



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**LIFE SCIENCES P2**

**FEBRUARY/MARCH 2011**

**MEMORANDUM**

**MARKS: 150**

**This memorandum consists of 12 pages.**

**PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2011**

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 are 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.
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 | A✓✓                                                                                                                                                                                                                                                                                                                                                                            |         |             |
|     | 1.1.2 | D✓✓                                                                                                                                                                                                                                                                                                                                                                            |         |             |
|     | 1.1.3 | B✓✓                                                                                                                                                                                                                                                                                                                                                                            |         |             |
|     | 1.1.4 | B✓✓                                                                                                                                                                                                                                                                                                                                                                            |         |             |
|     | 1.1.5 | D✓✓                                                                                                                                                                                                                                                                                                                                                                            | (5 x 2) | <b>(10)</b> |
| 1.2 | 1.2.1 | Non-biodegradable✓                                                                                                                                                                                                                                                                                                                                                             |         |             |
|     | 1.2.2 | Palaeontology✓                                                                                                                                                                                                                                                                                                                                                                 |         |             |
|     | 1.2.3 | Phylogenetic tree✓/cladogram/phylogeny                                                                                                                                                                                                                                                                                                                                         |         |             |
|     | 1.2.4 | Biogeography✓                                                                                                                                                                                                                                                                                                                                                                  |         |             |
|     | 1.2.5 | Extinct✓                                                                                                                                                                                                                                                                                                                                                                       |         |             |
|     | 1.2.6 | Caenozoic✓                                                                                                                                                                                                                                                                                                                                                                     |         |             |
|     | 1.2.7 | Vestigial✓/vestige                                                                                                                                                                                                                                                                                                                                                             |         |             |
|     | 1.2.8 | Biodiversity✓                                                                                                                                                                                                                                                                                                                                                                  |         | <b>(8)</b>  |
| 1.3 | 1.3.1 | A only✓✓/A                                                                                                                                                                                                                                                                                                                                                                     |         |             |
|     | 1.3.2 | B only✓✓/B                                                                                                                                                                                                                                                                                                                                                                     |         |             |
|     | 1.3.3 | Both A and B✓✓/A and B/Both                                                                                                                                                                                                                                                                                                                                                    |         |             |
|     | 1.3.4 | A only✓✓/A                                                                                                                                                                                                                                                                                                                                                                     |         |             |
|     | 1.3.5 | Both A and B✓✓/A and B/Both                                                                                                                                                                                                                                                                                                                                                    | (5 x 2) | <b>(10)</b> |
| 1.4 | 1.4.1 | Z ✓and R✓                                                                                                                                                                                                                                                                                                                                                                      |         | (2)         |
|     | 1.4.2 | P did not have the favourable characteristics✓/traits to survive in the new environment ✓/unable to adapt to the new environment                                                                                                                                                                                                                                               |         | (2)         |
|     | 1.4.3 | Natural selection✓/genetic changes/mutation                                                                                                                                                                                                                                                                                                                                    |         | (1)         |
|     |       |                                                                                                                                                                                                                                                                                                                                                                                |         | <b>(5)</b>  |
| 1.5 | 1.5.1 | - Wear rubber gloves when taking the samples✓ so as not to get contaminated with germs✓<br>- Samples should be taken by using a container/bottle attached to a string ✓ to avoid stepping too close to the river bank/prevent drowning/falling into water/contamination<br>- To avoid falling into river ✓ to prevent contamination by germs ✓<br><b>(Mark first TWO only)</b> |         | (4)         |
|     | 1.5.2 | Temperature of the human body✓ at which the bacterium normally lives✓/E Coli normally lives in large intestinal of humans/human body temperature is 37 °C/to allow bacteria to reproduce✓✓                                                                                                                                                                                     |         | (2)         |
|     | 1.5.3 | River Y✓                                                                                                                                                                                                                                                                                                                                                                       |         | (1)         |
|     | 1.5.4 | The chemical indicator changed to a cloudy yellow colour ✓which indicates the presence of E.Coli✓/which is a positive test for E.Coli                                                                                                                                                                                                                                          |         | (2)         |
|     | 1.5.5 | Lack /Absence of proper sewage systems✓/poor hygiene faeces getting into water/bacteria in water ✓                                                                                                                                                                                                                                                                             |         | (2)         |
|     |       |                                                                                                                                                                                                                                                                                                                                                                                |         | <b>(11)</b> |

1.6	1.6.1	Similar structures✓	(1)
		Homologous – that evolved from a common ancestor✓	(1)
		Analogous – that evolved from different ancestors✓	(1)
	1.6.2	Reproduction between organisms✓	
		Inbreeding – that are closely related✓	
		Outbreeding – are not closely related✓	(3)
			(6)
TOTAL SECTION A:			50

**SECTION B****QUESTION 2**

- 2.1 2.1.1 80✓km✓ (2)
- 2.1.2 As we move away✓ from the city centre the numbers of lichens✓ and white moths increases✓ while the numbers of dark moths decreases✓
- OR**
- As we move towards✓ the city centre the numbers of lichens✓ and white moths decreases✓ while the numbers of dark moths increases✓ (4)
- 2.1.3 Since industrial areas are more polluted✓ and lichens grow in unpolluted areas✓/are sensitive to pollution. (2)
- 2.1.4 The number of white moths will increase✓ and the number of black moths will decrease✓ (2)
- 2.1.5
- Less pollutants will be released✓ more lichens will grow and the tree trunks/roofs will be lighter/less dark and therefore✓
  - The light moths are less visible✓/while the dark moths will be more visible to predators
  - And will suffer a lower/higher mortality✓
  - White moths are better camouflaged✓/dark moths are not camouflaged
- any (4)
- (14)**
- 2.2 2.2.1 Africa✓ (1)
- 2.2.2  $\frac{547\,793}{3\,084\,746} \times \frac{100}{1}$ ✓ (3)
- = 17,8✓ accept (17,7 – 17,8) (3)
- 2.2.3 Trees used for:
- fuel✓/fire
  - building houses✓
  - space for human settlements✓/farming/livelihood
  - furniture✓
  - medicinal purposes ✓
- any (2)
- (Mark first TWO only)**
- 2.2.4
- Loss of habitat✓ results in death✓ of organisms/extinction of species/migration of species
  - The balance of gases✓/carbon dioxide/oxygen will be disturbed because of the loss of plants for photosynthesis✓
  - Disturb food chains✓/species migrate✓/dying out
  - Habitat degradation✓ which will result in increased soil erosion✓ reduces fertility of soil
- (any 2 x 2) (4)
- (Mark first TWO only)**

- 2.2.5
- Introduce legislation✓ to prevent the removing of trees✓
  - Impose heavy fines✓/penalties to discourage repeated acts✓ of deforestation
  - Educate people✓ about the negative effects✓ of the deforestation/ about the importance of trees
  - Research✓ new technologies to find other material for building✓/furniture/fuel (any 3 x 2) (6)
- (Mark first THREE only)** (16)
- [30]**

**QUESTION 3**

3.1 3.1.1

TORTOISE 1	TORTOISE 2
- Short neck✓	- Long neck✓
- More rounded shell✓	- More elongated shell✓
- No notch✓	- A notch✓
- (Shorter legs✓)	- (Longer legs✓)

**(Mark first TWO only)****(2 x 2 + 1 for table) (5)**3.1.2 Tall plants✓/shrubs/small trees **(1)**

- 3.1.3
- On each island there was **variation**✓ (long and short) in the population of tortoises lived under **different environmental conditions**✓ different sources of food
  - After a period of time each group of tortoises underwent **natural selection**✓ independently
  - On each island only those tortoises with the characteristics✓ (long or short neck) favourable for its own conditions survived✓
  - Continued natural selection resulted✓ in each island having tortoises that are very different from each other✓/ they differed genotypically and phenotypically
  - Reproductive isolating mechanisms prevented them from interbreeding✓ even if they are allowed to mix i.e. each is a separate species
- Compulsory**
- Any 3**
- (3 + any 3) (6) (12)**

3.2 3.2.1 A – Gorilla✓  
B – Modern human✓ **(2)**

3.2.2

GORILLA/A	MODERN HUMAN/B
1. Canines well developed✓/form fangs	1. Canines not well developed ✓
2. Sloping face✓	2. Flat face✓
3. Brow-ridge well developed✓	3. Brow-ridge less developed✓
4. Proportionally smaller cranium✓/brain	4. Proportionally large cranium✓/brain
5. Proportionally wider cheek bone✓	5. Proportionally narrower cheek bone✓
6. Sagittal crest✓ on top of the skull	6. No sagittal crest✓
7. Foramen magnum towards the back✓ of the skull	7. Foramen magnum towards the centre✓ of the skull/more forward
8. Chin not well developed✓	8. Chin well developed✓
9. No pronounced forehead	9. pronounced forehead

**(Mark first FOUR only)****(any 4 x 2)  
(1 mark for table) (9)**

3.2.3 B✓ (1)

3.2.4 - Allows total awareness✓ of the environment in sensing danger✓/looking for food (2)

- Enables hands to be free✓ to use implements✓/carry objects or offspring/throw/protect
- Exposes a large surface area✓ for thermo-regulation✓/lose body heat to surroundings in hot conditions/reduce overheating therefore reduce need for water
- Display of male/female sex organs✓ as part of courtship behaviour✓

(any 2 x 2) (4)

**(Mark first TWO only)**

- 3.2.5
- Capable of upright posture✓
  - Long upper arms✓
  - Freely rotating arms✓
  - Elbow joints allowing rotation of forearm✓
  - Rotate hands at least 180°✓
  - Flat nails instead of claws✓/bare finger tips
  - Opposable thumbs✓/which work in opposite direction to their fingers
  - Large brains/cranium compared to their body mass✓
  - Eyes in front✓/binocular vision/stereoscopic vision
  - Eyes with cones✓/colour vision
  - Sexual dimorphism✓/distinct differences between male and female
  - Olfactory brain centres reduced✓/reduced sense of smell
  - Parts of the brain that process information from the hands and eyes are enlarged✓
  - Two mammary glands only✓

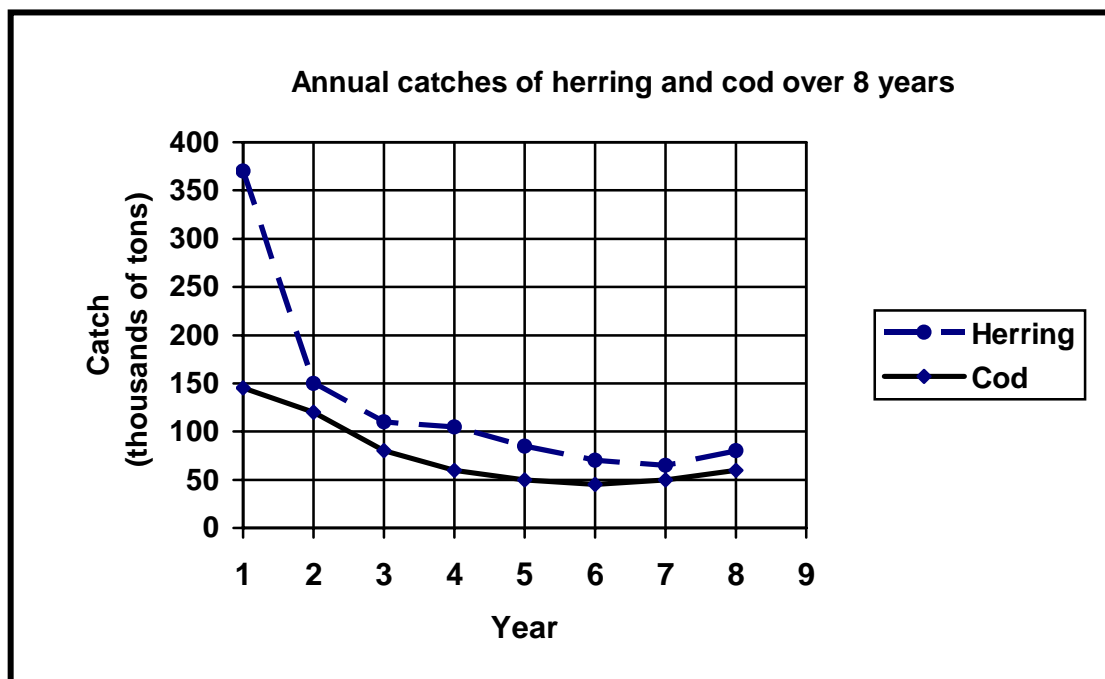
**(Mark first TWO only)**

(2)  
**(18)**  
**[30]**

**TOTAL SECTION B: 60**

**SECTION C****QUESTION 4**

4.1 4.1.1

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

Correct type of graph	1
Title of graph (both variables)	1
Correct label for X-axis	1
Graphs labelled/key provided for 2 graphs	1
Correct label for Y-axis including <b>unit</b>	1
All points joined for graph A	1
All points joined for graph B	1
Appropriate scale for X-axis	1
Appropriate scale for Y-axis	1
Drawing of the graphs	1 – 1 to 8 points plotted correctly 2 – 9 to 15 points plotted correctly 3 – all 16 points plotted accurately

(12)

**NOTE:**

If the wrong type of graph is drawn:

- marks will be lost for 'correct type of graph'
- marks will be lost for joining of points

If graphs are not drawn on the same system of axes

- mark the first graph only using the given criteria

If axes are transposed:

- marks will be lost for labelling of X-axis and Y-axis

- 4.1.2 Herring population shows a sharp decline✓ from year 1 to 2✓ and then a steady decline✓ until year 7 ✓and then small increase✓ any (4)
- 4.1.3
- Limit the size of fish caught✓
  - Limit the number/quotas of fish caught✓
  - Limit the fishing area✓
  - Licence to fish✓
  - Develop legislation✓to regulate fishing
  - Heavy penalties for flouting the legislation✓
  - Scientific research✓ to inform legislation
  - Minimal or no fishing during breeding season✓/limited fishing season
  - Education and awareness of endangered species✓
  - Encourage mariculture✓/sea farming
  - Discouraging illegal market by government selling it at lower price✓
  - Stricter monitoring✓
- (Mark first TWO answers only)** any (2)  
**(18)**
- 4.2 4.2.1 Semi-desert✓ (1)
- 4.2.2 To treat
- indigestion✓
  - minor infections✓
  - obesity✓
- (Mark first TWO only)** any (2)
- 4.2.3 Indigenous people were the first✓ to use the plant for suppressing appetite✓  
Royalty must be paid✓ for their intellectual property✓ (4)  
**(7)**

## 4.3 Possible answer

**Management strategies to manage solid waste****Landfill and burning with energy recovery✓**

(1)

- Utilise the heat generated ✓from the burning of landfill sites to generate electricity✓ thus saving on the electricity bill✓
- Investigate methods to collect and utilise methane gas as a fuel✓

any (2)

**Recovery and recycling✓**

(1)

- Encourage citizens of the city to put different types of waste✓ into different waste containers✓/bins of different colours
- Partnership with recycling companies for improved collection of different wastes✓
- Fines✓ for people that do not separate the waste into different bins
- This could generate income✓ and reduce the transport cost ✓
- Educate people to use organic waste✓ for example to make compost✓ which could fertilise soil, they can plant vegetables

any (2)

**Educate citizens and companies to reuse✓ waste**

(1)

- Glass✓ containers for milk, cold drinks and alcohol etc.
- This will reduce the need to produce more of these items✓
- thus saving energy and money✓

any (2)

**Reducing waste✓**

(1)

- Charge/penalties people extra if they generate more waste✓ to encourage citizens to manage waste more efficiently✓/renewable

any (2)  
(any 4 x 3) (12)**ASSESSING THE PRESENTATION OF THE ESSAY**

Marks	Description
3	Discussed all 4 strategies with no irrelevant information
2	Discussed 2 or 3 strategies or contains some irrelevant information
1	Discussed 1 or 2 strategies or contains much irrelevant information

**Synthesis** (3)  
(15)  
[40]

**GRAND TOTAL:** 150