TIME : **2½ hours**
MARKS: **150**

LIFE SCIENCES

PAPER 2 MEMORANDUM

SEPTEMBER 2009

education

Western Cape Education Department

NATIONAL STRATEGY FOR LEARNER ATTAINMENT

NATIONAL SENIOR CERTIFICATE

SEPTEMBER EXAMINATION – 2009

This memorandum consists of **10** pages.

SECTION A

QUESTION 1

1.1.1 B ✓✓
1.1.2 D ✓✓
1.1.3 C✓✓
1.1.4 D ✓✓
1.1.5 B ✓✓
1.1.6 A ✓✓
(6 x 2) (12)

1.2.1 Natural Selection ✓
1.2.2 Sustainability ✓
1.2.3 Red List/ Red Data List ✓
1.2.4 Phylogenetic tree/Cladogram ✓
1.2.5 Micro evolution ✓
1.2.6 Biological control ✓
1.2.7 Paleonthology ✓ (7)

1.3.1 D✓
1.3.2 E✓
1.3.3 A✓
1.3.4 C✓
1.3.5 H ✓
1.3.6 G ✓ (6)

1.4
1.4.1 When many species✓ all become extinct during the same time period✓. (2)

1.4.2 Accept any answer from 220 – 225 ✓million years ago✓/mya (2)

1.4.3 400 ✓– 200✓ = 200✓ families of species (3)

1.4.4 Number of families increased ✓ (1)

1.4.5 Asteroid – impact theory✓ (1)

1.4.6 - A comet, an asteroid or part of a star✓ from outer space struck the Earth/Gulf of Mexico which resulted in
- large clouds of dust blocking out the sun✓
- stopped photosynthesis✓
- global cooling✓/dinosaurs might have been ectotherms and not able to live in the cold
- world-wide fire✓
- monstrous tsunamis✓
- These factors caused the dinosaurs to become extinct any (5)

1.5

(a) The appendix in humans has no known function✓ /vestigial structure
The appendix functions in herbivores to digest plant materials✓
This indicates a close evolutionary relationship between humans and the other herbivores✓ (3)

(b) Gill slits in human embryo are non-functional✓
They are functional in fish for gas exchange✓
This indicates a possible aquatic ancestor for humans✓ (3)

1.6

1.6.1 Analogous ✓structures (1)

1.6.2 The structures serve the same function✓ (used for flight) in both species but are different in origin/plan✓. (2)

1.6.3 There is a web of skin ✓ (thin membrane)/ wing
Forelimbs and digits are thin/light and long✓ any (1)

TOTAL SECTON A [50]

SECTION B

QUESTION 2

2.1
2.1.1 Calculations of sectors for pie chart.

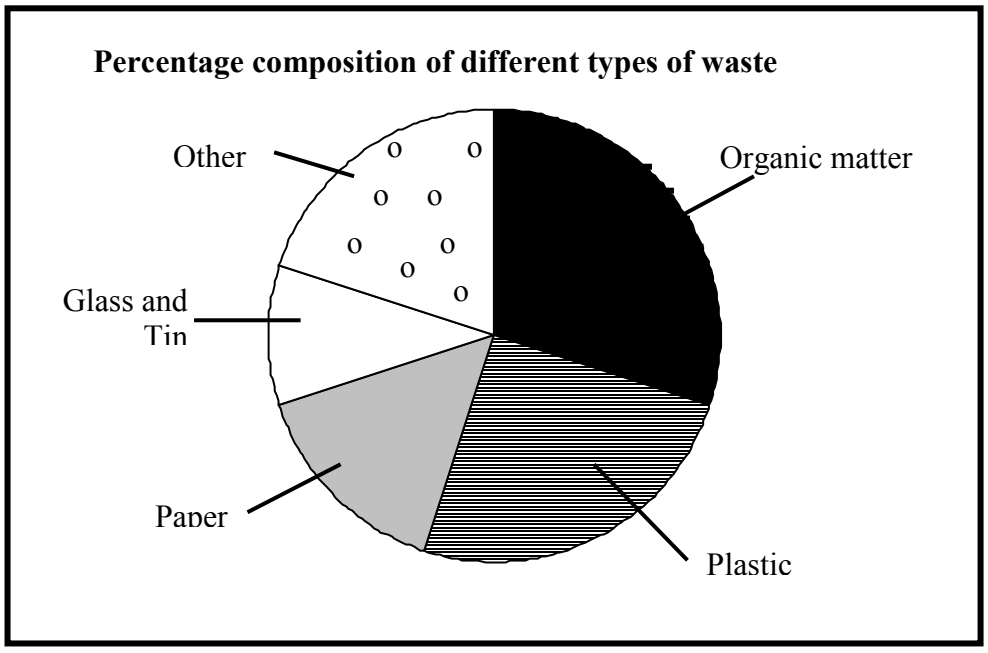
Organic matter: $\frac{30}{100} \times \frac{360}{1} = 108^{\circ}$

Plastic: $\frac{25}{100} \times \frac{360}{1} = 90^{\circ}$

Paper: $\frac{15}{100} \times \frac{360}{1} = 54^{\circ}$

Glass and tin: $\frac{10}{100} \times \frac{360}{1} = 36^{\circ}$

Other: $\frac{20}{100} \times \frac{360}{1} = 72^{\circ}$



Rubric for the mark allocation of the graph

Calculation/working to determine the correct proportions	1 mark for each calculation including the correct answer (5)	
Correct type of graph	1	
Title of graph	1	
Correct proportions for each labelled sector/slice	1 mark for each sector/slice (5)	(12)

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.

2.2.1 Nitrogen✓ (1)

2.2.2 - Run-off of nitrates and phosphates✓ from excess use of fertilizers has greatly increased the nitrate and phosphate in rivers✓ and lakes
- Leads to eutrophication✓
- overgrowth of microscopic algae✓/algal bloom
- Many algae and other organisms die✓as the oxygen is used up
- 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 (6)

2.2.3 Organic farming✓ (1)

2.3.1 respiratory illnesses✓
asthma✓
bronchitis✓
pneumonia✓ any (3)

2.3.2 The exposure to the soot and harmful gasses ✓released from the fire during the combustion process✓ (2)

2.3.3 keep small children away from open fires✓
make sure the hut/shack/living area is well ventilated✓
use alternative sources (paraffin) ✓ any (2)

2.3.4 use renewable resources✓ such as wind energy✓, nuclear energy✓, solar energy✓, hydro-electrical energy✓ any (3)
[30]

QUESTION 3

3.1

3.1.1 (a) Tortoise B✓ (1)

(b) Tortoise A✓ (1)

3.1.2 Short - necked tortoise A can feed on grasses✓ at ground level
Grasses are found on island Y✓ (2)

3.1.3 Allopatric speciation occurs when new species evolve✓
because populations are physically separated from the original population ✓
In the case of the tortoises (A and B) they were physically separated from the original mainland population✓ and from each other on separate islands. ✓
The two island populations adapted to their particular environments ✓and changed genetically and physically (phenotype) ✓ over a long period of time became reproductive isolated✓. Any (5)

3.2

3.2.1 A and C

3.2.2 foramen is closer to the middle✓ / under the skull (1)

3.2.3 Taung child✓
Mrs Ples✓
Little Foot✓ Mark first TWO only (2)

3.2.4 ✓(table)

Characteristic	Homo Sapiens (human)	Chimpanzee
Form of pelvis	Short and broad✓	Long and narrow✓
Eyebrow ridges	Less pronounced✓	Heavily pronounced✓
Jaws	Less protruding jaws✓/not prognathus	Protruding jaws✓/prognathus
Cranium size	Proportionally large cranium✓	Proportionally smaller cranium✓

1 mark for table (9)

3.3.1 the lower the number of lichens✓
the higher the frequency of moths✓ (2)

3.3.2 The high levels of air pollution closer to the city ✓decrease the growth of lichens and blackened✓ the tree trunks. This resulted in a high frequency of the black variant✓ of peppered moths because they could not easily be spotted by birds. Any (2)

3.3.3
(a) 80 ✓ (1)
(b) 20✓ (1)

3.3.4 It will follow the same pattern of distribution as shown by the lichen line graph✓. (1)

[30]

TOTAL SECTION B: 60

QUESTION 4

4.1.1 **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)

4.1.2 **Management practices to reduce over-exploitation**

- Sustainable harvesting✓ – over-exploitation must not be allowed✓
- 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✓
- Controlling exploitation✓- of indigenous plants by international companies✓
- Provision of free/cheaper food ✓ - to reduce dependence on indigenous plants✓ any 3 x 2 (6)

4.2

4.2.1 Birds flew into the unaffected areas from the affected areas✓. (1)

4.2.2 Remaining patches may not have had the habitat/food resources needed for some of the bird species✓/competition
These species may have become extinct✓ in that area/left the area.(2)

4.2.3 Bird species that would have been made extinct✓ in that area are preserved✓
The larger the area, the more useful the preservation✓. (3)

4.3.1 Mining✓ (1)

4.3.2 South Africa has a lot of mines that form waste✓ (1)

4.3.4 Industrial;
6 ✓
100 X 42✓ million = 2,52✓ million ✓ (4)

4.3.5 Recycle (glass) ✓
Re-use✓
Make own compost for garden✓ (3)

4.4 Arguments for industrial processes

- Provide jobs / and income for people
- Positive contribution to the economy
- Helps to prevent poverty in communities
- Can become a tourist attraction
- Any other valid reason (any 3) (3)

Arguments against industrial processes

- Health risks
- Exploitation of natural resources
- Can cause harm/pollution to the environment /Water pollution – leach of chemicals into water resources
- Can destroy ecosystems
- Cause eutrophication
- Any other valid reason (any 3) (3)

Negative impact on health

- Accumulation of heavy metals in food chain – cause diseases
- Mercury and radioactive toxins is poisonous to humans and can cause death
- can cause different infections and skin allergies
- Any other valid reason (any 3) (3)

Strategies to prevent water pollution

- Disposal of heavy metal and other polluters in proper ways, install solid waste cans which cannot leak/laws and regulations
- Enforce penalties on industries that release waste into rivers and streams
- Educational programmes on water pollution (any 3) (3)
  Content (12)

ASSESSING THE PRESENTATION OF THE ESSAY

Marks	Descriptions
2	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