Mathematics (Gr 7-9) vs Mathematics (Gr 10-12) vs Mathematical literacy

1. CONTENT

Mathematics Gr 7 – 9	Mathematics Gr 10 – 12	Math Lit Gr 10 – 12
Numbers and calculations with numbers, Finances	Getalpatrone, Sequences and series	Numbers and calculations with numbers
Patterns, functions and algebra	Functions and Inverses	Patterns, functions and algebra
Finances	Finances, Growth and Depreciation, Annuities	Finances
Introduction to Algebra	Algebra	Measurement
Geometry and Measurement	Differential Calculus	Maps, plans and other representations of the physical world
Probability	Probability	Probability
Data handling	Euclidean Geometry& Measurement	Data handling
	Analytical Geometry	
	Trigonometry	
	Data handling	

2. **LEVELS** of Assessment

Mathematics:

Cognitive Levels		Math Gr 7–9		Math Gr 10–12	
Level 1: Knowledge	(old SG)	25%	70%	20%	55%
Level 2: Routine Procedures		45%		35%	
Level 3: Complex Procedures	(old HG)	20%	30%	30%	45%
Level 4: Problem Solving		10%		15%	

Mathematical literacy:

From the CAPS document, p.109. Table 7: Percentage of marks to be allocated to the different assessment taxonomy levels in examinations in Grades 10, 11 and 12

The four levels of the Mathematical Literacy assessment taxonomy	Grades 10, 11 and 12		
	Paper 1	Paper 2	Overall allocation
Level 1: Knowing	60% (±5%)		30% (±5%)
Level 2: Applying routine procedures in familiar contexts	35%(±5%)	25% (±5%)	30% (±5%)
Level 3: Applying multi-step procedures in a variety of contexts	5% (minimum)	35% (±5%)	20% (±5%)
Level 4: Reasoning and reflecting		40% (±5%)	20% (±5%)

3. TYPES OF ASSESSMENT

(NOTE: Learners normally do better in assessments like assignments, research and projects than in tests and exams. Many of these assessments are done at home or are revision exercises or even open book tests written in class). Please note that in Mathematics Gr 7-9 and Mathematical Literacy assignments and projects more count while in Mathematics Gr 10-12 tests and examinations more count.

Type of Assessment	Mathematics	Mathematics		Mathematical literacy	
	Gr 7 – 9	Gr 10,11	Gr 12	Gr 10,11	Gr 12
Tests	3	5	3	2	2
Exams	1	2	3	2	3
Projects	1	1	2	0	0
Assignments	5	0	0	4	3

NOTE: End of die year Exam in Gr. 7 – 9 counts **60%** of final Promotion mark.
End of die year Exam in Gr. 10 - 12 counts **75%** of final Promotion mark.

4. Progress in levels of difficulty:

Progression refers to the process of development in more complicated or advanced knowledge and skills. It is also important to remember that the level of difficulty in content and the type of questions asked steadily increase as the learners develop.

Example:

One way in which Mathematics Literacy develop over the grades, is in terms of mathematical concepts or skills, eg In grade 10 learners are expected to work with one graph on an axis, in grade 11 two graphs and in gr 12 two or more graphs on the same axis. It is not necessarily the case in all the topics, there are some topics with no new content compared to grades 10 and 11 and in these cases progress takes place in the relation to the context and/or the problem solving processes required.

When we look at Mathematics, we can use "functions" (graphs) as an example. In grade 9 learners learn how to draw and interpret a line graph on a very basic level. In grade 10 hyperbola, parabola and exponential graphs as well as sin-, cos- and tan graphs are added. In grade vertical changes in these graphs are studied (what happens when a graph moves up or down). In grade 11 vertical and horizontal changes are studied. In Grade 12 graphs are moved vertically and

horizontally and it is also reflected around line y = x (the inverse). In Grade 12 third degree (cube) graphs and circles are also added.

Progression is found in the relation to the type, familiarity and complexity of the context of the problems to be solved. Moving from Grade 7 to Grade 9 and again from Grade 10 to Grade 12 the context will become increasingly less known and more distanced from the learners' frame of reference, and thus less accessible and more demanding.

More detail on content:

CONTENT:	Math Gr 7 – 9	Math Gr 10 – 12	Maths Lit Gr 10 – 12
Numbers and calculations with numbers:			
Whole number calculations: $+, -, \times, \div$. Fractions, Decimal fractions, %, estimates, ratio, rate.	✓	Very little	✓
Patterns, functions and algebra:			
Introduction to simple number patterns, straight line graphs	✓	✓	✓
More difficult graphs: parabola, hyperbola, exponential graphs, sin-, cos- and tan graphs	×	✓	×
Inverse functions	×	✓ Gr 12	×
Algebra:			
Introduction to Algebra: solving of linear equations; simple algebraic fractions	✓	✓	×
Algebra: More difficult algebraic fractions, solving linear and quadratic equations, linear and quadratic inequalities, simultaneous equations	×	✓	×
Logarithms	×	✓ Gr 12	×
Finances			
Finances: VAT, Exchange rate, Hire purchase, Simple and Compound Interest	✓	✓	✓
Finances: Depreciation, Annuities, Loans, Balance on a Loan, calculate "n" using logarithms.	×	✓	×
Probability			
Probability: Concepts, Simple games, determine simple probabilities (without using formulas) like tossing a coin, rolling a die, etc.	✓	✓Gr 10	✓
Probability: Calculate more difficult Bereken moeiliker probabilities (use of formulas necessary).	×	✓Gr 11, 12	×
Probability: Calculate more difficult Bereken moeiliker probabilities (use of formulas necessary). Fundamental counting principle.	×	✓Gr 12	×

Data handling:				
	Data handling: Determine mean, median, mode. Draw graphs like line graphs, pie charts, histograms, bar graphs and frequency polygons.	✓	✓Gr 10, 11, 12	✓
	Data handling: Ogive, standard deviation	×	✓Gr 11, 12	×
	Data handling: Regression analyses, correlation coefficient	×	✓Gr 12	×
Euclidean Geometry:				
	Euclidean Geometry: Recognize and learn characteristics of different geometric figures; Prove basis theorems of angles, lines, triangles, similarity and congruency.	✓	✓	×
	Euclidean Geometry: As above. Plus, proofs of and use of theorems in quadrilaterals.	×	✓Gr 10	×
	Euclidean Geometry: As above. Plus, proofs of and use of theorems in circles.	×	✓Gr 11	×
	Euclidean Geometry: As above. Plus, proofs of and use of theorems in triangles (similarity and proportion theorems).	×	✓Gr 12	×
Measurement:				
	Measurement: Area and volume of figures like triangles, circles, rectangles, squares, cubes and cylinders.	✓	✓	✓
	Measurement: As above. Plus, area of quadrilaterals and surface area and volume of pyramids, spheres, cones.	×	✓	×
Other				
	Sequences and series	×	✓Gr 12	×
	Differential Calculus	×	✓Gr 12	×
	Trigonometry	×	✓	×
	Analytical Geometry	×	✓	×
	Maps, plans and other representations of the physical world	×	×	✓

MATHEMATICS	Gr 7	Gr 8	Gr 9	Gr10	Gr 11	Gr 12
Number, Operations and Relations	30%	25%	15%			
Patterns, Functions and Algebra	25%	30%	35%			
Geometry	25%	25%	30%			
Measurement	10%	10%	10%			
Data Handling	10%	10%	10%			
	100%	100%	100%			
Number Patterns, Sequences and Series			Paper 1	7½ %	8,3 %	8,3 %
Functions and Inverses				15 %	15 %	11,7 %
Finance				5 %	5 %	5 %
Algebra				15 %	15 %	8,3 %
Differential Calculus				-	-	11,7 %
Probability				7½ %	6,7 %	5 %
Euclidean Geometry& Measurement			Paper 2	15 %	16,7 %	16,7 %
Analytical Geometry				15 %	10 %	13,3 %
Trigonometry				20 %	16,7 %	13,3 %
Data handling				7½ %	6,7 %	6,7 %
				100%	100%	100%

Suggestions to help your child in Mathematics

- Reinforcement: Children must physically sit down and do extra Mathematics problems without using the " Oh Yes method" where they look at the answers in their study guide saying "Oh yes I can do it".

  The value lies therein that they work through the steps and solve the problems themselves and only then refer to the memorandum available. By studying the answers to the problems the whole time, they are under the impression that they understand the problem, but they did not really work through the problem.

- The 30 minutes period in class is not enough for reinforcement. It is necessary to sit down at home and make the work his own and do exercises - working actively. Mathematics requires constant hard work.
- Typical questions have to be done. They cannot just watch how someone does a problem and think they will be able to do it. They have to sit and do the problems and do reinforcement exercises. Set homework alone is not enough (Mathematics and Science). Although there is great value in extra classes, learners have to work through problems by themselves. Every step in a Mathematics problem is worth marks and although not all learners can work to the final answer, they have to be encouraged to do every step conscientiously to earn every possible mark.

- It happens often that a learner struggles with a specific problem and therefore spends so much time on the one problem during a test that they do not get to the rest of the paper.
- Self-confidence: Learners often give up too easily and think that a problem or concept is above their ability. Again there is value to systematically solving a problem.
  It helps if learners work with other learners on a Mathematical problem (eg. “Adopt-a-genius”). It sometimes happens that a co-learner approaches the work from another perspective and then the concept makes more sense.
- Motivate your child and encourage him to do extra exercises over the week-end when the pressure is less than during the week. Then specific problems can be discussed with the teacher.