



# education

---

Department:  
Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**LIFE SCIENCES P2  
FINAL MARKING GUIDELINE  
25 NOVEMBER 2008**

Signatures:

**This memorandum consists of 13 pages.**

**PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2008**

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 is 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 is accepted at *this* memo discussion.
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**  
Candidates will lose marks. Memorandum will allocate marks for units separately
16. Be sensitive to the **sense of an answer, which may be stated in a different way.**
17. **Caption**  
All illustrations (diagrams, graphs, tables, etc.) must have a caption
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 without consulting the Provincial Internal Moderator who in turn will consult with the External Moderator/s
20. Only memoranda bearing the signatures of the UMALUSI moderators and distributed by the National Department of Education via the Provinces must be used.

**SECTION A****QUESTION 1****1.1**

1.1.1 A✓✓

1.1.2 C/D✓✓

1.1.3 C✓✓

1.1.4 A/B✓✓

1.1.5 A✓✓

1.1.6 C✓✓

1.1.7 B✓✓

7 x 2 = **(14)****1.2**

1.2.1 Continental drift✓

1.2.2 Abiotic✓

1.2.3 Radiometric✓/Carbon/Absolute/Radiocarbon

1.2.4 Palaeontology✓

1.2.5 Biological control✓

1.2.6 Food web✓

1.2.7 Fossil fuels✓

**(7)****1.3**

1.3.1 E✓

1.3.2 H✓

1.3.3 F✓

1.3.4 D✓

1.3.5 G✓

1.3.6 B✓

**(6)****1.4**1.4.1 The number of river organisms✓/green algae/water-weeds/trout depends/  
does not depend on the condition/pollution level of the river✓**OR**River organisms/green algae/water-weeds/trout increase/decrease in  
number✓as water becomes cleaner/dirty✓**(2)**1.4.2 The number of green algae increases✓ as pollution of the water  
increases✓**OR**The number of green algae decreases✓as pollution of the water  
decreases✓**(2)**

1.4.3 More carbon dioxide✓/nutrients/eutrophication present in dirty water promotes photosynthesis which provides more energy✓ for reproduction of algae

**OR**

No✓/fewer fish/consumers in dirty water to feed on the green algae✓  
(any 1 x 2) (2)

1.4.4 A✓ and B✓ (2)

1.4.5 Clean and very clean water has fewer pathogens✓/pollutants that can kill the trout✓/cause diseases

**OR**

Clean and very clean water have fewer algae and water-weeds✓ therefore more oxygen✓ for the trout

**OR**

Particles✓/pollutants in dirty water clogs gills✓ (any 1 x 2) (2)  
**(10)**

**1.5**

1.5.1 (a) 19✓/20/21 (1)  
(b) 60✓ (1)

1.5.2 The number of species of the lichen✓ (1)

1.5.3 The number of species increases✓ and then becomes constant as you move away from the city centre✓

**OR**

The number of species is constant and then decreases✓ as you move towards the city centre✓ (2)

1.5.4 - As you move away from the city centre✓ pollution decreases✓

**OR**

- As you move toward the city centre✓ pollution increases✓ (any 1 x 2) (2)  
**(7)**

**1.6**

1.6.1 (Accept any answer from) 55 - 60✓ million years ago✓/mya (2)

1.6.2 Permian✓ extinction (1)

1.6.3  $400✓ - 200✓ = 200✓$  families of species

**OR**

$400✓ - (210 \text{ to } 230)✓ = (190 \text{ to } 170)✓$  families of species (3)  
**(6)**

**TOTAL SECTION A: (50)**

**SECTION B****QUESTION 2****2.1**

## 2.1.1 (a) Darwin

- As a result of genetic variation✓in the giraffe population
- some giraffes have longer necks✓ than others
- Environmental change✓/competition for resources occurred
- causing those with shorter necks to die✓
- and those with longer necks to survive✓
- This is natural selection✓/survival of the fittest
- The genes✓/genotype for longer necks
- were passed on to subsequent generations✓most of which now have long necks

any (4)

## 2.1.1 (b) Lamarck

- All giraffes had short necks✓ originally
- Giraffes frequently stretched✓/used their necks to reach for leaves of tall trees✓
- necks become longer✓
- The long necks acquired✓ in this way could be passed on to the next generation✓ /were inherited

any (4)

2.1.2 **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 want to evolve✓✓/**  
Lamarck's theory is deterministic✓✓

(2)

**(10)****2.2**

2.2.1  $1,6 \text{ m} / 0,4 \text{ m} \checkmark$  **OR**  $0,4 \text{ m} \times 4 = 1,6 \text{ m} \checkmark$   
 $= 4 \checkmark \checkmark$  : 4 times✓✓

**OR**

$35 \text{ mm} / 25 \text{ mm} \checkmark = 1,4 \text{ times} \checkmark \checkmark$  (due to translation error)

(3)

- 2.2.2 - Over time the number of toes appeared to decrease in number✓/  
 digits are now fused  
 - but increased in size✓/elongated

(2)

- 2.2.3 - The taller body✓/legs of the modern horse enables it to look over grasses and have a wider view✓  
 - The single/fused toe✓ of the modern horse enables it to run faster✓ over open ground

**(Mark FIRST answer only in learner's script)** (any 1 x 2) (2)  
**(7)**

**2.3**

2.3.1 Natural selection✓ (1)

2.3.2 (In A)

There is variation✓ in the appearance of the mice  
 There were equal numbers✓ of white and black mice

(In B)

The predator/bird catches the black mice✓  
 The white mice are camouflaged✓/black mice are more visible  
 Reducing the number✓ of black mice

(In C)

The population of the white mice remains the same✓ but the number of black mice has been **further** reduced✓/  
 more white mice survived

**The above statements do not have to be categorized into A, B and C**  
 any (5)

2.3.3 White ✓ (1)  
**(7)**

**2.4**

2.4.1 A group of organisms of the same species✓ that lives together in a defined area✓ at a given time✓ and interbreeding✓ can take place any (3)

2.4.2 A group of organisms that have similar characteristics✓ and can interbreed✓ to produce fertile✓ offspring (3)  
**(6)**  
**[30]**

**QUESTION 3****3.1**

- 3.1.1 - 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/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  
 - Parts of the brain that process information from the hands and eyes are enlarged✓  
 - Two mammary glands only✓

**(Mark first FOUR answers only in learner's script)**

any (4)

**3.1.2**

<b><i>Homo sapiens</i></b>	<b><i>Other primates</i></b>
1. Larger cranium✓/brain	1. Smaller cranium ✓/brain
2. Flat face✓/ Forehead slope less backwards	2. Face sloping✓/ Foreheads slope much backwards
3. Foramen magnum forward✓/bottom of the skull	3. Foramen magnum at the back of the skull✓
4. Brow ridges are not as pronounced✓	4. Brow ridges pronounced✓
5. Smaller canines✓	5. Larger canines✓
6. Smaller spaces between the teeth	6. Larger spaces between the teeth
7. Jaws with teeth on a gentle/round curve✓	7. Jaws with teeth in a rectangular/U shape✓
8. Less protruding jaws✓	8. More protruding jaws✓/ prognathous
9. Lower jaw has a well developed chin✓	9. Lower jaw has poorly developed chin✓

**(Mark first FOUR answers only in learner's script)**

(any 4 x 2 = 8 + 1 for table)

(9)

**(13)**

- 3.2 - Gill slits✓/arches are found in all the vertebrate embryos  
 - A tail✓ is found in all the vertebrate embryos  
 - Notochord✓  
 - Fish-like/tubular heart✓

**(2)**

**(Mark first TWO answers only in learner's script)**



**3.3**

- 3.3.1 - Random assortment✓/segregation/recombination of chromosomes during meiosis in the formation of gametes } **OR** meiosis✓  
 - Crossing over✓  
 - Chance/random fertilisation of gametes✓/sexual reproduction  
 - Mutation✓  
 - Outbreeding✓/Gene flow  
**(Mark first FOUR answers only in learner's script)** (4)

- 3.3.2 - Within each of the two groups there is variation✓  
 - Each group undergoes natural selection✓  
 - as a result of varying environmental conditions✓  
 - and develops differently✓  
 - genotypically✓ and phenotypically✓  
 - since the geographical barrier prevents gene flow✓/reproduction between the two populations  
 - The differences that develop between the two populations prevent them from inter-breeding✓ even if they were to mix  
 - such that one or both of the groups becomes a new species✓  
 any (6)  
**(10)**

**3.4**

- 3.4.1 Homologous✓ (1)

- 3.4.2 - Because the structures may have different functions✓  
 - but are similar in structure✓ suggesting a similar/common origin/ancestor (2)

- 3.4.3 (a) - There is a wing✓/web of skin/membrane  
 - Forelimb and digits are thin✓ /light/long  
**(Mark FIRST answer only in learner's script)** any (1)

- (b) - The bones are short✓/thick and therefore strong  
 - and the digits (fingers) ends in long claws ✓  
**(Mark FIRST answer only in learner's script)** any (1)

**(5)**  
**[30]**

**TOTAL SECTION B: 60**

**SECTION C****QUESTION 4****4.1**

4.1.1 February✓ (1)

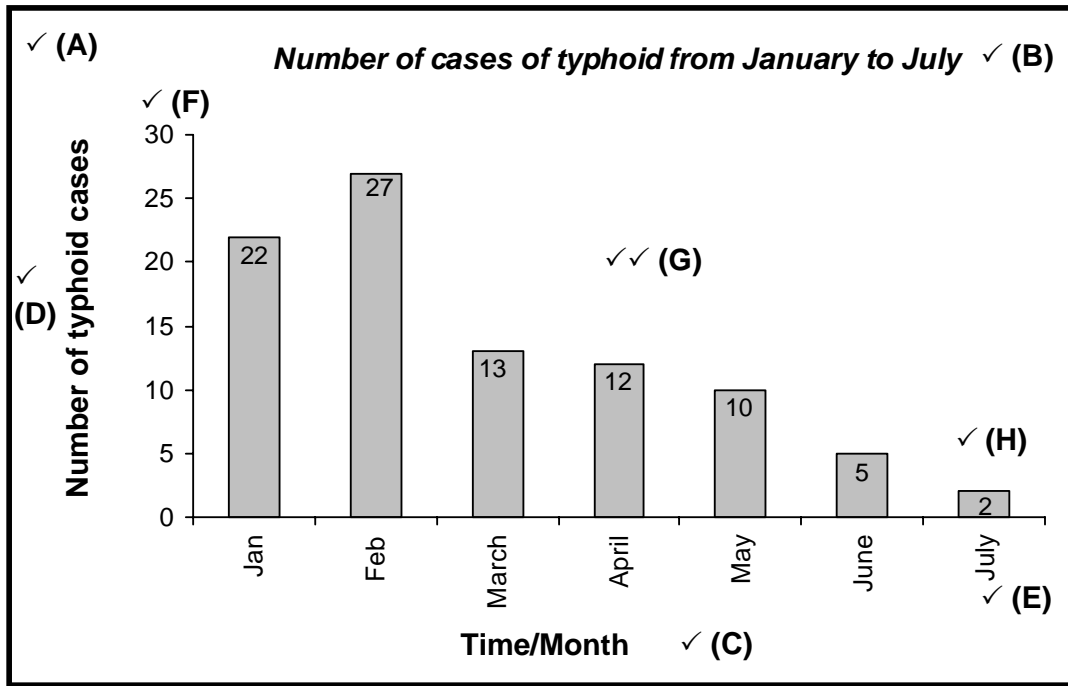
- 4.1.2 - Waste disposal✓ systems are inadequate✓  
- Many communities do not have piped water✓/sewer/sanitation systems and drinking water is contaminated✓/bacteria by human faeces  
- Lack of education✓ on typhoid and how it is spread✓  
**(Mark FIRST answer only in learner's script)** any (1 x 2) (2)

4.1.3 The higher the rainfall✓ the higher the number of cases of typhoid✓

**OR**

The lower the rainfall✓ the lower the number of cases of typhoid✓ (2)

4.1.4



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

A	Correct type of graph	1		
B	Title of graph (with two variables)	1		
C	Correct label for X-axis	1		
D	Correct label for Y-axis	1		
E	Appropriate scale for X-axis	1		
F	Appropriate scale for Y-axis	1		
G	Plotting of the bars	No bars correctly plotted	1 – 3 bars correctly plotted	4 – 7 bars correctly plotted
		0	1	2
H	Graph drawn from Jan to July for typhoid only	1		

**(9)**

**NOTE:**

If the wrong type of graph is drawn:

- Marks will be lost for 'correct type of graph' (A)
- Marks will be lost for 'plotting of the bars' except for histogram(G)

- 4.1.5 - Education/awareness about water pollution✓  
 - Clean-up campaign✓  
 - Monitoring of water quality✓  
 - Sanitary systems need to be upgraded and maintained✓  
 - Install taps✓/introduce piped-water  
 - Developing and implementation of government policy✓/  
 legislation  
 - Penalties for polluting water✓  
 - Prevent the release of chemicals and other waste into the  
 environment✓  
 - Must treat waste water properly to remove all harmful chemicals  
 before water is released into the environment✓  
 - The use of biodegradable chemicals and materials must be  
 enforced/encouraged✓  
 - Report activities that pollute water resources to the relevant  
 government department✓  
**(Mark first THREE answers only in learner's script)** any (3)  
**(17)**
- 4.2**
- 4.2.1 - Use of fishing nets✓to increase catch  
 - Improved boats✓ for deep-water fishing which increases the  
 fishing area  
 - Fish finding equipment✓(sonar/GPS)  
 - Storage facilities✓ – refrigeration – boat can go far out to sea  
 for many days  
 - Scuba equipment✓ to stay under water for longer periods to  
 poach perlemoen  
 - Chemicals✓ for easy catching of fish  
 - Improved rigs for exploiting oil✓/minerals/diamonds  
**(Mark first THREE answers only in learner's script)** any (3)
- 4.2.2 - Limit the size of fish caught✓  
 - Limit the number/quotas of fish caught✓  
 - Limit the fishing area✓  
 - License 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 THREE answers only in learner's script)** any (3)

- 4.2.3 - Species can become extinct✓✓  
 - Loss of biodiversity✓✓  
 - Fish/perlemoen/marine stocks start to decline✓✓  
 - People will lose their jobs✓✓  
 - Shortage of food✓✓/leading to starvation  
 - Reduce opportunities for ecotourism✓✓  
 - Upset the balance of ecosystems✓✓
- any 1x2 (2)  
**(8)**

#### 4.3 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)

##### 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 4 x 2 (8)  
**(12)**

##### Synthesis

The two aspects:

1. Impact of overexploitation on the environment
2. Management strategies to reduce over exploitation

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

(3)  
**(15)**

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