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Council for Quality Assurance in
General and Further Education and Training

Predictability of the National Senior Certificate Examinations
Mathematical Literacy Report
DBE & IEB

March 2026

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ACKNOWLEDGEMENTS

This research project was conceptualised, conducted, and managed by Dr Mbalenhle Ngema. The report was comprehensively reviewed by Dr Agness Matsie Mohale and Dr Emmanuel Sibanda, whose invaluable contributions are acknowledged.

The successful completion of this research would not have been possible without the valuable contributions of the subject expert, whose expertise, dedication, and insights greatly enhanced this project. The details of the subject expert who conducted the evaluation are provided in the table below.

Name & Surname	**Subject**
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ACRONYMS/ABBREVIATIONS

CAPS	Curriculum and Assessment Policy Statement
DBE	Department of Basic Education
FET	Further Education and Training
GFETQSF	General and Further Education and Training Qualifications Sub-framework
IEB	Independent Examinations Board
MCQ	Multiple Choice Question
NQF	National Qualifications Framework
NSC	National Senior Certificate
SACAI	South African Comprehensive Assessment Institute
SAGs	Subject Assessment Guidelines

Section 1: Overview of the Subject

The Curriculum and Assessment Policy Statement (CAPS) defines Mathematical Literacy as a subject aimed at equipping learners with the competencies required to engage meaningfully with the demands of the twenty-first-century world. Contemporary society is increasingly characterised by numerical information, data representations, and arguments based on quantitative reasoning. In this context, Mathematical Literacy seeks to develop learners' ability to interpret, analyse, and apply mathematical information in everyday situations. The subject therefore emphasises practical reasoning, decision-making, problem-solving, resource management, and the interpretation of numerical and statistical information. Achieving these outcomes requires learners to engage with both mathematical content and authentic real-life contexts, recognising that mathematical understanding supports the interpretation of real-world situations, while contextual problems determine the mathematical knowledge required.

Within the CAPS framework, Mathematical Literacy serves an important developmental purpose by preparing learners to become self-managing individuals, productive workers, and active citizens in a democratic society. Teaching and learning therefore focus on analysing real-world problems and developing strategies to address these problems mathematically. Through engagement with practical contexts, learners develop the ability to interpret quantitative information encountered in everyday life, including information presented in media, financial documents, and public discourse. This process develops critical thinking and supports learners in becoming informed and responsible participants in society.

CAPS identifies five key elements that underpin the teaching and learning of Mathematical Literacy.

Firstly, Mathematical Literacy involves the application of elementary mathematical content. The subject focuses on foundational concepts and skills that are relevant to interpreting numerical and statistical information encountered in daily life, the workplace, and civic environments. Rather than emphasising abstract mathematical theory, the focus is on practical application. Calculations are generally accessible through the use of a basic four-function calculator, highlighting the subject's emphasis

on relevance and applicability. Mathematical concepts are not taught in isolation but are embedded within contextualised scenarios to demonstrate their practical relevance.

Secondly, Mathematical Literacy is grounded in authentic real-life contexts. Learning activities should reflect realistic situations drawn from personal, workplace, social, political, and global environments. Authentic contexts enable learners to recognise the relevance of mathematics in everyday decision-making. Where possible, learners should engage with real documents and resources, such as real financial statements, municipal accounts, advertisements, and statistical reports. These resources often contain complex and imperfect information, reflecting the nature of real-world data rather than simplified examples. Interpreting such information requires learners to apply mathematical reasoning alongside critical thinking and contextual understanding.

Thirdly, Mathematical Literacy requires learners to solve both familiar and unfamiliar problems. Although some contexts may relate directly to learners' personal experiences, the subject aims to develop transferable skills that enable learners to respond effectively to a variety of situations. The broader aim of the subject is therefore to equip learners with transferable skills that enable them to analyse and respond to problems across a wide range of contexts. Mathematically literate learners should be able to interpret unfamiliar contexts, identify relevant information, select appropriate mathematical techniques, and apply suitable reasoning strategies. This promotes flexibility beyond specific mathematical topics or scenarios.

Fourthly, Mathematical Literacy emphasises decision-making and communication. A mathematically literate individual should be able to evaluate alternatives, compare solutions, and make informed decisions based on quantitative evidence. Equally important is the ability to communicate reasoning effectively using appropriate mathematical and contextual terminology. Teaching practices should therefore encourage learners to justify their solutions, explain their reasoning, and engage in discussions that promote mathematical communication.

Finally, Mathematical Literacy requires the integration of content and skills when solving problems. Although the curriculum is organised into distinct topics for teaching and assessment purposes, real-life problems often require the application of multiple concepts and skills simultaneously. Learners must therefore develop the ability to

identify relevant information, select appropriate mathematical tools, and integrate different techniques to develop meaningful solutions.

In summary, the CAPS Mathematical Literacy curriculum emphasises the application of elementary mathematical knowledge within authentic contexts to support informed decision-making and problem-solving. The subject aims to develop learners who can interpret quantitative information, apply mathematical reasoning in everyday situations, and participate critically and responsibly in society.

This report presents detailed findings from the evaluation of the predictability of the Department of Basic Education (DBE) and Independent Examinations Board (IEB) Mathematical Literacy examination papers administered from 2022 to 2024. The findings are presented according to examinable topics as outlined in CAPS and the IEB Subject Assessment Guidelines (SAGs). The report also provides recommendations for each topic for the DBE and the IEB, respectively.

Section 2: Research Design

The study employed a qualitative research design based on document analysis to examine the predictability of DBE and IEB examination papers from 2022 to 2024. Document analysis was appropriate as the study relied on existing examination materials, enabling subject experts to systematically analyse question papers and marking memoranda. Purposive sampling was used to select 10 high-enrolment subjects from the DBE and IEB, with the South African Comprehensive Assessment Institute (SACAI) excluded due to its alignment with DBE examination guidelines. Mathematical Literacy was included among the high-enrolment subjects.

Data were collected by a subject expert, who analysed relevant examination papers over the three-year period using evaluation tools informed by content and construct validity. The conceptual framework underpinning this study is discussed in detail in the *NSC Predictability Overview Report*. Each examination item was examined, trends across years were compared, and alignment with CAPS and the Abridged CAPS topics was assessed. A structured Microsoft Word-based instrument containing tables and thematic questions guided the analysis, focusing on topic coverage, item types, assessed skills, and weighting to evaluate examination predictability. The thematic questions are discussed in detail in the *NSC Predictability Overview Report*.

Section 3: Findings from the Evaluation of the DBE and IEB Question Papers

This chapter presents the detailed findings from the evaluation of the DBE and IEB National Senior Certificate (NSC) Mathematical Literacy Question Papers 1 and 2. The findings are based on a systematic analysis of examination papers administered from 2022 to 2024 and provide an overview of patterns associated with examination predictability.

The primary aim of the study was to investigate whether the observed upward trend in learner performance in NSC examinations reflects genuine improvements in learner competence or whether it may be influenced, in part, by increasing predictability in examination design. Through the analysis of selected subjects across three consecutive examination cycles, the study sought to generate evidence-based insights to support Umalusi's quality assurance and standardisation processes, while contributing to broader discussions on the validity, fairness, and integrity of high-stakes examination systems.

The findings are presented separately in Sections IIIA and IIIB for the DBE and IEB, respectively, with results discussed for each question paper. The presentation of findings is organised according to themes derived from the evaluation instrument's thematic questions, which are discussed in detail in the research design section of the *NSC Predictability Overview Report*.

For each topic, findings are summarised in tables accompanied by discussions focusing on six themes: topic coverage, content coverage by subtopic, topic weighting, item types by subtopic, subtopic–skill pairing, and scenario–subtopic–skill pairing. Sections a to f provide an analysis of these themes for each table, evaluating whether the components reflected in the tables contributed to the predictability of topics assessed in the Mathematical Literacy Paper 1 and Paper 2 final examinations from 2022 to 2024.

Before presenting the findings, each theme is defined in Sections a to f. These definitions provide the basis for analysing both Paper 1 and Paper 2 across the two assessment bodies.

a. Topic coverage

The topics prescribed for examination of the NSC subjects are outlined in Section 4 of the CAPS or the Abridged CAPS. These guidelines help ensure alignment between the examination and the intended curriculum. The analysis of topic coverage focused on the frequency with which each topic was examined over the three years, specifically identifying any emerging patterns that may have contributed to the predictability of topic selection.

b. Content coverage

This section examined the extent to which specific content areas or subtopics within the selected topic have been assessed over three years. By analysing the frequency and repetition of subtopics in the final examination question papers, the aim was to determine whether any patterns of content selection have emerged that may contribute to the predictability of the question paper.

c. Weighting of the topic

This section explored the distribution of mark allocation or weighting assigned to the selected topic over three years. By analysing whether the marks allocated to this topic have remained consistent, increased, or decreased across examination cycles, the aim was to determine the extent to which predictable emphasis may have emerged.

d. Variation in item types

To evaluate the extent to which question design contributed to the predictability of examination papers, it was essential to examine how specific item types have been used to assess a provided topic over time. This included analysing the variety of item types employed (such as multiple choice questions [MCQs], essays, calculations, and practical scenarios), the distribution of marks allocated to each type, and how difficulty levels and cognitive demands have varied. Additionally, the use of command words, terms that guide the expected cognitive response, can influence question predictability. This section examined these dimensions over three years to identify patterns that may signal repetition or predictability.

e. Topic and skill pairing

To evaluate the predictability of examination question papers, it was crucial to examine how specific cognitive skills have been paired with particular topics over time. Consistent assessment of the same skills, such as interpretation, calculation, analysis, or explanation, when linked to a specific topic across multiple years, may signal a recurring pattern, potentially leading to predictability. Conversely, variation in skill pairing can help ensure a more comprehensive assessment of the intended learning outcomes. This section explored the extent to which skill demands associated with this topic have remained consistent or varied across the past three years and determined whether such patterns suggest predictability in assessment design.

f. Scenario framing of items for a topic

Some examination questions use scenarios, visual stimuli or real-life contexts to test skills within a provided topic. The variety or repetition of such contexts over multiple years can influence the anticipation of question types. Consistent use of similar scenarios may contribute to predictability, whereas diverse and novel contexts encourage more profound understanding and critical thinking. This section explored how the contextual framing of questions for each topic has evolved over the past three years and sought to determine whether predictability patterns existed.

3.1: MATHEMATICAL LITERACY PAPER 1

This section presents an analysis of the final examination question papers for Mathematical Literacy Paper 1 from 2022 to 2024. The findings for each topic are summarised in Tables 3.1.1–3.1.6.

Table 3.1.1 below provides a summary of the analysis conducted to determine the level of predictability for the Finance topic for DBE Mathematical Literacy Paper 1 examinations from 2022 to 2024.

Table 3.1.1: Findings on the Predictability of the Finance Topic for the DBE Mathematical Literacy Paper 1 Examinations from 2022–2024

Topic: Finance							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**
2022	✓	Financial documents and tariff system		Table and calculations	34 Marks	L1, L2, L3, L4	L1, L2, L3, L4

	X	Income and expenditure, profit and loss					
	✓	Cost price and selling price	**82**	Table and calculations	8 Marks	L1, L2	L1, L2
	X	Break-even analyses					
	✓	Interest		Table and calculation	8 Marks	L1, L2	L1, L2
	✓	Inflation		Graph and calculations	6 Marks	L4	L4
	✓	Taxation		Table and calculations	9 Marks	L2, L4	L2, L4
	✓	Exchange rates		Table and calculation	17 Marks	L2, L4	L2, L4
2023	✓	Financial documents and tariff system		Table and calculations	23 Marks	L1, L2, L4	L1, L2, L3

	✓	Income and expenditure, profit and loss	**85**	Table and calculations	18 Marks	L1, L2, L4	L2, L3
	✓	Cost price and selling price		Table and calculations	22 Marks	L1, L2, L3	L2, L3
	✓	Break-even analyses		Graph and calculations	6 Marks	L4	L2, L 3
	X	interest					
	X	Inflation					
	✓	Taxation		Table and calculations	11 Marks	L1, L2, L4	L1, L2
	✓	Exchange rates		Table and calculations	5 Marks	L2	L2, L3
2024	✓	Financial documents and tariff system	89	Table and calculations	22 Marks	L1, L2, L3	L1, L2, L3
	✓	Income and expenditure,		Table and calculations	13 Marks	L1, L2, L3, L4	L1, L2

		profit and loss					
	✓	Cost price and selling price		Table and calculations	13 Marks	L2	L2, L3
	✓	Break-even analyses		Graph and calculations	2 Marks	L1	L2
	✓	interest		Short questions	16 Marks	L1, L2, L3, L4	L1, L2
	✓	Inflation		Table and calculations	8 Marks	L1, L3	L2, L3
	✓	Taxation		Table and calculations	15 Marks	L2, L3	L2, L3
	X	Exchange rates					

Table 3.1.1 presents a comparative overview of the Finance topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.1.1 have contributed to the predictability of the DBE Mathematical Literacy Paper 1 final examination question from 2022 to 2024.

a. Topic coverage

The findings indicate that the Finance topic has been assessed in all three years. It is therefore likely to appear in the following year, as it forms part of the prescribed application topics to be assessed in Paper 1. It constitutes 60% of Paper 1 of the exam and

approximately 90 marks out of 150. The assessment body should adhere to the CAPS prescription for assessing the Finance topic. This topic plays a core role in mathematical literacy, as it covers a large part of being mathematically literate in everyday life.

b. Content coverage

The sections of financial documents, tariffs, patterns, and relations are interrelated and cannot be separated. These subtopics frequently focus on the same skill but in different contexts; thus, they appear more often than other content due to this integration and the wide range of contexts in which they are assessed. Taxation is another topic that appeared throughout the three years, as it is a core section in Finance and should be assessed each year. Consequently, its continued inclusion in future examinations may contribute to predictability.

Subtopics, such as exchange rates, interest rates, and inflation, are related in terms of application; as a result, they were not frequently assessed, as they were filtered within the previous topics. For instance, inflation operates on the principle of interest; therefore, if inflation is assessed, then interest is assessed as its principle is used to answer the question. Break-even analysis, on its own, is not easy to assess; thus, it is omitted in some instances, but its core principles lie in patterns and relations, cost price and selling price, and income and expenditure. Its frequency depends on these subtopics; for instance, if income and expenditure are assessed that year, it will also be assessed, as its core principle is that businesses make a profit or loss.

The business context involves expenses and income, which can be achieved through costs and sales; thus, a break-even analysis can be conducted. Exchange rates are not frequently assessed. It should be assessed alternatively, and not each year. Its principle should be assessed, and its concept integrated into the financial document; therefore, in such cases, it cannot be easily predicted. The assessment bodies should continue to assess in this way, with topics such as break-even analyses, interest rates, exchange rates,

and inflation assessed in isolation and rotated. Although their core principle should be assessed each year, interest can be assessed through hire purchase, or on financial documents focused on car purchase, home loan, investment, etc.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 90 marks across the entire examination, with a ±8 mark variance. This suggests that, from the prescribed 90 marks, the marks can be increased or decreased by up to 8. With such knowledge, the variation in marks for the past years, from 82, 85 and 89 in 2022, 2023, and 2024, respectively, suggests an increase, but when taking into consideration the variance, the mark allocation remains the same, as it was within the range as prescribed. This indicates a prediction that the mark allocation in the following year's exams will range from 82 to 98.

Examiners should ensure that the mark allocation remains within the prescribed range of 82–98 marks by varying the topics assessed. For example, exchange rates, break-even analysis, and inflation should not be assessed each year separately, as this would exceed the 98 mark limit. If this occurs, it will introduce unacceptable predictability, as topic weighting is prescribed in the SAGs and CAPS.

d. Variation in item types

The evaluation indicates that calculations, table and graph analysis, and interpretation have been used in the past three years to assess the concepts. Calculation has remained the same across the years; however, graph drawing varied each year in Finance. In the past three years, break-even analysis was assessed only twice (2023 and 2024), as it can be assessed through graph drawing. Although graph drawing appears only twice or three times in Paper 1 each year, it is also used for graph interpretation. Meanwhile, table completion and table reading are the core parts of this topic, as information is mostly presented in tables. The missing amounts must be calculated; for example, from financial documents such as a bank statement, which is a form of a table, or a finance table of cost and selling price, where an amount is provided but the quantity is omitted; use a provided or a derived formula to find the

missing value in the table. The mark variation depended on the extent of the section it is covered. For instance, the mark allocation for graph drawing and interpretation depends on the task requirements, such as whether learners are required to complete two values and one graph, or three values and two graphs.

Over the past three years, the mark has not increased, as the examiner has consistently drawn a single graph, which is sufficient. In the table, completion does not exceed 3 values. In calculations, when scaffolding is used during questioning, the cognitive level decreases; when it is not, the cognitive level increases. The same applies in table completion: the more values to complete with different steps, the higher the cognitive level; but if the same step is repeated, the cognitive level remains the same. For instance, if the table is completed only for income values, the cognitive level and difficulty will remain the same; but if the values include fixed and variable costs, the cognitive level will increase. The difficulty will increase even further if the formula is involved. The same principle will apply to short questions and calculations. For example, if income tax is a monthly value and medical aid credit with rebates is not required, the cognitive level remains the same, and the level of difficulty decreases; if they are required, the level of difficulty increases, as the cognitive level remains the same.

Within the same question, using words such as 'verify' or 'show' to indicate whether the value is correct will increase the cognitive level. This prediction should be maintained, with scaffolding for tables and graphs continuing. For income tax and tariffs, the scaffolding should be minimal to maintain the acceptable level of difficulty and cognitive load. Eliminating scaffolding in such questions raises the cognitive level to 3 and the difficulty to 4. For example, in 2022, taxation was Level 4 cognitive and Level 4 difficulty, which did not involve scaffolding but required verification; in 2023, it had Level 4 cognitive and Level 2 difficulty with verification; there was scaffolding and leading questions about what to do, e.g. monthly value provided, no medical aid credit required, and the tax bracket is the lowest level.

e. Topic and skill pairing

The findings provide evidence that the calculation skill has been used in the Finance topic, as this skill makes it easier to answer questions about financial documents. Table and graph interpretation is an effective skill used in subtopics such as cost price and selling price, break-even analysis, taxation and interest. These skills are repeated each year, to the extent that there is a pattern of a tax table being provided each year. In terms of predictability, the extent of application of these skills cannot be predictable, since the tax table presented varies each year. The table varies in how it is interpreted and used based on the context and the required response. In 2024, the annual tax payable was calculated without a medical aid credit being required. In 2023, the monthly payable tax was provided to verify that this amount was calculated correctly. The table interpretation and analysis were limited to the first bracket, with only basic percentage calculations.

Meanwhile, in 2022, taxation required the use of a table indicating the tax payable by age group. There was calculation, table analysis and interpretation based on age. Over the three years, the table was presented in three different forms, but it still required calculating the monthly tax payable.

Financial documents are most often presented in table form (bank statements, till slips, and invoices suffice). Interpreting and analysing the table to perform calculations is required. For financial documents, calculation skills are also required, including handling missing values and showing how each value was calculated. This skill is repeated each year, but the manner in which it is used varies. The insurance statement in 2022 will differ from the bank statement in the 2023 examination question paper. Analysis and calculation are required. The interpretation of a negative value on both will differ. With tariff systems, a table consisting of a sliding scale, that is, a table consisting of values provided as a rating scale, changing in each row. In 2022, the comparison scale was to the area; table interpretation and calculation were required.

In 2024, the tariff table was linked to the invoice, and the skill required to interpret and calculate it was needed. The tariff table using a sliding scale was included in 2022, omitted in 2023, and included again in 2024. In 2023, the tariff system was presented in a table with cost and price values. The table required interpretation and calculation skills. In 2024, a matching-type skill was introduced; definitions and their terms are provided and need to be matched. In 2024, interest was assessed through a comparison table based on the hire-purchase concept, requiring learners to apply the underlying principles to calculate and compare the values. In 2022, the comparison skill within a stokvel was used to generate interest. The comparison skill is assessed in alternative ways, which might show a predictable pattern: e.g., in 2024 assessed, 2023 not assessed, in 2022 assessed.

The assessment body should continue to alternate between assessing comparing skills and applying the concept, and vary the way the concept is applied. In this way, the skill prediction will remain acceptable. The concept of application should be changed. For taxation, the table interpretation and calculations should be assessed annually; the extent of interpretation and calculations may vary. In financial documents, the interpretation and completion of tables should be assessed annually, and the documents should be updated to reflect these changes.

f. Scenario framing of items for a topic

The patterns observed indicate that the taxation scenario is used each year, but it is assessed with different skills. The contexts of loans, investments, and insurance are used to assess the concept of interest. The context of banking statements and slips was used to assess financial document interpretation and table reading. The use of a taxable table to calculate tax payable is predictable based on income tax. The issuance of a bank statement, till statement, or any other form of statement to be analysed or interpreted is predictable. In 2024, the water invoice, 2023 bank statement, and 2022 insurance policy statement were used as scenarios. The skills required will differ depending on the context in which they are assessed. Thus, learners cannot predict which financial document

will be presented or which skill will be required. For example, in a bank statement, the calculation skills required will differ from those required when provided a payslip or a budget.

It is recommended that the examination body continue to vary the context by presenting a different financial document each year. The tariffs vary each year, e.g., water table, electricity table, transport table. The concepts in this topic are context-oriented, meaning they cannot be assessed in isolation; e.g., taxation is a topic and a context at the same time. The financial document is a subtopic in its own right.

Summary of findings and recommendations for the DBE Mathematical Literacy Finance topic

Table 3.1.2 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.1.2: Summary of Findings and Recommendations on the Predictability of the 2022–2024 DBE Mathematical Literacy Finance Topic Paper (1)

Identified unacceptable predictability on topic coverage
There was no unacceptable predictability in this topic of Paper 1.
Identified unacceptable predictability on content coverage
There was no unacceptable predictability on content coverage.
Recommendations to avoid predictability in content coverage

In Finance, predictability cannot be avoided, even though it is not easy to see, because the content in each subtopic is vast, and each year the content covered in the part of the subtopic assessed changes. For example, tariffs under financial documents will be assessed annually; which tariffs are assessed depends on the context, e.g., water, electricity, transport, or banking tariffs. This suggests that if water tariffs were provided this year with basic values next year, if they appear, they might use a combination of decimal values with no free amount, or focus on domestic or business water tariffs.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Finance, the only strategy is to alternate the content in each subtopic. Content that uses the same principles should be alternated, e.g., interest rates, inflation, and exchange rates. For example, in one year, interest with inflation; the following year, exchange rates with interest. Financial documents: each year should be a different document, e.g., loan, bank statement, invoice, etc.
Identified unacceptable predictability on topic weighting
There was no unacceptable predictability on topic weighting.
Recommendations to avoid unacceptable predictability on topic weighting
Set questions in line with the CAPS and SAGs weighting per topic.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid assessing non-examinable subtopics.
Identified unacceptable predictability on item types
There was no unacceptable predictability in the identified item types.
Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that unacceptable predictability item types do not appear; e.g., financial documents will require calculations and table completion.

Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
There was no unacceptable predictability on the topic-skill pairing.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable, e.g., hire purchased based on car; next year, based on furniture. Income tax: current year based on including medical credit; next year, omit; include primary and secondary rebates.
Identified unacceptable predictability in the scenario framing of items
There was no unacceptable scenario framing.
Recommendations to avoid unacceptable predictability in scenario framing of items.
Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
The examiner should use an authentic, context-oriented scenario based on the assessed topic.

Table 3.1.3 below provides a summary of the analysis conducted to determine the level of predictability for the Data Handling topic for DBE Mathematical Literacy Paper 1 examinations from 2022 to 2024.

Table 3.1.3: Findings on the Predictability of the Data Handling Topic for the DBE Mathematical Literacy Paper 1 Examinations from 2022–2024

Topic: Data Handling							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**
2022	**X**	Developing questions and collecting data					
	✓	Classifying and organising data		Short questions and calculation. MCQ	12 Marks	L1, L2, L4	L1, L2
	✓	Measuring data	**59**	Table, graph and calculations	12 Marks	L1, L2	L2, L3
	✓	Representing data		Short questions and calculations	35 Marks	L1, L2	L1, L2, L3
2023	**X**	Developing questions					

		and collecting data					
	✓	Classifying and organising data	**56**	Short questions	2 Marks	L1	L1
	✓	Measuring data		Table and calculations	32 Marks	L1, L2, L3, L4	L2, L3, L4
	✓	Representing data		Short questions on graphs and calculations	22 Marks	L1, L2, L4	L2, L3
2024	✓	Developing questions and collecting data	**53**	Short questions and MCQ	5 Marks	L1, L2,	L2
	X	Classifying and organising data					

	✓	Measuring data		Table and calculations	23 Marks	L1, L2, L4	L1, L2
	✓	Representing data		Calculation, MCQ and short questions	25 Marks	L1, L2, L4	L1, L2

Table 3.1.3 presents a comparative overview of the Data Handling topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.1.3 have contributed to the predictability of the DBE Mathematical Literacy Paper 1 from 2022 to 2024.

a. Topic coverage

The findings indicate that the Data Handling topic has been assessed in all three years. It is therefore likely to appear in the following year, as it is part of the prescribed application topics to be assessed in Question Paper 1. It constitutes 35% of Paper 1 and approximately 53 marks out of 150. The assessment body should adhere to the CAPS prescription for assessing the Data Handling topic. This topic is a core part of mathematical literacy, as it covers being mathematically literate in everyday life.

b. Content coverage

The findings indicate that the Data Handling cycle is assessed each year, focusing on measuring and representing data. These subtopics frequently focus on the same skill but in different contexts; thus, they may appear to be more than the others due to this integration and the broader context in which these subtopics are assessed. Classifying data is another topic that appears in two years, as it links to the section on measuring data, and it should be assessed each year. It is likely to appear on the next exam. The subtopics, such as developing questions, collecting data, and classifying and organising data, are not frequently assessed, as in some instances they overlap with the previous topics. For instance, in measuring data, the information is gathered through data

collection, which is explained when the content explains how it was gathered; therefore, they are assessed when the data is presented in table form, but not directly asked as questions, although the principle is used to present the question.

Its frequency depends on these subtopics; for instance, if data measurement is assessed, then classifying and organising data will follow if information is presented in table form. If the information is presented as graphs, then either developing questions and collecting data will appear as a form of content-context to make sense of the graph, or the question about collecting data may be linked to the content-context. Developing questions and collecting data is not frequently assessed. It should be assessed alternately, not each year, since it is not easy to assess in isolation; it is easier to use when creating content-context based on the subtopic to be assessed. The topic will likely be omitted during both the first and second years of assessment. Consequently, the assessment bodies should continue to assess in this way, with topics such as developing questions, collecting data, and classifying and organising data assessed in isolation, and rotated.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 53 marks for Paper 1, with a ±8 mark variance. This suggests that within the prescribed range of 53 marks, the marks can be increased or decreased by up to 8. With such knowledge, the variation in marks for the past years, from 59, 56, and 53 in 2022, 2023, and 2024, respectively, suggests variation in increase and decrease, but when taking into consideration the variance, the mark allocation remains the same, as it was within the range as prescribed. This indicates a degree of predictability: the mark allocation will range from 51 to 59 in the following year's exams. Examiners should ensure that the mark allocation remains within the prescribed range of 51 and 59 by varying the topics to keep the mark allocation consistent, e.g., by not assessing developing questions and collecting data, and by separating classifying and organising data for separate years; they should alternate. That will change the allocation to be above 59.

d. Variation in item types

The evaluation indicates that the calculation, table and graph analysis and interpretation, and short questions have been used in the past three years to assess the concepts. Calculation, graph and table interpretation, and short questions have remained the same across the years. MCQ options varied each year; in the past three years, they appeared only twice (2022 and 2024). Over the past three years, the mark has not increased, despite the examiner consistently drawing graphs and tables. In calculations, when scaffolding is used during questioning, the cognitive level decreased; when it is not, the cognitive level increased. The same applies to table and graph interpretation: if multiple graphs are presented, the cognitive level may decrease or remain the same while the level of difficulty increases. For instance, if the graph has three bars across five categories, the cognitive level and difficulty will increase. With measurement data, if the question involves a reverse solution, the cognitive level and difficulty will increase, and the difficulty will increase further if the manipulation of the formula is involved.

The same principle will apply to short questions and calculations. For example, if the question asks to identify the median and the data is arranged, the cognitive level remains the same according to CAPS; if the data is not arranged, the cognitive level remains the same, and the level of difficulty increases. Within the same question, using words such as 'verify' or 'show' to indicate whether the value is correct will increase the cognitive level. This prediction should be maintained, with scaffolding continuing for tables and graphs, as well as for short questions and calculations, to maintain the acceptable level of difficulty and cognitive load. Eliminating the scaffolding in such questions places the questions in a higher cognitive level, such as Level 3 of cognitive and Level 4 of difficulty. For example, in 2023, there was a question where the mean was provided, and the missing value was not provided; this formed a part of a reverse calculation, which will be Level 3 cognitive and Level 3 difficulty, which did not involve scaffolding or provided more values that are required to assist in solving the problem. In 2022, a reverse question was provided with more options to choose from, and the cognitive level remained at Level 3, which is Level 2 in difficulty.

e. Topic and skill pairing

The findings provide evidence that the calculation skill has been used in data handling, as this skill makes it easier to answer questions related to measuring data. Table and graph interpretation is an effective skill used in subtopics such as classifying and organising data and representing data. Short questions are also used when a graph or table is provided to answer questions by identifying the relationship, giving examples, or describing a trend. The tables or graphs vary in how they are interpreted and used based on the context and the required response. In 2024, a compound graph, a table with two rows comparing only two years, and a Box-and-Whisker graph were presented. In all of these, there were interpretations, the identification of missing values, and the identification of trends. In 2023, a pie chart, a box-and-whisker plot, a birth chart, and a compound bar graph were provided, with interpretation, analysis, and calculations required.

Meanwhile, in 2022, compound and multiple bar graphs, three pie charts for comparison, and a line graph were provided. There were calculations, graph analysis and interpretation, and calculations. Over the three years, the graphs were presented in more than three different forms, but they still required calculation and interpretation skills.

Data are mostly presented in tabular form. Calculation skills are also required, including when a measure needs to be calculated, when a value is shown to have been calculated, or when a reverse calculation is provided. This skill is repeated each year, but its use varies. In 2024, the table comparing two years needed to calculate one of the measures will differ from the table showing four columns in the 2023 examination question paper. Analysis and calculation are required for a different measure. In 2024, a matching-type skill is introduced, with definitions and their terms provided and needing to be matched. Over the three years, the short-answer skill was also used to answer questions that require reading values from tables, providing examples, identifying and arranging values, or writing values in full.

The assessment body should continue to alternate between assessing comparing skills and applying concepts, and vary the way concepts are applied. In this way, skill predictability will remain acceptable, while the application of concepts should be varied.

f. Scenario framing of items for a topic

The patterns observed indicate that the context used to measure data each year changes and assesses different skills, similar to measures. The context used in graphs and tables varies each year but is related to the concept and the table reading. The use of a taxable table to calculate tax payable is predictable based on income tax. The issuance of a bank statement, till statement, or any other form of statement to be analysed or interpreted is predictable. In 2024, the water invoice; in 2023, the bank statement; in 2022, the insurance policy statement.

It is recommended that the examination body continue to vary the context by presenting different graphs and tables each year. The bar graphs vary by year, e.g., double-compound, triple-bar, stacked. This topic and its concepts are context-oriented, suggesting that they cannot be assessed in isolation; e.g., the Birth Chart for BMI and percentile is a subsection that simultaneously collects data and provides context. Graphs and tables presented are context-oriented and, at the same time, content to be assessed, e.g., interpreting a table showing people per workplace by province in 2022.

Summary of findings and recommendations for the DBE Mathematical Literacy Data Handling topic

Table 3.1.4 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.1.4: Summary of Findings and Recommendations on the Predictability of the 2022–2024 DBE Mathematical Literacy Data Handling Topic Paper (1)

Identified unacceptable predictability on topic coverage
There was no unacceptable predictability in this topic of Paper 1.
Identified unacceptable predictability on content coverage
There is no unacceptable predictability on content coverage.
Recommendations to avoid predictability in content coverage
In Data Handling, predictability cannot be avoided, since the content in each subtopic is vast and the content covered in the part of the subtopic assessed changes each year.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Data Handling, the only strategy is to alternate the content within each subtopic. Content that uses the same principles should alternate; e.g., for representing data, the graphs can vary each year: one year could be a pie chart, the next a stacked bar graph, the next a box-and-whisker plot, a compound bar graph, and a line graph, etc. In measuring data, the first year may include mean, mode, and quartiles; the next year, it may include median, range, and BMI.
Identified unacceptable predictability on topic weighting
There was no unacceptable predictability, as the topic weighting should be in accordance with CAPS and SAGs, with no deviation.
Recommendations to avoid unacceptable predictability on topic weighting
Set questions in line with the CAPS weighting per topic.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid assessing non-examinable subtopics.
Identified unacceptable predictability on item types

There was no unacceptable predictability in topic weighting, but there was variation within item types, such as MCQs and matching-type questions.
Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that unacceptable predictability item types will not appear. Definitions should not be asked in isolation from the context, and they should be context-based. Creating a matching-type or choosing question should be in context and content-related. The paper's format requires certain questions to be topic-based; e.g., Question 3 should consist solely of Data Handling.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
There was no unacceptable predictability in topic-skill pairing.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.
Identified unacceptable predictability in the scenario framing of items
There was no unacceptable scenario framing, as each question is content- and context-based.
Recommendations to avoid unacceptable predictability in scenario framing of items
Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper

Develop contextual scenarios for each subtopic that assess the prescribed content and skills. For example, the Birth Chart subtopic should be assessed through scenarios requiring learners to interpret and apply concepts such as BMI, growth percentiles, and related health indicators,

Table 3.1.5 below provides a summary of the analysis conducted to determine the level of predictability for the Probability topic for DBE Mathematical Literacy Paper 1 examinations from 2022 to 2024.

Table 3.1.5: Findings on the Predictability of the Probability Topic for the DBE Mathematical Literacy Paper 1 Examinations from 2022–2024

Topic: Probability							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**
2022	✓	Expression of probability	**9**	Calculations	7 Marks	L2	L1, L3
	✓	Prediction		Short question	2 Marks	L2	L1
	X	Evaluate the expressions of probability					

2023	✓	Expression of probability	**9**	Calculation	9 Marks	L2, L3	L2, L3
	X	Prediction					
	X	Evaluate the expressions of probability					
2024	✓	Expression of probability	**8**	Calculation	8	L2	L1, L3
	X	Prediction					
	X	Evaluate the expressions of probability					

Table 3.1.5 presents a comparative overview of the Probability topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.1.5 have contributed to the predictability of the DBE Mathematical Literacy final examination question Paper 1 from 2022 to 2024.

a. Topic coverage

The Probability topic has been assessed in all three years. It is therefore likely to appear in the following year, as it forms part of the prescribed application topics to be assessed in Question Paper 1. It constitutes 5% of Paper 1 and approximately 7 marks out of 150. The assessment body should adhere to the CAPS prescription for assessing the Probability topic. This topic plays a core role in mathematical literacy, as it covers a part of being mathematical in everyday life.

b. Content coverage

The findings indicate that Probability is assessed each year, focusing on expressions of probability. This subtopic will frequently focus on the same skill but in different contexts; thus, it will seem to be more than the others due to this integration and the vast range of contexts available to assess it. Prediction is another subtopic that appears in one year, as it's linked to the section on expressions of probability. The topic is likely to appear in the next examination, as it is assessed every 2 years. Subtopics such as evaluating expressions of probability are not assessed, as they are more practical and involve developing and evaluating; they are not easily assessed due to their nature, e.g., developing a game and evaluating its fairness. The topic will likely be omitted each year. Consequently, the assessment bodies should continue to assess probability in this way, with topics such as the expression of probability assessed each year and prediction assessed every third year. This ensures content rotation across years.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 7 marks across Paper 1, with no variance. This suggests that the marks cannot exceed the maximum or fall below the minimum. Then, the mark allocation over the past three years is as follows: 9, 9, and 8 marks in 2022, 2023, and 2024, respectively. This is not in line with the prescribed allocation. Examiners should ensure that the mark allocation should always be 7 marks and topics that needs to be varied during assessment are varied, to ensure that the mark allocation remain the same, e.g., not to assess predictability each year, they should alternate it for instance in 2022, the mark allocation was 9marks due to 2marks allocated to predictability, which means that adding predictability, without reducing marks on expression of probability, made the topic to be over assessed. That changed the allocation to be above 7.

d. Variation in item types

The evaluation indicates that the calculation has been used in the past three years to assess the concepts. Short questions were only used when prediction was assessed. In the past three years, the mark has varied as the examiner has constantly indicated the

specification on how the expected response should be, for example, express the probability as a percentage or fraction, defined in context. Such questions increase the difficulty level. The use of a table to present probability information increases cognitive demand to Level 3. In the past three years, tables have been used to present probability questions. The observed pattern indicates that when information is presented in table form and probability is to be calculated, the cognitive demands increase. If the questions specify how the calculation should be done, then the level of difficulty will increase. The examiners should alternate the probability questions to maintain the pattern and avoid predictability; e.g., change the specification and use tables, graphs, and tree diagrams to assess.

e. Topic and skill pairing

The findings provide evidence that calculation skill has been used in Probability, as this skill makes it easier to answer questions about the expression of probability. The tables or graphs vary in how they are interpreted and used, depending on the context and the required response. Furthermore, probability is not calculated in isolation; it is linked to other application topics. For example, in Examination Paper 1, Probability is integrated into the Finance and Data Handling topics. Therefore, if it is in Finance, it will be asked under the Finance content, such as financial documents or taxation; in such cases, calculation skills will be required. When data appear underrepresented in graphs and tables, interpreting graphs and performing calculations are required. Moreover, manipulation or simplification skills can also be assessed when the question specifies a specific format for presenting the expected response. For example, calculate the probability and express it as a decimal fraction.

Expressions of probability content are mostly presented in a table form. Calculational skill is also required, with a specific format beyond only calculating. This skill is repeated each year, but varies in how it is used: in 2024, to calculate and express in a simplified fraction; in the 2023 examination question paper, to calculate the probability as a decimal number; and in another question, as a fraction. In 2022, calculate the probability as a percentage.

The assessment body should continue to alternate the assessment of skills, and the application concept should be varied; in this way, the predictability of the skills will remain acceptable.

f. Scenario framing of items for a topic

The patterns observed indicate that the context used for expressions of probability changes each year, first depending on the application topic and, second, on the form of content representation used (e.g., table, graph, diagram, or paragraph). Examiners should continue varying the contexts and skills assessed each year while maintaining similar levels of cognitive demand. The context used differs each year but is related to the concept being assessed.

This topic and its concepts are content- and context-oriented, meaning its concepts cannot be assessed in isolation. For example, expressing probability as a decimal may be assessed within the Finance topic using an income tax context. In Data Handling, under representation of data, a compound bar graph of voters was provided, and the probability was to be expressed as a simplified fraction. Examiners should assess in this manner to avoid predictability and maintain year-over-year skill predictability.

Summary of findings and recommendations for the DBE Mathematical Literacy Probability topic

Table 3.1.6 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.1.6: Summary of Findings and Recommendations on the Predictability of the 2022–2024 DBE Mathematical Literacy Probability Topic Paper (1)

Identified unacceptable predictability on topic coverage
There was no unacceptable prediction in this topic of Paper 1.
Recommendations to avoid unacceptable predictability on topic coverage
There was no recommendation on unacceptable prediction on this topic.
Identified unacceptable predictability on content coverage
There was no unacceptable prediction on content coverage.
Recommendations to avoid predictability in content coverage
In Probability, predictability cannot be avoided, since the content in the subtopic varies; each year, the content covered in the part of the subtopic assessed changes.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Probability, the only strategy is to alternate the content in each topic and the expression required. The content that uses the same principles should be alternated.
Identified unacceptable predictability on topic weighting
There was no unacceptable predictability in topic weighting, but there was variation in the Probability distribution.
Recommendations to avoid unacceptable predictability on topic weighting
Set questions aligned with the CAPS weighting for each topic.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure the recommended subtopics are covered, and avoid over- or under-assessing.
Identified unacceptable predictability on item types
There was no unacceptable predictability on item types.

Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that the unacceptable predictability item types will not appear.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
There is no unacceptable predictability in topic-skill pairing.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.
Identified unacceptable predictability in the scenario framing of items
There was no unacceptable scenario framing, as each question is content- and context-based.
Recommendations to avoid unacceptable predictability in scenario framing of items.
Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
Use the content in each subtopic to create a scenario that will assess the topic.

Conclusions

Due to the variation observed at the subtopic level, the DBE Mathematical Literacy Paper 1 examinations were not predictable across the selected years (2022–2024). The assessment body should assess topics in varied ways to maintain acceptable predictability in examinations.

3.2: MATHEMATICAL LITERACY PAPER 2

This section presents an analysis of the DBE final examination question papers for Mathematical Literacy Paper 2 from 2022 to 2024. The findings for each topic are summarised in Tables 3.2.1–3.2.6.

Table 3.2.1 below provides a summary of the analysis conducted to determine the level of predictability for the Measurement topic for DBE Mathematical Literacy Paper 2 examinations from 2022 to 2024.

Table 3.2.1: Findings on the Predictability of the Measurement Topic for the DBE Mathematical Literacy Paper 2 Examinations from 2022–2024

Topic: Measurement							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**

2022	✓	Conversion		Calculations	19 Marks	L2, L3	L1, L2, L3, L4
	X	Measure length, weight, volume and temperature					
	✓	Perimeter, area and volume		Calculations	33 Marks	L1, L2, L3	L2, L3, L4
	✓	Time	**76**	MCQ, short answers and calculations	24 Marks	L1, L2, L3	L1, L2, L3
2023	✓	Conversion		Short questions calculations	5 Marks	L2	L2, L4
	X	Measure length, weight, volume and temperature					
	✓	Perimeter, area and volume	**67**	Matching column, short questions and calculations	52 Marks	L1, L2, L3, L4	L1, L2, L3, L4
	✓	Time		Calculations	10 Marks	L4, L3	L3

2024	✓	Conversion	**85**	Short questions and calculations	19 Marks	L1, L2, L3	L1, L2
	X	Measure length, weight, volume and temperature					
	✓	Perimeter, area and volume		Choices, calculations and short questions	60 Marks	L1, L2, L3	L1, L2, L3, L4
	✓	Time		Calculations and short questions	5 Marks	L2, L3	L2

Table 3.2.1 presents a comparative overview of the Measurement topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.2.1 have contributed to the predictability of the DBE Mathematical Literacy final examination question Paper 2 from 2022 to 2024.

a. Topic coverage

The findings indicate that the Measurement topic has been assessed in all three years. This indicates acceptable predictability, as it forms part of the prescribed application topic to be assessed in Paper 2. It constitutes 55% of Paper 2 and approximately 83 marks out of 150. The assessment body should adhere to the CAPS and SAGs prescriptions for assessing the Measurement topic. This topic plays a core role in mathematical literacy, as it covers a large part of being mathematical in everyday life.

b. Content coverage

The findings indicate that the subtopics perimeter, area, and volume were linked to conversion within the Measurement topic. This subtopic frequently appeared, focusing on skills required in Measurement, so it appeared more than the others due to the link between subtopics. Time is another topic that appeared throughout the three years, as it's an integral subtopic of Measurement and should be assessed each year. The topic is likely to appear on the next examination. Subtopics such as measuring weight, length, mass, and temperature are not easily assessed, as they focus on practical aspects of measurement. In the past three years, they have not been assessed. Although some components of this topic are assessed in examinations, such as interpreting values from images of clocks or thermometers, their application varies. For example, in the 2022 Paper 2 examination, a picture of a clock was provided to assess learners' ability to read the time and identify the type of clock.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is prescribed at 83 marks for Paper 2, with a ±8 mark variance. This suggests that, from the prescribed 83 marks, the total can increase or decrease by a maximum of 8 marks. With such knowledge, the variation in marks for the past years was 76, 67, and 85 in 2022, 2023, and 2024, respectively. This suggests a decrease from 2022 to 2023 and an increase from 2003 to 2024, but when considering the variance, the mark allocation remains the same, as it falls within the prescribed range. This indicates a predictable pattern: in the following year's exams, the mark allocation will range from 75 to 92. Examiners should ensure that the mark allocation remains within the prescribed range of 75 and 92 by varying the topics assessed, so that the mark allocation remains the same, e.g., by not assessing measuring weight, mass, and temperature. That will change the allocation to be above 92.

d. Variation in item types

The evaluation indicates that the calculation, table analysis and interpretation, and short-answer questions have been used in the past three years to assess concepts in measurement. Calculation has remained the same over the years; the table analysis varied each year. In the past three years, it appeared only twice (in 2023 and 2024). The presentation of recipes in examination questions could also be classified as part of table interpretation. These appeared frequently in the past years. Short answers, also in small quantity over the past three years, particularly in questions that involved providing reasons or justification.

Furthermore, over the past three years, MCQs in the form of one-word, multiple choice, and matching types have been introduced, accounting for a small portion of the marks in examination question papers. For example, in 2022, there was one choice question, which accounted for only 2 marks; in 2023, there were matching-type questions, which accounted for 2 marks. In 2024, a MCQ was worth 2 marks.

The mark variation depended on the extent of the section it covered. For instance, short answers were mostly asked in time-based questions, and a small portion in conversion-based questions. These questions were of lower cognitive demand, with difficulty ranging from easy to moderate. The use of words such as 'verify', 'show', and 'write down' increases the cognitive demands to Level 4 and, in some instances, the difficulty level. For example, in the 2022 Paper 2 examination, learners were asked to "write down the time displayed in clock B". The clock was digital and displayed a time in the afternoon shortly after 12:00.

The response should use the 24hr time format and reflect the afternoon; with this in mind, the level of difficulty will increase from easy to moderate. In 2023, the word verify was used with calculations to indicate the validity of the claim; the cognitive level increased to Level 4, and the difficulty level increased to difficult, as there was substitution to the correct formula, manipulation and simplification, with a specific instruction on how the answer should be presented, rounded to the nearest value. Predictability may

occur only in terms of subtopics and, to some degree, in the types of questions, e.g., calculations with recipes and subtopics such as time, perimeter, area, volume, and conversion. The level of difficulty and cognitive levels cannot be predicted, as each question will be based on content-context relationship. In conclusion, predictability will not be easily identified. Examiners should continue to distribute questions with varying cognitive demands and difficulty, using terms and words to differentiate between them.

e. Topic and skill pairing

The findings provide evidence that the calculation skill has been used in the Measurement topic, as this skill makes it easier to answer questions related to conversion, area, perimeter, and volume. Table and diagram interpretation is an effective skill used in subtopics such as conversion, area, perimeter, and volume. These skills are repeated each year, too, such as the pattern that questions involving recipes are provided, and those involving volume, area, and perimeter are provided. The table and diagram are interpreted and used differently depending on the context and the required response. In 2022, calculating the quantity of an item required when the recipe or the amount is doubled was required. In 2022, perimeter, volume, and area formulas were presented with a diagram based on the context; in this instance, a glue stick was provided. In 2023, the volume and area formulas for triangles and rectangles were provided in the context. In 2024, the formulas for the perimeter, volume, and area of a rectangle and a circle were provided with diagrams. Over the three years, different diagrams and the same formula were presented, but it still required calculating the area, perimeter, and volume.

Conversion and time also require skills in calculating, short-answer questions, and interpreting tables. Conversion and time are also integrated into the recipe table, where short answers are required regarding time interpretation, e.g., how long it will take to prepare the recipe or when the dish will be ready. The short questions are mostly lower-order, easy questions. Question types that involve calculations increase cognitive demand and difficulty. Time conversions between different time formats increase difficulty, while the

cognitive level remains the same. Moreover, recipes that involve metric conversions and mass conversion factors increase difficulty and cognitive load.

Lastly, integrating these topics into a diagram increases cognitive load and difficulty; the latter might remain the same or increase. For example, a question where dimensions of the diagram have different units, and the expected answer should be of a specific unit. Calculation skills will be used to convert, substitute, and simplify, resulting in calculations that are either multi-step or involve known procedures. When reverse calculations involving manipulation of the formula, simplification and conversion with rounding according to context are used, the cognitive level increases, from knowing to multi-steps, and the level of difficulty increases too, to difficult and very difficult. Writing answers based on context mostly increases the difficulty, as the context changes each year. In 2024, a matching-type skill was introduced, with definitions and terms provided that need to be matched.

The assessment body should continue assessing these skills within the same content areas while varying the contexts and applications to minimise predictability. The level of skills assessed and the application of concepts should also be varied; for example, one year may focus on area and volume, while the following year focuses on perimeter and density/capacity. Table interpretation and completion may be assessed annually, but the diagrams and contexts should be varied.

f. Scenario framing of items for a topic

The patterns observed indicate that the diagrams are used each year but are assessed using different skills. The context of a recipe assesses concepts such as conversion, time, and, to some extent, perimeter, area, and volume. For example, a cake recipe may require learners to calculate the area needed for preparation, determine whether the cake will fit into a container, and calculate the volume occupied by a specific quantity of cake. The context of building, storage and decoration assesses perimeter, area and volume. With Measurement, even context prediction is not possible, as it could be any life-related scenario that assesses the skills

and concepts. Therefore, it is recommended that the examination body continue to vary the context each year by presenting a different diagram and different conversion context. As these concepts are context-oriented, they cannot be assessed in isolation.

Summary of findings and recommendations for the DBE Mathematical Literacy Measurement topic

Table 3.2.2 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.2.2: Summary of Findings and Recommendations on the Predictability of the 2022–2024 DBE Mathematical Literacy Measurement Topic Paper (2)

Identified unacceptable predictability on topic coverage
There was no unacceptable predictability in this topic of Paper 2.
Identified unacceptable predictability on content coverage
There was no unacceptable predictability on content coverage.
Recommendations to avoid predictability in content coverage
In Measurement, predictability cannot be avoided, since the content in each subtopic is vast and changes each year in the assessed part of the subtopic.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Measurement, the only strategy is to alternate the content in each subtopic. Alternate content that assesses the same principles; e.g., one year: perimeter, volume, area of a rectangle; next year: area of a circle; following year: integrated shapes (circle, rectangle, triangle).

Identified unacceptable predictability on topic weighting
There was no unacceptable predictability on topic weighting.
Recommendations to avoid unacceptable predictability on topic weighting
Set questions aligned with the CAPS weighting for each topic.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid assessing non-examinable subtopics.
Identified unacceptable predictability on item types
There was no unacceptable predictability in the identified item types.
Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that unacceptable predictability item types do not appear; e.g., conversion will require calculations and table interpretation.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified. Avoid matching type or choice that assess in isolation of content and context.
Identified unacceptable predictability on topic–skill pairing
There was no unacceptable predictability in topic-skill pairing.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.
Identified unacceptable predictability in the scenario framing of items
There was no unacceptable predictability in scenario framing.

Recommendations to avoid unacceptable predictability in scenario framing of items.
Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
The examiner should use an authentic, context-oriented scenario based on the assessed topic.

Table 3.2.3 below provides a summary of the analysis conducted to determine the level of predictability for the Maps and Plans topic for DBE Mathematical Literacy Paper 2 examinations from 2022 to 2024.

Table 3.2.3: Findings on the Predictability of the Maps and Plans Topic for the DBE Mathematical Literacy Paper 2 Examinations from 2022–2024

Topic: Maps and Plans							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**
2022	✓	Scale		Short answers	4 Marks	L1, L2	L1
	✓	Maps		Short answers	20 Marks	L1, L2, L3	L1, L2, L4
	✓	Plans		Short answers and calculations	15 Marks	L2	L2, L4
	✓	Models		Short answers and calculations	24 Marks	L1, L2, L3, L4	L1, L2, L4

			63				
2023	✓	Scale		Match, practical and calculation	7 Marks	L1	L3
	✓	Maps		Match, complete sentence, short answer and calculate	42 Marks	L1, L2, L3	L1, L2, L3, L4
	✓	Plans	**85**	Short answer, match and calculations	20 Marks	L1, L2, L3	L1, L2, L4
	✓	Models		Short answers and Calculations	16 Marks	L1, L2, L3	L1, L2, L3
2024	✓	Scale	**57**	calculations	4 Marks	L4	L4
	✓	Maps		Calculations, short answers and choices	33 Marks	L1, L2	L1, L2, L4
	✓	Plans		Matching	6 Marks	L1, L2	L1, L2, L4
	✓	Models		Short answers and calculations	14 Marks	L1, L2	L1, L2

Table 3.2.3 presents a comparative overview of the Maps and Plans topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.2.3 have contributed to the predictability of the DBE Mathematical Literacy final examination question Paper 2 from 2022 to 2024.

a. Topic coverage

The findings indicate that the Maps and Plans have been assessed in all three years. It is therefore likely to appear in the following year, as it forms part of the prescribed application topics to be assessed in Examination Paper 1. It constitutes 40% of Paper 2 and approximately 60 marks out of 150. The assessment body should adhere to the CAPS prescription for assessing the Maps and Plans topic. This topic plays a core role in mathematical literacy, as it covers a part of being mathematical in everyday life. This indicates acceptable predictability.

b. Content coverage

The findings indicate that Maps and Plans and Models are subtopics assessed each year. These subtopics will frequently focus on the same skill but in different contexts; thus, they will seem to be more than the others due to this integration and the broader contexts in which they are assessed. Scale is also another topic that is assessed each year; it is rarely assessed in isolation, as it is linked to both Maps and Plans. The topic will likely be assessed in the next examination. Maps and Plans appear more than Models and Scale. Models are assessed separately, as they focus on a smaller section of everyday life representation, such as assembly, which involves reading instructions or following diagrams to make a model of an item purchased. The section on packaging within models also takes up a small portion of an examination question paper, as most of it is more practical than theoretical and not easily assessed. Thus, in some instances, they are not integrated within the same context, including Maps and Plans. These topics are all predictable and will be assessed in the following year's examination.

Their predictability is limited to the subtopic, but predicting which part of the subtopic will appear is not possible, as each subtopic encompasses vast concepts. For example, in maps, the type of map assessed each year differs; e.g., in 2024, an elevation or profile map and a provincial map were provided. In 2023, a global and a trail strip map were provided. In 2022, an information graphic map was provided. Each requires a specific skill for responding to it.

Furthermore, the response to each type depends on the context in which it is being assessed. For example, the strip map of the trail is not the same as the strip map of a journey between two towns or cities. The profile map for the runners will differ from that for the cyclists.

The observed pattern indicates that a map, plan, or model will be assessed each year. Additionally, one or two parts of each subtopic will appear in each assessment year. For example, each year an assembly diagram, map, or plan will appear. Or the assembly and packaging could appear in the same paper the following year, whereas the previous year, packaging did not appear. This means that within models, assembly will always appear, whereas packaging might not. The same thing may occur when assessing scale: measuring and using the scale may appear each year, but finding the scale may not; it can appear in another year. Therefore, it will not be possible to predict which pattern will occur the following year.

c. Weighing of the topic

The analysis reveals that the mark allocation for this topic is prescribed at 60 marks for the entire examination, with a variance of ±8 marks. This suggests that, from the prescribed 60 marks, the marks can be increased or decreased by up to 8. With such knowledge, the variation in marks over the past years is 63, 85, and 57 in 2022, 2023, and 2024, respectively. This suggests variation in increases and decreases, but when considering the variance, the mark allocation generally remains the same within the prescribed range,

except in 2023, when it was over-assessed. This suggests that the mark allocation for the following year's exams will range from 52 to 68. Examiners should ensure that the mark allocation remains within the prescribed range of 52 and 68 by ensuring that topics that need to be assessed less in isolation and that are not easily assessed are not allocated higher marks. For example, scale questions should not be allocated higher marks than Maps and Plans when assessed in isolation. In that way, it will ensure that the marks remain within range.

d. Variation in item types

The evaluation indicates that the calculation, Maps and Plans analysis and interpretation, and short questions have been used in the past three years to assess the concepts. Calculation, map and plans interpretation, and short questions have remained the same across the years. Multiple choice and match-and-choose options varied each year; in the past three years, they appeared only twice (2023 and 2024), and fewer marks were allocated to them. Over the past three years, based on calculations, when scaffolding was used during questioning, the cognitive level decreased, and marks were distributed across individual questions; when it was not, the cognitive level increased, as marks increased with the number of steps required. For example, on a scale, if the measured distance is provided and the number scale is used, then the cognitive level remains at Level 2, and the difficulty level remains at 2. However, if the measured distance is not provided when using the number scale, the cognitive level increases, the difficulty level remains the same, and the marks and steps increase. For example, there will be a mark for measurement, a mark for substituting the measured value, and a mark for converting it before substituting it, etc.

In terms of marks, it depends on the type of question asked and the expected response. For example, in 2022, a map was used; only 4 marks were allocated to the scale, as it only required them to identify the type of scale and to measure the distance on the map without doing any calculations. In 2023, a layout plan was used: 7 marks were required for the definition, the practical measurement

of the distance, and the calculation of the scale used. In 2024, a floor plan with only 4 marks was used to determine the scale; the measurement and the actual distance were provided; only required to substitute and simplify.
If words such as 'round to a specific number' are used, the difficulty level will increase in such questions. The same applies to map and plan interpretation. If an unfamiliar representation of plans and maps is provided, the cognitive level may decrease or remain the same while difficulty increases. For instance, in 2023, the global representation of a map with a short distance between towns was used, along with the road infographic from the 2022 examination question paper. Since the stimulus increases the difficulty, the short-answer questions are mostly at the same level of difficulty and cognitive, with the exception that when specific words are used, such as verify or provide two or more reasons, the cognitive level increases to 4 and the difficulty increases, depending on the number of responses required.

Questions with practical application, such as measuring the distance in the plan or map, then calculating, or showing how the value was calculated, generally increase the cognitive level, and the mark allocation increases. If further instructions are provided regarding conversion or rounding, the level of difficulty will increase. Moreover, most Packaging questions require practical calculations; the cognitive level is higher, and difficulty increases with the level of structure. For example, a 2-dimensional shape will be easier than a 3-dimensional shape. This prediction should be maintained, with scaffolding continuing for scales and models, and for short answers and calculations, to maintain or 4 the acceptable level of difficulty and cognitive levels. Eliminating the scaffolding in such questions raises them to a higher cognitive level (Levels 3 or 4) and increases their difficulty.

e. Topic and skill pairing

The findings provide evidence that the calculation skill has been used in Maps and Plans, as this skill makes it easier to answer questions about maps, scales, models, and plans. Map, plan, and diagram interpretation is an effective skill used in subtopics such as map, plan, assembly, and packaging. Short questions are also used when maps, models, diagrams, or plans are provided and

require answering questions by identifying, locating, stating, giving examples, or describing trends. The interpretations depend on the type of topic and context used with the required response.

In 2024, an assembly diagram for the foldable chair was provided, including all the items needed to make it. The information provided was to be interpreted to answer questions, such as how many wooden pieces are needed to make the chair or the name of the item with the longest length. In 2023, given the assembly steps, a movable chair with its components and alphabets was used in the diagram to indicate the pieces, and alphabets were used to label the components needed to make the chair. The diagram, steps, and components were to be interpreted to answer the questions by relating each step to the alphabet in its part of the steps and relating the alphabet to the component. This information needs to be interpreted and analysed to answer questions, such as determining the number of screws needed in step 4 or identifying the different types of screws required to assemble the parts of the chair.

In 2022, learners were required to interpret steps for assembling a deck chair, supported by explanations, diagrams, component quantities, and types of fasteners. The diagram and the assembly steps had to be interpreted before responding to the questions. Across the three years, assembly diagrams were presented in different formats; however, they consistently assessed calculation and interpretation skills.

In Maps, calculation skills were also required: one needed to calculate the journey distance indicated, determine the scale used, show how the provided speed was calculated, or determine whether they would arrive on time if travelling at the provided speed. This skill is repeated each year, but its use varies. In 2024, a map showing the distance and travel time between cities was provided. First, learners were required to calculate the distance between the two places. Second, learners were required to calculate the average speed between two towns. In 2023, a strip chart map showing the distance between two destinations was presented,

requiring learners to calculate the distance between the two towns and to the destination. In 2022, an infographic map showing tourist location details was provided, along with a table listing fees for entry to certain locations, with a calculation to verify whether they would have received the discount. In 2023 and 2024, a matching-type skill was introduced: the definition and its term are provided and need to be matched. In the three years, short answers were also used to answer questions that require reading values, identifying places on the map or in plans, providing examples, or providing reasons.

The assessment body should continue to vary the application concept and alternate the skills assessed; in this way, the skills prediction will remain acceptable.

f. Scenario framing of items for a topic

The patterns observed indicate that the context used for Maps and Plans changes each year and assesses different skills, while still using similar concepts. For instance, models change each year: in 2022, a birdhouse that needed to be assembled was provided; in 2023, packaging for a pack of water bottles on a table for an event. In 2024, learners were provided with paving brick packaging; they determined the number of paving bricks that fit in a single row. The scales' context depends on the context used for Maps and Plans. This subtopic cannot be assessed in isolation. For example, in 2024, a layout plan of the shower rooms was provided, and learners were required to calculate the scale that was used to draw the plan. In 2023, a layout plan for a conference room was provided, and learners were required to calculate the scale used to draw the layout. In 2022, learners were required to identify the scale used to draw a map showing national roads. The pattern indicates that the topics are context-dependent, and the context changes depending on the topic being assessed. Predictability is based on subtopics, not on context. Each year, maps, plans, models, and scales will be assessed. The context and the skills required are unpredictable, as they depend on the relationship between context and content. Therefore, it is recommended that the assessment body continue varying the context each year by presenting different maps, plans, and models.

Summary of findings and recommendations for the DBE Mathematical Literacy Maps and Plans topic

Table 3.2.4 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.2.4: Summary of Findings and Recommendations on the Predictability of the 2022–2024 DBE Mathematical Literacy Maps and Plans Topic Paper (2)

Identified unacceptable predictability on topic coverage
There was no unacceptable predictability in this topic of Paper 2.
Identified unacceptable predictability on content coverage
There was no unacceptable predictability on content coverage.
Recommendations to avoid predictability in content coverage
In Maps and Plans, predictability cannot be avoided, since the content in each subtopic is vast and the content covered in the part of the subtopic assessed changes each year.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Maps and Plans, the only strategy is to alternate the content in each subtopic. The content uses the same principles for alternating. For example, in maps, different types can be used each year (e.g., strip chart, provincial, national, route map, street map, etc.).
Identified unacceptable predictability on topic weighting
There was no unacceptable predictability, as the topic weighting should be in accordance with CAPS and SAGs, with no deviation.

Recommendations to avoid unacceptable predictability on topic weighting
Set questions in line with the CAPS weighting per topic.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid assessing non-examinable subtopics.
Identified unacceptable predictability on item types
There was no unacceptable predictability in item types, but there was variation within, including MCQ and matching-type questions.
Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that unacceptable predictability across item types does not occur. Definitions should not be asked in isolation from the context, and they should be context-based. Creating a matching-type or choosing question should be based on context and content. The paper's format requires certain questions to be topic-based; e.g., Question 3 should consist solely of Maps and Plans.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
There was no unacceptable predictability in topic-skill pairing.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.
Identified unacceptable predictability in the scenario framing of items

There was no unacceptable scenario framing, as each question is content- and context-based.
Recommendations to avoid unacceptable predictability in scenario framing of items.
Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
Develop contextual scenarios for each subtopic that assess the prescribed content and skills. For example, the Birth Chart subtopic should be assessed through scenarios requiring learners to interpret and apply concepts such as BMI, growth percentiles, and related health indicators.

Table 3.2.5 below provides a summary of the analysis conducted to determine the level of predictability for the Probability topic for DBE Mathematical Literacy Paper 2 examinations from 2022 to 2024.

Table 3.2.5: Findings on the Predictability of the Probability Topic for the DBE Mathematical Literacy Paper 2 Examinations from 2022–2024

Topic: Probability							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**
2022	✓	Expression of probability	**11**	Calculations	3 Marks	L2	L2

	X	Prediction					
	✓	Representation for determining possible outcome		Short answers and tree completion	8 Marks	L1, L2	L3
	X	Evaluate the expressions of probability					
2023	✓	Expression of probability	**8**	Calculation	8 Marks	L1, L2, L3	L2, L3, L4
	X	Prediction					
	X	Representation for determining possible outcome					
	X	Evaluate the expressions of probability					
2024	✓	Expression of probability	**8**	Calculation	8 Marks	L1, L2, L3	L3
	X	Prediction					

	X	Representation for determining possible outcome					
	X	Evaluate the expressions of probability					

Table 3.2.5 presents a comparative overview of the Probability topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.2.5 have contributed to the predictability of the DBE Mathematical Literacy final examination question Paper 2 from 2022 to 2024.

a. Topic coverage

The findings indicate that the Probability topic has been assessed in all three years. It is therefore likely to appear in the following year, as it forms part of the prescribed application topics to be assessed in Paper 2. It constitutes 5% of Paper 2 and approximately 7 marks out of 150. The assessment body should adhere to the CAPS prescription for assessing the Probability topic. This topic plays a core role in mathematical literacy, as it covers a part of being mathematical in everyday life. This alignment indicates acceptable predictability.

b. Content coverage

The findings indicate that Probability is assessed each year, focusing on expressions of probability. This subtopic will frequently focus on the same skill but in different contexts; thus, it will seem to be more than the others due to this integration and the vast range of

contexts available to assess it. Representing possible outcomes is another topic that appears in one year, as it's linked to the section on expressions of probability. The topic will likely appear in the next examination, as it has been assessed in alternate years. The subtopic, such as Evaluate expressions of probability, is not assessed because it is more of a practical topic that involves developing and evaluating; it is not easily assessed due to its nature, e.g., developing a game and evaluating its fairness. It's predictable that it will be omitted each year. Consequently, the assessment bodies should continue to assess in this way, with topics such as the expression of probability assessed each year and the representation of determining outcomes assessed every second year.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 7 marks for Paper 2, with no variance. This suggests that the marks cannot exceed the maximum or fall below the minimum. Then, the mark allocation over the past three years is as follows: 11, 8, and 8 marks in 2022, 2023, and 2024, respectively. This is not in line with the prescribed allocation. This indicates that the mark allocation for the following year's exams will not be 7 marks. Examiners should ensure the mark allocation remains 7 by varying the topics assessed. For example, the representation of determining outcomes and the expression of probability should not be assessed each year; these skills should be alternated, with one year focusing on expressing probability, the next on prediction, and another on representing outcomes.

Furthermore, the examiner could ensure that probability is integrated into a single topic within the paper, then alternate it each year. For example, have probability in maps, the following year in models, or in plans. In this way, mark distribution will be according to the CAPS, and there will be no obvious predictability.

d. Variation in item types

The evaluation indicates that calculations have been used in the past three years to assess the concepts. Short questions were used only when the representation of determining outcomes was assessed. In the past three years, the mark has varied as the examiner has always indicated the specification on how the expected response should be, for example, express the probability as a percentage or fraction, define in context. Such questions increase the difficulty level. The use of a tree diagram to present information on probability increases the level of cognitive demand to Level 3. In the past three years, content and context have been used to represent the question in Probability. For example, in 2022, the plan content, a restaurant seating plan, and the set menu were provided, and a tree diagram needed to be completed using the choices from the set menu. Completing the tree diagram required learners to consider the number of events and outcomes in each branch. The level of difficulty increased as the number of events and branches increased, and it increased further when branch outcomes alternated across events, such as two outcomes in Event 1, three in Event 2, and two in Event 3.

Furthermore, short-answer questions are also used to assess understanding of tree diagrams and tables, particularly when learners are asked to list the total outcomes or identify those in which the specific event occurs. The use of negating words, such as 'not', increases the difficulty of calculating probability while the cognitive level remains the same. For example, what is the probability of not choosing malva pudding as a dessert? The observed pattern indicates that when information is presented in a tree diagram, and probability is to be calculated, cognitive demands increase. If the questions specify how the calculation should be done, then the level of difficulty will increase. The examiners should alternate the probability questions to maintain the pattern and avoid predictability; e.g., change the specification and use tables, graphs, and tree diagrams to assess.

e. Topic and skill pairing

The findings provide evidence that the calculation skill has been used in Probability, as this skill makes it easier to answer questions related to the expression of probability. The tables or tree diagrams vary in how they are interpreted and used, depending on the context and the required response. Furthermore, Probability is not calculated in isolation; its content is linked to the other application topic. For example, in Paper 2, Probability is integrated into Measurement and into Maps and Plans. Therefore, if it's in Measurement, it will be asked under the content of conversion, area, perimeter, and volume; then calculation skills will be required. When it appears under Maps and Plans, diagrams, and tables, then interpretation and calculation are required. Moreover, manipulation or simplification can also be assessed when the question requires a specific format for presenting the expected response. For example, calculate the probability and express it as a decimal fraction.

Expressions of probability content are generally presented in diagrams or integrated into the content being assessed; e.g., if it maps, then it will be assessed under maps. What is the probability of having a traffic light at the Brooklyn Circle? From the 2023 examination paper. Calculational skills are also required, with a specific format beyond only calculating. This skill is repeated each year, but the manner in which it is used varies: in 2024, to calculate and express in a simplified fraction; in the 2023 examination question paper, to calculate the probability as a decimal number; and in another question, as a fraction. In 2022, calculate the probability as a percentage.

The assessment body should continue to alternate between assessing comparing skills and applying the concept, and vary the manner in which the concept is applied. In this way, skill predictability will remain acceptable, while the application of concepts should be varied.

f. Scenario framing of items for a topic

The patterns observed indicate that the context used for expressions of probability changes each year: first, it depends on the application topic it is integrated with; second, on the form of content representation used (e.g., table, diagram, maps, plans, or paragraph); and lastly, on the different skills assessed with similar expressions. The context used differs each year, but it is related to the concept being assessed.

This topic, with its concepts, is content- and context-oriented, meaning its concepts cannot be assessed in isolation. For example, expressing probability as a decimal in a map, in the context of maps, and the context will be related to street maps. In Measurement, a restaurant menu tree diagram was used to assess probability as a percentage and combinations involving beef choices. Similarly, a party pack context required learners to use sweet colour data to calculate probability. Examiners should vary contexts and formats to reduce predictability while maintaining consistency in assessing skills across years.

Summary of findings and recommendations for the DBE Mathematical Literacy Probability topic

Table 3.2.6 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.2.6: Summary of Findings and Recommendations on the Predictability of the 2022–2024 DBE Mathematical Literacy Probability Topic Paper (2)

Identified unacceptable predictability on topic coverage
There was no unacceptable predictability in this topic of Paper 2.
Identified unacceptable predictability on content coverage
There was no unacceptable predictability on content coverage.
Recommendations to avoid predictability in content coverage
In Probability, predictability cannot be avoided, since the content in the subtopic is varied; each year, the content covered in the part of the subtopic assessed varies.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Probability, the only strategy is to alternate the content in each topic and the expression required. The content that uses the same principles should be alternated.
Identified unacceptable predictability on topic weighting
There was no unacceptable predictability in topic weighting, but there was variation in the probability distribution.
Recommendations to avoid unacceptable predictability on topic weighting
Set questions in line with the CAPS and SAGs weighting per topic. Marks should be 7.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid over- and under-assessing.
Identified unacceptable predictability on item types
There was no unacceptable predictability on item types.
Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that the unacceptable predictability item types will not appear.

Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
There was no unacceptable predictability in topic-skill pairing.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.
Identified unacceptable predictability in the scenario framing of items
There was no unacceptable scenario framing, as each question is content- and context-based.
Recommendations to avoid unacceptable predictability in scenario framing of items.
Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
Use the content in each subtopic to create a scenario that will assess the topic.

Conclusions

No unacceptable predictability was identified in the DBE Mathematical Literacy Paper 2. Topics were predictable because they aligned with the CAPS requirements; however, the extent to which each topic was assessed was unpredictable, as variation in contexts and scenarios was observed.

3.3: MATHEMATICAL LITERACY PAPER 1

This section presents an analysis of the IEB final examination question papers for Mathematical Literacy Paper 1 from 2022 to 2024. The findings for each topic are summarised in Tables 3.3.1–3.3.6.

Table 3.3.1 below provides a summary of the analysis conducted to determine the level of predictability for the Finance topic for IEB Mathematical Literacy Paper 1 examinations from 2022 to 2024.

Table 3.3.1: Findings on the Predictability of the Finance Topic for the IEB Mathematical Literacy Paper 1 Examinations from 2022–2024

Topic: Finance							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**
2022	✓	Financial documents and tariff system	**97**	Calculations, short answers and graph drawing	62 Marks	L1, L2, L3, L4	L1, L2, L3, L4

	X	Income and expenditure, profit and loss					
	✓	Cost price and selling price		Calculations	4 Marks	L2	L2
	✓	Break-even analyses		Short answers	6 Marks	L2	L1, L4
	X	Interest					
	X	Inflation					
	✓	Taxation		Calculations	15 Marks	L1, L2, L3, L4	L1, L2, L3
	✓	Exchange rates		Calculations	10 Marks	L2, L3	L2, L3
2023	✓	Financial documents and tariff system	**89**	Calculation and short answers	3 Marks	2	4
	✓	Income and expenditure, profit and loss		Calculations	16 Marks	L1, L2, L3	L1, L2, L4

	✓	Cost price and selling price		Calculations	9 Marks	L1, L2	L2
	X	Break-even analyses					
	✓	interest		Short answers and calculations	35 Marks	L1, L2, L3	L1, L2, L4
	✓	Inflation		Short answers and calculation	5 Marks	L1, L2	L1, L2
	✓	Taxation		Calculations	15 Marks	L1, L2, L3	L1, L2, L3, L4
	✓	Exchange rates		Calculation and short answers	5 Marks	L2	L2, L4
2024	**X**	Financial documents and tariff system	**85**				
	✓	Income and expenditure, profit and loss		Short answers, calculations and graph interpretations	28 Marks	L2, L1	L1, L2, L3

	✓	Cost price and selling price		Table, calculations, short answers and draw graphs	30 Marks	L2, L3	L2
	X	Break-even analyses					
	X	interest					
	✓	Inflation		Calculations and table	4 Marks	L2	L2
	✓	Taxation		Short answers, calculations and table	17 Marks	L1, L2, L3	L1, L2, L3, L4
	✓	Exchange rates		Calculations and table	6 Marks	L2	L1, L2

Table 3.3.1 presents a comparative overview of the Finance topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.3.1 have contributed to the predictability of the IEB Mathematical Literacy final examination question Paper 1 from 2022 to 2024.

a. Topic coverage

The findings indicate that the Finance topic has been assessed in all three years. It is therefore likely to appear in the following year, as it forms part of the prescribed application topic to be assessed in Paper 1. It constitutes 60% of Paper 1 of the exam and

approximately 90 marks out of 150. The assessment body should adhere to the CAPS and SAGs prescriptions for assessing the Finance topic. This topic plays a core role in mathematical literacy, as it covers a large part of being mathematically literate in everyday life.

b. Content coverage

The findings indicate that the sections of financial documents, tariffs, patterns, and relations are interrelated and cannot be separated. These subtopics will frequently focus on the same skill but in different contexts, so they will appear to be more than the others due to this integration and the broader contexts in which they are assessed. Although in some instances, the content is used as context for other subtopics. This then led to a reduction in the frequency, or even the omission, of the subtopic being visible, assessed, or assessed as a topic. For example, in the 2024 exam question Paper 1, the tariff context was used in a cost-and-selling subtopic; thus, it does not appear as a subtopic in other years. Therefore, the topic does not appear each year; it appears once every two years. Taxation is another topic that appears throughout the three years, as it is a core section of Finance and should be assessed each year. It is likely to appear in the next examination. The subtopics, such as interest and inflation, are related in terms of application; as a result, they are not frequently assessed, as they filter into the previous topics.

For instance, inflation operates in the principle of interest; therefore, if inflation is assessed, then interest is assessed as its principle, not as a content, and is used to answer the question, e.g., in the 2023 examination question paper, interest was not assessed as a subtopic, but the principle of compound interest was used to calculate the current amount, provided information from the past two years. Break-even analysis, when assessed on its own, is not easy; thus, it is omitted in some instances, but its core principles lie in patterns and relations, cost price and selling price, and income and expenditure. Its frequency depends on these subtopics; for instance, if income and expenditure are assessed that year, it will also be assessed as a core principle, as its core is business making a profit or loss, but not as a subtopic.

For example, in the 2024 examination question paper, under the section on cost and selling price, a table had to be completed, 2 graphs were drawn, and the break-even point appeared, but its significance was not assessed, and the graphs were not analysed. The business context involves expenses and income, which can be measured through cost and sales; thus, a break-even analysis can be conducted. Exchange rates are frequently assessed. It should be assessed alternatively, and not each year. Its principle should be assessed, and its concept integrated into the financial document; therefore, in such cases, it cannot be easily predicted. The assessment bodies should continue to assess in this way, with topics such as break-even analyses, interest rates, exchange rates, and inflation assessed in isolation and rotated. Although their core principle should be assessed each year, interest can be assessed through hire purchase, or in financial documents focused on car purchase, home loan, or investment, etc., and the exchange rate can be used as context, not as a subtopic in some exam papers.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 90 marks for Paper 1, with a ±8 mark variance. This suggests that, within the prescribed range of 90 marks, the marks can be increased or decreased by up to 8 marks. With such knowledge, the variation in marks for the past years, from 97, 89 and 85 in 2022, 2023, and 2024, respectively, suggests an increase, but when taking into consideration the variance, the mark allocation remains the same, as it was within the range as prescribed. This indicates a prediction that the mark allocation in the following year's exams will range from 82 to 98. Examiners should ensure that the mark allocation remains within the prescribed range of 82 and 98 by varying the topics to keep the mark allocation constant, e.g., by not assessing exchange rates, break-even analysis, and inflation separately each year. That will change the allocation to be above 98. If this occurs, it will introduce unacceptable predictability, as topic weighting is prescribed in the SAGs.

d. Variation in item types

The evaluation indicates that calculations, table and graph analysis, and interpretation have been used in the past three years to assess the concepts. Calculation has remained the same across the years; graph drawing varied each year in Finance; under break-even analysis, cost price and selling price; and financial documents in the past three years appeared only twice (2022 and 2024). Although graph drawing appeared twice over the entire three years, graph interpretation occurred each year. Meanwhile, table completion and table reading are the core parts of this topic, as information is mostly presented in tables and filling in the missing amounts must be calculated, e.g., financial documents such as a payslip, which is a form of a table, or a finance table of cost and selling price, where an amount is provided but quantity is omitted, then use a provided or a derived formula to find the missing value in the table. The mark variation depended on the extent of the section it covered. For instance, the mark allocation for graph drawing and interpretation depends on the task requirements, such as whether learners are required to complete two values and one graph, or three values and two graphs.

Over the past three years, the mark has increased as the examiner has consistently assessed the drawing of two graphs on the same axis. With table completion, it did not exceed 3 values. In calculations, when scaffolding is used during questioning, the cognitive level decreased; when it is not, the cognitive level increased. The same applied to table completion: the more values to complete with different steps, the higher the cognitive level; but if the same step is repeated, the cognitive level remains the same. For instance, if a table only requires learners to enter income values, the cognitive level and difficulty are likely to remain the same. However, if the table includes costs with both fixed and variable components, cognitive demand increases, making it more difficult. This difficulty increases further when learners are required to manipulate formulas to obtain the required values.

The same principle will apply to short questions and calculations. For example, if income tax and medical aid credit with rebates are not required, the cognitive level remains the same, and the level of difficulty decreases. If they are required, the level of difficulty increases, as the cognitive level remains the same. In these exams, the cognitive levels increased to Level 3, while the difficulty levels remained at Level 2 because medical aid credit was not included. The calculation resulted in a rebate. Within the same question, the use of words such as 'explain' and 'give reasons' will increase the cognitive level. This indicates acceptable predictability and should be maintained, with scaffolding for tables and graphs continuing and for income tax and tariffs minimal to maintain the acceptable level of difficulty and cognitive load. Eliminating scaffolding in such questions raises the cognitive level to 3 and the difficulty to 4. For example, in 2022, the taxation task was Level 3 cognitive and Level 2 difficulty, with scaffolding that calculated taxable income from the previous question. In 2023, it had Level 3 of cognitive and Level 2 of difficulty.

Moreover, among the tax-related questions, the following was observed regarding the mark allocation and expected responses: in 2024, 7 marks were allocated to calculating the monthly tax, while in both 2023 and 2022, 6 marks were allocated to calculating the annual tax. Although the calculations differed for monthly and annual taxes, all three questions provided scaffolding to guide learners through the required steps. Therefore, the level of difficulty remained consistent across the three examination papers.

e. Topic and skill pairing

The findings provide evidence that the calculation skill has been used in the Finance topic, as this skill makes it easier to answer questions about financial documents. Table and graph interpretation is an effective skill used in subtopics such as cost price and selling price, break-even analysis, taxation and interest. These skills are repeated each year, to the extent that there is a pattern: a tax table is provided each year. In terms of predictability, the extent of application of these skills cannot be predicted, since the tax table presented varies each year. The table varies in how it is interpreted and used based on the context and the required response.

In 2024, the annual tax payable was calculated, with no medical aid credit required. In 2023, the taxable amount was calculated with errors; these had to be identified and rectified to obtain the correct annual value. Table interpretation and analysis of the response for the second tax bracket, with basic calculations. Meanwhile, in 2022, taxation required the use of tables, with rebates and a formula to calculate taxable income to determine the annual tax payable. There was calculation, table analysis, substitution, interpretation of the table, and calculating the annual tax. In the past three years, the tables presented had similar features, with questions asked differently but still requiring calculation skills to determine the tax payable.

Financial documents, such as bank statements, till slips, and invoices, were presented in a table format. To answer questions based on financial documents, Interpretation and analysis of tables to perform calculations are required. Calculation skills are also required, including handling missing values and determining which calculations are within a financial document. This skill is repeated each year, but the manner in which it is used varies; e.g., the payslip statement in 2022 will differ from that in the 2024 examination question paper. Furthermore, these skills (table interpretation and calculations) are also required in tariff systems that use a sliding scale, that is, a table of values that serve as a rating scale and change in each row.

For example, in 2022, the tariff table used a sliding scale with service charges and presented capacity; to interpret the table, a reverse calculation was required. The tariff table, consisting of a sliding scale with alternating values, was included in 2022 but omitted in 2023 and 2024. Interest as a subtopic was presented in the table, comparing skills based on the higher purchase concept, then used the principle of simple interest to calculate the values to be compared. Interpretation and calculation are assessed differently, and in different ways, which might show a predictable pattern, e.g., in the past three years they were assessed on exchange rates. For instance, the exchange rate in 2022 was presented as a graph that needed to be interpreted; in 2023, as a paragraph with values that needed to be interpreted, then calculated; and in 2024, as a paragraph and a diagram that needed to be interpreted.

The assessment body should continue to alternate in assessing these skills and vary the concept application; in this way, the skill prediction will remain acceptable. For taxation, the table interpretation and calculations should be assessed annually, with the extent of interpretation and calculations varying accordingly. In financial documents, table interpretation and completion should be assessed annually, with the financial document changed accordingly.

f. Scenario framing of items for a topic

The patterns observed indicate that Finance subtopics are scenario-based and are assessed each year using the scenario corresponding to that subtopic. For instance, the tax rate table is used each year, but it is applied with varying skill levels. The contexts of loans, investments, and insurance are used to assess the concept of interest. The context of banking statements and slips was used to assess financial document interpretation and table reading. The use of a taxable table to calculate tax payable is predictable based on income tax. The issuance of a bank statement, till statement, or any other form of statement to be analysed or interpreted is predictable. In 2024, information on a family's budget was provided, together with a table illustrating the increase in their expenditure over different years. In 2023, a mechanic's payslip was presented alongside a tax rate table. In 2022, an invoice from Hi-Q Tyres, Batteries, Brakes and More was used, and information on different cellphone contract options for the iPhone 13 Mini from three service providers was also provided. The skills required will differ depending on the context they are assessed. Thus, learners cannot predict which financial document will be presented or which skill will be required. For example, in an invoice statement, the calculation skills required will differ from those required when provided a payslip or a budget.

It is recommended that the examination body continue to vary the context by presenting a different financial document each year. The tariffs vary each year, for example, water, electricity, and transport tariffs. This topic and its concepts are context-oriented and cannot be assessed in isolation. For example, taxation serves both as a topic and as a context for assessing related concepts. Financial documents are a subtopic in their own right.

Summary of findings and recommendations for the IEB Mathematical Literacy Finance topic

Table 3.3.2 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.3.2: Summary of Findings and Recommendations on the Predictability of the 2022–2024 IEB Mathematical Literacy Finance Topic Paper (1)

Identified unacceptable predictability on topic coverage
There was no unacceptable predictability in this topic of Paper 1.
Recommendations to avoid unacceptable predictability on topic coverage
Use the topic as recommended in the CAPS and SAGs to avoid unacceptable predictability and end up assessing a topic of Paper 2 in Paper 1.
Identified unacceptable predictability on content coverage
There was no unacceptable predictability in content coverage, but coverage varied: the exchange rate was assessed as a subtopic each year, and the financial document varied. The following content was repeated over the past three years: 1. Exchange rate, taxation, cost price, and selling price. The following content varied over the past three years: 1. Interest, inflation, break-even analysis, financial documents, income and expenditure, and profit and loss.
Recommendations to avoid predictable content coverage

Financial documents, as a focus topic in Finance, must be assessed annually as a subtopic and as a context for other subtopics. Exchange rates to be varied between years. Subtopics that are not appearing frequently: continue to assess them annually instead. Examiners to assess repeated subtopics indicated above each year.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Finance, the only strategy is to alternate the content in each subtopic. Content that uses the same principles should be alternated, e.g., interest rates, inflation, and exchange rates. For example, in one year, interest and inflation; the following year, exchange rates with interest. Financial documents: each year should be a different document, e.g., loan, bank statement, invoice, etc.
Identified unacceptable predictability on topic weighting
There is no unacceptable predictability on topic weighting. The following topic marks were observed for each topic from 2022–2024: 1. Finance marks were 97, 89 and 85 in 2022, 2023, and 2024, respectively.
Recommendations to avoid unacceptable predictability on topic weighting
Set questions in line with the CAPS and SAGs weighting per topic. Topic weighting for Paper 1 should adhere to the following prescripts: 1. Finance – 90 marks with an allowance of ±8 marks.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid assessing non-examinable subtopics.
Identified unacceptable predictability on item types
There is no unacceptable predictability in the identified item types. The following item types were repeated in the 2022–2024 examination:

1. Calculation; 2. Short answers; and 3. Table completion or graph drawing.
Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that unacceptable predictability item types do not appear, e.g., financial documents require calculations and table completion.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
They're assessing the same skill in taxation without variation is unacceptable prediction, e.g., in the past three years, there was no variation; they calculated tax payable per month or year without medical aid credit, and without changing the rebates required; for example, change to include secondary and tertiary rebates instead of assessing primary rebates all the time.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the provided subtopic to assess the topic-pair skills, and vary the subtopic to ensure the required skills also vary.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the types of questions asked for each subtopic will ensure that the topic-skill pairing is not predictable; e.g., the following year, it should be based on furniture. Income tax: current year based on including medical credit; next year, omit; include primary and secondary rebates.
Identified unacceptable predictability in the scenario framing of items
There was no unacceptable predictability in scenario framing.
Recommendations to avoid unacceptable predictability in scenario framing of items.

Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
The examiner should use an authentic, context-oriented scenario based on the assessed topic.

Table 3.3.3 below provides a summary of the analysis conducted to determine the level of predictability for the Data Handling topic for IEB Mathematical Literacy Paper 1 examinations from 2022 to 2024.

Table 3.3.3: Findings on the Predictability of the Data Handling Topic for the IEB Mathematical Literacy Paper 1 Examinations from 2022–2024

Topic: Data Handling							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**
2022	**X**	Developing questions and collecting data					
	X	Classifying and					

		organising data	**45**				
	✓	Measuring data		Table calculations and short answers	10 Marks	L1, L2, L3	L1, L2
	✓	Representing data		Short questions and calculations	35 Marks	L1, L2, L3	L1, L2, L4
2023	**X**	Developing questions and collecting data	**54**				
	X	Classifying and organising data					
	✓	Measuring data		Table and calculations	17 Marks	L1, L2	L1, L2
	✓	Representing data		Short questions, graphs and calculations	37 Marks	L2	L1, L2, L4
2024	**X**	Developing questions	**59**				

		and collecting data					
	✓	Classifying and organising data		Short answers	2 Marks	L1	L1
	✓	Measuring data		Tables, calculations and short answers	33 Marks	L1, L2	L1, L2, L4
	✓	Representing data		Calculations and Short questions	24 Marks	L1, L2, L3	L1, L2, L4

Table 3.3.3 presents a comparative overview of the Data Handling topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.3.3 have contributed to the predictability of the IEB Mathematical Literacy final examination question Paper 1 from 2022 to 2024.

a. Topic coverage

The findings indicate that the Data Handling topic has been assessed in all three years. It is therefore likely to appear in the following year, as it is part of the prescribed application topics to be assessed in Paper 1. It constitutes 35% of Paper 1 and approximately 53 marks out of 150. The assessment body should adhere to the SAGs prescription for assessing the Data Handling topic. This topic is a core part of mathematical literacy, as it covers being mathematically literate in everyday life.

b. Content coverage

The findings indicate that the Data Handling cycle is assessed annually, particularly the subtopics of measuring and representing data. These subtopics will frequently focus on the same skill but in different contexts, so they will appear to be more than the others due to this integration and the broader contexts in which they are assessed. Classifying and organising data is another topic that appears, though not frequently, as it is linked to measuring data and should be assessed each year, either as a subtopic or as context. The topic may likely appear in alternate years. The subtopics, such as developing questions and collecting data, and classifying and organising data, are not frequently assessed; in some instances, they are covered in previous topics. For instance, in measuring data, information is gathered through data collection, which is explained in the context of how the data were collected.

For example, in 2023, the context used to present data followed the principles of data collection and organisation—a frequency table based on shoe size and height for Grade 12 female students. Therefore, they are assessed when the data is presented in table form, but not directly asked as questions, even though its principle is used to present the question. Its frequency depends on these subtopics; for instance, if data measurement is assessed, then classifying and organising data will follow if the information is presented in a table form. If the information is presented as graphs, then either developing questions and collecting data will appear as a form of content-context to make sense of the graph, or the question about collecting data may be linked to the content-context. Developing questions and collecting data is not frequently assessed. It should be assessed alternately, not each year, since it is not easy to assess in isolation; it is easier to use when creating content-context based on the subtopic to be assessed. The topic will likely be omitted in both the first and second years of assessment. Consequently, the assessment body should continue to assess in this way, with topics such as developing questions, collecting data, and classifying and organising data rotated.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 53 marks for Paper 1, with a ±8 mark variance. This means that, out of the prescribed 53 marks, the total can be increased or decreased by up to 8 marks. With such knowledge, the variation in marks for the past years, from 45, 54 and 59 in 2022, 2023, and 2024, respectively, suggests variation in both increases and decreases, but when taking into consideration the variance, the mark allocation remains the same, as it was within the range as prescribed. This suggests that the mark allocation for the following year's exams will range from 45 to 61. Examiners should ensure that the mark allocation remains within the prescribed range of 45 and 61 by varying the topics to keep the mark allocation the same, e.g., not assessing developing questions and collecting data, and classifying and organising data separately each year; they should alternate. That will change the allocation to be above 61.

d. Variation in item types

The evaluation indicates that the calculation, table and graph analysis and interpretation, and short questions have been used in the past three years to assess the concepts. Calculation, graph and table interpretation, and short questions have remained the same across the years. Over the past three years, the mark has increased as the examiner has consistently required learners to draw all graphs without plotting any part of them, thereby increasing the level of difficulty. Based on calculations, if scaffolding is done during questioning, the level of cognitive demand decreased; if not, it increased. For example, in 2022, learners were required to draw graphs; however, the axes were already fully scaled, requiring only labelling and plotting. For example, in 2022, learners were required to draw graphs, but the axes were fully scaled; only the labelling and plotting were to be done. Thus, the cognitive demand remained the same, and the level of difficulty increased, as some values are not on the grid lines; they still have to label the axes. Unlike the 2024 examination paper, in the 2024 examination paper the graph drawing, axes, and labels were provided on the grid; only plotting was required. Due to the type of graph to be drawn, cognitive demand increased, but difficulty decreased to Level 2.

The same applied to table completion, graph drawing, and the interpretation of tables and graphs; if multiple graphs or different graph types are presented, the cognitive level may decrease or remain the same as the difficulty increases. For instance, in 2024, a pictograph of a coffee bean, unlike the shoe hill representing a misleading data graph, was provided. The cognitive level will remain the same, and the difficulty will increase. Based on the measurement data, most questions are based on calculations and short-answer scaffolding; thus, their cognitive level will remain at 2, and the difficulty level will also remain at 2. The same principle will apply to short questions and calculations. For example, if the questions ask to identify the media and the data is arranged, then the cognitive level and difficulty remain the same; if the data is not arranged, the cognitive level remains the same, but the difficulty increases. Within the same question, the use of words such as 'identify', 'state', 'cognitive level', and 'level of difficulty' remains at 2. However, with words such as 'give reasons' and 'explain why', the cognitive level will increase, while the difficulty level will remain the same.

This should be maintained, with scaffolding continuing for tables and graphs, as well as for short questions and calculations, to maintain the acceptable level of difficulty and cognitive load. Eliminating the scaffolding in such questions raises them to a higher cognitive level, such as Level 3 of cognitive and Level 4 of difficulty.

e. Topic and skill pairing

The findings provide evidence that the calculation skill has been used in data handling, as this skill makes it easier to answer questions related to measuring data. Table and graph interpretation is an effective skill used in subtopics such as classifying and organising data and representing data. Short questions are also used when a graph or table is provided to answer questions by identifying the relationship, giving examples, or giving reasons. The tables or graphs vary in how they are interpreted and used based on the context and the required response. In 2024, a single bar graph was provided, along with a table with two rows for fuel prices and exchange rates, a pie chart of the cost breakdown, and a box-and-whisker graph. In all these, there were interpretations, calculations, and the

identification of missing values or trends. In 2023, a box-and-whisker graph and a single bar graph, interpretation and analysis, with calculations required.

Meanwhile, in 2022, histogram graphs, a table of cricketers awarded contracts, and a grid for drawing a graph were provided. There were calculations, graph analysis, graph drawing, and interpretation. Over the three years, the graphs were presented in more than three different forms, but they still required the use of calculation and interpretation skills.

Data are mostly presented in tables and graphs. Calculation skills are also required, where one of the measures needs to be calculated, explained, identified, or shown how a value was calculated. This skill is repeated each year, but its use varies. In 2024, the table showing fuel prices and exchange rates needed to identify one of the measures and calculate it will differ from the four-column table in the 2023 examination question paper. Analysis and drawing are required for a different measure. In the three years, analysis was also used to answer questions that required reading values from tables, providing examples, identifying arranged values, or writing values in full.

The assessment body should continue to alternate between assessing and comparing skills, and the application concept should be varied; in this way, the skills prediction will remain acceptable.

f. Scenario framing of items for a topic

The patterns observed indicate that the context used to measure data changes each year and assesses different skills, yet similar measures are used. The context used in graphs and tables differs each year but is related to the concept being assessed. The Data Handling context is content-related; each subtopic is built on it. For example, data representation can be assessed based on the data collected, thereby grounding it in real-life context. Additionally, if a table is provided, it must be grounded in real context. In

2024, a table on fuel prices was provided, requiring learners to identify the type of data and calculate the measure. In 2023, a table on shoe sizes and heights of matric learners was provided to calculate the measure and draw a graph. In 2022, a table of cricketers awarded contracts was provided to draw a graph and calculate. A context containing graphs and tables will likely appear in the next examination; however, the specific content and skills assessed cannot be predicted. Consequently, it is recommended that the examination body continue to vary the context by presenting different graphs and tables each year. The bar graphs vary by year, e.g., double-compound, triple-bar, stacked.

This topic and its concepts are context-oriented and cannot be assessed in isolation. For example, a birth chart used to assess BMI and percentiles is part of the measurement data and also provides the context for assessment. Graphs and tables presented are context-oriented and, at the same time, content to be assessed, e.g., interpreting a table showing people per workplace by province in 2022.

Summary of findings and recommendations for the IEB Mathematical Literacy Data Handling topic

Table 3.3.4 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.3.4: Summary of Findings and Recommendations on the Predictability of the 2022–2024 IEB Mathematical Literacy Data Handling Topic Paper (1)

Identified unacceptable predictability on topic coverage
There was no unacceptable predictability in this topic of Paper 1.
Recommendations to avoid unacceptable predictability on topic coverage
It is recommended that the Data Handling topic be assessed in Paper 1, specifically in Questions 1, 3, 4, and/or 5.
Identified unacceptable predictability on content coverage
There was no unacceptable predictability on content coverage.
Recommendations to avoid predictability in content coverage
In Data Handling, predictability cannot be avoided, since the content in each subtopic is vast and is covered each year under the subtopic being assessed. The content should be based on measuring data, representing data, and varying the classifying and collecting data.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Data Handling, the only strategy is to alternate the content in each subtopic. The content that uses the same principles should be alternated, e.g., representing data: the graphs can vary each year; for one year, it can be a pie chart or a stacked bar graph; next year, it can be a box-and-whisker plot, a compound bar graph, or a line graph, etc. In measuring data, the first year may include mean, mode, and quartiles; the next year, it may include median, range, and BMI.
Identified unacceptable predictability on topic weighting
There was no unacceptable predictability on the topic weighting. • The following topic marks were observed for each topic from 2022–2024: 1. Data Handling marks were 45, 54, and 59 in 2022, 2023, and 2024, respectively.
Recommendations to avoid unacceptable predictability on topic weighting

Set questions that will involve measuring, representing, and classifying and organising data. The mark allocation should range between 45–61. These subtopics should appear in Questions 1, 3, 4, and/or 5.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid assessing non-examinable subtopics.
Identified unacceptable predictability on item types
There was no unacceptable predictability in the identified item types.
Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that the unacceptable predictability item types will not appear. Measuring and representing data should be assessed, and the following item types should alternate within each subtopic: short answers, calculations, and graph drawing, based on the table and graphs provided.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
There is no unacceptable predictability in topic-skill pairing. In the past three years, the following skills were assessed repeatedly among the Data Handling subtopics: 1. Calculating. 2. Table, graph, and diagram interpretation and analysis; and 3. Drawing skills.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper

Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.
Identified unacceptable predictability in the scenario framing of items
There was no unacceptable predictability in the scenario framing, as each question is content- and context-based.
Recommendations to avoid unacceptable predictability in scenario framing of items.
Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
Use the content within each subtopic to develop scenarios that assess the relevant concepts. For example, box-and-whisker plots can be used to assess quartiles, percentiles, and other measures.

Table 3.3.5 below provides a summary of the analysis conducted to determine the level of predictability for the Probability topic for IEB Mathematical Literacy Paper 1 examinations from 2022 to 2024.

Table 3.3.5: Findings on the Predictability of the Inventories Topic for the IEB Probability Paper 1 Examinations from 2022–2024

Topic: Probability							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**
2022	✓	Expression of probability	**8**	Calculations	8 Marks	L2, L3	L2, L3

	X	Prediction					
	X	Representation for determining possible outcome					
	X	Evaluate the expressions of probability					
2023	✓	Expression of probability	**7**	Calculations	7 Marks	L2, L3	L2
	X	Prediction					
	X	Representation for determining possible outcome					
	X	Evaluate the expressions of probability					
2024	✓	Expression of probability	**6**	Calculation	4 Marks	L2	L1, L2
	X	Prediction					

	✓	Representation for determining possible outcome		Drawing	2 Marks	L2	L3
	X	Evaluate the expressions of probability					

Table 3.3.5 presents a comparative overview of the Probability topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.3.5 have contributed to the predictability of the IEB Mathematical Literacy final examination question Paper 1 from 2022 to 2024.

a. Topic coverage

The findings indicate that the Probability topic has been assessed in all three years. It is therefore likely to appear in the following year, as it forms part of the prescribed application topic to be assessed in Paper 1. It constitutes 5% of Paper 1 and should be 7 marks out of 150. The assessment body should adhere to the SAGs prescription for assessing the Probability topic. This topic plays a core role in mathematical literacy, as it covers a part of being mathematical in everyday life.

b. Content coverage

The findings indicate that Probability is assessed each year, focusing on expressions of probability. This subtopic will frequently focus on the same skill but in different contexts; thus, it will seem to be more than the others due to its integration with other subtopics and the broader context in which it is assessed. Representation for determining possible outcomes is another topic that appears in one

year, and it's also linked to the section on expressions of probability. The topic is likely to appear after 2 years, based on the observed assessment pattern. The subtopic, such as Evaluate expressions of probability, is not assessed because it is more of a practical topic that involves developing and evaluating; it is not easily assessed due to its nature, e.g., developing a game and evaluating its fairness. The topic will likely be omitted each year.

Prediction is another topic that has been omitted over the past three years. It is not easily assessed, as it is generally context-based and focuses on probability and likelihood, which are difficult to assess, given the principle of negation or what may not be realistic. As in an authentic context, it's not easy to make predictions from questions alone. For example, in 2024, the table on petrol prices and exchange rates could ask a question such as: what is the likelihood of choosing a petrol price with an exchange rate greater than R18? The assessment bodies should continue to assess in this way, with topics such as the expression of probability assessed each year and prediction and the evaluation of the expression of probability omitted each year. Representation: to determine possible outcomes, assess on an alternative basis, e.g., two consecutive years or every second year.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 7 marks across Paper 1, with no variance. This suggests that the marks cannot exceed the maximum or fall below the minimum. Then, the mark allocation over the past three years is as follows: 8, 7, and 6 marks in 2022, 2023, and 2024, respectively. This shows a decrease in mark allocation from 2023–2024, which is not in line with the prescribed allocation, although 2023 adhered to the prescribed topic weighting according to the SAGs. This indicates that the mark allocation for the following year's exams will not be 7 marks. Examiners should ensure that the mark allocation should always be 7 marks and topics that needs to be varied during assessment are varied and those need to be omitted are not assessed, to ensure that the mark allocation remain the same; e.g., not to assess predictability each year, they should alternate it for instance in 2022,

the mark allocation was 9marks due to 2 marks allocated to predictability, which means that adding predictability, without reducing marks on expression of probability, made the topic to be over assessed. That changed the allocation to be above 7.

d. Variation in item types

The evaluation indicates that the calculation has been used in the past three years to assess the concepts. In the past three years, the mark has varied as the examiner has constantly indicated the specification on how the expected response should be, for example, express the probability as a percentage or fraction. Such questions increase the difficulty level. The use of a table or tree diagram to present information on probability increases the cognitive demand to Level 3. In the past three years, tree diagrams, graphs, and box-and-whisker plots have alternated to represent probability questions. The observed pattern indicates that when information is presented in a tree diagram and probability is to be calculated, cognitive demand increases. If the questions specify how the calculation should be done, then the level of difficulty will increase. The examiners should alternate the probability questions to maintain the pattern and avoid predictability; e.g., change the specification and use tables, graphs, and tree diagrams to assess.

e. Topic and skill pairing

The findings provide evidence that calculation skill has been used in Probability, as this skill makes it easier to answer questions about the expression of probability. The tree diagrams or graphs vary in how they are interpreted and used, depending on the context and the required response. Furthermore, Probability is not calculated in isolation; its content is linked to the other application topics. For example, in Paper 1, Probability is integrated within the Finance and Data Handling topics. Therefore, if it's in Finance, it will be asked under the Finance content, such as financial documents, and calculation skills will be required. When data appear in graphs, tree diagrams, and box-and-whisker plots, then graph and diagram interpretation and calculation are required. Moreover, manipulation or simplification can also be assessed when the question specifies a specific format for presenting the expected response. For example, calculate the probability and express it as a decimal fraction.

Expressions of probability content are mostly presented in graphical and diagrammatic form. Calculational skill is also required, with a specific format beyond only calculating. This skill is repeated each year, but varies in how it is used: in 2024, to calculate and express in a simplified fraction; in the 2023 examination question paper, to calculate the probability as a decimal number; and in another question, as a fraction. In 2022, calculate the probability as a percentage. The representation for determining possible outcomes is mostly presented in tables and tree diagrams, and the skills for drawing and completing them to identify possible outcomes.

Furthermore, calculation skills are required to express the outcomes as fractions, decimals, or percentages. The assessment body should continue to alternate between assessing comparing skills and applying the concept. In this way, skill predictability will remain acceptable, while the application of concepts should be varied.

f. Scenario framing of items for a topic

The patterns observed indicate that the context used for expressions of probability changes each year, first depending on the application topic and, second, on the form of content representation used (e.g., table, graph, diagram, paragraph). Examiners should continue varying the contexts and skills assessed each year while maintaining similar levels of cognitive demand. The context used differs each year but is related to the concept being assessed.

This topic, with its concepts, is content- and context-oriented, meaning its concepts cannot be assessed in isolation. For example, expressing probability as a decimal may be assessed within the Finance topic using an income tax context. In 2022, cell phone contracts from three different service providers were provided to calculate the probability of choosing MTN. In Data Handling, underrepresentation of data, a tree diagram showing two types of athletic footwear was provided in the 2024 examination question

paper; probability was to be expressed as a decimal and as a percentage, and the tree was to be completed to find the missing outcomes. Examiners should assess in this manner to avoid predictability and maintain year-over-year skill predictability.

Summary of findings and recommendations for the IEB Mathematical Literacy Probability topic

Table 3.3.6 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.3.6: Summary of Findings and Recommendations on the Predictability of the 2022–2024 IEB Mathematical Literacy Probability Topic Paper (1)

Identified unacceptable predictability on topic coverage
There was no unacceptable predictability in this topic of Paper 1.
Recommendations to avoid unacceptable predictability on topic coverage
The recommendation is to ensure that the Probability topic is covered under Data Handling and under Finance in the Question Paper 1.
Identified unacceptable predictability on content coverage
The content that appeared is based on the subtopic of Probability, specifically the expressions of probability and their representations, for determining possible outcomes. These appear across the three-year examination question papers. Therefore, there is no unacceptable prediction on content coverage.
Recommendations to avoid predictable content coverage

In Probability, predictability cannot be avoided, since the content in the subtopic varies; each year, the content covered in the part of the subtopic assessed changes. Ensure that the topics assessed vary each year to avoid predictability.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Probability, the only strategy is to alternate the content in each topic and the expression required. The content that uses the same principles should be alternated.
Identified unacceptable predictability on topic weighting
There was no unacceptable predictability in topic weighting, but there was variation in the Probability distribution. The following topic marks were observed for each topic from 2022–2024: 1. The Probability marks were 8, 7, and 6 in 2022, 2023, and 2024, respectively.
Recommendations to avoid unacceptable predictability on topic weighting
Set questions that will cover a total of 7 marks for Probability.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure the recommended subtopics are covered and avoid both over- and under-assessment.
Identified unacceptable predictability on item types
The item types used in Probability over the past three years have been calculations, drawings, or tree diagrams. These item types allowed for variation and increased cognitive level and difficulty. These items are acceptable for the type of expected response. There is no unacceptable predictability on item types.
Recommendations to avoid unacceptable predictability on item types
Questions should be based on subtopics such as the expression of probability and representation, to determine possible outcomes and ensure that appropriate item types are used. Then the unacceptable predictability of item types will not appear.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper

Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
The topic-skill pairing that appeared over three years was calculation, diagram and graph interpretation, and simplification. These skills align with the subtopic being assessed, which includes a tree diagram, graphs, and box-and-whisker plots. There is no unacceptable predictability in topic-skill pairing.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills using the following representations, graphs, tables, and diagrams, ensuring that graph and table interpretation and diagram completion and simplification are used to avoid unacceptable predictability.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.
Identified unacceptable predictability in the scenario framing of items
The scenarios identified are based on the content being assessed. Each content is context-aligned. Probability is assessed in the context of Finance and Data Handling; its context will be based on these topics. Therefore, there is no unacceptable scenario framing, as each question is content- and context-based.
Recommendations to avoid unacceptable predictability in scenario framing of items.
Use scenarios based on the assessed content, focusing on Finance and Data Handling.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
Use the content in each subtopic to create a scenario that will assess the topic.

Conclusions

The IEB Mathematical Literacy Paper 1 examinations from 2022 to 2024 did not exhibit any unacceptable predictability. While overall topic coverage remained consistent, the way specific subtopics were assessed varied over the three-year period. This variation reduced the likelihood that candidates could accurately predict the exact content or format of the questions to be assessed.

3.4: MATHEMATICAL LITERACY PAPER 2

This section presents an analysis of the IEB final examination question papers for Mathematical Literacy Paper 2 from 2022 to 2024. The findings for each topic are summarised in Tables 3.4.1–3.4.6.

Table 3.4.1 below provides a summary of the analysis conducted to determine the level of predictability for the Measurement topic for IEB Mathematical Literacy Paper 2 examinations from 2022 to 2024.

Table 3.4.1: Findings on the Predictability of the Measurement Topic for the IEB Mathematical Literacy Paper 2 Examinations from 2022–2024

Topic: Measurement							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**

2022	✓	Conversion	**63**	Calculations and complete missing value MCQs	16 Marks	L1, L2, L3	L1, L2, L4
	X	Measure length, weight, volume and temperature					
	✓	Perimeter, area and volume		Calculations and MCQs	38 Marks	L1, L2	L1, L2, L3
	✓	Time		Short answers and calculations	6 Marks	L1, L2, L3	L1, L2
2023	✓	Conversion	**86**	Short questions, calculations and fill-in	28 Marks	L1, L2	L1, L2, L4
	X	Measure length, weight, volume and temperature					

	✓	Perimeter, area and volume		MCQ, calculations and fill-in	45 Marks	L1, L2, L3	L1, L2, L3
	✓	Time		Calculations	13 Marks	L1, L2, L3	L1, L2, L3, L4
2024	✓	Conversion	**85**	MCQ and calculations	6 Marks	L1, L2, L3	L1, L2
	X	Measure length, weight, volume and temperature					
	✓	Perimeter, area and volume		MCQ, calculation and short questions	44 Marks	L1, L2, L3	L1, L2, L3, L4
	✓	Time		Calculations, short questions and drawing	11 Marks	L1, L2	L1, L3

Table 3.4.1 presents a comparative overview of the Measurement topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.4.1 have contributed to the predictability of the IEB Mathematical Literacy final examination question Paper 2 from 2022 to 2024.

a. Topic coverage

The findings indicate that the Measurement topic has been assessed in all three years. It is therefore likely to appear in the following year, as it forms part of the prescribed application topics to be assessed in Paper 2. It constitutes 55% of the Paper 2 exam and approximately 83 marks out of 150. The assessment body should adhere to the SAGs prescription for assessing the Measurement topic. This topic plays a core role in mathematical literacy, as it covers a large part of being mathematical in everyday life.

b. Content coverage

The findings indicate that the subtopics perimeter, area, and volume were linked to conversion within the Measurement topic. This subtopic will frequently appear, focusing on the skills required in measurement, so it will seem to appear more than the others due to the link between these subtopics during the examination. Time is another topic that appears throughout the three years, as it's an integral subtopic of Measurement and should be assessed each year. It is likely to appear in the next examination. Subtopics such as measuring weight, length, mass, and temperature are not easily assessed, as they focus on practical aspects of measurement. In the past three years, they have not been assessed. Although some components of this topic were assessed in examinations, for example, in 2024, a picture of a clock without clock hands was provided, requiring learners to convert digital time to analogue time.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 83 marks for Paper 2, with a ±8 mark variance. This suggests that, from the prescribed 83 marks, the total can increase or decrease by a maximum of 8 marks. With such knowledge, the variation in marks for the past years was 63, 86, and 85 in 2022, 2023, and 2024, respectively. This indicates an increase from 2022 to 2023 and a decrease from 2003 to 2024, but when considering the variance, the mark allocation remains the same in 2023 and 2024, as it falls within the prescribed range. Only 2022 was under-assessed. This indicates that the mark allocation for the following year's exams will range from 75 to 92. Examiners should ensure that the mark allocation remains within the prescribed range of 75 and 92 by varying the topics

assessed, so that the mark allocation remains the same, e.g., by not assessing measuring weight, mass and temperature, or by not under-assessing the topic. That will change the allocation to be above 92 or below 75.

d. Variation in item types

The evaluation indicates that calculations and short-answer questions have been used over the past three years to assess concepts in measurement. Calculations have remained the same across the years. Short answers, in small quantities, have also been used over the past three years, particularly in questions that require reasons or justification, or in example-type questions. Furthermore, in the past three years, other item types have been introduced, such as choice, fill in, and complete a diagram. Choice questions, in the form of MCQs, account for a small portion of the marks in the examination question papers. For example, in 2022 there were three-choice questions, each worth only 6 marks; in 2023, there was one-choice question, worth 2 marks. In 2024, there were 2 MCQs, each worth 4 marks. The fill-in type questions, which accounted for approximately 15 marks over the three years, consist of filling in the missing part of a formula, completing incomplete steps, filling in the gap to complete a statement, or filling in the missing part of a diagram.

The mark variation depended on the extent of the section it covered. For instance, short-answer questions are mostly time-based, and a small portion of perimeter, area, and volume questions are also time-based. These questions were of lower cognitive demand, with difficulty ranging from easy to moderate. Words such as 'identify', 'read off', or 'write down in words' increase cognitive demand and, in some instances, the level of difficulty. For example, in the 2022 Paper 2, learners were asked to write the number of minutes in words without using numerals. The response should take into consideration that the value is a complex number; with this in mind, the level of difficulty will increase from easy to moderate, and the cognitive demands will remain the same. Calculation questions that involve substitution into the formula increase the difficulty level and cognitive demands depending on the response, as they

focus on choosing the correct formula, manipulating and simplifying, and providing specific instructions on how the answer should be presented and rounded to the nearest value.

Furthermore, minimise the use of fill-in-type questions, as they reduce the level of difficulty and cognitive demand by providing scaffolding. For example, in 2022, a conversion question provided the conversion factor, requiring learners only to complete the operation and the answer. The cognitive level is 1, and the difficulty level is easy. In 2023, when substituting for the formula questions, some values were omitted; the student needed to fill in the missing parts of the formula to get the expected response. This decreases the level of difficulty while the cognitive demand remains the same.

Predictability may occur only in terms of subtopics and, to some degree, the type of questions, e.g., calculations with recipes and subtopics such as time, perimeter, area, volume, and conversion. The level of difficulty and cognitive levels cannot be predicted, as each question will be based on content-context relationship. In conclusion, predictability will not be easily identified. Examiners should continue to distribute questions with varying levels of cognitive demand and difficulty, using terms and words to differentiate between them.

e. Topic and skill pairing

The findings provide evidence that calculation skill has been used in the Measurement topic, as this skill makes it easier to answer questions related to conversion, area, perimeter, and volume. Table and diagram interpretation is an effective skill used in subtopics such as conversion, area, perimeter, and volume. These skills are repeated each year, too, such as the pattern that questions involving recipes are provided, and those involving volume, area, and perimeter are provided. The table and diagram are interpreted and used differently depending on the context and the required response. In 2022, when the ingredients are increased to accommodate a certain number, the quantity of the item required in the recipe is doubled. In 2022, perimeter, volume, and area

formulas were provided with diagrams based on the context of a soccer field and a water bottle. In 2024, the volume and area formulas for circles and rectangles were presented in the context of a circular field, with irrigation and its tools shown. In 2023, the formula for perimeter, with a diagram of a bicycle, and the formulas for volume and area, with diagrams, were provided. Over the three years, different diagrams and the same formula were presented, but the calculations still require skills in area, perimeter, and volume.

Conversion and time also require skills in calculating, short-answer questions, and interpreting tables. Conversion and time are also integrated into the recipe table, where short answers are required for time interpretation, e.g., how long will it take to prepare the recipe, or at what time will the dish be ready. The short questions are mostly lower-order, easy questions. Question types that involve calculations increase cognitive demand and difficulty. Time conversions between different time formats increase difficulty, while the cognitive level remains the same. Moreover, recipes that involve metric conversions and mass conversion factors increase difficulty and cognitive load. Lastly, integrating these topics into a diagram increases cognitive load and difficulty; the latter might remain the same or increase. For example, a question where dimensions of the diagram have different units, and the expected answer should be of a specific unit. Calculation skills will be used to convert, substitute, and simplify, resulting in calculations that are either multi-step or involve known procedures. When reverse calculations involve manipulating the formula, simplifying, and converting with rounding according to context, the cognitive level increases from knowing to multi-step, and the level of difficulty increases too, to difficult and very difficult. Writing answers based on context mostly increases the difficulty, as the context changes each year.

The assessment body should continue assessing these skills within the same content areas while varying the contexts and applications to minimise predictability. The level of skills assessed and the application of concepts should also be varied; for example, one year may focus on area and volume, while the following year focuses on perimeter and density/capacity. Table interpretation and completion may be assessed annually, but the diagrams and contexts should be varied.

f. Scenario framing of items for a topic

The patterns observed indicate that the diagrams are used each year but are assessed using different skills. The context of a recipe assesses concepts such as conversion, time, and, to some extent, perimeter, area, and volume. For example, a cake recipe may require learners to calculate the area needed for preparation, determine whether the cake will fit into a container, and calculate the volume occupied by a specific quantity of cake. The use of scientific, technological, and mathematical contexts to assess perimeter, area, and volume indicates how effectively the subtopic integrates into the context. This further indicates that contexts cannot be predicted, as different topics can be embedded within a variety of contexts. With Measurement, even context prediction is not possible, as it could be any life-related scenario that assesses the skills and concepts.

It is recommended that the examination body continue to vary the context each year by presenting a different diagram and different conversion context. As these concepts are context-oriented, they cannot be assessed in isolation.

Summary of Findings and Recommendations for the IEB Mathematical Literacy Measurement topic

Table 3.4.2 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.4.2: Summary of Findings and Recommendations on the Predictability of the 2022–2024 IEB Mathematical Literacy Measurement Topic Paper (2)

Identified unacceptable predictability on topic coverage
There was no unacceptable predictability in the Measurement topic of Paper 2.
Recommendations to avoid unacceptable predictability on topic coverage
The following subtopic must be assessed each year to avoid unacceptable prediction errors in time, perimeter area, and volume.
Identified unacceptable predictability on content coverage
There is no unacceptable prediction on content coverage. The following content appeared consistently over the past three years: 1. Measurement – conversion, area, perimeter, volume, and time.
Recommendations to avoid predictability in content coverage
In Measurement, predictability cannot be avoided, since the content in each subtopic is vast and changes each year in the assessed part of the subtopic.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Measurement, the only strategy is to alternate the content in each subtopic. Alternate content that assesses the same principles; e.g., one year: perimeter, volume, area of a rectangle; next year: area of a circle; following year: integrated shapes (circle, rectangle, triangle).
Identified unacceptable predictability on topic weighting
There was no unacceptable predictability in topic weighting, but there was a variation within Measurement where the marks allocated were generally greater than the prescribed marks. The following topic weightings were observed for each topic: The marks were 63, 86, and 61 in 2022, 2023, and 2024, respectively.
Recommendations to avoid unacceptable predictability on topic weighting

Questions should be set to measure, with a total of 75–91 marks out of 150. Avoid adding non-examinable topics and subtopics that are not easily assessed, as they are more practical than theoretical.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid assessing non-examinable subtopics.
Identified unacceptable predictability on item types
There was no unacceptable predictability in item types; only variation in fill-in, completing a sentence or step, and MCQs. The following item types were observed over the three years: 1. Calculation, short answers, fill-in, drawing, and completing missing values.
Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that unacceptable predictability item types do not appear. For example, conversion will require calculations and table interpretation; the chosen context should align with the content being assessed.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified. Avoid matching type or choice that assess in isolation of content and context.
Identified unacceptable predictability on topic–skill pairing
There was no unacceptable predictability in topic-skill pairing. The following was observed: 1. Calculating skills to be able to get the required response; 2. Interpretation skills; 3. Manipulation skills of formulas; and 4. Drawing skills.

Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.
Identified unacceptable predictability in the scenario framing of items
There was no unacceptable predictability in the scenario framing item. The following patterns were observed: 1. The scenarios used were based on the content being assessed; 2. The scenarios used were based on the skills required for the content being assessed; and 3. The scenarios used were authentic and concrete examples, relating to the content of measurement.
Recommendations to avoid unacceptable predictability in scenario framing of items.
Use the scenario based on the assessed content; it should be related and more relevant to it.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
The examiner should use an authentic, context-oriented scenario based on the assessed topic.

Table 3.4.3 below provides a summary of the analysis conducted to determine the level of predictability for the Maps and Plans topic for IEB Mathematical Literacy Paper 2 examinations from 2022 to 2024.

Table 3.4.3: Findings on the Predictability of the Maps and Plans Topic for the IEB Mathematical Literacy Paper 2 Examinations from 2022–2024

Topic: Maps and Plans							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**
2022	✓	Scale	**78**	Calculations and drawings	10 Marks	L2, L3	L2, L3
	✓	Maps		Short answers, calculations and choice type	14 Marks	L1, L2, L3	L1, L2
	✓	Plans		Matching type and calculations	29 Marks	L1, L2, L3	L2, L3, L4
	✓	Models		Matching type and calculations	25 Marks	L1, L2, L4	L1, L2, L3, L4
2023	✓	Scale	**50**	Drawing and calculations	6 Marks	L3	L2, L3
	✓	Maps		Drawing, short answers and calculations	23 Marks	L1, L2	L1, L2, L4

	✓	Plans		Short answers and calculations	15 Marks	L1, L3	L1, L3
	✓	Models		Matching type	6 Marks	L2	L2
2024	✓	Scale	**79**	Calculations and short answers	12 Marks	L1, L2, L3	L1, L3
	✓	Maps		Calculations, short answers and drawings	33 Marks	L1, L2	L1, L2, L3
	✓	Plans		MCQs and short answers	12 Marks	L1, L2	L1, L2, L4
	✓	Models		Short answers and calculations	22 Marks	L1, L2	L1, L2, L3, L4

Table 3.4.3 presents a comparative overview of the Maps and Plans topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.4.3 have contributed to the predictability of the IEB Mathematical Literacy final examination question Paper 2 from 2022 to 2024.

a. Topic coverage

The findings indicate that Maps and Plans have been assessed in all three years. It is therefore likely to appear in the following year, as it forms part of the prescribed application topics to be assessed in Paper 2. It constitutes 40% of Paper 2 and approximately 60 marks out of 150. The assessment body should adhere to the SAGs prescription for assessing the Maps and Plans topic. This topic plays a core role in mathematical literacy, as it covers a part of being mathematical in everyday life.

b. Content coverage

The findings indicate that Maps and Plans and Models are subtopics assessed each year. These subtopics will frequently focus on the same skill but in different contexts; thus, they may seem to be more than the others due to integration and a broader context that assesses them. Scale is another topic assessed each year; it is rarely assessed in isolation, as it is linked to both Maps and Plans. The topic will likely be assessed in the next examination. Maps and Plans appear more than Models and Scale. Models are assessed separately, as they focus on a smaller section of everyday life representation, such as assembly, which involves reading instructions or following diagrams to make a model of an item purchased. The section on packaging within models also takes up a small portion of an examination question paper, as most of it is more practical than theoretical and not easily assessable. Thus, in some instances, they are not integrated within the same context, including Maps and Plans. These topics are all predictable and will be assessed in the next year's examination.

Their predictability is limited to the subtopic, but predicting which part of the subtopic will appear is not possible, as vast concepts fall under each subtopic. For example, in models, the type of assembly assessed each year varies; in 2024, a chessboard was built, and in 2023, instructions for making Aero Chocolate Fudge were provided. In 2022, steps and instructions for building a model of a space shuttle were provided. Each required a specific skill for responding to it. Furthermore, the response to each type depends on the context in which it is being assessed. For example, the instructions for making a cake will differ from those for building a space shuttle. The observed pattern indicates that a map, plan, and model are assessed each year.

Additionally, one or two parts of each subtopic will appear in each assessment year. For example, each year an assembly diagram and/or packaging, a map, and a plan will appear, or the assembly and packaging could appear in the same paper the following year. Meanwhile, when assessing scale, such as drawing a 2-dimensional scale diagram, it may seem to appear each year; then the scale may alternate between years. Therefore, it will not be possible to predict which pattern will occur the following year.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 60 marks for Paper 2, with a ±8 mark variance. This suggests that, within the prescribed 60 marks, the total can be increased or decreased by up to 8 marks. With such knowledge, the variation in marks over the past years was 78, 50, and 79 in 2022, 2023, and 2024, respectively. This indicates an increase in 2022 and 2024, and a decrease in 2023, even after accounting for the variance. The mark allocation did not remain within the prescribed range: in 2022 and 2024 it was over-assessed, while in 2023 it was under-assessed. The increase in marks was due to the model being over-assessed, with packaging and assembly combined and more marks allocated to packaging. This indicates that the mark allocation in the following year's exams will not fall within the range of 52 to 68.

Examiners should ensure that the mark allocation remains within the prescribed range of 52 and 68 by ensuring that the subtopics that need to be assessed in isolation, and those that are not easily assessed in isolation, are not allocated higher marks. For example, scale questions should not be allocated higher marks than Maps and Plans when assessed in isolation, and models should not be allocated more marks when both sections are assessed (packaging and assembly). This will ensure that the marks remain within range.

d. Variation in item types

The evaluation indicates that calculations and short questions have been used in the past three years to assess the concepts of Maps and Plans. These item types remained the same across the years. Additionally, a few questions in MCQs and matching formats were included each year, with fewer marks allocated to them. Moreover, drawing-type questions were included in the past 3 years, such as drawing a 2-dimensional shape or a route on a map. Over the past three years, based on calculations, when a scaffold was used during questioning, the cognitive demand decreased, and marks were distributed across the individual questions. If not, the level of cognitive demand increased, as the mark allocation increased with the number of steps required. For example, if the scale

factor and the scale values are provided, drawing a 2-dimensional shape will be at cognitive demand Level 2 and difficulty Level 2. However, if the scale is provided and learners must determine each side length before drawing, the cognitive level increases while the difficulty level remains the same. The number of marks and required steps also increase, as marks are allocated for converting each side using the scale, accurately drawing each side, and labelling the diagram.

In terms of marks, it depends on the type of question asked and the expected response. For example, in 2022, a map used only 3 marks for scale, as it only required a bar scale to measure the distance between two places, with the distance to be measured labelled this required calculations. In 2023, a layout plan was used: 5 marks were required to convert, then use the scale to find the sides, then calculate the area. In 2024, a floor plan was used with only 4 marks to determine the scale required to measure in mm, and the actual distance was provided in mm; thereafter, to substitute and simplify.

If words such as 'round to a specific number' are used, the difficulty level will increase in such questions. The use of words such as 'shows' indicates that the cognitive demand increases to Level 4, while the level of difficulty depends on the expected response. For example, in 2022, a model question presented calculations to determine whether 4 boxes will fit. The level of difficulty was 4, as there was conversion and rounding down. The cognitive demand was 4, as it's a conclusion-type question. In 2023, the map question showed that if Amy-May is dropped at 12:10, she will arrive at 12:40. The cognitive demand was Level 4; the difficulty level was 2, as the distance and speed were provided and needed to be substituted and converted. The short-answer questions are mostly at the same level of difficulty and cognitive demand, except that when specific words are used, such as verify or provide two or more reasons, the cognitive level increases to 4 and the difficulty increases, depending on the number of responses required.

Questions with practical application, such as measuring distance in a plan or map, drawing, then calculating, or showing how the value was calculated, generally increase cognitive level, and the mark allocation increases. If further instruction is provided on

converting or rounding, the level of difficulty will increase. Moreover, most Packaging questions require practical calculations; the cognitive level is higher, and difficulty increases with the level of structure represented. For example, a 2-dimensional shape will be easier than a 3-dimensional shape. This prediction should be maintained, with scaffolding continuing for scales and models, as well as for short answers and calculations, to maintain an acceptable level of difficulty and cognitive load. Eliminating the scaffolding in such questions raises them to a higher cognitive level (Levels 3 or 4) and increases their difficulty.

e. Topic and skill pairing

The findings provide evidence that calculation and interpretation skills have been used in Maps and Plans, as these skills make it easier to answer questions about maps, scales, models, and plans. Manipulation is an effective skill used in subtopics such as Maps and Plans and Packaging. For example, learners may need to manipulate the speed formula by using given speed and distance values to calculate time. Interpretation skills are also assessed when maps, models, diagrams, or plans are provided, requiring learners to identify, locate, state, or describe examples and trends. The interpretations depend on the type of topic and context used with the required response. There was also evidence of drawing skill over the past 3 years, including 2-dimensional diagrams and route maps.

In 2024, for Packaging, a chessboard was provided with the patterns that appear on it. The information provided was to be interpreted and calculations performed to answer the questions, such as how many spaces will remain if 16 pieces are to be placed. In 2023, a shelf to store tomato cans was provided with its dimensions, and the dimensions on the tin were also provided. The diagram and the information provided needed to be interpreted, then calculations performed to get the correct response, showing that the tin will fill two shelves. In 2022, boxes for shoes with transport boxes to store the shoe boxes were provided, along with the dimensions of each box. The information provided needed to be interpreted, and calculations were performed to confirm that four boxes of

shoes will fit in the transport box. Over the three years, the Packaging question was presented in more than three different forms, yet it still required skills in calculation and interpretation.

In Maps and Scales, calculation and drawing skills were also required, as one needs to calculate the value before drawing a 2-dimensional shape or read the information before drawing the route on the map. These skills are repeated each year, but they vary in how they are used. In 2024, a street map of Durban showing the route to a specific location was required. In 2023, a street map of Cape Town was needed to find the most direct route between two points. In 2022, a floor plan of a flat, the 2-dimensional shape of the bedroom wall, and the wall's dimensions, with the scale used to draw the wall, were required to accurately draw a 2-dimensional shape of the back of the wall using drawing skills. The interpretation skill was also used to answer questions that require reading values or identifying places on maps or plans, and to provide examples or reasons.

The assessment body should continue to alternate between assessing skills and applying the concept, and vary the way the concept is applied; in this way, the skills prediction will remain acceptable.

f. Scenario framing of items for a topic

The patterns observed indicate that the context used for Maps and Plans changes each year and assesses different skills, while still using similar concepts. For instance, models change each year; in 2022, a space shuttle that needed to be assembled was provided; in 2023, a recipe for Aero Chocolate Fudge and instructions were provided. In 2024, an irrigation arm with wheels and supporting pipes was provided for assembly. The scale as a subtopic cannot be assessed in isolation. For example, in 2024, a floor plan of a single house was provided, and learners were required to determine the scale used to draw it. In 2023, a street map with a bar scale was provided, and learners were required to calculate the distance to be walked between two destinations using the bar scale. In 2022, a provincial map was provided with a bar scale; learners were required to calculate the values. The pattern indicates that the

topics are context-dependent, and the context changes depending on the topic being assessed. Predictability is based on subtopics, not on context. Each year, maps, plans, models, and scales will be assessed. The context and the skills required are unpredictable, as they depend on the relationship between context and content.

It is recommended that the assessment body continue to vary the context each year by presenting a different map, plan, and model.

Summary of findings and recommendations for the IEB Mathematical Literacy Skills and Maps and Plans topic

Table 3.4.4 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.4.4: Summary of Findings and Recommendations on the Predictability of the 2022–2024 IEB Mathematical Literacy Maps and Plans Topic Paper (2)

Identified unacceptable predictability on topic coverage
No unacceptable predictability was identified in this topic in Paper 2. The following three topics were assessed in the examination papers from 2022–2024: 1. Measurement; 2. Maps and Plans; and 3. Probability.

Recommendations to avoid unacceptable predictability on topic coverage
The following topics should be included in Paper 2: 1. Measurement; 2. Maps and Plans; and 3. Probability. Probability should be integrated into the two topics rather than assessed separately.
Identified unacceptable predictability on content coverage
There was no unacceptable predictability on content coverage. The following content consistently appeared over the past three years: 1. Maps and Plans – maps, plans, models, and scales. These patterns align with the intended curriculum and generally provide adequate coverage of the prescribed content.
Recommendations to avoid predictable content coverage
In Maps and Plans, predictability cannot be avoided, since the content in each subtopic is vast and the content covered in the part of the subtopic assessed changes each year. Paper 2 content should be assessed as follows: 1. Question 1 should consist of a combination of Maps and Plans and Measurement; 2. Question 2 should consist of Measurement and Probability; 3. Question 3 should consist of Maps and Plans and/or Probability; and 4. Questions 4 and 5 should integrate the Maps and Plans, Measurement, and Probability. These are aligned with the assessment prescripts for Paper 2.
Strategies to maintain content coverage that do not lead to a predictable question paper

In Maps and Plans, the only strategy is to alternate the content in each subtopic. Alternate content that assesses the same principles; for example, use different map types each year (e.g., strip, provincial, national, route, or street maps).
Identified unacceptable predictability on topic weighting
There was no unacceptable predictability in topic weighting marks. The following topic marks were observed for each topic: 1. Maps and Plans: the marks were 78, 50, and 79 in 2022, 2023, and 2024, respectively.
Recommendations to avoid unacceptable predictability on topic weighting
The topic weighting should be aligned with the following structure to avoid unacceptable predictability: 1. Measurement range between 75 and 91 marks. These weightings are aligned with the CAPS and SAGs. This will ensure that the marks are distributed proportionally across topics over the years.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid assessing non-examinable subtopics.
Identified unacceptable predictability on item types
There was no unacceptable predictability in item types; only a variation in matching type and MCQs. The following item types were observed over the three years: 1. Calculation, short answers, drawing, and practical calculation (packaging), matching type (assembly).
Recommendations to avoid unacceptable predictability on item types
The following item types of calculation, short answers, drawing, matching type (for assembly) and practical calculation (packaging)are to be used each year and integrated across the topics in Paper 2, as they are repeatedly used for specific topics across the examination cycle.

Questions based on the recommended subtopic will ensure that unacceptable predictability item types do not appear. The paper's format requires certain questions to be topic-based, e.g., Question 3 should consist solely of Maps and Plans.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
There was no unacceptable predictability in topic-skill pairing. The following was observed: 1. Calculating skills to be able to get the required response; 2. Interpretation skills of maps, plans, and assembly diagrams; and 3. Drawing skills. These skills are linked to the subtopic being assessed, since the same topic is generally paired with the same skill.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills. Ensure that the topic-skill pairing varies from year to year. For example: a house floor plan for one year, a floor plan of a soup kitchen for another year, or a floor plan of a flat requires calculation and interpreting skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.
Identified unacceptable predictability in the scenario framing of items
There was no unacceptable predictability in the scenario framing, as each question is content- and context-based. The following patterns were observed: 1. The scenarios used were based on the content being assessed; 2. The scenarios used were based on the skills required for the content being assessed; and

3. The scenarios were authentic and concrete examples, relating to the content in Maps and Plans.
Recommendations to avoid unacceptable predictability in scenario framing of items.
Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
Develop contextual scenarios for each subtopic that assess the prescribed content and skills. For example, the Birth Chart subtopic should be assessed through scenarios requiring learners to interpret and apply concepts such as BMI, growth percentiles, and related health indicators.

Table 3.4.5 below provides a summary of the analysis conducted to determine the level of predictability for the Probability topic for IEB Mathematical Literacy Paper 2 examinations from 2022 to 2024.

Table 3.4.5: Findings on the Predictability of the Probability Topic for the IEB Mathematical Literacy Paper 2 Examinations from 2022–2024

Topic: Probability							
Year	**Examined (✓) or not examined (X)**	**Concepts covered by the topic**	**Overall weighting of the topic**	**Item type/types (e.g., MCQ, essays, short answers, table, etc.) per concept**	**Marks allocated per item type**	**Level of difficulty per item type**	**Cognitive level per item type**

2022	✓	Expression of probability	**9**	Calculations, MCQs and tree completion	5 Marks	L1, L3	L1, L2
	X	Prediction					
	✓	Representation, for determining possible outcome		Calculations and tree completion	4 Marks	L2	L3
	X	Evaluate the expressions of probability					
2023	✓	Expression of probability	**14**	Calculation (table)	4 Marks	L1, L2, L3	L2, L3, L4
	✓	Prediction		Complete a scale	4 Marks	2	2
		Representation, for determining possible outcome		Short answers and calculations	6 Marks	L2, L3	L4, L2
	X	Evaluate the expressions of probability					

2024	✓	Expression of probability	**10**	Calculation and short answers	4 Marks	L2	L3
	✓	Prediction		Short answers	2 Marks	1	3
	✓	Representation, for determining possible outcome		Short answers	4 Marks	2	2
	X	Evaluate the expressions of probability					

Table 3.4.5 presents a comparative overview of the Probability topic over the three-year period. The analysis, presented in Sections a to f, evaluates whether the components reflected in Table 3.4.5 have contributed to the predictability of the IEB Mathematical Literacy final examination question Paper 2 from 2022 to 2024.

a. Topic coverage

The findings indicate that the Probability topic has been assessed in all three years. It is therefore likely to appear next year, as it is part of the prescribed application topics. It constitutes 5% of Paper 2 and approximately 7 marks out of 150. The assessment body should adhere to the CAPS and SAGs prescriptions for assessing the Probability topic. This topic plays a core role in mathematical literacy, as it covers a part of being mathematical in everyday life.

b. Content coverage

The findings indicate that Probability is assessed each year, focusing on the expression of probability and on representation to determine possible outcomes. These subtopics will frequently focus on the same skill but in different contexts; thus, they will seem to be more than the others due to this integration and the broader contexts in which they are assessed. Prediction is another topic that appears in two years, as it's linked to the section on expressions of probability. The subtopic, such as Evaluate expressions of probability, is not assessed because it is more of a practical topic that involves developing and evaluating; it is not easily assessed due to its nature, e.g., developing a game and evaluating its fairness. The topic will likely be omitted each year. Consequently, the assessment bodies should continue to assess in this way, where topics such as the expression of probability are assessed, and the representation of determining outcomes and prediction are assessed alternatively.

c. Weighting of the topic

The analysis reveals that the mark allocation for this topic is 7 marks across Paper 2, with no variance. This suggests that the marks cannot exceed the maximum or fall below the minimum. Then, the mark allocation over the past three years is as follows: 9, 14, and 10 marks in 2022, 2023, and 2024, respectively. This is not in line with the prescribed allocation; it was over-assessed. This is because they assessed the topic in isolation and three subtopics simultaneously. This indicates that the mark allocation for the following year's exam will not be 7 marks. Examiners should ensure the mark allocation remains 7 by varying the topics assessed. For example, the representation of determining outcomes and the expression of probability should not be assessed each year; these skills should be alternated, with one year focusing on expressing probability, the next on prediction, and another on representing outcomes.

Furthermore, the examiner could ensure that Probability is integrated into a single topic within the paper, not assessed in isolation, and rotate it each year. For example, have Probability in maps, the following year in models, or in plans. In this way, mark distribution will be according to the CAPS, and there will be no unacceptable variation.

d. Variation in item types

To evaluate the extent to which question design contributes to the predictability of examination papers, it is essential to examine how specific item types have been used to assess a provided topic over time. This includes analysing the variety of item types employed (such as MCQs, essays, calculations, and practical scenarios), the distribution of marks allocated to each type, and how difficulty levels and cognitive demands have varied. Additionally, the use of command words, terms that guide the expected cognitive response, can influence question predictability. This section examined these dimensions over three years to identify patterns that may signal repetition or predictability. When patterns of predictability are identified, targeted recommendations are provided to promote greater variation; in contrast, where a balanced approach is evident, strategies are suggested to maintain this consistency in future assessments.

The evaluation indicates that the calculations have been used in the past three years to assess the concepts. Short answers and completion of tree diagrams were used only when the representation of determining outcomes was assessed. In the past three years, the mark has varied as the examiner has always indicated the specification on how the expected response should be, for example, express the probability as a percentage or fraction, define in context. Such questions increase the difficulty level. The use of a tree diagram to present information on probability increases the level of cognitive demand to Level 3. In the past three years, content and context have been used to represent the question in Probability. For example, in 2022, the tree diagram representing soccer match games needed to be completed with the missing outcomes. Completing the tree diagram required learners to consider the number of events and outcomes in each branch. The level of difficulty increased as the number of events and branches increased, and it increased further when branch outcomes alternated across events, such as two outcomes in Event 1, three in Event 2, and two in Event 3.

Furthermore, short-answer questions are also used to assess understanding of tree diagrams and tables, particularly when learners are asked to list the total outcomes or identify those in which the specific event occurs. The use of negating words, such as 'not', increases the difficulty of calculating probability while the cognitive level remains the same. For example, what is the probability that it will rain on Saturday?

The observed pattern indicates that when information is presented in a tree diagram, and probability is to be calculated, cognitive demands increase. If the questions specify how the calculation should be done, e.g., probability as a percentage or as a decimal with 2 decimal places, then the level of difficulty will increase. The examiners should alternate the probability questions to maintain the pattern, e.g., by changing the specification and using tables, graphs, and tree diagrams to assess.

e. Topic and skill pairing

The findings provide evidence that the calculation skill has been used in Probability, as this skill makes it easier to answer questions related to the expression of probability. The tables or tree diagrams vary in how they are interpreted and used, depending on the context and the required response. Furthermore, probability is not calculated in isolation; its content is linked to other application topics. For example, in Paper 2, Probability is integrated into Measurement and Maps and plans. Therefore, if it's in measurement, it will be asked under the content of conversion, area, perimeter, and volume; then calculation skills will be required. When it appears under Maps and Plans, diagrams, and tables, then interpretation and calculation are required. Moreover, manipulation or simplification can also be assessed when the question requires a specific format for presenting the expected response. For example, calculate the probability and express it as a percentage or list the possible combination outcomes a homeowner can choose from.

Expressions of probability are generally presented through diagrams or integrated within the context being assessed. For example, when assessing plans, probability may be embedded within the scenario, such as determining the probability of drawing a home game from a given plan or layout, as seen in the 2022 examination paper. Calculation skills are also required, often within a specific format beyond the calculation itself. This skill is repeated each year, but the manner in which it is used varies: in 2024, it was used to calculate the probability that it will not rain; in 2023, it was used to calculate the percentage probability of the two missing weather forecasts: cloudy or rainy; and in 2022, it was used to calculate the probability as a percentage that it will not rain.

The assessment body should continue to alternate between assessing comparing skills and applying concepts, and vary the way concepts are applied; in this way, the skills prediction will remain acceptable.

f. Scenario framing of items for a topic

The patterns observed indicate that the context used for expressions of probability changes each year: first, it depends on the application topic it is integrated with; second, on the form of content representation used (e.g., table, diagram, map, plan, or paragraph); and lastly, on the different skills assessed with similar expressions. The context used differs each year but is related to the concept being assessed.

This topic's concepts are content- and context-oriented, meaning they cannot be assessed in isolation. For example, expressing probability as a percentage may be assessed within the content area of plans, using a weather chart as the context for a scenario in which an owner moves to a new place. In Measurement, under area, perimeter, and volume, a two-way table of a weather chart was provided, with a hot-air balloon, and probability was to be expressed as a percentage. Examiners should assess in this manner to avoid predictability and maintain year-over-year skill predictability.

Summary of findings and recommendations for the IEB Mathematical Literacy Probability topic

Table 3.4.6 below summarises identified patterns of predictability across key components of question paper design, along with corresponding recommendations to reduce predictability and strategies to maintain effective assessment practices without compromising variability.

Table 3.4.6: Summary of Findings and Recommendations on the Predictability of the 2022–2024 IEB Mathematical Literacy Probability Topic Paper (2)

Identified unacceptable predictability on topic coverage
There was no unacceptable prediction in this topic of Paper 2.
Recommendations to avoid unacceptable predictability on topic coverage
There is no recommendation on unacceptable prediction on this topic.
Identified unacceptable predictability on content coverage
There was no unacceptable prediction on content coverage.
Recommendations to avoid predictability in content coverage
In Probability, predictability cannot be avoided, since the content in the subtopic is varied; each year, the content covered in the part of the subtopic assessed varies.
Strategies to maintain content coverage that do not lead to a predictable question paper
In Probability, the only strategy is to alternate the content in each topic and the expression required. The content that uses the same principles should be alternated.
Identified unacceptable predictability on topic weighting
There is no unacceptable predictability, as the topic weighting was varied as shown below:

1. The Probability marks were 9, 14, and 10 in 2022, 2023, and 2024, respectively.
Recommendations to avoid unacceptable predictability on topic weighting
The topic weighting should be according to the following structure, to be able to avoid unacceptable predictability: 1. Probability has 7 marks. These weightings are according to CAPS and SAGs. This will ensure that the marks are distributed proportionally across topics over the years.
Strategies to maintain topic weighting that do not lead to a predictable question paper
Ensure that the recommended subtopics are covered and avoid over- and under-assessing.
Identified unacceptable predictability on item types
There was no unacceptable predictability on item types.
Recommendations to avoid unacceptable predictability on item types
Questions based on the recommended subtopic will ensure that the unacceptable predictability item types will not appear.
Strategies to maintain the assessment of item types that do not lead to a predictable question paper
Use the item types related to the subtopic identified.
Identified unacceptable predictability on topic–skill pairing
There was no unacceptable predictability in topic-skill pairing. following item types were observed over the three years: 1. Calculation, short answers, and tree diagram completion.
Recommendations to avoid unacceptable predictability through topic–skill pairing
Use the subtopic provided to assess the topic-pair skills.
Strategies to maintain topic–skill pairing that do not lead to a predictable question paper
Variation in the type of question asked for each subtopic will ensure that the topic-skill pairing is not predictable.

Identified unacceptable predictability in the scenario framing of items
There is no unacceptable scenario framing, as each question is content- and context-based.
Recommendations to avoid unacceptable predictability in scenario framing of items.
Use the scenario based on the content assessed.
Strategies to maintain scenario framing of items that do not lead to a predictable question paper
Use the content in each subtopic to create a scenario that will assess the topic.

Conclusions

The IEB Mathematical Literacy Paper 2 examination papers from 2022 to 2024 did not demonstrate any problematic predictability. Although the overall coverage of topics remained similar, the assessment of specific subtopics varied from year to year. As a result, candidates would have found it difficult to anticipate the precise content or structure of the questions that would appear.

PART IV DISCUSSIONS, CONCLUSIONS, AND GENERAL RECOMMENDATIONS

Section 4: Discussions, Conclusions, and General Recommendations

Sections 3.1–3.4 presented comprehensive findings from the evaluation of topics assessed in the DBE and IEB Mathematical Literacy NSC examination papers. These findings were derived from a systematic analysis of examination papers administered between 2022 and 2024, with the aim of identifying patterns of predictability across the sampled subjects. Building on these findings, this chapter discusses the results in relation to the study's conceptual framework and broader assessment principles. It further presents evidence-based recommendations informed by observed trends and concludes by reflecting on the implications of the findings for assessment quality, validity, and future examination design.

4.1 Discussions

Evidence presented in Sections 3.1–3.4 indicates that, across the majority of topics assessed in DBE and IEB Mathematical Literacy Papers 1 and 2, examinations demonstrate acceptable levels of predictability in terms of curriculum-aligned content, skills, and subtopics, while maintaining variation in question contexts and structures. This balance reflects the intended design of Mathematical Literacy assessments, where alignment with curriculum requirements supports fairness and standardisation, while variation in contextual scenarios prevents rote memorisation and promotes authentic problem-solving.

For DBE Paper 1, the findings indicate that although question contexts and scenarios varied across years, core topics such as Finance, Data Handling, and Probability were consistently assessed. Within financial documents, learners were required to interpret financial information and apply related calculation skills, despite variations in contexts. Similarly, Data Handling consistently required the interpretation of graphs and tables, as well as calculations involving measured data. Probability questions also assessed interpretation and calculation skills. Therefore, while the specific question structures and contexts were not predictable, the underlying content and skills

remained aligned with curriculum requirements. The variation at the subtopic level ensured that DBE Paper 1 examinations from 2022 to 2024 did not display unacceptable predictability.

A similar pattern was observed in DBE Paper 2. Core topics such as Measurement, Maps and Plans, and Probability were assessed consistently, as expected within the curriculum. Measurement questions required learners to perform conversions and apply calculations involving perimeter, area, or volume. Maps and Plans questions assessed the interpretation of diagrams, maps, and plans, together with calculations involving scale and related measures. Although the required skills remained consistent, the contexts and question formats varied across years. Consequently, learners could anticipate the skills required but could not predict the specific contexts or structures of questions. No unacceptable levels of predictability were therefore identified in DBE Paper 2 during the period analysed.

The IEB Paper 1 examinations reflected similar trends. Core topics such as Finance, Data Handling, and Probability were consistently assessed between 2022 and 2024. For example, taxation and interest calculations were included within financial documents contexts, although the applications and scenarios differed across years. Data Handling questions consistently assessed the interpretation of graphs and tables and calculations involving measured data, while Probability questions assessed interpretation and calculation skills. Despite consistency in assessed skills and content, variation in subtopics and contextual scenarios reduced the likelihood of candidates predicting the exact nature of examination questions.

A similar trend was evident in IEB Paper 2. Measurement, Maps and Plans, and Probability were consistently represented across the selected years. Measurement questions assessed conversions and calculations involving perimeter, area, and volume, while Maps and Plans questions focused on interpreting diagrams and applying scale calculations, including packaging-related contexts. Probability questions frequently involved interpreting representations such as tree diagrams and applying calculation skills. However, the contextual framing of these questions varied across examination papers, ensuring that while broad topic coverage remained predictable, the specific questions were not.

Overall, the findings indicate that both examining bodies maintained an appropriate balance between curriculum alignment and contextual variation. Although topics

and core skills remain predictable due to curriculum requirements, variations in contexts, scenarios, and subtopic combinations prevent excessive predictability and support the validity, fairness, and integrity of the examinations.

4.2 Conclusions

The analysis of Mathematical Literacy examination papers from 2022 to 2024 indicates that both DBE and IEB assessments demonstrate acceptable levels of predictability while remaining aligned with curriculum requirements. Across DBE and IEB Papers 1 and 2, key topics were consistently assessed; however, variations in contexts, scenarios, and subtopic emphasis limited the predictability of the exact structure and content of questions. Consequently, while topic coverage remained stable, the application of content and skills varied across years, supporting fair assessment practices and maintaining an appropriate level of unpredictability.

4.3 General Recommendations

The following recommendations are made based on the study:

- Assessment bodies should continue varying the real-life contexts used in Mathematical Literacy questions to ensure that learners are assessed on conceptual understanding and problem-solving skills rather than the memorisation of question types.
- While topic-level predictability is unavoidable due to curriculum requirements, variation in subtopic emphasis should be maintained to prevent learners from predicting the specific focus of examination questions.
- Examination designers should adopt multi-year rotation matrices to regulate the recurrence of subtopics, skills, item types, and scenario framings.
- Moderation processes should include explicit cross-year comparisons to identify emerging patterns, particularly in subjects where increasing learner performance trends may raise concerns about predictability.
- The development and expansion of item-type and scenario banks should be encouraged to diversify question structures, reduce reliance on familiar templates, and minimise unintended patterning.

- Routine predictability audits using the six analytical dimensions outlined in the tables should be implemented to support ongoing monitoring and prevent the development of unintended assessment patterns.