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

NOVEMBER 2011

FINAL MEMORANDUM 24/11/2011

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.

　　　　　　　　　　　　　　　　　　Please turn over

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   B✓✓ / (A)
         1.1.2   B✓✓
         1.1.3   C✓✓
         1.1.4   D✓✓
         1.1.5   D✓✓   (5 x 2)   **(10)**

1.2   1.2.1   (Scientific) theory✓
         1.2.2   Eutrophication✓
         1.2.3   (Bio)diversity✓
         1.2.4   Palaeontology ✓
         1.2.5   Alien✓/Exotic/Invasive   (5 x 1)   **(5)**

1.3   1.3.1   None✓✓
         1.3.2   Both A and B✓✓/A and B/Both
         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)   **(10)**

1.4   1.4.1   2002✓   (1)
         1.4.2   The abalone will decrease✓✓/ become extinct   (2)
         1.4.3   Species can become extinct✓
                     Loss of biodiversity✓
                     Upset the balance of ecosystems✓
                     (Mark first THREE answers only)   (3)

         1.4.4   Limit the size caught✓
                     Limit the number/quotas caught✓
                     Limit the harvesting/collection area✓
                     License to harvests ✓
                     Develop legislation✓to regulate harvesting
                     Scientific research✓ to inform legislation
                     Minimal or no harvesting during breeding season✓/limited
                     harvesting season
                     Education and awareness of endangered species✓
                     Encourage mariculture✓/sea farming/agriculture
                     Discouraging illegal market by government selling it at lower price✓
                     Stricter monitoring✓
                     Heavy penalties ✓
                     Declare protected species✓   (2)
                     (Mark first TWO answers only)   **(8)**

1.5   1.5.1   (a)   Mayfly nymph ✓   (1)
                (b)   Sludge worms ✓   (1)
                (c)   Leeches ✓   (1)

        1.5.2   - The size/volume of the water samples must be the same✓
                 - The samples must be taken at the same depth✓
                 - Samples must be taken at the same time in all three areas✓
                 - Use sterile/clean containers✓
                 (Mark first TWO only)   (any 2)   (2)

        1.5.3   - Wear rubber gloves/protective clothing when taking the samples✓
                   so as not to get contaminated with germs✓
                 - 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
                 (Mark first TWO only)   (4)

        1.5.4   The amount of O_2 decreases✓ as the amount of waste
                 decreases. ✓
                 When the amount of waste levels off✓, the amount of oxygen
                 increases✓ until it becomes constant ✓   (any 4)   (4)
                                                                                  (13)

1.6   1.6.1   Paleozoic Era✓   (1)

        1.6.2   (a) Paleozoic Era ✓   (1)

                (b) Permian✓   (1)

        1.6.3   Cretaceous extinction ✓   (1)
                                                                                  (4)

                                              TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1	2.1.1	(Allopatric) speciation✓	(1)

2.1.2	- There is genetic variation within the fishes✓
- The water level dropped and separates the fish into 3 populations✓
- The fishes lived under different environmental conditions✓/ had different sources of food
- The fishes underwent natural selection✓ independently in each lake
- Only those fishes that were better suited✓ to obtain the type of food available survived✓
- Continued natural selection in each lake over many generations ✓
- resulted in each lake having species that were very different (genotypically and phenotypically) from species of other lakes ✓
- These differences prevented them from interbreeding✓ leading to the formation of new species ✓

(any 7)	(7)

(8)

2.2	2.2.1	- crossing over✓ takes place
- leading to an exchange of genetic material✓/recombination occur
- between homologous chromosomes✓
- random arrangement✓ of chromosomes/ independent assortment
- along the equator✓
- allow different combinations of chromosomes to move into each daughter cell✓
- thus leading to variation in the gametes✓ produced	(any 6)	(6)

2.2.2	- Large number of gametes produced✓
- Gametes are different because they are produced by meiosis✓
- random fusion of gametes✓
- therefore the offspring✓ produced
- will be genetically different✓	(any 4)	(4)

(10)

2.3

Lamarck	**Darwin**
1. Law of use and disuse✓	1. Law of natural selection✓
2. The acquired✓characteristics are passed on to the next generation	2. Inherent✓ genetic characteristics can be inherited from parents
3. Organisms have an internal drive to change✓/deterministic	3. Organisms do not have an internal drive to change✓/nature selects the best to survive
4. Individuals change✓	4. Populations change✓
5. Infers that no extinction because organisms adapt and therefore survive✓	5. Extinction occurs since organisms may have features that do not favour survival ✓

No mark for table	**(4)**

2.4   Gill slits✓/arches are found in all the vertebrate embryos
A tail✓ is found in all the vertebrate embryos
Notochord✓
Fish-like/tubular heart✓
Cephalisation✓   **(3)**
(Mark first THREE answers)

2.5   2.5.1   Desirable alleles✓ can be selected and passed on to
successive generations✓   (2)

            2.5.2   Reduction of the gene pool✓
passing on unfavourable characteristics✓/
such as the inability to adapt to new environments,✓
and increased ability to contract diseases easily. ✓   any   (3)
                                                                            (5)
                                                                           [30]

QUESTION 3

3.1	3.1.1

GORILLA	HUMAN
1. Smaller head ✓	1. Larger head✓
2. Longer arms in relation to body ✓	2. Shorter arms in relation to body✓
3. Opposable toes on feet✓	3. No opposable toe on feet✓
4. Wider pelvis✓	4 Smaller pelvis✓
5. Hand bones longer✓	5. Hand bones shorter✓
6. Straight attachment between femur and pelvis✓	6. Angular attachment between femur and pelvis ✓
7. Ribcage wide✓	7. Ribcage narrow✓
8. Thin tibia and fibula✓	8 Thick tibia and fibula✓
9. Bones of the hind limb shorter✓	9. Bones of the hind limb longer✓
10. Shorter ✓skeleton	10. Taller ✓skeleton
11. Short vertebrate column✓	11. Longer vertebrate column✓
12. Short neck✓	12. Long neck✓
13. Small eye sockets✓	13. Large eye sockets✓

(Mark first THREE answers only)		(any 3 x 2 = 6 + **1 for table**)	(7)

3.1.2	-	Upright posture✓
-	Long upper arms✓
-	Freely rotating arms✓
-	Elbow joints allowing rotation of forearm✓
-	Rotate hands at least 180⁰✓
-	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 THREE answers only)	(any 3)	(3)
(10)

3.2	3.2.1	Changes✓ in the genetic code✓/gene/structure of DNA	(2)

3.2.2	Drugs chemicals✓, radiation✓, viruses✓, high temperature✓
(Mark first TWO answers only)	(any 2)	(2)

3.2.3	Neutral: has no effect✓ on the structure and functioning of the organism✓

Lethal: the mutated organism dies✓ and the harmful characteristics are not passed on to the next generation ✓	(4)
(8)

3.3　　3.3.1　Air conditions✓/exhaust fumes and normal air conditions　　(1)

　　　3.3.2　Exhaust gases ✓have a negative effect✓/ positive effect/ no effect on the percentage of seeds that germinate✓　　(3)

　　　3.3.3　She replicated the investigation three times✓✓　　(2)

　　　3.3.4　Little/no O_2 in exhaust fumes✓ compared to normal atmospheric air negatively affects germination in seeds. ✓

　　　　　　　　　　OR

　　　　　More O_2 in normal atmospheric air✓ compared to exhaust fumes favours germination✓

　　　　　　　　　　OR

　　　　　More CO/pollutants in exhaust fumes✓ compared to normal atmospheric air✓negatively affects germination in seeds. ✓

　　　　　　　　　　OR

　　　　　Less CO/pollutants in normal atmospheric air✓ compared to exhaust fumes favours germination.✓　　(2)

　　　3.3.5　(27 + 31 + 45)✓ /103 ÷ 3 = 34,3✓%　　(2)

　　　3.3.6　Education✓
　　　　　Monitoring ✓of air quality
　　　　　Developing and implementation of government policy/legislation✓
　　　　　Penalties for polluting air/soil✓
　　　　　Prevent the release of chemicals✓
　　　　　Report air pollution ✓
　　　　　Filters on exhausts/catalytic converters✓
　　　　　Using alternative fuel✓/reduce use of fossil fuels　　(2)
　　　　　(Mark first TWO only)　　**(12)**
　　　　　　　　　　　　　　　　　　　　　　[30]

　　　　　　　　　　　　　　　TOTAL SECTION B:　　60

SECTION C

QUESTION 4

4.1   4.1.1   Changes in the population size✓ of dark peppered moths /and the
                 amount of pollution **over time**✓   (2)

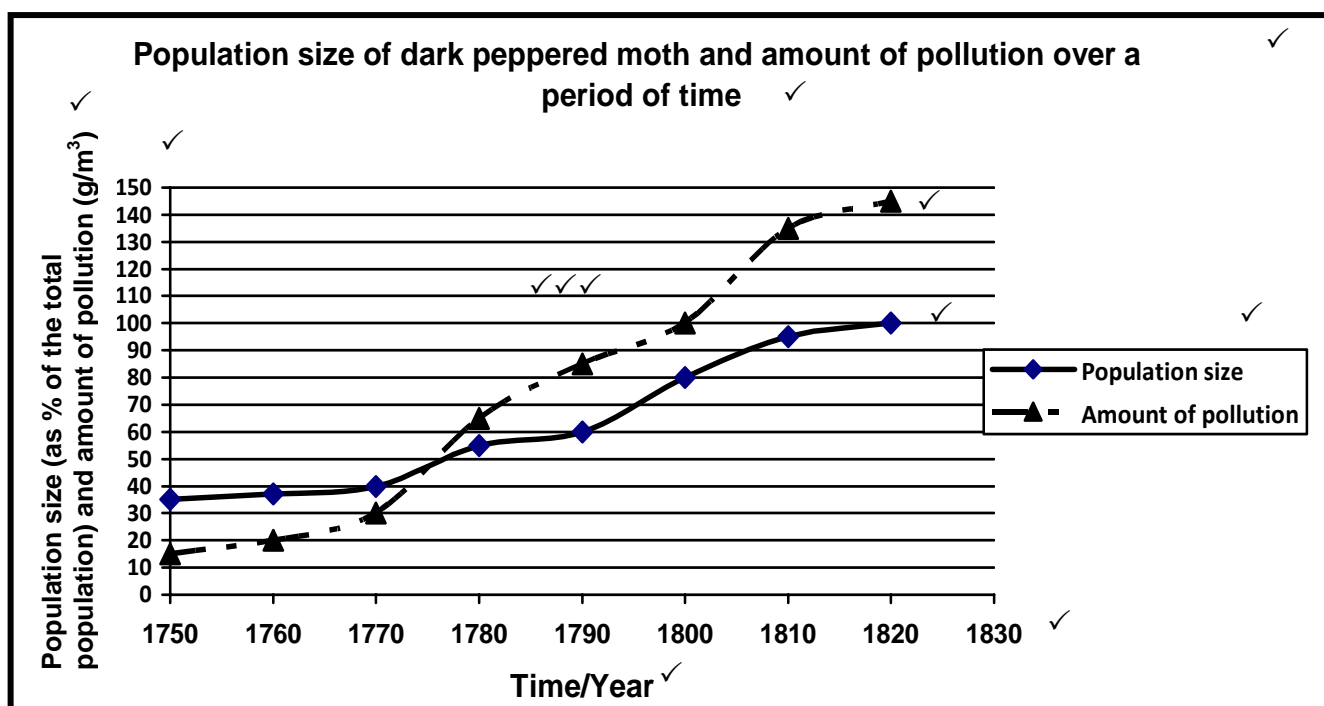   4.1.2   Population size✓/amount of pollution   (1)

       4.1.3   As the pollution increases✓ the number of dark peppered moths
                 increase✓
                                        OR
                 As the pollution decreases✓ the number of dark peppered moths
                 decrease✓   (2)

       4.1.4

Rubric for the mark allocation of the graph

Correct type of graph	1
Caption for graph	1
Correct label for X-axis	1
Graphs labelled/key provided for 2 graphs	1
Correct label for Y-axis including **units**	1
Appropriate scale for X-axis	1
Appropriate scale for Y-axis	1
Drawing of graphs	1 – 1 to 8 points plotted correctly 2 – 8 to15 points plotted correctly 3 – all 16 points plotted correctly
All points joined for graph A	1
All points joined for graph B	1

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: (12)
- Marks will be lost for labelling of 'X-axis' and 'Y-axis'   **(17)**

4.2   4.2.1   Biodegradable – Products that can be broken down✓by organisms
                  such as bacteria and fungi
                  e.g. any organic waste✓/faeces/vegetable matter, etc.   (2)

                  Non-biodegradable – Products that cannot be broken down✓ by
                  organisms such as bacteria and fungi
                  e.g. glass✓/plastic, etc.   (2)

        4.2.2 $\underline{200}$ x 100✓ = 50✓%
                  400   (2)

        4.2.3   280✓ years   (1)

        4.2.4   Health risk✓
                  Aesthetics of the environment✓will be degraded
                  Chemicals can be released into the environment✓
                  Negative impact on food chain/biotic components✓
                  Attract scavengers✓   (any 1)   (1)
                                                                    (8)

4.3   **Management strategies to improve the quality of water**

- Legislation✓ / monitoring of emissions from industries to discourage water pollution✓
- Provide adequate sewage systems✓ so that people do not urinate or pass faeces near a source of water✓
- Provide clean containers to collect water ✓so that pollutants do not contaminate the water✓
- Educate people✓ on the importance of caring for our environment✓
- Reduce the use of pesticides ✓so that less run off to our rivers ✓
- Provide purified✓/safe water to everyone to avoid use of contaminated water✓.
- Conduct research✓ to find ways of reducing pollution✓

(Mark first FOUR only)   (4 x 2)   (8)

Sources of water pollution

- Sewage✓
- Waste from factories✓
- Dumping of rubbish/waste✓
- Soap and chemicals entering the water✓

(Mark first TWO only)   (2)

Effects on human physiology and health

- Gastroenteritis✓
- Cancer✓
- Typhoid✓
- Allergies✓
- Cholera✓
- Diarrhoea✓
- Infections/rashes✓

(Mark first TWO only)   (2)

                                                          Content   (12)

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Description
3	Well structured – demonstrates insight and understanding of question
2	Minor gaps in the logic and flow of the answer
1	Attempted but with significant gaps in the logic and flow of the answer
0	Not attempted/nothing written other than question number/ All irrelevant information

                                                          Synthesis   (3)
                                                                       (15)

                                          TOTAL SECTION C: 40
                                          GRAND TOTAL: 150