



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

LIFE SCIENCES PRACTICAL TASK 2

21 AUGUST 2023

MARKS: 40

TIME: 1 ½ hour

This question paper consists of 6 pages.

INSTRUCTIONS

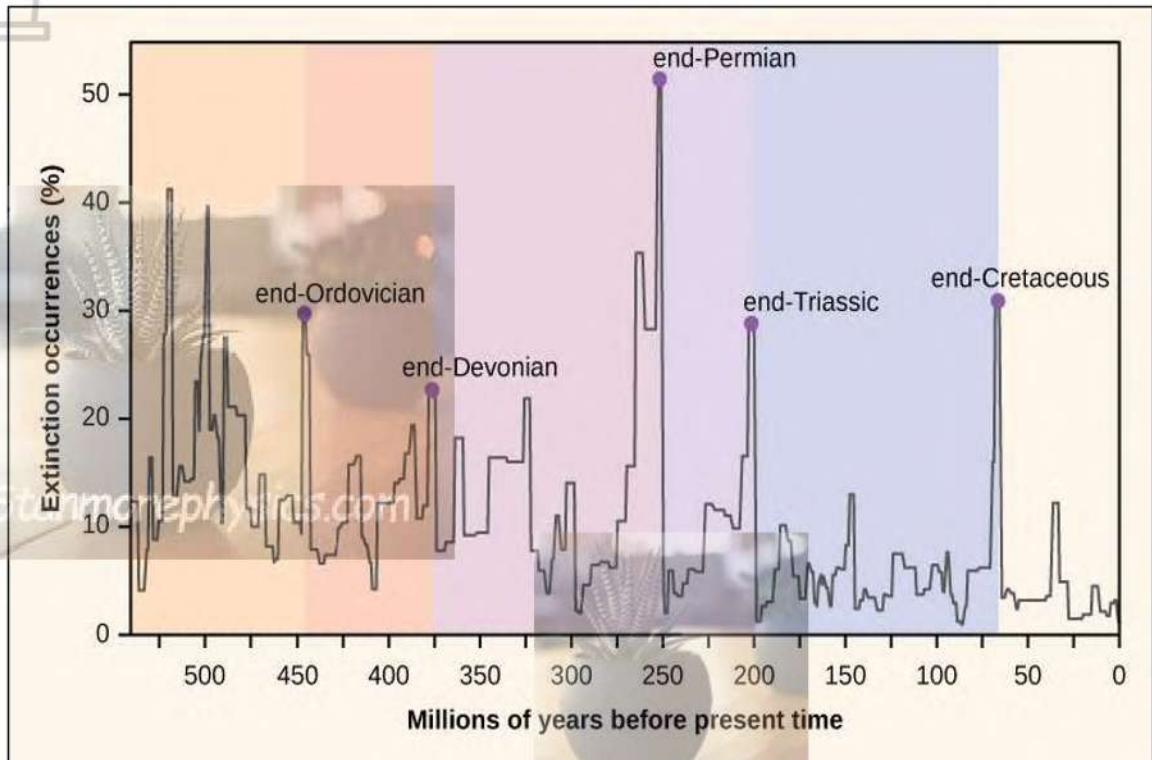
Read the following instructions carefully before answering the questions.

1. Answer ALL the questions on the FOLIO PAPER provided.
2. Start EACH question on a NEW page.
3. NUMBER the answers correctly according to the numbering system used in this question paper.
4. ALL drawings should be done in pencil and labelled in blue or black ink.
5. Draw diagrams and flow charts ONLY when requested to do so.
6. The diagrams in this question paper may NOT necessarily be drawn to scale.
7. Non-programmable calculators, protractors and compasses may be used.
8. Write neatly and legibly in blue or black ink.



QUESTION 1: HISTORY OF LIFE ON EARTH

1.1 The graph below shows the various mass extinctions that have occurred since life on Earth began and the number of species that went extinct during each period mentioned in the graph. Study it and answer the questions that follow.



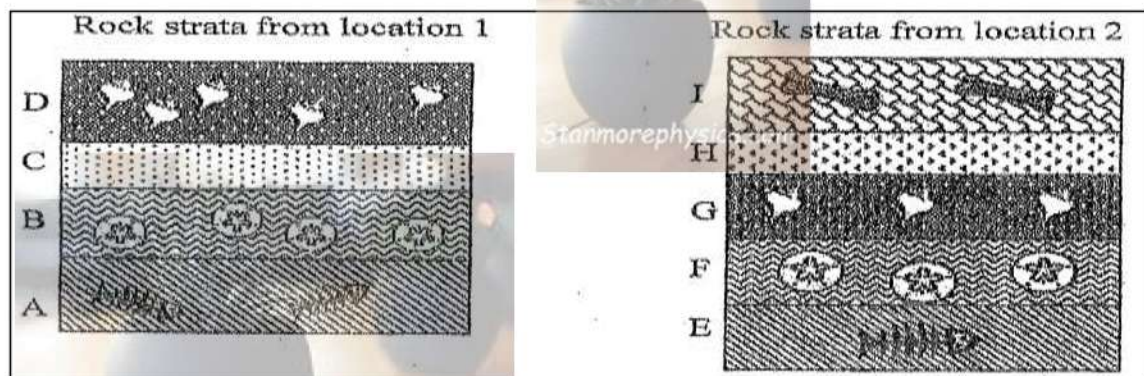
- 1.1.1 During which period did the first mass extinction occur? (1)
 - 1.1.2 Name the period during which the least extinction occurred (1)
 - 1.1.3 How long ago did the mass extinction mentioned in QUESTION 1.1.2 end? (1)
 - 1.1.4 Many scientists believe that we are in the middle of the sixth mass extinction.
 - (a) Name the cause of the sixth mass extinction (1)
 - (b) Explain your answer in QUESTION 1.1.4(a) above using an example (3)
- (7)

- 1.2** The table below represent ONE of the TWO popular methods used by scientist to date rocks and fossils. Study the table below that shows the decay of carbon ¹⁴ into nitrogen ¹⁴ over the period time and answer the questions that follow.

Decay of carbon 14								
Years from present	0	5720	11440	17160	X	28600	34320	40040
Number of half-lives elapsed	0	1	2	3	4	5	6	7
% of original carbon remaining	100	50	25	12,5	Y	3,125	1,5625	0,78

- 1.2.1 Name the type of dating that is illustrated in this table. (1)
- 1.2.2 What is the half-life of carbon ¹⁴? (1)
- 1.2.3 Identify the following in the table dependent variable (1)
- 1.2.4 Calculate the value of: (1)
- (a) X (1)
- (b) Y (1)
- 1.2.5 What percentage of nitrogen ¹⁴ would you expecting a rock that is 11440 years old? (1)
- 1.2.6 Explain why the carbon ¹⁴ dating method will not be suitable to date fossil over 80 million years ago (2)
- (8)

- 1.3** The diagrams below represent sedimentary rock strata from two different paleontological sites. Study it and answer the questions that follow.



- 1.3.1 Name the method of fossil dating represented by the above diagrams, (1)
- 1.3.2 Refer to Rock strata from location 1. Which fossils (A or B) is older (1)
- 1.3.3 Name the strata from location 1 that is similar to strata F from location 2. (1)
- 1.3.4 Which layer in location 2 is not found in location 1. Give ONE possible reason for its absence.? (2)
- (5)
- [20]

QUESTION 2: BIOSPHERE TO ECOSYSTEMS

2.1 The passage below is on the effect of the abiotic factors on living organisms in an Ecosystem.

Grade 10 learners at Baobab secondary school in Limpopo province heard that the Spekboom plant is very good at storing carbon dioxide from the atmosphere which helps prevent the extreme increase in the Earth's temperature called global warming. This carbon dioxide is used by plants for photosynthesis.

They decided to investigate how quickly different plants absorb CO_2 . They got three different types of plants from their local nursery: a Spekboom, an Aloe and a Prickly Pear. They make sure that the plants are of the same height. They plant them in equal sized pots with the same type and amount of soil. All three plants are placed in the same location and get equal amounts of water.

They take the weight/mass of their plants in the pots at the start of the investigation. They then leave the plants to grow for one month and measure their weight/mass again.

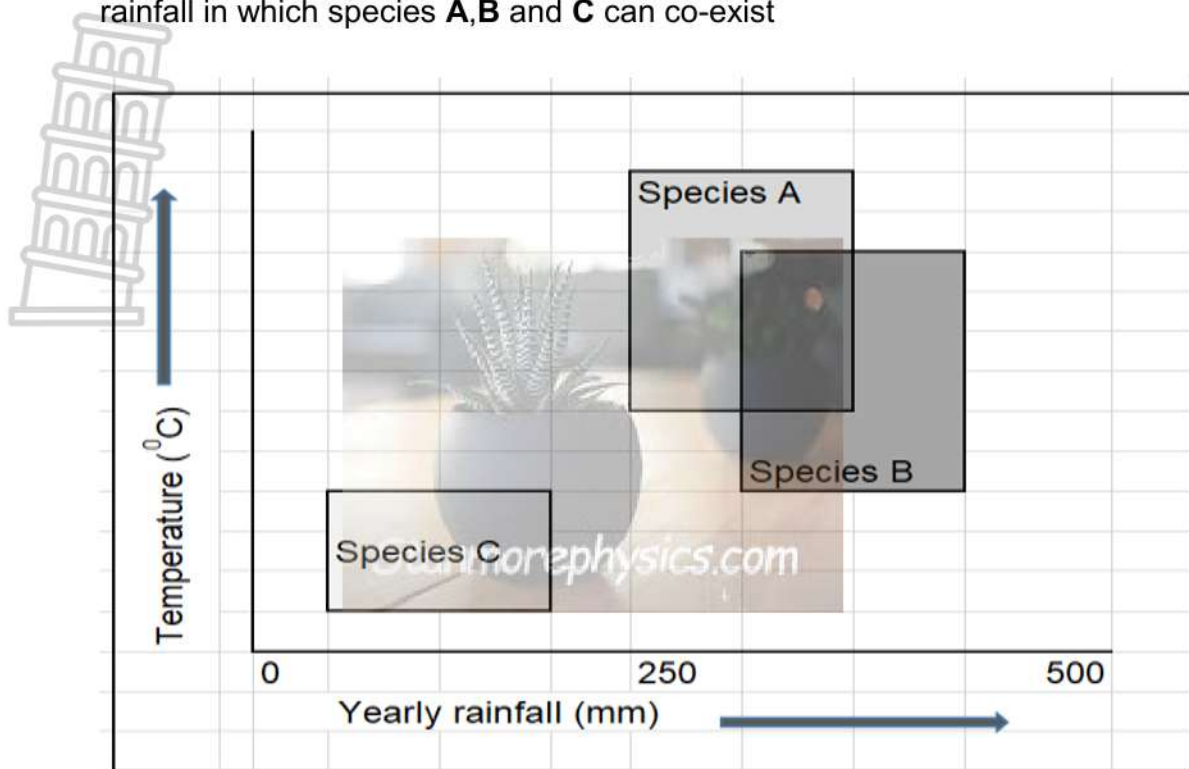
The results are shown in the table below.

Plant	Weight /Mass(g)		Increase
	Start	End	
Aloe	700	730	30
Prickly Pear	700	750	50
Spekboom	700	790	90

- 2.1.1 What is the importance of these plants in the Greenhouse effect? (2)
- 2.1.2 Identify TWO controlled variables in this investigation. (2)
- 2.1.3 Plot a bar graph of weight/mass increase of the three plants. (6)
- 2.1.4 How could they improve the reliability of their investigation? (1)
- 2.1.5 Calculate the percentage increase in mass from the start to the end of the investigation on the Spekboom plant? (2)
- 2.1.6 Explain how using the weight gain of the plants will give Grade 10 learners an idea of how much CO_2 the plants are absorbing. (2)

(15)

2.2 In the following diagram the areas enclosed show the range of temperature and rainfall in which species **A**, **B** and **C** can co-exist



- 2.2.1 Which species can survive over the greatest temperature range? (1)
- 2.2.2 Explain why species **A** and **B** are more likely to compete with each other, than with species **C**. (2)
- 2.2.3 Predict what would happen to species **B** as the yearly rainfall drops to 250mm. Explain your answer. (2)

(5)
 [20]

GRAND TOTAL : 40



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL
SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES PRACTICAL TASK 2
MARKING GUIDELINES

Stanmorephysics.com

MARKS: 40

These MARKING GUIDELINES consist of 09 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES 2023

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 a part of it is required.** Read all and credit the relevant part.
4. **If comparisons are asked for but descriptions are given.** Accept if the 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 the 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 the answer, provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names are given in terminology.** Accept, provided it was accepted at the national memo discussion meeting.
14. **If only the letter is asked for but only the name is given (and vice versa).** Do not 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 appear(s) 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.

QUESTION 1: HISTORY OF LIFE ON EARTH

- 1.1 1.1.1 Ordovician✓ (1)
- 1.1.2 Devonian✓ (1)
- 1.1.3 375 ✓ mya✓ (1)
- 1.1.4 (a) Human Impact/ humans✓ (1)
- (b) - Over population of human species. ✓ Demand for more resources from earth✓ leads to habitat destruction and loss of biodiversity✓ (3)
- Pollution. ✓ Toxic kill species✓ /suffocation, leads to habitat destruction ✓ and loss of biodiversity.✓
- Global warming. ✓ Change in weather patterns(drought/flooding), ✓ leads to death of organisms✓
- Deforestation. ✓ Greater demand for land and resources✓ leads to habitat destruction ✓ and declining of biodiversity.✓
- Unsuitable hunting practices. ✓ Animals killed/poached for meat/body parts ✓ leads to numbers decreasing. ✓ (7)
- 1.2 1.2.1 Radiometric dating✓ (1)
- 1.2.2 5 730 years✓ /the time it takes for 50% of C¹⁴ to decay (1)
- 1.2.3 Percentage of original carbon remaining✓ /number of half-lives elapsed. (1)
- 1.2.4 (a) X = 22 880✓ (1)
- (b) Y = 6,25✓ (1)
- 1.2.5 100% - 25% = 75%✓ (1)
- 1.2.6 By the time the fossil reaches an age of 80 million years, ✓ all the C¹⁴ isotopes would have decayed a long time ago✓ (2)
- 1.3 1.3.1 Relative dating✓ (8)
- 1.3.2 A. ✓ (1)
- 1.3.3 B. ✓ (1)
- 1.3.4 Layer I. ✓ They were probably removed by soil erosion. ✓ (2)
- (5)
- [20]

QUESTION 2: BIOSPHERE TO ECOSYSTEMS

2.1	2.1.1	They absorb the Greenhouse gas CO ₂ ✓ reducing global warming.✓	(2)
	2.1.2	They chose plants of the same height ✓ They put the plants in equal sized pots ✓ All plants had the same type of soil ✓ All plants had the same amount of soil ✓ All plants were in the same location ✓ All plants received the same amount of water ✓ Mark first TWO only (Any 2)	(2)

2.1.3	Weight/Mass increase of three plant species after one month <table><thead><tr><th>Type of plant</th><th>Weight/Mass increase (g)</th></tr></thead><tbody><tr><td>Aloe</td><td>30</td></tr><tr><td>Prickly Pear</td><td>50</td></tr><tr><td>Spekboom</td><td>90</td></tr></tbody></table> Mark Allocation: <table><tr><td>Type of Graph (T)</td><td>1 Mark</td></tr><tr><td>Caption (C) Both variables included</td><td>1 Mark</td></tr><tr><td>X and Y axis labels and Y axis unit (L)</td><td>1 Mark</td></tr><tr><td>X and Y axis scales and bars same width (S)</td><td>1 Mark</td></tr><tr><td rowspan="3">Plotting of points (P)</td><td>No bars plotted correctly</td><td>0 Marks</td></tr><tr><td>1–2 bars plotted correctly</td><td>1 Mark</td></tr><tr><td>All bars plotted correctly</td><td>2 Marks</td></tr></table>	Type of plant	Weight/Mass increase (g)	Aloe	30	Prickly Pear	50	Spekboom	90	Type of Graph (T)	1 Mark	Caption (C) Both variables included	1 Mark	X and Y axis labels and Y axis unit (L)	1 Mark	X and Y axis scales and bars same width (S)	1 Mark	Plotting of points (P)	No bars plotted correctly	0 Marks	1–2 bars plotted correctly	1 Mark	All bars plotted correctly	2 Marks	(6)
Type of plant	Weight/Mass increase (g)																								
Aloe	30																								
Prickly Pear	50																								
Spekboom	90																								
Type of Graph (T)	1 Mark																								
Caption (C) Both variables included	1 Mark																								
X and Y axis labels and Y axis unit (L)	1 Mark																								
X and Y axis scales and bars same width (S)	1 Mark																								
Plotting of points (P)	No bars plotted correctly	0 Marks																							
	1–2 bars plotted correctly	1 Mark																							
	All bars plotted correctly	2 Marks																							
2.1.4	Increase the sample size ✓ / repeat the experiment	(1)																							
2.1.5	$90 / 700 \times 100 \checkmark = 12,857\% \checkmark / 12,86\% / 12,9\% / 13 \%$	(2)																							
2.1.6	When plants absorb CO ₂ out of the atmosphere they use it to create organic compounds ✓ / carbohydrates which they use to grow ✓ The more they grow the more they gain weight ✓ (Any 2)	(2)																							
		(15)																							
2.2	2.2.1 A✓	(1)																							
	2.2.2 They are able to survive in a similar temperature✓ and rainfall ✓ range	(2)																							
	2.2.3 It would die✓ since there will be a shortage of water✓ for its survival.	(2)																							
		(5)																							
		[20]																							
	GRAND TOTAL :	40																							