



# basic education

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

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**LIFE SCIENCES P2**

**VERSION 2 (OLD CONTENT) FOR PART-TIME CANDIDATES**

**FEBRUARY/MARCH 2013**

**MEMORANDUM**

**MARKS: 150**

**This memorandum consists of 10 pages.**

## PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2013

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 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 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.).
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 Moderator 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 | D✓✓   |         |             |
|     | 1.1.2 | C✓✓   |         |             |
|     | 1.1.3 | B✓✓   |         |             |
|     | 1.1.4 | C✓✓   |         |             |
|     | 1.1.5 | C✓✓   | (5 x 2) | <b>(10)</b> |
| 1.2 | 1.2.1 | Phylogenetic tree✓/cladogram  |         |             |
|     | 1.2.2 | Transitional fossils✓   |         |             |
|     | 1.2.3 | Abiotic✓  |         |             |
|     | 1.2.4 | Food web✓   |         |             |
|     | 1.2.5 | Theory✓   |         | <b>(5)</b>  |
| 1.3 | 1.3.1 | B only✓✓  |         |             |
|     | 1.3.2 | A only✓✓  |         |             |
|     | 1.3.3 | Both ✓✓/A and B   |         |             |
|     | 1.3.4 | A only✓✓  | (4 x 2) | <b>(8)</b>  |
| 1.4 | 1.4.1 | Accept any value between 520 and 550✓   |         | (1)         |
|     | 1.4.2 | Bacteria ✓  |         | (1)         |
|     | 1.4.3 | Ferns ✓   |         | (1)         |
|     | 1.4.4 | Birds✓  |         | (1)         |
|     | 1.4.5 | Reptiles✓ and Birds✓  |         | (2)         |
|     |       |   |         | <b>(6)</b>  |
| 1.5 | 1.5.1 | The number of lichens increases✓ and the number of dark moths decreases✓ as the distance from the city centre increases✓  |         | (3)         |
|     | 1.5.2 | Lichens are sensitive to air pollution✓. In the industrial area there are high levels✓ of air pollution and the lichens die✓  |         | (3)         |
|     | 1.5.3 | If the pollution is reduced in the industrial area the number of dark moths will decrease✓  |         | (1)         |
|     | 1.5.4 | The trunks of the trees will become lighter✓ again if pollution is reduced. The dark moth will become visible✓ against the white tree trunks and be eaten✓ by the predators |         | (3)         |
|     |       |   |         | <b>(10)</b> |

1.6 1.6.1

Homo/O	Chimpanzee/P
1. Canines not well developed ✓	1. Canines well developed ✓/form fangs
2. Less protruding jaws ✓/not prognathus	2. Protruding jaws/prognathus ✓
3. Brow-ridge less pronounced ✓	3. Heavily pronounced brow-ridge ✓
4. Proportionally large cranium ✓	4. Proportionally smaller cranium ✓
5. Smaller lower jaw ✓	5. Larger/heavier jaw ✓

(Mark first THREE only)

(any 3 x 2)  
(1 mark for table) (7)

1.6.2 N ✓, M ✓, O ✓ (3)

1.6.3 Taung child ✓  
Mrs Ples ✓  
Little-foot ✓  
(Mark first ONE only) (Any 1) (1)  
(11)

**TOTAL SECTION A: 50**

## SECTION B

### QUESTION 2

2.1 2.1.1 Colour of the beetle ✓ (1)

2.1.2 Natural selection ✓/survival of the fittest (1)

2.1.3

- There is variation ✓ in the colour of the beetles/black and white/light colour
- The white/light-coloured beetles have the desirable characteristic ✓/are better adapted/to camouflage better for surviving
- more of the white/light-coloured beetles survive ✓
- and reproduce white/light-coloured offspring ✓
- More of the black beetles died ✓/were eaten by the predators
- over generations all beetles will be white/light-coloured ✓

(6)  
(8)

2.2 2.2.1 Pangaea ✓ (1)

2.2.2 The fossils of the *Glossopteris* plants in similar biomes ✓ indicate that they evolved from a common ancestor ✓ that lived on Pangaea and as result of continental drift ✓ /biogeography/they are present on other continents (3)  
(4)

- 2.3      2.3.1      Arsenic✓ (1)
- 2.3.2      The factory could have been closed down✓  
The factory could have put measures in place to prevent the metals  
from going into the water✓/factory could have disposed of arsenic  
in another way  
**(Mark first TWO only)** (Any 2) (2)
- 2.3.3      Cadmium✓ (1)
- 2.3.4      None ✓ of the metals poses a health danger, because all the  
concentrations are lower✓ than the concentration that humans can  
tolerate  
**OR**  
Heavy metals accumulate in the body over time✓ and may  
therefore exceed✓ the levels of tolerance (2)  
**(6)**
- 2.4      2.4.1      Number of germinating seeds✓ (1)
- 2.4.2      More/less✓ seeds will germinate✓ in damp air✓/with sulphur  
dioxide air  
**OR**  
There is no influence by SO<sub>2</sub>✓ on the germination✓ of the seeds✓ (3)
- 2.4.3      Repeat the investigation a few times✓/use more seeds and  
calculate the average✓  
Use the same species✓/size of germinating seeds because other  
species may respond differently ✓  
Ensure enough time✓ for the germination of the seeds  
Some seeds may need longer time✓  
**(Mark first THREE only)** (Any 3 x 2) (6)
- 2.4.4      - asthma✓  
- bronchitis✓  
- allergies✓  
- emphysema✓  
- lung cancer✓  
- coughing✓  
- shortness of breath✓ (Any 2) (2)  
**(12)**  
**[30]**

### QUESTION 3

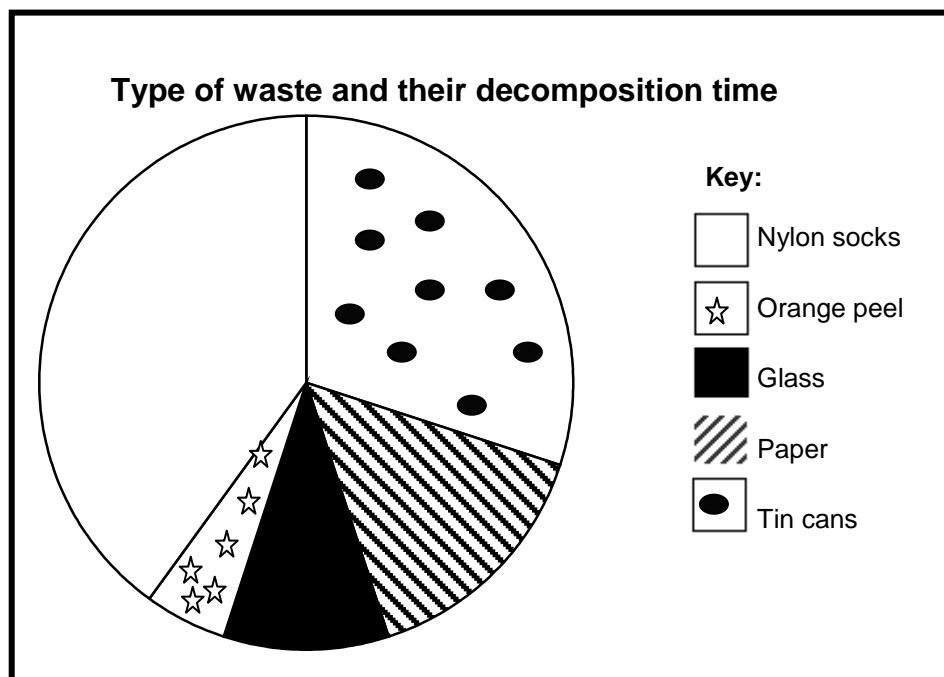
3.1 3.1.1 Nylon socks  $\frac{40}{100} \times 360^\circ = 144^\circ$

Tin cans  $\frac{30}{100} \times 360^\circ = 108^\circ$

Paper  $\frac{15}{100} \times 360^\circ = 54^\circ$

Glass  $\frac{10}{100} \times 360^\circ = 36^\circ$

Orange peel  $\frac{5}{100} \times 360^\circ = 18^\circ$



#### Mark allocation of the graph

Calculation/working to determine the correct proportions	2 marks: All five calculations correct 1 mark: 1 to 4 calculations correct
Correct type of graph	1
Title of graph	1
Proportions accurate for each sector/slice labelled/key	5 marks: All five sectors correct (use transparency template) (1 x mark/sector)

#### NOTE:

If the wrong type of graph is drawn: marks will be lost for 'correct type of graph' as well as for 'drawing of sectors in correct proportion'.

(9)

	3.1.2	Paper✓/Glass/Tin/Orange peel <b>(Mark first ONE only)</b>	(Any 1)	(1)
	3.1.3	<ul style="list-style-type: none"> <li>- People collect and sell waste at buy-back centres✓ and benefit therefore economically✓/create own jobs</li> <li>- People who collect waste and take it to recycling depots✓ contribute to sustainable use of materials✓</li> <li>- Recycling saves energy✓ and therefore reduces the amount of energy used to make new products✓</li> </ul> <b>(Mark first TWO only)</b>	(Any 2 x 2)	(4) <b>(14)</b>
3.2	3.2.1	Tortoise A ✓		(1)
	3.2.2	<p>During continental drift two different islands formed✓/Geological barrier</p> <p>The population will split up into two groups✓</p> <p>Each island has a different environment ✓/vegetation</p> <p>Each group of tortoises undergoes natural selection independently ✓</p> <p>The tortoises with longer necks (Group B) survived on island X✓ because they could feed on the cactus plants✓</p> <p>The tortoises with shorter necks (Group A) survived on island Y✓ because they could feed on grass✓</p> <p>Each group may become genotypically✓ and phenotypically different✓ which might prevent them from interbreeding✓</p> <p>They become reproductively isolated leading to the formation of a new species✓ through allopatric speciation✓</p>	(Any 9)	(9) <b>(10)</b>
3.3	3.3.1	D✓		(1)
	3.3.2	Oil✓		(1)
	3.3.3	A✓		(1)
	3.3.4	<p>The direction of the flow of the river washed✓ the oil away✓ from site A</p> <p style="text-align: center;"><b>OR</b></p> <p>The sample taken at site A is the less✓ shaded✓</p>		(2)
	3.3.5	<p>Decrease in food supply✓</p> <p>Decrease in the economy✓</p> <p><b>(Mark first ONE only)</b></p>	(Any 1)	(1) <b>(6)</b> <b>[30]</b>
<b>TOTAL SECTION B:</b>				<b>60</b>



## SECTION C

### QUESTION 4

- 4.1 4.1.1 Precision grip✓ for using tools/grasping things to obtain a power grip (1)
- 4.1.2
- Long upper arms✓
  - Freely rotating arms✓
  - Elbow joints allowing rotation of forearm✓
  - Flat nails instead of claws✓/bare finger tips
  - Large brains✓/skulls 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
  - Portions of the brain centre that process information from hands and eyes enlarged
  - Two teats only✓
  - Few offspring
- (Mark first FOUR answers only)** (Any 4) (4)  
**(5)**
- 4.2 4.2.1
- Identical DNA structure in different species✓
  - Similar protein synthesis✓ among different species
  - amino acid sequence of haemoglobin✓ similar/similar proteins✓
  - Similar metabolic pathways✓/cellular respiration in many species
  - Similar sequence of genes✓ in different species also show close genetic relationship
- (Mark first FOUR only)** (Any 4) (4)
- 4.2.2
- Similar structure of embryo✓ at early stage of development
  - All vertebrate embryos have gill slits✓
  - All vertebrate embryos have a tail✓ at early stage of development
- (Mark first TWO only)** (Any 2) (2)  
**(6)**
- 4.3 4.3.1
- (a) Exchange of genetic material✓ during crossing over✓ (2)
- (b) Fusion of many different sperms and ova✓ leads to variation in offspring (1)
- 4.3.2 Alteration in the sequence of nitrogenous bases on DNA✓ (1)
- 4.3.3 During meiosis✓ one or more homologous chromosomes✓ /sister chromatids fail to separate✓ (3)
- 4.3.4 Fertilisation✓ (1)
- 4.3.5
- (a) **Lethal:** the mutated organism dies ✓/the harmful characteristics are not passed on to the next generation (1)
- (b) **Fixed:** advantageous✓/becomes part of 'normal' genome/ sometimes the advantageous mutation wipes out all the other alleles controlling the same characteristic within the population (1)  
**(10)**

4.4 4.4.1 Diarrhoea✓ (1)

4.4.2 The researchers visited clinics ✓  
and hospitals ✓/doctors  
and do a survey in rural communities✓ to collect data (3)  
(4)

#### 4.5 POSSIBLE ANSWER

##### Impact on environment

- Plants can become extinct✓/lead to loss in biodiversity
  - Food chains/webs can be destroyed✓
  - Shortage of food✓
  - Could lead to degradation of the environment✓
  - Erosion of ground surface if too many plants are removed✓
  - Increase run-off of water✓
  - Destroy habitats of many organisms✓
  - Alien plant invasion✓
  - Upset the balance of oxygen and carbon dioxide✓/global warming
- (Any 4) (4)

##### Management practices to reduce over-exploitation

- Sustainable harvesting✓ – controlling and monitoring over-exploitation✓
  - Research✓ done - to look at reproductive cycle✓/alternative source of active ingredient /cloning
  - Legislation✓ - control harvesting✓
  - Penalties ✓for breaking legislation✓
  - Education✓/campaign - impact and consequences of over-exploitation✓
  - Establish nurseries✓/seed banks - to replace plants harvested✓
  - Establish more nature reserves✓ - to conserve indigenous plants✓
  - Monitoring exploitation✓ - of indigenous plants by international companies✓
  - Provision of free✓/cheaper food - to reduce dependence on indigenous plants✓
- (Any 4 x 2) (8)

Synthesis: (3)

Description	Marks
Not attempted/irrelevant information	0
ONE aspect addressed with some irrelevant information	1
ONE aspect addressed with no irrelevant information <b>OR</b> TWO aspects addressed with some irrelevant information	2
TWO aspects addressed with no irrelevant information	3

(15)

**TOTAL SECTION C: 40**  
**GRAND TOTAL: 150**