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Council for Quality Assurance in
General and Further Education and Training

What's in the CAPS Package?
A Comparative study of the National Curriculum Statement (NCS) and the Curriculum and Assessment Policy Statement (CAPS): FET Phase

Mathematics

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NCS

Paper 1:

Algebra, Sequences, Functions, Calculus, Linear Programming, Finance

Paper 2:

Coordinate geometry, Transformation geometry, Trigonometry, Statistics

Paper 3: (done by <5% of Mathematics learners)

Euclidean geometry, Probability and Statistics

CAPS

Paper 1:

Algebra, Sequences, Functions, Calculus, Finance, Probability

Paper 2:

Coordinate geometry, Euclidean geometry, Trigonometry, Statistics (including regression and correlation)

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NCS: format and user-friendliness

- Chapter 1 - Introducing the National Curriculum Statement

  This chapter describes the principles and the design features of the National Curriculum Statement Grades 10 – 12 (General). It provides an introduction to the curriculum for the reader.

- Chapter 2 - Introducing the Subject

  This chapter describes the definition, purpose, scope, career links and Learning Outcomes of the subject. It provides an orientation to the Subject Statement.

- Chapter 3 - Learning Outcomes, Assessment Standards, Content and Contexts

  This chapter contains the Assessment Standards for each Learning Outcome, as well as content and contexts for the subject. The Assessment Standards are arranged to assist the reader to see the intended progression from Grade 10 to Grade12. The Assessment Standards are consequently laid out in double-page spreads. At the end of the chapter is the proposed content and contexts to teach, learn and attain Assessment Standards.

- Chapter 4 – Assessment

  This chapter deals with the generic approach to assessment being suggested by the National Curriculum Statement. At the end of the chapter is a table of subject-specific competence descriptions. Codes, scales and competence descriptions are provided for each grade. The competence descriptions are arranged to demonstrate progression from Grade 10 to Grade 12.

NCS Learning Outcomes

Learning Outcome 1: Number and Number Relationships

Learning Outcome 2: Functions and Algebra

Learning Outcome 3: Space, Shape and Measurement

Learning Outcome 4: Data Handling and Probability

NCS Assessment Standards

e.g. We know this when the learner is able to:

11.2.4 Manipulate algebraic expressions:

(a) by completing the square;

(b) simplifying algebraic fractions with binomial denominators.

11.2.5 Solve:

(a) quadratic equations (by factorisation, by completing the square, and by using the quadratic formula) and quadratic inequalities in one variable and interpret the solution graphically;

(b) equations in two unknowns, one of which is linear and one of which is quadratic, algebraically or graphically.

Exam guidelines

ASSESSMENT STANDARDS	CLARIFICATION OF ASSESSMENT STANDARDS
Manipulate algebraic expressions: (a) by completing the square; (b) simplifying algebraic fractions with binomial denominators.	• To avoid unnecessary assumptions the binomial denominators should be linear expressions. • Completing the square is necessary in the teaching process to determine the turning point of a parabola.
Solve: (a) quadratic equations (by factorisation, by completing the square, and by using the quadratic formula) and quadratic inequalities in one variable and interpret the solution graphically; (b) equations in two unknowns, one of which is linear and one of which is quadratic, algebraically or graphically.	• Solving quadratic equations by completing the square will not be examined. • Solution of non-quadratic inequalities should be seen in context of the graphs of functions. *For example:* Determine the value(s) if x for which $\frac{8}{x-3} \leq 2$ (The solution to this question should be read off the graph of the two functions.)

CAPS format and user-friendliness

1. Introduction to the curriculum and assessment policy statements
   Background , Overview, General aims of the South African Curriculum, Time allocation

2. Introduction to Mathematics
   What is Mathematics?, Specific Aims, Specific Skills
   Focus of Content Areas, Weighting of Content Areas, Mathematics in the FET

3. Overview of topics per term and annual teaching plans
   Specification of content to show Progression
   Content clarification with teaching guidelines (includes allocation of teaching time, sequencing and pacing of topics, topic allocation per term)

4. Assessment in Mathematics
   Introductions, informal or daily assessment, formal assessment, programme of assessment, recording and reporting, moderation of assessment, general

CAPS Topics

- Functions
- Number Patterns, Sequences and Series
- Finance, growth and decay
- Algebra
- Differential Calculus
- Probability
- Euclidean geometry and Measurement
- Analytical Geometry
- Trigonometry
- Statistics

CAPS: Overview of topics section

Grade 10	Grade 11	Grade 12
NUMBER PATTERNS, SEQUENCES AND SERIES		
Investigate number patterns leading to those where there is constant difference between consecutive terms, and the general terms is therefore linear	Investigate number patterns leading to those where there is a constant second difference between consecutive terms and the general terms is therefore quadratic	Identify and solve problems involving number patterns that lead to arithmetic and geometric sequences and series, including infinite geometric series
FINANCE, GROWTH AND DECAY etc		

CAPS: allocation of teaching time

Terms	Grade 10	
		No. of weeks
Term 1	Algebraic expressions	3
	Exponents	2
	Number patterns	1
	Equations and inequalities	2
	Trigonometry	3
	Functions	4

CAPS: Topic allocation per term

No of Weeks	Topic	Curriculum statement
1	Numbers and patterns	Patterns: Investigate number patterns leading to those where there is a constant difference between consecutive terms, and the general term (without using a formula-see content overview) is therefore linear.

CAPS: Clarification column

Clarification
Comment: • Arithmetic sequence is done in Grade 12, hence $T_n = a + (n-1)d$ is not used in Grade 10. **Examples:** 1. Determine the 5th and the n^{th} terms of the number pattern 10; 7; 4; 1; .... There is an algorithmic approach to answering such questions. (R) 2. If the pattern MATHSMATHSMATHS... is continued in this way, what will the 267th letter be? It is not immediately obvious how one should proceed, unless similar questions have been tackled. (P)

Coverage

NUMBER OF SUBTOPICS		
	NCS	CAPS
FUNCTIONS	52	49
PATTERNS & SEQUENCES	10	10
FINANCE	10	9
ALGEBRA	27	26
CALCULUS	14	13
PROBABILITY		19
EUCLIDEAN GEOMETRY	7	32
ANALYTICAL GEOMETRY	8	9
TRIGONOMETRY	16	15
STATISTICS & DATA HANDLING	15	19
TRANSFORMATION GEOMETRY	6	
LINEAR PROGRAMMING	8	
Total number of subtopics	173	201

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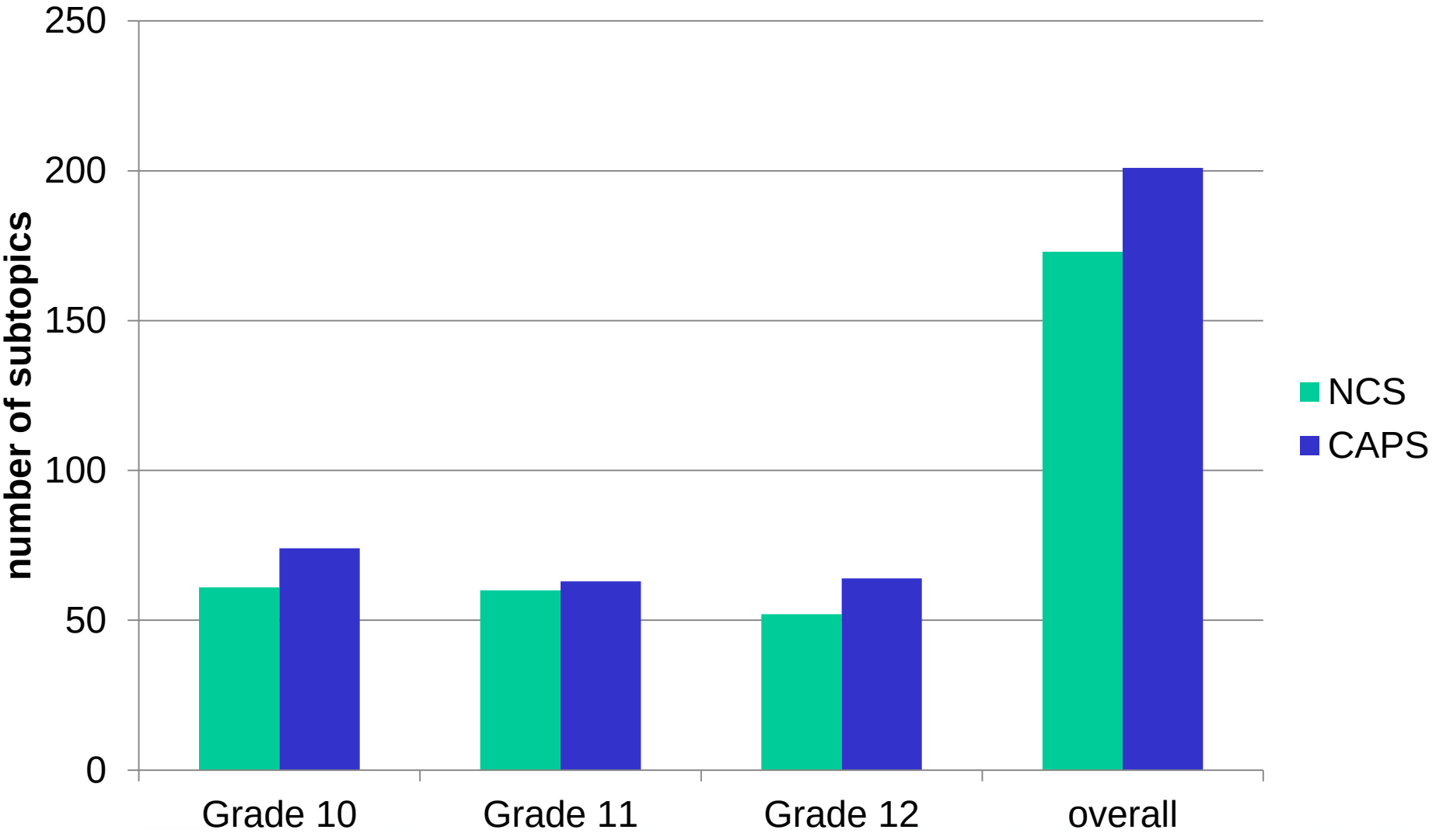
Coverage


250
200
150
100
50
0
number of subtopics
Grade 10
Grade 11
Grade 12
overall
NCS
CAPS

Comparison of depth of the CAPS topics relative to NCS		
Topic	**the CAPS**	**Brief justification**
FUNCTIONS	Same	
PATTERNS & SEQUENCES	Same	
FINANCE	Same	
ALGEBRA	Slightly more demanding	A few more sophisticated algebraic computations included.
CALCULUS	Same	
PROBABILITY	High demand topic added	Probability requires complex thinking when extended to combinations of events.
EUCLIDEAN GEOMETRY	High demand topics added	Euclidean geometry tends to demand insight and involves an understanding of proof in theorems and riders.
ANALYTICAL GEOMETRY	Same	
TRIGONOMETRY	Same	
STATISTICS & DATA HANDLING	More demanding	Inclusion of work with bivariate data
TRANSFORMATION GEOMETRY	Low demand topic removed	Only the basics of transformation geometry were dealt with in the NCS
LINEAR PROGRAMMING	Moderate demand topic removed	Although linear programming requires interpretation of scenarios it is a contained area of work.

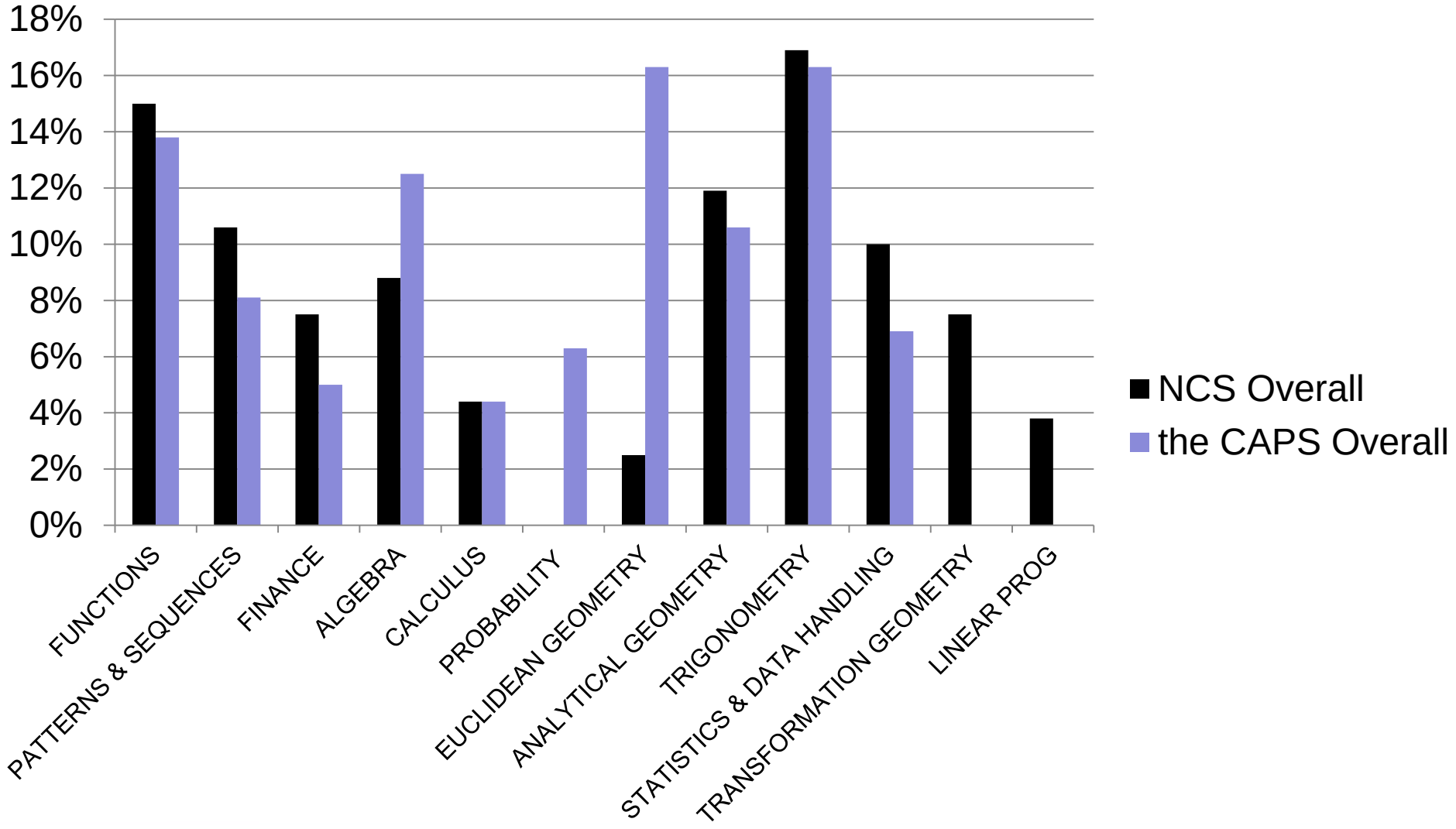
Summarising change in depth

Summary of comparison of depth comparing the CAPS to NCS		
Same demand	**More demanding**	**Added or removed**
6	2	Added 2 high demand Removed 1 low and 1 moderate demand

Weighting of Mathematics in the curriculum

Subject time allocation		
	NCS	**the CAPS**
Total classroom time allocated for Mathematics in the phase	4.5 hours per week	4.5 hours per week
% of total classroom time	16%	16%

Weighting (marks)



Comparison of coverage, level of demand and weighting of topics in the CAPS relative to that in NCS			
Topic (content/skill)	**Number of subtopics**	**Level of demand**	**Overall weighting in terms of marks**
FUNCTIONS	Similar	Same	Similar
PATTERNS & SEQUENCES	Same	Same	Less
FINANCE	Similar	Same	Less
ALGEBRA	Similar	Slightly more demanding	More
CALCULUS	Similar	Same	Same
PROBABILITY	More	High demand topic added	More
EUCLIDEAN GEOMETRY	More	High demand topics added	More
ANALYTICAL GEOMETRY	Similar	Same	Similar
TRIGONOMETRY	Similar	Same	Less
STATISTICS	More	More demanding	Less
TRANSFORMATION GEOMETRY	Less	Low demand topic removed	Less
LINEAR PROGRAMMING	Less	Moderate demand topic removed	Less

Assessment			
NCS Grade 10 and 11	**NCS Grade 12**	**CAPS Grade 10 and 11**	**CAPS Grade 12**
7 tasks and one end of year exam per year	7 tasks and one end of year exam per year	7 tasks and one end of year exam per year	7 tasks and one end of year exam per year
2 tests 2 exams 2 investigations 1 project 1 assignment	2 tests 3 exams 1 investigation/project 2 assignments	4 tests 2 exams 1 investigation/ project 1 assignment /test	3 tests 3 exams 1 investigation/ project 1 assignment
No dominant form – equally tests, exams, investigations, project or assignments	Still quite evenly split but slightly more skewed to tests and exams	Tests and exams	Tests and exams

Entrance level requirements

- A facility with number and calculations with number
- An understanding of number and number systems and the generalisations of these properties using the language of algebra
- Some basic facility with the language of algebra
- Understanding of the geometric meanings of the coordinates of points in the Cartesian plane.
- Work with the geometry of lines and triangles and experience of working with geometric shapes
- Basic understanding of collecting, organising and representing data
- An orientation to mathematics that includes sense-making, explanation, justification and application in context.

Comments on exit level outcomes

- Functions: move between different representations
- Sequences and series: investigate different sequences, arithmetic and geometric sequences and series
- Finance, growth and decay: interpret and solve problems based on situations relating to interest and annuities
- Algebra: ability to work fluently with language of algebra
- Calculus: basic, largely intuitive understanding of derivatives and ability to apply them
- Probability: understanding of key ideas in calculating probability
- Euclidean geometry: work with geometry of polygons and circles deductively.
- Analytical geometry: Work with points, line segments, lines and circles on the Cartesian plane
- Trigonometry: Work with trig functions and apply them to geometric situations
- Statistics: Work with univariate and bivariate data

Comments on exit level outcomes

- Functions: restricted list. Limited to functions given by equations.
- Calculus: meaning of 1^{st} derivative
- Geometry: Notions of proofs and axiomatic systems
- Trigonometry: Functions limited to domain -360^{o} to 360^{o}
- Aims at generic level not sufficiently pulled through into body of curriculum (e.g. modelling, conjecturing, generalisation, justification and proof)

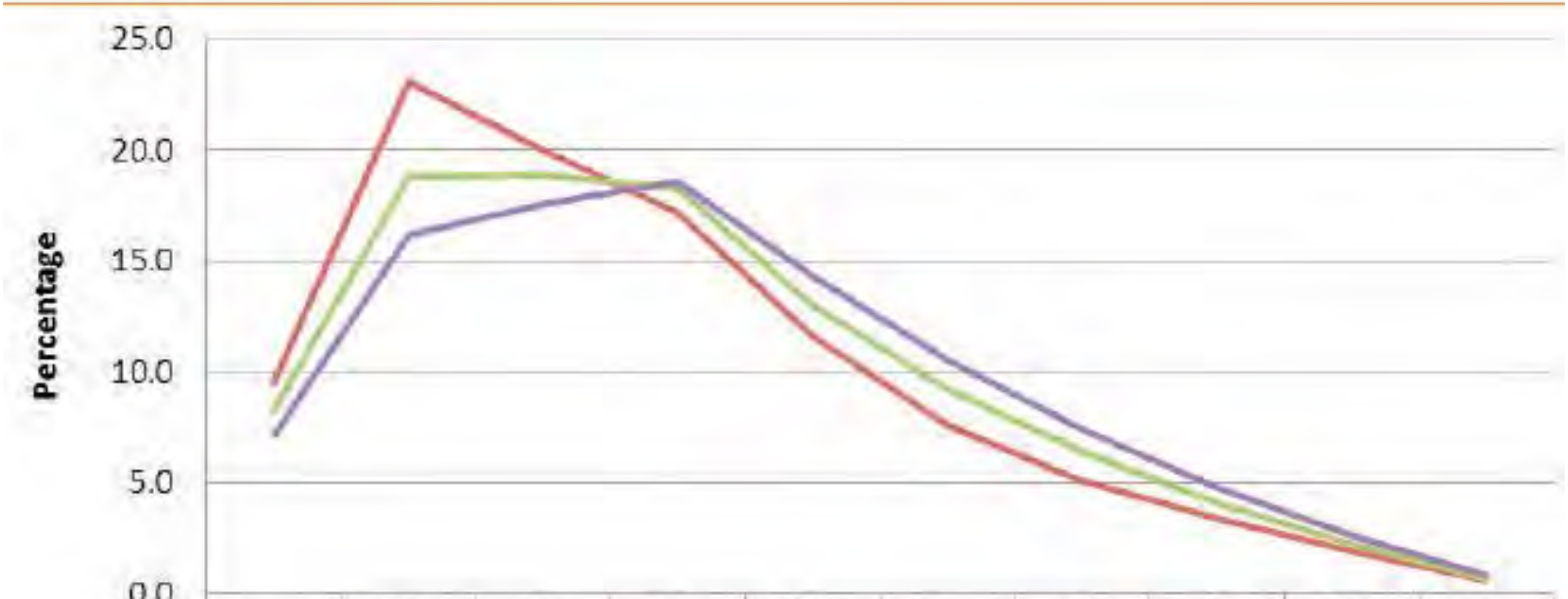
Comments

Weighting of levels of cognitive demand	
Knowledge	20%
Routine Procedures	35%
Complex Procedures	30%
Problem Solving	15%

- Cannot increase breadth
- Look for places to increase depth

BUT

Performance in Maths NSC (pre-CAPS)



	0 - 9.9	10 - 19.9	20 - 29.9	30 - 39.9	40 - 49.9	50 - 59.9	60 - 69.9	70 - 79.9	80 - 89.9	90 - 100
2011	9.5	23.1	20.0	17.2	11.6	7.6	5.1	3.4	1.9	0.6
2012	8.3	18.8	18.9	18.3	13.0	9.2	6.4	4.1	2.2	0.7
2013	7.1	16.2	17.6	18.6	14.3	10.5	7.4	4.8	2.6	0.8