



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES P2

NOVEMBER 2010

FINAL MEMORANDUM

MARKS: 150

This memorandum consists of 14 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2010

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.

1.6 1.6.1

Percentages/amount of types of waste on a school ground

Type of waste	Percentages (%)
Paper	40
Plastic	30
Organic matter	5
Aluminium cans	15
Glass bottles	10

Checklist for marking table:

Caption✓

Labelled all rows correctly✓

Labelled both columns correctly✓

All 5 percentages correct✓✓/3 to 4 percentages correct✓/

Less than 3 correct - 0 marks

(5)

1.6.2 (a) The process by which waste materials✓ are treated in such a way that they can be used again✓/reused (2)

1.6.2 (b) - To avoid over-exploitation of the limited natural resources✓
 - To save/raise money✓/(create jobs)
 - To reduce the amount of waste material✓/cleaner environment
 - Less energy✓used/ Reduce carbon footprint
 - Fewer landfill sites✓

(2)

(Mark first TWO only)**(9)****TOTAL SECTION A: 50**

SECTION B**QUESTION 2**

- 2.1 2.1.1 To enrich the soil✓/increase crop yield/plants grow better/to increase productivity (1)
(Mark first ONE only)
- 2.1.2 14✓ OR 1 400 kg/hectare✓ (1)
- 2.1.3 650✓ kg/hectare✓ (2)
- 2.1.4 As the fertiliser increases to 650 kg/hectare the yield of grass increases✓
Further increase up to 700 kg/hectare causes the yield to remain the same✓/constant
With increases beyond 700 kg/hectare there is a decrease✓ in yield
IF GENERAL TRENDS ARE GIVEN WITHOUT SPECIFIC FIGURES, AWARD A MAXIMUM OF 2 MARKS
any (3)
- 2.1.5 Much of the fertiliser will be wasted✓/ because of increase run-off
Leads to pollution✓/eutrophication/ algal bloom in the water✓ any (2)
- 2.1.6 - Leads to eutrophication✓/over enrichment of the water/ pollution
- Overgrowth of microscopic algae✓/algal bloom
- Many algae and other organisms die✓
- Their bodies are broken down by bacteria✓
- Bacteria need oxygen therefore oxygen levels in water gets further depleted✓
- Lack of oxygen causes animals to die✓ any (3)
(12)
- 2.2 2.2.1 As you move away from✓/towards town the amount of particle pollution✓ decreases✓
OR
As you move away✓/towards from town the amount of particle pollution✓ increases✓
OR
As you move away✓/towards town there is no influence✓ on the amount of particle pollution✓
OR
Higher✓/lower pollution at A✓/B/C than the other two✓
OR
Highest✓/lowest pollution✓ at A✓/B/C (3)

- 2.2.2 Amount of visible particle pollution✓/number of particles (1)
- 2.2.3 To have clear defined blocks✓ to count the particles accurately✓ (2)
- 2.2.4 So that petroleum jelly does not remove✓/dissolve the ink/
does not interfere with the results (1)
- 2.2.5 To get an average✓/ to make the results more reliable/accurate (1)
- 2.2.6 - All other environmental conditions in A, B and C must be similar✓/the slides must be similarly exposed
- Increase the number of glass slides✓ placed at each location
- Use more locations between the centre of town and the fishing spot✓/repeat the investigation
- Decrease the time✓ of exposure of the slides from a week to daily
- Increase the period✓ of time/different seasons
- Use one counter✓/trained counters
- Ensure that non-particle pollutants and material sticking on the slide do not interfere✓ with the particle collection
- Use more advanced equipment✓ to collect and measure data (3)
(Mark first THREE only) (11)
- 2.3 2.3.1 - has a calming effect✓
- helps with digestion problems✓
- helps with infant colic✓
- anti-inflammatory✓
- anti-oxidants✓
- anti-ageing✓
- reduces hypertension✓
- treatment of allergies✓
- increase immunity✓/resistance to diseases
- reduces headache✓ (2)
(Mark first TWO only)
- 2.3.2 - Plants can become extinct✓/lead to loss in biodiversity
- Food chains/webs can be destroyed✓/altered
- Could lead to degradation of the environment✓
- Erosion of ground surface if too many plants are removed✓
- Increase run-off of water✓
- Alien plant invasion✓in the habitats from which the plants are removed
- Upset the balance of oxygen and carbon dioxide✓/global warming if too many plants are removed (2)
(Mark first TWO only)

2.3.3

- Sustainable harvesting✓
- Impose quotas✓/limit numbers
- Limit area✓ where plants are harvested
- Limit size of plants harvested✓
- Limit time/seasons of collection✓
- Research done to look at reproductive cycle✓/alternative source of active ingredient /cloning
- Legislation to control harvesting✓/ Controlling exploitation of indigenous plants
- Permits to control harvesting✓
- Monitoring of harvest✓
- Penalties✓ for breaking legislation
- Education✓/campaign on the impact and consequences of over-exploitation
- Establish nurseries✓/seed banks - to replace plants harvested
- Establish more nature reserves✓ to conserve indigenous plants

(Mark first THREE only)

(3)

(7)

[30]

QUESTION 3

3.1 3.1.1 “some large, some small”✓/ “some strong and some weak” (1)

3.1.2 - **Variation in the wildebeest population**✓* (1)

slow and weak✓, were eaten by the lions✓ and do not pass on their characteristics to their offspring✓	OR	some large and strong✓ survive✓ and pass on their favourable characteristics to their offspring✓	max (3)
---	-----------	--	---------

- **If this process continues from generation to generation the characteristic of the population will change**✓* (1)

*** compulsory marks** (6)

3.2 3.2.1 ***Principle of use and disuse**✓/**adaptation to the environment**
*** compulsory mark** (1)

- Structures of individuals in a population that are used more frequently✓ became better✓/adapted
- Structures of individuals in a population that are used less frequently✓ becomes smaller✓/disappear max (2)

***Principle of inheritance of acquired characteristics**✓
*** compulsory mark** (1)

- Acquired characteristics developed by the organism in its lifetime✓ are passed on to its offspring✓ (2)

3.2.2 Acquired characteristics✓ are not inherited✓/do not cause any change to the DNA of an organism's gametes (sperms or ova)

OR

Organisms did not evolve because they wanted to evolve✓✓/
Lamarck’s theory is deterministic✓✓ (2)
(8)

3.3 3.3.1 (a) **Differences in jaws**

A	B
1. Smaller canines✓/more uniform teeth	1. Larger canines✓/different kinds of teeth
2. Smaller/no spaces/no diastema between the teeth✓	2. Larger spaces/diastema between the teeth✓
3. Jaws with teeth on a gentle/round curve✓	3. Jaws with teeth in a rectangular/U shape✓
4. Less protruding jaw✓	4. More protruding jaw✓

(Mark first TWO only)

any 2 x 2
+1 for Table (5)

3.3.1 (b) **Differences in Feet**

In A the big toe is close to the other 4 smaller toes✓/faces forward

In B the big toe is apart/opposable from the other 4 smaller toes✓/points outwards

OR

In A the heel bone is relatively larger✓ and in B it is relatively smaller✓

OR

In A the bones in the foot are straight✓ and in B they are curved✓

OR

In A phalanges are relatively shorter✓ and in B they are relatively longer✓

any 1 x 2

(2)

(Mark first ONE only)

(7)

3.3.2 A✓

(1)

3.3.3 Foramen magnum✓ more towards the centre✓ of the skull in A/ more forward

OR

In B the foramen magnum✓ more towards the back✓ of the skull

(2)

(10)

3.4 3.4.1 Speciation✓

(1)

- 3.4.2
- **In diagram 1** the rabbits were able to interbreed✓/genes can flow freely in the population
 - **In diagram 2** the two populations were separated by the river✓/geographic barrier
 - The two populations cannot interbreed✓/no gene flow
 - Within each of the two separated populations there was variation✓
 - Each group underwent natural selection✓independently✓ as a result of varying environmental conditions✓
 - Each group becomes genotypically✓ and phenotypically✓ different
 - **In diagram 3** the geographic separation no longer exist✓
 - but the two populations do not interbreed✓/no gene flow even though they can mix
 - because of the presence of reproductive isolating mechanism✓
 - They are now 2 different species✓

any

(5)

(6)

[30]

TOTAL SECTION B: 60

SECTION C**QUESTION 4**

4.1 4.1.1
$$\left. \begin{array}{l} 5\,673 + 3\,733 + 1\,477 + 1\,106 + 364 = 12\,353 \\ 24\,706 - 12\,353 = 12\,353 \end{array} \right\} \checkmark$$

$X = 12\,353 \checkmark$ million tons CO₂/yr \checkmark

OR

Credit any other
correct working \checkmark

$\frac{50}{100} \times 24\,706 \checkmark = 12\,353$

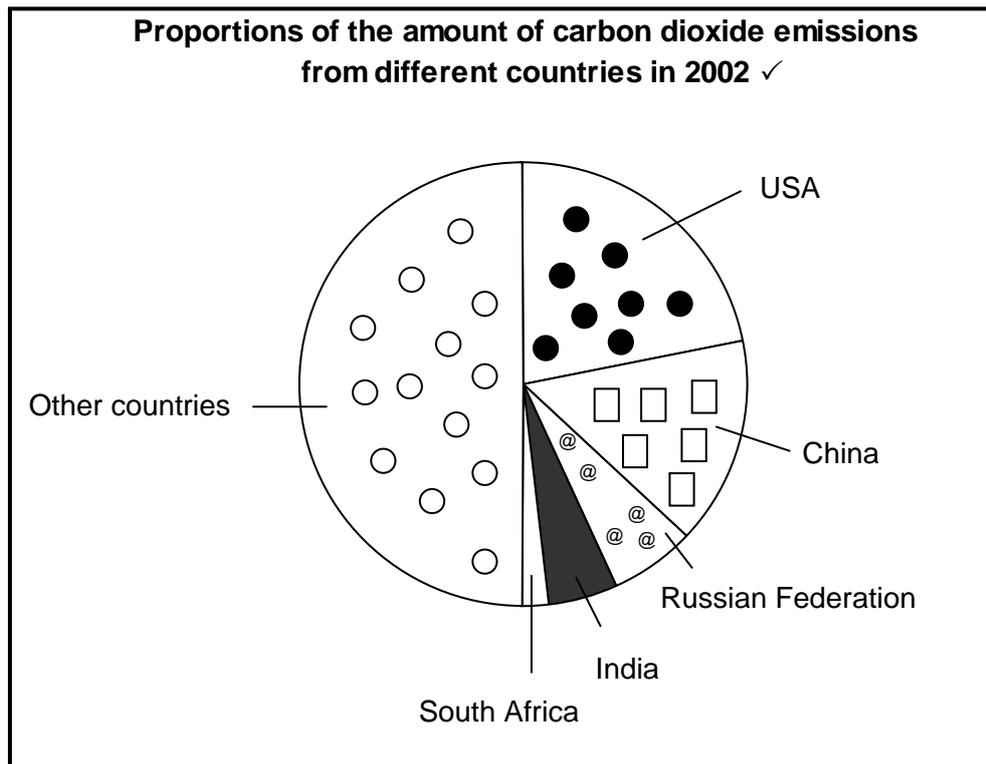
$X = 12\,353 \checkmark$ million tons CO₂/yr \checkmark (3)

- 4.1.2 (a) - USA causes more pollution than other countries \checkmark
 - contributes more to global warming \checkmark
 - which affects all the other countries in the world \checkmark
 - setting a bad example \checkmark any (2)

- (b) - Remind USA of the implications/examples of their non-participation \checkmark that will affect all the other countries in the world \checkmark including themselves
 - USA must reduce their emissions of carbon dioxide \checkmark otherwise they can be excluded from the UN \checkmark
 - Stiff penalties \checkmark to be imposed on USA to force them to reduce emissions \checkmark
 - Impose sanctions \checkmark /not buy USA products until they reduce emissions \checkmark 2 x 2 (4)
- (Mark first TWO only)**

- 4.1.3 More
 - industries \checkmark that releases CO₂
 - cars \checkmark that release exhaust fume
 - more urban areas \checkmark greater use of natural resources
 - burning of coal \checkmark /coal power stations for electricity
 - burning of wood \checkmark to prepare food, etc.
 Poor implementation \checkmark /monitoring of legislation
 Less legislation \checkmark /penalties for non-compliance (3)
(Mark first THREE only) (12)

4.1.4



T ✓
K ✓✓
P ✓✓✓

Other countries: $\frac{50}{100} \times \frac{360}{1} = 180^\circ \checkmark$	$\frac{12\ 353}{24\ 706} \times \frac{360}{1} = 180^\circ \checkmark$
USA: $\frac{22}{100} \times \frac{360}{1} = 79,2^\circ \checkmark / 79^\circ$	$\frac{5\ 673}{24\ 706} \times \frac{360}{1} = 82,6^\circ / 83^\circ \checkmark$
China: $\frac{15}{100} \times \frac{360}{1} = 54^\circ \checkmark$	$\frac{3\ 733}{24\ 706} \times \frac{360}{1} = 54,4^\circ / 54^\circ \checkmark$
Russian Fed: $\frac{6}{100} \times \frac{360}{1} = 21,6^\circ \checkmark / 22^\circ$	$\frac{1\ 477}{24\ 706} \times \frac{360}{1} = 21,5^\circ / 22^\circ \checkmark$
India: $\frac{5}{100} \times \frac{360}{1} = 18^\circ \checkmark$	$\frac{1\ 106}{24\ 706} \times \frac{360}{1} = 16,1^\circ / 16^\circ \checkmark$
SA: $\frac{2}{100} \times \frac{360}{1} = 7,2^\circ \checkmark / 7^\circ$	$\frac{364}{24\ 706} \times \frac{360}{1} = 5,3^\circ / 5^\circ \checkmark$

OR

6 x 1 (6)

Mark allocation of the pie chart

Correct type of graph (pie chart) (T)	1
Correct proportion of slices (P)	1: 1 - 2 correct 2: 3 - 4 correct 3: 5 - 6 correct
Label/key for each slice (K)	1: 1 to 3 2: 4 to 6
Caption	1
Calculations	1 x 6

(7)

NOTE: If the wrong type of illustration is drawn: marks will be lost for "correct type of graph" as well as for drawing the slices in correct proportions.

(13)

(25)

4.2 Possible answers:

Strategies to reduce air pollution

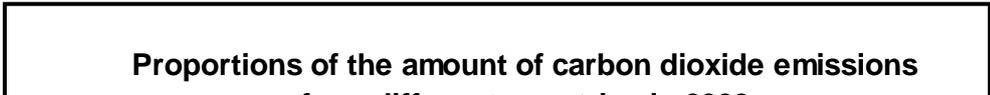
- **Introduce legislation**^{✓^S} to force societies to reduce air pollution^{✓^R}/ change behaviour
 - **Monitor emissions from industries**^{✓^S} to ensure that legislation is being followed^{✓^R}
 - **Impose heavy fines**^{✓^S} to discourage repeated acts of pollution^{✓^R}
 - **Implementation of tax**^{✓^S} **on CO₂ emissions** to encourage the use of smaller cars^{✓^R}
 - **Provide incentives to companies**^{✓^S} /**subsidise the purchase and use of clean energy** to encourage them to reduce air pollution^{✓^R}
 - **Educate**^{✓^S} **people about the ill effects of air pollution** so that they behave responsibly^{✓^R}
 - **Research new technologies**^{✓^S} to find more efficient methods of energy production^{✓^R} without releasing greenhouse gases for example solar panels, wind turbines
 - **Increase/improve the use of public transport**^{✓^S} so that fewer people use private vehicles^{✓^R}
 - **More fuel efficient cars/bicycles**^{✓^S} so that less fuel is burnt^{✓^R}
 - **Increasing the efficiency of electricity use**^{✓^S} **at home/industries** which will decrease the amount of coal burnt^{✓^R} in electricity production
 - **Reduce, re-use and recycle**^{✓^S} to conserve energy^{✓^R} to lower pollution
 - **Switch from fuels**^{✓^S} **that produce a lot of greenhouse gases (coal)** to those that produces less (natural gas) as alternative energy source^{✓^R}
 - **Preventing deforestation**^{✓^S} /**loss of other functioning ecosystems** will prevent carbon stored in vegetation of being released in the environment^{✓^R}
 - **Restoring forests**^{✓^S} /**wetlands/other ecosystems** will remove carbon dioxide from the air because plants absorb carbon dioxide^{✓^R}
 - **Methods to break down**^{✓^S} **toxic waste** before it is released into the atmosphere^{✓^R}
 - **Regulate smoking/use of fires**^{✓^S} because it produces smoke which contributes^{✓^R} to pollution
 - **More landfill sites for waste material**^{✓^S} instead of using incinerators^{✓^R}
- (Mark any SIX x 2 only and not random points)* maximum 6 x 2 (12)

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Description
3	Describe 5 - 6 strategies with appropriate reasons
2	Describe 3 - 4 strategies with appropriate reasons
1	List 1- 6 strategies with no appropriate reasons OR Describe only 1-2 strategies with appropriate reasons
0	Has not attempted/has not written anything other than question number/no correct information

Synthesis (3)
(15)

TOTAL SECTION C: 40
GRAND TOTAL: 150



NSC – Final Memorandum
Calculations Method 1

Method 1

Calculations Method 2

