



*Let the mind manage the body
Que l'esprit gère le corps*

**MAURITIUS
EXAMINATIONS
SYNDICATE**

NATIONAL CERTIFICATE OF EDUCATION

SCIENCE

EXPLANATORY NOTES

Abstract

This document outlines the philosophy adopted in the development of the assessment material for Science.

Specimen paper
for first assessment in October 2020

Acknowledgments:

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Background

At the end of the Nine-Year-Continuous-Basic-Education (NYCBE) cycle, all students from the Regular and Extended programmes take the National Certificate of Education (NCE) Assessment. This assessment is in line with the philosophy defined in the National Curriculum Framework (NCF) Grades 7, 8 and 9 (MIE, 2016)¹ and the learning outcomes detailed in the Syllabus Grades 7, 8 & 9 (MIE, 2017)².

The assessment will be carried out in the following subjects:

- English
- Mathematics
- French
- Science
- Information and Communication Technology
- Technology Studies
- Business and Entrepreneurship Education (BEE)
- Social and Modern Studies (SMS)
- Art and Design
- An optional core subject (Asian Languages, Arabic and Kreol Morisien, if chosen by the candidate)

A 7-point Grading structure will be used in each subject, as illustrated below:

Numerical Grade	Marks
1	85 and above
2	75 and above but below 85
3	65 and above but below 75
4	55 and above but below 65
5	45 and above but below 55
6	35 and above but below 45
7	Less than 35

¹ Mauritius Institute of Education, 2016, *National Curriculum Framework Nine-Year Continuous Basic Education Grades 7, 8 & 9*, Republic of Mauritius

² Mauritius Institute of Education, 2017, *National Curriculum Framework Nine-Year Continuous Basic Education Syllabus Grades 7, 8 & 9*, Republic of Mauritius

Purpose of the NCE Assessment

The main purpose of the NCE Assessment is to measure and certify learning that has taken place at the end of the NYCBE cycle. The information gathered from the assessment will be used for:

- **Certification**

Meeting the minimum requirements on the NCE assessment (see the Award Rules in the Annual Programme) will lead to the candidate being conferred an NCE certificate which will be recognised at Level 2 on the National Qualifications Framework.

- **Promotion to Grade 10**

Assessment results from the NCE will guide schools in determining whether students get promoted to Grade 10.

- **Orientation**

The NCE assessment will provide information to guide students as to whether they want to continue in the general or in the technical/vocational stream. Within the general stream, it may guide students in their choice of subjects as from Grade 10.

- **Admission to academies**

Performance in the NCE Assessment will determine whether candidates are admitted to academies. The following extract from the Education Act indicates the criteria for admission to academies:

Priority of admission to Grade 10 in an Academy shall be determined on the basis of the grade aggregate and the relative performance of the eligible pupil in the best 8 core subjects, including English, French and Mathematics, at the NCE assessment and the choice of the responsible party specified in paragraph (1).

Guiding principles in Assessment

A number of key principles of assessment guided the development of the NCE assessment.

- **Validity**

Validity is a central concept in assessment. In simple terms, it refers to the extent to which an assessment measures what it is supposed to be measuring. Validity also refers to the extent to which the assessment is providing evidence of candidates' achievement levels. An assessment is considered valid if it meets its purposes (Edwards *et al.*, 2018)³

- **Reliability**

Reliability, another crucial concept in assessment, refers to producing reliable, stable and consistent results over time. Ensuring reliability requires clear and consistent processes for the setting, marking and grading of the NCE assessment.

- **Impact**

The NCE Assessment aims at having positive effects on teaching and learning with positive washback into the curriculum and into the educational system. An important consideration during the development of this assessment was the potential impact that it would have on the life chances of candidates, allowing for maximum inclusion and retention of students in the system while maintaining standards.

- **Fairness**

Needs and characteristics of learners were considered in the design of the NCE assessment so as not to disadvantage any group or individual. Care has been taken to minimise cultural and gender biases and to accommodate the different abilities and the social, cultural and linguistic backgrounds of candidates.

³ Edwards, M.C., Slagle, A., Rubright, J.D. and Wirth, R.J., 2018. Fit for purpose and modern validity theory in clinical outcomes assessment. *Quality of Life Research*, 27(7), pp.1711-1720

Key Considerations in Designing the Science Paper

Different parameters guided the design of the assessment in Science.

- **Equal weighting to the three Sciences**

Given that the three Sciences have the same teaching-time allocation, the weighting given to each in the assessment is the same. This approach also aims at giving equal importance to the three Sciences and sufficient guidance to candidates to make informed decisions on their choice of subjects at Grade 10.

- **Weighting of the Assessment Objectives**

The definition and weighting of the different assessment objectives (AO) have been devised in line with the aims and the expected and specific learning outcomes as defined in the NCF and the TLS for Science. Consideration has also been given to that fact that students following the main and extended programmes will take the same paper and thus it should cater for all ability groups. The AOs will be applied in the three Sciences to encourage the development of the relevant knowledge and skills across the Science subject.

- **Grade 9 Learning Outcomes**

Candidates will be assessed on the content at Grade 9 level principally. While prior knowledge of certain key concepts is important, the assessment will focus on the content knowledge of the learning outcomes at Grade 9 level. However, skills developed at earlier levels could also be assessed.

- **Population of Candidates**

The paper has been designed bearing in mind the profile of candidates who will be taking the NCE assessment. While aiming at maintaining the standards required for a Grade 9 paper, the paper also gives sufficient opportunities to students from all ability groups to perform. At the higher-end the paper also contains some items which would stretch the ability range and allow candidates to show their mastery of Science at Grade 9 level.

- **Official Guidelines**

As per the Ministry's guidelines, to ensure that all candidates are given a fair chance of showing they have acquired the necessary knowledge skills and competencies, each of the Biology, Chemistry and Physics paper contains about 50% of marks allocated to items which are considered to be at basic level, 20% to items considered at intermediate level and 30% of items at proficient level.

Science will be assessed in 3 separate papers, Biology, Chemistry and Physics. The order in which candidates will sit for the 3 papers may change from year to year.

Assessment Objectives

The assessment objectives for the Science paper have been defined as follows:

AO1: Knowledge with Understanding

Learners should be able to demonstrate knowledge with understanding in the following:

1. scientific facts, concepts, processes, laws, definitions and phenomena;
2. scientific vocabulary and terms linked to the topics being assessed;
3. scientific instruments and experimental techniques;
4. safety measures and precautions;
5. scientific and technological applications in society and in the environment.

AO2: Application

Learners should be able to:

1. apply their knowledge in everyday life situations;
2. use and interpret numerical and other forms of data;
3. identify, select, organise and classify relevant information;
4. observe and report on given contexts, situations and diagrams;
5. use information to identify patterns, report trends and draw inferences;
6. present reasoned explanations based on knowledge acquired for scientific phenomena, patterns and relationships.

AO3: Scientific Inquiry and Problem-Solving Skills

Learners should be able to demonstrate their understanding of the scientific method and their ability to apply inquiry skills in:

1. following scientific procedures;
2. planning and designing a simple scientific experiment;
3. making simple hypotheses and predictions;
4. drawing conclusions and providing explanations in respect of evidence shown or gathered;
5. evaluating solutions to a given problem;
6. reporting and communicating findings in a scientific manner;
7. supporting ideas with appropriate justifications and evidence;
8. demonstrating knowledge of safety precautions that need to be observed.

The following table shows the approximate weighting given to the different assessment objectives in the Specimen Science paper:

Weighting of the Assessment Objectives in Science

Assessment Objectives	Weighting (%)		
	Biology	Chemistry	Physics
Knowledge with Understanding	50	50	45
Application	25	25	35
Scientific Inquiry & Problem-Solving skills	25	25	20

Paper Description

Each of the Biology, Chemistry and Physics papers will be of a duration of 45 minutes and will carry 50 marks. Each paper will comprise the following:

- Question 1 – 10 Multiple choice items assessing mainly knowledge with understanding at basic level. Each item will carry 1 mark.

- Questions 2 and 3 – These questions will comprise the following types of questions:
 - o Fill-in-the-blanks, matching, very short answered items or short answered items, simple calculation, labelling, simple drawing and other simple objective-types questions. Questions 2 and 3 will carry about 15 marks.

- Questions 4, 5 and 6 – In each question paper, there will be 2 or 3 structured questions which will carry a total of about 25 marks. These will be structured questions with a number of different items. The items will be mainly short-answered, open-ended, calculation, drawing graphs or interpreting graphs and data, drawings etc. The items will be assessing mainly application, scientific inquiry and problem-solving skills. Items will be graded in terms of difficulty level within each question with items pitched at the intermediate and proficient levels mainly.

