



# 1428 BIOLOGY MARKING CRITERIA

BOTSWANA EXAMINATIONS COUNCIL

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## 1428 BIOLOGY MARKING CRITERIA

### 1 INTRODUCTION

The marking criteria for the Provider Based Assessment (PBA) of the Botswana Senior Secondary Education (BSSE) Biology syllabus provides guidance to Facilitators when assessing the learners as they perform research with experiments or design of a model.

The skills required to perform the tasks can be better assessed by the Education and Training Providers (ETPs) and may not easily be assessed through written examinations. The marking criteria is therefore useful when assessing candidates on the critical skills that they are expected to acquire but may only be evaluated better at ETP level. The marking criteria specifies the skills that are necessary for research that has a laboratory experiment, project and model.

The marking criteria is meant to ensure that there is a common interpretation and understanding of performance criteria across the ETP. Although the marking criteria outlines the expected skills to be assessed under research and models, the ETP has the discretion to promote quality learning by encouraging learners to present all the relevant structures of a research write up.

### 2 PROVIDER BASED ASSESSMENT

#### 2.1 General Expectations

It is mandatory for the ETP to keep a learner portfolio for all the tasks assessed as stipulated in the Biology teaching syllabus. However, the Botswana Examinations Council (BEC) shall sample the Assessment Tasks that shall contribute towards the final grade from the learner portfolio. The awarding body may in addition to conducting external moderation conduct audits for Provider Based Assessment. The audit reports may be useful when standardising and moderating the PBA.

Each task that forms part of evidence requirements for Provider Based Assessment (PBA) shall be marked by the ETP. There will be internal moderation by the ETP and external moderation by the BEC. The ETP shall provide the BEC with a Portfolio of Evidence for each candidate. The BEC shall sample a project scored out of 40 to moderate and use for the final grade.

Candidates may only attempt each assessment task once. Similarly, a candidate may not amend an assessment once it has been submitted for marking by the ETP. The Portfolio of Evidence should include all the evidence requirements that are stipulated in the Biology teaching syllabus.

#### 2.2 Supervision of PBA

Candidates are expected to carry out the assessed tasks under direct supervision of the ETP. Any works completed by candidates outside the laboratory will need to be authenticated by the ETP. Where candidates have taken rough work away and typed up their notes, the original notes should be collected with the work.

If a candidate is absent during an assessment, then the candidate can complete the assessment later provided the ETP is satisfied that the assessment is secure.

#### 2.3 Advice on Marking

Teachers should mark the assessments clearly in red ink using their professional judgement. The work should be annotated with a tick (✓) to indicate where a mark is awarded and a cross (✗) where a mark is not awarded. Comments should be added to justify the award of marks.

Half marks (or other fractions of marks) must not be used.

Teachers should read the work as a whole and award marks where evidence is observed. This may be in different sections, for example independent and dependent variables may be in the theory section or the method section. ETPs may use the marking table to judge the work of the learners.

### 3 MARKING CRITERIA FOR PROVIDER BASED ASSESSMENT

The Marking Criteria is designed for the assessment of laboratory experiments that may require some research and models.

#### 3.1 Research with Laboratory Experiments

Marking Criteria	Marks	Score
<b>1.0 Title, aims and objectives</b>	<b>[2]</b>	
• clear title relevant to the field of study	1	
• aims and/or objectives relevant to the title	1	
<b>2.0 Theoretical Background including a hypothesis</b>	<b>[5]</b>	
<b>2.1 Theoretical Biology</b>	<b>3</b>	
• relevant theory / principles / laws covered	1	
• explanation of the theory / principle / law	1	
• shows how the research aim/objectives fit(s) into the theory	1	
<b>2.2 Hypothesis</b>	<b>1</b>	
• a hypothesis that is predictive and relevant is stated	1	
<b>2.3 Research Questions</b>	<b>1</b>	
• the research question(s) is/are precise and measurable	1	
<b>3.0 Methodology</b>	<b>[12]</b>	
<b>3.1 Variables (Independent / Dependent / Control)</b>	<b>2</b>	
• independent and dependent variables stated/implied	1	
• control variable(s) identified	1	
<b>3.2 Instruments or materials</b>	<b>3</b>	
• basic list of materials/instruments provided (materials/instruments can be used to perform the experiment)	1	
• the instruments/materials are appropriate to perform the task	1	
• detailed list and justification for selection of the material/instrument	1	
<b>3.3 Procedure</b>	<b>5</b>	
• method logical and relevant to the experiment	1	
• fully labelled diagram	1	
• method to vary the independent variable	1	
• method to measure the dependent variable	1	
• statement on how control variables are handled (at least one variable)	1	
<b>3.4 Precautions</b>	<b>2</b>	
• awareness of danger / inconvenience	1	
• measures taken to avoid danger / inconvenience	1	

<b>4.0 Data presentation and Analysis</b>	<b>[12]</b>	
<b>4.1 Results</b>	<b>5</b>	
• appropriate method of presentation e.g., table	1	
• column headings: quantity and unit	1	
• evidence of how a series of results is obtained from the variables	1	
• consistency of results	1	
• range of independent variable	1	
<b>4.2 Drawing a graph</b>	<b>5</b>	
• axes: labelled axes with sensible scales	1	
• scale: graph occupies more than half the graph paper in each direction	1	
• plotting of points: all points plotted correctly to within half a small square	1	
• line: line of best-fit drawn	1	
• quality of results: deviation of points from the line (all points within a small square from the line)	1	
<b>4.3 Interpretation of results</b>	<b>2</b>	
• gradient and/or y-intercept determined	1	
• interpretation of the graph and/or results	1	
<b>5.0 Discussion</b>	<b>[5]</b>	
• how results compare with theory	1	
• one limitation of the experiment explained	1	
• more than one limitation explained	1	
• one improvement of the experiment	1	
• more than one improvement to the experiment	1	
<b>6.0 Conclusion</b>	<b>[2]</b>	
• attempt at relevant conclusion	1	
• detailed correct conclusion linked to theory	1	
<b>7.0 References</b>	<b>[2]</b>	
• two or more references listed with the author, year, title, and page references	1	
• evidence of where the use of the references is in the report	1	
<b>Total</b>	<b>[40]</b>	

### 3.2 Projects and Models

Marking Criteria	Marks	Score
<b>1.0 Title, aims and objectives</b>	<b>[2]</b>	
• clear title relevant to the field of study	1	
• aims and/or objectives relevant to the title	1	
<b>2.0 Theoretical Background including a hypothesis</b>	<b>[6]</b>	
<b>2.1 Theoretical Biology</b>	<b>3</b>	

• relevant theory / principles / laws covered	1	
• explanation of the theory / principle / law	1	
• shows how the research aim/objectives fits into the theory	1	
<b>2.2 Hypothesis</b>	<b>1</b>	
• a hypothesis that is predictive and relevant is stated	1	
<b>2.3 Research Questions</b>	<b>2</b>	
• the research question(s) are precise	1	
• research questions are measurable	1	
<b>3.0 Methodology</b>	<b>[13]</b>	
<b>3.1 Variables (Independent / Dependent / Control)</b>	<b>2</b>	
• independent and dependent variables stated/implicit	1	
• control variable(s) identified	1	
<b>3.2 Instruments or materials</b>	<b>4</b>	
• basic list of materials/instruments provided (materials/instruments can be used to design the model)	1	
• the instruments/materials are appropriate to design the model	1	
• detailed list of the materials required	1	
• justification for selection of the materials	1	
<b>3.3 Procedure</b>	<b>5</b>	
• method logical and relevant to the model	1	
• fully labelled diagram	1	
• method to vary the independent variable	1	
• method to measure the dependent variable	1	
• statement on how control variables are handled (at least one variable)	1	
<b>3.4 Precautions</b>	<b>2</b>	
• awareness of danger / inconvenience	1	
• measures taken to avoid danger / inconvenience	1	
<b>4.0 Data presentation and Analysis</b>	<b>[12]</b>	
<b>4.1 Results</b>	<b>5</b>	
• appropriate method of presentation e.g., table	1	
• column headings: quantity and unit	1	
• evidence of how a series of results is obtained from the variables	1	
• consistency of results	1	
• range of independent variable	1	
<b>4.2 Design Model</b>	<b>3</b>	
• materials listed have been used	1	
• product works without safety concerns	1	
• description/details of how the product works	1	
<b>4.3 Interpretation of results</b>	<b>2</b>	

• analysis of how model works stated	1	
• interpretation or explanation of the results	1	
<b>5.0 Discussion</b>	<b>[5]</b>	
• how results compare with theory / findings consistent with theory	1	
• one limitation of the experiment explained	1	
• more than one limitation explained	1	
• one improvement of the experiment	1	
• more than one improvement to the experiment	1	
<b>6.0 Conclusion</b>	<b>[2]</b>	
• attempt at relevant conclusion	1	
• detailed correct conclusion linked to theory	1	
<b>7.0 References</b>	<b>[2]</b>	
• two or more references listed with the author, year, title and page references	1	
• evidence of where the use of the references is in the report	1	
<b>Total</b>	<b>[40]</b>	

## 4 MODERATION OF PROVIDER BASED ASSESSMENT

Moderation is conducted to ensure that assessment of outcomes as done by the ETP is fair, valid, reliable and consistent. Moderation shall be conducted at two levels: internal by the ETP and external by the awarding body.

### 4.1 Internal Moderation

The ETP must conduct internal moderation for all research/projects that are stated as evidence requirements by the Biology teaching syllabus.

Internal moderation shall include standardisation of the marking criteria by the Biology teachers in the ETP to ensure that teachers' judgements are consistent before being subjected to external moderation. Internal moderation ensures that the scores from ETPs are reflective of the standard applied by the ETP. The ETP shall provide evidence of internal moderation that shall include the marked projects and standardised score. It might be necessary to request for a remark of a teaching group or class before external moderation is conducted.

### 4.2 External Moderation

The awarding body shall sample either **one** project or **one** research work from the list of the research/projects that the learners are expected to perform by the teaching syllabus to be used for external moderation and contribution in the final grade of the candidates. The project/research shall be communicated to the ETP during the external moderation and may not be replaced by another research/project.

The purpose of external moderation is to ensure that all ETPs have adhered to the standard of the marking criteria. External moderation shall be performed only when it is evident that there was

standardisation and internal moderation done by the ETP. Where the scores of the learners provide evidence of unreliable marking, the ETP shall be asked to remark the work of the learners.

## **5 PROVIDER BASED ASSESSMENT FORMS**

The work of the learners submitted for grading must be authentic and its assessment must be reliable, fair and valid. The awarding body reserves the right to disqualify any work of the candidates that is proven to be unreliable and has evidence of malpractice. There are forms that should be completed for all the learners during the conduct of Provider Based Assessments. The forms shall be required to be available during audits and moderation.

- A Authenticity Form:** The form shall consist of the learner biography and a declaration that shall be signed by both the learner and the teacher at the end of the course. The form should be on the cover page of the learner's portfolio.
- B External Moderation Form:** The form is to be completed by Moderators appointed by the awarding body for each ETP. The external moderation is done to check adherence of the ETP to the marking criteria.

**Other Critical Information:** In addition to the authenticity form, the ETP must keep a record of the tasks done by each Learner as well as the scores for the task. There should also be a record for the Internal Moderation of the tasks. The Internal Moderation marks are the ones that shall be used for External Moderation.

The sample of the form is attached as appendix.



## 6 Appendix A



### EXTERNAL MODERATION FORM

<b>CENTRE NAME</b>		<b>CENTRE NUMBER</b>	
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<b>LEARNING OUTCOME</b>	
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<b>PERFORMANCE CRITERIA</b>	
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CANDIDATE NUMBER	CANDIDATE NAME	CENTRE MARK	MODERATION MARK



## Appendix B

# AUTHENTICITY FORM

### A LEARNER DETAILS

LEARNER NAME		CLASS	
CENTRE NAME		CENTRE NUMBER	
SYLLABUS NAME		SYLLABUS CODE	

### B DECLARATION BY THE LEARNER

I,....., do declare that **all** the works contained in the portfolio are original and were not copied from any book, any past work, any learner or any other source.

Signed.....

Date.....

### C DECLARATION BY THE TEACHER

I,....., do declare that **all** the works contained in the portfolio are authentic and are a true reflection of the performance of the learner.

Signed.....

Date.....

### D DECLARATION BY THE HEAD OF CENTRE

I,....., do declare that **all** the works contained in the portfolio are authentic and are a true reflection of the performance of the learner.

Signed.....

Date.....