



# basic education

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Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**SENIOR CERTIFICATE/  
NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**LIFE SCIENCES P2**

**NOVEMBER 2020(2)**

**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 12 pages.**

**PRINCIPLES RELATED TO MARKING LIFE SCIENCES**

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. Marking guidelines 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 learner's 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. **Changes to the marking guidelines**  
No changes must be made to the marking guidelines. The provincial internal moderator must be consulted, who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).
20. **Official marking guidelines**  
Only marking guidelines 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.

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

1.1	1.1.1	B✓✓		
	1.1.2	C✓✓		
	1.1.3	B✓✓		
	1.1.4	D✓✓		
	1.1.5	C✓✓		
	1.1.6	A✓✓		
	1.1.7	D✓✓		
	1.1.8	D✓✓		
	1.1.9	C✓✓		
	1.1.10	C✓✓	(10 x 2)	<b>(20)</b>
1.2	1.2.1	Homologous✓ structures		
	1.2.2	Canines✓		
	1.2.3	Cranium✓		
	1.2.4	Autosomes✓		
	1.2.5	Chromatin✓		
	1.2.6	Karyotype✓		
	1.2.7	Prognathous✓	(7 x 1)	<b>(7)</b>
1.3	1.3.1	A only✓✓		
	1.3.2	B only✓✓		
	1.3.3	A only✓✓	(3 x 2)	<b>(6)</b>
1.4	1.4.1	(a) Meiosis✓/Meiosis I		(1)
		(b) Prophase I✓		(1)
	1.4.2	Ovary✓		(1)
	1.4.3	C✓ - centromere✓		(2)
	1.4.4	3✓/Three		(1)
				<b>(6)</b>
1.5	1.5.1	(a) Black✓fur		(1)
		(b) Smooth✓texture		(1)
	1.5.2	(a) bbRR✓		(1)
		(b) White (fur) with rough (texture)✓✓		(2)
		(c) BbRr✓		(1)
	1.5.3	Rough✓ texture		(1)
				<b>(7)</b>
1.6	1.6.1	Genetic✓ evidence		(1)
	1.6.2	1 - A✓            C		
		2 - C✓ <b>OR</b> A		
		3 - B✓            B		(3)
				<b>(4)</b>

**TOTAL SECTION A: 50**

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

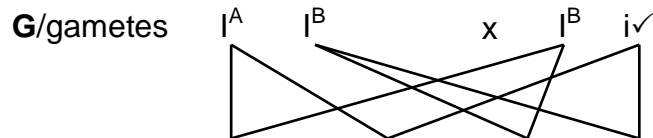
2.1	2.1.1	DNA profiling✓		(1)
	2.1.2	Jennie✓		(1)
	2.1.3	- Jennie's DNA profile✓/ bands - matches the DNA profile/ bands of the sample✓from the crime scene		(2)
	2.1.4	- Proof of paternity✓ - Tracing missing persons✓ - Identification of genetic disorders✓ - Establishing family relations✓ - Matching tissues for organ transplants✓ - Identifying dead persons✓/animals	Any	(1)
		<b>(Mark first ONE only)</b>		<b>(5)</b>
2.2	2.2.1	The production of (genetically) identical organisms✓		(1)
	2.2.2	- A muscle cell contains all the genetic material✓ of the bull/ is diploid whereas - a sperm cell has only half of the genetic material✓/ is haploid		(2)
	2.2.3	- To remove the genetic material of the cow✓ - so that only the genetic material from the (best meat producing) bull is present✓		(2)
	2.2.4	- To produce organisms with desired traits✓e.g. health; appearance; nutritious; yield; shelf-life; etc - Conservation of threatened species✓ - To create tissues/organs for transplant✓	Any	(1)
		<b>(Mark first ONE only)</b>		<b>(6)</b>

2.3 2.3.1 3✓/ Three (1)

- 2.3.2 - Complete dominance✓  
 - The allele for blood group B/ I<sup>B</sup> is dominant✓ and  
 - the allele for blood group O/ i is recessive✓ (3)

2.3.3 P<sub>1</sub> Phenotype: Blood group AB x Blood group B✓  
 Genotype: I<sup>A</sup>I<sup>B</sup> x I<sup>B</sup>i✓

Meiosis



Fertilisation

F<sub>1</sub> Genotype: I<sup>A</sup>I<sup>B</sup> I<sup>A</sup>i I<sup>B</sup>I<sup>B</sup> I<sup>B</sup>i✓\*

Phenotype: Blood group:  
 AB; A; B✓\*

P<sub>1</sub> and F<sub>1</sub>✓

Meiosis and fertilisation✓

**Compulsory 2\*+ Any 4**

**OR**

P<sub>1</sub> Phenotype: Blood group AB x Blood group B✓  
 Genotype: I<sup>A</sup>I<sup>B</sup> x I<sup>B</sup>i✓

Meiosis

Fertilisation

Gametes	I <sup>A</sup>	I <sup>B</sup>
I <sup>B</sup>	I <sup>A</sup> I <sup>B</sup>	I <sup>B</sup> I <sup>B</sup>
i	I <sup>A</sup> i	I <sup>B</sup> i

1 mark for correct gametes  
 1 mark for correct genotypes\*

F<sub>1</sub> Phenotype: Blood group:  
 AB; A; B✓\*

P<sub>1</sub> and F<sub>1</sub>✓

Meiosis and fertilisation✓

**Compulsory 2\*+ Any 4 (6)**  
**(10)**

## SC/NSC – Marking Guidelines

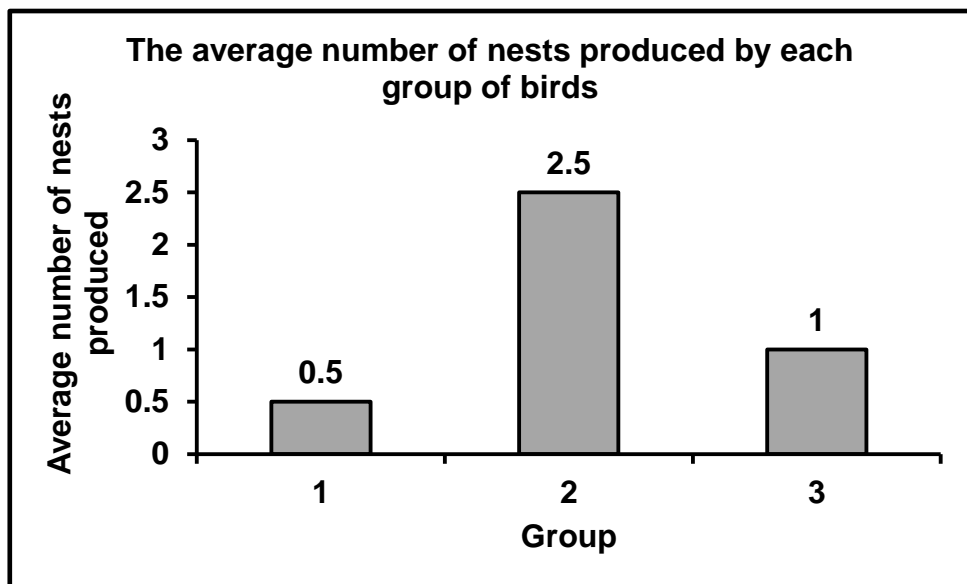
2.4	2.4.1	- A change in the sequence ✓ of - nitrogenous bases ✓/nucleotides in a gene	(2)
	2.4.2	Nigeria ✓	(1)
	2.4.3	$\frac{39\ 746}{305\ 733} \times 100 = 13\%$	(3)
	2.4.4	(a) dd ✓	(1)
		(b) Dd ✓	(1)
			<b>(8)</b>
2.5	2.5.1	Pedigree ✓ diagram	(1)
	2.5.2	(a) 6 ✓	(1)
		(b) 1 ✓	(1)
	2.5.3	$X^G X^g$ ✓ ✓	(2)
	2.5.4	Unaffected ✓ ✓/without Goltz syndrome	(2)
	2.5.5	- Pilusa is affected ✓/ $X^G Y$ - Anju is unaffected ✓/ $X^g X^g$ - Males inherit the Y chromosome from Pilusa ✓ - and inherit $X^g$ from Anju ✓	(4)
			<b>(11)</b>
			<b>[40]</b>

**QUESTION 3**

- 3.1
- Organisms produce a large number of offspring✓
  - There is variation✓ amongst the offspring
  - Some have favourable characteristics and some do not✓
  - When there is a change in the environmental conditions✓/ there is competition
  - organisms with favourable characteristics, survive✓
  - whilst organisms with unfavourable characteristics, die✓
  - The organisms that survive, reproduce✓
  - and pass on the allele for the favourable characteristic to their offspring✓
  - The next generation will therefore have a higher proportion of individuals with the favourable characteristic✓
- Any **(7)**
- 3.2
- 3.2.1 *Hominidae*✓ (1)
- 3.2.2
- Evidence such as tools✓ /weapons/ language/ artefacts
  - is used to show advances✓ in human development
- (2)
- 3.2.3 3 mya✓ (1)
- 3.2.4
- *H. ergaster* shows characteristics of both✓ *A. afarensis* and *H. heidelbergensis*
  - therefore it is a transitional✓ species
- (2)
- 3.2.5
- The fossils of *Australopithecus* were ONLY found in Africa✓
  - The fossils of *Homo habilis* were ONLY found in Africa✓
  - The OLDEST fossils of *Homo erectus* were found in Africa✓
  - The OLDEST fossils of *Homo sapiens* were found in Africa✓
  - This suggests that (the ancestors of) *Homo sapiens* originated in Africa✓\*
- \*1 Compulsory + Any 2 (9)**
- 3.3
- 3.3.1
- (a) (Species-specific) courtship behaviour✓ (1)
- (b) Length of the (male long-tailed widowbird's) tails✓ (1)
- 3.3.2
- A larger sample size✓
  - increases the reliability✓ of the investigation
- (2)
- 3.3.3
- To serve as a control✓
  - so that it can be compared✓ with the other groups
  - and show that the tail length is the only factor that affects the results✓/improves the validity of the investigation
- Any (2)



3.3.4



(6)

**Guideline for assessing the graph**

CRITERIA	ELABORATION	MARK
Correct type of graph <b>(T)</b>	Bar graph drawn	1
Caption of graph <b>(C)</b>	Both variables included	1
Axes labels <b>(L)</b>	X- and Y-axis correctly labelled	1
Scale for X- and Y-axis <b>(S)</b>	- Equal space between bars and width of bars for X-axis and - Correct scale for Y-axis	1
Plotting of bars <b>(P)</b>	1 to 2 bars plotted correctly	1
	All 3 bars plotted correctly	2

3.3.5 The longer the (male long-tailed widowbird's) tail, the higher the mating success✓✓

**OR**

The shorter the (male long-tailed widowbird's) tail, the lower the mating success✓✓

(2)  
**(14)**



**SECTION C****QUESTION 4****Location (P)**

- The DNA is located in the nucleus✓
- and mitochondria✓ and
- chloroplasts✓

Any (2)

**Structure (S)**

- DNA is a double-stranded✓ molecule that
- forms a helix✓
- It is made up of nucleotides✓
- Each nucleotide has a deoxyribose sugar✓ molecule
- a phosphate group✓ and
- a nitrogenous base✓
- The bases are A, T, C and G✓
- which join to form complementary pairs✓ / (A to T and C to G)
- held by hydrogen bonds✓

Any (7)

**DNA replication (D)**

- The DNA (double helix) unwinds✓ and
- unzips✓ / hydrogen bonds break
- to form two separate strands✓
- Both DNA strands serve as templates✓
- to build a complementary DNA✓ / (A to T and C to G)
- using free (DNA) nucleotides✓ from the nucleoplasm
- This results in two identical (DNA) molecules✓
- Each molecule consists of one original strand and one new strand✓

Any (6)

**Significance of DNA replication for mitosis (M)**

- The genetic material/DNA is doubled✓
- so that each cell receives the same amount of DNA✓
- to ensure that all the daughter cells are (genetically) identical✓

Any (2)

Content: (17)  
Synthesis: (3)  
**(20)**

**ASSESSING THE PRESENTATION OF THE ESSAY**

<b>Criterion</b>	<b>Relevance (R)</b>	<b>Logical sequence (L)</b>	<b>Comprehensive (C)</b>
<b>Generally</b>	All information provided is relevant to the question	Ideas are arranged in a logical/cause-effect sequence	All aspects required by the essay have been sufficiently addressed
<b>In this essay in Q4</b>	Only information relevant to: <ul style="list-style-type: none"> <li>- Location and structure of DNA</li> <li>- Process of DNA replication</li> <li>- Significance of DNA replication for mitosis</li> </ul> There is no irrelevant information	The description for each of: <ul style="list-style-type: none"> <li>- Location and structure of DNA</li> <li>- Process of DNA replication</li> <li>- Significance of DNA replication for mitosis</li> </ul> Is logical and sequential	At least the following marks should be obtained for: <ul style="list-style-type: none"> <li>- Location of DNA (<b>P:1/2</b>)</li> <li>- Structure of DNA (<b>S:5/7</b>)</li> <li>- Process of DNA replication (<b>D:4/6</b>)</li> <li>- Significance of DNA replication for mitosis (<b>M:1/2</b>)</li> </ul>
<b>Mark</b>	1	1	1

**TOTAL SECTION C: 20**  
**GRAND TOTAL: 150**