin, and functions of body structures ✓.
- This is how scientists get an idea of the relationship that exists✓ between extinct species and living species✓. any (2)

#### **Vestigial structures**

- Living animals contained small remnants (leftovers) of organs from ancestors that did not do anything✓e.g. reduced pelvis of whales, legs of snakes. ✓ (2)

#### **Analogous structures**

- Analogous body structures perform the same functions in different species✓ but they have evolved independently,/ have different structures ✓ for example, the wing of a butterfly ✓and the wing of an owl✓.They don't have a common ancestor (4)

#### **Homologous structures**

- Homologous body structures have the same structure but differ in function in different species., which indicate they share a common ancestor.✓
- For example, the bones which are found in the fin of a seal/claw of the mole, front leg of the horse and the arm of a human ✓ (4)

Content: (12)

#### **ASSESSING THE PRESENTATION OF THE ESSAY**

<b>Marks</b>	<b>Descriptions</b>
<b>0</b>	Not attempted/nothing written other than question number
<b>1</b>	Attempts but with significant gaps in the logic and flow of the answer
<b>2</b>	Minor gaps in the logic and flow of answer
<b>3</b>	Well structured – demonstrates insight and understanding of question

Synthesis: (3)

(15)

**TOTAL SECTION C: 40**

**GRAND TOTAL PAPER: 150**