



## Design of learning Outcomes Framework, Associated Learning and Assessment Programmes

ESF Project 1.228

# Mathematics

educators feedback



Operational Programme II - Cohesion Policy 2007-2013  
*Empowering People for More Jobs and a Better Quality of Life*  
Project part-financed by the European Union  
European Social Fund  
Co-financing rate: 85% EU Funds; 15% National Funds

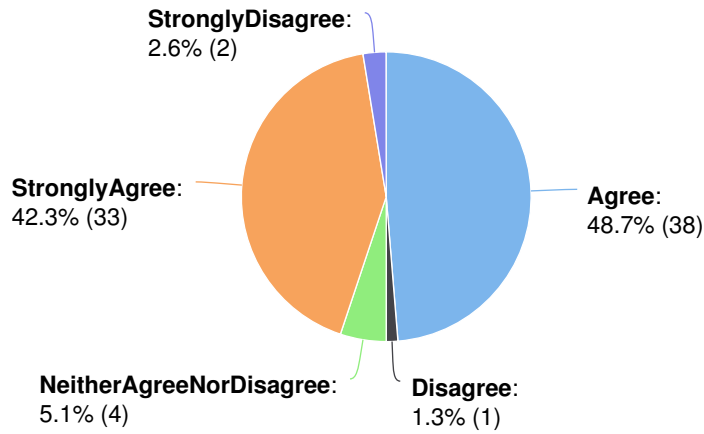


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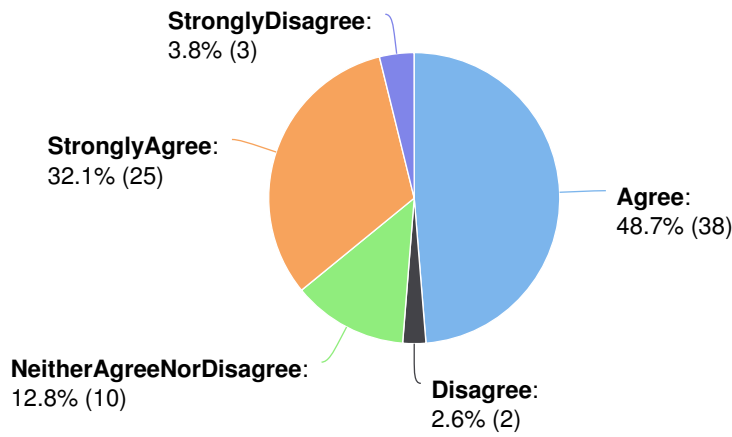
## Number of respondents

Education Officers	0
Head / Assistant Head of school / Deputy Heads	3
Head Of Departments	7
Inclusion Coordinators	0
Learning Support Assistants	7
Other	2
Subject Specialists	1
Teachers	52
University Lecturers	3
Vocational Education Training Lecturers	0

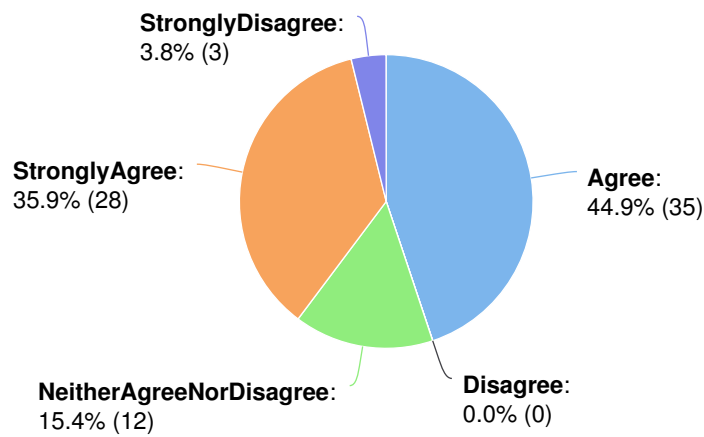
## Focused on the learner



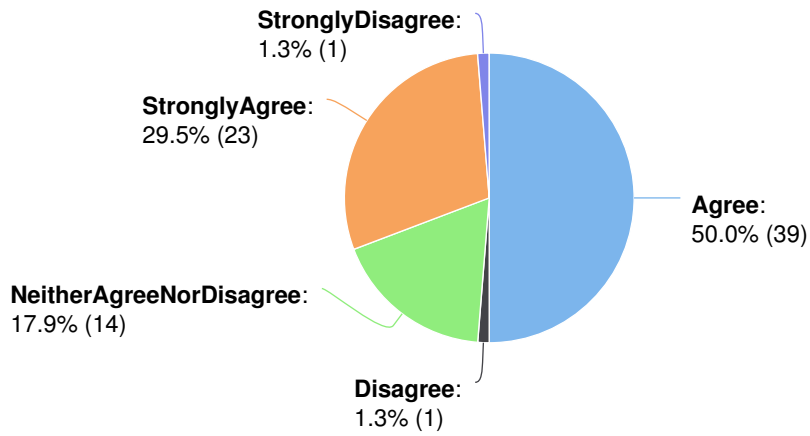
## Comprehensive



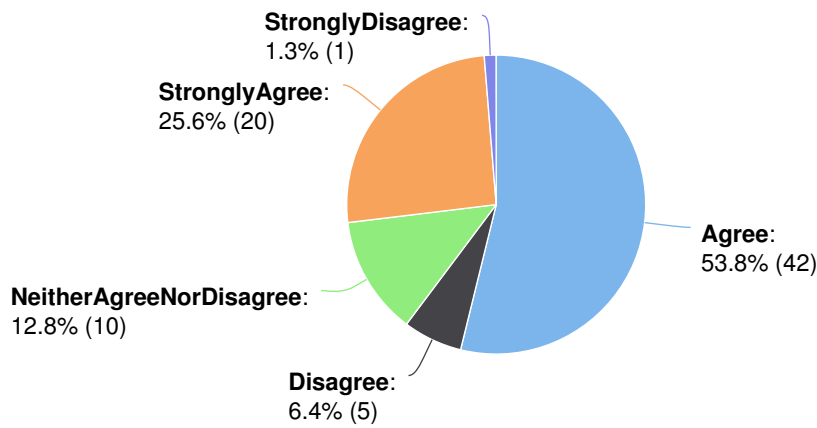
## Clear



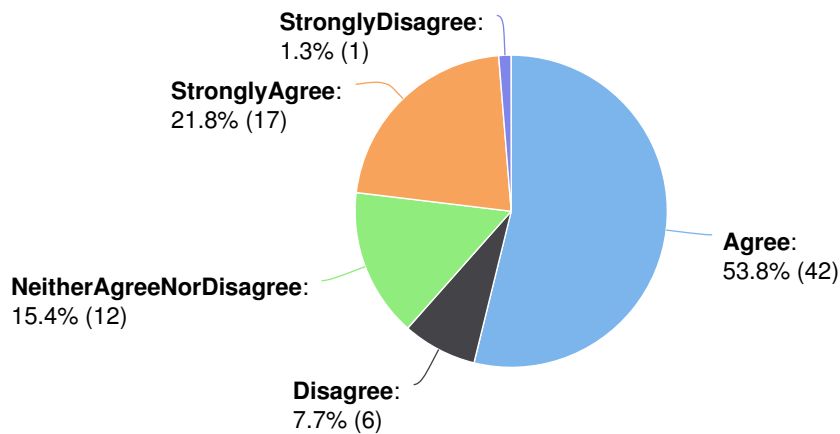
### Articulate



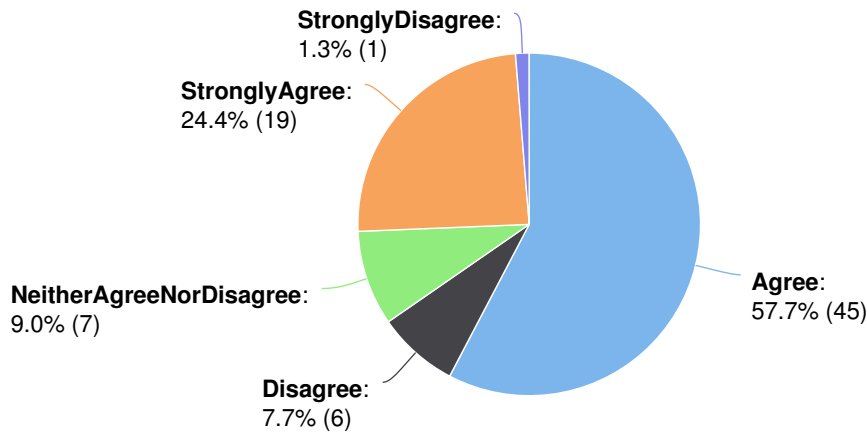
### Good for providing direction for learning activities



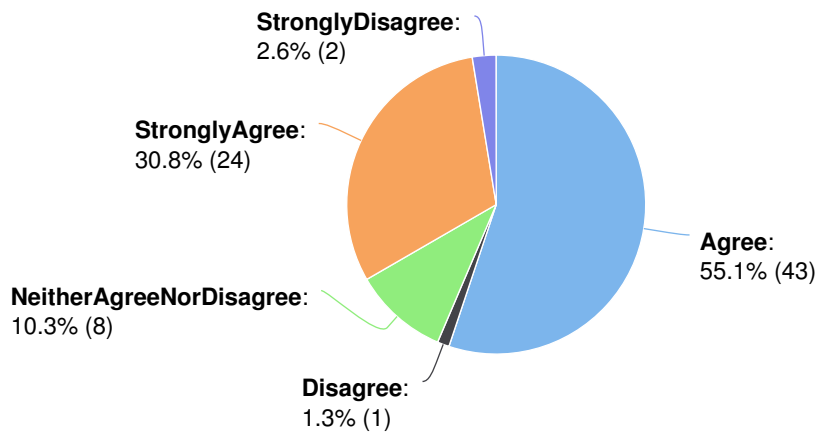
### Good guidelines for teaching and assessment



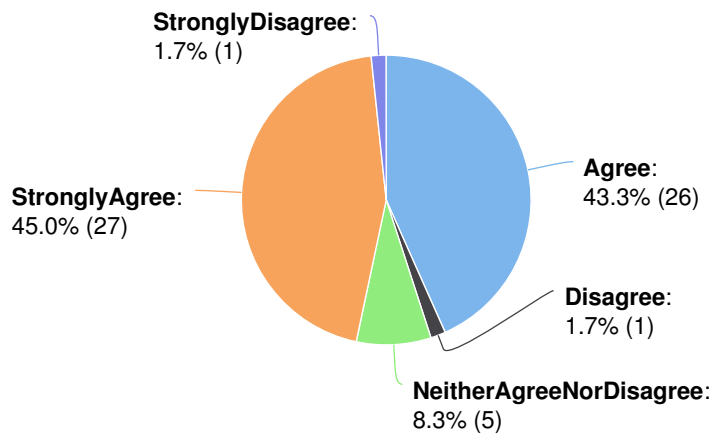
### Measurable



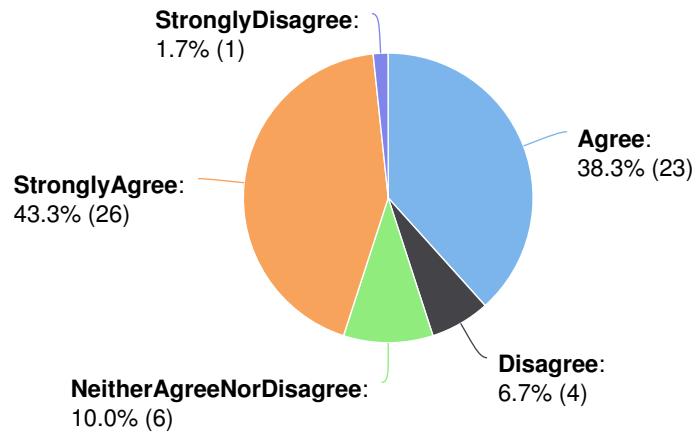
### Suitable for providing progression



### I feel that the Learning Outcomes approach will help me in my teaching



I feel that the Learning Outcomes approach will enhance my teaching practice



# Feedback

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#107

teacher None primary church\_school

*General comments or concerns about the subject:*

I feel that the outcomes proposed are realistic and can be reached.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

Not really as I taught them all and they are age appropriate.

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#131

head\_assistant\_head\_of\_school\_deputy\_head None primary

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#132

learning\_support\_assistant None primary state\_school

*General comments or concerns about the subject:*

If there is going to be any changes, it is wiseable to adapt them not in the next scholastic year but the year after (2016-2017) so that all educators will be well prepared for the new changes.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#133

teacher mathematics secondary state\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#134

learning\_support\_assistant None primary state\_school

*General comments or concerns about the subject:*

The outcomes proposed are suitable for both the learners and educators. The educators must be familiar with the system first. It is advisable that educators have time to prepare in advance for any new strategies.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#146

teacher None primary state\_school

General comments or concerns about the subject:

Textbooks are outdated and should have been changed years ago.

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#188

learning\_support\_assistant None primary state\_school

General comments or concerns about the subject:

I really like the way it is structured, i.e. there is a progression of what the student can achieve. When there is mentioned (using a dynamic geometry software) , are we going to be provided with such tools please?

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#197

head\_of\_department mathematics secondary state\_school

General comments or concerns about the subject:

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Level 7 - I do not think that the students should be asked to solve 2 linear equations algebraically.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#200

teacher None primary state\_school

General comments or concerns about the subject:

That there is too much syllabus to cover in a small period of time, thus resulting in a number of pupils who do not grasp some learning outcomes.

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Read and writing the vocabulary of time -Such a hard topic for kids at this stage.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

There are already too many!

#201

teacher None primary church\_school

General comments or concerns about the subject:



Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#202

learning\_support\_assistant None primary church\_school

General comments or concerns about the subject:

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#206

teacher mathematics primary state\_school

General comments or concerns about the subject:

I think that all these learning outcomes are clear and important.

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

No

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

Problem solving. Simple mathematical problem solving where children can solve real mathematical problems which are not too difficult.

#210

teacher mathematics primary state\_school

General comments or concerns about the subject:

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#225

subject\_specialist mathematics secondary state\_school

General comments or concerns about the subject:

Naqbel ma dan il layout imma certu topics bhall Histograms , variations, proofs bhal ta l alternate segment huma tqal biex tfal kollha li qeghdin form 5 jitghallmuhom. Nahseb apparti li hu ftit tqil huwa ftit vast ukoll

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Histograms with unequal intervals  
Upper u Lower Bounds  
Dawn topics li jsibuhom tqal u qatt ma juzawhom

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

Functions .. ghax ma jidirlix li rajtu

#242

None

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#243

None

primary

state\_school

*General comments or concerns about the subject:*

Including learning outcomes that reflect skills and attitudes.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#247

teacher

None

primary

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#253

other

None

Assistant Director Curriculum (assessment)

*General comments or concerns about the subject:*

Outcomes focus totally on the subject and there is little space for the cross curricular themes to be taught and assessed here. This is very much a copy of what there presently is.. except that Carroll diagrams have been added to the already long list of concepts that students have to tackle at this level. Moreover, I was expecting to find more outcomes related to application after the feedback from international studies. If the above outcomes don't expect application and higher order thinking we will continue to get the same results as there will not be the required change in pedagogy. Higher order thinking needs to feature here before we expect to see it in the classrooms.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#255

head\_of\_department

mathematics

secondary

state\_school

*General comments or concerns about the subject:*

A general comment on the levels 9 and 10 in the LOFs. From Yr 1 to F4, there is one level associated with two years of schooling. How come when they reach F5, one level (Level 9) is associated with just one year? Moreover, high performers are encouraged to reach level 10. That means two levels in one year. Level 9 is already for high achievers in my opinion.

[The following points concern the formatting/presentation of the LOFs in this level, rather than its content:

Algebra point N2 is skipped  
Data Handling - Statistics: Add point N1 next to the outcome  
Align Measures point N 2]

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

Rather than taking an LO out, I think we need to clarify Algebra point N10. Finding the derivative w/o the understanding of differentiation might not be appropriate. How about "I understand the basic principles of differentiation and find the derivative of...?"

Algebra point 11. Can we explain further? What exactly do we mean? Isn't this behind the principles of graphs in previous levels? Or is it just the notation  $f(x)$  that is implied?

Euclidian Geometry: Can we specify which circle theorems are to be proved from scratch?

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

Statistics: Standard Deviation w/o a proper understanding of the normal distribution might not be appropriate. May be we can do it: "1. Understand (or appreciate) the fact that there are a number of instances where the data of a population is normally distributed. 2. I understand that the standard deviation is a measure that is used... (as above)".

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#259

teacher None primary state\_school

**General comments or concerns about the subject:**

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

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#263

teacher None primary state\_school

**General comments or concerns about the subject:**

Please disregard my previous feedback since I misread the headings to be ticked. Thank you

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

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#267

teacher mathematics secondary church\_school

**General comments or concerns about the subject:**

I would remove HISTOGRAMS and put them in LEVEL 10

I think that some of the topics in Level 9 are quite difficult for some of the students. Is the system i.e. PAper A and Paper B still going to be in place? As most of the topics are not for paper B students such as Alternate segment, factorisation , cumulative frequency graphs etc etc. We need more guidelines on assessment and the way forward.

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

see above

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

Maybe more examples of mathematics related to everyday life

#271

head\_of\_department

mathematics

secondary

state\_school

**General comments or concerns about the subject:**

The following concern just the formatting/presentation:

\* Align pt 3 of numerical calculations

\* In "Numerical calculations" and "Algebra", terms "power" and "indices" are used interchangeably. We can use either one of the terms or else both consistently e.g. "I can use and interpret fractional indices (powers)".

\* Algebra pt 3 Add ", " between "speed" and "distance"

\* Euclidian Gemotery N8: Add space between "construct" and "the"

\* Euclidian Geomtery N11: "locus of points" rather than "locus of a point"

\* GENERAL formatting – Power notation (ex Algebra pt 3) should be fixed

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

\* Algebra pt 3: Can we remove  $\pm 1/2$   $\pm 1/3$  and  $-3$ , to leave it as is the case right now in SEC syllabus?

\* Measures pt2: This point is repeated in Level 10. We can have it in level 9 only.

\* Euclidian Geometry pts 2-4: I think this outcome is difficult to assess. Would it be appropriate to remove them? Or else change them to "I can prove...". Also, if we leave them as they are, is there one proof for each of the points 2-4, or are there others? If so we can change that to "a proof" instead of "the proof".

\* Euclidian Geometry N4: Shall we specify which circle theorems?

\* Euclidian Geometry N10 & 11: Can these two points be combined? Also, shall we specify which loci are to be included?

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

\* Pt 1 in Algebra is included in pt 1 in "numerical calculations"? If the one in Algebra is to include algebraic terms, I think we should specify this. Also, shall we include negative fractional indices in Algebra like in Numerical Calculations?

\* Measures pt 5: Shall we add angles of elevation/depression?

\* Euclidian Geometry N5: Better to separate congruent and similar triangles in two separate points to avoid misunderstandings

\* Transformations N1: To add integral values for positive scale factors

\* Transformations N2: To add fractional values for negative scale factors

\* Transformations N3: Better to rephrase "..... by insepction AND by construction" to avoid misunderstandings

\* Statistics N4: Histograms are usually used with frequency tables for GROUPED data, since they represent continuous data. I would replace "ungrouped" with "grouped". Also we can rephrase the statement as "I can construct and interpret histograms with equal intervals from a frequency table consisting of grouped data."

#295

teacher

None

primary

state\_school

**General comments or concerns about the subject:**

Year 3 teachers and year 4 teachers should have separate learning outcomes.

Also, Maths is too vast and there are too many different methods.

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

Many of the Mathematics Learning outcomes are not part of the Year 3 syllabus:

The Number System - Outcomes 1, 9 and 8 - (Year 3 children cover numbers up to 200. In my school year 3 teachers cover numbers up to 1000 but it's not in the syllabus).

Numerical Calculations - Outcomes 3,9, 12, 15, 22, 23, 24, 26, 30, 31

Shape, Space and measures -Outcomes 1, 3, 4, 5, 9, 12

Year 3 teachers

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

#298

teacher mathematics secondary church\_school

**General comments or concerns about the subject:**

1. Some of the topics which are currently done in O Level(L9) have moved to level 10. Will L10 start to be included for O Level certification?
2. Some L10 topics are currently in the A Level syllabus. Are these intended to be done with very high achievers? Does this imply that there are going to be special classes for high achievers?
3. Is the O Level syllabus going to be reduced by some topics?

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

#305

teacher mathematics secondary church\_school

**General comments or concerns about the subject:**

Well done a breath of fresh air finally. It's a good indicator for students who want to further studies in Mathematics. Shouldn't we also introduce Matrices?

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

Matrices they are very relevant to further studies and applicable to real life situations.

#313

teacher None primary state\_school

**General comments or concerns about the subject:**

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#331

teacher mathematics secondary independent\_school

General comments or concerns about the subject:

Clear, to the point and directive. Well done. I like the fact that ethics and moral values were included too

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

I would reduce some topics of paper A and put them in level 10 such as cumulative frequency , histograms.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

Focus more on Algebra for paper A students especially if the intend to take Pure Maths at A level

#340

head\_assistant\_head\_of\_school\_deputy\_head mathematics secondary church\_school

General comments or concerns about the subject:

I think that they are very well written. The way the outcomes are presented makes it really easy for the teacher to assess the student in a more summative way. They also help both the student and the parent know the strengths and weakness of the student in all subjects. I also think that they are student friendly.

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#344

teacher None primary state\_school

General comments or concerns about the subject:

Number System

1. - Ten thousand is beyond Year 3 level
  2. - Thousands and Hundreds are beyond Year 3 level.
  5. Counting in two digits numbers not 3 digit numbers. 7. Counting forward in 25 and 50 is done to 100. Numerical Calculations
  3. Rounding to whole numbers is done to the nearest ten, not to hundreds and thousands
  4. Adding of a number to a number is done to whole numbers up to 100.
  10. All pairs of 100 in multiples of 10 only are done.
  12. and 13, 18 - Not in year 3 syllabus
  - 23 and 24 - In year 3 doubling and halving of whole numbers is done up to 100
  - 29 till 31 - Beyond Year 3 syllabus
- Shape Space and Measure
1. - Is done in Year 4 level.
  4. - Beyond year 3 level
  5. - Is done not on squared paper.

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#349

None

General comments or concerns about the subject:

There still seems to be a leap in the learning process from the primary to the middle levels. The learning objectives covered so far in the syllabus set seem to have been re-arranged, with specific ones being mentioned too late in the learning process of the students. Not all computer programs are available in schools. Which material is obligatory for all and which is only for those who sit for a Paper A? How is level 10 incorporated in the syllabus? Will there be lessons for high achievers only set in a time-table? What do the symbols used mean - why is there no legend for them in order to know what they mean? In conclusion, there does not seem to be a big difference between what is being covered now and what is being proposed.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

#360

teacher mathematics secondary church\_school

*General comments or concerns about the subject:*

NA

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

No

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

Quote.

Subject Focus: Number - The Number System

1. I understand and use prime factorization to work out the square root of large numbers and to work out the LCM and HCF.  
Unquote.

In this LO I would rather include the use of surds (it helps students simplifying square root of large numbers) rather than working them out using prime factorization. I would keep the prime factorization use to LCM and HCF.

#361

head\_of\_department mathematics secondary state\_school

*General comments or concerns about the subject:*

General/ Presentation aspects

\*Number system N1: I would rephrase it as "I can prime factorise a number and use prime factorisation in problems". N2: I would rephrase it as "I can express, calculate and use the equivalent value of a number to the power of another number" or else explain further.

\* Num Calc: N1: Rephrase "I can use the rules for multiplying and dividing numbers with integer powers and same base (positive, negative and zero indices); rule for raising a power to a further power e.g. ...." Fix presentation of power notation.

\*Num Calc N12: This point should precede point N8

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

\*Numerical system N4: I would add "... and small numbers" N9&10: I would add "...with and without the use of calculator"

\*Num Calc 12: I would add an extra point afterwards "I can work out the repayable amount of a loan after a given number of repayments"

\*Num Calc 13: I would include "inverse proportion" here rather than in Algebra

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

Num Calc:N11: Can we explain this further? Is this similar to "appreciation" and "compound interest" in N8?

#362

head\_of\_department mathematics secondary state\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

\*Measures N12: Rephrase as “I can work out the surface area of a prism and use the formula to work out its volume. I can derive and use the formula for the surface area and volume of a cylinder.

\* Measures N19: This is a good point. On the other hand, is the Google Earth part completely technical without involving Maths to find actual distances? Also how shall we assess this?

\*Euclidian N2: I would remove this

\*Euclidian N8: Does this involve mathematical skills or is it only about the skill of using the software?

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

\*Measures N2: What type of diagrams are we referring to?

\*Measures N6: Rephrase “I can deduce the size of each interior angle of a regular polygon”

\*Measures N9: Which solids are we referring to? Also replace “area/volume” with “area and volume”. Also, first we should state that students can use the formulae to find the volume and area of solids and then to rearrange them to find radius etc.

\*Euclidian N5: Specify which circle theorems

#363

head\_of\_department

mathematics

secondary

state\_school

**General comments or concerns about the subject:**

General/ Presentation aspects

\*Statistics N2,4: I would replace “grouped freq table” with “frequency table containing grouped data”

\*Statistics N3: Here I think it makes more sense if the data is ungrouped. So I would add “consisting of ungrouped data” after the word “table”

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

\*Statistics N4: Remove “calculate” since you can only estimate the mean here

\*Statistics N4: I have checked how to work out or estimate the range from a freq table where the data is grouped. None of these books seem to tackle this. I would remove this since it is not clear which values to consider to work it out.

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

\*Statistics N1: I would add also continuous data (besides discrete)

#365

teacher

None

secondary

state\_school

**General comments or concerns about the subject:**

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

In lvl 5: I know how to convert between analogue and digital clock

I know how to convert between 12 hr and 24 hr clock.

#367

teacher

None

primary

state\_school

**General comments or concerns about the subject:**

Jekk, kif qed jgħidu l-Abacus se jinbidel is-sena d-dieħla, nixtieq li jekk se jidħol xi ktieb ġdid dan jidħol gradwalment sena sena. Għal dawk it-tfal li huma mdorrijin bis-sistema tal-Abacus, naħseb li jkun aħjar li jkomplu bih biex ma jittfixklux ma' metodi differenti.

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**



teacher None primary state\_school

**General comments or concerns about the subject:**

We would like to have separated learning outcomes for year 3 and year 4. Most of the proposed learning outcomes are too difficult for a 6/7 year old child.

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

In year 3 the pupils will still be struggling to learn up to 100, let alone up to 10000. Thus calculations beyond 100 are too difficult. Even doubling beyond 100 is difficult.

I would remove calculations Nos. 12, 15 (table of 8), 18, 29, 30, 31, 32.

We do not use protractors. They are still young for the concept. We only look at right angles in real life.

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

Counting up to 1000 in year 3.

Regarding calculations, I think it is high time we reintroduce column addition and subtraction. There are too many methods to be taught and we are confusing our young ones. For difficult calculations we use the number grid. If we introduce the column system, the pupils will no longer need the number-grid.

teacher None primary state\_school

**General comments or concerns about the subject:**

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

learning\_support\_assistant None primary state\_school

**General comments or concerns about the subject:**

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

learning\_support\_assistant mathematics primary state\_school

**General comments or concerns about the subject:**

IDEALLY TO BE INTRODUCED IN THE NEXT SCHOLASTIC YEAR 2016

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

teacher None primary state\_school

*General comments or concerns about the subject:*

The learning outcomes are clear and are a good guidelines for teaching and assessment. However, I have been using the Abacus textbooks for these last ten years, and I came to the conclusion that these textbooks focus mainly on different methods regarding the number system. I am not against exposing children to different methods, but at the age of eight, children stick to only one method, the one they comprehend most. In my opinion, this system has hindered the reasoning of everyday problems, due to time restrictions.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

At level 5, children still struggle to comprehend the relationship between the analogue and the digital time, concerning the "TO" concept. I would leave this learning outcome for level 6.

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

I agree with the presented ones.

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#418

teacher None primary state\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#428

head\_assistant\_head\_of\_school\_deputy\_head mathematics secondary church\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#431

teacher mathematics secondary state\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#442

teacher mathematics secondary state\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

I have particular concerns on the following learning outcomes since they are very ambiguous in the sense that I can see no value in them:

- I remember the first ten square numbers [The Number System LO12] and I can recite all multiplication/division facts up to  $10 \times 10$  [Number Calculations LO11]. Can we consider these as a learning outcome? Learning outcomes are statements that describe significant and essential learning/skill that learners have achieved, and can reliably demonstrate at the end of a lesson, course or program. In other words, learning outcomes identify what the learner will know and be able to do by the end of a lesson, course or program.

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

#443

teacher mathematics secondary state\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

- I can use trial and improvement methods involving a calculator to find approximate solutions for which there is not a simple method [Level 10 – Fundamentals of Algebra LO6]. Do we think that a gifted student is the only one who can solve an equation using trial and improvement methods? Do we think that it is more difficult than solve equations using factorisation, completing the square or the quadratic formula? I think that this learning outcome should be relegated to Level 8.

#444

teacher mathematics secondary state\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

Some learning outcomes at Level 10 do not have any connection with the other levels. I believe that gifted students should be given the opportunity to do challenging work, which is in a way related to what they were doing. I believe that the following learning outcomes should be eliminated:

- o I can find the derivative of  $y = ax^n$  [Fundamentals of Algebra LO10].
- o I can understand their [trigonometric function's] use in solving simple trigonometric equations in conjunction with the CAST rule [Fundamentals of Algebra LO13].
- o I can work with vectors in 2D using the base unit vectors  $i$  and  $j$  [Measures LO4].
- o I understand that standard deviation is a measure that is used to quantify the amount of variation of a set of data and can work out situations related to the standard deviation [Statistics LO1].

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

I would include matrices to extend with transformations and simultaneous equations.

#445

teacher mathematics primary

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

#447

teacher mathematics secondary church\_school

**General comments or concerns about the subject:**

Its a good initiative as I believe in giving detailed feedback to students, rather than just a mark!

However my query is about 'How' it will be actually implemented as a good amount of students wont be able to understand what they know - or rather self assess themselves in such detail. I am stating so as around 30% of the students cant even remember the name of a topic we did last month, let alone its content & what they learnt! We have Form 4 students who still don't know the area of a Triangle.

We also would need some guidelines as how to implement such a system. Ideally we would need a standard way to guide students as how to asses themselves. Perhaps all such points can be done in a form of a class exercise.

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

#448

teacher mathematics secondary state\_school

**General comments or concerns about the subject:**

Finally some fresh ideas . Well written. I like the fact that some moral values were added.

I have some queries regarding Books and assessment.. Is the current system going to remain? WITH Paper A and Paper B? Are we going to be provided with new books? Thanks and well done

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

I think it is a big long. Students should have more time for understanding and for quality learning.

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

NO

#449

teacher mathematics secondary independent\_school

**General comments or concerns about the subject:**

Well written. Clear and student focused

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

#460

teacher None primary state\_school

**General comments or concerns about the subject:**

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

THESE OUTCOMES ARE BEYOND THE AVERAGE YEAR 3 CHILD:

I can round whole numbers to the nearest ten, hundred or thousand.

I can add 1, 10, 100 or 1,000 to any whole number.

I can use the decimal notation to express measures of length, mass and capacity & volume.

I can count forward in steps of 25 and 50 to 500.

I can derive all pairs of multiples of 50 with a total of 1000.

I can understand that 0.5 represents a half.

I can derive all pairs of multiples of 100 with a total of 1000.

I can halve even numbers up to 500.

I can recognise mixed numbers which include a whole number and a fraction.

I can recognise simple equivalent fractions.

I can use equivalent fractions to discuss issues of equality e.g. gender.

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

#469

teacher None secondary private\_school

**General comments or concerns about the subject:**

Il fatt lu maqsumin bil livelli taghmel hafna sens fejn kull student jista jilhaq il livell adattat ghalih

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

Nahseb kieku nnaqsu xi ftit halli fil klassi jkollna sktar cans ghat taghlim , ghal kreattivita u ghall kwalita ahjar ta taghlim

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

Le. Il livell 10 ha naghlmuh ukoll jew dak ghall min verament juxtieq jiehdu A level? Idea tajba hafna ghall min ghandu mhabba lejn is suggett. Ghandna bzonn ta kotba imma aktar addattati

#472

teacher None primary

**General comments or concerns about the subject:**

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

#486

teacher mathematics secondary church\_school

**General comments or concerns about the subject:**

**Are there any Learning Outcomes you (respondants) would take out? Specify which and why.**

With reference to Algebra - Fundamentals of Algebra pt. 18: "I can solve quadratic equations by factorising and by using the formula", the part "using the formula" can be included with level 9, so that students who manage to solve equations by factorising but do not master the formula can still reach level 8.

**Are there any Learning Outcomes you (respondants) would include? Specify which and why.**

The following points which are referred to in level 9 can be included with level 8 as I think they can be mastered at an earlier level:

Number - Numerical Calculations pt 4 "I can use ideas of direct and inverse proportion ... real life examples".

Algebra - Fundamentals of Algebra pt 11 "I can interpret and understand rates of change ... non linear graphs".

Shape, Space and Measure - Measurements pt 1 "I can calculate ... irregular polygons" and pt 2 "I can calculate ... segments of a circle".

Shape, Space and Measure - Euclidean Geometry pt 1 "I can understand ... mathematical proof", pt 2 "I can understand ... sum of a triangle", pt 3 "I can understand ... a quadrilateral" and pt 6 "I can derive ... and trapezium".

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#501

teacher None secondary church\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#502

teacher mathematics secondary church\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#503

teacher mathematics secondary church\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#504

teacher mathematics secondary church\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#505

teacher mathematics secondary church\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#506

teacher mathematics secondary

General comments or concerns about the subject:

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#519

teacher mathematics secondary church\_school

General comments or concerns about the subject:

Student centred and well written. Maybe a bit too long. Well done

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#531

head\_of\_department mathematics secondary state\_school

General comments or concerns about the subject:

Learning Outcomes are too prescriptive and put much emphasis on content rather than the process.

At an early age, students need to experience, explore, observe, manipulate and develop their capabilities to describe the world around them (in mathematical terms). Thus I would put an emphasis on relating mathematics to students' experiences of it.

For example, related to the number system, I would also include:

I can create number bonds for 5, 10 and 20. (Students use uni-fix cubes to show number patterns that add up to 5, 10, 20 etc.) or 'I can make 5, 10 and 20 using manipulatives'.

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Number - Numeric Calculations Level 5 No.15: I know my 2, 3, 4, 5, 8 and 10 tables by heart.

I quote research from neuroscience (brain research) which has repeatedly shown the damaging effects of learning by heart. As we all know some students are really slow at memorizing facts and especially the times tables, but still have exceptional mathematical abilities. This may lead them to believe that they will not be successful with maths and end up turning away from the subject (something that we are currently experiencing). Brain research (using MRI scans) has shown that those who memorize more easily are not the high-achieving students and do not possess what researchers call "mathematical ability".

Professor Jo Boaler states that: "the more we emphasize memorization to students the less willing they become to think about numbers and their relations and to use and develop number sense".

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

I would include:

I can create and describe number patterns.

I can make and describe 5, 10, 20 and 50 using manipulatives.

#536

teacher mathematics secondary state\_school

General comments or concerns about the subject:

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#538

teacher mathematics primary church\_school

**General comments or concerns about the subject:**

The content for level 6 is very much adequate for the students at the age of 9 to 10 years. It is quite a basic content for progression at secondary level. However, a misguided understanding of a topic might have effect in the students' attainments of the subject at secondary level.

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#539

teacher mathematics secondary church\_school

**General comments or concerns about the subject:**

There seems to be a good transition between primary and secondary years with emphasis on revision to check if the basics are well known. Thus there should be a good communication and coherent learning styles between teachers in the primary and secondary sector.

These learning objectives might lack a bit of detail regarding activities and experiments such as probability.

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#540

learning\_support\_assistant mathematics primary church\_school

**General comments or concerns about the subject:**

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

#541

teacher mathematics secondary church\_school

**General comments or concerns about the subject:**

I think that learning outcomes are clear but some need to be more specific, like the ones dealing with similar and congruent triangles. The above outcomes can be easily used as a checklist.

Are there any Learning Outcomes you (respondants) would take out? Specify which and why.

Are there any Learning Outcomes you (respondants) would include? Specify which and why.

1. Use real statistics to calculate mean, median mode or range to help students see the relevance and use this chapter.
2. Be able to identify the difference between dependent and independent events.
3. I can write a sequence (and nth term) given a pattern (diagram).

#542



teacher mathematics secondary church\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

Subject Focus: Number - The Number System

1. I understand and use prime factorization to work out the square root of large numbers and to work out the LCM and HCF. unquote.

In this LO I would rather include the use of surds (it helps students simplifying square root of large numbers) rather than working them out using prime factorization. I would keep the prime factorization use to LCM and HCF.

#543

teacher mathematics church\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

#567

university\_lecturer mathematics

*General comments or concerns about the subject:*

Dear All, it is not sufficient that one can produce a computational answer, for it is not the answer that is of the greatest importance to elementary school children's mathematical development. Rather it is their ability to apprehend mathematics as a conceptual system. Teaching multiplication as repeated addition is reinforcing the generative metonymic role of counting number in the real number system. Try to examine the actual conditions under which not only the concept of number but the action of multiplication may arise. By Henri Lebesgue, multiplication is a change in the system of units in measurement. Multiplication then is not reduced to a form of addition, but in its conceptual origin is a different mathematical action altogether. Please read his book "La Mesure des Grandeurs". The consequences of failure to master measurement systems can be anything but trivial. Sincerely yours, VG Gutev (Professor of Mathematics, University of Malta)

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

#571

university\_lecturer mathematics

*General comments or concerns about the subject:*

My first impression is that this new way of presenting the syllabus is meant to make it clearer and more readable. But it reads like a faux litany; the board should test it out on a child first. It starts very detailed but by the time they reached Level 10, there are a bare minimum of items. What is one supposed to make out of the single item of Euclidean Geometry? Which theorems and which proofs? Is Pythagoras' theorem included or not, and is it the classical proof, or one of the newer ones? Or, in Algebra, point 7, what are "slightly harder than just linear", is it  $x^{1.1}$ ? Is point 10 really introducing derivatives at this level? In Level 5, what is meant by gender issues in point 30 of Number Calculations? The adopted approach may work for Primary syllabi, but it exceeds its limit for Level 10.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

teacher mathematics secondary state\_school

**General comments or concerns about the subject:**

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

other mathematics secondary retired academic (Emeritus Prof of Maths Education, Open University UK)

**General comments or concerns about the subject:**

Multiplication is not repeated addition!!!!

Repeated addition is a form of multiplication. For schools, Multiplication is scaling, whether discrete (by integers) or continuous (by real numbers).

What does it mean to 'understand'? How can 'I' ( a learner) know whether I understand or not?

Understanding is certainly not the same as doing things.

Assessment could include 'learner construction tasks': e.g. I can construct several, even many numbers between two rational numbers.

NB: fractions are operators or objects; they are always fractions of, as are percentages. Rational numbers are the result of applying fractions to a unit, say on the number line, where it is observed that many different fractions yield the same place on the number line and so are considered to be equivalent as operators.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

university\_lecturer None

**General comments or concerns about the subject:**

Point\_1) These outcomes vaguely state what can be done, without referring to which underlying skills are required. This provides room for inappropriate teaching methods.

GENERAL COMMENTS:

Point\_2) Curricula should be designed to ensure that every student is challenged to the best of HIS/HER ability, not the average national ability.

Point\_3) National "Minimum" Curricula should not be construed as national "Maximum" curricula. They must not be used as a means of limiting promising students to the lowest common denominator. Students demonstrating a flair for mathematics should be exposed to additional subject matter in preparation for continued education in that field.

Point\_4) At university level, (eg: engineering) we find that a student's ability to do well in disciplines requiring an innovative attitude, depends on his/her attitude to towards learning beyond the confines of the curriculum. We find that this is very poorly addressed. Only a handful turn up with this key ability.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

teacher mathematics secondary state\_school

*General comments or concerns about the subject:*

We cannot target that students learn to make use of technology when resources are limited. Use of tablets and computers can be a drawback for students who do not have updated technological gadgets at home. Our classroom resources are not reliable and even if they are updated, they are likely to become unreliable again after a few years so it cannot be a criteria. It should be a suggestion only.

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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#660

teacher mathematics secondary state\_school

*General comments or concerns about the subject:*

*Are there any Learning Outcomes you (respondants) would take out? Specify which and why.*

*Are there any Learning Outcomes you (respondants) would include? Specify which and why.*

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