**NATIONAL CURRICULUM STATEMENT
GRADES 10-12 (GENERAL)**

SUBJECT ASSESSMENT GUIDELINES

MATHEMATICAL LITERACY

JANUARY 2007

PREFACE TO SUBJECT ASSESSMENT GUIDELINES

The Department of Education has developed and published Subject Assessment Guidelines for all 29 subjects of the National Curriculum Statement (NCS). These Assessment Guidelines should be read in conjunction with the relevant Subject Statements and Learning Programme Guidelines.

Writing Teams established from nominees of the nine provincial education departments and the teacher unions formulated the Subject Assessment Guidelines. The draft copies of the Subject Assessment Guidelines developed by the Writing Teams were sent to a wide range of readers, whose advice and suggestions were considered in refining these Guidelines. In addition, the Department of Education field-tested the Subject Assessment Guidelines in 2006 and asked for the comments and advice of teachers and subject specialists.

The Subject Assessment Guidelines published in September 2006 are intended to provide clear guidance on assessment in Grades 10 and 11 from 2007 and in Grade 12 from 2008.

The Department of Education wishes you success in the teaching of the National Curriculum Statement.

CONTENTS

1.   PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides guidelines for assessment in the National Curriculum Statement Grades 10 - 12 (General). The guidelines must be read in conjunction with *The National Senior Certificate: A Qualification at Level 4 on the National Qualifications Framework (NQF)* and the relevant Subject Statements. The Subject Assessment Guidelines will be applicable for Grades 10 and 11 from 1 January 2007 and for Grade 12 from 2008.

Section 2 of this document provides guidelines on assessment in the National Curriculum Statement. Section 3 provides assessment guidelines that are particular to each subject.

The Department of Education will regularly publish examples of assessment tasks and examinations. The first examples will be published on the Department of Education website in October 2006.

Together, these documents assist teachers in their teaching of the National Curriculum Statement. The Department of Education encourages teachers to use these guidelines as they prepare to teach the National Curriculum Statement. Teachers should also use every available opportunity to hone their assessment skills. These skills relate both to the setting and marking of assessment tasks.

2.   ASSESSMENT IN THE NATIONAL CURRICULUM STATEMENT

2.1   Introduction

Assessment in the National Curriculum Statement is an integral part of teaching and learning. For this reason, assessment should be part of every lesson and teachers should plan assessment activities to complement learning activities. In addition, teachers should plan a formal year-long Programme of Assessment. Together the informal daily assessment and the formal Programme of Assessment should be used to monitor learner progress through the school year.

Continuous assessment through informal daily assessment and the formal Programme of Assessment should be used to:
- develop learners' knowledge, skills and values
- assess learners' strengths and weaknesses
- provide additional support to learners
- revisit or revise certain sections of the curriculum and
- motivate and encourage learners.

In Grades 10 and 11 all assessment of the National Curriculum Statement is internal. In Grade 12 the formal Programme of Assessment which counts 25% is internally set and marked and externally moderated. The remaining 75% of the final mark for certification in Grade 12 is externally set, marked and moderated.

In Life Orientation however, all assessment is internal and makes up 100% of the final mark for promotion and certification.

2.2 Continuous assessment

Continuous assessment involves assessment activities that are undertaken throughout the year, using various kinds of assessment forms, methods and tools. In Grades 10-12 continuous assessment comprises two different but related activities: informal daily assessment and a formal Programme of Assessment.

2.2.1 Daily assessment

The daily assessment tasks are the planned teaching and learning activities that take place in the subject classroom. Learner progress should be monitored during learning activities. This informal daily monitoring of progress can be done through question and answer sessions; short assessment tasks completed during the lesson by individuals, pairs or groups or homework exercises.

Individual learners, groups of learners or teachers can mark these assessment tasks. Self-assessment, peer assessment and group assessment actively involves learners in assessment. This is important as it allows learners to learn from and reflect on their own performance.

The results of the informal daily assessment tasks are not formally recorded unless the teacher wishes to do so. In such instances, a simple checklist may be used to record this assessment. However, teachers may use the learners' performance in these assessment tasks to provide verbal or written feedback to learners, the School Management Team and parents. This is particularly important if barriers to learning or poor levels of participation are encountered.

The results of these assessment tasks are not taken into account for promotion and certification purposes.

2.2.2 Programme of Assessment

In addition to daily assessment, teachers should develop a year-long formal Programme of Assessment for each subject and grade. In Grades 10 and 11 the Programme of Assessment consists of tasks undertaken during the school year and an end-of-year examination. The marks allocated to assessment tasks completed during the school year will be 25%, and the end-of-year examination mark will be 75% of the total mark. This excludes Life Orientation where no end-of-year examination is required and the tasks undertaken during the school year account for 100% of the final assessment mark.

In Grade 12, the Programme of Assessment consists of tasks undertaken during the school year and counts 25% of the final Grade 12 mark. The other 75% is made up of externally set assessment tasks. This excludes Life Orientation where the internal assessment component counts 100% of the final assessment mark.

The marks achieved in each assessment task in the formal Programme of Assessment must be recorded and included in formal reports to parents and School Management Teams. These marks will determine if the learners in Grades 10 and 11 are promoted. In Grade 12, these marks will be submitted as the internal continuous assessment mark. Section 3 of this document provides details on the weighting of the tasks for promotion purposes.

2.2.2.1 Number and forms of assessment required for Programmes of Assessment in Grades 10 and 11

The requirements for the formal Programme of Assessment for Grades 10 and 11 are summarised in Table 2.1. The teacher must provide the Programme of Assessment to the subject head and School Management Team before the start of the school year.

Table 2.1: Number of assessment tasks which make up the Programme of Assessment by subject in Grades 10 and 11

SUBJECTS		TERM 1	TERM 2	TERM 3	TERM 4	TOTAL
Language 1: Home Language		4	4*	4	4*	16
Language 2: Choice of	HL	4	4*	4	4*	16
HL or FAL	FAL	4	4*	4	4*	16
Life Orientation		1	1	1	2	5
Mathematics or Maths Literacy		2	2*	2	2*	8
Subject choice 1**		2	2*	2	1*	7
Subject choice 2**		2	2*	2	1*	7
Subject choice 3		2	2*	2	1*	7

Note:
*   One of these tasks must be an examination
**   If one or two of the subjects chosen for subject choices 1, 2 or 3 include a Language, the number of tasks indicated for Languages 1 and 2 at Home Language (HL) and First Additional Language (FAL) are still applicable. Learners who opt for a Second Additional Language are required to complete 13 tasks in total: 4 tasks in term 1 and 3 tasks in each of terms 2, 3 and 4.

Two of the assessment tasks for each subject except Life Orientation must be examinations. In Grades 10 and 11 these examinations should be administered in mid-year and November. These examinations should take account of the requirements set out in Section 3 of this document. They should be carefully designed and weighted to cover all the Learning Outcomes of the subject.

Two of the assessment tasks for all subjects should be tests written under controlled conditions at a specified time. The tests should be written in the first and third terms of the year. In Life Orientation however, the tests should be written in the second and fourth terms to coincide with midyear and end-of-year examinations.

The remainder of the assessment tasks should not be tests or examinations. They should be carefully designed tasks, which give learners opportunities to research and explore the subject in exciting and varied ways. Examples of assessment forms are debates, presentations, projects, simulations, written reports, practical tasks, performances, exhibitions and research projects. The most appropriate forms of assessment for each subject are set out in Section 3. Care should be

taken to ensure that learners cover a variety of assessment forms in the three grades.

The weighting of the tasks for each subject is set out in Section 3.

2.2.2.2 Number and forms of assessment required for Programme of Assessment in Grade 12

In Grade 12 all subjects include an internal assessment component, which is 25% of the final assessment mark. The requirements of the internal Programme of Assessment for Grades 12 are summarised in Table 2.2. The teacher must provide the Programme of Assessment to the subject head and School Management Team before the start of the school year. This will be used to draw up a school assessment plan for each of the subjects in each grade. The proposed school assessment plan should be provided to learners and parents in the first week of the first term.

Table 2.2: Number of assessment tasks which make up the Programme of Assessment by subject in Grade 12

SUBJECTS		TERM 1	TERM 2	TERM 3	TERM 4	TOTAL
Language 1: Home Language		5	5*	4*		14
Language 2: Choice of HL or FAL	HL	5	5*	4*		14
	FAL	5	5*	4*		14
Life Orientation		1	2	2		5
Mathematics or Maths Literacy		3	2*	2*		7
Subject choice 1**		2	2*	(2*) 3*		(6#) 7
Subject choice 2**		2	2*	(2*) 3*		(6#) 7
Subject choice 3		2	2*	(2*) 3*		(6#) 7

Note:

*   One of these tasks must be an examination

**   If one or two of the subjects chosen for subject choices 1, 2 or 3 include a Language, the number of tasks indicated for Languages 1 and 2 at Home Language (HL) and First Additional Language (FAL) are still applicable. Learners who opt for a Second Additional Language are required to complete 12 tasks in total: 5 tasks in term 1, 4 tasks in term 2 and 3 tasks in term 3.

\#   The number of internal tasks per subject differs from 6 to 7 as specified in Section 3 of this document.

Two of the assessment tasks for each subject except Life Orientation must be examinations. In Grade 12 these examinations should be administered in mid-year and September. These examinations should conform to the requirements set out in Section 3 of this document. They should be carefully designed and weighted to cover all the Learning Outcomes of the subject.

Two of the assessment tasks for all subjects should be tests written under controlled conditions at a specified time. The tests should be written in the first and third terms of the year. In Life Orientation however, the tests should be written in the second and third terms to coincide with midyear and trial examinations.

The remainder of the assessment tasks should not be tests or examinations. They should be carefully designed tasks, which give learners opportunities to research and explore the subject in exciting and focused ways. Examples of assessment

forms are debates, presentations, projects, simulations, assignments, case studies, essays, practical tasks, performances, exhibitions and research projects. The most appropriate forms of assessment for each subject are set out in Section 3.

2.3 External assessment in Grade 12

External assessment is only applicable to Grade 12 where the final end-of-year examination is externally set and moderated. This makes up 75% of the final mark for Grade 12. This excludes Life Orientation which is not externally assessed or externally examined.

In some subjects the external assessment includes practical or performance tasks that are externally set, internally assessed and externally moderated. These performance tasks account for one third of the end-of-year external examination mark in Grade 12 (that is 25% of the final mark). Details of these tasks are provided in Section 3.

The external examinations are set externally, administered at schools under conditions specified in the *National policy on the conduct, administration and management of the assessment of the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF)* and marked externally.

Guidelines for the external examinations are provided in Section 3.

2.4 Recording and reporting on the Programme of Assessment

The Programme of Assessment should be recorded in the teacher's portfolio of assessment. The following should be included in the teacher's portfolio:
- a contents page;
- the formal Programme of Assessment;
- the requirements of each of the assessment tasks;
- the tools used for assessment for each task; and
- record sheets for each class.

Teachers must report regularly and timeously to learners and parents on the progress of learners. Schools will determine the reporting mechanism but it could include written reports, parent-teacher interviews and parents' days. Schools are required to provide written reports to parents once per term on the Programme of Assessment using a formal reporting tool. This report must indicate the percentage achieved per subject and include the following seven-point scale.

RATING CODE	RATING	MARKS %
7	Outstanding achievement	80 – 100
6	Meritorious achievement	70 –79
5	Substantial achievement	60 – 69
4	Adequate achievement	50 – 59
3	Moderate achievement	40 – 49
2	Elementary achievement	30 – 39
1	Not achieved	0 – 29

2.5 Moderation of the assessment tasks in the Programme of Assessment

Moderation of the assessment tasks should take place at three levels.

LEVEL	MODERATION REQUIREMENTS
School	The Programme of Assessment should be submitted to the subject head and School Management Team before the start of the academic year for moderation purposes. Each task which is to be used as part of the Programme of Assessment should be submitted to the subject head for moderation before learners attempt the task. Teacher portfolios and evidence of learner performance should be moderated twice a year by the head of the subject or her/his delegate.
Cluster/ district/ region	Teacher portfolios and a sample of evidence of learner performance must be moderated twice during the first three terms.
Provincial/ national	Teacher portfolios and a sample of evidence of learner performance must be moderated once a year.

3. ASSESSMENT OF MATHEMATICAL LITERACY IN GRADES 10 –12

3.1 Learning Outcomes and Assessment Standards

During the first cycle of implementation of the National Curriculum Statement referred to in Section 1.1 of this guideline, assessment in Mathematical Literacy will focus on a sub-set of the Assessment Standards. This sub-set will be referred to as the 'core' Assessment Standards; they are listed in Appendix 1 of this guideline document. While the external national examination of Mathematical Literacy in Grade 12 in 2008, 2009 and 2010 will be based on these Assessment Standards only, teachers who feel confident to do so are encouraged to teach to all the Assessment Standards in the Mathematical Literacy Subject Statement published by the Department of Education in 2003.

3.2 Introduction to assessment of Mathematical Literacy in Grades 10 - 12

The competencies developed through Mathematical Literacy are those that are needed by individuals to make sense of, participate in and contribute to the twenty-first century world — a world characterised by numbers, numerically based arguments and data represented and misrepresented in a number of different ways. Such competencies include the ability to reason, make decisions, solve problems, manage resources, interpret information, schedule events and use and apply technology to name but a few.

Learners must be exposed to both mathematical content and real-life contexts to develop these competencies. On the one hand, mathematical content is needed to make sense of real life contexts; on the other hand, contexts determine the content that is needed.

When teaching and assessing Mathematical Literacy, teachers should avoid teaching and assessing mathematical content in the absence of context. At the same time teachers must also concentrate on identifying in and extracting from the contexts the underlying mathematics or 'content'.

Assessment in Mathematical Literacy needs to reflect this interplay between content and context. Learners should use mathematical content to solve problems that are contextually based. An example to illustrate this interplay is given in Appendix 2.

Assessment tasks should be contextually based, that is, based in real-life contexts and use real-life data, and should require learners to select and use appropriate mathematical content in order to complete the task. Some assessment tasks might more explicitly give learners the opportunity to demonstrate their ability to 'solve equations', 'plot points on the Cartesian plane' or 'calculate statistics such a mean, median and mode for different sets of data' while other assessment tasks might be less focused on specific mathematical content and rather draw on a range of content to solve a single problem.

Teachers need to design assessment tasks that provide learners with the opportunity to demonstrate both competence with mathematical content and the ability to make sense of real-life, everyday meaningful problems.

3.2.1 Mathematical Literacy assessment taxonomy

Assessment can be pitched at different levels of cognitive demand. On one end of the spectrum are tasks that require the simple reproduction of facts while at the other end of the spectrum, tasks require detailed analysis and the use of varied and complex methods and approaches.

Assessment in Mathematical Literacy is no different. To determine the level of cognitive demand at which assessment tasks are posed it is useful to use a hierarchy or taxonomy.

The PISA (Programme for International Student Assessment) Assessment Framework (OECD, 2003) provides a possible taxonomy for assessment of Mathematical Literacy based on what it calls *competency clusters*. The TIMSS (Trends in Mathematics and Sciences Study) Assessment Framework (IEA, 2001) provides another, based on *cognitive domains*. Drawing on these two very similar frameworks the following taxonomy for Mathematical Literacy is proposed:

- Level 1: Knowing
- Level 2: Applying routine procedures in familiar contexts
- Level 3: Applying multistep procedures in a variety of contexts
- Level 4: Reasoning and reflecting

The levels of this taxonomy are described in Appendix 3 and illustrated by means of references to an assessment task (*Responsible use of paracetamol*) provided in Appendix 4.

3.2.2 Mathematical Literacy assessment taxonomy, rating codes and marks

The Mathematical Literacy assessment taxonomy is not intended to be linked to rating codes and/or marks in an absolute sense. However, the taxonomy does provide a tool to differentiate between learners' performances and to award rating codes. Figure 1 suggests how a weighting of the different kinds of tasks at each level of the taxonomy could correspond to the different rating codes.

It follows that a learner would not be able to achieve an Outstanding achievement rating code of 7 (80% – 100%) without having satisfied the requirements of the questions that are pitched at the *reasoning and reflection* level of the taxonomy. Similarly, Figure 1 also illustrates that while it may be possible to achieve a sub-minimum of 25% based on tasks that require *knowing* alone, learners who are awarded an Adequate achievement rating (40% – 49%) also had to successfully complete some tasks pitched at the *applying routine procedures in familiar contexts* level of the taxonomy.

RATING CODE	RATING	MARKS %	MATHEMATICAL LITERACY ASSESSMENT TAXONOMY			
7	Outstanding achievement	80 – 100				
6	Meritorious achievement	70 – 79				Reasoning and reflecting
5	Substantial achievement	60 – 69			Applying multi-step procedures in a variety of contexts	
4	Moderate achievement	50 – 59		Applying routine procedures in familiar contexts		
3	Adequate achievement	40 – 49				
2	Elementary achievement	30 – 39	Knowing			
1	Not achieved	0 – 29				

Figure 1: Rating codes, marks and the Mathematical Literacy assessment taxonomy

3.3 Daily assessment in Grades 10, 11 and 12

In Mathematical Literacy, daily assessment takes several forms. The review of homework tasks, responses to questions posed by the teacher and learners, the completion of mini-assignments and the presentation of solutions by learners to the class are a few of the options.

Teachers may also use daily assessment to monitor progress by learners on extended assessment tasks such as projects and assignments. In such cases, the teacher might expect learners to work on their project and/or assignment in class. The teacher can view each learner's work to get a sense of progress while at the same time offering support and assistance.

3.4 Assessment in Grades 10 and 11

The Programme of Assessment for Mathematical Literacy in Grades 10 and 11 consists of eight tasks which are internally assessed. Of the eight tasks, seven tasks are completed during the school year and make up 25% of the total mark for Mathematical Literacy, the end-of-year examination is the eighth task and makes up the remaining 75%.

3.4.1 Programme of Assessment in Grades 10 and 11

Table 3.1 illustrates one possible Programme of Assessment for Mathematical Literacy that meets the requirements described in Section 2.3.1 of this document.

The suggested Programme of Assessment assumes that:
- All of the Learning Outcomes are addressed throughout the year.
- The Learning Outcomes are evenly weighted in terms of time allocated to teaching and learning and assessment activities.
- The Assessment Standards and Learning Outcomes are integrated throughout teaching and learning and in the assessment activities.

Table 3.1: Example of a Programme of Assessment for Grades 10 and 11 showing the weighting of assessment tasks

	CONTINUOUS ASSESSMENT (25%)				EXAMINATION (75%)
	Term 1	**Term 2**	**Term 3**	**Term 4**	
Grade 10	Investigation (10%)	Assignment (10%)	Investigation (10%)	Project (10%)	Examination
	Test (15%)	Examination (30%)	Test (15%)		
Grade 11	Assignment (10%)	Investigation (10%)	Project (10%)	Investigation (10%)	Examination
	Test (15%)	Examination (30%)	Test (15%)		

3.4.2 Tasks

The different tasks listed in the Programme of Assessment are described below. Examples of each of these tasks for Mathematical Literacy in Grade 10 can be viewed at www.thutong.org.za.

Control test

Control tests test content under controlled exam or test conditions. Learners are expected to prepare for these tests and the content that will be tested is explicitly communicated to learners before the test. In the context of Mathematical Literacy where context plays an important role, it is quite possible for learners to be asked to bring notes on the context to the test — making it an 'open-book' test.

Example: Having studied telephone costs and in particular the linear relationships that such costs reveal, learners could be set a test on linear functions or relationships. Since the test will be contextually based in the area of telephone costs, learners would be welcome to bring all the information they already have about telephone costs to class with them.

Assignment

An assignment in the context of Mathematical Literacy is a well-structured task with clear guidelines and a well-defined solution. An assignment could provide the learners with the opportunity to repeat a task that has already been done in class and/or to apply an approach or method studied in class to a new context. Both the content and contexts of the assignment are likely to be familiar to the learner. While the teacher may allocate classroom time to and supervise the completion of an assignment, parts of an assignment could also be completed by the learner in his or her own time.

Example: If learners have determined the bank fees for a given bank statement based on the fee structure of an Mzansi bank account for a particular month, an assignment could ask the learner to calculate the bank fees for the same bank statement but based on the fee structure of a different kind of bank account.

Investigation/ Research task

An investigation in the context of Mathematical Literacy may take the form of a research task wherein data and/or information is collected to solve a problem. While the problem that focuses the research task is well defined, the nature of the data collected will determine the solution to the problem.

Example: To understand the impact of inflation on the costs of goods and to establish an informal sense of what the inflation rate is, a research task could ask learners to source the price of ten different household items over a period of twenty years. The research may involve learners visiting a library and looking through the newspaper advertisements in the archive.

Project

A project, in the context of Mathematical Literacy, is an extended task in which the learner is expected to select appropriate mathematical content to solve a context-based problem.

Example: In Learning Outcome 3, learners are expected to 'use and interpret plans'. In a project intended to give learners the opportunity to show their achievement of this Assessment Standard, learners could be set the task of building a cardboard model of a building for a given plan.

3.4.3 Examination papers for Grades 10 and 11

End-of-year examination
The end of year examination papers for Grades 10 and 11 will be internally set, internally marked and internally moderated, unless otherwise instructed by provincial departments of education.

The following is recommended with respect to the time allocation and number of papers in the final examination for Grades 10 and 11.
- One (3 hour) paper of 150 marks in Grade 10
- Two (2½ hour) papers of 100 marks each in Grade 11 (see comments on Grade 12 examination papers to see how the two papers differ)

An examination should:
- give equal weighting to the four Learning Outcomes and should attempt to examine all of the Assessment Standards determined for the grade;
- examine the Assessment Standards in an integrated manner; and
- be differentiated according to the Mathematical Literacy taxonomy (as described) with the following proportion of marks allocated to each of the levels:
  - 30% of the marks at the *knowing* level,
  - 30% of the marks at the *applying routine procedures in familiar contexts* level,
  - 20% of the marks at the *applying multistep procedures in a variety of contexts* level, and
  - 20% of the marks at the *reasoning and reflecting* level.

A Mathematical Literacy examination will typically consist of five to eight questions:
- Question will be focused by different contexts.
- Each question will integrate Assessment Standards from more than one Learning Outcome.
- Each question will include sub-questions at each of the different levels of the Mathematical Literacy Assessment taxonomy.

An example of a final Grade 10 examination paper is provided at www.thutong.org.za.

Table 3.2 is a planning grid that can be used to set an examination in Mathematical Literacy. As teachers set questions so they enter the question numbers and mark allocations into the relevant blocks. When the examination paper has been set, the teacher checks that there is an appropriate balance between marks allocated to each of the levels of the taxonomy and each of the Learning Outcomes.

Consider the **Responsible use of paracetamol** (Appendix 4) and **Read all about it** (Appendix 5) assessment tasks. If these tasks were to be included as examination questions in a Grade 11 examination, the teacher who is setting the examination might enter the details for these tasks into the examination planning grid as shown in Table 3.3.

Table 3.2: Examination planning grid

	Level 1 (30%) Knowing	Level 2 (30%) Applying routine procedures in familiar contexts	Level 3 (20%) Applying multistep procedures in a variety of contexts	Level 4 (20%) Reasoning and reflecting	Check
LO1 (25%) Number and operations in Context					
LO2 (25%) Functional Relationships					
LO3 (25%) Space, Shape and Measurement					
LO4 (25%) Data Handling					
Check					

Table 3.3: Examination planning grid with the information for the
Responsible use of paracetamol **and** *Read all about it* **questions entered**

	Level 1 (30%) Knowing	Level 2 (30%) Applying routine procedures in familiar contexts	Level 3 (20%) Applying multi-step procedures in a variety of contexts	Level 4 (20%) Reasoning and reflecting	Check
LO1 (25%) Number and Operations in Context	1.1 (2) 2.1.1 (6) 2.3.1 (2)	2.1.2 (5) 2.3.3 (3) 2.2.1 (8) 2.3.2 (4)	2.2.2 (4)	2.4 (6)	
LO2 (25%) Functional Relationships	1.2 (4)	1.3 (2) 1.4 (3)	1.5 (6)	1.6 (4)	
LO3 (25%) Space, Shape and Measurement	3.1 (2) 3.3.1 (6)	3.2.1 (4) 3.2.2 (4) 3.3.2 (4)	3.2.3 (4) 3.3.3 (8)		
LO4 (25%) Data Handling			1.7 (4)	1.8 (8)	
Check					

An examination of Table 3.3 reveals that at this stage of setting the examination more questions addressing Learning Outcome 2 and Learning Outcome 4 are still needed as well as more questions at levels 1 and 2 of the taxonomy. The teacher who is setting the examination can now develop or source questions accordingly.

3.5   Assessment in Grade 12

In Grade 12, assessment consists of two components: a Programme of Assessment which makes up 25% of the total mark for Mathematical Literacy and an external examination which makes up the remaining 75%. The Programme of Assessment for Mathematical Literacy consists of seven tasks which are all internally assessed. The external examination is externally set and moderated.

3.5.1   Programme of Assessment

Table 3.5 illustrates one possible assessment plan for Mathematical Literacy that meets the requirements described in Section 2.3.1 of this document.

The suggested Programme of Assessment plan assumes that:
• All of the Learning Outcomes are addressed throughout the year.
• The Learning Outcomes are evenly weighted in terms of both time allocated to teaching and learning and assessment activities.
• The Assessment Standards and Learning Outcomes are integrated throughout teaching and learning and in the assessment activities.

Table 3.4: Example of a Programme of Assessment for Grade 12 showing the weighting of assessment tasks

	CONTINUOUS ASSESSMENT (25%)				EXAMINATION (75%)
	Term 1	**Term 2**	**Term 3**	**Term 4**	
Grade 12	Investigation/ Project (10%)	Assignment (10%)	Test (10%)	Assignment (10%)	Examination
	Test (10%)	Examination (25%)	Examination (25%)		

A description of the different kinds of tasks suggested in the Programme of Assessment has been provided in Section 3.4.2.

3.5.2   External assessment in Grade 12

The final end-of-year examination is nationally set, marked and moderated.

External examination
The external, nationally set, marked and moderated examination will:
• give equal weighting to the four Learning Outcomes and will examine the core Assessment Standards listed in Appendix 1;
• examine the Assessment Standards in an integrated manner;
• be differentiated according to Mathematical Literacy taxonomy as described with the following proportion of marks allocated to each of the levels:
  ▪ 30% of the marks at the *knowing* level,
  ▪ 30% of the marks at the *applying routine procedures in familiar contexts* level,
  ▪ 20% of the marks at the *applying multistep procedures in a variety of contexts* level, and
  ▪ 20% of the marks at the *reasoning and reflecting* level.

Table 3.5 illustrates how the questions in the final Grade 12 Mathematical Literacy examination will be distributed over two papers.

Table 3.5: Allocation of the Learning Outcomes and question types in the two papers

	Level 1 (30%) Knowing	Level 2 (30%) Applying routine procedures in familiar contexts	Level 3 (20%) Applying multistep procedures in a variety of contexts	Level 4 (20%) Reasoning and reflecting
LO1 (25%) Number and Operations in Context				
LO2 (25%) Functional Relationships	Paper 1 (150 marks) Paper 1 is intended to be a basic knowing and routine applications paper		Paper 2 (150 marks) Paper 2 is intended to be an applications and reasoning and reflecting paper	
LO3 (25%) Space, Shape and Measurement				
LO4 (25%) Data Handling				

The nationally set, marked and moderated examination will consist of two papers:

- Paper 1 — a 'basic knowing and routine applications paper' that will consist of between five and eight shorter questions.
- Paper 2 — an 'applications, reasoning and reflecting' paper that will consist of between four and six longer questions. By contrast to Paper 1 these questions will require more interpretation and application of the information provided.
- All of the questions will focus on a context.
- All questions will integrate Assessment Standards from more than one Learning Outcome.
- All questions will include sub-questions from the different levels of the Mathematical Literacy assessment taxonomy appropriate to the paper.

Table 3.6 gives an indication of the proportion of marks to be allocated to the different taxonomy levels in each paper.

Table 3.6: Proportion of marks to be allocated to different taxonomy levels

	Paper 1	Paper 2	Overall allocation in the examination
Level 1	60% (+5)		30%
Level 2	40% (+5)	20% (+5)	30%
Level 3		40% (+5)	20%
Level 4		40% (+5)	20%

An example of a set of Grade 12 examination papers is provided at www.thutong.org.za.

The following table provides guidance regarding the number of internal examination papers and the duration and mark allocation of each paper:

Table 3.7: Number of examination papers and the duration and mark allocation of each paper for Grade 10, 11 and 12

	GRADE 10	GRADE 11	GRADE 12
TERM 2	Paper: 2 hours (100 marks)	Paper 1: 1½ hours (75 marks) Paper 2: 1½ hours (75 marks)	Paper 1: 2 hours (100 marks) Paper 2: 2 hours (100 marks)
TERM 3			Paper 1: 3 hours (150 marks) Paper 2: 3 hours (150 marks)
TERM 4	Paper: 3 hours (150 marks)	Paper 1: 2½ hours (100 marks) Paper 2: 2½ hours (100 marks)	

3.6   Promotion

A learner must achieve a minimum of 30% (Level 2: Elementary achievement) in Mathematical Literacy for promotion at the end of Grades 10 and 11 and for certification at the end of Grade 12.

APPENDIX 1:   MATHEMATICAL LITERACY CORE ASSESSMENT STANDARDS FOR EXAMINATION IN GRADE 12 IN 2008, 2009 and 2010

Learning Outcome 1: Number and Operations in Context
The learner is able to use knowledge of numbers and their relationships to investigate a range of different contexts which include financial aspects of personal, business and national issues.

Grade 10 We know this when the learner is able to:	Grade 11 We know this when the learner is able to:	Grade 12 We know this when the learner is able to:
10.1.1 Solve problems in various contexts, including financial contexts, by estimating and calculating accurately using mental, written and calculator methods where appropriate, inclusive of: • working with simple formulae • using the relationships between arithmetical operations (including the distributive property) to simplify calculations where possible;. (NOTE: students are not expected to know the distributive property by name) (The range of problem types includes percentage, ratio, rate and proportion).	11.1.1 In a variety of contexts, find ways to explore and analyse situations that are numerically based, by: • estimating efficiently; • working with formulae by hand and with a calculator; • showing awareness of the significance of digits; • checking statements and results by doing relevant calculations. (The range of problem types includes percentage, ratio, rate and proportion).	12.1.1 Correctly apply problem-solving and calculation skills to situations and problems dealt with.
10.1.2 Relate calculated answers correctly and appropriately to the problem situation by: • interpreting answers in terms of the context; • reworking a problem if the first answer is not sensible, or if the initial conditions change; • interpreting calculated answers logically in relation to the problem and communicating processes and results.	11.1.2 Relate calculated answers correctly and appropriately to the problem situation by: • interpreting answers in terms of the context; • reworking a problem if the first answer is not sensible or if the initial conditions change; • interpreting calculated answers logically in relation to the problem, and communicating processes and results.	12.1.2 Relate calculated answers correctly and appropriately to the problem situation by: • interpreting answers in terms of the context; • reworking a problem if the first answer is not sensible or if the initial conditions change; • interpreting calculated answers logically in relation to the problem and communicating processes and results.
10.1.3 Apply mathematical knowledge and skills to plan personal finances, inclusive of: • income and expenditure; • the impact of interest (simple and compound) within personal finance contexts.	11.1.3 Apply mathematical knowledge and skills to plan personal finances and investigate opportunities for entrepreneurship inclusive of: • specifying and calculating the value of income and expenditure items; • estimating and checking profit	12.1.3 Analyse and critically interpret the a variety of financial situations mathematically, inclusive of: • personal and business finances; • the effects of taxation, inflation and changing interest rates • the effects of currency fluctuations; • critical engagement with debates about socially responsible trade.

Learning Outcome 2: Functional Relationships

The learner is able to recognise, interpret, describe and represent various functional relationships to solve problems in real and simulated contexts.

Grade 10 We know this when the learner is able to:	Grade 11 We know this when the learner is able to:	Grade 12 We know this when the learner is able to:
10.2.1 Work with numerical data and formulae in a variety of real-life situations: • Determining output values for given input values; • Determining input values for given output values; (Types of relationships to be dealt with include linear and inverse proportion relationships)	11.2.1 Work with numerical data and formulae in a variety of real-life situations, including: • Finding break-even points involving linear functions by solving simultaneous equations (Types of relationships to be dealt with include linear and inverse proportion relationships)	12.2.1 Work with numerical data and formulae in a variety of real-life situations, in order to: • solve planning problems; • investigate the impact of compound change on situations.
10.2.2 Draw graphs (by hand and/or by means of technology where available) in a variety of real-life situations by: • point-by-point plotting of data; • working with formulae to establish points to plot.	11.2.2 Draw graphs (by hand and/or by means of technology where available) as required by the situations and problems being investigated.	12.2.2 Draw graphs (by hand and/or by means of technology where available) as required by the situations and problems being investigated.
10.2.3 Critically interpret tables and graphs that relate to a variety of real-life situations by: • finding values of variables at certain points; • describing overall trends; • identifying maximum and minimum points; • describing trends (including in terms of rates of change).	11.2.3 Critically interpret tables and graphs in a variety of real-life and simulated situations by: • estimating input and output values;	12.2.3 Critically interpret tables and graphs in real life situations including in the media, inclusive of: • graphs with negative values on the axes (dependant variable in particular); • more than one graph on a system of axes.

Learning Outcome 3: Space, Shape and Measurement

The learner is able to measure using appropriate instruments, to estimate and calculate physical quantities, and to interpret, describe and represent properties of and relationships between 2-dimensional shapes and 3-dimensional objects in a variety of orientations and positions.

Grade 10 We know this when the learner is able to:	Grade 11 We know this when the learner is able to:	Grade 12 We know this when the learner is able to:
10.3.1 Solve problems in 2-dimensional and 3-dimensional contexts by: • estimating, measuring and calculating values which involve: ▪ lengths and distances, ▪ perimeters and areas of common polygons and circles, ▪ volumes of right prisms, • checking values for solutions against the contexts in terms of suitability and degree of accuracy.	11.3.1 Solve problems in 2-dimensional and 3-dimensional contexts by: • estimating, measuring and calculating values which involve: ▪ lengths and distances, ▪ perimeters and areas of polygons, ▪ volumes of right prisms and right circular cylinders, ▪ surface areas of right prisms and right circular cylinders, • making adjustments to calculated values to accommodate measurement errors and inaccuracies due to rounding.	12.3.1 Solve problems in 2-dimensional and 3-dimensional contexts by: estimating, measuring and calculating values which involve: lengths and distances, perimeters and areas of polygons, volumes of right prisms, right circular cylinders, surface areas of right prisms, right circular cylinders, making adjustments to calculated values to accommodate measurement errors and inaccuracies due to rounding.
10.3.2 Convert units of measurement within the metric system.	11.3.2 Convert units of measurement between different scales and systems using conversion tables provided.	12.3.2 Convert units of measurement between different scales and systems using conversion tables provided as required in dealing with problems.
10.3.3 Draw and interpret scale drawings of plans to represent and describe situations	11.3.3 Use and interpret scale drawings of plans to: • estimate and calculate values according to scale.	12.3.3 Use and interpret scale drawings of plans to: • estimate and calculate values according to scale, and build models.
10.3.4 Use grids and maps in order to determine locations and plan trips	11.3.4 Use grids and maps, and compass directions, in order to: • Determine locations; • Describe relative positions.	12.3.4 Use grids and maps, and compass directions, in order to: • Determine locations; • Describe relative positions.

Learning Outcome 4: Data Handling

The learner is able to collect, summarise, display and analyse data and to apply knowledge of statistics and probability to communicate, justify, predict and critically interrogate findings and draw conclusions.

Grade 10 We know this when the learner is able to:	Grade 11 We know this when the learner is able to:	Grade 12 We know this when the learner is able to:
Assessment Standard 10.4.4. is the focal Assessment Standard of LO4. The other LO4 Assessment Standards serve to develop the skills that will enable learners to achieve this one. 10.4.4 Critically interpret data and representations thereof (with awareness of sources of error) in order to draw conclusions on questions investigated and to make predictions and to critique other interpretations.	Assessment Standard 11.4.4. is the focal Assessment Standard of LO4. The other LO4 Assessment Standards serve to develop the skills that will enable learners to achieve this one. 11.4.4 Critically interpret data and representations thereof (with awareness of sources of error and bias) in order to draw conclusions on problems investigated and make predictions and to critique other interpretations.	Assessment Standard 12.4.4. is the focal Assessment Standard of LO4. The other LO4 Assessment Standards serve to develop the skills that will enable learners to achieve this one. 12.4.4 Critically interpret data, in order to draw conclusions on problems investigated to predict trends and to critique other interpretations.

10.4.1   Investigate situations in own life by:
• formulating questions on issues such as those related to:
▪ social, environmental and political factors,
▪ people's opinions,
▪ human rights and inclusivity;
• collecting or finding data by appropriate methods (e.g. interviews, questionnaires, the use of data bases) suited to the purpose of drawing conclusions to the questions.
	11.4.1 Investigate a problem on issues such as those related to:
	   social, environmental and political factors;
	   people's opinions;
	   human rights and inclusivity by:
	   collecting or finding data by appropriate methods (e.g. interviews, questionnaires, the use of data bases) suited to the purpose of drawing conclusions to the questions.
	   using appropriate statistical methods;
	   selecting a representative sample from a population with due sensitivity to issues relating to bias;
	   comparing data from different sources and samples.
		12.4.1 Investigate a problem on issues such as those related to:
		• social, environmental and political factors;
		• people's opinions;
		• human rights and inclusivity by:
		▪ collecting or finding data by appropriate methods (e.g. interviews, questionnaires, the use of data bases) suited to the purpose of drawing conclusions to the questions.
		▪ using appropriate statistical methods;
		▪ selecting a representative sample from a population with due sensitivity to issues relating to bias;
		▪ comparing data from different sources and samples.

10.4.2 Select, justify and use a variety of methods to summarise and display data in statistical charts and graphs inclusive of: • tallies; • tables; • pie charts; • histograms (first grouping the data); • single bar and compound bar graphs; • line and broken-line graphs.	11.4.2 Select, justify and use a variety of methods to summarise and display data in statistical charts and graphs inclusive of: • tallies; • tables; • pie charts; • single and compound bar graphs; • line and broken-line graphs;	12.4.2 Select, justify and use a variety of methods to summarise and display data in statistical charts and graphs to: • describe trends

10.4.3 Understand that data can be summarised in different ways by calculating and using appropriate measures of central tendency and spread (distribution) to make comparisons and draw conclusions, inclusive of the: • mean; • median; • mode; • range.	11.4.3 Understand that data can be summarised and compared in different ways by calculating, and using measures of central tendency and spread (distribution), for more than one set of data inclusive of the: • mean; • median; • mode; • range; .	12.4.3 Understand that data can be summarised and compared in different ways by calculating and using measures of central tendency and spread (distribution), including: • mean; • median; • mode; • quartiles; (INTERPRETATION ONLY) • percentiles.(INTERPRETATION ONLY)
10.4.5 Work with simple notions of likelihood/probability in order to make sense of statements involving these notions • express probability values in terms of fractions, ratios and percentages.	11.4.5 Work with simple notions of likelihood/probability in order to make sense of statements involving these notions.	12.4.5 Work with simple notions of likelihood/probability in order to make sense of statements involving these notions
10.4.6 Effectively communicate conclusions and predictions (using appropriate terminology such as trend, increase, decrease, constant, impossible, likely, fifty-fifty chance), that can be made from the analysis and representation of data.	11.4.6 Demonstrate an awareness of how it is possible to use data in different ways to justify opposing conclusions.	12.4.6 Critique statistically-based arguments, describe the use and misuse of statistics in society, and make well-justified recommendations.

APPENDIX 2:   ILLUSTRATION OF THE RELATIONSHIP BETWEEN MATHEMATICAL CONTENT AND CONTEXT

The following example demonstrates the wide range of mathematical content that learners need to be able to draw on for a real-life context that can be used with a particular purpose - making sense of the Free Basic Water policy and/or municipal accounts.

Mrs Maharaj's and Mr Cele's Mathematical Literacy classes

Mrs Maharaj's mathematical literacy class is exploring the Free Basic Water policy announced by President Mbeki in 2002 to establish who benefits the most from this policy - the poor or the wealthy.

Mr Cele's class is trying to understand a household utilities account.

Both classes might work with municipal water tariffs and in particular compare the tariffs of two different municipalities. The classes could both engage in the following sequence of activities:
- First, they might, calculate the costs for a range of different consumptions in each municipality based on the published tariffs for those municipalities.
- Then, they might, tabulate these values and draw graphs based on their tables of values. The graphs could reveal (by intersecting) that up to a certain consumption the one municipality's tariffs are lower than the other municipality's but beyond that point they are higher.
- To determine the consumption for which the two municipalities' tariffs are the same the class might either develop equations to determine the costs for the two municipalities and solve these simultaneously or explore the break-even point through numerical methods.
- Based on the tables of values, the graphs and/or the solutions of the equations, these classes will be able to answer questions of interest to them regarding the Free Basic Water policy and/or their own utility bills.

As Mathematical Literacy develops competencies through the interplay of content and context, the mathematical content of the lesson(s) needs to be made explicit. That is, Mrs Maharaj's and Mr Cele's learners should realise that they:
- used formulae to determine rates;
- tabulated data;
- plotted points on a graph;
- developed and solved equations; etc.

In particular, these learners should realise that the graphs were linear functions each defined for different intervals (piece-wise linear functions). Learners should be made aware of the characteristics of linear functions as they appear in context.

By making the underlying mathematical content explicit, Mrs Maharaj and Mr Cele ensure that when learners come across this mathematics in another context — say the time taken to travel different distances by train — they can draw on their earlier experience with the content (linear functions) to solve the new problem.

The example shows a problem firmly rooted in a context — a very real and meaningful context. It also illustrates how certain mathematical content is needed to make sense of the context and solve the problem. By using mathematical content learners solve a context-based problem and develop competencies. In this example learners develop the ability to evaluate policy and make predictions about its implementation based on the interpretation of their findings.

APPENDIX 3:   DESCRIPTION OF THE LEVELS IN THE MATHEMATICAL LITERACY ASSESSMENT TAXONOMY

Level 1: Knowing

Tasks at the *knowing* level of the Mathematical Literacy taxonomy require learners to:
- Calculate using the basic operations including:
  - algorithms for +, -, ×, and ÷;
  - appropriate rounding of numbers;
  - estimation;
  - calculating a percentage of a given amount; and
  - measurement.
- Know and use appropriate vocabulary such as equation, formula, bar graph, pie chart, Cartesian plane, table of values, mean, median and mode.
- Know and use formulae such as the area of a rectangle, a triangle and a circle where each of the required dimensions is readily available.
- Read information directly from a table (e.g. the time that bus number 1234 departs from the terminal).

In the ***Responsible use of paracetamol*** example, questions 1.1 and 1.2 are at the *knowing* level of the taxonomy.
- Question 1.1 requires the learner to determine the relationship between body weight and dosage of paracetamol from the information given at the start of the task and to use this relationship to determine the dosage for children whose weight is given. The task requires the use of a basic operation (multiplication) and all the information is given.
- Question 1.2 requires the learner to use the same information and operation as in question 1.1 to complete a table of values.

Level 2: Applying routine procedures in familiar contexts

Tasks at the *applying routine procedures in familiar contexts* level of the Mathematical Literacy taxonomy require learners to:
- Perform well-known procedures in familiar contexts. Learners know what procedure is required from the way the problem is posed. All of the information required to solve the problem is immediately available to the student.
- Solve equations by means of trial and improvement or algebraic processes.
- Draw data graphs for provided data.
- Draw algebraic graphs for given equations.
- Measure dimensions such as length, weight and time using appropriate measuring instruments sensitive to levels of accuracy.

In the ***Responsible use of paracetamol*** example, questions 1.3 and 1.4 are at the *applying routine procedures in familiar contexts* level of the taxonomy.
- Question 1.3 requires the learner to describe the relationship between input and output values in a table of data by means of an equation. Since the relationship is linear and learners from Grade 9 upwards should be familiar with this

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> relationship, the task is one that requires the application of routine procedures.
> - Question 1.4 requires the learner to draw an algebraic graph of a linear function based on either a table of values and/or an equation. The knowledge and skills required to draw this graph have been developed in Mathematics in the General and Education Training Band and nurtured from Grade 10 in Mathematical Literacy and hence is considered to be the application of a routine procedure.
> - Since it is expected that learners will deal with a large number of contexts in which the relationship between the variables is linear, it is reasonable to suggest that the nature of the context is familiar, even if the learner has not expressly dealt with medicine as a context before.

Level 3: Applying multistep procedures in a variety of contexts

Tasks at the *applying multistep procedures in a variety of contexts* level of the Mathematical Literacy taxonomy require learners to:
- Solve problems using well-known procedures. The required procedure is, however, not immediately obvious from the way the problem is posed. Learners will have to decide on the most appropriate procedure to solve the solution to the question and may have to perform one or more preliminary calculations before determining a solution.
- Select the most appropriate data from options in a table of values to solve a problem.
- Decide on the best way to represent data to create a particular impression.

> In the **Responsible use of paracetamol** example, questions 1.5 and 1.7 are at the *applying multistep procedures in a variety of contexts* level of the taxonomy.
> - Question 1.5 requires the learner first to determine the number of *mg* of paracetamol for the child and then to determine the number of measures of a given type of medicine. This is a multistep procedure and the procedure, though not complex, is not obvious from the way the question is posed.
> - Question 1.7 requires learners to firstly choose between two graphs — one for boys and one for girls and secondly to select the appropriate line on each graph to answer a question. In this sense, the procedure is multistep in nature. While the learner may not have seen this exact graph before, it is expected that a learner in Grade 12 will be sufficiently competent and experienced with graphs to make sense of the information presented in this one.

Level 4: Reasoning and reflecting

Tasks at the *reasoning and reflecting* level of the Mathematical Literacy taxonomy require learners to:
- Pose and answer questions about what mathematics they require to solve a problem and then to select and use that mathematical content.
- Interpret the solution they determine to a problem in the context of the problem and where necessary to adjust the mathematical solution to make sense in the context.
- Critique solutions to problems and statements about situations made by others.
- Generalise patterns observed in situations, make predictions based on these patterns and/or other evidence and determine conditions that will lead to desired outcomes.

In the ***responsible use of paracetamol*** example, questions 1.6 and 1.8 are at the *reasoning and reflecting* level of the taxonomy.

- Question 1.6 requires the learner to make inferences. Learners are expected to draw on what they have learnt about the safe use of paracetamol in the question so far to make deductions or inferences. The answer that the learner provides will be within a range of possible values and the quality of the answer will be based on the *reasoning* that is evident in determining the answer.
- In question 1.8 the learner is expected to evaluate the dosage recommended by the manufacturer. Firstly, the learner must make inferences about how the manufacturer made their recommendations. Secondly, the learner must critique the decision. In critiquing the dosage recommended by the manufacturer, the learner must draw not only on mathematical content but also on his or her own experiences of the world. Therefore, this question is at the highest level of the Mathematical Literacy taxonomy.

APPENDIX 4:   ASSESSMENT TASK: RESPONSIBLE USE OF PARACETAMOL

ILLUSTRATION: Assessment task: Responsible use of Paracetamol

INFORMATION:

Paracetamol is a drug with analgesic (painkiller) properties.

Paracetamol is the active ingredient in the well-known medicine Panado that can be bought over the counter in supermarkets and pharmacies.

Paracetamol is, however, involved in many incidents of accidental poisoning though overdose.

Paracetamol dosage is based on body weight. A healthy single dose of paracetamol for children is considered to be 10mg per kilogram of bodyweight, with up to four doses per day.

Question 1

1.1.   Calculate how many *mg* of paracetamol can each of the following children safely have per dosage?
    1.1.1.   Gabriella—weight: 12*kg*   (1)
    1.1.2.   Ricardo—weight: 20½*kg*   (1)   [2]

1.2.   Copy and complete the table below:

ble below: Weight of patient	6*kg*	7*kg*	8*kg*	9*kg*	15*kg*	25*kg*	35*kg*
mg of paracetamol per safe dosage							

[4]

1.3.   Write an equation (in the form $y = \ldots$) that can be used to determine the number of *mg* of paracetamol in a safe dose for a child with a given weight. Let y be the number of *mg* of paracetamol and x the weight of the child in kilograms.

[2]

1.4.   Based on your answers to 1.2 and/or 1.3 draw a graph that can be used to determine the number of *mg* of paracetamol in a safe dose for a child with a given weight.

[3]

Further information
Paracetamol is sold in supermarkets and pharmacies in the following concentrations:
- Infant drops: 60mg per drop (0,6ml)
- Syrup: 120mg per medicine measure (medicine spoon) (5ml)
- Tablets: 120mg per tablet

1.5   Determine the following:
    1.5.1.   The number of infant drops in a safe dose for a child that weighs 7kg.   (2)
    1.5.2.   The number of medicine measures in a safe dose of syrup for child that weighs 9½kg.   (2)
    1.5.3.   The number of tablets in a safe dose for child that weighs 12¼kg. (2)

[6]

1 of 3

Responsible use of Paracetamol continued

Further information
The directions for use on the paracetamol syrup (120mg/5ml) state:
- 3 – 12 months old: 2,5 to 5ml per dose
- 1 – 5 years old: 5 to 10ml per dose
- 6 – 12 years old: 10 to 20ml per dose
- A maximum of 4 doses per day

1.6   What do these directions suggest about what the manufacturer considers to
be the weight of a 6 – 12 year old child?

[4]

1.7   Refer to the CDC weight-for-age percentile charts on the next page to
answer the questions that follow.
   1.7.1   According to the chart, how heavy is a 6 year-old girl whose
   weight is at the 25th percentile?   (1)
   1.7.2   According to the chart, how heavy is a 12 year-old girl whose
   weight is at the 75th percentile?   (1)
   1.7.3   According to the chart, how heavy is a 6 year-old boy whose
   weight is at the 75th percentile?   (1)
   1.7.4   According to the chart, how heavy is a 12 year-old boy whose
   weight is at the 25th percentile?   (1)

[4]

1.8   Based on the information provided (including the weight-for-age charts) in
this question discuss (with reasons):
   1.8.1   How you think the recommended dosage for paracetamol syrup
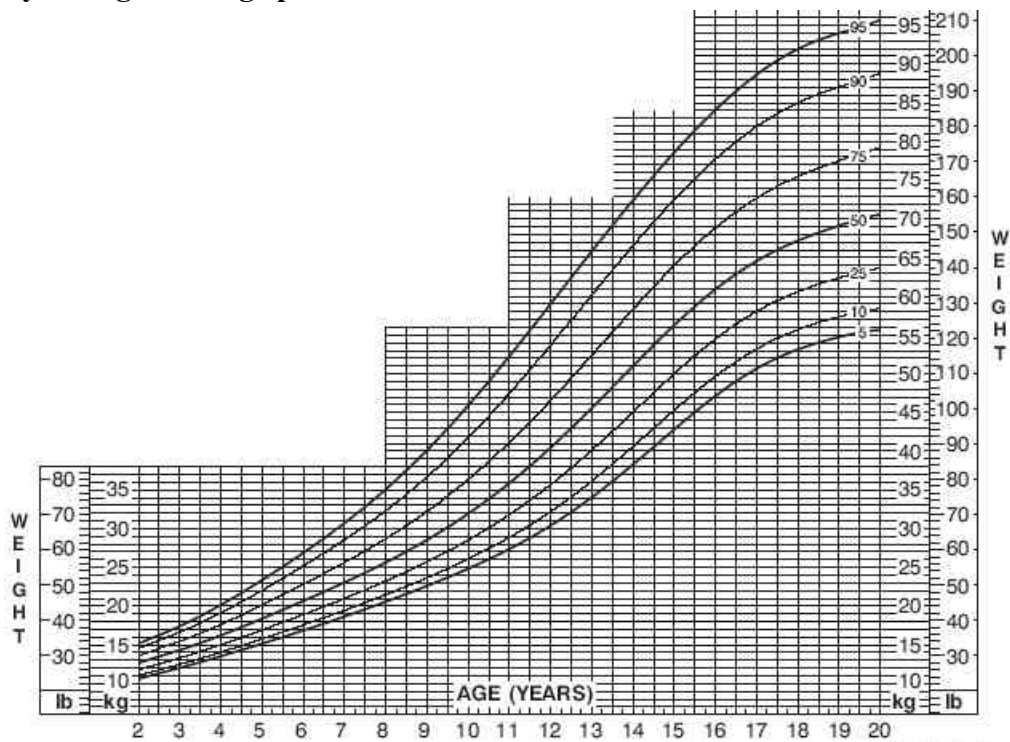   has been determined.   (4)
   1.8.2   Whether or not you think this is the most appropriate dosage to
   recommend.   (4)
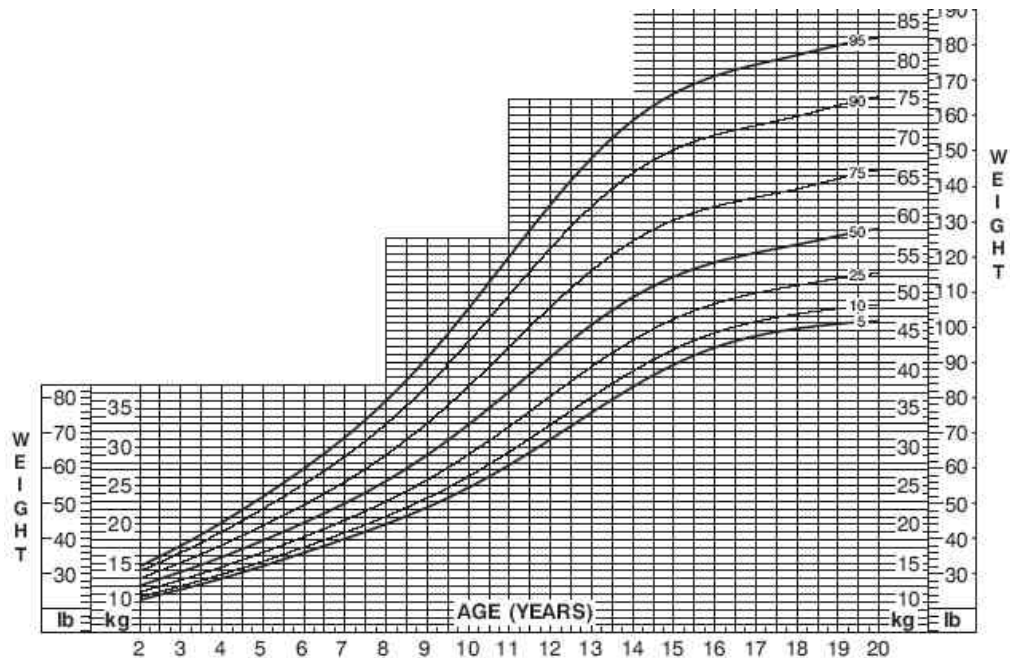
[8]

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Responsible use of Paracetamol continued

Boys: weight-for-age percentiles

Girls: weight-for-age percentiles

Published May 30, 2000 (modified 11/21/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

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ILLUSTRATION: Assessment task: Read all about it!

Question 2

2.1 The *Daily News* is a daily newspaper sold from Monday to Friday in Pretoria. The cover price of the newspaper is R 4,00 (VAT incl.). To have the newspaper delivered to your home you must subscribe to the newspaper and pay the subscription fee in advance. The table below gives the subscription rates for the paper.

Description	Period (weeks)	Total (R)
1 Month		
Monday to Friday	4	R76,02
3 Months		
Monday to Friday	13	R234,01
6 Months		
Monday to Friday	26	R442,01
12 Months		
Monday to Friday	52	R831,97

2.1.1 Consider a 1 month subscription
　　i. How many newspapers does a 1 month subscription represent?
　　ii. How much would this number of newspapers cost if you paid the full cover price for each newspaper?
　　iii. What percentage discount does the newspaper effectively give a person who subscribes for 1 month? (6)

2.1.2 What percentage discount does the newspaper effectively give a person who subscribes for 1 year? (5)

[11]

2.2 Newspapers are delivered to subscribers by teenagers on bicycles.

- These delivery boys/girls are co-ordinated by an adult. The Daily News pays a teenager 31c per newspaper to deliver it and also pays the co-ordinator 29c per newspaper that is delivered.
- Vishnu co-ordinates the delivery of newspapers by 6 teenagers in his area.
- The *Daily News* must be delivered by 06:30 every morning. If a teenager delivers all of his/her papers on time each day of the week Vishnu pays them a 20% bonus—this money is deducted from his co-ordinator's fee.

Wages for the week of 25 to 29 July 2005						
Teenager	Number of papers per day	Total number of papers in week	Delivery pay	On time (yes/no)	Time bonus	Total pay
Kgethi	38			Yes		
Tsolo	42			No		
Mogoko	36			No		
Joyce	34			Yes		
Suzanne	45			No		
Total						

1 of 3

Assessment task: Read all about it! continued

        2.2.1   Vishnu is working out how much to pay each student for a particular week. Copy and complete the following table.   (8)

        2.2.2   How much will Vishnu earn for co-ordinating the delivery of papers in the week above?   (4)

                                                                       [12]

2.3   Income from newspaper sales

        2.3.1   If shopkeepers and street-corner vendors are paid 45c for each newspaper they sell, how much does the *Daily News* get for each newspaper they sell via a shop or street-corner vendor?   (2)

        2.3.2   How much does the *Daily News* get for each newspaper after the delivery costs have been deducted if the client has a 6 months subscription?   (4)

        2.3.3   How much more would the *Daily News* get over the 6 month period if the subscriber bought all of the newspapers from a shop?   (3)

                                                                       [9]

2.4   Discuss (based on the calculations in this question) how a subscription impacts of income from newspaper sales. Explain (with reasons) why you think it is in the *Daily New's* interest to give a discount to subscribers.
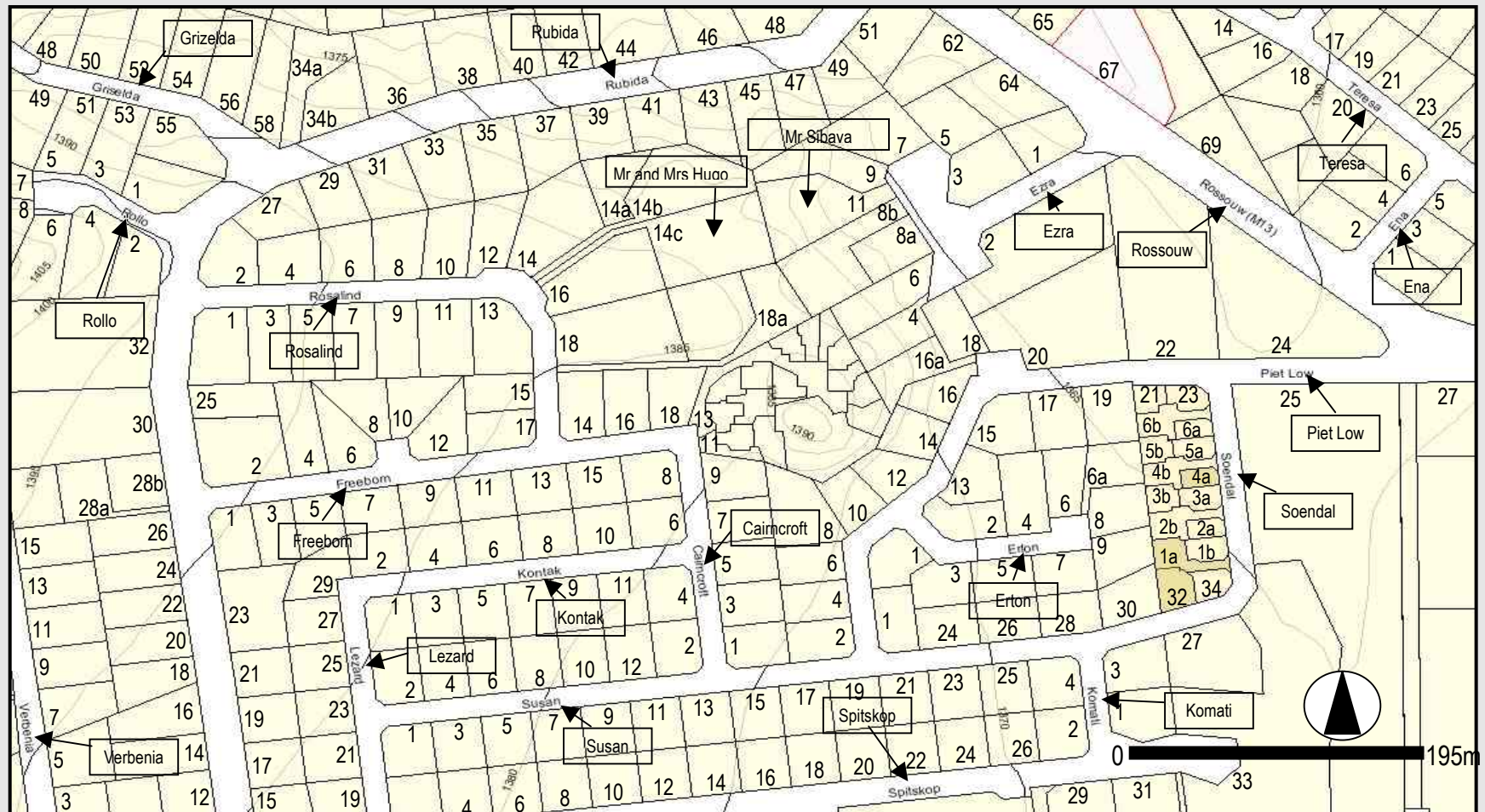
                                                                         [6]

Question 3

                                                                       38

Refer to the accompanying map of Linwood Ridge in Pretoria. Vishnu's team of teenagers deliver the *Daily News* in this area.

3.1.   Write down the street address of:

        3.1.1.   Mr and Mrs Hugo   (1)

        3.1.2.   Mr Sibaya   (1)

                                                                              [2]

3.2.   Mr Sibaya wants to travel by road to visit Mr and Mrs Hugo.

        3.2.1.   Draw two different routes that he could take on the map and mark them "route 1" and "route 2"   (4)

        3.2.2.   Write a detailed route description for route 1.   (4)

        3.2.3.   **ESTIMATE** the distance of route 2 (show working).   (4)

                                                                           [12]

3.3.   Mogoko must deliver the *Daily News* to the following 6 people in this area.

A.	S. Mapukata	43 Rubida St	B.	K. Court	7 Erton Close
C.	P. Koopman	30 Rubida St	D.	Z. Nombexeza	6 Ezra Close
E.	M. Speelman	5 Kontak Rd	F.	B. Mapeyi	9 Rosalind Ave

        3.3.1.   Mark each of these houses on the mark using the letters A, B, C etc.   (6)

        3.3.2.   If Mogoko must collect the newspapers from Vishnu's house at 3 Ena St, and return home to 16 Spitskop Ave, draw on to the map the shortest route that Mogoko can use to deliver all of the papers.   (4)

        3.3.3.   **ESTIMATE** the distance of the route and the time that it will take Mogoko to complete the delivery to these houses (show working).   (8)

                                                                           [18]

                                                                                        32